VOLUME 18 2023

EJMH

European Journal of Mental Health

Well-Being in Social and Ecological Context

UNIVERSITAS BUDAPESTINENSIS · DE SEMMELWEIS NOMINATA · 1769

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INSTITUTE OF MENTAL HEALTH
Faculty of Health and Public Administration Semmelweis University, Budapest

European Journal of Mental Health

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VOLUME 18 | 2023

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Abstracted/indexed in APA PsycInfo, Directory of Open Access Journals (DOAJ), EBSCO, ERIH Plus, Google Scholar, Index Copernicus, Matarka, Researchgate, SJR Journal Ranking, Scopus, and Web of Science Emerging Sources Citation Index (ESCI)

ISSN 1788-7119 (online)
Published by Semmelweis University Institute of Mental Health, Budapest

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0001

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SYSTEMATIC REVIEW

Factor Structure of the Shortened Six-Item Version of the de Jong Gierveld Loneliness Scale (DJGLS-6)

A Systematic Review and Testing Factor Models in a Nationally Representative Sample

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History
Received: 11 January 2021
Accepted: 16 August 2022
Published: 25 January 2023

Citation
L., Kenny, P., Hyland, M., Cloitre, & M., Shevlin (2023). Factor structure of the shortened six-item version of the de Jong Gierveld Loneliness Scale (DJGLS-6). A systematic review and testing factor models in a nationally representative sample. *European Journal of Mental Health, 18,* e0001, 1–12. https://doi.org/10.5708/EJMH.18.2023.0001

Introduction: Loneliness is linked to negative physical and mental health outcomes. Therefore, it is important to employ reliable and valid screening measures for early detection and treatment. A widely used scale for assessing loneliness is the shortened six-item Jong Gierveld Loneliness Scale (DJGLS-6).
Aims: To review and evaluate the factor structure of the DJGLS-6.
Methods: Study 1 was a systematic review. To examine the factor structure of the DJGLS-6, peer-reviewed studies were reviewed in accordance with PRISMA guidelines. Study 2 tested the factor analytic models found in Study 1. Confirmatory factor analysis (CFA) was performed using data from a nationally representative sample of adults to assess the latent structure of the six-item scale.
Results: In Study 1, findings from the two papers reviewed suggested that the scale measures two correlated dimensions: social and emotional loneliness. This finding was consistent with the results of Study 2. However, the fit statistics for the one and two-factor CFA models were not acceptable. Modification indices indicated that adding a cross-factor loading to allow item 2 ("I miss having people around") of the social loneliness factor, to load on both the emotional and social factor, to load on both the emotional and social factors would significantly improve the fit of the model.
Conclusions: The analysis failed to support previous findings concerning the robustness of the subscales. We recommend performing future evaluations of the scale and for the authors to consider changing item 2 accordingly.

Keywords: loneliness; systematic review; factor structure; confirmatory factor analysis; de Jong Gierveld scale for loneliness

ISSN 1788-7119 (online)

Introduction

Loneliness pertains to negative affectivity stemming from the subjective feeling that the quantity and quality of one's relationships are not satisfying one's social needs (Hawkley & Cacioppo, 2010). Research has long demonstrated that loneliness constitutes a major contributing factor to developing both negative mental and physical health issues, including cognitive decline (Boss et al, 2015), hypertension (Hawkley et al., 2010), and coronary heart disease (Thurston & Kubzansky, 2009). Also, a strong association exists between loneliness and poor work performance (Amarat et al., 2019), depression (Liu, Gou, & Zuo, 2016), anxiety (Danneel et al., 2019), and suicide (Chang et al., 2017; Goldsmith et al., 2002). Due to the negative impact that loneliness may have on an individual's wellbeing, employing reliable and valid screening measures remain essential for early detection and treatment.

In recent decades, several instruments to assess loneliness have been developed for various purposes, including research and service use (e.g., University of California, Los Angeles Loneliness Scale; UCLA). The de Jong Gierveld 11-item loneliness scale (DJGLS-11: de Jong Gierveld & Kamphuis, 1985; de Jong Gierveld & Van Tilburg, 1999) is one of the most commonly used measures for assessing loneliness. The 11 items were formed based on the theory that social loneliness and emotional loneliness are distinct yet related concepts, as proposed by Weiss (1973). Weiss argued that social loneliness develops through lack of a broader group of contacts (e.g., work colleagues), while emotional loneliness develops through failure to form a close emotional attachment (e.g., a spouse). Researchers can employ the emotional subscale (six items), social subscale (five items) or the overall loneliness scale depending on their research question. To date, few studies exist that evaluate the DJGLS-11. Nevertheless, evaluations of the scale, performed by the developers, have reported reliability coefficients typically ranging from .80 to .90, which suggests good internal consistency. This has been found mostly among samples of older-aged adults with whom it has been used most often (de Jong Gierveld & Van Tilburg, 1999).

In order to be useful in large-scale epidemiological surveys where short measures are preferable, a reduced six-item version was constructed (de Jong Gierveld & Van Tilburg, 2006). The developers produced the scale with the aim of maintaining the original threefold application (the total loneliness scale and the social and emotional subscales). For the construction of the scale, they used data from the Dutch Living Arrangements and Social Networks of Older Adults Survey (NESTOR-LSN: see Knipscheer et al., 1995). From the original set of six items for the emotional loneliness subscale, three items with the highest factor loadings were selected. Similarly, from the five items representing social loneliness, the three items with the highest factor loadings were selected. The six item scale includes three positively worded items; "There are plenty of people that I can lean on in case of trouble", "There are many people that I can count on completely" and "There are enough people that I feel close to", and three negatively worded items; "I experience a general sense of emptiness", "I miss having people around" and "Often, I feel rejected". A three-point Likert scale was used for each item as suggested by the scale authors; "no," "more or less" and "yes". CFA was then employed to verify the specification of the two latent factors. They reported that the shortened scale produced both valid and reliable scores for overall loneliness and the two subscales. They also reported that the scale works suitably for use in large surveys and has been validated in Chinese (Leung et al., 2008) German, Russian, Bulgarian, Georgian, Japanese, French (all countries included in de Jong Gierveld & Van Tilburg, 2010) and Malaysian (Jaafar et al., 2020). However, although the shortened scale has gained more popularity in recent times, when compared to the original 11-item scale, research concerning the scale's factor structure is concerningly limited. Therefore, a thorough review of the DJGLS-6 structure remains warranted in order to determine that it is reliable, valid, and the factor structure is consistent with the original scale.

The purpose of this present study is to review and evaluate the psychometric properties of the latent structure of the DJGLS-6. First, a systematic review of the available literature regarding the DJGLS-6's factor structure will be conducted (Study 1). The review will follow the PRISMA 2009 protocol with the aim of providing evidence on whether the abbreviated form of the scale measures the same two dimensions of emotional loneliness and social loneliness as the 11-item scale. Second, based on the findings from the systematic review, CFA will be performed using a nationally representative sample aged 18-70 years old from the United States (US) to test the scale's factor structure (Study 2).

STUDY 1: A SYSTEMATIC REVIEW

Method

Search Terms

Table 1. shows the search terms used for variations in (1) the name of the author, (2) the term "loneliness", (3) the description of the questionnaire, (4) the abbreviated version of the questionnaire, and (5) the use of "factor" analysis.

Table 1. Search Terms Used for the Systematic Review

Keyword:	de Jong Gierveld	AND Loneliness	AND Scale	AND Shortened	AND Factors
	de Jong	Lone*	Scale	Short*	Factor
	or dejong		*or* Measur*	*or* 6 item	*or* Structure
	or DJGLS		*or* Questionnaire	*or* 6-item	*or* Construct
	and Gierveld		*or* Test		*or* Propert*
			or Instrument		
			or Assessment		
			or Tool		

Variations in spelling were applied during the search process to ensure the inclusion of all relevant reports; * To capture various suffixes that may follow the terms.

Databases

Eight of the most appropriate databases were identified using both the advice from an academic librarian and USearch, in order to determine the approximate number of studies relevant to the review question and the most appropriate databases to use for the main search. The databases selected were (1) Scopus; (2) Medline; (3) JSTOR; (4) PubMed; (5) EMBASE; (6) Web of Science; (7) PsycINFO; and (8) Science Direct. Additional papers were gathered via a snowball search technique; i.e., trawling the reference lists of relevant articles.

Limiters were applied in the databases that allowed for the inclusion of every filter. These were whether a publication was a review, a meta-analysis, or a double-published paper; should the article be published in a language other than English; and if any article was published prior to the year 2006. The nine databases were searched within a three-week period in August 2018. Criteria are presented in Table 2.

No exclusion criteria relating to the participants were used. Both clinical and non-clinical participants of any age, sex, occupation, or country who completed the de Jong questionnaire were considered in this review. Studies that meet the presented inclusion criteria were included regardless of the setting or context. The second stage involved reviewing the resulting article's abstracts and methods for studies that evaluated the shortened DJGLS-6.

According to Taylor and colleagues (2007), sensitivity allows researchers to identify the most articles available – relevant to one's research question – as possible. Table 3 expresses precision as the number of relevant studies found in one database shown as a percentage of the total number of studies identified from that same database.

Table 2. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
1. Publication is a peer-reviewed empirical article	1. Publication is a review, meta-analysis, or double published papers
2. Publication is a dissertation, book or chapter	2. Publication in a language other than stated in the inclusion criteria
3. Publication is an intervention	
4. Qualitative and quantitative studies	
5. Full studies and abstracts published in English	
6. Publication in the time span from when the shortened scale was first published to this current year 2006-2018	
7. Studies that investigate the factor structure	
8. Studies that investigate the psychometrics of the scale	

Table 3. Results of Database Searches

Database	Total Retrieved	Relevant Articles	Sensitivity (%)	Precision (%)
JSTOR	92	23	7	25
Pubmed	2	0	0	0
Embase	6	10	3	60
Medline	4	0	0	0
Psych Info	34	3	1	9
World of Science	5	0	0	0
Science Direct	129	4	1	3
Scopus	49	11	3	22

Note: For sensitivity rating, percentages are calculated on the basis of total articles which, excluding duplicates, came to 51.

The results found that both JSTOR and SCOPUS stood low in sensitivity; however, they stood both moderately good in terms of precision. A very high level of precision was found for EMBASE, alongside a very low degree of sensitivity. Both Psych Info and Science Direct scored low in precision and sensitivity, whilst Pubmed, Medline, and World of Science databases produced a no score for both sensitivity and precision.

Results

Two papers that examined the factor structure of the DJGLS-6 were identified. Using data from seven European and Asian countries (Germany, Netherlands, France, Bulgaria, Russia, Georgia, and Japan), the first paper (de Jong Gierveld & Van Tilburg, 2010) tested the shortened DJGLS-6's criterion and construct validity. The aim of the second paper (de Jong Gierveld & Van Tilburg, 2006) was to build and test the DJGLS-6. It did so using three separate, but related, studies: The aim of Study 1 was to build the shorter scale from the original 11-item version, and the aim of Study 2 and 3 was to test the shortened scale's psychometric properties. Both studies' participants, models stated, criterion variables used, reliability scores, and models compared (if any) are as follows:

Paper 1: de Jong Gierveld and Van Tilburg (2010)

Participants

This study was conducted across seven countries and used probability sampling to capture non-institutionalized members of the adult population (N = 69,749) with an age range of 18 to 79 years. The sample sizes in the study ranged from 8,158 (Netherlands) to 12,828 (Bulgaria) The authors chose to study both older adults (60–79 years) and younger adults (18–59 years) separately and compare the groups; as to date, most research in this area has suggested that loneliness is an older-adult-specific issue; however, Dykstra (2009), argued that support for this assumption is quite limited.

Models

The models specified two correlated dimensions and were tested using CFA. For this study, Weighted Least Squares (WLS) estimation was used and tetrachoric correlations were computed as items were dichotomously scored. The factor loadings were tested for invariance for the seven countries included prior to the estimates specific to each country being computed. To assess the model fit, the authors used the Standardized Root Mean Square Residual (< .08) and Comparative Fit Index (>95). Results for the older aged adults reported a correlation between the two latent factors ranging from moderate (r = .36) to high (r = .68). Similarly, results ranged from r = .32 to r =70 for the younger aged group (18-59 years). An acceptable model fit was found for all countries investigated, both for the younger and older-aged participants. These results suggest that both the social and emotional subscales are two solid constructs of the loneliness concept. The test for factor loadings invariance failed for both groups, which suggests that across the countries, correlations between items are different. For example, the factor loadings in France were satisfactory (.70 – .80) for the older aged group whilst the correlation between the factors stood relatively high (r = .64), indicating that the items of the two loneliness dimensions share a meaning. However, the correlation between the factors in Bulgaria came

out low (r = .36) while the factor loadings were quite high (.78 – .98), suggesting a sharper distinction between social and emotional items. That said, the results from all country-specific analyses supported the bi-dimensional structure.

Criterion variables

The authors selected four predictors based on past research to test the convergent validity of loneliness (age and gender, partner living with them, subjective health, current financial situation, and the number of children). They applied LISREL multiple group model testing, to test the predictors for invariance. The regression coefficients for the social and emotional loneliness predictors were estimated as equal for all countries. Therefore, outcomes are similar for those living in different countries but with similar characteristics in regard to both social and emotional loneliness. Convergent validity in both the younger and older-aged adults was supported by these results and notably adults are more vulnerable to experiencing both social and emotional loneliness if they report poor health. The relationship between financial difficulties and the two loneliness subtypes also proved to be significant for each country.

Reliability

Reliability coefficients for emotional loneliness, as estimated using Cronbach's alpha, ranged from α = .81 (France) to α = .91 (Bulgaria), while for social loneliness, the coefficients ranged from α = .85 (France) to α = .95 (Bulgaria). For the younger adults, group coefficients ranged from α = .82 (France) to α = .95 (Netherlands) for emotional loneliness, while social loneliness ranged from α = .85 (France) to α = .94 (Bulgaria). These results demonstrate the good psychometric characteristics of the two loneliness subscales; however, this study did not test the reliability of the overall six-item loneliness scale. Overall test outcomes suggested reliable and valid scores for both emotional and social loneliness for each of the countries investigated in this study.

Paper 2: de Jong Gierveld and Van Tilburg (2006)

Participants

For Paper 2, the first study obtained data from the 'Dutch Living Arrangements and Social Networks of Older Adults Survey' (Nestor – LSN). Participants were chosen from the 'Netherlands Kinship Panel Study' (NKPS; Dykstra & de Jong Gierveld, 2004) (N = 8,154), aged between 18 and 79 for Study 2. For Study 3, the researchers used data from a mail survey conducted by the regional health services in the Netherlands. The respondents ranged in age from 21 to 99 years old (N = 3,260).

Models

Initially, the researchers applied a principal component factor analysis with varimax-rotated factors for the selection process, leading to the shortened version of the scale. From this, two factors emerged containing three items representing the six emotional items and three items representing the five social items. Then, CFA was used to examine the two-factor model. Following this, the maximum likelihood estimation method was used as unrelated error terms and equal variances of error terms were assumed in this analysis. All items from the shortened six-item scale were then assigned to their distinct proposed subscales. An acceptable model fit was found through CFA for the two data sets. These findings suggest both subscales were two dimensions of the overall loneliness concept. Paper 1: Emotional loadings (.49 – .75), Social loadings (.60 – . 67) and factor correlation (r = .43), Paper 2: Emotional loadings (.49 – .75) Social loadings (.60 – .67) and factor correlation (r = .43), Study 3: Emotional loadings (.64 – .74) Social loadings (.64 - .74) and factor correlation of (r = .42).

Criterion variables

In investigating the validity of the DJGLS-6, the authors used numerous variables considered important determinants of loneliness; i.e. absence of a partner and subjective health (VanderWeele et al., 2012). Regarding whether the participant had an intimate partner, our results found that for emotional loneliness, correlations stood much higher (r = .30 - .34) than for social loneliness (r = .03 – .09) supporting previous research (e.g., de Jong Gierveld and Van Tilburg, 2006). Furthermore, when examining the association between subjective health and loneliness in relation to their correlation coefficients, similar patterns were observed for emotional (r = .23 – .24) and social correlations

(*r* = .14 – .16). These findings were notably similar to the original 11-item scale indicating that the shortened six-item scale is a good scale which contains the main features of loneliness similarly to that found in the original scale.

Comparisons

The authors compared the correlations between the original 11-item scale and subscales with the shortened scale and three-item subscales. The correlation stood very high, ranging from *r* = .93 to r = .95 between the shortened and the original 11-item scale in the surveys. Similarly, the correlation was also quite high (*r* = .88) between the original six-item emotional subscale and the shortened three-item emotional scale. The correlation between the original and shortened social loneliness scales ranged very high also, with correlation coefficients of *r* = .93. The correlation coefficients between the three-item subscales and the DJGLS-6 were relatively good, varying between *r* = .77 and r = .87. In addition, regarding the age groups investigated, correlation coefficients for congruent validity did not differentiate.

Reliability

For the total adult population, reliability coefficients for the shortened six-item scale ranged from α = .70 to α= .76, and stood lower for the subscales (α =.67 – .74 emotional loneliness scale, α = .70 – .73 social loneliness).

Discussion

Study 1 aimed to conduct a systematic review on the factor structure of the shortened, six-item scale. Whilst only two full-text publications were found, we would argue here that this is an important finding on its own. Considering the wide use of the scale for there being such few studies authored by the developers which examine the factor structure is concerning and highlights the need for further testing to ensure results produced from using the scale are valid. That said, from the two publications found, the results of alpha coefficients for each study showed quite good reliability with coefficients ranging from α = .70 to α = .76 for the DJGLS-6 total score which is supported by researchers such as Cortina (1993), who suggest that a given level of α > .70, is adequate. The alpha values for the subscales ranged from good α = .67 to excellent α = .95 for the emotional subscale and from α = .70 to α = .95 for the social subscale. As the review included a total of 79,197 adults with ages ranging from 18–99 years from seven different countries. One can therefore suggest that the DJGLS is a sound instrument that produces reliable scores for assessing both emotional and social loneliness for both young and older adults across various cultural settings. Multivariate regression analyses further found that the congruent validity of both subscales was supported.

For de Jong Gierveld and Van Tilburg's (2006) study, the authors first compared the shortened six-item scale and each of the three-item subscales with the original 11-item scale and the subscales. Correlation coefficients between the two overall loneliness scales and the subscales were quite high. CFA found that the three-item emotional scale and the three-item social scale were two unique constructs of the overarching loneliness concept. Using two determinants (subjective health and partner status), the validity of the original scale and subscales and the shortened scale and subscales were compared. Those with intimate partners scored significantly less on loneliness than those without intimate partners. Mirroring results in de Jong and Van Tilburg's (2010) study, the correlations were much weaker for social loneliness than for emotional loneliness. Similar patterns of correlation coefficients were also reported for the association between subjective health and loneliness. Overall, the validity of the shortened scale and subscales stands strikingly similar to the original scales in this respect.

Strenghts and Limitations

This study had a number of strengths. First, the literature review was systematic and rigorous and involved the searching of eight different databases. Second, the selected studies were summarised in detail. The studies examined have several limitations. First, although both studies in this review set out to confirm the specification of the two latent factors, de Jong and Van Tilburg's (2010) tested only one model, the two-factor model. In validating the scale, we recommend that future researchers compare the 2-factor model with the 1-factor model, particularly as the correlations among the factors were all quite high. Moreover, Cronbach's alpha was employed in both studies to estimate the reliability of the total scale and subscales. Future research may estimate the reliability of the DJGLS-6 using alternative composite reliability to retrieve a more accurate estimate. In addition, the minimum reliability scores for both the overall loneliness scale and the social subscale stood at α= .70 and the emotional subscale

was α= .67. Nunnally (1978), however, suggests that reliabilities of α= .70 are only acceptable at the very early stages of research. In contrast with instruments used in applied settings, a reliability of α= .80 may not even be high enough. He argues that where important decisions about the fate of individuals are made based on test scores, reliability should be at least α= .90, preferably α= .95. Employing and interpreting alpha incorrectly can potentially cause a scale or test to be criticised wrongfully for not generating results deemed trustworthy and furthermore, it can cause a scale to be mistakenly discarded. Overall, the number of studies that met the search criteria was small.

STUDY 2: TESTING THE MODELS OF THE DJGLS-6 IN A NATIONALLY REPRESENTATIVE SAMPLE

In Study 1, the results of the review supported both the 1 and 2-factor models. Based on these findings, Study 2 will test these models through CFA, using a large sample of U.S. adults to investigate the structure of the DJGLS-6 further.

Method

Participants

A nationally representative sample of United States adults was randomly recruited via an online research panel using probability-based sampling. Data were collected in March 2017 with the aim of examining the construct validity of Posttraumatic Stress Disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) for the 11th International Classification of Diseases (*ICD-11*) (please see Cloitre et al., 2019). Inclusion criteria required participants to have experienced at least one traumatic incident at some point during their lifetime and were aged between 18 and 70 years when they participated. A total of 1,839 participants qualified from the initial 3,953 screened (eligibility rate = 46.3%). As females and members of racial minority groups (here Hispanic and African American participants) are more likely to be exposed to trauma and be diagnosed with a trauma disorder (McCutchen et al., 2022), these groups were intentionally oversampled (each at a 2:1 ratio). To adjust this, the data were weighted in order to more accurately represent the United States' adult population. The age of respondents ranged from 18 to 70 years old, and all surveys were completed online. Demographic characteristics of the sample are reported in Table 4.

Table 4. Demographic characteristics of the sample

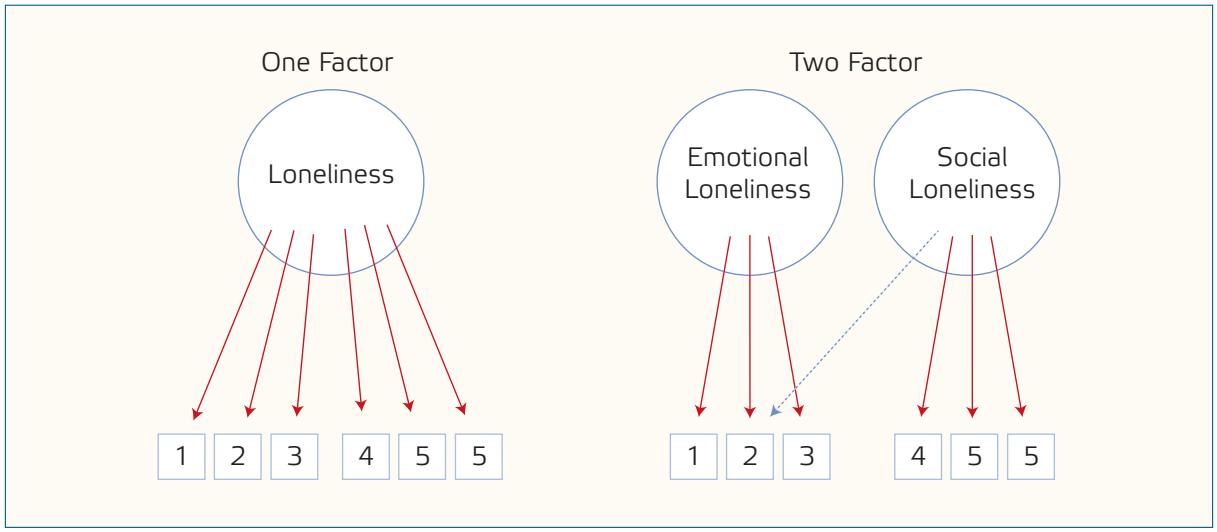
Database	N	%
Gender		
Male	883	48%
Female	956	52%
Relationship Status		
Married	1016	55.3%,
Cohabiting with a partner	149	8.1%
Single	428	23.3%,
Divorced	202	10.9%
Widowed	44	2.4%,
Ethnicity		
White	1173	6.4%
Hispanic	310	16.9%
Black	217	11.8%
Other (including 2+ races)	139	7.6%
Education		
Bachelor's degree or higher	585	31.8%
College	558	30.3%
Finished high school	528	28.7%
Did not finish high school	168	9.1%
Salary		
US$75,000+	891	48.5%
US$35,000-US$74,999	547	29.8%
US$20,000-US$34,999	202	11.0%
US$0-US$19,999	199	10.8%
	Mean	*SD*
Age	44.55	14.89

Note: For sensitivity rating, percentages are calculated on the basis of total articles which, excluding duplicates, came to 51.

Analytical Plan

Using Mplusv7 (Asparouhov & Muthen, 2012), two factor analytic models were tested within a CFA structure. These are shown in Figure 1. The models specified and tested were based on the original three-fold application of the measure proposed by de Jong Gierveld and Kamphuis (1985). A one-factor solution to where the six items of the DJGLS load onto a single latent variable

Figure 1. Diagram of Factor Analytic Models of the Loneliness Items



Note: Dashing factor loading represents the "modified Two Factor" modell.

(Loneliness) was inputted for Model 1. A two-factor model correlation solution was inputted for Model 2 whereby the two latent variables are represented by either Social Loneliness (items: 4, 5 & 6) or Emotional Loneliness (items: 1, 2 & 3).

According to Jackson and colleagues (2009), it is best practice to assess the model fit using numerous fit statistics including the chi-square statistic, the comparative fit index (CFI; Bentler, 1990), the root mean square error of approximation (RMSEA; Steiger, 1990), SRMR and the Tucker–Lewis index (TLI; Tucker & Lewis, 1973). These guidelines were followed for this analysis. In addition, to estimate all models tested, the weighted least squares mean variance adjusted (WLSMV) estimator was employed.

Results

Descriptive statistics at the item level are presented in Table 5. The mean scores were all similar, between 1 (Likert label "No") and 2 (Likert label "more or less").

The fit statistics are reported in Table 6 for all models. Chi-square values were high relative to the degrees of freedom for all models produced, however, although the chi-square was statistically significant, according to Tanaka (1987), the sample size was large and therefore this score should not lead to the models getting rejected. The highest TLI and CFI values were found for the two-factor model, which exceeded the .90 cut-off. The lowest chi-square values and RMSEA were also produced for the two-factor model. Further, the upper RMSEA confidence interval was smaller than the lower confidence interval for the next best-fitting model, which suggests the two-factor model was considered the best model.

However, the RMSEA was too high for the model to be considered acceptable. Based on this, the modification indices were inspected to determine whether there were theoretically defensible model modifications that would significantly improve the model. Modification indices (MI) for each fixed parameter in the model indicate the expected decrease in the chi-square of that parameter was included in the model; a MI greater than 3.84 suggests that including that parameter would significantly improve the model. The MI indicated that adding a cross-factor loading, to let item 2 ("I miss having people around") load on the social factor, as well as the emotional factor, would improve the model. The factor loadings and correlations

Table 5. Descriptive Statistics for the DJGLS-6 Items

Item	Mean	*(SD)*
General sense of emptiness	1.43	.65
Miss having people around	1.56	.67
Often feel rejected	1.39	.63
People to rely on	1.78	.77
Trust many people	1.91	.79
Feel close to people	1.70	.74

Note: For sensitivity rating, percentages are calculated on the basis of total articles which, excluding duplicates, came to 51.

Table 6. Comparison of Alternative Models and Fit Indices

Model	χ^2	df	*P*	*CFI*	*TLI*	*RMSEA (90% CI)*
One Factor	881.447	9	< .001	.943	.905	.231 (.218 – .244)
Two Factor	111.903	8	< .001	.993	.987	.085 (.071 – .099)
Two Factor Modified	53.512	7	< .001	.997	.993	.061 (.046 – .076)

Note: CFI = comparative fit index; TLI = Tucker Lewis index; RMSEA = root mean square error; CI = confidence interval

for the modified model are presented in Table 7. Factor loadings for model 1 and model 2 were all high and statistically significant. However, item 2 for emotional loneliness was considerably lower when compared to item 1 and 3 of emotional loneliness, and for social loneliness, to items 4–6. The reliability of the emotional items stood at (α= .74), for social items at (α= .87), and for the full scale at (α= .81); these were all high.

Table 7. Factor Loadings for the Modified de Jong Gierveld & Van Tilburg's (2006) Model of the DJGLS-6

Model	Factor 1: Emotional	Factor 2: Social
1. General sense of emptiness	.87 (.02)	
2. Miss having people around	.76 (.03)	.22 (.04)
3. Often feel rejected	.89 (.02)	
4. People to rely on		.91 (.01)
5. Trust many people		.92 (.01)
6. Feel close to people		.89 (.01)
Factor 1: Emotional	1.00	
Factor 2: Social	.60 (.02)	1.00

Note: All factor loadings are statistically significant (p < .010).

Discussion

The primary aim of Study 2 was to test alternative factor analytical models of the DJGLS-6. Based on previous research (de Jong Gierveld & Van Tilburg, 2006), two models were specified and analyzed, and the two-factor model was considered the best model. However, not all the items loaded significantly onto their assigned factors. The factor loading for Item 2 ("I miss having people around me") on the emotional loneliness factor was positive, high, and statistically significant. However, it also loaded on the social factor, albeit the loading was modest (.22, $p < .050$). A reason for this could be simply how Item 2 is worded. As presented in Table 5, the three social items were developed to capture an individual's wider social connections (e.g., work colleagues) and the emotional items developed to capture one's feelings towards more intimate relationships (e.g., a spouse). Item 2 is phrased in such a way that it could be reflecting the satisfaction the respondent feels with the number of relationships as opposed to the quality of the relationships. De Jong Gierveld and Van Tilburg (1999) have acknowledged that the scale's homogeneity is quite weak and factors can emerge which possibly reflect both a response bias associated with item wording and the dimensions of emotional and social loneliness.

That said, both the total DJGLS-6 scale scores and subscale scores indicated high levels of internal consistency and for these models; all the factor loadings were both positive and statistically significant. However, the two factors only had a moderate relationship ($r = .60$), as did de Jong Gierveld and Van Tilburg's (2006; Study 2) study ($r = .42 – r = .53$) indicating that these factors have acceptable discriminant validity. Overall, although the modified two-factor solution was found to be the best-fitting model, this result should not be used to reject the use of a single summed DJGLS-6 score. The factors were correlated, albeit modestly, but we suggest using both the overall scale score and the modified subscales for future research.

Strenghts and Limitations

This study had a number of strengths. First, the sample size for the analysis was large and the data were representative of the US general population. Second, the analytic methods were optimal for the ordered-categorical nature of the data. Study 2 also had several limitations. First, the scale encompasses three negatively formulated items (emotional subscale) and three positively formulated items (social subscale) and possesses moderate correlations between factors; therefore, caution should be used when interpreting findings. Second, the RMSEA of the two-factor model was found to be too high for the model to be considered acceptable, and as item 2 loads poorly on both the social and emotional scale, it would be expected that future studies consider such findings and consider changing the item accordingly.

Conclusion, Implications, and Future Directions

The valid and reliable assessment of both emotional and social loneliness is an important tool for predicting how each dimension may uniquely affect mental and physical health issues, and in turn, it may allow researchers and clinicians to identify and assist those who are more vulnerable to experiencing loneliness.

As loneliness has shown to have such adverse effects on both physical and mental health, the need for a reliable and robust measurement to capture this for research and clinical settings is imperative. Growing evidence is now supporting the bi-dimensional nature of loneliness and as such, recent focus has shifted towards tools that acknowledge this distinction. Employing a valid measurement that captures both emotional and social loneliness will not only provide rich and important guidance for future prevention, intervention, and treatment strategies but also can provide additional knowledge and clarification for research. This review and analysis provide evidence that the DJGLS-6 is a reliable and valid scale for such uses. However, as one item (item 2 of the emotional loneliness scale) has shown to weaken the strength of the scale, more work is needed to ensure that all items are optimally capturing social and emotional loneliness.

Our findings from both studies found the DJGLS-6 to be a measure of loneliness, which is brief and bi-dimensional. This measurement can also be used as a unidimensional model, depending on the research question. However, the analysis failed to support previous findings concerning the robustness of the subscales and due to the lack of studies currently available that evaluate the validity and reliability of the DJGLS-6, further analysis is needed to ensure the strict and sufficient bi-dimensionality of the shortened de Jong Gierveld loneliness scale. We advise that the authors look to reconsider item 2 of the emotional scale and evaluate the factor structure in order to provide a scale that captures the loneliness subtypes which can be used for both research and clinical purposes.

Acknowledgements

We would like to thank the reviewers for their considered and thoughtful comments that helped improve the paper.

Funding

The authors received neither financial nor non-financial support for the research, authorship, or publication of this article.

Author contributions

Laura Kenny: conceptualization, design, methodology, investigation, data management, formal analysis, interpretation, writing original draft.
Philip Hyland: conceptualization, methodology, project administration, supervision, writing review and editing.
Marylene Cloitre: funding acquisition, writing review and editing.
Mark Shevlin: conceptualization, design, methodology, project administration, supervision, writing original draft, writing review and editing.
All authors gave their final approval of the version to be published, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement

The authors have no conflicts of interest to disclose.

Ethical statement

This manuscript is the authors' original work. The studies involving human participants were reviewed and approved by Institutional Review Board of Department of Psychology, Maynooth University, Kildare, Ireland (#2016-00-001).
All participants engaged in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0003

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REVIEW ARTICLE

The Psychological Impact of the COVID-19 Pandemic on Frontline Healthcare Workers.

A Systematic Review and a Meta-Analysis

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History
Received: 13 December 2021
Accepted: 27 September 2022
Published: 28 February 2023

Citation
So, S., Wang, T. Q., Yu, B. E., Malvankar-Mehta, M. S. (2023). The Psychological Impact of the COVID-19 Pandemic on Frontline Healthcare Workers. A Systematic Review and a Meta-Analysis. *European Journal of Mental Health, 18,* e0003, 1–22. https: //doi.org/10.5708/EJMH.18.2023.0003

Introduction: The COVID-19 pandemic has created a chronically stressful work environment for healthcare workers, increasing the negative psychological effects experienced.
Aims: The authors of this systematic review and meta-analysis aimed to assess the impact of COVID-19 on frontline healthcare workers' mental health, using various psychological outcomes.
Methods: A systematic literature search was conducted up until June 30th, 2022 on MEDLINE, EMBASE, CINAHL, Cochrane Library, Web of Science, ClinicalTrials.gov, and Dissertations and Theses.
Results: This meta-analysis includes 22 cross-sectional studies with a total of 32,690 participants. Anxiety (ES = 0.23, CI: [0.18, 0.28]), depression (ES = 0.17, CI: [0.10, 0.24]), PTSD (ES = 0.28, CI: [0.08, 0.48]), and stress (ES = 0.35, CI: [0.17, 0.53]) was significantly prevalent among frontline healthcare workers.
Conclusions: Our results suggested that European healthcare workers were experiencing high psychological symptoms associated with the COVID-19 pandemic. The monitoring of their psychological symptoms, preventative interventions, and treatments should be implemented to prevent, reduce, and treat the worsening of their mental health.

Keywords: COVID-19, healthcare workers, meta-analysis, systematic review, psychological impact

Introduction

At the end of December 2019, a cluster of pneumonia cases was found to be associated with a novel coronavirus, COVID-19, in Wuhan, China. After spreading at an alarming speed, Europe had become the epicenter of disease spread by late February 2020 (Allam, 2020), and afterwards the World Health Organization (WHO) would declare COVID-19 to be a global pandemic on March 11th, 2020 (WHO, 2020). As of June 28th, 2020, the number of confirmed global cases has exceeded 10 million (WHO, n.d.).

ISSN 1788-7119 (online)

Since the pandemic's beginning, healthcare workers (HCWs) have been working tirelessly to protect the population despite a daily risk of contracting COVID-19, which produces a chronically stressful work environment. This risk also impacts the daily life of HCWs, as HCWs continually face negative psychological effects of chronic work stress, social isolation due to quarantine (Robertson et al., 2004), as well as fear of illness and fear of infecting family, friends, and colleagues (Adams & Walls, 2020). As spreading waves of COVID-19 infection cyclically arrive and subside in countries all around the world, HCWs must also deal with an ever-increasing workload, while potentially also facing shortages of personal protective equipment or intensive care beds (Saglietto et al., 2020; Shaukat et al., 2020; Walton et al., 2020). Furthermore, an increasing proportion of the European population faces economic insecurity due to downturns in numerous European nations and fear of infecting family, friends, and colleagues; this could impact the prevalence of psychological symptoms in European HCWs, including conditions such as anxiety, depression, insomnia, post-traumatic stress disorder, and many others (Koçak et al., 2021; Witteveen & Velthorst, 2020).

The accumulation of these challenges can cause short-term and long-term psychological distress and produce negative mental health symptoms in European HCWs. Therefore, it is important to track and measure the psychological impact of this pandemic on HCWs, as it could indicate the need for future changes or for maintaining the currently available mental health support services needed for all HCWs. Our systematic review and meta-analysis aims to assess the impact of COVID-19 on the mental health of frontline healthcare workers, employing the measurement of various psychological outcomes.

Methods

Search Strategy

A literature search was conducted in the following five databases: MEDLINE, EMBASE, CINAHL, Cochrane Library, and Web of Science. A gray literature search was conducted in ClinicalTrials.gov, and Dissertations and Theses. The search was conducted till June 30th, 2022. Sets of keywords relating to COVID-19 (i.e. coronavirus, SARS-CoV-2, nCoV-2019), mental health (i.e. depression, anxiety, post-traumatic stress disorder, stress, insomnia), healthcare workers (i.e. healthcare provider, health personnel), and Europe (i.e. Europe, Eastern Europe) were used with restrictions placed on human and English-published literature. All articles were imported into Covidence, which is a web-based systematic review screening tool it was used to remove duplicates and to organize two levels of screening: title and abstract screening and full text screening.

After all articles had been imported into Covidence (Veritas Health Innovation, n.d.), two reviewers independently screened titles and abstracts for healthcare workers! mental health outcomes related to COVID-19. Articles that were accepted past the first level of screening then proceeded through a second level of screening where independent full texts were reviewed. The second screening question used for the full-text review was "Does the study focus on the impact of COVID-19 on the mental health of healthcare workers in Europe?" Conflicts at both levels of screening were resolved through consensus and discussion between the reviewers (SS and TQW). After each screening level, chance-corrected kappa statistic was used to assess interobserver agreement for the inclusion of studies.

Inclusion and Exclusion criteria

The population of interest consisted of frontline healthcare professionals who are working in a setting with a COVID-19 exposure risk. Inclusion criteria for this study were that the evidence presented must be related to the impact of COVID-19 on healthcare workers' mental health, using a validated assessment instrument for mental illnesses. Studies included were cross sectional studies. Exclusion criteria were nonhuman and non-English studies as well as mental health studies that do not pertain specifically to healthcare workers in Europe. No limits were placed via study design.

Risk of Bias Assessment

The quality of each study was assessed using the CLARITY risk of bias instrument for cross-sectional surveys of attitudes and practices (Agarwal et al., 2011). This assessment tool measures the risk of bias based on five factors: 1) selection of representative population, 2) survey response rate, 3) missing data within completed questionnaires, 4) sensibility of the clinical survey, and 5) established validity of survey instrument. Table 1 describes in detail the assessment done for each included article.

Data Extraction

For each included study, quantitative and qualitative information related to healthcare workers' mental health outcomes was collected independently (Table 1). The following data were extracted: study information (i.e., author and year), study characteristics (i.e., mean age of participants, location of study, percentage of females, and participants' mental health outcomes (i.e., scores of anxiety, depression, insomnia, PTSD, stress). Data entry was abstracted manually from studies into an Excel sheet and organized according to the type of mental health outcome (Table 2.1-2.5).

Table 1. Study characteristics of included studies

Author	Year	Study Design	Study Location	Total number of participants, *N* (%)	Age Mean *(SD)*; Range; *N* (%), etc.	Female, *n* (%)	Non-Binary *n* (%)
Aisa et al.	July 2021	Cross-sectional multicenter, international study	Europe	557	–	–	–
Büntzel et al.	January 2021	Survey study	Germany	167	–	–	–
De Pasquale et al.	April 2022	Cross-sectional multicenter, national study	Italy	107	26.75(3.86)	78 (73)	–
Erquicia et al.	November 2020	Cross-sectional study	Spain	395	40.20(11.46)	291 (75.6)	–
Failla et al.	October 2021	Cross-sectional web-based, international study	France, Italy, Portugal, Spain	443	Median (IQR): 29 (25-33)	–	–
Goberna-Tricas et al.	June 2021	Qualitative descriptive study	Spain	10	Range: 29-50	10 (100)	–
Hummel et al.	January 2021	Cross-sectional multicenter, international study	Germany, UK, Spain, France, Portugal, Austria, Italy, Switzerland	354	Median (range): 41 (18-84)	–	–
Morawa et al.	May 2021	Cross-sectional web-based, international study	Germany	3678	18-30: 812 (22.1) 31-40: 974 (26.5) 41-50: 820 (22.3) 51-60: 899 (24.4) 61-70: 167 (4.5) >70: 6 (0.2)	2751 (74.8)	15 (0.4)
Mortier et al.	May 2021	Observational prospective cohort multicenter study	Spain	5169	Range: n (% ± SE) 18-29: 881 (15.3 ± 1.6) 30-49: 2553 (47.7 ± 1.1) >50: 1730 (37.0 ± 2.1)	n (% ± SE) 4172 77.3 (1.3)	–
Sharif et al.	March 2021	Cross-sectional web-based, international study	Europe, Africa, Asia, South America, North America	207	–	–	–
Skoda et al.	November 2020	Cross-sectional web-based, nation-wide study	Germany	2224	–	1690 (75.99)	5 (0.22)
van Hout et al.	February 2022	Cross-sectional multicenter, international study	40 European countries	2289	42 (11)	1509 (66)	–
Vindrola-Padros et al.	November 2020	Cross-Sectional Rapid Appraisal Study	UK	30	–	17 (56.67)	–
Abdessater et al.	April 2020	Cross-sectional web-based, national study	France	275	29.5 (0.47)	91 (33.33)	–

(continued on the next page)

Table 1, continued

Author	Year	Study Design	Study Location	Total number of participants, *N* (%)	Age Mean *(SD)*; Range; *N* (%), etc.	Female, *n* (%)	Non-Binary *n* (%)
Antonijevic et al.	December 2020	Cross-sectional web-based study	Serbia	684	–	572 (83.62)	–
Babore et al.	November 2020	Cross-sectional web-based, national study	Italy	595	40.69 (11.48) Range: 21-72	478 (80.3)	–
Collantoni et al.	April 2021	Cross-sectional web-based, hospital-based study	Padua, Italy	996	–	755 (75.8)	–
Davico et al.	March 2021	Cross-sectional web-based, national study	Italy	380	18-29: 84 (22.1) 30-49: 216 (56.8) 50-69: 77 (20.3) >70: 3 (0.8)	296 (77.9)	–
Denning et al.	April 2021	Cross-sectional web-based, international study	UK, Poland	UK: 765 Poland: 232	–	UK: 535 (69.9) Poland: 210 (90.5)	Undisclosed UK: 9 (1.2) Poland: 2 (0.9)
Gorini et al.	October 2020	Cross-sectional web-based multicenter	Italy	650	44.59 (11.1)	439 (67.5)	–
Man et al.	July 2020	Cross-sectional study	Romania	115	40.78 (9.58)	102 (88.7)	–
Rossi et al.	May 2020	Cross-sectional web-based, national study	Italy	1379	39.0 (16.0)	1064 (77.2)	–

Table 2.1. Anxiety scores of healthcare workers in the included studies

Author	*N*	Measurement Scale	Mean*(SD)*, [95% CI]	Prevalence; *N* (%)
Erquicia et al.	395	DASS-21	–	59 (14.5)
Antonijevic et al.	684	GAD-7	7.18(5.94)	–
Antonijevic et al.	Frontline doctors: 75	GAD-7	7.37(5.68)	Frontline doctors and nurses minimal: 44 (28.39) mild: 52 (33.55) moderate: 25 (16.13) severe: 34 (21.94)
Antonijevic et al.	Frontline nurses: 102	GAD-7	9.58(6.57)	Frontline doctors and nurses minimal: 44 (28.39) mild: 52 (33.55) moderate: 25 (16.13) severe: 34 (21.94)
Antonijevic et al.	Second-line physicians: 245	GAD-7	5.31(4.93)	Second-line doctors and nurses minimal: 208 (44.26) mild: 135 (28.72) moderate: 68 (14.47) severe: 59 (12.55)
Antonijevic et al.	Second-line nurses: 262	GAD-7	8.05(6.16)	Second-line doctors and nurses minimal: 208 (44.26) mild: 135 (28.72) moderate: 68 (14.47) severe: 59 (12.55)
Büntzel et al.	Physicians: 86	Self-perception of anxiety related to patients*	–	64 (74.4)
Büntzel et al.	Physicians: 85	Self-perception of anxiety related to COVID-19 risk*	–	31 (40.7)

(continued on the next page)

Table 2.1, continued

Author	*N*	Measurement Scale	Mean *(SD)*, [95% CI]	Prevalence; *N* (%)
Büntzel et al.	Other medical staff: 69	Self-perception of anxiety related to COVID-19 risk*	–	36 (52.2)
Collantoni et al.	996	GAD-7	–	Any anxiety: 597 (59.9) Severe: 97 (9.7)
Collantoni et al.	Physicians: 215	GAD-7	5.35(4.50)	–
Collantoni et al.	Nurses and other professionals: 635	GAD-7	7.27(5.50)	–
Collantoni et al.	Healthcare assistants: 146	GAD-7	6.12(4.54)	–
Denning et al.	UK: 765	HADS	–	Prevalence % [95% CI]: 27% [24, 30]
Denning et al.	Poland: 232	HADS	–	Prevalence % [95% CI]: 28% [22, 33]
Erquicia et al.	395	DASS-21	3.38(3.78)	126 (31.4)
Erquicia et al.	395	HARS	11.92(8.63)	–
Failla et al.	443	DASS-21	8.13(7.79)	43.10%
Gorini et al.	Total: 650	GAD-2	–	None: 457 (70.3) Mild: 116 (17.8) Severe: 77 (11.8)
Gorini et al.	Physicians: 177	GAD-2	–	None: 137 (77.4) Mild: 27 (15.3) Severe: 13 (7.3)
Gorini et al.	Nurses: 214	GAD-2	–	None: 136 (63.6) Mild: 50 (23.4) Severe: 28 (13.1)
Gorini et al.	Other HCWs: 217	GAD-2	–	None: 157 (72.4) Mild: 30 (13.8) Severe: 30 (13.8)
Gorini et al.	Admin: 42	GAD-2	–	None: 27 (64.3) Mild: 9 (21.4) Severe: 9 (21.4)
Hummel et al.	354	DASS-21	7.90(8.36)	Normal/mild: 240 (67.80) Moderate: 49 (13.84) Severe/very severe: 65 (18.36)
Morawa et al.	3678	GAD-2	–	702 (19.1)
Morawa et al.	Physicians: 1061	GAD-2	1.45(1.41)	189 (17.8)
Morawa et al.	Nurses: 1275	GAD-2	1.48(1.48)	242 (19.0)
Morawa et al.	Medical Technical Assistants: 1342	GAD-2	1.66(1.50)	270 (20.1)
Rossi et al.	1379	GAD-7	Mean (range): 9 (4-13)	273 (19.80)
Skoda et al.	Physicians: 492	GAD-7	–	29 (5.89)
Skoda et al.	Nursing staff: 1511	GAD-7	–	172 (11.41)
Skoda et al.	Paramedics: 221	GAD-7	–	10 (4.55)

-: data unavailable; *: uses unvalidated measurement tool; DASS-21: Anxiety and Stress Scale; GAD-2: 2-items Generalized Anxiety Disorder; GAD-7: 7-items Generalized Anxiety Disorder; HADS: Hospital Anxiety and Depression Scale; HARS: Hamilton Anxiety Rating Scale, PHQ-4: 4-items Patient Health Questionnaire

Table 2.2. Depression scores of healthcare workers in the included studies

Author	*N*	Measurement Scale	Mean *(SD)*, [95% CI]	Prevalence; *N* (%)
Antonijevic et al.	684	BDI-IA	7.84(7.57)	–
Antonijevic et al.	Frontline doctors: 75	BDI-IA	7.73(6.97)	Frontline doctors and nurses minimal: 101 (68.24) mild: 27 (18.24) moderate: 15 (10.14) severe: 5 (3.38)
Antonijevic et al.	Frontline nurses: 102	BDI-IA	10.65(9.12)	Frontline doctors and nurses minimal: 101 (68.24) mild: 27 (18.24) moderate: 15 (10.14) severe: 5 (3.38)
Antonijevic et al.	Second-line doctors: 245	BDI-IA	6.35(6.45)	Second-line doctors and nurses minimal: 332 (75.28) mild: 73 (16.55) moderate: 25 (5.67) severe: 11 (2.49)
Antonijevic et al.	Second-line nurses: 262	BDI-IA	8.34(7.89)	Second-line doctors and nurses minimal: 332 (75.28) mild: 73 (16.55) moderate: 25 (5.67) severe: 11 (2.49)
Collantoni et al.	996	PHQ-9	–	Any depression: 421 (42.3%) Severe: 37 (3.7%)
Collantoni et al.	Physicians: 215	PHQ-9	4.00(3.94)	–
Collantoni et al.	Nurses and other professionals: 635	PHQ-9	4.10(4.04)	–
Collantoni et al.	Healthcare assistants: 146	PHQ-9	5.43(4.81)	–
De Pasquale et al.	107	POMS	15.50(11.90)	–
Denning et al.	UK: 765	HADS		Prevalence % [95% CI]: 12% [9, 14]
Denning et al.	Poland: 232	HADS		Prevalence % [95% CI]: 14% [10-19]
Erquicia et al.	395	DASS-21	3.05(3.5)	49 (12.2)
Erquicia et al.	395	MADRS	9.93(7.37)	–
Failla et al.	443	DASS-21	13.3(10.27)	60.50%
Gorini et al.	Total: 650	PHQ-2	–	None: 502 (77.2) Mild: 104 (16.0) Severe: 44 (6.8)
Gorini et al.	Physicians: 177	PHQ-2	–	None: 144 (81.4), Mild: 26 (14.7) Severe: 7 (4.0)
Gorini et al.	Nurses: 214	PHQ-2	–	None: 148 (69.2) Mild: 43 (20.1) Severe: 23 (10.7)

(continued on the next page)

Table 2.2, continued

Author	*N*	Measurement Scale	Mean *(SD)*, [95% CI]	Prevalence; *N* (%)
Gorini et al.	Other HCWs: 217	PHQ-2	–	None: 178 (82.0), Mild: 28 (12.9), Severe: 11 (5.1)
Gorini et al.	Admin: 42	PHQ-2	–	None: 32 (76.2) Mild: 7 (16.7) Severe: 3 (7.1)
Hummel et al.	354	DASS-21	10.39(9.12)	Normal/mild: 246 (69.49) Moderate: 60 (16.95) Severe/very severe: 48 (13.56)
Morawa et al.	3678	PHQ-2		769 (20.9)
Morawa et al.	Physicians: 1061	PHQ-2	1.48(1.35)	185 (17.4)
Morawa et al.	Nurses: 1275	PHQ-2	1.70(1.44)	275 (21.6)
Morawa et al.	Medical Technical Assistants: 1342	PHQ-2	1.86(1.45)	309 (23.0)
Rossi et al.	1379	PHQ-9	Median (IQR): 10 (5–14)	341 (24.73)
Sharif et al.	207	SRQ-20	–	34 (16.4)
van Hout et al.	Junior nurse: 240	WHO-5	54.0(18.2)	–
van Hout et al.	Senior nurse: 657	WHO-5	57.5(19.3)	–
van Hout et al.	Senior medical doctor: 803	WHO-5	56.9(19.8)	–
van Hout et al.	Junior medical doctor: 269	WHO-5	54.8(17.8)	–
van Hout et al.	Junior allied health professional: 31	WHO-5	57.5(17.2)	–
van Hout et al.	Senior allied health professional: 66	WHO-5	51.0(21.2)	–
van Hout et al.	Other: 223	WHO-5	55.7(19.8)	–

–: data unavailable; BDI-IA: Beck Depression Inventory IA; HADS: Hospital Anxiety and Depression Scale; PHQ-2: Patient Health Questionnaire-2; PHQ-9: Patient Health Questionnaire-9; MADRS: Montgomery-Asberg Depression Rating Scale; DASS-21: Depression Anxiety Stress Scales-21; POMS: Profile of Mood States; SRQ-20: Self-Reporting Questionnaire-20; WHO-5: World Health Organization-5 Well-Being Index

Table 2.3. Insomnia scores of healthcare workers in the included studies

Author	*N*	Measurement Scale	Mean *(SD)*, [95% CI]	Prevalence; *N* (%)
Collantoni et al.	996	ISI-7	–	Any insomnia: 424 (42.6%) Severe: 34 (3.4%)
Collantoni et al.	Physicians: 215	ISI-7	6.49(5.37)	–
Collantoni et al.	Nurses and other professionals: 635	ISI-7	8.29(6.54)	–
Collantoni et al.	Healthcare assistants: 146	ISI-7	6.62(5.62)	–
Rossi et al.	1379	ISI-7	Median (IQR): 10 (4-16)	114 (8.27)

–: data unavailable; ISI-7: Insomnia Severity Index-7

Table 2.4. PTSD scores of healthcare workers in the included studies

Author	*N*	Measurement Scale	Mean *(SD)*, [95% CI]	Prevalence; *N* (%)
Collantoni et al.	996	IES-R	–	Any PTSD: 652 (65.5%) Severe: 97 (9.7%)
Collantoni et al.	Physicians: 215	IES-R	15.27(14.93)	–
Collantoni et al.	Nurses and other professionals: 635	IES-R	20.05(16.92)	–
Collantoni et al.	Healthcare assistants: 146	IES-R	17.95(15.26)	–
Davico et al.	380	IES-R	Median (IQR): 29.0 (21.0-40.0)	29.7%
Gorini et al.	650	IES-R	–	None: 356 (55.1) Mild: 104 (16.1) Moderate: 36 (5.6) Severe: 150 (23.2)
Gorini et al.	Physicians: 177	IES-R	–	None: 120 (67.8) Mild: 21 (11.9), Moderate: 9 (5.1) Severe: 27 (15.3)
Gorini et al.	Nurses: 214	IES-R	–	None: 87 (41.0), Mild: 43 (20.3), Moderate: 13 (6.1), Severe: 69 (32.5)
Gorini et al.	Other HCWs: 217	IES-R	–	None: 127 (59.1), Mild: 31 (14.4) Moderate: 10 (4.7), Severe: 47 (21.9)
Gorini et al.	Admin: 42	IES-R	–	None: 22 (52.4), Mild: 9 (21.4), Moderate: 4 (9.5), Severe: 7 (16.7)
Rossi et al.	1379	GPS	Median (IQR): 9 (6-12)	681 (49.38)
De Pasquale et al.	107	COVID-19-PTSD	26.18(14.60)	–

–: data unavailable; COVID-19-PTSD: COVID-19 PTSD Checklist for DSM-5; GPS: Global Psychotrauma Screen; IES-R: Impact of Event Scale-Revised

Table 2.5. Stress scores of healthcare workers in the included studies

Author	*N*	Measurement Scale	Mean *(SD)*, [95% CI]	Prevalence; *N* (%)
Abdessater et al.	275	Original survey	Univariable logistic regression OR [95% CI], p-value Medical history: 2.96 [1.23, 7.12], 0.01 Experience (Senior): 1.76 [1.05, 2.97], 0.04 COVID-19 patients: 2.39 [1.30, 4.39], 0.006 Severe COVID-impacted location: 1.71 [1.06–2.78], 0.029 Multivariable logistic regression OR [95% CI], p-value Medical history: 2.57 [1.31, 5.98], 0.013	–
Aisa et al.	557	PSS-10	23.66(5.2)	–
Antonijevic et al.	684	PSS-10	17.94(5.73)	–
Antonijevic et al.	Frontline doctors: 75	PSS-10	18.40(5.60)	Frontline doctors and nurses Low: 41 (25.15) Moderate: 68 (41.72) High: 54 (33.13)

(continued on the next page)

Table 2.5, continued

Author	*N*	Measurement Scale	Mean *(SD)*, [95% CI]	Prevalence; *N* (%)
Antonijevic et al.	Frontline nurses: 102	PSS-10	16.26(5.77)	Frontline doctors and nurses Low: 41 (25.15) Moderate: 68 (41.72) High: 54 (33.13)
Antonijevic et al.	Second-line doctors: 245	PSS-10	19.69(5.68)	Second-line doctors and nurses Low: 168 (35.29) Moderate: 195 (40.97) High: 113 (23.70)
Antonijevic et al.	Second-line nurses: 262	PSS-10	18.73(5.39)	Second-line doctors and nurses Low: 168 (35.29) Moderate: 195 (40.97) High: 113 (23.70)
Babore et al.	Female: 478	PSS-10	19.56(7.06)	–
Babore et al.	Male: 117	PSS-10	15.38(6.65)	–
Buntzel et al.	Physicians: 94	Self-perception of very high stress*	–	34 (36.5)
Büntzel et al.	Other medical staff: 73	Self-perception of very high stress*	–	31 (42.5)
Erquicia et al.	395	DASS-21	6.29(4.60)	–
Failla et al.	443	DASS-21	19.06(9.71)	61.20%
Hummel et al.	354	DASS-21	17.10(10.51)	Normal/mild: 208 (58.76) Moderate: 55 (15.54) Severe/very severe: 91 (25.71)
Man et al.	COVID-19 patients: 67	PSS-10	16	–
Man et al.	Non-COVID-19 patients: 48	PSS-10	15	–
Rossi et al.	1379	PSS-10	Median (IQR): 24 (18-29)	302 (21.90)

–: data unavailable; *: validated by author's group, available on request; DASS-21: Depression Anxiety Stress Scales-21; PSS-10: Perceived Stress Scale-10

Statistical Analysis

Meta-analysis was completed using STATA v. 15.0 (StataCorp, 2017). The main outcomes of interest were prevalence of anxiety, depression, insomnia, PTSD, and stress.

For prevalence, effect size (ES) was calculated as the treatment effect. The raw prevalence rates in the meta-analysis were transformed to logit scale and re-transformed back to original measured units. ES for each study was then aggregated using the fixed or random-effect model based on the presence of heterogeneity to estimate the summary effect.

To test heterogeneity, statistics, *Z*-value, and χ^2 statistics were computed. An value of less than 50% implies low heterogeneity, and in these cases, a fixed-effect model was computed. An statistics of 50% or more represents high heterogeneity, and in these cases a random-effect model was calculated. Additionally, a high *Z*-value, a low p-value (< 0.01) and a large value implies significant heterogeneity and, therefore, a random-effect model using DerSimonian and Laird methods was computed. Forest plots were also generated for each case. Funnel plots were generated to check publication bias. Causes of heterogeneity were also explored.

Results

Search Results

Database searches resulted in 201 published and 24 gray literature records. The 201 records were imported into the Covidence systematic review software and 15 duplicates were removed. At the end of the first screening, 44 articles remained that moved onto the full-text screening. After the full-text screening, 22 cross-sectional studies were included. The Kappa statistic for the first and second levels of screening came to 0.644 and 0.706, respectively. The systematic review study retrieval process is detailed in a Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram (Figure 1) (Moher et al., 2009). The included cross-sectional studies, contained nine high quality articles, and thirteen medium quality articles (Figure 2).

Figure 1. PRISMA Flow Diagram for the impact of COVID-19 on the mental health of healthcare workers in Europe

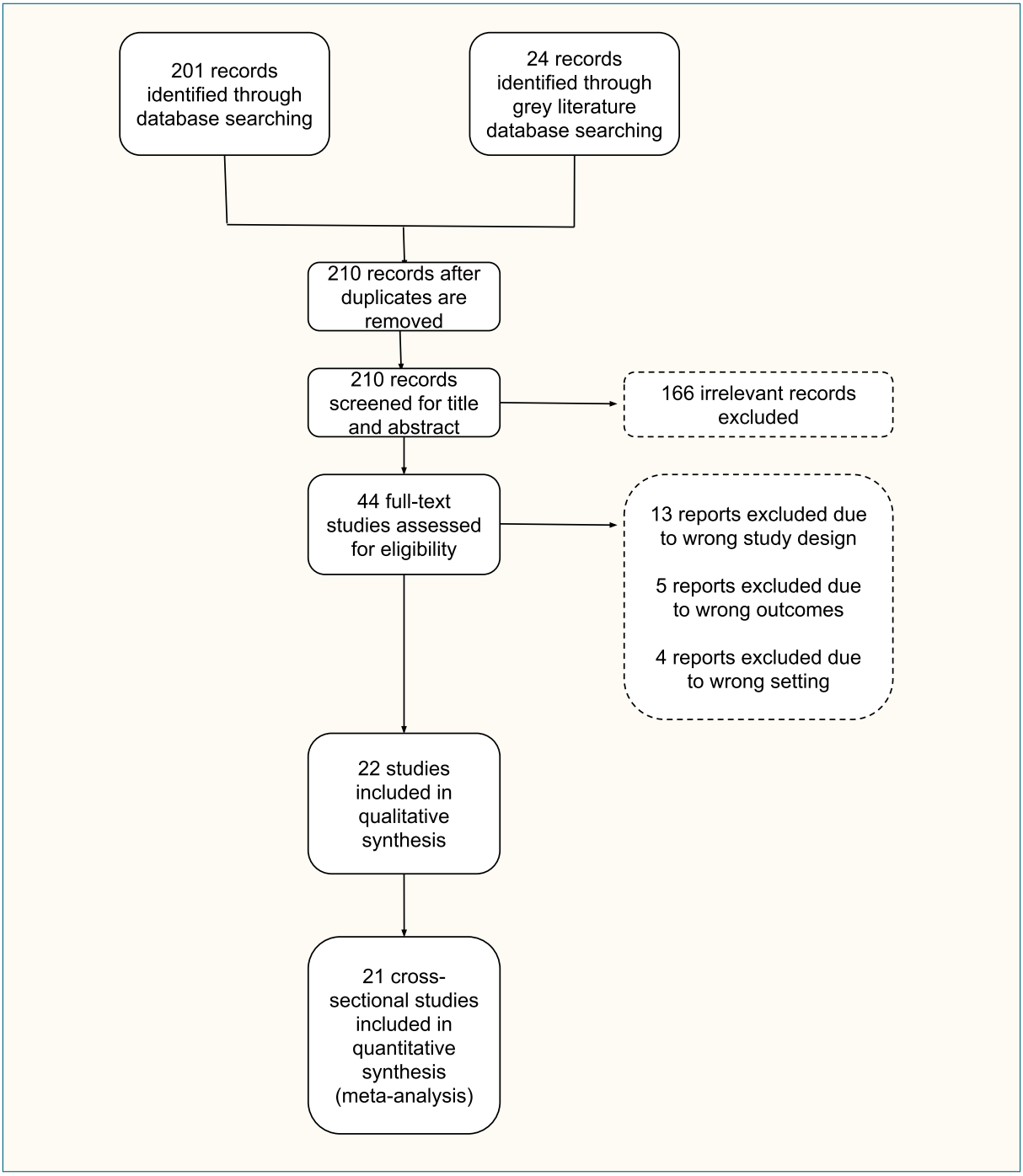


Figure 2.1. Results of risk of bias assessment for studies included

Figure 2.2. Summary plot of risk of bias assessment for studies included

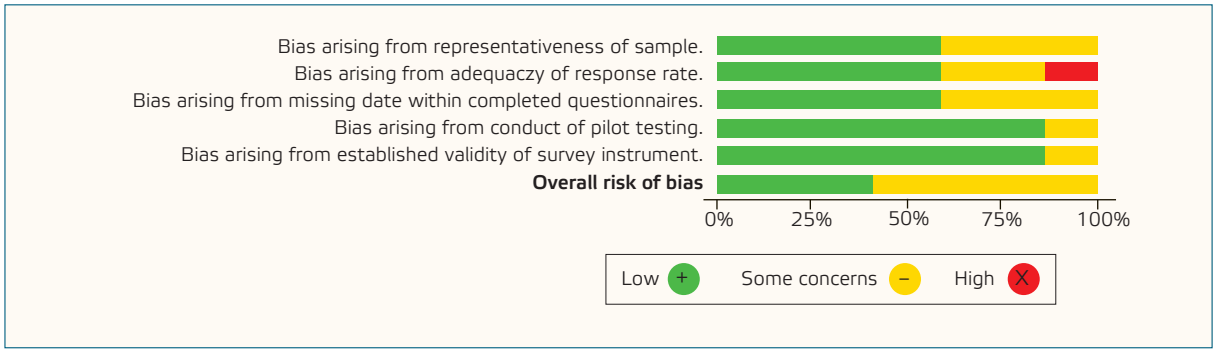


Table 3. Measurement of the included studies

Mental Health Outcome	Measurement Scale	Abbreviation	References
Anxiety	Anxiety and Stress Scale	DASS-21	(Osman et al., 2012)
	7-items Generalized Anxiety Disorder	GAD-7	(Spitzer et al., 2006)
	2-items Generalized Anxiety Disorder*	GAD-2	(Kroenke et al., 2009; Spitzer et al., 2006)
	Hospital Anxiety and Depression Scale	HADS	(Zigmond & Snaith, 1983)
	Hamilton Anxiety Rating Scale	HARS	(Lobo et al., 2002)
Depression	Beck's Depression Inventory	BDI-IA	(Beck et al., 1988)
	Anxiety and Stress Scale	DASS-21	(Osman et al., 2012)
	Hospital Anxiety and Depression Scale	HADS	(Zigmond & Snaith, 1983)
	2-items Patient Health Questionnaire*	PHQ-2	(Kroenke et al., 2001, 2009)
	9-items Patient Health Questionnaire	PHQ-9	(Kroenke et al., 2001)
	Profile of Mood States	POMS	(Douglas M. McNair, 1992)
	Self-Reporting Questionnaire-20	SRQ-20	(Beusenberg et al., 1994)
	Montgomery-Asberg Depression Rating Scale	MADRS	(Lobo et al., 2002)
Emotional Well-being	World Health Organization- 5 Well-Being Index	WHO-5	(Bech, 2004)
Insomnia	Insomnia Severity Index	ISI	(Morin, 1993)
Post-traumatic Stress Disorder	Global Psychotrauma Screen	GPS	(Olff et al., 2020)
	Impact of Event Scale-Revised	IES-R	(Weiss & Marmar, 1997)
	COVID-19 PTSD Checklist for DSM-5	Modified PCL-5	(Weathers et al., 2013)
Stress	Anxiety and Stress Scale	DASS-21	(Osman et al., 2012)
	Perceived Stress Scale	PSS-10	(Cohen et al., 1994)

a: the GAD-2 and PHQ-2 are components of the Patient Health Questionnaire-4 (PHQ-4)

Study Characteristics

This systematic review includes 22 cross-sectional studies with a total of 32,690 participants (Table 1). Out of all the cross-sectional studies, six studies were undertaken in Italy (Babore et al., 2020; Collantoni et al., 2021; Davico et al., 2021; De Pasquale et al., 2022; Gorini et al., 2020; Rossi et al., 2020), three in Spain (Erquicia et al., 2020; Goberna-Tricas et al., 2021; Mortier et al., 2021), three in Germany (Büntzel et al., 2021; Morawa et al., 2021; Skoda et al., 2020), one in Romania (Man et al., 2020), one in the United Kingdom and Poland (Denning et al., 2021), one in France (Abdessater et al., 2020), one in Serbia (Antonijevic et al., 2020), one in the United Kingdom (Vindrola-Padros et al., 2020), and five in a combination of European countries (Aisa et al., 2022; Failla et al., 2021; Hummel et al., 2021; Sharif et al., 2022; van Hout et al., 2022).

Publication Bias

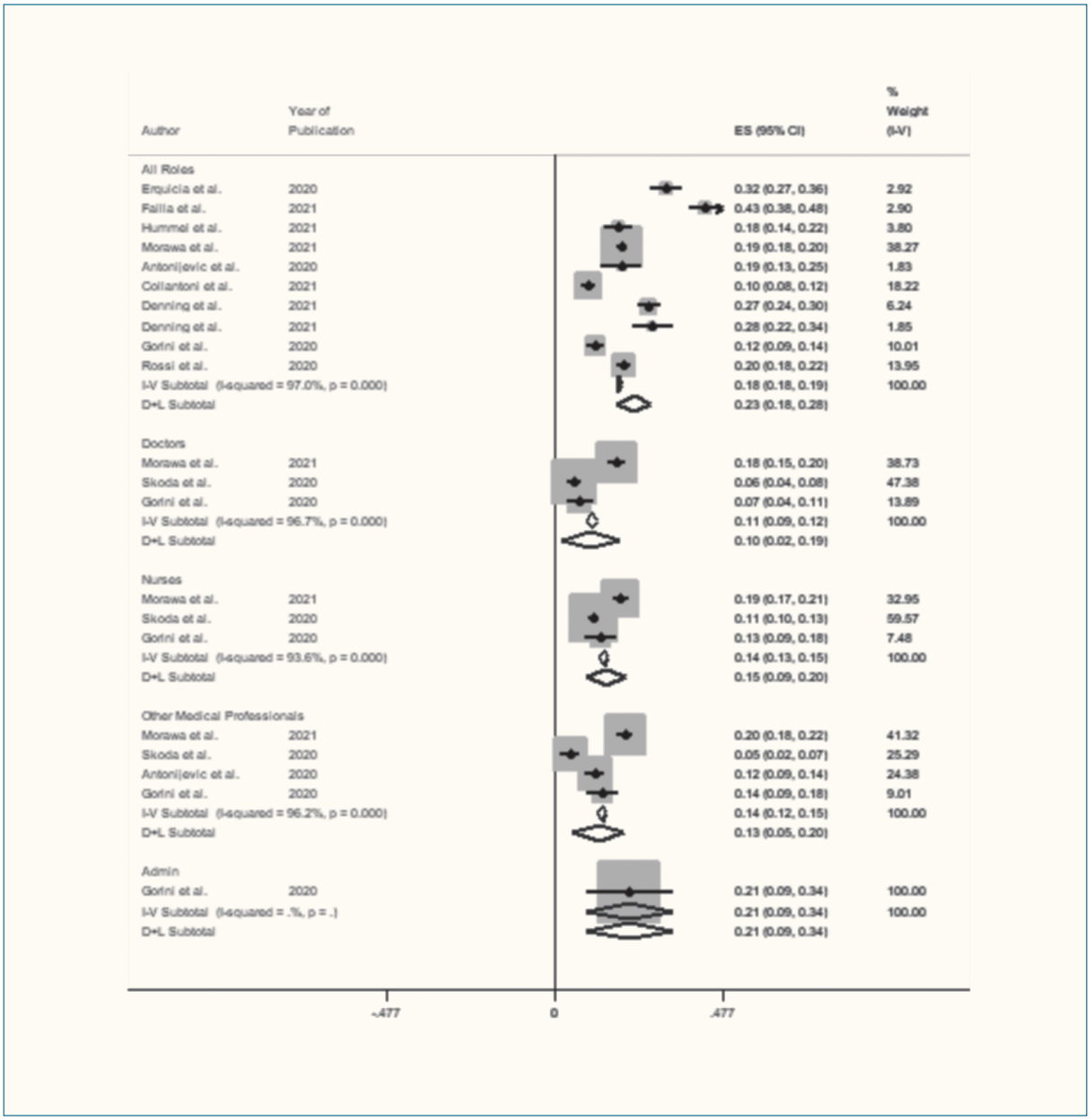
Each study measured different sets of mental health outcomes and their severity, via different psychological symptom scales (Table 3). Throughout the articles, anxiety was graded on five different scales. HCWs' depression symptoms were analyzed using eight different measurement scales. Emotional well-being and insomnia were each graded using one scale. Post-traumatic stress disorder (PTSD) was measured using three different scales. HCWs' stress symptoms were analyzed using two different scales.

Figure 3.2, 3.4, 3.6, and 3.8 showed funnel plots for the prevalence of anxiety, depression, PTSD, and stress, respectively. The visual inspection of funnel plots did not reveal any asymmetry. Additionally, publication bias remains only one of the numerous possible explanations for funnel plot asymmetry.

Main Outcomes

The main outcome of the study serves to analyze and quantify the impact of COVID-19 on the prevalence of anxiety, depression, PTSD, and stress in frontline health care workers.

Figure 3.1. Forest plot for studies examining anxiety prevalence among healthcare workers during COVID-19 pandemic in Europe



Prevalence of Anxiety

Figure 3.1 summarizes the results gained from the outcome measure, that is: anxiety prevalence in frontline healthcare workers during the COVID-19 pandemic. Ten studies focused on the impact of COVID-19 on the mental health of frontline health care workers and all the studies showed a significant impact on anxiety. Heterogeneity between studies that investigated the impact (I^2 = 97.0%) stood significantly (high. In studies examining the impact (ES = 0.23, CI: [0.18, 0.28]), anxiety registered significantly prevalent among frontline healthcare workers.

Prevalence of Depression

Figure 3.3 summarizes the results for the prevalence of depression among frontline health care workers during the COVID-19 pandemic. Ten studies existed evaluating the prevalence of depression. There appeared significant

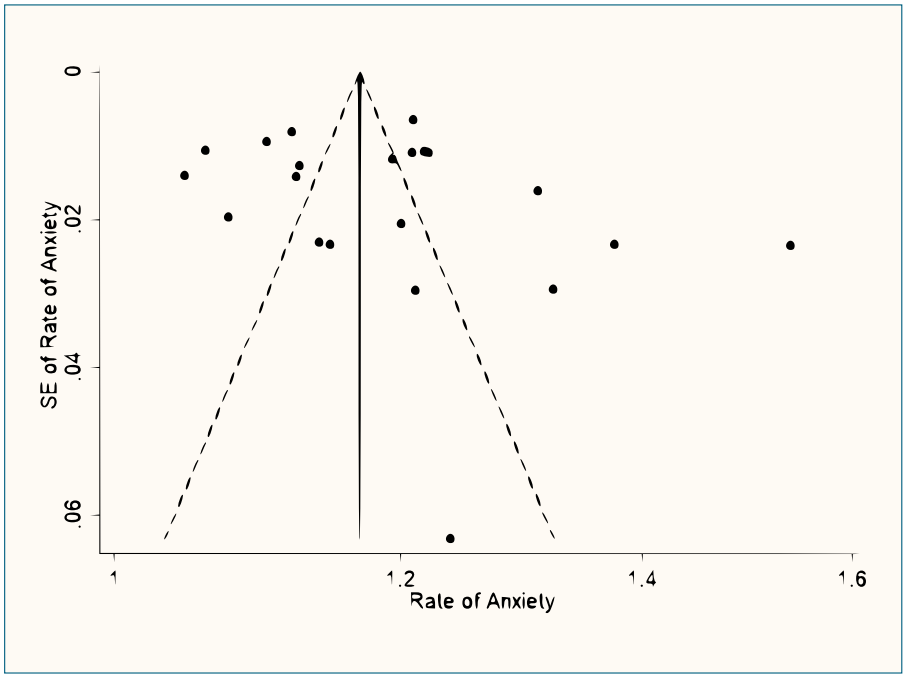


Figure 3.2. Funnel plot for studies examining anxiety prevalence among healthcare workers during COVID-19 pandemic in Europe

heterogeneity between studies (I^2 = 99.1%,). Figure 3.3 suggests that depression was significantly prevalent (ES = 0.17, CI: [0.10, 0.24]) among frontline healthcare workers.

Prevalence of PTSD

Figure 3.5 illustrates a forest plot of ES of PTSD prevalence among frontline health care workers during the COVID-19 pandemic. Four studies examining the impact of PTSD among frontline healthcare workers showed a significant prevalence (ES = 0.28, CI: [0.08, 0.48]). Further, all four studies had a significant () amount of between study heterogeneity (I^2 = 99.5%). Our results indicated a significant PTSD prevalence during the COVID-19 pandemic among frontline healthcare workers.

Prevalence of Stress

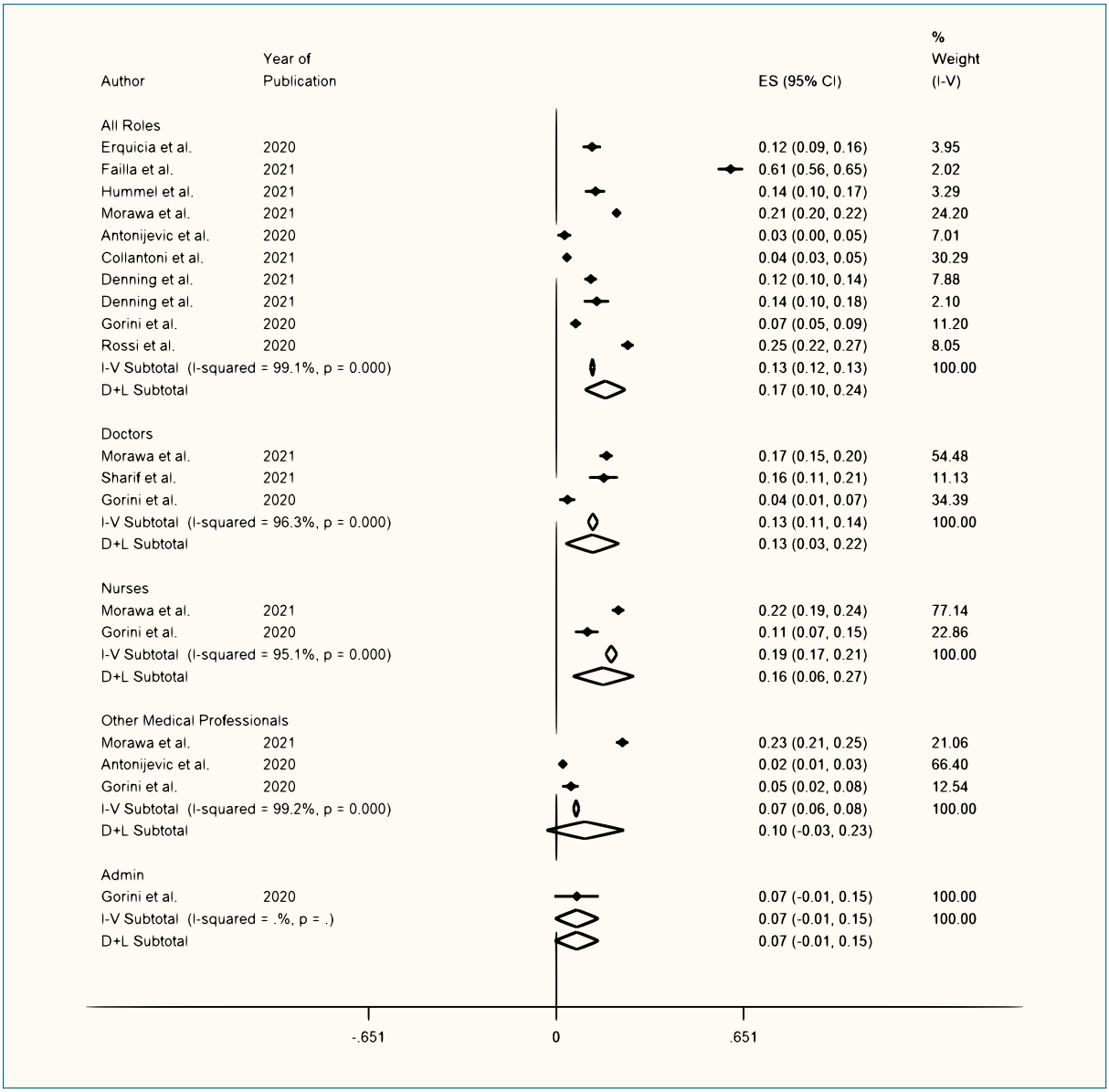
Figure 3.7 displays a forest plot for ES prevalence of stress among frontline healthcare workers. We found four studies examining the impact of COVID-19 among frontline healthcare workers. Heterogeneity between the four studies (I^2 = 98.7%,) stood significantly high and thus, a random-effects model was computed. Results showed significant prevalence of stress among frontline healthcare workers (ES = 0.35, CI: [0.17, 0.53]).

Discussion

We conducted a systematic review and meta-analysis to evaluate mental health outcomes of European HCWs during the COVID-19 pandemic. Through various database searches, cross-sectional studies from various European nations measured the impact of the COVID-19 pandemic on psychological symptoms such as anxiety, depression, PTSD, stress, and others. Aside from the prevalence data that were used for statistical analyses in this study, some studies also reported risk factors for certain psychological symptoms, relationships between physical and psychological symptoms, and suggested urgently needed interventions to prevent negative mental health outcomes in European HCWs.

Female sex (Collantoni et al., 2021; Denning et al., 2021; Gorini et al., 2020; Rossi et al., 2020), young age (Rossi et al., 2020), high alcohol consumption (Morawa et al., 2021), living with elderly family members (Col-

Figure 3.3. Forest plot for studies examining depression prevalence among healthcare workers during COVID-19 pandemic in Europe



lantoni et al., 2021), transferring to a different unit (Collantoni et al., 2021), and fear of COVID-19 infection (Gorini et al., 2020; Morawa et al., 2021) were independently associated with enhanced anxiety symptoms. Man et al. (2020) found that problem-focused coping significantly predicted anxiety, sadness, and fear compared to emotion-focused coping. Healthcare professionals working in a high risk exposure environment were associated with higher anxiety compared to those working in a low or no risk exposure environment (Antonijevic et al., 2020). Morawa et al. (2021) and Skoda et al. (2020) found that healthcare workers have lower anxiety symptoms than the general population, whereas Antonijevic et al. (2020) reported the opposite. Medical assistants reported having significantly higher anxiety and depression symptoms than physicians and nurses (Morawa et al., 2021) while nurses have higher anxiety symptoms than physicians (Collantoni et al., 2021; Morawa et al., 2021; Skoda et al., 2020).

Similarly, the following HCW characteristics were independently associated with increased depression symptoms: female sex (Collantoni et al., 2021; Gorini et al., 2020; Rossi et al., 2020), young age (Rossi et al., 2020), high alcohol consumption (Morawa et al., 2021), death of a colleague (Rossi et al., 2020), nursing job role (Collantoni et al., 2021; Morawa et al., 2021; Skoda et al., 2020), not being vaccinated (Sharif et al., 2022), and working in the frontline (Antonijevic et al., 2020; Collantoni et al., 2021; Rossi et al., 2020). Positive infection status is positively associated with depression symptoms (Collantoni et al., 2021; Sharif et al., 2022). Being a physician (Denning et al., 2021) is significantly associated with decreased depression symptoms. However, medical assistants appear to

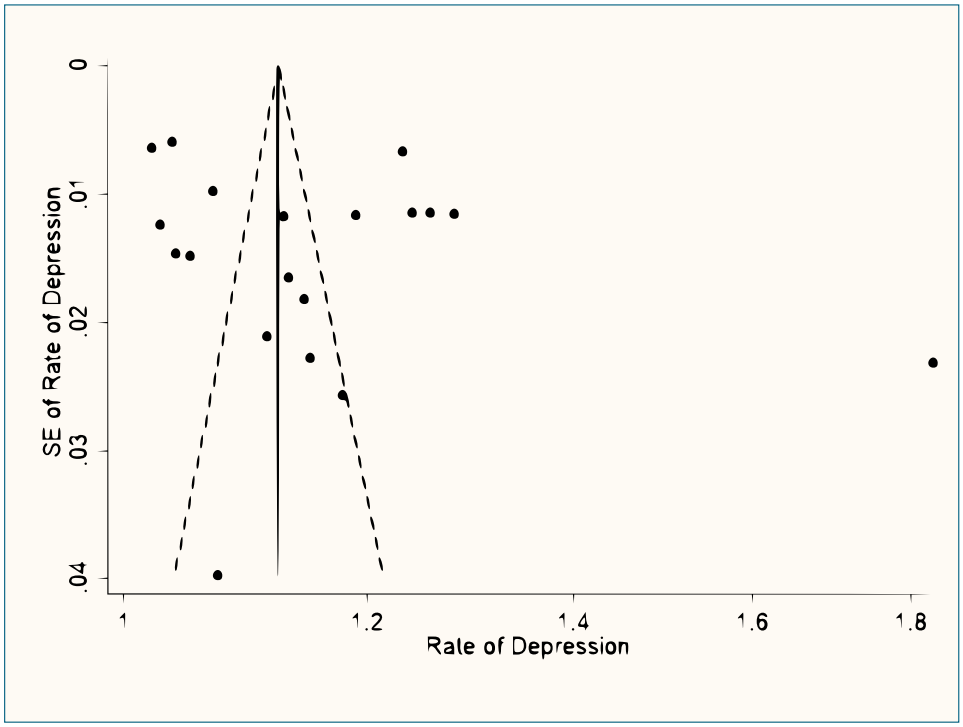


Figure 3.4. Funnel plot for studies examining depression prevalence among healthcare workers during COVID-19 pandemic in Europe

have significantly greater depression symptoms than physicians and nurses, while HCWs have significantly lower symptoms than the general population (Morawa et al., 2021). Redeployment during the pandemic also significantly increased depression symptoms (Collantoni et al., 2021; Denning et al., 2021; Sharif et al., 2022).

Nurses (Collantoni et al., 2021; Rossi et al., 2020) and HCWS who were redeployed to different settings (Collantoni et al., 2021) independently reported significantly higher insomnia symptoms than other HCWs. Overall, HCWs have significantly lower emotional disturbances compared to the general population (De Pasquale et al., 2022).

Experiencing the death of a colleague (Rossi et al., 2020), working in the frontline (Collantoni et al., 2021; Davico et al., 2021; Rossi et al., 2020), working as a nurse (Collantoni et al., 2021; Gorini et al., 2020), being redeployed (Collantoni et al., 2021), and being female (Collantoni et al., 2021; Davico et al., 2021; Gorini et al., 2020) all appeared as independent PTSD risk factors for healthcare workers. However, HCWs have lower PTSD symptom scores in comparison to the general population (Davico et al., 2021).

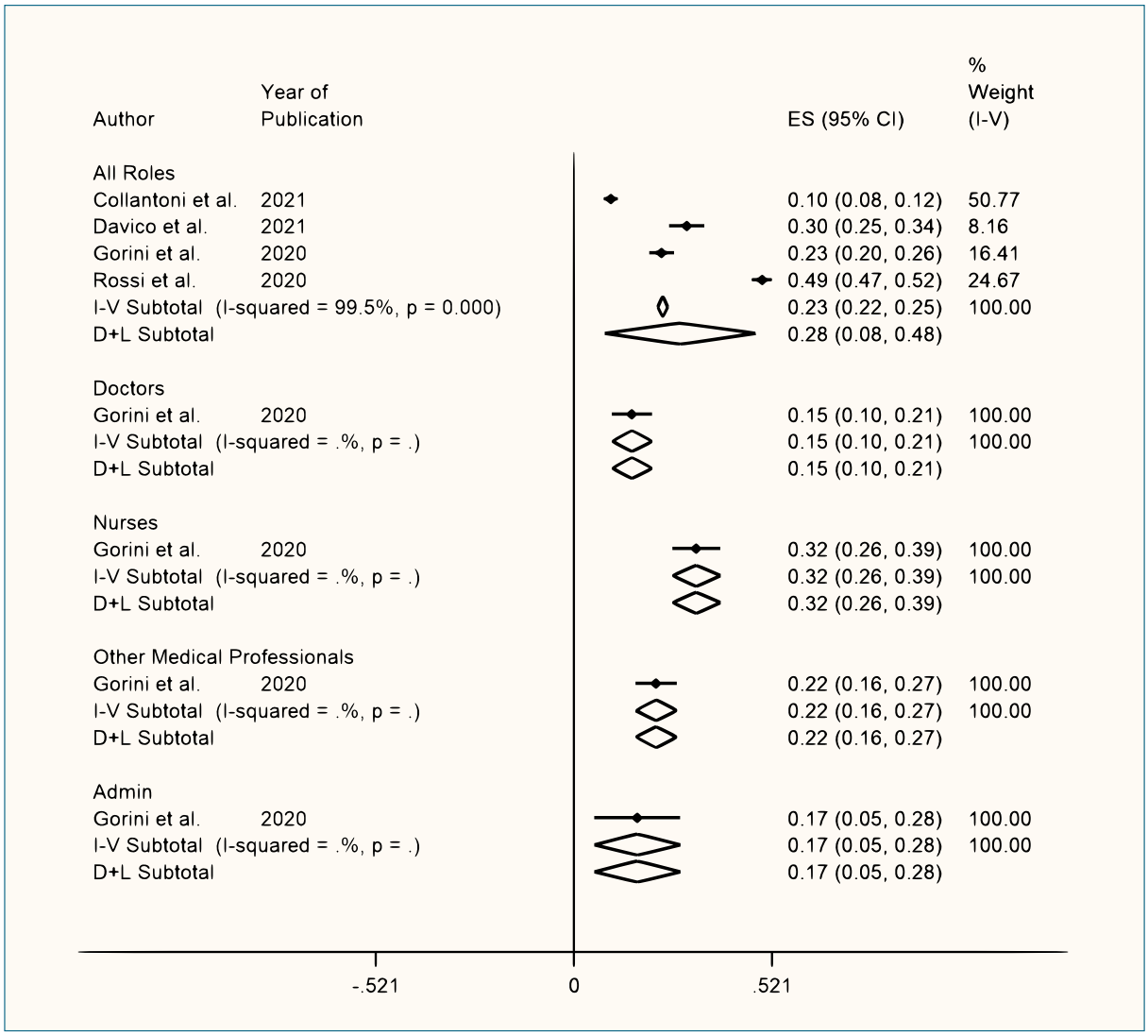
Female sex (Aisa et al., 2022; Babore et al., 2020; Erquicia et al., 2020; Rossi et al., 2020), young age (Aisa et al., 2022; Rossi et al., 2020), being a nurse (Aisa et al., 2022), and working in the frontline (Abdessater et al., 2020; Antonijevic et al., 2020; Babore et al., 2020) were independently associated with increased stress symptoms, while having a child (Babore et al., 2020) was associated with fewer stress symptoms. Aisa et al. (2022) reported a strong association between high intensive care unit bed occupancy and stress due to the greater workload. Abdessater et al. (2020) found that a respiratory illness history in HCWs is significantly associated with more stress. Greater stress symptoms in healthcare workers compared to the general population were discovered by Aisa et al. (2022).

The mental comorbidity of anxiety and burnout was positively associated with depression in healthcare workers (Denning et al., 2021). Compared to other healthcare workers in other European countries, anxiety, depression, and stress symptoms stood at the highest for healthcare workers in the United Kingdom and France, which may be a result of high case-fatality rates (Hummel et al., 2021). Stress symptoms stood significantly higher in healthcare workers compared to other workers in various European countries, due to unprepared facilities and personal protective materials shortage at the beginning of the pandemic (Aisa et al., 2022).

From the overall outcomes reported in the included studies, the characteristics of the most vulnerable healthcare worker would be a young woman working in the frontline in France or the United Kingdom, specifically as a redeployed nurse or medical assistant with a prior history of respiratory and mental illness. On the other hand, the characteristic of the least vulnerable healthcare worker would be an older male physician who has no respiratory and mental illness history.

Excessive workload was associated with psychological symptoms (Aisa et al., 2022). With limited personal protective equipment and COVID information, healthcare workers often did not eat, drink, or relieve them-

Figure 3.5. Forest plot for studies examining PTSD prevalence among healthcare workers during COVID-19 pandemic in Europe



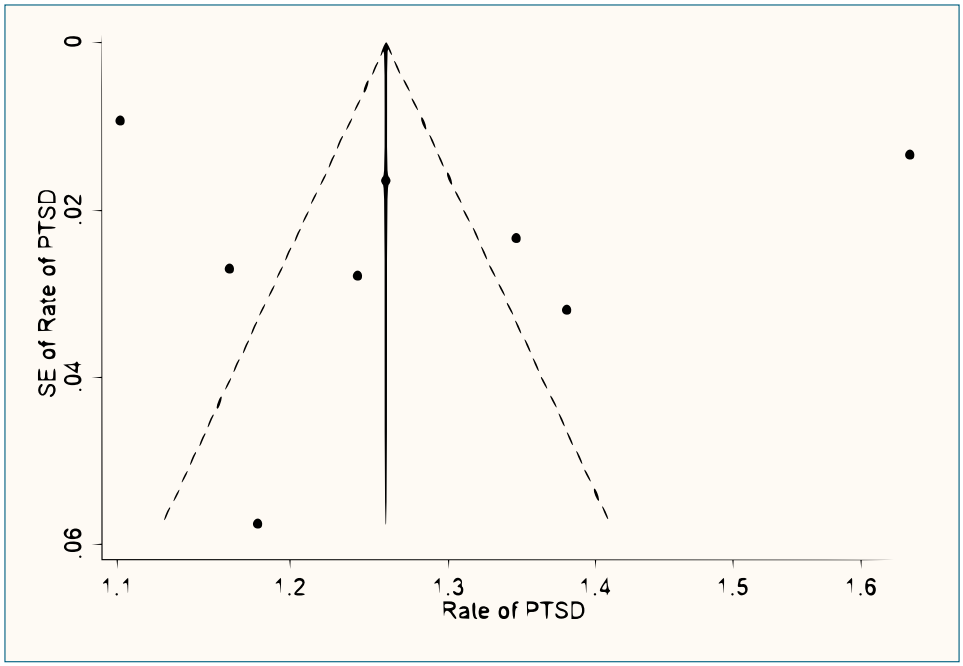
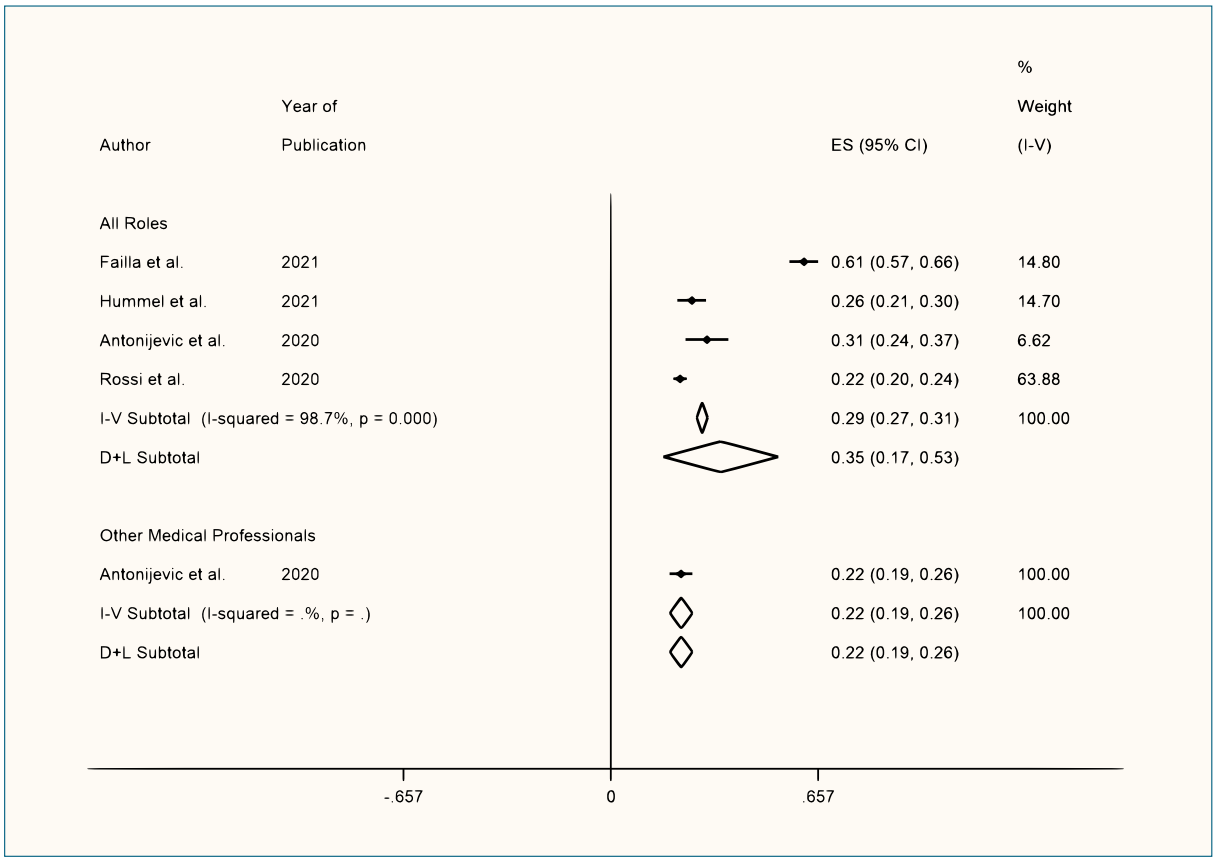


Figure 3.6. Funnel plot for studies examining PTSD prevalence among healthcare workers during COVID-19 pandemic in Europe

Figure 3.7. Forest plot for studies examining stress prevalence among healthcare workers during COVID-19 pandemic in Europe.



selves during shifts while simultaneously working long shifts in high temperatures and negative pressure environments, and thus became mentally and physically exhausted (Aisa et al., 2022; Büntzel et al., 2021; De Pasquale et al., 2022; Erquicia et al., 2020; Gorini et al., 2020; Hummel et al., 2021; Morawa et al., 2021; Sharif et al., 2022; van Hout et al., 2022; Vindrola-Padros et al., 2020). All these factors increased the risk of psychological distress for healthcare workers. Moreover, medical professionals were overworked due to the shortage of medical

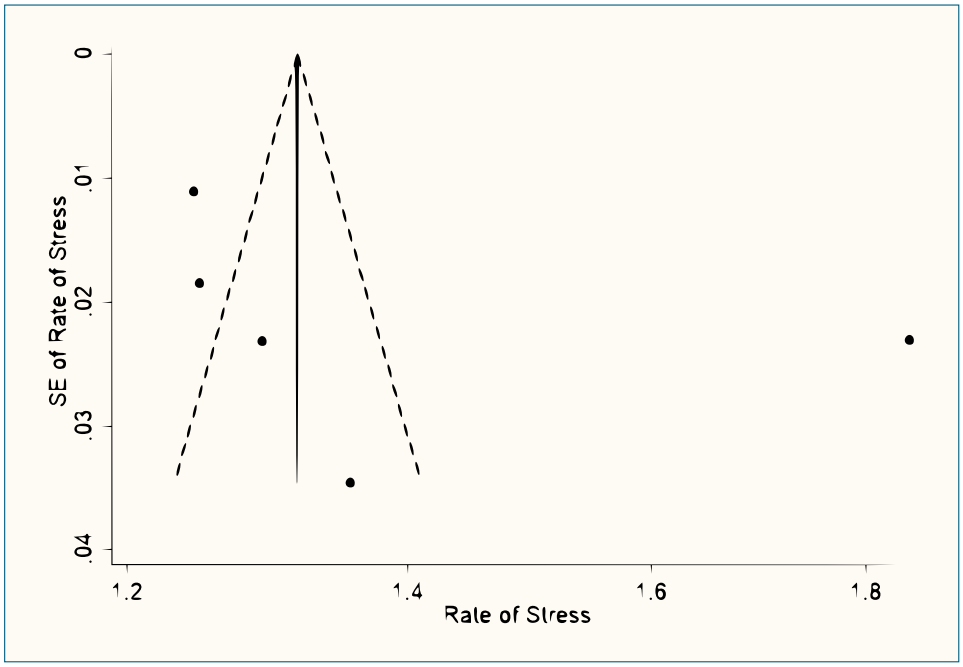


Figure 3.8. Funnel plot for studies examining stress prevalence among healthcare workers during COVID-19 pandemic in Europe.

staff and resources such as PPEs, COVID-19 PCR testing services, and guidelines for COVID-19 treatment (Abdessater et al., 2020; Aisa et al., 2022), leading to the increased intensity of their work requiring excessive physical and mental energy.

Studies suggested that monitoring healthcare workers' physical and psychological symptoms and needs was important in terms of adjusting their work schedule and tailoring specific psychological interventions and treatments (Rossi et al., 2020). In order to decrease stress and increase occupational confidence, healthcare workers should be well prepared through pre-job training of new treatment and sterilization protocols, have adequate education on preventing disease spread, and be equipped with adequate PPE (Sharif et al., 2022). Aisa et al. (2022) suggest that healthcare workers should receive psychiatric team counseling and motivational virtual messages to reduce stress. Additionally, Babore et al. (2020) found that those with severe mental health symptoms preferred seeking services directly from professionals than from close family and friends. The data included in this meta-analysis emphasized the urgent need for mental health services to minimize the psychological impact of the COVID-19 pandemic on healthcare workers that may persist even years after the pandemic.

All of the studies included were cross-sectional in nature, which inherently lack longitudinal follow-up due to the short data collection time during these acute phases of the pandemic. However, these studies met the inclusion criteria, were published, and shared vital insights and therefore, were included. Substantial heterogeneity between the studies was demonstrated, which could reflect different study participants from different countries, different self-reported questionnaires, different levels of severity cut-offs to calculate the prevalence for each mental health outcome, demographics, inclusion/exclusion criteria, study location, and year the study was conducted. The results drawn from this quantitative synthesis of the currently available literature suggest that more studies need to be reported to better understand the psychological effects of COVID-19 on healthcare workers.

Strengths and Limitations

One of the strengths of this systematic review involves the wide variety of studies included from different European nations spanning most of Europe's regions. Covering a wide selection of European nations and healthcare institutions generates a current view of the overall state of European HCWs in general, highlighting the factors that uniquely influence the work of HCWs in Europe, as opposed to HCWs residing in other continents. Additionally, most included studies had large sample sizes, which can provide a more accurate picture regarding the true state of European HCWs' mental health than studies with lower power.

The study limitations for meta-analyses such as this are necessary to understand, and aid in understanding the context of the results. First, it is necessary to consider the quality of the included studies. This revealed a significant variation in quality scoring with high-, medium-, and poor-quality studies having been reported. Nevertheless, as only few studies were available for analysis, all were included, irrespective of their quality. This is a recognized, but necessary, limitation due to the few clinical studies currently available. The poor quality can be seen in the missing data that were not reported in studies, such as sample percentage of genders and mean age (Table 1). Second, the meta-analysis of observational studies is influenced by inherent biases in the included articles. For example, a multitude of other factors such as the level of education, ethnicity, income status, socioeconomic status, and family could influence the estimates in the original studies. Lastly, it should be noted that although almost all included studies measured mental health outcomes through validated scales, these consisted not of clinical diagnoses but rather interviews or surveys that may carry a bias due to self-reporting.

Conclusion, Implications, and Future Directions

Healthcare workers in Europe were at greater risk of various mental health disorders due to the fear of transmitting COVID-19 to loved ones, strenuous working conditions, and lack of knowledge about COVID-19 in general and its treatment in particular. Healthcare workers' mental health is essential for providing patients with the best care and averting the collapse of the healthcare system. Preventative interventions and treatments as well as social support should be implemented to prevent, reduce, and treat healthcare workers' psychological symptoms. Furthermore, their mental and physical health should be closely monitored to ensure the effectiveness of these preventative measures over an extended period of time. Future studies should focus on longitudinally following the long-term psychological impact of this pandemic on the mental health of healthcare workers and explore the effectiveness of these interventions in preventing and reducing these negative psychological symptoms of healthcare workers.

Funding
The authors received neither financial nor non-financial support for the research (including data acquisition) and/or authorship and/or publication of this article.

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All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of interest statement
The authors have no conflicts of interest to disclose.

Ethical statement
This manuscript is the authors' original work.
The study was pre-registered on PROSPERO with the registration number CRD42022343054.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0005

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REVIEW ARTICLE

Candidate Biomarkers to Evaluate the Association Between Psychosocial Stressors and Cardiovascular Diseases

A Short Review

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History
Received: 19 February 2021
Accepted: 3 October 2022
Published: 28 March 2023

Citation
Ayari, H., Zeller, M. (2023). Candidate Biomarkers to Evaluate the Association Between Psychosocial Stressors and Cardiovascular Diseases. A Short Review.
European Journal of Mental Health, 18, e0005, 1–12.
https://doi.org/10.5708/EJMH.18.2023.0005

Introduction: The association between psychosocial stressors and cardiovascular diseases had been suggested.
Aims: This review was performed to assess, from literature data, the pertinence of using new biomarkers in the occurrence or prognosis of cardiovascular diseases in a psychosocial context.
Methods: We choose to consider wide-ranging descriptions of psychological stressors (occupational stress, financial strain, marital stress, social isolation, etc.) that may induce or influence the cardiovascular diseases' outcome. We addressed literature data confirming the link between candidate biomarkers, such as cortisol, endothelial dysfunction, pro-inflammatory cytokines, allostatic load, and cardiovascular diseases.
Results and Conclusion: Herein we showed a link between cortisol, endothelial dysfunction, pro-inflammatory cytokines, and the incidence or prognosis of cardiovascular diseases in a psychosocial context of stress. Allostatic load index was also identified as a pertinent tool in the assessment of the cumulative psychosocial stressors' burden exerted on the body.

Keywords: psychosocial stressors, cortisol, endothelial dysfunction, inflammation markers, allostatic load

Introduction

Cardiovascular diseases include pathological processes along the brain-heart and blood vessel axes such as intracerebral hemorrhage (ICH), transient ischemic attack (TIA), acute myocardial infarction (AMI), and peripheral arterial disease. They are considered the most frequent complications of atherosclerosis (Ross & Glomset, 1976, Roger et al., 2012). Yet, acute thrombotic complications of atherosclerosis such as ischemic stroke and myocardial infarction remain global leading causes of disability and mortality (Liberale et al., 2021). An estimated 17.9 million people died of these diseases in 2019 worldwide, representing 32% of all deaths. These deaths are mainly due to heart attacks and stroke (World Health Organization, 2021). The number of fatalities is estimated to increase to over 24 million a year by 2030, which imposes huge disability and healthcare costs (Yazdanyar & Newman, 2009).

ISSN 1788-7119 (online)

In addition to classic cardiovascular disease risk factors such as hypertension, dyslipidemia, visceral obesity, and diabetes (Paoletti et al., 2004), recent works have examined the role of psychosocial stressors as a potential cause of these diseases (Brotman et al., 2007; Kivimäki & Steptoe, 2018; Hagström et al., 2018; Scott-Storey et al., 2019; Peterson, 2020; Osborne et al., 2020). Major psychosocial stressors include occupational stress, financial strain, low socioeconomic status, marital stress, social isolation, perceived loneliness, and anxiety. The different components of psychosocial stressors may act alone or combine in a group and exert effects at different life course stages (Marmot, 1998; Hemingway & Marmot, 1999).

Three decades of research based on cohort studies provided evidence for psychosocial pathways leading to cardiovascular morbidity and mortality (Brunner, 2017). For example, across multiple international cohorts, unmarried patients, including those who are divorced, separated, widowed, or never married, have an increased prevalence of adverse cardiovascular events when compared to their married counterparts (Dhindsa et al., 2020). Besides, a high prevalence of cardiovascular diseases in patients with post-traumatic stress disorder was reported (Šagud et al., 2017).

The strong association between psychosocial stressors and heart diseases had been suggested in a wide range of populations, including young, older, men, women, socioeconomic strata, lifestyle, and conventional risk factors (Marmot, 1998, Yusuf et al., 2004; Rosengren et al., 2004; Nyberg et al., 2013; Diaz et al., 2014; Celano et al., 2016). Low socioeconomic status is inversely associated with coronary heart disease and it has been proposed that psychosocial pathways may play a mediating role (Matthews & Gallo, 2011; Schultz et al., 2018; Baggett et al., 2018). In addition, there is a clear social gradient in stroke mortality and morbidity, as lower socioeconomic groups worldwide have consistently higher rates of stroke than higher socioeconomic groups (Fransson et al., 2015; Booth et al., 2015; Havranek et al., 2015).

Two main mechanisms have been suggested to explain the link between stress exposure and cardiovascular disease incidence or prognosis in established diseases. The first hypothesis proposes that psychosocial stressors affect cardiovascular health indirectly, through the modification of lifestyle behaviors such as smoking, poor dietary habits, physical inactivity, medication nonadherence, alcohol consumption, and weak sleep duration (Kivimäki et al., 2012; Diaz et al., 2014; Virtanen et al., 2015). But this hypothesis does not entirely explain the link between adverse behavioral risk profiles and stress-related disorders. The second hypothesis involves a direct pathway, through dysregulation of the sympathetic nervous system (SNS) and the hypothalamus-pituitary-adrenal axis (HPA), that could induce inflammatory, metabolic, and hemostatic changes which have atherogenic effects and increase the risk of cardiovascular events (Alboni & Alboni, 2006; Pajer, 2007; Chen et al., 2013; Dich et al., 2015).

The aim of the current review is mainly focused on the identification of candidate biomarkers in cardiovascular diseases related to stress. We chose to consider wide-ranging descriptions of psychosocial stressors (occupational stress, financial strain, marital stress, social isolation…). Regarding biomarkers, special attention will be given to cortisol, endothelial function, inflammatory markers, and allostatic load.

Literature Data About Biomarkers Of Cardiovascular Diseases In A Psychosocial Stress Context

Cortisol As A Biomarker Of Cardiovascular Diseases Related To Psychosocial Stress

The adrenal cortex secretes cortisol after the activation of the Hypothalamus-Pituitary-Adrenal axis (HPA axis). This steroid hormone is involved in regulating a large panel of physiologic functions such as glucose and lipid metabolisms, body composition, and the immune system (Stalder et al., 2013). Cortisol is also called the stress hormone. The prolonged activation of the HPA axis by chronic stress may result in cortisol disruption and important metabolic dysfunction such as elevated fasting insulin and HOMA insulin-resistance index, dyslipidemia, visceral obesity, hypertension, and arterial stiffness, which is the main cause leading to cardiovascular diseases (Rosmond, 2003; Gaete, 2015; Pivonello et al., 2016; Cozma et al., 2017).

The incidence and prognosis impact of cortisol on cardiovascular diseases related to stress were widely studied. Hamer et al. provide support for the hypothesis that hyper-reactivity of the HPA axis is one of the mechanisms through which psychosocial stress may influence the risk of coronary heart disease. The authors included healthy men and women participants without history or objective signs of coronary heart disease, and they showed a prospective association between cortisol stress reactivity and progression of sub-clinical atheroscle-

rosis state, coronary artery calcification, which may lead to clinical endpoint (coronary heart disease). This association was largely independent of conventional risk factors and was most evident in participants without detectable coronary artery calcification at baseline, which further supports the notion that heightened cortisol reactivity might be important in the etiology of atherosclerosis and is not a simple marker of disease progression (Hamer et al., 2012).

Of note, the single serum cortisol measurement may be influenced by the physical stress due to the actuated illness or the emotional stress associated with hospital admission. Measurements of only one-time point may yield inconclusive results. This is especially true when we know that some other studies, using serum or saliva specimen collection, have not shown associations between cortisol and cardiovascular risk factors (Smith et al., 2005; et al., 2010); nor was it reported that low cortisol levels were associated with cardiovascular risk factors (DeSantis et al., 2011). Cortisol is an HPA axis-related hormone with a robust circadian rhythm where levels typically peak in the morning hours and decline across the day (Fiorentino et al., 2012). So, the single serum cortisol measurement may be biased by confounding factors. Scalp hair is a novel matrix that allows for the measurement hormones over several months and it is easy to assess using an Enzyme-Linked Immunosorbent Assay (ELISA) method (Wester & Van Rossum, 2015).

We cannot rule out the role of unmeasured confounding risk factors or genetic influences that might account for cortisol response patterns and cardiovascular disease risks such as Glucocorticoid Receptor (GR) polymorphism, which may be related to higher pro-inflammatory activity and greater risk (Van den Akker et al., 2008).

Endothelial Dysfunction As A Biomarker Of Cardiovascular Diseases Related To Psychosocial Stress

Endothelial dysfunction, a well-established response to cardiovascular risk factors and that precedes the development of atherosclerosis, is associated with an increased risk of plaque rupture and many adverse outcomes' manifestation. It is characterized by reducing the bioavailability of vasodilators. particularly Nitric Oxide (NO) and/or an increase in endothelium-derived contracting factors. The resulting imbalance leads to an impairment of endothelium-dependent vasodilation, which is the functional characteristic of endothelial dysfunction (Lerman & Burnett, 1992).

Evidence exists for a robust link between cardiovascular diseases and endothelial dysfunction under the effect of psychosocial stressors. In fact, in animal models – particularly non-human primates – it was shown that experimentally induced psychosocial stress, by changing the social status of female monkeys from dominant to subordinate, causes endothelial damage and accelerates atherosclerosis which in turn might impact the development and progression of cardiovascular diseases (Shively et al., 1997).

Of note, Flow-Mediated Dilation (FMD) of the brachial artery is the reference technique to measure arterial tonometry, and decreased FMD reflects decreased/impaired endothelial function. This concept has emerged as an essential indicator to predict recurrent cardiovascular events. In this context, using a community-based sample of employed individuals, Charles et al. demonstrated that female blue-collar workers had the lowest mean FMD value and those in the management/professional and services categories (white-collar) had the highest mean values. These findings suggest, moreover, that alterations in endothelial function may be one of the pathways linking occupational categories to FMD (Charles et al., 2014). It was proposed that there are several mechanisms through which occupational category may be associated with endothelial function and they include psychological stress and unhealthy lifestyle behaviors (Siasos et al., 2013). Similarly, a previous study demonstrated that participants perceiving themselves to be of lower social status in their communities exhibited reduced endothelial function (lower FMD) (Cooper et al., 2010). Furthermore, Chen et al. showed that stress score, as measured by the Depression Anxiety Stress Scales, was a powerful independent predictor for decreased brachial FMD (Chen et al., 2013). Depression, which is considered a risk factor for poor prognosis after an acute coronary syndrome (Mehta, 2011), was characterized by endothelial dysfunction and may contribute to the development of coronary artery disease (Lichtman et al., 2014).

Social isolation and perceived loneliness are also major psychosocial stressors (Udell et al., 2012; Perissinotto et al., 2012). In this regard, the best illustration of the deleterious effect of this psychosocial stress in animal research is provided by the report of Peuler et al. The authors showed, using a model system of social stressors, that the prairie vole, *Microtus ochrogaster,* a highly social rodent species, develops an impairment of vascular endothelial function after experimental isolation. This impaired endothelium-dependent vasodilation was not observed in wild animals. These findings confirm clearly that psychosocial stressors may play a role in endothelial dysfunction (Peuler et al., 2012).

Carotid Intima-Media Thickness (IMT) and ankle-brachial index are used to estimate the burden of atherosclerosis when patients are still asymptomatic. Overall increases in vascular wall thickness could indicate general vascular dysfunction. Local increases in vascular wall thickness are likely indicative of vascular remodeling and plaque formation, which precede vessel occlusion and ischemic events. Charles et al. have shown that job strain, represented by longer hours of work, is associated with higher IMT. Significant positive associations were observed between work hours and common carotid IMT among women, even after adjustment for age, race/ethnicity, education, annual household income, and cardiovascular disease-related risk factors. Moreover, longer hours of work were significantly associated with lower levels of the ankle-brachial index, which is an indicator of atherosclerosis and can serve as a prognostic marker for cardiovascular events among men (Charles et al., 2012).

Blocking cortisol production with metyrapone in healthy participants prevented adverse clinical effects such as mental stress-induced endothelial dysfunction (FMD) (Van den Akker et al., 2008). Based on the aforementioned case, it is reasonable to speculate that a strong link between cortisol and endothelial dysfunction/FMD exists. On the other hand, it is known that glucocorticoids strongly stimulate the production and release of endothelin (ET), a potent vasoconstrictor, by vascular smooth muscle cells (Provencher et al., 1998). Conversely, glucocorticoids are known to inhibit the NO Synthase (NOS), which is an enzyme catalyzing the production of NO, a powerful vasodilator and the key factor involved in the phenomenon of FMD. Taken together, this information provides arguments in favor of the role of glucocorticoids in the impairment of endothelial function in cell and tissue models (Wallerath et al., 1999; Simmons et al., 1996; Johns et al., 2001; Rogers et al., 2002). Consequently, it is no wonder that cortisol mediates the mental stress-induced impairment of endothelial function in humans.

Inflammation As A Biomarker Of Cardiovascular Diseases Related To Psychosocial Stress

Inflammation may be the starting point of the atherosclerotic process that results ultimately in a host of clinical complications, including ischemia, acute coronary syndrome, and stroke (Ross & Glomset, 1976; Paoletti et al., 2004; Deuchar et al., 2011).

Accumulating data provided an argument in favor of a positive association between stressful events, especially workplace stressors and the increased production of pro-inflammatory cytokines, such as C-Reactive Protein (CRP) and Tumor Necrosis Factor-α (TNF-α), which are closely associated with a spectrum of age-related diseases such as heart diseases and stroke (Glaser & Kiecolt-Glaser, 2005; Fioranelli et al., 2018, Eguchi et al., 2018). Similarly, it was demonstrated that psychological stress is an independent coronary heart disease risk factor associated with increased inflammation (Wirtz & von Känel, 2017).

The study of Epel et al. provided a better understanding of the underlying mechanism. According to this study, chronic stress might be associated with the premature aging of immune cells. Telomerase activity and telomere length, which are two cellular markers indicating cell aging, were measured in peripheral blood mononuclear cells obtained from mothers caring for a chronically ill child, as well as from mothers of healthy children. Of note, caregivers reported greater stress than controls. The clinical investigations demonstrated that a higher level of stress was associated with lower telomerase activity and shorter telomere length (Epel et al., 2004).

A link between stress-induced immune dysregulation and endothelial dysfunction is plausible. Thakore et al. found a positive relation between stress at work and increased perivascular inflammation (using CRP dosage) as well as endothelial dysfunction (as measured by IMT) (Thakore et al., 2007). Examining the inter-relationship among cortisol, inflammatory markers and endothelial function in a psychosocial stress-induced context would be of great interest to identify new biomarkers. Based on literature data, glucocorticoids may have a pro-inflammatory effect on the endothelium, so it is hardly surprising that cortisol is linked to the inflammatory mechanism and endothelial dysfunction (McEwen, 1998; McEwen, 2008; Kunz-Ebrecht et al., 2003; Deuchar et al., 2011).

Allostatic Load As A Group Of Physiological Biomarkers Of Cardiovascular Diseases Related To Psychosocial Stress

As we illustrated above, stress is known to lead to adverse changes in multiple biological systems, including endocrine, metabolic, and immune systems, which may eventually cause cardiovascular diseases (Juster et al., 2010). A large body of literature on stress and physiological functioning has focused on single biological markers such as cortisol and interleukin levels. Emerging research on stress, however, argues for the importance of simultaneously considering multiple processes rather than a single underlying mechanism (McEwen, 2003).

Allostatic Load (AL), a multisystem indicator of physiological changes resulting from stress, is computed using biological markers of multiple biological systems simultaneously (Juster et al., 2010). AL aims to summarize levels of physiological activity across a range of regulatory systems related to the stress response. The original formulation focused on different markers, including cardiovascular risk factors, HPA-axis activity, SNS activity, and biomarkers obtained from fasting blood (Seeman et al., 1997). Due to this multidimensionality, AL is thought to be a more comprehensive and sensitive measure of the effects of chronic stress on the body than any single biomarker (Juster et al., 2010; Gallo et al., 2014). Even when the changes in each one of these systems are modest and not predictive of health outcomes, the cluster of changes across different multiple physiological systems presents a health risk (Seeman et al., 2001). There is growing evidence that AL can measure stress-related wear and tear of the body (Mauss et al., 2015; 2016).

The traditional way of calculating an AL index has focused on the distribution of biomarkers within a given sample and then counting the number of dysregulated biomarkers for each individual (Seeman et al., 1997). AL index is constructed based on predefined cut-off values of many clinical biomarkers. Juster et al., used cortisol, Dehydroepiandrosterone-Sulphate (DHEA-S), CRP, fibrinogen, insulin, glycosylated hemoglobin, albumin, creatinine, pancreatic amylase, total cholesterol, high-density lipoprotein cholesterol (HDL-cholesterol), and triglycerides. Systolic and diastolic blood pressure values based on three resting oscillometric recordings were included; in addition, visceral obesity was assessed by waist-hip ratio. AL indices ranged from 0 to 15 (Juster et al., 2011).

Increased AL is associated with higher job demands in industrial workers in Germany and lower decision latitude and job strain in healthy Montreal workers; as well as burnout, career instability, effort-reward imbalance, and exhaustion (Schnorpfeil et al., 2003; Bellingrath et al., 2009; Juster et al., 2011; Juster et al., 2013; Mauss et al., 2015; 2016). It is worth noting that the study of Mauss et al., published in 2016 replicates the former results published in 2015 in a large sample of German industrial employees using a short form of AL. The revised form of AL included diastolic blood pressure, waist circumference, glycosylated hemoglobin, low-density lipoprotein, and heart rate variability. This short form of AL corroborated data obtained from the original one, which comprised 15 parameters. Based on these findings, the AL index is a pertinent tool in the assessment of the cumulative burden exerted on the body through variation to adapt to life's strain (Mauss et al., 2015; 2016; Gillespie et al., 2019; Veronesi et al., 2019).

Other studies found no effect of job strain on AL (Langelaan et al., 2007; Johansson et al., 2007). The number and type of biomarkers vary by study, which may explain this difference.

Strengths and Weaknesses of these Biomarkers

From the key papers that constitute this review, the data about the psychosocial stress impact on cardiovascular diseases are reliable. The evaluations of these papers used rigorous methodology which then led us to draw firm conclusions. This review highlights the potential of new biomarkers to reveal cardiovascular disease occurrence and prognosis in a psychosocial context. Biomarkers may identify new pathophysiological pathways, and help diagnosing and managing the diseases. Moreover, biomarkers able to detect earlier phases of disease development would facilitate targeted strategies to prevent pathological complications. These strategies have prognostic significance, thus they help improve patient outcomes and can assess the risk stratification in asymptomatic individuals at higher risk (Meune et al., 2014; McCarty, 2016; Smolderen et al., 2019).

Although much recent progress has occurred in identifying cardiovascular disease risk biomarkers related to psychosocial stress context, the emergence of each new biomarker or group of biomarkers raises questions of mechanistic relevance. In other words: (1) How much are these new markers worth? (2) Are the target molecules a biomarker, or are they related in a causal way to the disease pathogenesis? (3) Will the biomarkers help clinicians to improve patient outcomes? (4) How should clinicians incorporate these new biomarkers into clinical practice/standard care? (5) What overall diagnostic improvement do these new biomarkers offer? (6) Several differences exist between women and men in the incidence, clinical course, outcome, and comorbidities, so more attention should be given to the above differences to counteract these confounding factors (Vaccarino & Bremner, 2016; Vaccarino et al., 2016). (7) The potential role of genetics in these complex relationships is unknown. Individuals who have special variants of the polymorphisms associated with an increased production of cortisol, for example, may show worse immunological dysregulation when confronted with stressful events. (8) We should keep in mind that overall, the most powerful indexes are based on a combination of data, including clinical, electrocardiographic, and biological measurements (Meune et al., 2014; Dona et al., 2016; Emdin et al., 2016). Finally,

data replication in larger studies remains necessary to reveal the concrete significance of these biomarkers in the development or prognosis of cardiovascular diseases.

Conclusion

Our study mainly focuses on identifying new candidate biomarkers for cardiovascular diseases related to psychosocial stress. In this review, we addressed literature data approving the link between cortisol, endothelial dysfunction, inflammation, and AL in the development and progression of these diseases. Of note, alterations in neurohormonal stress response systems (catecholamines) happen quickly following an exposure to stress and cannot be used as a biomarker to traduce underlying chronic psychosocial stress exposure (Kvetnansky et al., 2013; Carter & Goldstein, 2015).

Here we chose to collect data from a wide range of cardiovascular diseases to garner more information on the effect of psychosocial stress. We considered wide-ranging descriptions of psychosocial stressors that may influence a physical health outcome through a psychological mechanism.

Psychosocial stress is theoretically modifiable. It is currently the subject of increased attention through interventions based on stress reduction. Many studies are addressing the role of stress prevention in cardiovascular disease development and progression in comparison with lifestyle risk factors and standard risk factors. Most behavioral interventions designed to attenuate the stress based on health educational program, music therapy (Orth-Gomér, 2012; Atiwannapat et al., 2016), and pharmacological tests, based on randomized controlled trials of anti-depressant treatment (Baumeister et al., 2012), to reduce psychosocial stress in the primary and secondary prevention of cardiovascular diseases, have not shown a real benefit. However, mind-body interventions such as regular yoga practice and tai chi seem very promising in this field. Curiously, compelling evidence suggests that these practices have generally produced positive immune and endocrine changes and might be the main strategies to avoid the negative effects of occupational stress (Antoni et al., 2000; Irwin et al., 2003; Andersen et al., 2004; Segerstrom & Miller, 2004; Huang et al., 2013/4; Manchanda & Madan, 2014; Tyagi et al., 2016; Chan et al., 2018).

Recent technological advances, including the signature emerging from multiple omics approaches. For instance, transcriptomics could potentially capture the inherent biological state during psychological stress. The approach using data-driven computational modeling has raised the prospect of identifying the potential of new candidate biomarkers. The further assessment of these signatures regarding for example oxidative stress, inflammation, vascular smooth muscle cell proliferation, and thrombosis in diverse populations, will be essential to make the underlying pathological process of cardiovascular diseases related to psychological stress context more comprehensive. We posit that this strategy may contribute to determining and deciphering the complex underlying process and merits further attention, particularly when considering the impact of such cardiovascular disorders on public health.

Acknowledgements

This work was supported by the University Hospital of Dijon.

Author contributions

Hanène Ayari: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, writing original draft, writing review and editing.
Marianne Zeller: supervision, writing review and editing.
All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflicts of Interest

The authors declare no conflicts of interest to disclose.

Ethical Statement

This manuscript is the authors' original work.

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Abbreviation's list:
AMI: Acute Myocardial Infarction
AL: Allostatic Load
CRP: C-Reactive Protein
DHEA-S: Dehydroepiandrosterone-Sulphate
ELISA: Enzyme-Linked Immunosorbent Assay
ET: Endothelin
FMD: Flow-Mediated Dilation
GR: Glucocorticoid Receptor
HDL-cholesterol: High-Density Lipoprotein-Cholesterol
HPA axis: Hypothalamus-Pituitary-Adrenal axis
ICH: Intra-Cerebral Hemorrhage
IMT: Intima-Media Thickness
NO: Nitric Oxide
NOS: Nitric Oxide Synthase
SNS: Sympathetic Nervous System
TIA: Transient Ischemic Attack
TNF-α: Tumour Necrosis Factor-α

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0002

BACK TO CONTENTS

RESEARCH ARTICLE

The Impacts of Alexithymia and Sexual Distress on Sexual Functioning Among Portuguese Women

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History
Received: 13 December 2021
Accepted: 27 September 2022
Published: 24 February 2023

Citation
Ribeiro, C. & Pereira, H. (2023). The Impacts of Alexithymia and Sexual Distress on Sexual Functioning Among Portuguese Women.
European Journal of Mental Health, 18, e0002, 1–13.
https://doi.org/10.5708/EJMH.18.2023.0002

Introduction: Recognizing own's emotions seems to have an important role regarding not only our overall well-being, but also our sexual functioning.
Aims: The aim of this study is to analyze the association or impact of alexithymia on female sexual functioning.
Methods: 459 Portuguese women, with a mean age of 34.57 years (*SD* = 10.27), ranging from 18 to 65 years, completed the Toronto Alexithymia Scale (TAS-20), the Female Sexual Distress Scale – Revised (FSDS-R) and, additionally, completed the Female Sexual Function Index (FSFI), indicating if and when a sexual relationship occurred in the last month.
Results: The results showed that higher levels of alexithymia were associated with worse sexual functioning and higher levels of sexual distress. Higher levels of sexual distress were associated with worse sexual functioning. It was possible to establish a significant linear regression model between dimensions of alexithymia (difficulties in identifying feelings and difficulties in describing feelings) and sexual distress in sexual functioning; the variables together explained about 45.2% of sexual functioning in these women.
Conclusions: The results emphasize the relevance of alexithymia's dimensions in sexual functioning concerning women with or without sexual dysfunction, since they present themselves as significant predictors. Professionals working in women's sexual health should take this into account for more effective assessment and intervention in matters concerning sexual health.

Keywords: sexual functioning, sexual distress, alexithymia, emotions, women

Introduction

Sexual response is a complex and highly subjective phenomenon, influenced by biological, psychological, social, cultural, and relational factors, such as the quality of the relationship, the level of shared intimacy, the interest and the sexual function of the partner, as well as physical and mental health (Witting et al., 2008). A study carried out by Nobre, 2006, in Portugal, in an all-female sample, found that 15% of women indicated having a low sexual desire (most of the times or always), thus exhibiting negative sexual symptoms of a moderate to severe degree (Nobre, 2006). A Portuguese study by Ribeiro and collaborators revealed the presence of arousal disorders in 10-15% of the women studied (increasing to 25-30% after menopause) and a desire disorder in 25.7% of them (Ribeiro et al., 2011).

According to scientific literature, awareness of emotions, as well as internal bodily sensations, constitutes an important factor in sexual functioning (Ceunen et al., 2016). Wiens, Mezzacappa and Katkin (2000), argue that

ISSN 1788-7119 (online)

emotions are felt with greater intensity when individuals are more aware of the responses their body experiences. However, in order to become aware of the sensations that occur inside the body, it is necessary to know how to perceive these inner sensations (Price & Hooven, 2018). Well-adjusted and adequate emotional regulation remains essential for an individual's psychological and emotional well-being. Negative physiological emotions must be balanced by positive ones for a good quality of life (Wiens, Mezzacappa & Katkin, 2000).

Sifneos (1973) proposed the term "alexithymia" to refer to the difficulty in describing feelings. Alexithymia can also be characterized as a deficiency in the ability to recognize internal signals (Herbert & Pollatos, 2012; Trevisan et al., 2019). The ability to perceive internal bodily signals influences emotional regulation (Fustos et al., 2013; Grynberg & Pollatos, 2015). A greater ability to perceive bodily signals allows for more effective emotion regulation through the ability to discriminate between emotional states as they occur (Fustos et al., 2013). Alexithymia describes a cognitive-emotional disorder that refers to an individual's difficulties in experiencing and describing emotions. The term includes other characteristics, such as a difficulty in differentiating sensations (including physical ones) from emotions; limited symbolic thinking, including lack of imagination and fantasy; and a style of thinking distinguished by its literal and utilitarian character, thus being focused on external events (Taylor et al., 2016). Alexithymia is a multidimensional concept that describes several personality characteristics and is associated with a greater risk to mental health, as it is related to ongoing psychopathologies (Leweke et al., 2011). It can be a transitory state, occurring concomitantly with anxiety and depression (Montoro et al., 2016).

Literature reveals an association between alexithymia and sexual functioning, as occurs with interoception (Madioni & Mammana, 2001). Berengue and collaborators, in a Portuguese study, showed that better overall female sexual functioning was correlated with lower levels of alexithymia in its various dimensions (Berengue et al., 2019). In Brody's study (2003), the relationship between the frequency of penile-vaginal intercourse (using the FSFI) and alexithymia was evaluated; the results showed that women with higher levels of alexithymia reported having a lower frequency of intercourse. This association was not found in men. To explain these results, the author drew on evolutionary psychology and considered the hypothesis that female sexuality is more linked to the need for emotional integration than male sexuality (Brody, 2003). Scimeca and collaborators (2013) investigated the association between alexithymia and sexual behavior in a sample of individuals without sexual disorders and found that alexithymia was associated with low levels of sexual satisfaction, but not with sexual arousal. Only women with higher levels of alexithymia had reduced levels of sexual satisfaction. Higher levels of alexithymia were also associated with greater sexual distress (Scimeca et al., 2003). In a study by Costa and Collaborators (2018), the authors concluded that sexual desire was facilitated by a greater awareness of emotions and internal bodily sensations, as well as by better emotional regulation. It was also found that in women, less alexithymia was correlated with greater sexual desire.

Men and women are different in their sexual physiology and have differences in their sexual response; e.g., the process of sexual arousal (Chivers & Bailey, 2005). In this sense, we believe that female sexuality should be analyzed independently of male sexuality. Thus, our research aims to understand the relationship between sexual distress and sexual functioning among Portuguese women. First, it will compare levels of female sexual distress, sexual functioning and alexithymia by sociodemographic and health characteristics. Second, it will assess the relationship between female sexual distress, sexual functioning and alexithymia, and also assess the predictive influence of the different dimensions of alexithymia and sexual distress on sexual functioning.

Methods

Sample

The sample consisted of 459 heterosexual women, belonging to a convenience sample without sexual disturbances. Data was collected online from January 2018 to March 2019, and inclusion criteria were as follows: self-identifying as a heterosexual woman, being 18 or older, and being able to understand Portuguese. As this was not a clinical sample; snowball sampling techniques and mailing lists were used to collect the data. The sample size was calculated using a 95% confidence interval. The women in the sample ranged between 18 and 65 years, with an average age of 34.57(10.27) years. Table 1 describes the study participants. In the sample, 15.7% of the participants use antidepressants, reflecting the fact that Portugal registers one of the highest rates of antidepressants use in Europe (Estrela et al., 2020), 29% have other health problems, and 33.8% take other medications (including nutritional supplements). Some 338 (73.6%) of the participants have a regular partner, (a regular partner stands independent of their marital status – the participants may declare themselves single but have sex with

a regular partner, or not), while 241 (52.5%) cohabitate with their partner. On average, the duration of relationships endures 111.55 months (about 9.3 years).

Table 1. Sociodemographic characterization of the sample (N = 459)

Variable	*n*	%
Marital status		
Single	252	54.9
Cohabiting	55	11.9
Married	132	28.8
Divorced	20	4.4
Relationship		
Regular partner		
Yes	338	73.6
No	121	26.4
In cohabitation		
Yes	241	52.5
No	218	47.5
Educational attainment		
Up to 9 years of school	15	2.4
Up to 12 years of school	76	15.2
Undergraduate	164	34.4
Master's	182	37.7
Ph.D.	22	4.8
Professional status		
Unemployed	35	7.4
Student	48	10.2
Employed	376	81.7
Health		
Antidepressants		
Yes	72	15.7
No	387	84.3
Other health problems		
Yes	133	29
No	326	71
Other medication		
Yes	155	33.8
No	304	66.2

Procedures

The study was carried out in Portugal, with greater and better access to the Portuguese population. The sample was collected for convenience, since the questionnaires used were disseminated online through social networks such as LinkedIn and Facebook, as well as sent by email; others were delivered in paper format by hand. Participants were warned not to answer the questionnaire in the presence of others or give advance notice of questions occurring about sexual intimacy. They were also alerted to the importance of answering all questions honestly; however, it was said that they could opt to not answer any particular question were they not comfortable doing so. In addition, because it is a quantitative study, all questionnaires presented objective and closed-response questions. All participants were informed of the study objectives in writing, with confidentiality and anonymity guaranteed to all participants. As noted, the inclusion criteria included being 18 years old or older and understanding the Portuguese language fluently. The study guaranteed the anonymity and confidentiality of the data collected and obtained informed consent from the participants in accordance with the Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects.

In the DSM-5, Hypoactive Sexual Desire Disorder (HSDD) has been eliminated as a distinct psychological entity and replaced by a fusion of diagnoses from the DSM-IV. HSDD and Female Sexual Arousal Disorder (FSAD) have been merged into a single diagnosis called Female Sexual Interest/Arousal Disorder (FSI/AD). In the present investigation, however, the DSM-IV diagnoses were considered because the distinct nature of these diagnoses is deemed to be of greater scientific usefulness. Evidence exists for the specificity of HSDD and FSAD disorders in women (e.g., pre-menopausal) that argues against merging female desire and arousal disorders into a single category (DeRogatis et al., 2011).

The reliability of diagnostic criteria using online questionnaires instead of face-to-face settings can be an issue. We argue that the internet provides several advantages to support the evaluation of mental disorders, since internet-based questionnaires can include complex scoring rules, present items effortlessly, provide feedback whenever needed, are very cheap and allow accessibility across different samples at a greater convenience. Moreover, the anonymity of online assessment enables self-awareness and self-disclosure, thus creating more valid results. Given these advantages, numerous and diverse online diagnostic assessment tools have been made available (Nguyen et al., 2015).

Measurement Instruments

Sociodemographic questionnaire

Sociodemographic data about the participants were collected through a questionnaire that included information such as age, occupation, marital status (single, cohabiting, married, divorced – a multiple-choice question), educational qualifications and sexual orientation (multiple-choice question). Direct and independent questions were asked about whether the women cohabited with anyone (a yes-no question) and whether they had a regular part-

ner (a yes-uncertainty-no question), regardless of marital status. The questionnaire asked participants to characterize their mental and physical health, including whether there they are using antidepressants (yes-no question); if they have other health problems (yes-no question) and which ones, as well as whether they are consuming other medications (yes-no question), and which ones.

Sexual health

Sexual health was evaluated based on the definition and diagnostic criteria of the DSM-IV as to whether HSDD and FSAD were present. HSDD questions included: "Do you have a persistent and recurrent lack of motivation for sexual activity? That is, a reduction or absence of spontaneous desire, or in response to sexual/erotic stimuli, or inability to maintain desire or interest during sexual activity, or loss of desire to take the initiative or engage in sexual activities, including avoiding situations that lead to sexual activity" and "If YES, does it cause severe discomfort or interpersonal difficulties?" for answers: "Yes" or "No". FSAD questions included: "Currently exhibits a persistent or recurrent inability to maintain adequate vaginal lubrication until completion of sexual activity" and "If YES, does it cause severe discomfort or interpersonal difficulty?" for answers: "Yes" or "No". Other questions were asked to characterize sexual activity, such as: predominant sexual orientation (multiple choice question); whether the participant has a regular partner; and whether they are cohabitating with the partner (yes-no question), and for what duration.

The last month was specifically characterized, asking participants how many days they have been in a sexual relationship (with intercourse – penis in vagina – or without intercourse); how many days they wanted to have sex (with and without intercourse); how many days they masturbated alone; and how many days they wanted to masturbate alone.

Toronto Alexithymia Scale (TAS-20)

This scale, which has 20 items and is a self-assessment instrument, developed by Taylor and collaborators (Taylor et al., 1997), presents an adequately precise and valid evaluation of the alexithymia construct. The study used the version adapted for the Portuguese population, developed by Prazeres, Parker and Taylor (2000). In the TAS-20, participants must indicate their degree of agreement with each of the items presented on a Likert-type scale, where 1 means "totally disagree" and 5 means "totally agree". The TAS-20 consists of three factors/dimensions: (F1) difficulties identifying feelings, (F2) difficulties describing feelings, and (F3) externally oriented thinking (Prazeres et al., 2000). The determination of alexithymia is based on the sum of the values assigned to each item in the scale, with items 4, 5, 10, 18 and 19 being reverse scored. In the total score, the values can vary between 20 and 100. A sum less than or equal to 51 is considered low alexithymia, between 52 and 60 is considered moderate alexithymia, and equal to or greater than 61 is considered high alexithymia (Taylor et al., 1997). This scale showed good internal consistency when applied to our investigation sample. The scale has an alpha of .86 (Hill & Hill, 2012).

Female Sexual Function Index (FSFI)

The FSFI is a multidimensional instrument for assessing female sexual functioning in the four weeks prior to when it is filled out. The items that make up the FSFI have five answer options, of which the participant must check only one. The answer option, in each item, corresponds to a value from 0 (where 0 means that there was no sexual activity mentioned in that item) to 5 ("almost always or always"; "very high"; "not difficult"; or "very satisfied"), or from 1 to 5 (that is, 5 or 6 answer options, depending on whether the answer includes the option 0 = "no sexual activity"). When making the quotations, items 8, 10, 12, 17, 18 and 19 are reversed. The FSFI consists of 19 questions that assess aspects of female sexual function across six domains: sexual desire, arousal, lubrication, orgasm, satisfaction (including overall sexual satisfaction and satisfaction with the relationship) and pain (Rosen et al., 2000). This instrument was validated for the Portuguese population by Pechorro, Diniz, Almeida and Vieira (2009), having verified, at the time of its validation, an adequate internal consistency based on Cronbach's alpha (above .82 for each of its dimensions and .95 for the total scale). The individual domain scores and full scale score of the instrument are derived by the computational formula outlined. For each dimension, results are obtained by summing the individual item scores for that dimension and then multiplying that result by a specific weight value assigned to each dimension (sexual desire x0.6; arousal x0.3; lubrication x0.3; orgasm x0.4; satisfaction x0.4; pain x0.4). The total FSFI score is obtained by summing the scores for all dimensions. In each sub-dimension, the score stands between 1.2 and 6 or between 0 and 6, while the total FSFI score lies between 2

and 36. Higher scores means better sexual functioning (Pechorro et al., 2009). That is, higher values are indicative of better sexual function, including the various relevant domains of sexual functioning in women, and a score of 0 indicates no sexual activity in the last month. The score for each domain adds up to the total value of the questionnaire (Rosen et al., 2000). According to the authors, should this value be equal to or less than 26.55 (the cutoff point), it is considered female sexual dysfunction (Wiegel et al., 2005). In the study, the scale has excellent internal consistency when applied to the sample of women, with an alpha of .93 (Hill & Hill, 2012).

Female Sexual Distress Scale-Revised (FSDS-R)

This instrument is a 13-item scale designed to provide a standardized quantitative measure of personal suffering or anguish related to women's sexual life. The answers are based on a Likert-type scale from 0 (never) to 4 (always), referring to the last 30 days (DeRogatis et al., 2008). The total score of this instrument is calculated using the sum of all items, with higher values indicating a higher level of sexual maladjustment. The total scale score ranges from 0 (minimum) to 52 (maximum). A score above 11 indicates clinically significant sexual anguish (DeRogatis et al., 2008). The scale can distinguish between women who experience sexual distress and those who do not (DeRogatis et al., 2008). The scale was translated from the original English scale developed by DeRogatis and colleagues (DeRogatis et al., 2008). The psychometric sensitivity of the items was assessed using the asymmetry (*SK*) and kurtosis (*KU*) coefficients. Factor analysis was not performed, since the scale is not divided into factors. It was not necessary to eliminate any item from the original scale. In the study, the scale has excellent internal consistency when applied to the sample of women, with an alpha of 0.94. As in international validations of the instrument (e.g., Aydin et al., 2016) it was verified whether the total value of the scale (distress) correlated with sexual functioning and its dimensions, identified in the literature as being associated with sexual distress. The analysis of the correlations between the results of the FSDS-R full scale and the full scale and subscales that make up the IFSF showed a significant and negative correlation ($-.38 < r < -.66$) between all dimensions of sexual functioning, as can be seen in Table 6, showing convergent validity.

Statistical Analysis

All statistical procedures were performed using the Statistical Package for the Social Sciences (SPSS), version 27.

Before opting for parametric or non-parametric tests, the assumption of homoscedasticity was validated with the Levene test ($p > .050$), the normality assumption was validated with the Shapiro-Wilk test ($p < .050$ in some cases), or by evoking the Central Limit Theorem, as the sample tends to normal ($n > 30$) (Marôco, 2014). In addition, all asymmetry (SK) and kurtosis (KU) values were analyzed and in these cases they did not reveal serious asymmetry problems, being always below 3 and 7 respectively.

The analysis of the correlation between the variables of age and time of cohabitation and the variables of sexual functioning, distress and alexithymia was performed using Pearson correlations.

The significance of HSDD and FSAD's effects (i,e, diagnostic criteria, no symptoms, symptoms but no distress) on sexual functioning, distress and alexithymia levels was assessed using one-way ANOVA. The effect of antidepressant consumption (consuming or not consuming) on the average of sexual functioning, distress and alexithymia levels was analyzed with a Student's *t*-distribution test.

Finally, a hierarchical linear regression model was constructed to test the contribution of independent variables to the dependent variable (sexual functioning). To avoid Type I errors, Bonferroni correction tests were performed.

Results

From the total of 459 participants in the non-clinical sample, clinical sub-samples with HSDD and FSAD diagnostic criteria were taken. These diagnoses were performed based on the DSM-IV-TR criteria (APA, 2000), as explained in the Measurement instruments section. Table 2 shows the frequencies for these diagnoses as presented in the sample, as well as the cases in which symptoms are presented, but the distress criterion is missing.

Regarding effective and desired sexual activity in the last 30 days, 127 (27.7%) of the participants did not have a sexual relationship with intercourse in the last 30 days, 256 (55.8%) did not have a sexual relationship not involving intercourse, and 173 (37.7%) did not masturbate. As for the desire for sexual activity, in the last 30 days, 63 (13.7%) did not wish to have sex with intercourse, 203 (44.2%) did not wish to have sex that did not involve

Table 2. Characterization of the clinical subsample, taken from the normative sample

	n	%
HSDD	121	26.4
Low desire without distress	73	15.9
No symptoms	265	57.7
FSAD	83	18.1
Low arousal without distress	36	7.8
No symptoms	340	74.1

Table 3. Characterization of actual sexual relationships and sexual desire in the sample (average number of days per month)

	Realized activities *M(SD)*	Desired activities *M(SD)*
With intercourse	7.8 (51.86)	10.34 (25.4)
Without intercourse	2.33 (4.99)	4.5 (7.03)
Masturbation	3.4 (5.23)	4.13 (6.31)

intercourse, and 185 (40.3%) did not wish to masturbate. Other information regarding the average number of days per month including sexual activities can be seen in Table 3.

Regarding sexual functioning, the presence of HSDD had a statistically significant effect on the sexual functioning of women ($F(2, 321) = 94.93$; $p < .001$; $\eta^2_p = .372$; $\pi = 1$), with a high effect dimension. Women without symptoms had significantly better sexual functioning than women with HSDD diagnostic criteria and women without desire but without distress (and therefore without diagnostic criteria). A statistically significant effect of the presence of FSAD on women's sexual functioning was also observed ($F(2, 321) = 80.96$; $p < .001$; $\eta^2_p = .335$; $\pi = 1$). Women without symptoms had significantly better sexual functioning than women with FSAD diagnostic criteria and women without arousal but without distress. Women's sexual functioning showed statistically significant differences while consuming antidepressants; when women took these medications (M*(SD)* = 25.89(5.24); $n = 48$), sexual functioning registered inferior compared to women who did not consume them (M*(SD)* = 28.75(5.04); $n = 275$).

On women's sexual distress, HSDD bore a statistically significant effect: ($F(2, 439) = 145.52$; $p < .001$; $\eta^2_p = .399$; $\pi = 1$), with a high effect dimension. Women without symptoms had significantly less sexual distress than women exhibiting HSDD diagnostic criteria and women without desire but without distress (and therefore without diagnostic criteria). A statistically significant effect of the presence of FSAD on women's sexual distress was also observed ($F(2, 439) = 63.69$; $p < .001$; $\eta^2_p = .225$; $\pi = 1$). Women without symptoms had significantly better sexual functioning than women with FSAD diagnostic criteria and women without arousal, but without distress. Women's sexual anguish was influenced by the consumption of antidepressants; when women consumed these medications (M*(SD)* = 18.84(12.69); $n = 69$), sexual distress was higher in relation to women who did not consume them (M*(SD)* = 13.31(13.26); $n = 371$).

Regarding alexithymia levels, HSDD had a statistically significant effect on alexithymia ($F(2, 437) = 15$; $p < .001$; $\eta^2_p = .064$; $\pi = 1$). Women without symptoms had significantly lower levels of alexithymia than women with HSDD diagnostic criteria and women with no desire but no distress (and therefore no diagnosis). A statistically significant effect of the presence of FSAD on women's sexual distress was also observed ($F(2, 439) = 8.96$; $p < 0.001$; $\eta^2_p = .039$; $\pi = .97$). Women with FSAD diagnostic criteria had significantly higher levels of alexithymia than women without symptoms. Women who consumed antidepressants (M*(SD)* = 50.64(13.33); $n = 66$) had higher levels of alexithymia compared to women who did not consume them (M*(SD)* = 46(12.89); $n = 373$). This and other information can be seen in Table 4.

A weak negative correlation existed between age and alexithymia levels ($r = -.18$; $p > .001$; $n = 438$). Older women tended to have lower alexithymia levels (Table 5). Cohabitation time did not show any significant association with sexual functioning, alexithymia or sexual distress, as shown in Table 5.

Through the correlations of the variables under study, we found that alexithymia had a significant and positive association with sexual distress ($r = .35$; $p < .001$; $n = 426$) and a negative association with sexual functioning ($r = -.21$; $p < .001$; $n = 310$); that is, when women had higher levels of alexithymia, they tended to have worse sexual functioning. Sexual functioning also had a negative and strong association with sexual distress ($r = -.66$; $p < .001$; $n = 316$) and with all the subdimensions of alexithymia. Specifically, regarding the dimensions of alexithymia, it was found that the difficulty of identifying feelings was positively related to sexual distress ($r = .38$; $p < .001$; $n = 433$) and negatively with sexual functioning ($r = -.18$; $p < .001$; $n = 316$). Similar results were found for the other dimensions of alexithymia related to distress and women's sexual functioning, as shown in Table 6.

A hierarchical multiple regression was performed in order to assess the effects of alexithymia and its dimensions, as well as sexual distress, on women's sexual functioning. Model 2 describing the multiple linear regression of women's sexual functioning as a function of sexual anguish, general alexithymia, difficulties in identifying

Table 4. Differences in mean sexual functioning, sexual distress, and alexithymia levels, according to symptoms or diagnoses of HSDD and FSAD, and antidepressant consumption

		M *(SD)*	F	*p*
Sexual Functioning				
HSDD	No symptoms	30.63 (0.29)	94.93	<0.001**
	No desire/no distress	26.7 (0.58)		
	HSDD	23.08 (0.48)		
FSAD	No symptoms	29.94 (3.96)	80.96	<0.001**
	No arousal/no distress	25.95 (3.77)		
	FSAD	22 (5.54)		
Antidepressant	Yes	25.89 (5.24)	0.449	<0.001**
	No	28.75 (5.04)		
Sexual Distress				
HSDD	No symptoms	8.27 (9.41)	145.52	<0.001**
	No desire/no distress	13.01 (11.16)		
	HSDD	27.94 (11.68)		
FSAD	No symptoms	11.05 (11.42)	63.69	<0.001**
	No arousal/no distress	12.56 (9.60)		
	FSAD	27.42 (13.58)		
Antidepressant	Yes	18.84 (12.69)	0.096	0.001**
	No	13.31 (13.26)		
Alexithymia levels				
HSDD	No symptoms	44.24 (12.60)	15	<0.001**
	No desire/no distress	46.73 (12.99)		
	HSDD	51.95 (12.51)		
FSAD	No symptoms	45.53 (12.77)	8.96	<0.001**
	No arousal/no distress	44.5 (11.55)		
	FSAD	52.04 (13.42)		
Antidepressant	Yes	50.64 (13.33)		
	0.085	0.008**		
	No	46 (12.89)		

feelings, difficulties in describing feelings, and thoughts that were externally oriented, proved to be statistically significant ($F(4, 292) = 63.184$; $R^2 = 0.452$; $p < 0.001$). The model explained 45.2% of the variability of women's sexual functioning. However, the analysis of the regression coefficients and their statistical significance revealed that

Table 5. Association of age and time of cohabitation with sexual functioning, alexithymia and sexual distress

		Sexual Functioning (FSFI)	Alexithymia (TAS-20)	Sexual
Age	*r*	.02	−.18**	−.081
	p	.748	<.001	.092
	N	321	438	438
Cohabitation	*r*	− .04	−.78	.09
	p	.575	.293	.218
	N	160	182	186

Table 6. Matrix correlation

	1	2	3	4	5	6
1 - Alexithymia	1	.886**	.864**	.650**	.350**	–.211**
2 - Diff. identifying feelings	–	1	.690**	.313**	.383**	–.182**
3 – Diff. describing feelings	–	–	1	.408**	.283**	–.202**
4 – External Orientation	–	–	–	1	.142**	–.135*

Table 7. Hierarchical multiple linear regression of female sexual functioning

	Model 1			Model 2			Model 3		
	B	*SE B*	*ß*	*B*	*SE B*	*ß*	*B*	*SE B*	*ß*
Sexual distress	– .289	.020	–.670*	–.299	.020	–.695*	–.309	.027	–.723*
Alexithymia	.005	.019	.012						
Diff. identifying feelings				.124	.046	.161*	.077	.057	.103
Diff. describing feelings				–.131	.068	–.114*	–.036	.087	–.032
External Orientation				–.042	.056	–.035	–.046	.081	–.037
Age							.016	.039	.031
Cohabitation							–.002	.004	–.037
R^2	.444			.452			.505		
F for change in R^2	119.697*			63.184*			24.335*		

general alexithymia and externally oriented thoughts were not significant predictors; whereas difficulty in identifying feelings (ß = 0.161, $t(298) = 2.73$; $p = 0.007$) and sexual distress (ß = -0.299, $t(298) = -15.14$; $p < 0.001$), were significant predictors, while difficulty in describing feelings (ß = -131, $t(298) = -1.927$; $p = .055$) was a partially significant predictor, as shown in Table 9. When a multiple hierarchical regression was performed in order to assess the effects of age, time of cohabitation, the subdimensions of alexithymia and sexual distress on women's sexual functioning, it appears that, despite the model being significant ($F(6, 143) = 24.335$; $R^2 = 0.505$; $p < .001$), only sexual distress was a significant predictor of the model, as shown in Table 7.

Discussion

The study's aim was to assess the impact of alexithymia, as well as sexual distress, on the sexual functioning of women. The results showed that alexithymia has a relevant bearing on women's sexual functioning.

The results showed that age did not influence women's sexual functioning or anguish, contrary to several investigations that have concluded that sexual functioning is affected by aging (for example, Kleinstäuber, 2017 and Jenczura et al., 2018). In the case of men, sexual difficulties seem to be more related to age, bearing a greater association with health problems. In the case of women, menopause has a negative impact on women's sexual interest and desire; however, psychosocial factors seem to have an important role (Avis, 2000). In this study, age has a negative relationship with alexithymia, showing that with age, women tend to be more capable of identifying and recognizing their own emotions. These data are supported by another study arguing that older adults seem more emotionally adapted compared to young adults. Older adults seem to have fewer negative emotions, have greater emotional ability and prefer to use effective emotional regulation techniques (Birditt & Fingerman, 2005). Other studies argue that older people experience improvements in the social and emotional domains of life (Akiyama et al., 2003). This may explain the results presented in this investigation, as recognizing and identifying emotions is crucial to achieving adequate emotional regulation in the case of women.

Cohabitation time did not show a positive association with alexithymia, distress or sexual functioning, despite studies that support the idea that, in long-term relationships, daily attitudes facilitate sexual desire, especially when these attitudes instill the feeling that the partner is valuable and that the relationship is special. However,

intimacy and sexuality is influenced by several variables, making it a very complex process. Thus, sexual motives seem to vary according to circumstances (Birnbaum et al., 2016). Sexual functioning encompasses more than sexual desire, in addition to other psychological and emotional variables that may be at play.

The results show us that, in a non-clinical sample, there is actually a relatively high percentage of women exhibiting criteria compatible with a diagnosis of HSDD (26.4%) and FSAD (18.1%), according to the DSM-IV criteria (APA, 2000). These data confirm the fact that the lack of sexual desire is one of the most common sexual complaints in women throughout the life cycle, with representative studies carried out in several countries. For a diagnosis to occur, it is necessary to present clinically significant distress; thus, prevalence rates fall, with only 7-10% of women reporting sexual dysfunction (Mitchell et al., 2013).

In this study, women's sexual functioning showed a significant influence on the presence or absence of criteria for HSDD and FSAD. Women without symptoms have significantly better sexual functioning compared to women with HSDD diagnostic criteria and women without desire but without distress (and therefore without a diagnosis); the same is the case for FSAD. These data show that even if the criterion of sexual anguish is not present and there is no experience of severe discomfort or interpersonal difficulties, worse sexual functioning occurs compared to women who have no symptoms or do not have a low sexual desire or low arousal. That is, when there is a low desire or low arousal, even without sexual distress, sexual functioning is affected. Sexual functioning was significantly better in women who reported not taking antidepressants compared to those who reported taking antidepressants. Depression itself is associated with decreased libido and decreased sexual activity (Gitlin, 1997). Women taking antidepressants can have symptoms of mood swings. In addition, antidepressant medications often interfere with various stages of the sexual response (Ferguson, 2001).

Sexual distress was significantly affected by the presence or absence of criteria for HSDD, FSAD and the consumption of antidepressants in this study. The diagnostic criterion for these sexual disorders is anguish and is influenced by severe discomfort or interpersonal difficulties (APA, 2000). Additionally, the level of alexithymia was significantly affected by the presence of HSDD, FSAD and the consumption of antidepressants. Alexithymia, besides representing a failure to recognize and access emotions and feelings, can result from global deficits in the recognition of internal bodily sensations (Sowden et al., 2016). This justifies its important role in clinical treatment, with symptoms or even clinical diagnoses relating to sexual desire or sexual arousal. These results show that the ability to recognize, identify and express emotions is lower in the presence of sexual and other psychiatric disorders. These data are supported by Palser and collaborators, whose studies indicate that subjects with alexithymia are the most likely to report clinically significant levels of anxiety (Palser et al., 2018). As verified in this study, the consumption of antidepressants is related to the presence of psychiatric conditions. The results also showed that alexithymia is associated with more sexual distress and less sexual functioning. In this sense, the study results corroborate the argument that higher levels of alexithymia, in various sexual pathologies, may be due to low awareness or inadequate interpretation of the effects on the body, which is also supported by Brewer, Cook and Bird (2016). Likewise, Wise et al. (2002) verified that subjects with sexual disorders (arousal, orgasm and sexual pain) have higher levels of alexithymia. Specifically, in this study, regarding the dimensions of alexithymia, it was found that difficulty in identifying feelings is positively related to sexual distress and negatively to sexual functioning. Similar results were found regarding the other dimensions of alexithymia related to distress and women's sexual functioning. Sexual distress is linked to negative emotions, such as shame, guilt, frustration, anxiety, fear and anger in relation to one's sex life or sexual experience (DeRogatis et al., 2008).

The levels of distress in women show a significant and positive correlation with all dimensions of alexithymia, demonstrating the important role of this variable in women's sexual well-being. These data are in line with a study by Scimeca and collaborators (2013), where higher levels of alexithymia were also associated with more sexual distress. In an investigation carried out by Madioni and Mammana (2001), the results showed an association between alexithymia and some sexual symptoms, in a clinical sample of sexual disorders and one with normative subjects (similar to the present study); the scale values were significantly higher in the clinical sample in men and women diagnosed with HSDD. The significant association between alexithymia and psychological distress as verified in the present study is corroborated by previous studies (for example, Leising et al., 2009). Previous research concluded that a specific combination of alexithymic characteristics is more important as a risk factor for psychological distress; in the present study, the positive association between alexithymia and psychological distress was attributed to all subscales (including global ones). This is in line with previous results regarding positive associations between specific problems in identifying emotions and higher levels of psychological distress (Härtwig et al., 2014; Liang & West, 2011); in this case, we are referring to sexual anguish. More alexithymic subjects are more likely to report clinically significant levels of anxiety (Palser et al., 2018).

It was possible to build a multiple linear regression model of women's imparied sexual functioning due to sexual distress, difficulties in identifying feelings and difficulties in describing feelings. General alexithymia was not considered a significant predictor of the model, despite its significant association with worse sexual functioning and more sexual distress. However, difficulties in identifying feelings, as well as difficulties in describing feelings, proved to be essential dimensions of alexithymia regarding the production of an adequate female sexual response. The ability to perceive one's own sensations is essential to developing attitudes that lead to emotional regulation (Gross, 2015). The fact that alexithymia, in a global dimension, is not a predictor of the model, even if some of its subdimensions are, reinforces the complexity of this concept/phenomenon, and reveals that its various components play different roles in women's sexual functioning, in addition to the complexity of female sexual functioning. According to Baumeister (2000), women have greater intra-individual variation and less consistency in their sexual behavior than men throughout the life cycle; additionally, women's sexuality is more influenced by social and cultural factors (Baumeister, 2000). In terms of sexual functioning, these gender differences support the importance of developing studies focusing on the genders independently.

Strengths and Limitations

Some limitations of this study should be considered when analyzing and interpreting the results. All methods used were self-reported and we presented a convenience sample, which may have some influence on the answers. Since this type of sampling does not guarantee representativeness for the population, our findings are not generalizable. Sexual functioning remains quite complex and can be influenced by several biological, psychological and social factors, which may also interfere with the study results. Furthermore, the questions formulated with the DSM-5, HSDD, and FSAD diagnostic criteria, helped more objectively understand the percentage of women who can indicate the selected criteria for these diagnoses. However, we know that establishing a rigorous clinical diagnosis requires a more comprehensive clinical evaluation, adapted to each patient.

Future investigations suggest studies that include male samples, with gender-discriminatory and comparative analysis, in order to understand more objectively the influence that alexithymia can have on sexual functioning. It is also suggested that studies that specifically address the effect of alexithymia in women's sexual functioning in other countries be developed. Women who are taking antidepressants could be doing so to treat depression or another condition that is linked to sexual functioning, and these conditions were not controlled for in the present study, which could interfere with the results. The fact that the study sample was non-clinical may be a limitation, as the prevalence of other symptoms or sexual disturbances was not controlled for. Other physical pathologies could have interfered with the results, conditioning the results as well as the analysis.

Conclusion, Implications, and Future Directions

The results of this study have important implications for the recognition of relevant variables in women's sexual functioning. The ability to identify, recognize and express emotions is an important factor in the experience of female sexuality. These data reinforce the idea that sexual intervention programs or protocols based on increased awareness and emotional regulation can bring significant improvements to women's sexual functioning, regardless of whether they have sexual dysfunctions or not, and can help minimize sexual problems or even protect them from future sexual disorders. Although the sample collected was a normative, non-clinical sample, it was observed that there is a relatively high percentage of women who meet the diagnostic criteria for HSDD (26.4%) and for FSAD (18.1%).

It is clear that the perception of the body's state, or perceiving and being aware of what happens inside one's body, seems to facilitate adequate and full sexual functioning, while the difficulty experiencing and describing one1s emotions hinders appropriate sexual functioning.

In conclusion, a greater awareness of emotions and internal bodily sensations as well as better emotional regulation facilitates women's sexual functioning, and the results revealed that better sexual functioning correlates with less alexithymia.

Acknowledgement

We acknowledge the contribution of all those research participants and the reviewers whose efforts allowed the work to be more rigorous.

Funding
The authors received neither financial nor non-financial support for the research (including data acquisition) and/or authorship and/or publication of this article.

Author contributions
Celina Ribeiro: conceptualization, design, methodology, investigation, data management, formal analysis, interpretation, writing original draft, writing review and editing.
Henrique Pereira: design, project administration, formal analysis, supervision, writing review and editing.

All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflicts of Interest
The authors declare no conflicts of interest to disclose.

Ethical Statement
The research was approved by the university research ethics board on 3 July 2021.
This manuscript is the authors' original work.
All participants engaged in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

Data Availability Statement
The data presented in this study are available upon request. All information regarding datasets was kept safe in an encrypted file in our computers to preserve the anonymity of all participants. Still, we can make it available upon request, by sending the authors an email with a valid request.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0004

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RESEARCH ARTICLE

Adolescents' Perceptions About Non-Suicidal Self-Injury, Suicidal Ideation and Suicide Attempts

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History
Received: 13 November 2021
Accepted: 25 September 2022
Published: 24 March 2023

Citation
Duarte, E., Silva, S., & Gouveia-Pereira, M. (2023). Adolescents' Perceptions About Non-Suicidal Self-Injury, Suicidal Ideation and Suicide Attempts. *European Journal of Mental Health, 18,* e0004, 1–11. https://doi.org/10.5708/EJMH.18.2023.0004

Introduction: Non-suicidal self-injury, suicidal thoughts and behaviors present high prevalence rates in adolescence.
Aims: This study aimed to describe adolescents' perceptions about these phenomena, and to analyze and compare the differences of these perceptions among adolescents with and without a history of non-suicidal self-injury, suicidal ideation, and suicide attempts.
Methods: The convenience sample consisted of 452 adolescents in ages between 12 and 18 (M(*SD*) = 15.59(1.50), 48% male and 52% female. For data collection, the Free Association Test was used in a survey, and data was analyzed through content analysis.
Results: Results showed that 10.8% of the participants presented a history of non-suicidal self-injury, 19.9% suicidal ideation, and 2.7% suicide attempts. Perceptions were grouped into eight dimensions: Consumption of Psychoactive Substances; Death/Suicide; Interpersonal Factors; Intrapersonal Factors; Moral Judgments; Negative Emotions; Psychological Functions; and Self-Injurious Methods. Further analysis revealed that adolescents with and without a history of non-suicidal self-injury, suicidal ideation, and suicide attempts presented differences in their perceptions of these phenomena.
Conclusions: These findings contribute to the understanding regarding the perceptions of adolescents about these phenomena and might have implications regarding their prevention and intervention.

Keywords: adolescence, non-suicidal self-injury, suicidal ideation, suicide attempts, free word association

Introduction

Over the past few decades, there has been an increase in the prevalence of suicidal thoughts and behaviors (STBs) among adolescents, including suicidal ideation (SI; Azevedo & Matos, 2014; Werlang et al., 2005) and suicide attempts (SAs; Bilsen, 2018; Evans et al., 2017). Likewise, research suggests that the prevalence of non-suicidal self-injury (NSSI) has also been growing in adolescents (Muehlenkamp et al., 2012; Zetterqvist et al., 2021). Although differentiated phenomena, NSSI and STBs usually co-occur, and evidence points to a shared continuum of self-harm (Knorr et al., 2019; Rogers et al., 2018; Webb, 2002).

In Portugal, NSSI prevalence in adolescence ranges from 20.3% to 34.5% (Carvalho et al., 2017; Gaspar et al., 2019; Gonçalves et al., 2012; Nobre-Lima et al., 2018), SI prevalence oscillates between 10.7% and 22% (Azevedo & Matos, 2014; Carvalho et al., 2017; Pereira & Cardoso, 2015), and about 7% of adolescents report

ISSN 1788-7119 (online)

having attempted suicide (Oliveira et al., 2001; Sampaio et al., 2000). These rates are identical to those found in international studies that focused on adolescents: 7.5-46.5% NSSI (Cipriano et al., 2017), 8.1- 16.9% SI (Biswas et al., 2020; Georgiades et al., 2019; Sampasa-Kanyinga et al., 2017; Uddin et al., 2019), and 3- 17% SAs (Georgiades et al., 2019; Sampasa-Kanyinga et al. 2017; Uddin et al., 2019).

NSSI serves a variety of psychological functions, namely intrapersonal (e.g., to escape from aversive states, or generate positive feelings) or interpersonal (e.g., to access help, or to escape from negative social situations) functions (Klonsky, 2007; Nock & Prinstein, 2004). Studies that focused on the perceptions about these functions concluded that individuals without a history of NSSI tend to emphasize interpersonal functions more than those with a history of these behaviors, while their views regarding intrapersonal functions remain similar (Batejan et al., 2015; Duarte, et al., 2019c).

Exploring and characterizing the societal perceptions of NSSI and STBs might contribute to the understanding of these issues (O'Connor & Nock, 2014; Sampaio et al., 2000; Vieira & Coutinho, 2008). It is also important to comprehend whether these perceptions change according to the lived experiences of young people with NSSI and STBs (Grimmond et al, 2019). For instance, previous studies have shown that adolescents with and without a history of deliberate self-harm reveal different representations regarding the functions of these behaviors (Bresin et al., 2013; Duarte et al., 2019b; Duarte et al., 2019c), which indicates that experience influences how this phenomenon is represented. Other studies have found that a more permissive and accepting attitude towards suicide may itself be a risk factor for STBs (Arnautovska & Grad, 2010; Hollinger, 2016; Joe et al., 2007), which underlines the importance of assessing these perceptions.

The adolescent's interpersonal sphere can play an important role in this context, namely regarding the individual's initiative to reveal STBs and NSSI to others, to search for specialized help, and to search for support during follow-up and treatment (Baetens et al., 2015). More specifically, peers can be considered both a risk factor and a protective factor for NSSI and STBs. On the one hand, if peers are aware of the reasons for an adolescent to become involved in STBs, they can definitely promote identifying these behaviors and reducing the associated stigma (Bresin et al., 2013). On the other hand, peers can be a risk factor themselves due to the social contagion effect that may exacerbate or encourage these behaviors within peer groups (Hasking et al., 2015). Furthermore, peers can be relevant agents for developing strategies to prevent STBs (Fortune et al., 2008; Hasking et al., 2015; Schlichthorst et al., 2020; Wasserman et al., 2015). Taking these factors into account, the understanding of the perceptions about NSSI, SI and SA can simultaneously contribute to comprehending the personal experience of these phenomena and to the clarification of how interpersonal relations can be a crucial factor for prevention and intervention.

Therefore, considering the prevalence of NSSI and STBs in adolescence and due to the scarcity of Portuguese studies that focused on adolescents' perceptions about these phenomena, the current study comprises two main goals: 1) to explore and describe the perceptions of adolescents about NSSI, SI and SA by means of free word association; 2) to compare the perceptions of adolescents with and without a history of NSSI, SI and SA. Since this still remains an under-researched topic, the present study follows a qualitative design to allow a deeper analysis of these perceptions.

Methods

Participants

Participants consisted of a convenience sample involving 452 adolescents who studied in public schools located in Portugal's central area. From this total, 48% (217) were male and 52% (235) were female, and their ages ranged between 12 and 18 years old (M(*SD*) = 15.59(1.5)). Participants attended school years between the 7th and 12th grades, with the majority (74.1%) attending secondary school (10th to 12th grades). As shown in Table 1, the lifetime prevalence of NSSI was 10.8% (*n* = 49), the prevalence of SI was 19.9% (*n* = 90) and the prevalence of SAs was 2.7% (*n* = 12). However, these phenomena coexist in some participants: 18 adolescents reported a history of NSSI and SI; one adolescent NSSI and SAs; three participants reported a history of SI and SAs; and seven adolescents revealed a history of NSSI, SI and SAs. Female participants revealed a higher prevalence of these phenomena (Table 1).

Table 1. Participants' gender and history of NSSI, SI and SAs

		Female	Male	Frequency	%
NSSI	With NSSI	42	7	49	10.8%
	Without NSSI	193	210	403	89.2%
SI	With SI	56	34	90	19.9%
	Without SI	179	183	362	80.1%
SAs	With SAss	10	2	12	2.7%
	Without SAs	225	215	440	97.3%

Measures

Considering the goal of the present study, the Free Word Association Test was selected as the method of data collection, since it allows the broad study of perceptions and has been previously used in studies with similar objectives (e.g., Araújo et al., 2010). This instrument consisted of three main questions for each of the study variables (NSSI, SI and SAs). These questions started with a brief introduction in which the variables were presented: "Some adolescents exhibit behaviors in which they intentionally hurt themselves" (NSSI); "Some adolescents have ideas and thoughts about suicide" (SI) and "There are some adolescents who have already made suicide attempts, that is, who tried to commit suicide" (SAs). After each of these introductions, the respondent was asked to write down at least five words that came to mind when they thought of the mentioned phenomena. There was an additional question regarding each of the variables (e.g., "Have you ever tried to commit suicide? At what age?"), which allowed us to assess the previous history of NSSI, SI and SAs. Sociodemographic questions were also applied to collect basic information about the participants' age, sex, and school year.

Since these are sensitive topics, at the end of the questionnaire, several helplines and community contacts were provided. The schools' administration was also given the contacts from the research team in order to allow further communication if any issue arose.

Procedures

Several convenience contacts were made with schools, presenting the research goals and procedures. After the request for cooperation was authorized by the schools' administration, classes were chosen, and the schools' director selected specific dates for data collection. After that, consent forms were given to the legal guardians of the students. In a later phase, the adolescents who had this authorization filled out the questionnaire.

The participants were informed about the voluntary nature of the study, as well as regarding the anonymity and confidentiality throughout the process of data collection and analysis.

Ethical Procedures

The current study integrated a wider research project that aimed to characterize NSSI and STBs in Portuguese adolescents. This project was approved by the General Education Directorate of the Ministry of Education and Science from Portugal during March 2017 concerning the participation of adolescents.

Data Analysis

The participants' sociodemographic data was analyzed using SPSS v25 software. The data collected through the Free Word Association Test were studied using content analysis (Bardin, 2008). This analysis implies the specification of categories that constitute classes grouping elements with common characteristics (Bardin, 2008), allowing to reduce the complexity of the study's themes (Vala, 1999). Thus, each answer elicited through the Free Association Test was considered a coding unit that was further sorted into categories. Two researchers conducted the analysis independently, grouping the coding units into categories framed by the existing literature. In a posterior phase, the resultant sets of analyses were compared and discussed, identifying differences and possible issues in the coding process.

Results

Considering the total of responses given by the adolescents, 4237 coding units emerged (mean of nine units per participant). The coding units were organized into 66 categories, which were then grouped into eight main dimensions. As shown in Table 2, these dimensions comprise: Consumption of Psychoactive Substances (42 coding units and three categories); Death/Suicide (247 coding units and two categories), which refers to issues of consummated suicide and death; Interpersonal Factors (601 coding units and 13 categories), that refers to interpersonal and social variables (e.g. Bullying and Social Isolation); Intrapersonal Factors (775 coding units and five categories), that includes intrapersonal factors such as Depression and Low Self-esteem; Moral Judgments (513 coding units and 11 categories), that includes moral judgments and stereotyped perceptions (e.g. Cowardice and Stupidity); Negative Emotions (1792 coding units and 16 categories); Psychological Functions (92 coding units and three categories) that consist of three types of psychological functions usually associated with DSH; and Self-Injurious Methods (175 coding units and 13 categories).

Overall, the Negative Emotions dimension was the most referenced by the four groups of participants (1790 coding units), followed by the dimensions related to intrapersonal (776 coding units) and interpersonal factors (599 coding units). Focusing on the coding units of each adolescent group, some differences emerged. These differences can be seen mostly between groups of participants with and without a history of NSSI, SI and SA. For instance, only the adolescents who did not report a history of these phenomena mentioned the consumption of psychoactive substances. Similarly, in the dimension concerning self-injurious methods, no coding units were mentioned by adolescents with a history of NSSI and SA. In the Moral Judgments dimension, adolescents without a history of NSSI, SI and SA presented more coding units, particularly regarding NSSI. These differences will be further discussed in detail.

Discussion

To comprehensively discuss results, we will first describe the contents that emerged from our analysis and compare them with information from previous research. Secondly, we will focus on the results from each participant group (i.e., adolescents with and without a history of NSSI, SI and SA) and their comparison. Finally, we will reflect on our results as a whole and on their possible impact on the prevention and intervention of NSSI, SI and SA.

From a global perspective, Negative Emotions was the dimension most mentioned by all groups of participants. In addition, it also revealed a considerable diversity of contents with more than 16 categories, which indicates that emotionality amounts to a great importance in how NSSI, SI and SAs are perceived. It is known that emotions have an influence on the prediction of STBs, namely on the propensity of young people to get involved in these behaviors (Kranzler et al., 2016). Sadness, pain, suffering, and despair were the most mentioned negative emotions, which may also be linked to the idea that STBs are associated with difficulties in the emotional field (Xu, 2020; Wolff et al., 2019). Negative emotionality is also often linked to NSSI, and one of the most reported motivations for engaging in these behaviors is to regulate negative emotions (Klonsky, 2007; Taylor et al., 2019). Thus, NSSI is commonly performed as an emotion regulation strategy, as it decreases the experience of negative affect (Andover & Morris, 2014). Furthermore, a recent study revealed that individuals with a history of NSSI showed greater difficulties in negative emotion reactivity and regulation than the comparison group without a history of NSSI (Mettler et al., 2021).

The two following dimensions with more coding units were Interpersonal and Intrapersonal Factors associated with NSSI, SI and SAs. Regarding interpersonal factors, previous studies found that STBs are associated with social isolation (Calati et al., 2019; Oexle & Ruesch, 2018), bullying and peer rejection (Holt et al., 2015), family issues (Fortune et al., 2008), lack of social support (Stewart et al., 2017) and other interpersonal issues (Bazrafshan et al., 2016; Hawton et al., 2012). Likewise, most intrapersonal factors mentioned by the participants have been previously associated with NSSI, SI and SA, namely depression (Chu et al., 2016; Hegerl, 2016; Wang et al., 2017), low self-esteem (Soto-Sanz et al., 2019), and other psychopathologies (Nock et al., 2013).

Regarding the less mentioned dimensions, the consumption of psychoactive substances has been associated with NSSI and SA (Fortune et al., 2008; Stewart et al., 2017), and it can also be a self-injurious method (Duarte et al., 2019a; Gouveia-Pereira, & Gomes, 2019; Hawton et al., 2003). The psychological functions that were referenced by the participants are in accordance with those described by the literature (e.g., Klonsky, 2007), as well as the several self-injurious methods that can be utilized (Duarte et al., 2019a; Gouveia-Pereira, & Gomes, 2019; Klonsky, 2007; Klonsky et al., 2015).

Table 2. Content analysis (NSSI, SI and SAs) – Percentage (%) and frequency (N) of coding units per group of participants in each dimension

		NSSI		SI		SAs	
Dimensions	Categories	With NSSI	Without NSSI	With SI	Without SI	With SAs	Without SAs
Consumption of Psychoactive Substances	Alcohol	–	0.2 (3)	–	0.2 (2)	–	0.4 (5)
	Drugs	–	1.1 (14)	–	0.2 (3)	–	1.1 (14)
	Smoking	–	0.1 (1)	–	–	–	–
	Total	–	1.4 (18)	–	0.4 (5)	–	1.5 (19)
Death/Suicide	Death	–	–	6 (19)	6.7 (81)	–	6.1 (77)
	Suicide	6 (9)	4.3 (54)	–	0.7 (7)	–	–
	Total	6 (9)	4.3 (54)	6 (19)	7.4 (88)	–	6.1 (77)
Interpersonal Factors	Arguments	1.3 (2)	–	–	–	–	–
	Bullying	5.3 (8)	–	2.5 (8)	2.5 (30)	–	2.8 (35)
	Discrimination	–	0.8 (10)	–	0.5 (6)	–	0.5 (6)
	Family Issues	1.3 (2)	0.7 (9)	0.6 (2)	1.2 (15)	4 (1)	–
	Friends	–	0.5 (6)	1 (3)	–	4 (1)	0.6 (7)
	Lack of Social Support	–	–	1.6 (5)	–	–	–
	Loss of Someone Significant	–	–	–	1 (12)	–	1.2 (15)
	Love Issues	1.3 (2)	0.6 (8)	0.6 (2)	0.4 (5)	–	0.4 (7)
	Rejection	0.7 (1)	0.4 (5)	–	–	–	–
	Social Isolation	8.6 (13)	6.5 (82)	11.5 (36)	6.1 (74)	12 (3)	6.9 (88)
	Social Issues	–	–	–	0.2 (2)	–	–
	Social Pressure	–	0.6 (7)	–	0.7 (9)	–	0.7 (9)
	Violence	–	1.8 (23)	–	1.5 (19)	–	1.8 (23)
	Total	18.5 (28)	11.9(150)	17.8 (56)	14.1 (172)	20 (5)	14.9 (190)
Intrapersonal Factors	Depression	11.2 (17)	7.5 (95)	9.9 (31)	6.5 (78)	8 (2)	6.3 (80)
	Insecurity	–	1.5 (19)	2 (6)	1.2 (15)	–	1.1 (14)
	Low Self-esteem	–	2.8 (35)	5.8 (18)	3.3 (40)	16 (4)	4.2 (53)
	Psychological Issues	–	0.9 (11)	6 (19)	8.9 (107)	–	9 (114)
	Psychopathy	–	0.6 (7)	–	0.4 (5)	–	0.4 (5)
	Total	11.2 (17)	13.3 (167)	23.7 (74)	20.3 (245)	24 (6)	21 (266)
Moral Judgments	Childishness	–	1.2 (15)	–	0.4 (5)	–	–
	Cowardice	–	–	1 (3)	0.3 (4)	–	1 (13)
	Exaggeration	–	–	–	–	–	0.7 (9)
	Madness	–	3.6 (46)	–	–	–	–
	Masochism	–	1.7 (22)	–	–	–	–
	Pity	–	0.9 (11)	–	0.3 (4)	–	0.7 (9)
	Ridiculousness	–	–	0.3 (1)	–	–	–
	Selfishness	–	–	0.9 (3)	0.7 (9)	–	0.5 (6)
	Stupidity	–	11.7 (148)	2.2 (7)	5.3 (64)	–	3.6 (46)
	Unnecessary	–	–	1 (3)	0.9 (11)	–	1.2 (15)
	Weakness	–	1.5 (19)	–	1.7 (21)	–	1.5 (19)
	Total	–	20.6 (261)	5.4 (17)	9.6 (118)	–	9.2 117)

(continued on the next page)

Table 2. continued

		NSSI		SI		SAs	
Dimensions	Categories	With NSSI	Without NSSI	With SI	Without SI	With SAs	Without SAs
Negative Emotions	Anger	2.6 (4)	2.7 (34)	1.6 (5)	2.5(30)	–	1.8 (23)
	Angst	2 (3)	1.7 (22)	0.3 (1)	2 (25)	–	–
	Blame	–	0.6 (7)	–	–	–	–
	Contempt	1.3 (2)	–	–	–	–	0.5 (6)
	Despair	7.9(12)	5 (63)	8.3 (26)	6.4(77)	4 (1)	7.6 (97)
	Disappointment	–	–	–	1.7(21)	–	0.9 (12)
	Disgust	–	–	–	0.7 (9)	–	–
	Fear	3.3 (5)	2.1 (26)	–	2.2(27)	4 (1)	3 (38)
	Frustration	1.3 (2)	0.9 (11)	0.6 (2)	1 (11)	–	1.4 (18)
	Impulsivity	0.7 (1)	0.2 (3)	0.6 (2)	–	–	–
	Pain	11.8(18)	7.7 (98)	8 (25)	5.2(63)	12 (3)	6.1 (78)
	Rebellion	1.3 (2)	2 (25)	0.6 (2)	1.3(16)	–	1.3 (17)
	Sadness	15.8 (24)	12.6(159)	7.3 (23)	10.9(132)	12 (3)	11.7 (149)
	Shame	0.7 (1)	0.6 (7)	–	–	–	–
	Sorrow	2.6 (4)	2.3 (29)	1.3 (4)	2 (24)	12 (3)	2.4 (31)
	Suffering	4.6 (7)	6.2 (78)	4.5 (14)	4.8(58)	12 (3)	5.1 (65)
	Total	55.9 (85)	44.6(562)	33.1 (104)	40.7(493)	56 (14)	41.8 (534)
Psychological Functions	Affect Regulation	4.6 (7)	0.5 (6)	2 (6)	–	–	–
	Escape Mechanism	4 (6)	–	3.1 (10)	2 (24)	–	–
	Interpersonal Influence	–	2.5 (33)	–	–	–	–
	Total	8.6 (13)	3 (39)	5.1 (16)	2 (24)	–	–
Self–Injurious Methods	Drowning	–	–	–	–	–	0.2 (3)
	Hanging	–	–	1 (3)	1 (12)	–	–
	Jumping from High Places	–	–	1 (3)	1.2(15)	–	0.5 (6)
	Knife	–	0.6 (8)	–	1 (12)	–	1 (13)
	Lye	–	–	4.7 (15)	–	–	–
	Medication	–	0.1 (1)	0.3 (1)	0.4 (5)	–	0.9 (12)
	Overdose	–	–	1 (3)	–	–	0.7 (9)
	Pencil Sharpener	–	0.1 (1)	–	–	–	–
	Rope	–	–	–	0.2 (3)	–	0.5 (6)
	Run Over	–	–	–	–	–	0.3 (4)
	Scissors	–	0.2 (2)	–	–	–	–
	Self-Mutilation	–	–	0.6 (2)	1.1(13)	–	0.7 (9)
	Weapon	–	–	0.3 (1)	0.6 (7)	–	0.5 (6)
	Total	–	1 (12)	8.9 (28)	5.5(67)	–	4.8 (68)
Total Coding Units		152	1263	314	1212	25	1271

Focusing on the comparison of the contents mentioned by the six adolescent groups , some differences emerged from our analysis. Globally, these differences were considerably accentuated in the dimensions Consumption of Psychoactive Substances, Moral Judgements and Self-Injurious Methods, where the three groups without a history of NSSI, SI and SAs presented less or no coding units. On the other hand, the differences in the remaining dimensions/categories were residual. Regarding the dimension Consumption of Psychoactive Substances, this finding may be explained by the fact that adolescents without a history of STBs generally attribute contents and causes of external nature to individuals with STBs, such as the consumption of drugs and alcohol (Stewart et al., 2017). Likewise, in our results, adolescents without a history of NSSI, SI and SA tended to associate negative judgments and stereotypes with these phenomena, using terms such as "Stupidity", "Cowardice" and "Ridiculous". These results are somewhat in accordance with previous research indicating that stereotypical discourses and stigma are common in the context of STBs (Duarte et al., 2019c; Gouveia-Pereira, & Sampaio, 2019; Fortune et al., 2008; Hollinger, 2016). Regarding the dimension of Self-Injurious Methods, our results suggest that the perceptions of adolescents without a history of NSSI, SI and SA give greater emphasis to the physical or behavioral engagement in self-aggressive methods.

Besides these disparities, most dimensions/categories were mentioned by all the adolescent groups, implying that their perceptions were integrated in a system of shared meanings and that they were independent of the personal experience of STBs. These conclusions allow us to hypothesize that adolescents without a history of these behaviors are aware of these phenomena and try to understand the possible reasons that lead adolescents to engage in NSSI, SI and SA. Likewise, it might imply that adolescents share information amongst themselves, discuss different subjects, considering each other's opinions and experiences, which can justify the absence of differences in most of the categories. Other possible justification for this lack of differences is due to the growing media visibility regarding mental health, NSSI and STBs and to the fact that it may influence views, attitudes and beliefs about these issues. Lastly, we think it is essential to highlight the similarity of the perceptions concerning the three variables, which might be a sign that adolescents view NSSI, SI and SA as part of the suicidal continuum (Knorr et al., 2019; Rogers et al., 2018) and not as entirely separate phenomena.

Strengths and Limitations

Although this study's results contribute to the understanding of the perceptions of NSSI, SI and SAs, it is important to underline some limitations. Firstly, the free word association test has some negative points, such as the fact that free associations are determined by fragments of ideas and concepts that, instead of continuing thought and elaborate new associations, may create blocks that do not allow individuals to relate new associations to the previous concept (Merten, 1992). Secondly, although the qualitative approach allows a deeper content analysis, it also limits the results' generalization. Thirdly, the previous history of NSSI, SI and SAs was assessed through simple questions, which might bear some influence on the prevalence rates. Since this study used a convenience sample, further limitations relate to the homogeneity of the sample, sample size, sampling method, and data collection setting (classroom).

Conclusion, Implications, and Future Directions

Considering the scarcity of studies focusing on the perceptions of NSSI, SI and SA and their increasing prevalence in adolescence, this study aimed to describe adolescents' perceptions about these phenomena, and to compare the differences of these perceptions among adolescents with and without a history of NSSI, SI and SAs. Our findings revealed that all the participants groups associated negative emotions with these variables and that adolescents with and without a history of NSSI, SI and SAs presented differences in their perceptions of these phenomena.

Besides contributing to the global understanding about these perceptions, our results might also have clinical implications, since they indicate? that peers can play a potential supportive role in signaling NSSI and STBs and for posterior intervention. Also, these results help to clarify and identify stereotypes and stigma that should be addressed in prevention programs, adapting them to adolescents and their realities.

We consider it important to continue this line of research. Future studies could focus on understanding the possible changes of perceptions over the development of adolescents, as well as should they change their perceptions according to the exposure to NSSI, SI and SA (i.e., friends' knowledge; contact with online contents about these phenomena). Also, we consider it equally important to understand whether STB perceptions differ in articulation with other variables, such as religion or cultural background.

Acknowledgements:
The authors would like to thank all the research participants.

Funding
The authors received neither financial nor non-financial support for the research (including data acquisition) and/or authorship and/or publication of this article.

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All authors gave their final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflicts of Interest
The authors declare no conflicts of interest to disclose.

Ethical Statement
The research was approved by the General Education Directorate of the Ministry of Education and Science from Portugal during March 2017.
This manuscript is the authors' original work.
All participants engaged in the research voluntarily and anonymously, and provided their written informed consent to participate in this study.
Data are stored in coded materials and databases without personal data, and the authors have policies in place to manage and keep data secure.

Data Availability Statement
The data presented in this study are available upon request. All information regarding datasets was kept safe in an encrypted file in our computers to preserve the anonymity of all participants. Still, we can make it available upon request, by sending the authors an email with a valid request.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0006

BACK TO CONTENTS

RESEARCH ARTICLE

Experimental Staffing Models in Inpatient Acute Mental Health Services. A Longitudinal Comparative Study of Occupational Therapy Services

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History
Received: 1 October 2022
Accepted: 13 February 2023
Published: 28 April 2023

Citation
Phoenix, N., Taylor, J. (2023). Experimental Staffing Models in Inpatient Acute Mental Health Services. A Longitudinal Comparative Study of Occupational Therapy Services.
European Journal of Mental Health, 18, e0006, 1–13.
https://doi.org/10.5708/EJMH.18.2023.0006

Introduction: An NHS Mental Health Trust in England recently used an experimental staffing model by including Occupational Therapists (OT) in the staff numbers on ten working age adult acute inpatient wards.
Aims: This study aims to compare different staffing models involving occupational therapists and make recommendations for preferred staffing models.
Methods: This is a longitudinal comparative study of archived patient and multi-disciplinary electronic records and data collected from Kent and Medway NHS and Social Care Partnership Trust. Areas of analysis included quantitative data and qualitative coding and theming, covering the period February 2016-June 2019 during the experimental staffing model, and July 2019-March 2021, when the model ended and teams were Occupational Therapy-led. Full ethical approval and consent was gained in 2020 from the Trust and University to request and access data to complete this research.
Results: This experimental staffing model resulted in less delivery of Occupational Therapy specific interventions, resulting in poorer retention rates and impacting on patient and student experiences. Since working in Occupational Therapy led teams, the quality of Occupational Therapy interventions, job retention, student experiences, patient care and safety have improved.
Conclusions: The recommended staffing model for working age acute mental health wards has Occupational Therapists embedded in OT-led teams. Staffing tools need to be developed that involve Allied Health Professional leaders and this field needs more research.

Keywords: Occupational Therapy/Therapist, Staffing models, Experimental staffing, Inpatient wards, Mental Health.

The 1st author of this study is an Occupational Therapist, with ten years of experience working in mental health services. There are no declared conflicts of interest, although the author declares researcher bias. Having worked within both staffing models, the researcher has formed exclusive opinions of their success; all endeavors will be made to ensure that results are analyzed and presented in a fair unbiased manner.

The term "patients" will be used throughout this paper to refer to "service users" and "clients" as this is the language used within National Health Service (NHS) inpatient mental health services.

ISSN 1788-7119 (online)

Introduction

Globally, the World Health Organisation (WHO) recognizes that countries do not prioritize mental health care services, with governments on average using 2% of health budgets for mental health care (WHO, 2022). However, the UK Government has made a commitment to increase funding for Mental Health services as part of the NHS Long Term Plan (NHS England, 2019a).

Anyone experiencing a mental health crisis may be unable to look after themselves, or they may be putting themselves or others at risk of harm. In England, in these cases, some individuals are admitted to an acute mental health inpatient hospital, as either a voluntary or detained patient (Mind, 2022). Financial cuts and bed closures have increased bed pressures and staff turnover, resulting in many United Kingdom (UK) Mental Health Trusts experiencing a staffing crisis (Gilburt, 2020; Mahase, 2020; Mind, 2020). Additionally, an expectation exists for Occupational Therapy (hereafter OT) services to be available seven days a week in acute services to ensure a smooth transition from hospital to community (NHS England, 2013; 2016). In response to these staffing demands, NHS Trusts have made changes to staffing models on inpatient mental health wards, adapting OT job descriptions accordingly (Department of Health, 2007). Health and Social Care in England is regulated by the Care Quality Commission (CQC), who inspect across the following criteria: Safe, Well-led, Effective, Responsive and Caring. The CQC celebrates innovative approaches to delivery of services, but safe staffing levels remain a priority across all services (CQC, 2022).

Due to the difference in local needs, no staffing ratio standards exist for inpatient mental health wards; for example, numbers of staff per admitted patient (NHS England, n.d.). Health Education West Midlands (2021) created a new staffing framework, using staffing tools to aid hospital managers in making staffing decisions; an example, the ratio of registered and unregistered staff per shift. The Trust in this comparative study chose to use the Hurst tool prior to implementing the experimental staffing model; however, no record exists of why this tool was chosen (Eldridge et al, 2015). The tool includes Allied Health Professionals in its structure, although it does not break this down into the 12 professional groups that make up the non-homogenous AHP group (Hurst, 2016). At this time a typical shift pattern, for approximately 20 patients, is comprised of six staff members on early and late shifts (two nurses and four Healthcare Assistants "HCAs") and four on the night shifts (two nurses and two HCAs) (Eldridge et al, 2015). Additional multi-disciplinary team (MDT) and unqualified support staff members worked a Monday to Friday 8-4pm/9-5pm shift pattern or duty shifts and were not counted in the ward numbers. Lloyd and Williams (2010) conducted a critical review of OT job descriptions in acute mental health settings, spanning 20 years, and found four key themes in the duties of OTs: individual assessment, therapeutic groups, individual treatment and discharge planning. This description constitutes a good summary of the OT role in this service prior to the experimental staffing model and demonstrates what value the profession brings. It is recognised by the Royal College of Occupational Therapists (2022) that OTs working in Mental Health play a vital role in the recovery outcomes for inpatients, such as reducing hospital admission, supporting people to remain in employment, facilitating early discharge, improving physical health, and providing interventions in the areas of self care, leisure and productivity.

Following the staffing review in 2015, Nursing Directors decided to implement an experimental staffing model which included Occupational Therapists (OTs) in the ward shift numbers. This appears to be implemented as a result of shortage of a Nursing workforce at the time and the belief that it would embed therapeutic ways of working on the wards. No evidence exists that Allied Health Professional (AHP) or OT managers were involved at this stage. New roles were also created, including Assistant Psychologists, Associate Practitioners and Releasing Time to Care workers. OTs were included in the ward numbers, with new shift patterns, operational line management (by majority nursing managers), shared generic responsibilities and supervision outside of professional disciplines. There was an emphasis on being flexible to the needs of the service, and OTs had reduced contact with other OT colleagues. In these new roles, OTs were expected to conduct handover, ward round, order medications, represent the ward at tribunals, conduct multi-disciplinary meetings and support the ward's safe running. In addition to this, if the ward was short staffed then HCA duties such as environmental checks, therapeutic observations, cleaning, and the serving of meals would need to be completed by OT staff. This was in addition to running therapeutic groups and completing functional OT assessments. The experimental model was in place from February 2016 until it ceased in June 2019, when OTs came out of the numbers and returned to being OT led.

Increasing evidence of mental health Trusts experimenting with staffing models exists. A scoping analysis of 52 inspection reports conducted by the Care Quality Commission (CQC, 2019), showed evidence of over ten UK mental health Trusts using experimental staffing models involving OTs. In addition to this, a recent UK Trust experimented with an OT-led forensic rehabilitation ward (Bate et al, 2019). Changing staffing models in entire Trusts is both time consuming and costly. Furthermore, there is a paucity of research into skill mix and OT roles

in acute inpatient mental health wards (Munro & Baker, 2007; Lloyd & Williams, 2010); highlighting the lack of evidence base for these staffing interventions.

The aims of this study are to firstly analyze and compare evidence during the experimental staffing model covering the period February 2016 to June 2019, and July 2019 to March 2021 (when OTs were OT led); secondly, to make recommendations for future staffing models in acute mental health inpatient units in the UK and discuss where OTs are best placed for the benefit of patients and the profession. Lastly, this study contributes to the research regarding OTs involved in experimental staffing interventions on acute mental health wards, as none currently exists.

The complex hypothesis for this study is that OT led teams lead to improved retention rates of OTs; improved patient feedback; increased quantity of groups; improved quality of assessments; improved OT student experiences; reduced complaints and reduced recorded incidents involving OTs. The alternative hypothesis is that including OTs in the standardized ward safe staffing numbers remains the model of choice, for the benefit of staff and patients. The null hypothesis states that no significant difference exists between the two models. This is specific to the UK NHS system, although we are aware of other inpatient mental health units across Europe which also have difficulty with levels of staffing and inconsistencies in the provision of Occupational Therapy in these systems (Samele et al, 2013).

Literature Review

A literature search was conducted within the British Journal of Occupational Therapy, Medline, Assia and CINAHL using the keywords: "Occupational Therapy/Therapist, Staffing models, Teams, Generic working, Inpatient wards, Mental Health, organizational change, and acute mental health". Articles focusing on community mental health teams were excluded from this study. The original search only identified two articles and so the scope of the search was broadened to include international studies. The date range was also extended to 1984–2021 as there was a paucity of articles within the most recent ten-year date range, therefore seminal works were included in this study. Secondary searches were conducted within the bibliographies of found articles. Nine articles discussed the role of OTs in acute inpatient mental health wards; however, no articles which specifically discussed OTs involved in staffing interventions in acute mental health inpatient wards were found, thus adding further value to this study as a new area of research.

The photovoice study by Birken and Bryant (2019) aimed to explore the experiences of patients visiting a specific Occupational Therapy department in an acute mental health unit and utilized service users in this participatory research. Participants described the OT department as a safe place to engage in their personal recovery, to practice skills and learn to manage themselves. This study is supported by Robertson (1984, pp. 107), who defines the psychotherapeutic approach and purpose of group interventions as providing "a physical medium through which problems and unconscious conflicts can be addressed in a nonverbal manner"; an OT will put conscious thought and effort into this emotionally safe environment. A limitation of this study involves the small sample size as only five participants completed the research programme: this was due to the changing nature and high patient turnover in acute wards.

The study by Simpson et al (2005) aimed to explore the relationship between OTs and the MDT on acute psychiatric wards using structured interviews. The study found that the role of OTs was often misunderstood by the MDT and that OTs working in separate therapy teams were often excluded from important meetings, ward management, and decision making. This often led to OTs feeling undervalued by the team; as their professional opinion and assessments were not considered in discharge planning discussions. Although the study was small in scale, due to high turnover in the acute setting the findings indicated that there were overarching issues with members of the MDT holding strong beliefs that the most important aspect of an OTs role on an acute ward was to provide activity groups and to relieve boredom (Simpson et al, 2005). The large-scale workforce study by Crawford et al (1992) analyzed the staffing levels of Mental Health Occupational Therapists in the Trent Regional Health Authority and found that no norms could be established for staff: patient ratios in OT services. A limitation of the study: it is over three decades old and uses limited citations in the bibliography. Crawford et al (1992) discusses increased pressure from the MDT for OTs to complete more group work, to achieve more patient contacts, and the MDT valuing quantity over quality. This was often perpetuated when OTs were outnumbered by nurses and psychiatrists (Simpson et al, 2005). Ashby et al (2013) and Fortune (2000) support this: they argue that OT roles and responsibilities were often negatively influenced in a workplace dominated by nurses and doctors who were working within biomedical models.

Simpson et al (2005) and Crawford et al (1992) found that patients' individual outcomes were more important to the OTs than group numbers, describing their main priorities as assessing activities of daily living (ADL); supporting needs on discharge and linking patients with community resources to achieve long term recovery outcomes. This is linked to the theories that underpin the OT profession, i.e., providing meaningful occupation focused interventions in a client centered manner (Fisher, 2014).

Though small in scale, the study Fortune (2000) found that OTs in mental health wards quickly identified gaps on the ward and were described as chameleons. OTs adapt their practice to meet the needs of the service, helping the team where needed; despite this work not being occupationally focused. Being useful in the workplace then led to positive feedback and reinforcement of this behavior by the team. However, adopting roles imposed by others perpetuated issues with professional identity and may have prevented whole communities from benefiting from the unique value of OT (Fortune, 2000). The small-scale study by Ashby et al (2013) found that poor professional identity led to a reduced validation of occupational practice and reduced job retention.

A study by Munro and Baker (2007) looked specifically at practice papers that evaluated workforce interventions which had altered the skill mix on inpatient mental health wards. The findings imply that patient feedback and the involvement of all professional members of the MDT should be at the forefront of all staffing research, based on evidence and national benchmarks, and not reactive to financial demands or staff shortages (Munro and Baker, 2007). However, common findings among these articles demonstrated that increased staffing levels per shift had a direct impact on increasing one to ones and therapeutic interventions as well as reducing violence and aggression (Munro and Baker, 2007). The main critique of this practice review involves it only being able to analyze two studies from the UK, and that none of these interventions discussed counting OTs into the ward numbers.

Whilst there were some methodological flaws in the study by Davies (2015), it discussed a pilot study previously under trial in a UK NHS Trust that had OTs in independent teams match shift patterns to those of nursing staff, increasing opportunities for personal care and cooking assessments at more meaningful times of the day. Additionally, Davies (2015) reported an increase in the amount of contact between OTs and friends, families and carers during visiting times and increased therapeutic groups in the evenings and on weekends These studies tell us that historical inconsistencies exist in the use and provision of Occupational Therapists in acute mental health settings, as well as a poor understanding of the unique and valued contribution of Occupational Therapy by the MDT within these settings. What remains left unanswered is which staffing model best benefits the patients and where Occupational Therapists are best placed in these settings. Therefore, the objective of this study focuses on whether the use of an experimental staffing model including Occupational Therapists indicates best practice for staff and patients.

Methods

Datasets

This is a longitudinal comparative study using a combination of quantitative and qualitative electronic records and acute care group archived data from ten wards within one of three NHS Mental Health Trust in the region of South East England. Due to the researcher being party to the experimental staffing model in this territory, and the investigator also to being affiliated with the local University in which the Trusts is based, they conducted their research here. This approach was adopted due to the historical nature of the events being examined and the convenience of access to data. The Trust held all data; specific details of data origin are detailed in the results table below.

This study compared data from five pieces of quantitative evidence; with average and percentage differences identified where possible. Complete years of data were compared where possible, for fair and accurate data comparison:

- Quantity and completion of ADL assessments, per month.
- Quantity of groups, run monthly.
- Recruitment and retention figures, per year.
- Quantity of patient behavior related incidents reported by or involving OTs or in therapy areas, per month.
- Staff Survey results, per year.

These five pieces of data were the most relevant to the study objectives =
Four additional pieces of qualitative data underwent coding and thematic analysis:

- OT student evaluation feedback from each placement on all sites. Gathered by Practice Placement Facilitator Lead for feedback to support the ongoing development and improvement of students' placement experiences.
- Patient reported outcome measure on the OT service given as a questionnaire annually during OT week on all inpatient sites. Gathered yearly by AHP Leads, this feedback informs ongoing service developments and quality improvement projects within the Trust.
- Patient and Carer compliments and complaints gathered by patient experience lead for all inpatient sites to ensure high standards of safe and effective care are delivered to patients and carers. This ensures the Trust is accountable by listening to feedback and patient satisfaction.
- Patient comments and feedback from the Patient Reported Experience Measure completed on discharge from inpatient acute services on all inpatient sites. This is designed to gather patient satisfaction reports and to highlight to senior leaders themes regarding best practice and areas of concern.

It was felt that the quantitative data alone did not capture the staff, patient, or student experiences of the experimental staffing model or the subsequent return to OT led teams; and inclusion of this data added value to this study.

Data was taken from all inpatient sites; items related to food, medication, doctors and heating were excluded from this study. Significantly more data was available during the experimental staffing model due to the longer period of time being analyzed; this is considered in the results to avoid a focus on quantities.

Procedure

This study covers the period February 2016 - June 2019, (during experimental staffing) and July 2019 – March 2021 (OT led teams).

Kelly (2020) argues that when conducting data archive analysis, researchers need to be clear and specific when requesting information; otherwise, this can have a negative impact on the quality of data and the validity of the research. For the purposes of this study (conducted during the COVID-19 pandemic) the researcher gathered data by sending emails with a clear explanation of data requests. In addition, the researcher held video conference calls with different departments, and used screen sharing technology to view and discuss the data required. All data within the Trust was stored and provided electronically, no manual or paper searches were conducted. All data was stored on a password-protected Trust laptop, which only the researcher had access to. To avoid and protect against researcher bias in this stage of the study, requests for data were checked and revised by two independent parties following full ethical approval from the Trust and University to conduct the study.

Analysis

Quantitative: The results of this data did not undergo any statistical analysis but were used as illustrative purposes to draw conclusions from this study. The quantitative data has been presented in a table to demonstrate a comparison between the two time periods.

Qualitative: Coding and theming was conducted for both periods using Braun and Clarke's (2006) six-stages of thematic analysis. Themes were then divided into positive and negative categories, then further synthesized into a comparative narrative. The process by which the six steps were followed is identified below:

Step 1: Become familiar with the data, Step 2: Generate initial codes, Step 3: Search for themes, Step 4: Review themes, Step 5: Define themes, Step 6: Write-up.

Full ethical approval and consent was gained in 2020 from the Kent and Medway NHS and Social Care Trust and Canterbury Christ Church University to request and access data to complete this research.

Results

Quantitative Results

The data collected is presented in Table 1, showing the area being analyzed, the data from both time periods, and a comparison of the results.

Figure 1. below shows comparative percentages for all quantitative data sets.

Table 1 and Figure 1 present the results of the data collection for the quantitative datasets for both time periods being compared in the study. The table details the original source of the data, with accurate numerical figures

stated, and provides a comparison between the two different time periods. The Figure presents a percentage comparison for the data; however, no statistical analysis exists of these datasets. To demonstrate the relationships between the different datasets, the results were aggregated into percentages.

Table 1. Quantitative descriptive results

Quantitative results	During experimental staffing model February 2016–June 2019	Occupational Therapy led OT teams. July 2019–March 2021	Results compared
Quantity of standardized OT ADL assessments completed; gathered from a monthly electronic health record audit database.	Average assessments per month per team: 89. Average incomplete assessments per month: 42. Average per month: 9.3 completed by qualified OT.	In full year 2020 average assessments per month: 54. Average incomplete assessments per month: 2. Average per month: 16 completed by qualified OT.	More assessments completed by individual OTs; less incomplete assessments and more assessments are completed by qualified staff since OTs are in OT led teams.
Quantity of therapy groups; gathered from historical audits and electronic diaries.	From historical paper audits 715 groups per month per site.	From electronic diaries and performance data. 894 groups per month per site.	20% improvement in quantity of groups since OTs are in OT led teams.
Recruitment and retention figures of OTs gathered at point of recruitment and post ending; gathered automatically and supplied by the rostering team for all inpatient sites.	40 months. 21 new starters in the total period. 24 leavers in the total period. Majority of leavers in this period were the new starters. Average of 7 new starters per year. Average of 7.3 leavers per year. 100% turnover of staff. Average length of service for newly qualified or basic grade OTs was 8 months. Of the total 24 leavers in this period (not including retirement) 22 left the Trust altogether. Some to become unemployed. Two stayed in the Trust and one of these was for a promotion.	21 months. 4 new starters. 3 leavers all left for promotions. 1 Leaver in 2019 went onto a promotion in a different Trust. None of the New starters since June 2019 have left the Trust at this point.	Improved retention rates since OTs have been in OT led teams.
Patient behavior related incident reports involving OTs or in therapy areas; Recorded on the Trust incident reporting system.	When comparing incidents for the three full years during experimental staffing per year the average is 7.6; equivalent to 0.63 per month.	In a full year of data for 2020 there were four incidents; equivalent to 0.33 per month.	52% reduction in patient behavior related incidents involving OTs or in therapy areas since OTs have been in OT led teams.
Staff Survey	OT survey results were included in MDT results at this time. 51 questions were matched across five year averages and percentages compared. The answers of four questions were improved for the years 2016, 2017, and 2018, compared to 2019 and 2020.	OT survey results were made separate from the MDT results when OTs were OT led. The answers to 28 questions had improved results in both 2019 and 2020, compared to 2016, 2017 and 2018. 26 of the 51 questions had the highest scores in 2020 compared to all previous years analyzed.	Over 50% of the staff survey results had the highest positive scores in 2020 compared to the previous five years.

Qualitative Results

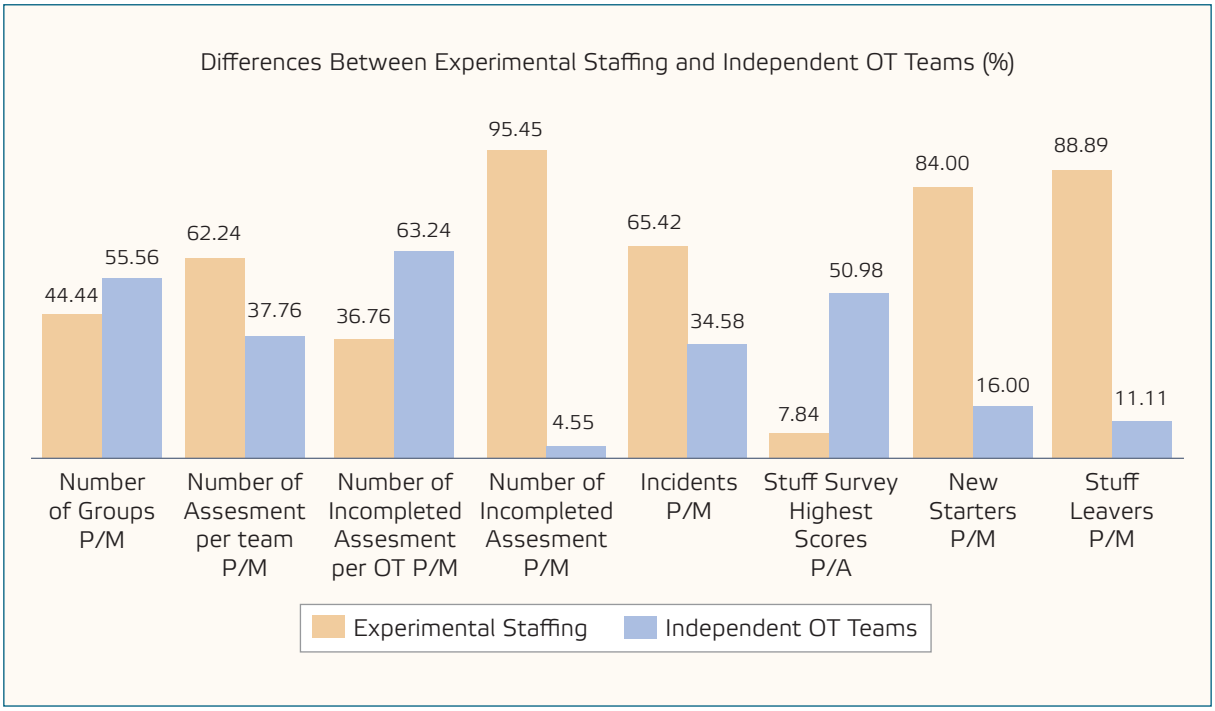
Themes have been divided into similarities and differences within the qualitative data. Braun and Clarke's (2006) six stage model of thematic analysis was used to draw any comparisons within the different staffing models.

Similarities

More staff

A strong theme across both time periods was a request from patients for "more staff" on the wards. Across both time periods patients requested more OT services, groups, activities and interventions. Respondent feedback requesting "More staff" totaled 13% during the experimental staffing model and 9% when OTs where in independent OT teams.

Figure 1. Comparative percentages for all quantitative data sets



However, during the experimental staffing model, there was a subtheme of requests for "more OT staff". Quotes taken during the experimental staffing period support this: "OT not always available due to time commitments"; "OT's were too busy."; "OT's are too busy doing non-OT work, be beneficial for them and us if they were not in the numbers. More time for groups and activities."

OT is valued and has a positive impact on mental health

A strong theme in both periods is that OT services are valued by patients, and more direct OT intervention is desired; regardless of which staffing model is being used. Patients' feedback showed that OT was valued highly, with positive ratings of 44% during experimental staffing, and 57% following the change in staffing model. When discussing the benefits of OT services, patients expressed that, "(OT) has helped me to do some of the things I used to enjoy which has helped to improve my mood and make negative thoughts less dominant." There was additional feedback on feeling listened to, reduced anxiety, improved mood, increased motivation and better social skills, with one patient quoted saying, "It (OT) helps confidence and integrates communication amongst patients".

Patients also discussed the value of going outside for OT activities and the benefits of accessing green spaces. "Occupational therapy has helped me immensely by getting me out and helping with my mental state of mind and educating and relaxing with meditation, art, and walking in the natural places".

Environment and facilities

There was consistent feedback across both time periods that the ward environments and facilities needed improvement. Patients across both time periods requested increased access to fitness facilities, gym equipment, and physical activity.

Positive feedback about the ward team

Positive feedback about the ward team stretched across both time periods. There was feedback regarding improved communication and students indicating that the team worked well together when OTs were OT led. Throughout both time periods, patients valued the same selection of four specific group interventions which included art, music, self-care, and cooking.

Differences

Professional identity

Some variation manifested between the role of OT services when comparing both time periods, as patients were able to be clearer about the role of OT when they were OT led. This is apparent in the language they used around mobility, equipment, and skills for living in the home; with a clear emphasis on the important role an OT played in "supporting my discharge home" or "giving me the skills to live at home".

Feedback from students on placement during the experimental staffing model stated there was not enough time to complete OT workload and they described placement as "busy", "stressful" and "pressured". In addition to this, researchers found an increase in the positive feedback from OT students on placement in OT led teams, reporting a wonderful placement experience with increased learning opportunities, knowledge, and skills.

OT has a positive impact on feeling safe

A new theme that emerged in the data during OT led teams was a reported "feeling of safety" on the wards. Patients expressed, "I am in a safer environment" and "felt very safe" or described the ward as "a safe place to be". This was also shown when patients spoke about how "OT [Team] makes the ward therapeutic and calmer. OT staff save the ward when chaotic".

Once OTs were OT led, patients no longer requested more one-to-one time with staff, potentially indicating this need was being met.

A significant difference between the two time periods was the analysis of overall positive and negative feedback. During therapeutic staffing, 56% was positive feedback and 44% of overall feedback was negative, whereas when OTs worked in independent teams, this increased to 73% positive feedback and 27% negative feedback.

Discussion

The findings of this study would suggest that OTs in working age adult acute mental health inpatient wards for this South East England NHS Trust are best placed in OT led teams. This model appears to mirror staffing models in some European countries that have established mental health inpatient units (Samele et al, 2013). Currently, no European standards for staffing levels or models for inpatient adult mental health and Occupational Therapy provision, are determined by availability of Occupational Therapists and population needs of each country (Kunze et al, 2004). Although it is important to note that some countries do not have established mental health hospitals or systems, and do not provide Occupational Therapy provision in these settings (Samele et al, 2013).

The qualitative feedback in this study adds value and meaning to the quantitative results, with a reduction in occupational therapy provision of groups and assessments coinciding with feedback from patients that there was a lack of Occupational Therapy provision on the wards. These findings are supported by the criticism and recommendations made by the CQC (2019), who inspected the Trust during the experimental staffing model. One can therefore argue that counting OTs in the ward numbers resulted in outcomes that would increase institutionalization and MH inpatients being deprived of the opportunity to participate and engage in meaningful occupations (Whiteford et al, 2019).

During the staff and patient feedback pilot study gray paper conducted during the experimental staffing model, OT staff gave feedback that they felt a distinct lack of professional identity; reduced sense of value; lack of time for role-specific tasks and poor team morale (Demirbasa et al, 2018). Simpson et al, (2005) argues that completing OT assessments stands as an integral part of an OT role and has a strong link with professional identity. Additionally, Shorten and Crouch (2014) state that occupationally focused interventions lead to improved recovery outcomes for mental health patients. Therefore, the conclusion can be drawn that qualified OTs being given the time and recognition to complete full assessments when teams were OT led improved the quality of assessments, resulted in effective delivery of services and better outcomes for patients.

The lack of professional recognition regarding Occupational Therapy provision, captured in this study, is likely linked to the poor retention rate data of OT's during the experimental staffing period. Ashby et al (2013) support this; they argue that poor professional identity is shown to be linked to poor job retention. Many of the OTs in this study were new registrants and therefore the experimental staffing model did not achieve the aims of the AHPs into Action and NHS Long Term Plan (NHS England, n.d.; 2019a) of securing the future workforce

by making it the career of choice and supporting new registrants to stay in their chosen profession. Additionally, Health Education England (2021) found that positive placement experiences can be attributed to decisions around whether students stay in that profession or not, thus indicating that students in this study were more likely to remain in the profession and have a positive placement experience when teams were OT led.

A positive outcome of the experimental staffing model found that OTs had more opportunity for career progression into leadership roles, such as ward management. Vacancies that were previously exclusively for Nursing and Midwifery Council registered applicants are now open to Health and Care Professions Council registered professions. This opens up further career progression opportunities for OTs such as service manager and operational lead team roles. Additionally, these career opportunities have continued since the experimental staffing model ended. NHS England (2019b) argues that recruiting into leadership roles from a diversity of professions will enable trusts to deliver the integrated and multi-professional working essential for transformative patient care.

As well as additional leadership opportunities since being in OT led teams, there have also been increased opportunities for profession specific continued professional development courses – such as Postgraduate Sensory Integration, Talking Mats and Assessment of Motor and Process Skills training. The Royal College of Occupational Therapists (2019) states that development opportunities should be made possible and supported by employers as they improve the quality of services and provide a direct benefit for patients.

The CQC (pg. 7, 2019) inspection echoes the results of this comparative study around the lack of access to physical fitness interventions as it states that 'patients were not appropriately supported to access the gym, there was an inconsistency in structured activities'. This constituted a theme across both time periods and continues to be an unmet need. The Trust has since addressed this issue and employed sports and exercise instructors on all inpatient sites who sit within the OT-led team; these improvements have only become possible since OT teams have been OT-led.

Quantitative results indicate OTs were more likely to be involved in patient behavior-related incidents during the experimental staffing model. One should expect this result, however, as OT's were spending more physical time on the ward and were actively involved in the day-to-day running of the units. However, during an inspection the CQC (2019) found that there were consistently low staffing numbers; which resulted in patients and staff reporting feeling unsafe during the experimental staffing model. In contrast to this, a new theme of "safety"emerged when OTs were OT-led. Patients discussed "feeling safe", "feeling secure" and the "staff keeping them safe"; this was significant enough to form a new subtheme. These findings indicate that having OTs in OT led teams can contribute to a therapeutic atmosphere on inpatient mental health wards and can result in patients having an increased sense of safety. Birken and Bryant (2019) support this; they state OTs are experts in creating safe, therapeutic spaces for patients.

A strong theme occurring across both time periods was that OTs had a positive impact on mental health and contributed to preparing the patient for discharge from the hospital and building skills for living at home. However, patients were better able to articulate the aims of Occupational Therapy discharge planning and skill building when OTs formed OT led teams. Having OTs practicing in an occupationally focused manner, therefore, and having a clearly defined role in the team appears to have contributed to an improved patient understanding of the profession; Birken & Bryant (2019) suggest that an increased understanding of professional aims can lead to improved recovery outcomes.

A strong theme across both time periods involved a request for more staff, with no differentiation from patients about what professional groups were needed. The Trust was inspected by the CQC during the experimental staffing model in 2018 and although the Trust was rated as Good overall, the Acute wards for working-age adults required improvement as they were not sufficiently safe, effective, or well led (CQC, 2019). In December 2020, when the experimental staffing model had ended, the Trust was again inspected by the CQC (2021) and the Trust was found to have enough staff to keep patients safe; a strong culture of team working and mutual support manifested between different professions (CQC, 2021). The findings of these two CQC inspections taken at different time periods, reinforce the results of this comparative study. In addition to this, the Staff Survey results show a 50% increase in positive results for matched questions in 2020 compared to the previous five years. These findings support the results of this comparative study: that OTs working in OT-led teams have a positive impact on the overall experience of the MDT. It is also interesting to recognise that these measured improvements occurred during the challenges of COVID-19.

European countries that are developing their mental health inpatient services could consider the findings in this study and the wider experience of the UK NHS inpatient mental health service provision when planning any staffing models.

Strengths and Limitations

Verheij et al (2018) argue that data archive research using electronic health records poses possible sources of bias. An example of this: the researcher compared hand-recorded data against electronic data due to changes in technology over time. Additional limitations are that the 1st researcher is not independent and has expressed researcher bias. Furthermore, this study was carried out in one South East UK NHS Trust and it is acknowledged that the results of this study cannot be generalized and further research is needed in other UK NHS Trusts.

This study possesses increased knowledge and understanding of how OTs in working age adult acute mental health inpatient wards can work effectively and introduced an evidence base for experimental staffing models affecting OTs. The benefits of using a longitudinal study allowed the analysis of changes over time and the recognition of the long term impact on staff and patients.

Conclusion, Implications, and Future Directions

In conclusion, the results of this study have supported the complex hypothesis that suggests OTs in this UK NHS Trust were likely to be more effective when working within the OT-led staffing model. OTs being included in the ward numbers had a negative impact on various clinical, professional, and patient factors, and the impact it had on job retention meant it was not sustainable. Patients reported feeling safer and their needs were being met when OT teams were OT-led. In addition, this study has demonstrated that patients highly value OT and they would like more OT interventions to be available. Additionally, this study has demonstrated that should the unique contribution of Occupational Therapy be not valued or understood by senior leaders, this has a negative impact on decision making for the wider MDT.

The aims of the experimental staffing model were to address the staffing shortages; however, the findings of this study and the two CQC (2019; 2021) inspections indicate that the staffing shortages were not resolved by using this experimental staffing model. Additionally, the financial decision to reduce nursing and HCA numbers resulted in OTs filling gaps and adopting the roles of other team members. Increased focus on diagnosis and treatment of the patients' mental health impairment meant that Occupational Therapy practice on the wards became influenced by the medical model of disability (NHS Practitioner Health, 2010). When considering the use of alternative staffing models where staff are expected to take on additional responsibilities, a multidisciplinary approach to embedding therapy needs to be considered wherein unique professional contributions are respected and valued whilst simultaneously meeting the needs of the patients. There should be mutual respect for boundaries between roles, valuing the expertise of each professional and clear expectations of teams' members, with a shared aim of completing the workload in the best interest of the patients. Appropriate training should be in place to support any role expectations that sit outside of normal professional practice, and these should be considered the exception and not the norm. For example, were the OT not available at the weekend, then Nurses should have the appropriate skills and knowledge to run a Health and Wellbeing group. Likewise, an OT should have the appropriate skills and training to cover a Nurse needing a break from eyesight observations and can use the time effectively to engage in meaningful occupation or functional assessment with the patient. Both these examples sit within the scope of practice of each professional group – but it is mutually recognised that these tasks are the exception and not the norm. What this study has brought to light is that the use of OT staff to fill Nursing vacancies in this UK NHS Trust was not cost effective or in the best interests of patients, staff, or students.

It is a recommendation of this study that the CQC and the World Health Organisation European Framework state what staffing models are being used when carrying out inspections. Furthermore, it is recommended that AHP leaders are involved in the development of future staffing reviews and Trusts who are using experimental staffing models carry out their own independent reviews and evaluations.

Mental Health Trusts that are already using experimental staffing models should consider carrying out their own independent research, service evaluation, or audit, as further evidence remains needed from a wider scope of practice; especially from Trusts or European Hospitals that have used alternative staffing models successfully. Staffing models should be led by research, patient feedback and be MDT led; not driven by finance and staff shortages. In addition, AHP Leaders and OT managers should be involved from the very start of staffing reviews. Lloyd and Williams (2010) argue OTs should define their roles within mental health wards and evolve with services; otherwise those roles may be defined by others.

Key findings are outlined below:

- The experimental staffing model which included OTs in the ward numbers was not successful in addressing staffing shortages.
- OTs in working age adult acute inpatient mental health wards for this South East UK Trust are best placed in OT-led teams.
- AHP Leaders should be involved in large scale staffing reviews.

Funding

The authors received neither financial nor non-financial support for the research (including data acquisition) and/or authorship and/or publication of this article.

Author contributions

Nina PHOENIX: conceptualization, design, methodology, funding acquisition, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft, writing review and editing.
Julie TAYLOR: supervision, writing review and editing.

Declaration of interest statement

Nina Phoenix is employed by the organization where the research was conducted. No further conflict of interest to declare.
Julie Taylor has no conflict of interest to disclose.

Ethical statement

This manuscript is the authors' original work.
The studies involving human participants were reviewed and approved by Kent and Medway NHS and Social Care Partnership Trust Clinical Audit and Service Evaluation Group authorization number 305/20.
All patients/participants participated in the research voluntarily and anonymously. The patients/participants provided their written informed consent to participate in this study. Their data are stored in coded materials and databases without personal data. We have policies in place to manage and keep data secure.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0007

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RESEARCH ARTICLE

Emotional Awareness and Internalizing Problems

A Preliminary Test of State and Trait Associations among Adolescents

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History
Received: 12 January 2022
Accepted: 27 February 2023
Published: 26 May 2023

Citation
Ghafaryan shirazi, Y., Lindblom, J., Punamäki, R-L., Yli-Peltola, M., Peltonen, K. (2023). Emotional Awareness and Internalizing Problems. A Preliminary Test of State and Trait Associations among Adolescents. *European Journal of Mental Health, 18,* e0007, 1–12. https://doi.org/10.5708/EJMH.18.2023.0007

Introduction: Difficulties in emotional awareness (EA) are often linked to the risk of internalizing problems (IP). Most empirical studies have found this association but have not considered possible state- and trait-related fluctuations in EA and IP assessments.
Aims: We tested the directionality of the state-level associations, that is, whether EA at Time 1 predicts IP at Time 2 or the other way around. In line with previous research, we hypothesized that low EA would predict a subsequent increase in IP, as difficulties in emotional awareness dispose one to emotional problems. As an alternative model, we tested the trait-level associations between EA and IP. We hypothesized that a negative latent correlation exists between EA and IP, as common factors may cause them to be associated at the trait level.
Methods: Participants were 68 students who completed the Levels of Emotional Awareness Scale and the Strength and Difficulties Questionnaire at two-time points with a one-month interval. We used the Cross-lagged Panel Model to test the state-level associations and structural equation modeling to test trait-level effects.
Results: Results displayed no directional effect of EA on IP, and neither did IP predict EA within one month. However, we found a trait-level correlation between EA and IP. We discuss the preliminary results between state and trait level EA and IP in the context of the early developmental environment.
Conclusions: This study is a preliminary test of state- and trait-level associations between EA and IP, which could be valuable for practitioners and clinicians.

Keywords: levels of emotional awareness, internalizing problems, state-trait differences, early developmental environment.

Introduction

Internalizing problems (IP), such as anxiety and depression, are characterized by overly intense and prolonged emotional experiences accompanied by inefficient and maladaptive regulation of one's internal emotional and cognitive states (Gross & Jazaieri, 2014). A meta-analysis of 21 studies delineated low emotional awareness (EA) as the central process underlying IP (Sendzik et al., 2017). EA refers to the capacity to consciously process, recognize, articulate and differentiate emotions in oneself and others (Lane & Schwartz,1987). Understanding the role

ISSN 1788-7119 (online)

of such emotional processes on adolescent depression is essential, as this can help to provide focused support and interventions for adolescents who suffer from psychopathology.

Previous longitudinal studies have confirmed the direct and indirect association between EA and IP in multiple ways (Blöte & Westenberg, 2019; McLaughlin et al., 2011; Rieffe & Rooij, 2012; Flynn and Rudolph, 2010; 2014, Stange et al., 2013). Low levels of EA are directly associated with a higher level of IP by sustaining and enhancing negative emotional arousal and by resulting in an inappropriate mental representation of oneself and the situation (Blöte & Westenberg, 2019; Rieffe & Rooij, 2012; Flynn and Rudolph, 2010; 2014, Stange at al., 2013). A lack of emotional understanding facilitates inappropriate, maladaptive judgments, attitudes, and beliefs (Gasper & Clore, 1998; Schwarz & Clore, 1983). EA represents the early stage of the emotion regulation process that indirectly affects IP through emotion regulation strategies (McLaughlin et al., 2011).

Although research has often demonstrated associations between EA and the risk of IP (Rieffe & Rooij, 2012; Stange et al., 2013; Flynn and Rudolph, 2010; 2014), most studies have analyzed the associations without investigating the direction of the state-level association. To the best of our knowledge, only two longitudinal studies have examined the directional association between EA and IP among adolescents. A five-year longitudinal study by Blöte & Westenberg (2019) measured students' (mean age = 13.40 years; 45% girls) emotional clarity and depressive symptoms at three-time points. Their results showed that depression symptoms and low emotional clarity predicted relatively high scores of each other over time. Further study by McLaughlin et al. (2011), measured emotional understanding, anxiety, and depression at a two-time point at seven monthly intervals. Their results showed that low EA predicted increased anxiety symptoms among adolescents but did not predict an increase in depressive symptoms. Also, they found that anxiety and depression did not predict low EA. Altogether, these studies provide evidence for the low EA's significant role in developing adolescent IP.

State and Trait Emotional Awareness

According to the level of emotional awareness model (LEA; Lane & Schwartz, 1987), EA is conceptualized as five levels that develop from the undifferentiated somatic emotional response to a more sophisticated and differentiated one. The five levels are defined in ascending order from the simplest to the most complex: bodily sensations, action tendencies, unidimensional emotions, multidimensional emotions (i.e., blends), multidimensional emotional experience of self and others. The LEA model can be conceptualized as both state- and trait-related constructs (Lane, 2020; Versluis et al., 2018). The current study uses statistical modeling to separate state and trait EA. First, we analyze state EA by building a cross-lagged panel model. Second, we apply a two-factor latent model to analyze trait EA. In the latent factor model, we extract a trait component from the variables assuming that the measurements consist of a trait, a state, and a measurement error variance.

A state-related EA is conceptualized to involve a relatively short time frame and reflects a momentary conscious experience of emotion (i.e., what one feels currently). In contrast, a trait-related construct represents individuals' habitual tendency to act and experience certain emotions (i.e., what one thinks s/he feels in general). From the trait perspective, concepts such as emotional intelligence (Mayer et al., 2003) and emotional flexibility (Bonanno et al., 2004) are highly similar to EA. EA reflects multiple process-related variables from the state perspective, such as experiencing emotion, arousal, expression, and regulation (Lane, 2020). Situational variables strongly influence the state of emotions. The state-related processes may explain the individual differences in trait-EA through three factors: namely, affective response generation processes, affective response representation, and conscious access to underlying emotional experiences.

Individual Differences in Emotional Awareness

Individual differences in state and trait EA may stem from two possible sources. First, individuals differ in the degree of their biological affordance, referring to what individuals' biology offers them as resources for interacting with the environment. For example, an individual's biology offers resources through genetic inheritance and epigenetics, that is, the interaction of the gene with the environment. The second source of individual differences in EA is the learning processes that occur during the developmental years (Smith et al., 2018).

This article applies Smith et al. (2018) framework to view factors that may determine developmental associations between EA and IP in the context of the family environment. Regarding the affect response generation process, the parental evaluation may determine whether adolescents develop more complex appraisals of emotions or only a few ways of appraising emotions (Gottman et al.,1996). Parental emotion coaching is negatively associated

with IP (Shott et al., 2016; Stocker et al., 2007). Regarding the affective response representation, parental discussion about emotions is essential in helping adolescents attend to emotions and acquire broader representations or emotional knowledge (Laible, 2004a, 2004b). Studies have demonstrated that mothers of securely attached preschoolers are more emotionally elaborative in reminiscing past emotional experiences than mothers of insecurely attached preschool children (Laible, 2004b). In addition, studies have found a link between mothers' elaboration and explanation of stressful events and fewer internalizing problems in pre-adolescents (Fivush & Sales, 2006). Individuals also differ in the ways that they consciously access affective information. Different cognitive habits to consciously process, represent, and appraise emotional situations may develop in response to differences in attachment relationships (Main et al., 1985). The ability to process emotional information can protect adolescents from developing depressive symptoms (Stange et al., 2013). Previous studies that support this view provided evidence for the link between appraisal tendency/biases and trait differences in affective responding (see Scherer, 2009; Scherer & Brosch, 2009; Scherer & Ceschi, 2000).

The factors determining the trait-level association between EA and IP may be developed in response to the early developmental environment. A significant body of research found a relationship between parental emotional expressions and the family's emotional climate regarding internalizing problems (Yap & Jorm, 2015; Yap et al., 2014). From an evolutionary perspective, anxiety has evolved to serve an adaptive function of coping with threats and depression in order to cope with losses and interpersonal conflict (Sloman et al., 2006). Altogether, these researches support our study's hypothesis that EA and IP may be trait-like characteristics of one's personality and develop in response to the early developmental environment. Children's emotional experiences (state EA) in the early developmental period may contribute to developing a dispositional tendency to repeatedly experience specific state emotions (trait EA) that may make adolescents more vulnerable to developing IP.

Research Task and Objectives

The general aim of this study is to analyze the associations between EA and IP. We analyze the associations at the levels of states (i.e., longitudinal changes) and traits (i.e., latent factors). First, we test the directionality of the state-level associations, that is, whether EA at Time 1 predicts state IP at Time 2 or the other way around. In line with previous research, we hypothesized that a low EA would predict a subsequent increase in IP, as difficulties in emotional awareness dispose one to emotional problems. As an alternative model, we tested the trait-level associations between EA and IP. We hypothesized that a negative trait-level association exists between EA and IP, as common factors may cause them to be correlated at the trait level. Finally, the study aims to discuss the results in light of the currently available literature on adolescents' early developmental environment. It is noteworthy that due to their phenomenological similarities, we considered anxiety and depression as internalizing problems in this study.

Methods

Participants and Procedure

The data used in this study is obtained from an intervention research designed to enhance emotional awareness. Twelve-year old students were chosen since this is the critical transition time from childhood to adolescence (Spear, 2009). The study data was gathered using convenience sampling; researchers selected participants from sixth-grade elementary school classes at the Tampere University Teacher Training School located in Finland. Researchers obtained ethical permission to conduct the study from the ethics committees of the University of Tampere who approved the research; we provided information about the study to the participants' parents and received their informed consent at the beginning of the research. The participants completed the EA and IP questionnaires during two-time points at one-month intervals. The intervention did not show a statistically significant effect on the IP, ($F(2, 59) = 1.99$, $p = .140$), nor on EA, ($F(2, 61) = 1.12$, $p = .332$). The intervention study included one control group receiving no training and three intervention groups receiving different training regarding their oral and written narrative skills: 1) oral co-narration, 2) literary narrative (for similar intervention study, see; Ghafaryan Shirazi et al., 2021). We used the whole sample from the intervention study to analyze the current study.

Measures

Levels of Emotional Awareness (LEAS-C)

The LEAS-C is a self-report measure assessing levels of emotional awareness, developed for children (Bajgar et al., 2005). The LEAS-C has proved to be a reliable measure (Bajgar et al., 2005; Veirman et al., 2011). It includes 12 evocative interpersonal scenarios involving two people described in a few sentences. Children are asked to answer two questions about how they might feel about the described scenario and how they think the other person might feel the scenarios are organized around four emotions: anger, fear, happiness, and sadness. Three separate ratings are made for each scenario:(1) self, (2) other, (3) total, in which the description of emotions for each person is assigned a level score from 0 to 4. The rating follows the criteria for each 5 levels of emotional awareness. Therefore, for each scenario, there is one "self" score from 0 to 4 and one "other" score from 0 to 4. The total score for each item is the highest of these two ("self" and "other") scores – unless, in the case of the four two-level scores, the respondent receives a score of 5 if the description of emotions follows the guidelines for level 5. Ratings for each scenario are summed to give a maximum possible score out of 60. The test is robust to bias since the response correctness remains independent of the scoring and based on the complexity of emotional words as well as the extent to which these emotions can be differentiated from one another. This study used the total-awareness scores (LEAS-T), and the Cronbach's alpha was $\alpha = .78$.

Internalizing Problems

Internalizing problems were measured on the Strength and Difficulty Questionnaire (SDQ) by Goodman (1997). SDQ includes 25 items on five subscales describing emotional problems, peer problems, behavioral problems, hyperactivity, and prosocial behavior. Each subscale includes five items, and the participants selected from 3-point Likert-type scales (0 = not true, 1= somewhat true, 2 = certainly true) the description that best fitted them. In a low-risk or general population sample, the three-subscale divisions of the SDQ have often been used, including internalizing problems, externalizing problems, and the prosocial scale (Goodman et al, 2010). The internalizing problems score was obtained by summing up the emotional and peer problem scales. The SDQ test demonstrated moderate test-retest reliability (Yao et al., 2009) and strong to satisfactory internal consistency (Yao et al., 2009; Goodman, 2001), although other studies demonstrated low internal consistency (Mieloo et al., 2012). The internal reliability of the children's self-report was $\alpha = .78$ for SDQ total and $\alpha = .79$ for internalizing problems.

Statistical Analyses

To answer our research question about how EA associates with IP, we built both the cross-lagged panel model (CLPM) and the two-factor latent model using the Lavaan package (Rosseel, 2012) in R software. First, the CLPM tested the directionality of the longitudinal associations between EA and IP. The model tested whether EA at Time 1 predicts IP at Time 2 (i.e., cross-lagged effect) when controlling for the stability (i.e., autocorrelation) of IP from Time 1 to Time 2. We also explored the alternative directional association between that IP at Time 1 predicting EA at Time 2.

Second, the two-factor latent model was built to test the trait-level associations between EA and internalizing. The logic behind the model is that a measured variable at the one-time point is assumed to contain a trait, a state, and a measurement error variance. This way, a trait component can be extracted from a state measurement point. Finally, the association between the constructs was tested, examining the latent correlation between the factors. The main difference to the CLPM model is that the model treats time-related changes (i.e., state-level variance) as errors and provides a more stable correlation estimate for the constructs. Robust maximum likelihood (MLR) – estimated and bootstrapped (with 5000 runs) standard errors – was used in the Lavaan package (Rosseel, 2012) to provide unbiased estimates. In all models, the adolescent's gender was used as a covariate.

Results

Descriptive Statistics

The participants consisted of 68 students; Female = 34, Male = 34; average age: 12.20(.37); Min = 12, Max = 13). Table 1 shows the demographic characteristics of the participants. The participants' fathers mainly worked in the manufacturing, production and business industry (26.3%), followed by other industries (10.5%), health (3.5%), and education (5.3%). The rest of the participants' – almost half of the participants (28.1%) – did not know about their parents' occupations. Most participants' mothers worked in the education industry (26.3%). The health (19.3%) and business industry (17.5%) were, respectively, the second and third most popular choice of industry among the participants' mothers. The rest (22.8%) reported that they did not know their parents' occupations, and (8.8%) reported other industries.

Regarding the number of siblings, participants mainly reported having one sibling (38.2%) and two siblings (26%). Only (14.7%) reported having three siblings, and 13.2% reported between four to six siblings.

In terms of the initial level for participants' IP and EA, it is noteworthy that the majority of the participants (82%) reported normal levels of IP symptoms at baseline. Only 8.8% were reported to exceed the cut-off score for having borderline and abnormal symptoms of IP (see more; https://www.sdqinfo.org/). The participants' total EA mean score at baseline was *M(SD)* = 28.88 (6.91), which compared to the total EA's maximum possible score of 60, reveals that participants possessed a slightly less than moderate awareness of their emotions.

Table 1. Study's Demographic Information

Variables	*n*	%
Sex of Children		
Boys	34	50.0
Girls	34	50.0
Father's Occupation		
Education industry	3	5.3
Health industry	2	3.5
Manufacture & Production Industry	15	26.3
Business Industry	15	26.3
I don't know	16	28.1
other Industries	6	10.5
Mother's Occupation		
Education industry	15	26.3
Health industry	11	19.3
Manufacture & Production Industry	3	5.3
Business Industry	10	17.5
I don't know	13	22.8
other Industries	5	8.8
Number of Siblings		
No sibling	5	7.4
one sibling	26	38.2
2 siblings	18	26.5
3 siblings	10	14.7
4–6 siblings	9	13.2

Both the Shapiro-Wilk and Kolmogorov-Smirnov tests of normality results indicated that EA is normally distributed ($p > .001$), but IP is not normally distributed ($p < .001$). There was a significant change in EA scores between Time 1: *M(SD)* = 28.88(6.91) and Time 2: *M(SD)* = 26.77(8.69), $t(61) = 2.51$, $p = .014$. The Wilcoxon signed-rank test showed no significant changes in the IP between Time 1: *M(SD)* = 7.07(2.93) and Time 2: *M(SD)* = 7.06 (2.92), $z = -.12$, $p = .909$.

Table 2. Correlation between study variables controlling for gender

Variables	1	2	3	4
1.EA-T1	–	.79 ***	.06	– .06
2.EA-T2			– .01	– .12
3.IP-T1				.70***
4.IP-T2				–

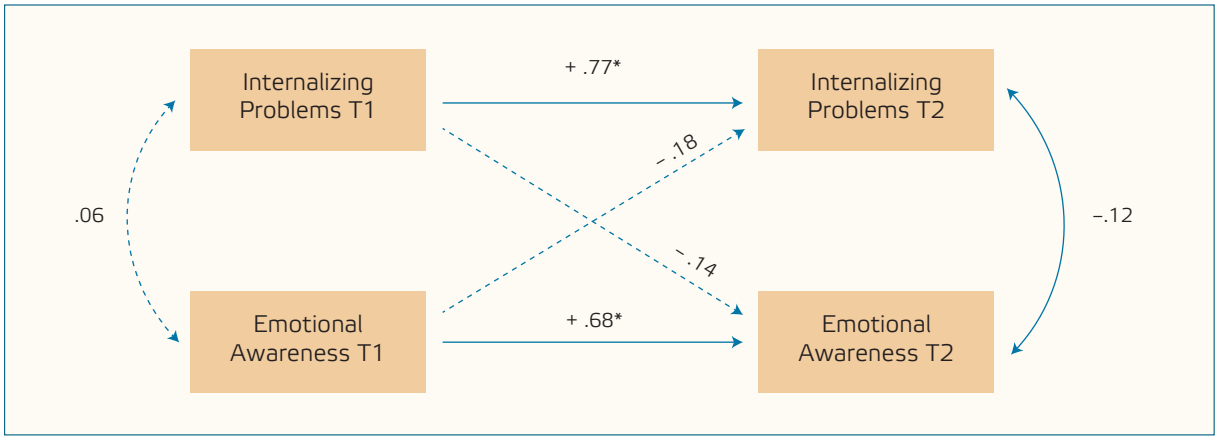
Note. EA: emotional awareness, IP: internalizing problems.
T1 and T2 stand for measured score at Time 1 and Time 2, ***p < .001.

Table 2 illustrates the Spearman correlation between study variables controlling for gender. As you can see, a significant Spearman correlation existed between EA at Time 1 and Time 2, $r\ (61) = .79$, $p < .001$, which reflects the continuity of EA throughout two-time points (autocorrelation). There was a non-significant correlation between EA at Time 1 and IP at Time 1, $r\ (64) = .06$, $p = .607$; and negative non-significant correlation between EA at Time 1 and IP at Time 2, $r(59) = -.06$, $p = .629$. Likewise, EA at Time 2 demonstrated a non-significant negative correlation with IP at Time 1, $r(63) = -.01$, $p = .882$; and similarly for the EA at Time 2 and IP at Time 2, $r(61) = -.12$, $p = .354$. Finally, the adolescents' IP scores from Time1 and Time 2 were highly and positively correlated, $r(61) = .70$, $p < .001$.

Relationships between Emotional Awareness (EA) and Internalizing Problems (IP)

The result from the CLPM exploring the directional association between variables showed no cross-lagged effect of EA on IP, $\beta = -.18$, $SE = .05$, $p = .101$. There was also no cross-lagged effect of IP on EA, $\beta = -.14$, $SE = .31$, $p = .18$. A considerable continuity of time manifested from Time 1 to Time 2 for both EA, $\beta = 0.68$, $SE = .16$, $p < .001$, and IP, $\beta = .77$, $SE = .08$, $p < .001$ (see; Figure 1.). Finally, a state-level negative correlation between EA and IP was apparent at Time 2 ($r = -.33$, $p < .001$), but not at Time 1 ($r = -.21$, $p > .001$). Altogether, the results did not indicate directional effects between EA and IP. The model was fully saturated and thus provided no fit indices.

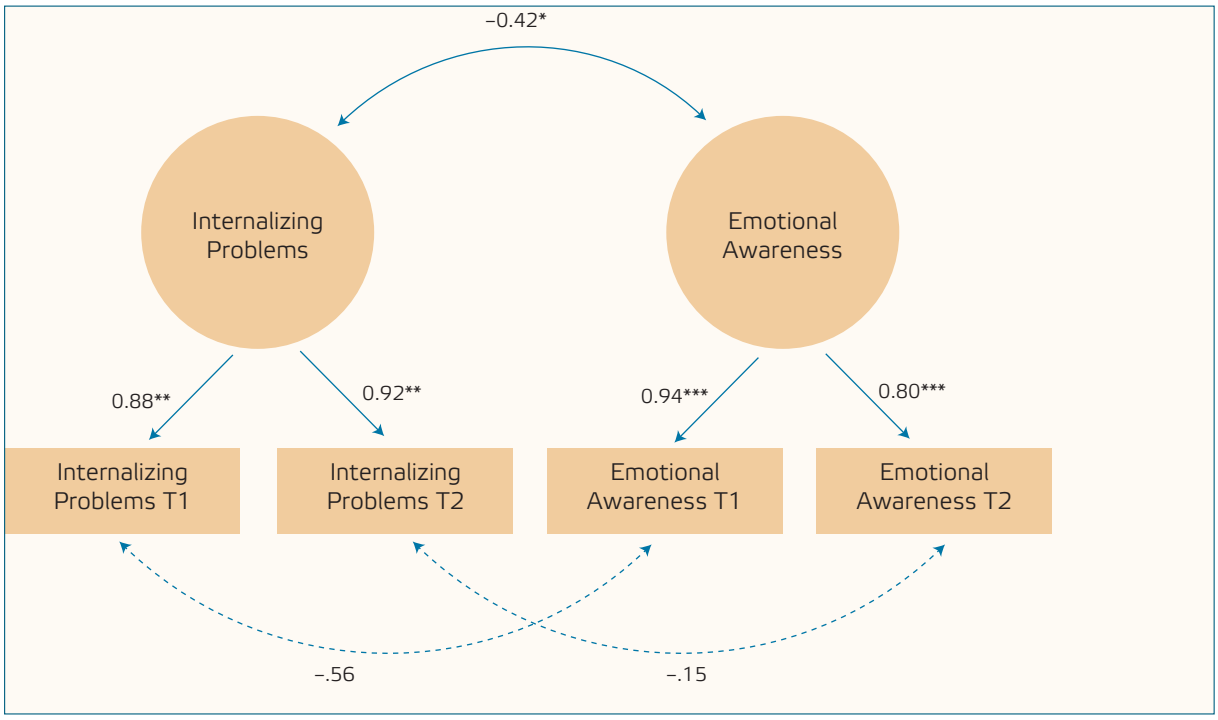
Figure 1. Cross Lagged Panel Model (CLPM) depicting state-related associations between EA and internalizing symptoms



Note. Dashed lines indicate nonsignificant, p > .05, paths. The single-headed arrows represent regressions and double-headed arrows represent the correlation. T1 and T2 denote time 1 and Time 2, *p < .001.

Figure 2 shows the two-latent factor model used to explore the trait-level association. Results displayed a moderate negative correlation between EA and IP, $r = -.42$, $SE = .29$, $p = .029$. The model showed a good fit, $\chi^2(1) = .94$, $p = .335$, $TLI = 0.999$, $CFI = 0.999$, RMSEA = 0.999, $p = .294$, $SRMR = .01$ (Hu & Bentler,1999; Hair et al., 2014). The robust maximum likelihood estimation method mitigated the violations of the normality assumption imposed by the IP variable (Finney & DiStefano, 2006).

Figure 2. Latent two-factor model depicting trait-level associations between EA and internalizing symptoms



Note. Dashed lines indicate nonsignificant, p > .05, paths. The single-headed arrows represent regressions and double-headed arrows represent the correlation. T1 and T2 denote time 1 and Time 2. *p = .029 ; **p = .257 ***p < 0.001.

Discussion

Accumulating evidence suggests that low EA is associated with IP in children. Most empirical studies have detected this association but have not considered state and trait levels in EA and IP assessments (Rieffe & Rooij, 2012; Stange et al., 2013; Flynn & Rudolph, 2010; 2014; Blöte & Westenberg, 2019; McLaughlin et al., 2011). The present study aimed to conduct a preliminary test of both state and trait level associations between EA and IP among adolescents. In the first research task, we explored the direction of the state-level associations between EA and IP. We hypothesized that low EA would predict a subsequent increase in IP, as difficulties in emotional awareness dispose one to emotional problems. Against our hypotheses, however, we found no cross-lagged associations between EA and IP. Yet, the results showed a negative state-level correlation between EA and IP at Time 2 but not at Time 1.

Contrary to our hypothesis, there were no directional associations between EA and IP. In the second research task using the two-factor latent model, we tested the trait-level associations between EA and IP. We hypothesized that a negative latent correlation exists between EA and IP, as common factors may cause them to be associated at the trait level. As expected, we found a moderate trait-level correlation between EA and IP. These results may shed light on the nuances and complex relations between state and trait EA and IP in an early developmental environment.

Surprisingly, our findings showed a lack of cross-lagged state-level associations between EA and IP. The state-level correlation at Time 2 may be the effect of confounding variables such as daily stressors (e.g., having a bad day), leading to a concomitant fluctuation in both EA and IP. The present finding contrasts with previous studies' results that suggested low EA predicts IP (Blöte & Westenberg, 2019; McLaughlin et al., 2011). Although the reason for our finding is not apparent, we deem the complexity of the state EA and IP associations worth considering. For example, being highly aware of one's emotions might have a counterproductive effect on emotional well-being. Relatedly, previous studies have argued that EA involves two correlated but different emotional abilities, which are attention to emotions and emotional clarity (Boden & Thompson, 2017; Subic-Wrana et al., 2014). While speculative, it is possible that excessive attention to emotions heightens IP, whereas

emotional clarity decreases IP. Such mixed effects of these abilities could explain why we found no cross-lagged effect of EA on IP.

It is also worth noting that most previous studies on EA and IP have focused on middle childhood (Flynn and Rudolph, 2010; 2014; Rieffe & Rooij, 2012; Blöte & Westenberg, 2019), and research on adolescence has been scarce (McLaughlin et al., 2011; Stange et al., 2013). Thus, the differences in the age period of focus might be one reason for the discrepancy between our state-level results and the previous studies. In addition, adolescence is a rapid time of socioemotional maturation, and other factors may be more salient for emotional well-being during this period. We acknowledge that larger and more representative samples are needed for the generalization of the result. It is possible that the lack of state-level associations in our study was due to methodological issues. Indeed, we assessed EA and IP at one-month intervals. Accordingly, it is possible that our timespan of one month was too short for capturing significant developmental effects. Further, the participants in our study were sampled from a community population. We deem it possible that EA may have a stronger effect on IP among adolescents with more severe problems. The majority of the study participants had normal levels of IP symptoms and moderate awareness of their emotions. Longitudinal and experimental studies, utilizing both normative and clinical samples, are needed to scrutinize the directional effects between EA and IP among adolescents.

As hypothesized, the results displayed a trait-level association between EA and IP. Considering the lack of directional state-level associations, the association between EA and IP may reflect a common origin of these personality characteristics. Indeed, learning processes during the earlier development can shape children's unique dispositional tendencies to represent, generate, and consciously access emotions that overlap with their vulnerability to develop IP. In other words, both EA and IP may have evolved as developmental responses to the earlier developmental environment. We acknowledge that the temperamental and biological aspects of personality also play an essential role in the development of EA and IP (Munafò et al., 2003). Yet, to stimulate clinical understanding, this article focuses on the learning processes during early development. In the following lines, we bring examples from the early developmental environment to delineate the possible link between trait EA and IP, using Smith et al. (2018) framework.

First, trait EA may be associated with IP through underlying state-related processes of the affective response representation. Studies found a relation between mothers' elaboration and explanation of stressful events and fewer internalizing problems in pre-adolescents (Fivush & Sales, 2006). Second, trait EA may be associated with IP through underlying state-related processes of affective response generation. Prior studies pointed out that individual differences in appraisal tendencies may reflect trait differences in affective responding (see Scherer, 2009; Scherer & Brosch, 2009; Scherer & Ceschi, 2000). Studies revealed a negative association between parental emotion coaching and depression among adolescents (Shott et al., 2016; Stocker et al., 2007). Thirdly, trait EA may be associated with IP through underlying state-related processes of conscious access. For example, adolescents with low EA may habitually avoid or anxiously heighten attention to their emotions and prevent specific cognitive representations from becoming conscious (Thompson, 2014; Dykas & Cassidy, 2011; Mikulincer & Shaver, 2016).

Anxiously attached adolescents tend to ruminate and see themselves as incompetent to alter negative emotional states (Alloy et al., 2010). Bölte and Westenberg (2019) found an association between low EA and high levels of depressive symptoms in pre-adolescents (mean age =13.40). They concluded that the association between low EA and depression might be explained by rumination, resulting from less clarity about negative emotions caused by adolescents' attempts to avoid or suppress threatening emotions. Another study by Rieffe & Rooij (2012) indicated that attention to emotions and analyzing one's emotions are negatively associated with depression while hiding emotions contributed to worry and ruminative thoughts over time in young adolescents (age 10-12). Another study by Stange et al. (2013) investigated the effect of negative inferential style, such as ruminative brooding and deficits in EA, as vulnerability factors for depression in young adolescents (ages 12 and 13). Their study result showed EA as a protective factor that insulates adolescents from the impact of life stress on depressive symptoms. In a series of studies in 2010 and 2014, Flynn and Rudolph investigated the mechanism linking EA to adolescents' depressive symptoms by looking at interpersonal stress responses. Their result demonstrated that a low EA contributes to a maladaptive stress response facilitated by the interruption in deploying resources to adapt and resolve interpersonal stress responses that subsequently exacerbate adolescents' susceptibility to depressive symptoms.

Strengths and Limitations

This study's main contribution is the consideration of state and trait levels in analyzing EA and IP. However, we acknowledge that the current study has several methodological limitations. First, the study sample was very small and reflected a selected part of the population. Thus, the results should be considered preliminary. Additionally, the current study only contains two-time point measurements and small-time intervals. These limitations may, for example, underestimate the cross-lagged effects. More long-term studies can provide more reliable results; thus, this study's results should be considered tentative. Second, the CLPM model has been criticized for not separating the trait and state-level effects (Hamaker et al., 2015). Yet, our limited sample precluded us from conducting more complex statistical analyses. For example, it has been shown that three-time points are needed to differentiate stable trait level effects and within-person change over time. Third, this study used the traditional LEAS method, typically used to assess trait EA. The limitation is that we did not use a more genuine assessment of state-EA (e.g., diary methods; Versluis et al., 2018). Finally, this study should be generalized with caution to other age groups since the sample consisted of only 12 years old students. Yet, we hope our work stimulates further research as the topic has rarely been studied before now. We thus believe that our brief theoretical and conceptual summary is valuable for practitioners and clinicians.

Conclusion, Implications, and Future Directions

The current study aimed to conduct a preliminary test of both state and trait level associations between EA and IP among adolescents. The explanations for the lack of state association could be the mixed effects of EA abilities; i.e., attention to emotions and emotional clarity (i.e., counterproductive effect), and may relate to the methodological limitations of our study. Further, the result displayed a trait-level association between EA and IP. Guided by the Smith et al. (2018) framework, we suggest that trait EA may be associated with trait IP through three underlying state-related processes in the context of early development. Future studies can be designed to elaborate on the associations between state/trait EA and IP by investigating the relative contributions of each of these possible state-related processes outlined by Smith et al. (2018) in the context of early development. Furthermore, researchers can model which EA state processes associated with the emotional aspect of everyday parenting can account for inadequate habits or traits in emotion processing, which subsequently can lead to IP. Researchers recommended using the state-LEAS assessment to investigate whether the accumulation of these state processes can slowly change adolescents' trait-LEAS or not. These researches can also directly test whether and how family experiences (e.g., parental scaffolding, discussions) help to achieve state-LEAS experiences (high EA) and whether these truly lead to trait EA. Finally, researchers can also design interventions focusing on one specific underlying aspect of state-EA; i.e., affect response generation, representation, or conscious access, to examine further which underlying aspects of state-EA enhance trait EA and relieve IP the most.

Acknowledgements
We thank Pihla Rautanen, Kaisa Niemelä and other teachers and the school staff that make this study possible.

Funding
This research did not receive any grant.

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Yasaman GHAFARYAN SHIRAZI: conceptualization, design, methodology, investigation, project administration, data management, interpretation, writing original draft, writing review and editing.
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Declaration of interest statement
The authors declare no conflict of interest.

Ethical statement

The studies involving human participants were reviewed and approved by University of the Tampere ethics committee.
All participants participated in the research voluntarily and anonymously.
The participants provided their written informed consent to participate in this study.
Their data are stored in coded materials and databases without personal data.

Data Availability Statement

The data supporting this study's findings are available to the public.
We have policies in place to manage and keep data secure.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0008

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RESEARCH ARTICLE

Coffee, Energy Drinks Consumption and Caffeine Use Disorder Among Law Enforcement College Students in Hungary

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History
Received: 26 January 2022
Accepted: 23 January 2023
Published: 29 June 2023

Citation
Erdős, Á. (2023). Coffee, Energy Drinks Consumption and Caffeine Use Disorder among Law Enforcement College Students in Hungary. European Journal of Mental Health, *18,* 0008, 1–12. https://doi.org/10.5708/EJMH.18.2023.0008

Introduction: Caffeine is one of the most popular and consumed substances worldwide. The prevalence of caffeinated beverage consumption stands quite high among young people and in some professions, such as law enforcement.
Aims: The aim of our study was to assess the lifetime and daily prevalence of caffeine consumption, the extent of consumption, and the prevalence of caffeine use disorder among law enforcement students.
Methods: A cross-sectional, questionnaire-based survey was conducted among Hungarian law enforcement students at the University of Public Service (Hungary) Faculty of Law Enforcement (UPS FLE). The study sample (N = 180) consisted of 57.2% male (n = 103) and 42.8% female (n = 77). The Caffeine Use Disorder Questionnaire (CUDQ) was used to measure caffeine use disorder among law enforcement students.
Results: The lifetime prevalence of caffeine consumption is 98.3% (n = 177) among law enforcement students. Two-fifths (n = 72) of law enforcement students are classified as daily consumers. The average caffeine intake of daily consumers was 177.5 mg/day (range: 60–550 mg/day; SD = 89.54). The majority (64.7%; n = 110) of caffeine users had experienced at least one symptom of caffeine use disorder in the past 12 months.
Conclusions: This is the first study on caffeine consumption among Hungarian law enforcement students. Previous results suggest that the consumption of a high dose of caffeine could compromise aiming accuracy and shot placement, thereby jeopardizing the health and welfare of law enforcement personnel. Our results may be useful for researchers, Hungarian and foreign law enforcement agencies and law enforcement colleges, and vocational schools as well.

Keywords: caffeine consumption, caffeine use disorder, law enforcement, college students, Caffeine Use Disorder Questionnaire

Introduction

Coffee remains one of the most popular and consumed beverages worldwide, and caffeine is its best-known component, present also in many other beverages (tea, soft drinks, energy drinks), foodstuffs (cocoa, chocolate), sports supplements, and even medicines (Abalo, 2021). In 2020/2021, around 166.63 million 60-kilogram bags of coffee were consumed worldwide (ICO, 2021). The per capita coffee consumption in the European Union (EU) is 5.18 kg per year (ECF, 2019). In Hungary, the per capita coffee consumption was 2.7 kg and per capita tea consumption was 0.149 kg in 2020 (KSH, 2022).

Coffee consumption also serves as an important part of workplace culture in most countries around the world (Bradley et al., 2007; Rodrigues et al. 2021). The top reasons for drinking coffee during work include: enjoyment (56%), relaxation (40%), increasing alertness (29%), suppressing fatigue (29%), and improving concentration

ISSN 1788-7119 (online)

(24%) (Rogers & Wesnes, 2017). Because of its psychostimulant and physical performance-enhancing effects, caffeine can be useful in all professions that require sustained physical and mental work and exertion, and which may involve sleep deprivation (Bors et al., 2018). However, research suggests that there are significant differences in caffeine intake levels between populations of different occupations (Bouher, 1989; Lieberman et al., 2018; Tsiga et al., 2015). Lieberman et al. (2018) found that adults in "legal" or "management" professions consumed more caffeine than adults in other professions. Researchers believe that, because caffeine increases alertness and reduces fatigue, its use by individuals in these occupations may reflect the demanding nature of their professions. In another study, doctors and nurses were found to consume significantly more caffeine than office workers (Tsiga et al., 2015). Doctors and surgeons use caffeine to reduce fatigue and increase alertness, athletes use caffeine to enhance their physical performance (Jahrami et al., 2020).

Crisis response personnel also often use stimulants such as caffeine and nicotine to stay alert (Bergen-Cico et al., 2020). Police officers also commonly use caffeine, nicotine, and other drugs to manage depression and anxiety (Amaranto et al., 2003). In their research, McCormik, Cohen, and Plecas (2011) found that the most commonly consumed beverage among police members was coffee, and coffee is high in caffeine content. In a 12-hour shift, among members who drank at least one drink that contained caffeine, the average amount of caffeine consumed was 116 mg with a range of 30 mg to 385 mg. Lafata (2007) suggested that coffee consumption exists as a part of on-duty police culture. Ogeil et al. (2018) found that police officers and the general population have similar rates of caffeine consumption (90% vs. 89%). However, while mean average consumption is estimated at 186 mg across the population, they found that more than 20% of the police used a high level of caffeine (> 400mg/day), and more than 5% used medication or over-the-counter drug to promote wakefulness (excluding caffeine) in the past month (Ogeil et al., 2018). Meanwhile, the estimated proportion of "high level" (> 400mg/day) caffeine consumers was only 14% in the general adult population (Fulgoni et al., 2015).

However, caffeine consumption also occurs before employment. The prevalence of caffeinated beverage consumption also stands quite high among young people. Youth often consume coffee drinks in large amounts. Caffeine consumption by adolescents and young adults has increased dramatically over the last decade through both increased coffee consumption and so-called "energy drinks", which may contain other constituents that impact health (El-Nimr et al., 2019). Energy drinks have become a popular product after the millennium, especially among teens and young adults (Torpy & Livingston, 2013). Caffeinated drinks (such as coffee, tea, and energy drinks) differ mainly in their caffeine content and other ingredients. Consumption of energy drinks by young people can be particularly problematic because: (1) energy drinks have a high sugar and sweetener content (Grósz & Szatmári, 2008), which makes them appealing to children; (2) some energy drinks contain extremely high levels (240-505 mg) of caffeine (Reissig etl al., 2009); (3) energy drinks are also available in large packets (600-1500 ml), so it is easy to overdose on caffeine (Dojcsákné & Kiss-Tóth, 2018); (4) young people usually mix energy drinks with alcohol (Malinauskas et al., 2007; Miller, 2008; O'Brien et al., 2008) which have serious health consequences.

Young adults usually use caffeine to get more energy, for the taste, or as part of social gatherings (Jahrami et al., 2020). Among students, research suggests that the regular consumption of caffeinated beverages is 24.4% to 50% explained by improved concentration, academic performance, and preparation for exams and projects (Bertasi et al., 2021; Katib et al., 2018; Malinauskas et al., 2007; Mahoney et al., 2019). Hungarian research also suggests that a significant proportion of Hungarian students consume energy drinks and other caffeinated drinks for study. Berényi et al. (2010) found that 42.7% of university students consume caffeinated beverages to improve academic performance. Results from another study also show that more than half (52.3%) of university students use energy drinks during their study, with one fifth (22.6%) of them specifically expecting caffeine to improve mental performance.

Scientific results suggest that the consumption of coffee and energy drinks is explained in most cases by the beneficial pharmacological effects of the main active substance. Caffeine causes most of its biological effects via antagonizing all types of adenosine receptors (ARs): A1, A2A, A3, and A2B and, as does adenosine, exerts effects on neurons and glial cells of all brain areas (Daly et al., 1994; Fredholm et al., 1999; Ribeiro & Sebastião, 2010). It also interacts with dopaminergic transmissions in the central nervous system; increases vigor and reduces tiredness via dopaminergic pathways (Fredholm et al. 1999; Meeusen et al., 2013; Souissi et al., 2012). Caffeine use results in a temporary increase in metabolism, increased wakefulness, attention, and clear thinking (Glaister & Moir, 2019). However, caffeine consumption can also have a number of adverse consequences. The European Food Safety Authority (EFSA) recommends that the safe amount of caffeine for adults should not exceed 400 mg per day (EFSA, 2015). Intake of high doses (> 400 mg) of caffeine can cause anxiety, nausea, tremors, and nervousness (Garrett & Griffiths, 1997), muscle spasms, rambling, or disorientation (Glaister & Moir, 2019). Some studies also suggest that regular high caffeine intake (> 450 mg/day) may increase the risk of cardiovascular disease

(Greenland, 1993). More than 744 mg/day consumption of caffeine has been shown to increase urinary excretion of calcium and magnesium (Tucker, 2003). Even higher doses (~2000 mg/day) lead to muscle convulsions, toxic symptoms, ventricular fibrillation, cardiovascular symptoms, hallucinations, and (~3000 mg/day) death (Glaister & Moir, 2019; Willson, 2018). The frequency of caffeinated drink (energy drink) consumption was positively associated with marijuana use, sexual risk-taking, fighting, and seatbelt omission. In some cases (among white students), it was associated with smoking, drinking, alcohol problems, and illicit prescription drug use (Miller, 2008).

High caffeine-content beverage drinking, such as coffee or energy drinks, becomes habit-forming (Budney & Emond, 2014; Olekalns & Bardsley, 1996). Numerous controlled laboratory investigations show that caffeine produces behavioral and physiological effects similar to other drugs of dependence. Moreover, several recent clinical studies indicate that caffeine dependence is a clinically meaningful disorder that affects a nontrivial proportion of caffeine users (Addicott, 2014; Meredith et al., 2013). The DSM-5 includes Caffeine Use Disorder (CUD) as a condition of further study. DSM-5 proposed three necessary and sufficient diagnostic criteria for CUD: (1) a persistent desire or unsuccessful efforts to cut down or control caffeine use; (2) continued caffeine use despite knowledge of having a persistent or recurrent physical or psychological problem that caffeine is likely to have caused; and (3) withdrawal, as manifested by the characteristic withdrawal syndrome for caffeine, or caffeine or a closely related substance is taken to relieve or avoid withdrawal symptoms. Six additional diagnostic criteria included in other substance use disorders, such as craving or strong desire or urge to use caffeine, tolerance, and taking caffeine in larger amounts or over a longer period of time than intended, were also included as markers for greater severity beyond the three key criteria for CUD (Sweeney et al., 2019).

Overall, research findings suggest that caffeine consumption is positively related to the law enforcement profession and to university education. However, very little is known about caffeine use and CUD among young people who choose the law enforcement profession. Higher education is one of the most important settings for professional socialization; for this reason, certain health behavioral issues related to the chosen profession should be addressed at school. This is the first study on caffeine consumption among Hungarian law enforcement students.

Methods

Data Collecting and Sample

A cross-sectional, questionnaire-based online survey was conducted among Hungarian law enforcement students at the University of Public Service (Hungary) Faculty of Law Enforcement (UPS FLE). The research was carried out in accordance with the UPS's Code of Scientific Ethics.

The research was conducted between October 2020 and January 2021. Participation was voluntary and anonymous. We reached all 556 students at the UPS FLE, and almost a third of the students (32.3%) took part in the survey. A total of 180 respondents provided accessible answers and formed the research sample.

Table 1. Socio-demographic characteristics of the study participants, *n* (%)

		Sample (*N* = 180)	
		(n)	*(%)*
Sex	male	103	57.2
	Female	77	42.8
Status	cadet	163	90.6
	double-status	17	9.4
Academic year	1st-year	55	30.6
	2nd-year	38	21.1
	3rd-year	46	25.6
	4th-year	41	22.8
Type of residence	villages	49	27.2
	small town	44	24.4
	large town	30	16.7
	capital/county seat	57	31.7

The study sample (n = 180) consisted of 57.2% male (n = 103) and 42.8% female (n = 77). The majority of respondents were male, reflecting the gender distribution in the population of the UPS FLE. 90.6% of the respondents (n = 163) are so-called "cadets", and 9.4% are "double-status-student". The "cadet" is a special status, close to the professional status, but its primary purpose is to help prepare one for a career as an officer. "Double-status" students are professional non-commissioned officers who study full-time. The distribution of the sample by gender and academic year corresponds to these characteristics of the total population. Table 1 shows other socio-demographic data.

Measures

In our study, the caffeine content of caffeinated products was calculated on the basis of previous studies (AIS, 2021; Attipoe et al., 2016; Barone & Roberts, 1996; Bunker & McWilliams, 1979; Burg, 1975; Chin et al., 2008; Gilbert et al., 1976; Greden, 1974; Grósz & Szatmári, 2012; McLellan et al., 2016; Mineharu et al., 2009; Nagy & Litt, 1974; Roehrs & Roth, 2008; Zocconi et al., 2013). The estimated caffeine content was 100 mg per cup (150 ml) of ground coffee (including espresso, brewed, and drip coffee), 60 mg per cup (150 ml) of instant coffee. Energy drinks contain an average 75 mg caffeine per can (250 ml).

Prevalence of use

Participants had to rate the frequency of caffeine consumption on an 8-point scale (1 = never, 2 = weekly or less, 3 = several times in a week, 4 = one portion per day, 5 = two portions per day, 6 = three portions per day, 7= four portions per day, 8 = five or more portions per day) for the following caffeinated products: brewed coffee, instant coffee, and energy drink(s).

Caffeine Use Disorder Questionnaire

The Caffeine Use Disorder Questionnaire (CUDQ), tested on the Hungarian population, was used to measure CUD among law enforcement students (Ágoston et al., 2018). The 10-item CUDQ comprises the proposed DSM-5 (Diagnostic and Statistical Manual of Mental Disorders) criteria of CUD. The first nine items of the CUDQ measure symptoms of CUD, and the last item asks whether the respondent has experienced significant distress because of the symptoms – although this last criterion (significant distress) is not included in the DSM-5 recommended symptoms (August, 2018).

Based on previous research involving this topic, the most clinically relevant symptoms are (1) persistent desire or unsuccessful efforts to cut down or control caffeine use, (2) continued caffeine use despite the knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by caffeine, and (3) characteristic caffeine withdrawal syndrome or caffeine use to relieve or avoid withdrawal symptoms (Meredith et al., 2013).

According to Ágoston (2018), in the clinical assessment of CUD, three other symptoms that we should pay particular attention to are (1) symptomatic distress, (2) non-compliance with work- or school-related obligations, and (3) the appearance of social problems. All three symptoms indicate a functional impairment in everyday life and may therefore at the clinical level be able to capture problems that have developed or are developing (Ágoston, 2018).

Participants had to indicate on a 4-point Likert scale (1 = Never, 2 = Sometimes, 3 = Often, 4 = Very often) their choice regarding how often they experienced the symptoms during the last 12 months. The internal consistency of CUDQ was acceptable (Cronbach's α = 0.71–0.83) in the previous studies (Ágoston et al., 2019; Kaya et al., 2021). The internal consistency value of CUDQ was (Cronbach's α) .76 in this study, which indicates a high level of reliability.

Statistical Analysis

For statistical analysis, frequencies were calculated and significance levels were determined using χ^2 tests. The significance level was taken as $p < .050$. The association relationship between the test values was measured using the Cramer V (V) and Phi (ϕ) coefficient. For the metric variables, a two-sample t-test (t) and a Cohen's effect size index (d) were used.

Aims and Hypotheses

The aim of our study was to assess the lifetime and daily prevalence of caffeine consumption, the extent of consumption, and the prevalence of CUD among law enforcement students.

Due to the chosen profession, it is assumed that the prevalence of caffeine consumption among Hungarian law enforcement students stands higher than in the general population (H.1). It is also assumed that CUD remains more prevalent among females than males (H.2). On the one hand, women are more likely to use drugs for mood and emotion regulation and stress reduction, while for men it is more related to risk and pleasure seeking (Greenfield et al., 2010). On the other hand, women have higher somatosensory amplification (Köteles et al., 2009), which may indicate higher levels of CUD.

Given the results of previous national studies (Ágoston, 2018), it is also assumed that the most common symptoms of CUD among law enforcement students are cravings, uses to relieve withdrawal symptoms, and uncontrolled use (H.3).

Results

Prevalence and Frequency of Consumption

The lifetime prevalence of coffee or energy drink (hereinafter: caffeinated beverages) stands at 98.3% (n = 177) among law enforcement students. A total of 97.1% of males and all females without exception had consumed a caffeinated beverage in their lifetime. Based on life prevalence values, brewed coffee consumption accounts for the largest share (39.6%) of caffeine intake, followed by energy drinks (33.5%) and instant coffee (26.9%).

Current caffeine consumption prevalence stood at 94.4% (n = 170), meaning that more than 90% of students use coffee or energy drinks with some regularity. Two-fifths (40.0%) of law enforcement students are classified as daily consumers, who drink at least one type of caffeinated beverage every day. And 54.4% of respondents are occasional consumers who drink coffee or energy drinks once a week or less. Females had slightly higher rates of daily caffeine consumption than males. Almost half of the women (48.6%) compared to only 37.5% of men consume coffee or energy drinks at least once a day. The difference was not significant between females and males, however, in the frequency of caffeinated beverage consumption ($\chi^2(1) = 2.12$; $p = .145$; $\phi = 0{,}11$). The results also suggest that academic years do not influence the frequency of caffeinated beverage consumption. Among first, second, third and fourth-year students, no significant difference existed between the proportion of daily and occasional consumers ($\chi^2(1) = 4.26$; $p = .233$; $\phi = 0.16$). Examining the regularity of caffeine consumption, no significant pattern was found across sociodemographic variables (Table 2).

Table 2. Prevalence of daily caffeine consumption by different socio-demographic variables, percentage of respondents (%)

	n	Daily consumption prevalence (%)	χ^2(df)	p	V/ ϕ
Sex					
male	36	37.5	2.12(1)	.145	0.11
female	36	48.6			
Status					
cadet	63	41.2	0.86(1)	.352	0.07
double-status	9	52.9			
Academic year					
1st-year	27	50.9	4.26(3)	.233	0.16
2nd-year	15	45.5			
3rd-year	18	40.9			
4th-year	12	30.0			
Type of residence					
villages	22	46.8	2.65(3)	.447	0.12
small town	20	50.0			
large town	11	36.7			
capital/county seat	19	35.8			

n: answers number
χ^2 (df): chi-square statistics and the degree of freedom;
p: significance value associated with the Chi-squared test;
V: Cramer's V (for variables with several categories);
ϕ: Phi values (for dichotomous variables).

Table 3. Distribution of caffeinated beverage consumers by product and frequency of consumption, % *(n)*

% *(n)*	Never	less frequently than weekly	a few times a week	1 prop./day	2 prop./day	3 prop./day	4 prop./day
brewed coffee*	16.6 (30)	26.1 (47)	19.4 (35)	16.1 (29)	11.7 (21)	5.6 (10)	.6 (1)
instant coffee**	41.1 (74)	31.7 (57)	12.8 (23)	6.7 (12)	2.2 (4)	.6 (1)	.0
energy drinks***	26.7 (48)	47.2 (85)	15.6 (28)	2.2 (4)	2.2 (4)	.0	.0

* missing: 4; ** missing: 7; *** missing: 8

The majority (96.6%) of students who partake of caffeine on a regular basis consume more than one type of caffeinated product. Only 25.3% of consuming law enforcement students are not considered to be polycaffeine users; which means that they only consume one type of caffeinated beverage at a time. The frequency of consumption regarding each caffeinated product is shown in Table 3.

The average caffeine intake of daily consumers came to 177.5 mg/day (range: 60–550 mg/day/person; *SD* = 89.54). Almost a fifth (18.1%) of daily consumers consume 300 mg or more of caffeine per day. And 1.4% have a daily caffeine intake of 400 mg or more. Among daily drinkers, males (178.3 mg; *SD* = 83.80) use more caffeine on average than females (176.6 mg; *SD* = 96.12). However, the difference in average daily caffeine intake between the two sexes was not significant ($t(69) = 0.07$, $p = .937$, Cohen's d = 0.01).

In addition to the regularity and quantity of caffeine consumption, the study also examined the prevalence of caffeine use disorder.

According to the results, the majority (64.7%; $n = 110$) of current caffeine users had experienced at least one symptom (*M(SD)* = 2.73(2.34)) of CUD in the past 12 months. Results indicate a higher prevalence of substance use disorder symptoms among women. Female students reported more (*M(SD)* = 1.98(1.96)) symptoms of caffeine use disorder than male students (*M(SD)* = 1.86(2.39)), although the difference between the means was not significant ($t(167) = -0.36$; $p = .715$). However, a significant difference manifested – ($t(134) = 4.21$; $p < .001$; Cohen's d = 0.67) – in the average number of symptoms experienced between regular (daily) users (*M(SD)* = 2.73(2.34)) and occasional users (*M(SD)*=1.31(1.90)). On average, regular users experienced twice as many diagnostic criteria in the 12 months prior to the survey than occasional caffeine users.

A total of 49.1% had at least three symptoms (mild CUD), 20.0% met four or more criteria (moderate CUD), and 7.1% of the current caffeine users experienced six or more CUD symptoms (severe CUD) in the past 12 months. 5.9% ($n = 10$) of the students met all three symptom criteria considered most clinically important (Meredith et al., 2013).

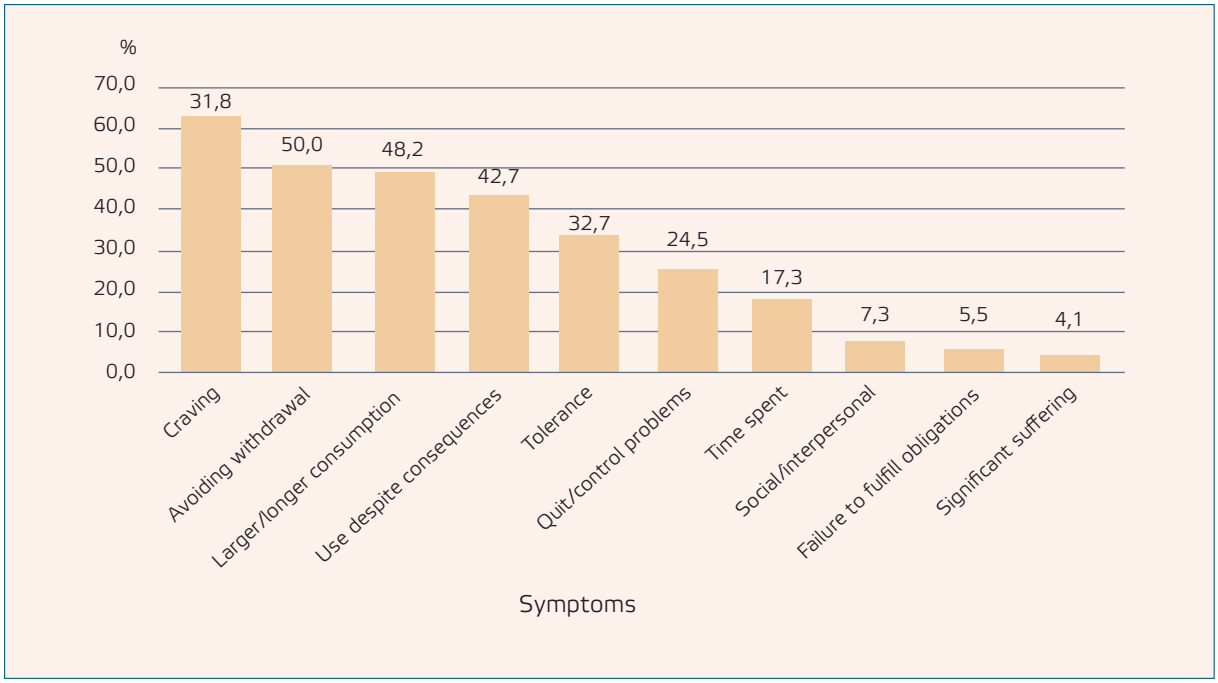
In this study, the three most serious symptoms that indicate a functional impairment in everyday life were reported in the following proportions among students experiencing symptoms: significant suffering from symptoms (4.1%); dereliction of duty (5.5%) and social problems (7.3%).

The most common symptoms of caffeine use disorder consisted of craving (61.8%), drinking to avoid withdrawal symptoms (50.0%), and drinking longer than planned or more caffeine (48.2%). Symptoms such as drinking caffeine despite negative symptoms in social relationships (7.3%) or in the context of failure to fulfill obligations (5.5%) were the least common among current caffeine users (Figure 1).

Discussion

We assumed that the prevalence of caffeine consumption among Hungarian law enforcement students is higher than in the general population (H.1). Rehm et al. (2020) found that 59.5% of the US adult population (≥ 20 years) consume caffeine-containing products daily. Benson, Unice, and Glynn (2018) suggest that the daily prevalence of caffeine use among the 18–24 age group is 35.3%, while the daily prevalence among 25-29-year-olds is 53.4%. According to the results of the latest Hungarian national youth survey, 59% of young Hungarians aged 15–29 consume coffee and 13% of them drink energy drinks at least once a day (Domokos et al., 2020). Our results suggest, however, that the daily prevalence of caffeine consumption among law enforcement students is not higher than among the general population. So the first hypothesis is not confirmed.

Figure 1. Prevalence of symptoms regarding caffeine use disorder according to the CUDQ



Previous studies among university students have found no gender differences in caffeine consumption (El-Nimr et al., 2019; Năsui et al., 2021; Jahrami et al., 2020). Among law enforcement students; moreover we found no differences in the frequency of caffeine consumption between males and females. Fulgoni et al., (2015) in their study also found no gender difference in the frequency of caffeine consumption. However, males had a higher average daily caffeine intake compared to females (211 ± 5 vs. 161 ± 3 mg/day).

The average daily intake of caffeine came to 177.5 mg/day (range: 60–550 mg/day; *SD* = 89.541). Daily caffeine intake stood higher among male students than females (178.3 vs. 176.6 mg/day), but the difference was not significant. According to previous national and international studies regarding university student populations, daily caffeine intakes range from 159 to 224 mg (Ágoston et al., 2017; Ágoston, 2014; Mahoney et al., 2019). Compared with the results of previous studies, the average daily caffeine intake of law enforcement students is not at all outstanding.

On the other hand, it is important to note that 18.1% of daily users consume 300 mg or more of caffeine per day. And the daily caffeine intake for 1.4% of the law enforcement students amounts to 400 mg or more. These results are noteworthy because more than 400 mg of caffeine consumption can cause serious physical and psychological symptoms such as anxiety, nausea, tremors, nervousness, muscle spasms, or confusion (Garrett & Griffiths, 1997; Glaister & Moir, 2019). Some adverse clinical effects can occur at intakes of 300 mg or more (Nawrot et al., 2003).

In addition to the "general risks" of high-dose caffeine intake, there are also profession-specific problems among law enforcement officers. For example, police officers have a significantly higher prevalence of prehypertension and arterial hypertension, and should therefore be more vigilant in reducing alcohol and caffeine consumption (Arredondo, 2019). An et al. (2020) found that, among police officers, factors such as job stress, smoking, alcohol, and caffeine consumption lead to an increase in diastolic blood pressure (DBP). Furthermore, an increase in daily caffeine consumption by police officers is positively associated with an increase in the prevalence of irritable bowel syndrome (IBS) (Sertbas, 2014). In another study, caffeine use was independently associated with increased odds of errors, stress, and burnout (Ogeil et al., 2018). Some research also suggests that caffeine may reduce hand stability (Bovim et al., 1995; Jacobson et al., 1991). Monaghan et al. (2017) analysis revealed that the energy shots significantly ($p \leq .050$) impaired pistol steadiness, whereas the placebo yielded no significant difference in aiming steadiness. Based on these results, it was concluded that the consumption of energy shots could compromise aiming accuracy and shot placement, thereby jeopardizing the health and welfare of law enforcement personnel (Monaghan et al., 2017; Monaghan et al., 2014). On the other hand, according to Copenhaver (2016), as officers consume more stimulant drinks per shift they also drink alcohol for a greater number of days per week, normally consume an alcoholic drink after work, sleep less, and consume more fast food.

Based on previous studies, it was also assumed that CUD is more prevalent among females than males (H.2). In our study, the CUDQ was used to assess the prevalence of CUD-related symptoms among students. More than half (64.7%) of the students who drank caffeinated beverages had at least one symptom of CUD. Some 49.1% of the current coffee and energy drink users have mild CUD, 20.0% moderate, and 7.1% severe; 5.9% (n=10) of the students met the three clinically most important symptom criteria. The observed CUD symptoms' prevalence in the present study stands lower than do prior estimates of meeting criteria roughly similar to the three key diagnostic criteria, which range from less than 10% to 13% among general samples of adults (Sweeney et al. 2020). On average, female students reported more (M=1.98) symptoms of caffeine use disorder than male students (M=1.98 vs. M=1.86), although the difference between the means was not significant. Our second hypothesis is therefore only partially confirmed.

Finally, given the results of previous national studies, it is also assumed that the most common symptoms of CUD among law enforcement students are cravings, uses to relieve withdrawal symptoms, and uncontrolled use (H.3).

We found that daily users experienced significantly more symptoms than occasional drinkers. This result suggests that more frequent consumption of coffee and other caffeinated beverages is associated with a higher number of caffeine use disorder symptoms. This observation remains generally consistent with prior research (Ágoston, Urbán & Demetrovics, 2016). Among the individual symptoms indicative of CUD, craving, avoidance of withdrawal symptoms and loss of control were the most common. Our findings are almost identical to those of a previous study in Hungary (Ágoston, 2018). These results suggest that cravings, use to relieve withdrawal symptoms, and uncontrolled substance use may be the primary symptoms of CUD. So the third hypothesis is confirmed.

Strengths and Limitations

This is the first study to investigate caffeine consumption patterns and the prevalence of substance use disorder among Hungarian law enforcement students. The results presented may be useful for researchers, law enforcement colleges, and vocational schools as well.

The topic of this study bears great importance for law enforcement agencies. The occupational stress experienced by law enforcement officers is arguably different from the stress experienced by individuals in other occupations. One factor contributing to the difference involves the nature of the work (Mann & Neece, 1990). Police work, by nature, is highly unpredictable and stressful. Moreover stress – particularly occupational stress – has been shown to lead to increased coffee and cigarette consumption (Burke, 1994; Conway et al., 1981; Swanson et al. 1994). On the other hand, although less clearly delineated in the literature, the amount of coffee intake may influence the size of heart-rate variability in response to stress situations (Hickman et al., 2011). All of these can jeopardize the safe and professional implementation of law enforcement measures.

Though this study is believed to have provided useful information regarding caffeine use, and CUD among law enforcement students, it carries several limitations. First, the study is strictly self-report. Thus, estimations of caffeine consumption rely on both participants' awareness of and accuracy in their reports of daily caffeine intake. On the other hand, the study only focuses on the consumption of coffee, instant coffee, and energy drinks, not other caffeinated products (e.g. tea or caffeine pills). The actual prevalence of caffeine consumption and level of caffeine intake may also be affected. A further limitation in the results of the study is that convenience sampling was used in the sampling procedure. Due to the sample size, only cautious conclusions can be drawn from the results for this specific population.

Conclusion, Implications, and Future Directions

Young people in their early twenties face a number of risk factors related to health behaviors (e.g. stress, irregular lifestyle, lack of time, and many temptations) that can lead to health risk behaviors such as irregular eating, high intake of sweets, smoking, alcohol consumption and high caffeine intake (Kontor et al., 2016). The rate of caffeine consumption among police students and the prevalence of CUD is not high compared to the general population.

Although caffeine has a lower addictive potential compared to other psychoactive substances, the widespread use of caffeine-content products makes important studies on its use and its impact on public health, both in the physical and mental fields (Ágoston, 2018). It is also important to note that according to the results from several

surveys, a significantly higher proportion of coffee drinkers are smokers (Olsen, 1991; Palatini et al., 2016). This may be due to the key role that coffee consumption plays in relation to smoking.

It would be particularly important to provide opportunities for law enforcement students in training to acquire relevant knowledge about the potential risks of consuming this psychoactive substance.

Acknowledgements
I would like to thank the participants for taking part in the research. Thanks to the reviewers of the article.

Funding
This research did not receive any grant.

Author contribution
Ákos ERDŐS: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, writing original draft, writing review and editing.

Declaration of interest statement
The authors declare no conflict of interest.

Ethical statement
The research was carried out in compliance with the University of Public Services' (UPS) Ethical Code (Code of Ethics adopted by the Senate of the University of Public Service by Resolution 32/2019 (VII. 10.) and amended by Resolution 23/2020 (I. 29.)). The study has been prepared in accordance with the UPS' Code of Ethics (7. §), so without approval procedure. All participants engaged in the research voluntarily and anonymously.
The participants provided their written informed consent to participate in this study.
Their data are stored in coded materials and databases without personal data.

Data Availability Statement
The data supporting this study's findings are available to the public.
We have policies in place to manage and keep data secure.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0009

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RESEARCH ARTICLE

Dual Personality Model: Adjustment Indexes Towards an Integrative View of Personality Traits in a Highly-educated Argentinian Sample

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History
Received: 17 January 2023
Accepted: 11 June 2023
Published: 11 July 2023

Citation
de la Iglesia, G., & Castro Solano, A. (2023). Dual Personality Model: Adjustment Indexes Towards an Integrative View of Personality Traits in a Highly-Educated Argentinian Sample. European Journal of Mental Health, *18,* 0009, 1–14. https://doi.org/10.5708/EJMH.18.2023.0009

Introduction: Differentiating between normal, pathological, and positive traits may be achieved by conceptualizing personality traits as a continuum in which these aspects could be placed as sickness or health poles. The tendency to focus on one aspect of the continuum to the detriment of the other has prompted the following question: What would be the outcome of studying both aspects conjointly?
Aims: This study aimed at assessing the appropriateness of different personality adjustment indexes proposed by the Dual Personality Model. These indexes combine positive and pathological aspects of personality in a single measure.
Methods: The sample was composed of 1061 individuals from the general Argentinian population (M_{age}=39.87, *SD*=14.68, 51% males).
Results: Individuals who scored higher on the personality adjustment index (PAI) had higher positive traits and well-being, and lower pathological traits, psychological symptoms, and lack of personality functioning. Also, higher scores on each trait continuum index were related to favorable outcomes.
Conclusions: It was concluded that PAI and trait continuum indexes are potentially useful measures for psychological research and for applied fields. The possibility of combining pathological and healthy aspects in a single measure makes it possible to view individuals in an integrated manner in any personality assessment. The indexes should be considered global measures which could be further complemented with a disaggregated analysis.

Keywords: personality, pathological traits, positive traits, integrated model, dual personality model

Introduction

The study of personality has been central and abundant in the field of psychology. From its early postulations (e.g., Allport, 1927) to the most recent notions (e.g., DeYoung & Allen, 2019), many theories and measures have been developed in attempts to explain what personality is. Among them, the trait perspective remains one of the most widely accepted and longest studied approaches in the scientific community (Deary, 2009). Personality traits have been studied mainly to understand individual differences and their association with other relevant aspects of human life and psychological variables, such as psychological symptoms (e.g., Nouri et al., 2019), well-being (e.g., Zhang & Renshaw, 2020), loneliness (e.g., Buecker et al., 2020) and other outcomes like job performance

ISSN 1788-7119 (online)

(e.g., Tisu et al., 2020), academic achievement (e.g., Morales-Vives et al., 2020), and treatment adherence (e.g., Emilsson et al., 2020), among many others.

Normal, Pathological, and Positive Traits

As for normal or typical personality traits, the Five-Factor Model (FFM) is currently the dominant trait paradigm in personality research (McCrae, 2009). It postulates that personality may be more or less sufficiently explained by five broad domains or factors: neuroticism, extraversion, agreeableness, conscientiousness, and openness to experience. This model has been widely used in psychology in the educational (Poropat, 2009), organizational (Salgado, 2010), and psychotherapy fields (e.g. Tanzilli et al., 2018).

Regarding the pathological aspects of personality, or personality disorders (PDs), until the latest edition of the Diagnostic and Statistical Manual of Mental Disorders and its text revision (DSM-5 and DSM-5-TR, American Psychological Association, 2013, 2022), the diagnosis was guided by a categorical approach of the disorder's presence/absence by examining whether a certain number of symptoms (criteria) occur. The fifth edition complements this standard categorical way of diagnosing personality disorders with a new proposal: a dimensional approach. In this new methodology, introduced in Section III of the manual, personality traits are conceived of as consistent patterns of behavior, emotion, and thought (e.g., Allport, 1937; Cattell, 1965) of a dimensional nature (Goldberg, 1993). Given that studying traits in a dimensional manner enables one to conceive them as a *continuum* with a healthy pole and a pathological pole, these traits are believed to represent the pathological pole and are the pathological versions of FFM's traits. The model includes five pathological traits: negative affect (which replicates neuroticism), detachment (vs. extraversion), antagonism (vs. agreeableness), disinhibition (vs. conscientiousness), and psychoticism (vs. openness to experience). This new dimensional approach is thought to better represent PDs' degrees of severity and comorbidity and it has greater empirical support (Clark et al., 1997; Cloninger, 2000; Krueger et al., 2013; Trull & Durrett, 2005; Widiger & Samuel, 2005). In general, these maladaptive traits are related to poor mental health (e.g., Bach et al., 2018).

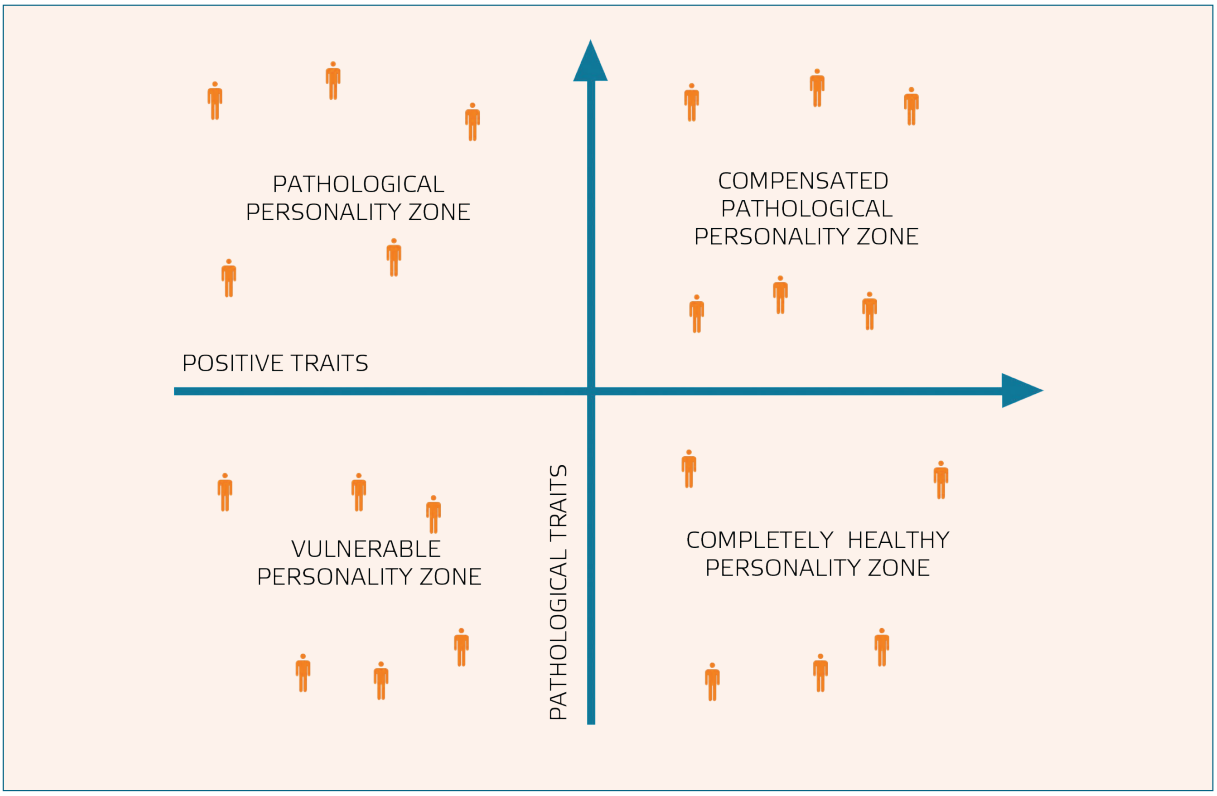
In the health or positive field of personality, the nosologies of traits have not reached such consensus. Although some models such as Peterson and Seligman's (2004) Values in Action (VIA) have been proposed, no clear agreement exists for a commonly used nosology of healthy characteristics. Therefore, there is no sanity manual for assessing the presence of mental health (Leising, 2008; Leising et al., 2009; Sadler & Fulford, 2006; Wakefield, 1992). In an attempt to explore this gap, de la Iglesia and Castro Solano (2018) postulated the Positive Personality Model (PPM). They aimed at completing the trait continuum and proposing a positive pole. To do this, they analyzed a model of positive traits involving the positive opposite of the pathological traits in the DSM-5 dimensional model. The positive traits obtained were serenity (vs. negative affect), humanity (vs. detachment), integrity (vs. antagonism), moderation (vs. disinhibition), and sprightliness (vs. psychoticism). When compared to the FFM normal traits (Costa & McCrae, 1985), the PPM traits were better predictors of well-being, job satisfaction and performance, academic achievement and adjustment, and the state of complete mental health (de la Iglesia & Castro Solano, 2018, 2019a, 2019b, de la Iglesia et al., 2019).

Dual Personality Model

Differentiating among normal, pathological, and positive traits requires conceptualizing personality traits as a continuum in which these aspects may be placed as sickness or health poles. Guided by the medical model, psychology as a science has developed a great amount of knowledge emphasizing the need to identify, classify, and treat mental disorders (Millon, 1996). Then, the proposals of positive psychology brought to light another main aspect of health: the characteristics related to good psychological functioning. The importance of this aspect was supported by a considerable amount of evidence obtained from research (e.g., Seligman et al., 2005). However, the focus on positive aspects somehow resulted in the same shortcoming as that of the medical model: exclusively studying a single aspect of the phenomenon. This tendency to focus on one feature of mental health to the detriment of the other prompted the following question: What would be the outcome of studying both aspects conjointly?

In the field of psychological symptoms and mental health, some proposals have been made in this sense. Keyes (2005), for example, postulated the *Complete State of Mental Health Model* in which health and sickness are two correlated unipolar dimensions that together constitute a complete state of mental health, and through their

Figure 1. Dual Personality Model diagnostic groups



combination, subjects may be diagnosed as flourishing or languishing. Another proposal is the *Dual-Factor Model* (DFM; Greenspoon & Saklofske, 2001), which states that a decrease in symptomatology does not necessarily imply an increment in well-being and vice versa. Four possible scenarios may be assessed by the combination of well-being and symptomatology: (1) vulnerable subjects with low symptomatology and low well-being; (2) troubled subjects with high symptomatology and low well-being; (3) complete mental health, also called flourishing (Kelly et al., 2012), subjects with low symptomatology and high well-being; and (4) symptomatic but content, also labeled ambivalent (Eklund et al., 2010), subjects with high symptomatology and high well-being (Suldo & Shaffer, 2008). In general, the greatest contrasts are found between the complete mental health group and the troubled group (e.g., Antaramian, 2015; Eklund et al., 2010; Guerra Vargas, 2017; Lyons et al., 2013; Smith, 2018; Suldo & Shaffer, 2008; Suldo et al., 2011). However, the vulnerable group has also been characterized as exhibiting non-desirable outcomes (e.g., Antaramian et al., 2010).

In the field of personality psychology, de la Iglesia and Castro Solano (2021) formulated the Dual Personality Model (DPM), which replicates the DFM of Greenspoon and Saklofske (2001) in the personality arena. The central idea of the DPM is that personality traits may and must be assessed in their pathological and positive aspects conjointly. This assessment would provide a notion of the total personality adjustment that considers both aspects of the phenomenon as well as an integrated view of personality functioning as a whole, in contrast to a dissociated one. The combination of pathological and positive traits results in four possible diagnostic groups (Figure 1). The group with the greatest adjustment, namely the completely healthy personality group, is composed of subjects with high positive traits and low pathological traits. Those who present both positive and pathological traits belong to the compensated pathological personality group. Subjects with high pathological traits and low positive traits belong to the pathological personality group. Finally, those who have low positive and low pathological traits belong to the vulnerable personality group. Given the precedents mentioned regarding mental health integrating models, it may be hypothesized that those individuals who belong to the completely healthy and/or the compensated pathological groups should also present healthier or more desirable life outcomes. The model was operationalized by the *Five Continua Personality Inventory* (FCPI; de la Iglesia & Castro Solano, 2021), described in the Method section.

Personality Adjustment Measures

The study of personality adjustment via the combination of pathological and healthy aspects may also be assessed by means of indexes that combine these aspects. These types of integrative measures attempt to represent the interaction of opposite traits and are only informative of changes in the *continuum* they include. Any increment or decrement of the measure will not be informative of changes in the traits they comprise. Therefore, in any personality assessment they should be used as initial global indicators and later be complemented by more detailed single measures.

A clear precedent is Millon's Clinical Index (previously known as Adjustment Index), which combines positive and negative traits in a single score and has been proved to be useful in psychological assessments (Millon & Bloom, 2008). Following these standards, de la Iglesia and Castro Solano (2021) proposed the use of a Personality Adjustment Index (PAI) that combines positive and pathological traits in a single measure and makes it possible to diagnose the four personality adjustment groups described above. Using local norms, the index is calculated by (1) averaging the z-scores of positive traits, (2) averaging the z-scores of pathological traits, and (3) subtracting the pathological average from the positive average.

$$PAI = \left(\frac{\frac{RS - \bar{X}_{SE}}{\sigma_{SE}} + \frac{RS - \bar{X}_{HU}}{\sigma_{HU}} + \frac{RS - \bar{X}_{IN}}{\sigma_{IN}} + \frac{RS - \bar{X}_{MO}}{\sigma_{MO}} + \frac{RS - \bar{X}_{SP}}{\sigma_{SP}}}{5} \right) - \left(\frac{\frac{RS - \bar{X}_{NA}}{\sigma_{NA}} + \frac{RS - \bar{X}_{DA}}{\sigma_{DA}} + \frac{RS - \bar{X}_{AN}}{\sigma_{AN}} + \frac{RS - \bar{X}_{DI}}{\sigma_{DI}} + \frac{RS - \bar{X}_{PS}}{\sigma_{PS}}}{5} \right)$$

Note: PAI = Personality Adjustment Index; RS = Raw Score; SE = Serenity; HU = Humanity; IN = Integrity; MO = Moderation; SP = Sprightliness; NA = Negative Affect; DA = Detachment; AN = Antagonism; DI = Disinhibition; PS = Psychoticism

The PAI hypothetically allows one to assess both healthy and pathological aspects in a single measure. It should test whether the evidence of pathological and positive traits obtained separately is sustained when both aspects are considered conjointly. To this end, the association of the PAI and other criteria such as mental health, psychological symptoms, and measures of personality functioning must be studied. Also, the question arises as to whether the indexes for each trait are sufficiently valid to allow a more thorough study of personality adjustment. In order to confirm the adequacy of these new measures, they should be tested empirically. The aims of this research, therefore, were (1) to empirically study the performance of the Personality Adjustment Index in relation to personality traits, mental health measures, and personality functioning measures, and (2) to test the appropriateness of adjustment measures for each trait continuum.

Method

Sample

The sample was composed of 1061 individuals from the general Argentinian population. Their mean age was 39.87 years (*SD* = 14.68, *Min* = 18, *Max* = 95; 51% males, 49% females). Regarding their education, 22.7% had a high-school diploma or a lower level of education, 34.4% were attending college or had dropped out of college, and 42.9% had a college degree. As for their socio-economic status (SES), most of them (64%) reported middle, 19.9% upper-middle, 13.3% lower-middle, 1.9% high, and 0.9% low SES.

Procedure

This research had a cross-sectional design. Advanced psychology students supervised by a senior researcher collected a convenience sample in 2019. Data was obtained by a self-reported paper-pencil protocol that included all measures detailed in the following subsection. Participation was anonymous and voluntary, and participants were required to be Argentinian and at least 18 years of age. Participants gave their informed and written consent after being told about the objective of the research and the possibility to refuse or interrupt their participation at any time. No incentives were given either to participants or to data collectors. All procedures performed during studies involving human participants were in accordance with the ethical standards of the institutional and/or

national research committee and with the 1964 Helsinki declaration as well as its later amendments or comparable ethical standards. This research was approved by the Ethics Research Committee, Department of Psychology, University of Buenos Aires.

Measures

Five continua Personality Inventory (FCPI)
This is a 55-item measure that assesses ten personality traits as conceived by the Dual Personality Model (FCPI; de la Iglesia & Castro Solano, 2021). Five personality traits are pathological and agree with those proposed in Section III of DSM-5-TR as criterion B for diagnosing personality disorders (American Psychological Association, 2022): negative affect, detachment, antagonism, disinhibition, and psychoticism. The other five personality traits are of a positive nature and represent those postulated by the Positive Personality Model (PPM; de la Iglesia & Castro Solano, 2018): serenity, humanity, integrity, moderation, and sprightliness. In addition to the ten-trait scales, many other composite measures may be obtained by computing different combinations of items. The Personality Adjustment Index is one of the global indexes that allow one to assess personality from a single measure. As described, it combines the five pathological traits and the five positive traits in a single score. The measure also facilitates the assessment of both aspects involving criterion A of personality disorders: self-functioning (identity and self-direction) and interpersonal functioning (empathy and intimacy). Both aspects are measured as "lack of…" since an increment in their scores reflects impairments in those aspects. The FCPI went through a series of psychometric studies that provided abundant evidence of its psychometric properties. This analysis included a pilot study, expert judgment, exploratory and confirmatory factor analyses, internal consistency analysis, and convergent validity with external measures of mental health, psychological symptoms, and personality.

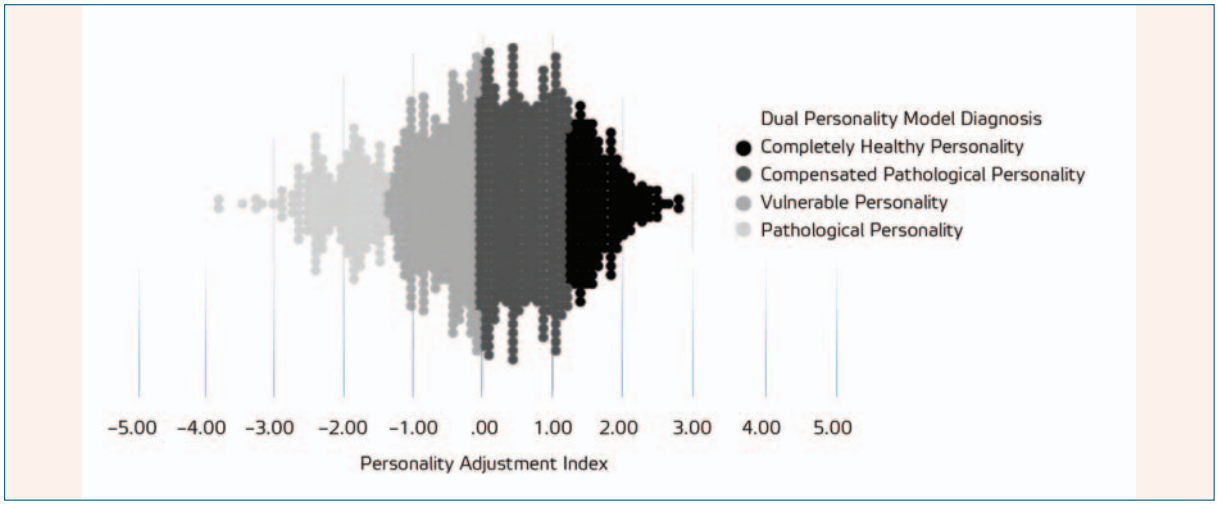
Symptom Checklist 27 (SCL-27)
This test is a short version of SCL-90-R (Derogatis, 1975). It has 27 items that are answered on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely) (Hardt & Gerbershagen, 2001). With the SCL-27, six measures of symptoms may be addressed – depressive, dysthymic, vegetative, agoraphobic, social phobia, and mistrust symptoms. A global total score that informs the person's current discomfort may also be calculated: the Global Severity Index (GSI). In Argentina, Góngora and Castro Solano (2021) studied its psychometric properties. Cronbach's alpha for the total score in this sample was .93

The Mental Health Continuum–Short Form (MHC-SF)
This test has 14 items that measure well-being by means of three sub-scales: emotional, psychological, and social (Keyes, 2005). The items are answered on a 6-point Likert scale that inquires how often the respondent has felt different well-being states (0 = never to 5 = every day). Its factorial structure was confirmed in its local adaptation, where the evidence of convergent validity was also obtained (Lupano Perugini et al., 2017). Cronbach's alpha for the total score in this sample was .89.

Statistical Analysis

Firstly, the Personality Adjustment Index (PAI) was calculated using de la Iglesia and Castro Solano's (2021) equation and the four groups of personality adjustment were formed according to the norms' cutting-off values. Local norms were obtained in a previous study where the FCPI was psychometrically studied (de la Iglesia & Castro Solano, 2021). Using means and standard deviations, linear T scores were calculated for each composite score. The use of linear T scores has sometimes been questioned (Friedman et al., 2015), the debate centered on the possibility that some T scores may not correspond to the same percentiles across different scales due to the variables' different distributions. Given that it is expected for most psychological variables to not follow a normal distribution, this is the most frequent scenario and to force these distributions would be unnatural and non-representative of the real phenomenon. This is why the use of linear T scores emerges as the most parsimonious option (Morey, 2018). Nevertheless, in the case of FCPI, percentiles across scales were compared and no substantial differences were observed (de la Iglesia & Castro Solano, 2021). Then, ANOVAs were calculated to determine whether the groups effectively differed in the positive and pathological traits that compose the PAI. Since most variables presented skewed distributions, and the homogeneity of variances was mostly not met, all ANOVAs were complemented with a Welch test. Additionally, effect sizes were provided for each result.

Figure 2. Personality Adjustment Index distribution and Dual Model Personality diagnostic groups



Later, product-moment Pearson correlations were calculated to explore the relations among the variables included in the research. This was complemented by a multiple linear regressions analysis in order to study the relations among the variables controlling for gender and age. Afterward, ANOVAs were calculated to test differences in psychological symptoms as well as well-being and criterion A variables according to PAI's diagnostic groups. Finally, the difference between the z-score of each positive trait and its pathological counterpart was calculated to test the appropriateness of using individual indexes for each personality trait continuum. For each index, four groups were outlined using the same guidelines for cutting-off values of PAI: T ≤ 39 was the pathological group, T40-49 was the vulnerable group, T50-59 was the compensated group, and T ≥ 60 was the positive group. Then, as with PAI, correlations, multiple linear regressions and ANOVAs were used to see how the indexes were related to the variables included in the research.

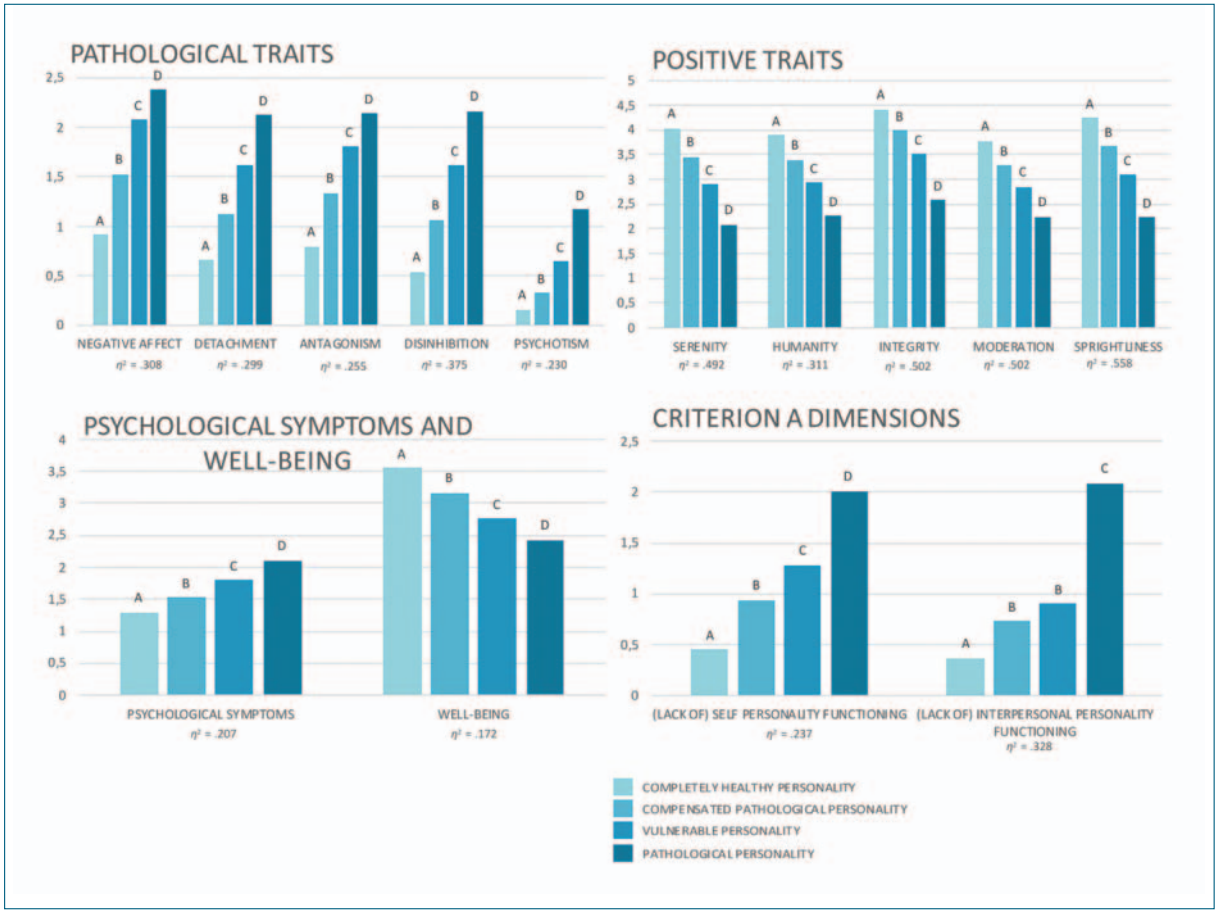
Results

First, the Personality Adjustment Index (PAI) was calculated using de la Iglesia and Castro Solano's (2021) equation, and the four groups of personality adjustment were formed according to the cutting-off values of the local norms. As a result, 39.2% (n = 416) of the sample were in the compensated pathological personality group, 27.9% (n = 296) in the vulnerable personality group, 17.6% (n = 187) in the completely healthy personality, and 15.3% (n = 162) in the pathological personality group (see Figure 2).

Second, ANOVAs were calculated to determine whether the groups effectively differed in the positive and pathological traits that compose the PAI (Figure 3). Statistically significant differences were found in all pathological traits and in all positive traits in the ANOVAs and also in the Welch tests (p < .05). Bonferroni post hoc tests indicated that statistically significant differences were present in all pairwise comparisons. Pathological traits stood higher in the pathological personality group, followed by the vulnerable personality group, the compensated pathological personality group, and lastly the completely healthy personality group. In the case of the positive traits, the pattern exhibited exactly the reverse order: the group with the highest presence of positive traits was the completely healthy personality group, followed by the compensated pathological personality group, the vulnerable personality group, and lastly the pathological group. Effect sizes for each comparison are displayed in Figure 3.

Product-moment Pearson correlations were calculated to determine whether the PAI was related to measures of psychological symptoms, well-being, and personality functioning (criterion A). All associations were statistically significant (p < .01). PAI was negatively and strongly associated with the presence of psychological symptoms (r = –.49), the lack of self-personality functioning (r = –.48), and the lack of interpersonal personality functioning (r = –.58). The association between PAI and well-being was strong and positive (r = .43). Additionally, a multiple regression analysis was calculated in order to control for gender and age (as independent variables in the first Block) for each dependent variable. In all cases, PAI (introduced as an independent variable in Block 2) remained a statistically significant predictor (p < .001) and in the directions expected: β for psychological symptoms = – .486, β for lack of self-personality functioning = – .499, β lack of interpersonal personality functioning = – .579, β and for well-being = .413

Figure 3. Differences in pathological and positive traits, psychological symptoms and well-being, and criterion A dimensions regarding Personality Adjustment Index groups
Note: Same letter indicates no statistical difference between groups in the Bonferroni post hoc test.



After applying PAI's diagnostic groups, differences in psychological symptoms and well-being were studied by means of ANOVAs (Figure 3). Both results were statistically significant; furthermore, in the Welch tests ($p < .01$) and Bonferroni post hoc tests exhibited the expected pattern of differences between pairs, and all pairwise comparisons were statistically significant ($p < .01$). The pathological personality group had more symptoms, followed by the vulnerable personality group, the compensated pathological personality group, and lastly the completely healthy personality group. The reverse pattern was found for well-being, and the group with the greatest well-being was the completely healthy group.

Also, differences were studied regarding both personality functioning dimensions in criterion A of the personality disorder diagnosis (American Psychological Association, 2022; Figure 3). In both cases, the results were statistically significant in both F and Welch tests ($p < .05$), and the pathological personality group scored higher on (lack of) self-personality functioning and (lack of) interpersonal personality functioning. Bonferroni post hoc tests showed statistically significant differences in all pairwise comparisons ($p < .05$), except for the comparison between the vulnerable personality group and the compensated pathological personality group, which showed no differences in the interpersonal functioning dimension. Otherwise, the pathological personality group had higher scores in criterion A dimensions, and the pattern was the same as that previously found (Figure 3).

Then, the difference between the z-score of each positive trait and its pathological counterpart was calculated to test the appropriateness of using individual indexes for each personality trait continuum. The Negative Affect-Serenity continuum was labeled *Emotional Management Index* (EMI), the Detachment-Humanity continuum was labeled *Interest in Others Index* (IOI), the Antagonism-Integrity continuum was labeled *Adherence to Rules Index* (ARI), the Disinhibition-Moderation continuum was labeled *Impulse Control Index* (ICI), and the Psychoticism-Sprightliness continuum was labeled *Environmental Control Index* (ECI). Pearson product-moment correlations were calculated between each continuum index and measures of psychological symptoms, well-being, (lack of) self-personality functioning, and (lack of) interpersonal personality functioning. All correlations were statistically significant ($p < .01$) and, in general, associations remained between moderate and strong, negative in the case of

Table 1. Correlation between trait continuum indexes and measures of psychological symptoms, well-being, and personality functioning

	Psychological Symptoms	Well-being	(Lack of) self-personality functioning	(Lack of) interpersonal personality functioning
Emotional Management Index	–.53*	.44*	–.41*	–.44*
Interest in Others Index	–.31*	.44*	–.34*	–.52*
Adherence to Rules Index	–.24*	.20*	–.35*	–.51*
Impulse Control Index	–.32*	.23*	–.37*	–.33*
Environmental Control Index	–.48*	.34*	–.49*	–.51*

* < .01

psychological symptoms and lack of personality functioning, and positive regarding well-being (Table 1).

A multiple regression analysis was calculated for each independent variable in which gender and age were introduced in Block 1 as control variables, and all trait continuum indexes as predictors in Block 2. As Table 2 presents, all models were statistically significant ($p < .001$). Most results replicated the correlation results and a few lost their statistical significance or changed their sign. In the case of psychological symptoms, for example, IOI and ICI do not seem to play a relevant role in its prediction. IOI, ARI, and ICI were not statistically significant predictors of lack of personality functioning. ICI was not a statistically significant predictor in the case of lack of interpersonal functioning. And lastly, regarding well-being, ICI lost its statistical significance and ARI changed its sign and emerged as a negative predictor.

Table 2. Multiple linear regression analysis between trait continuum indexes and measures of psychological symptoms, well-being, and personality functioning

	β	*F(gl)*	R^2	Δ R^2
Psychological Symptoms				
Block 1: Control variables		25.59(2,1058)***	.046	-
Gender (dummy, probability of being male)	–.103**			
Age	–.191***			
Block 2: Trait continuum indexes		82.57(7,1053)***	.350	.308***
Gender (dummy, probability of being male)	–.083**			
Age	–.111***			
Emotional Management Index	–.379***			
Interest in Others Index	–.048 ns			
Adherence to Rules Index	.096**			
Impulse Control Index	.039 ns			
Environmental Control Index	–.303***			
(Lack of) Personality Functioning				
Block 1: Control variables		0.50(2,339)ns	–.003	–
Gender (dummy, probability of being male)	–.016 ns			
Age	.052 ns			
Block 2: Trait continuum indexes		18.13(7,334)***	.260	.272***
Gender (dummy, probability of being male)	–.057 ns			
Age	.050 ns			
Emotional Management Index	–.174**			
Interest in Others Index	–.019 ns			
Adherence to Rules Index	.017 ns			
Impulse Control Index	–.082 ns			
Environmental Control Index	–.349***			

(continued on the next page)

Table 2. -continued

	β	*F(gl)*	R^2	Δ R^2
(Lack of) Interpersonal Personality Functioning				
Block 1: Control variables		3.87(2,339)*	.017	–
Gender (dummy, probability of being male)	.088 ns			
Age	.124*			
Block 2: Trait continuum indexes		27.97(7,334)***	.356	.347***
Gender (dummy, probability of being male)	–.010 ns			
Age	.113*			
Emotional Management Index	–.133*			
Interest in Others Index	–.221***			
Adherence to Rules Index	–.203**			
Impulse Control Index	.021 ns			
Environmental Control Index	–.173*			
Well-being				
Block 1: Control variables		15.45(2,1058)***	.027	
Gender (dummy, probability of being male)	–.010 ns			
Age	.168***			
Block 2: Trait continuum indexes		62.85(7,1053)***	.290	.266***
Gender (dummy, probability of being male)	–.007 ns			
Age	.109***			
Emotional Management Index	.314***			
Interest in Others Index	.357***			
Adherence to Rules Index	–.170***			
Impulse Control Index	–.058 ns			
Environmental Control Index	.086*			

***p < .001; **p < .01; *p < .05; ns = statistically non-significant

For each index, four groups were also outlined: pathological, vulnerable, compensated, and positive. Then, ANOVAs were calculated to identify differences in psychological symptoms and well-being in the groups (Figure 4). In the case of EMI, all tests were statistically significant in both F and Welch tests (p < .01). The Bonferroni post hoc test indicated differences between all combinations of pairs in the psychological symptoms and well-being, and the pattern replicated that found for PAI. Regarding personality functioning dimensions, differences were found between the positive and compensated groups versus the vulnerable and pathological groups. The positive and compensated groups showed fewer difficulties in self and interpersonal functioning.

In the IOI, the psychological symptom patterns were like those previously reported except that in psychological symptoms, no differences were found between the pathological and vulnerable groups (p > .05). As for personality functioning dimensions, the pathological group emerged as the one with the greatest difficulties in this aspect.

In the ARI, differences were found between the positive and compensated groups versus the vulnerable and pathological groups regarding psychological symptoms and well-being. The positive and compensated groups manifested fewer symptoms and higher well-being. For personality functioning, the pathological group emerged as the one with the greatest difficulties in comparison to the other groups.

As for the ICI, the pathological group had a greater number of psychological symptoms than the vulnerable group, and this group exhibited a greater number of symptoms than the positive and compensated groups. As for well-being, the positive and compensated groups had higher scores than the vulnerable and pathological groups. The pathological group exhibited greater difficulties in self and interpersonal personality functioning than the rest of the groups.

Figure 4. Differences in psychological symptoms, well-being, and criterion A dimensions regarding trait continuum indexes
Notes: Same letter indicates no statistical difference between groups in the Bonferroni post hoc test. EMI = Emotional Management Index (Negative Affect-Serenity continuum), IOI = Interest in Others Index (Detachment–Humanity continuum), ARI = Adherence to Rules Index (Antagonism-Integrity continuum), ICI = Impulse Control Index (Disinhibition-Moderation continuum), ECI = Environmental Control Index (Psychoticism-Sprightliness continuum).

Finally, the positive group had fewer symptoms than the compensated group, which in turn had fewer symptoms than the vulnerable and pathological groups. In addition, the pathological and vulnerable groups had less well-being while the vulnerable and pathological groups had higher difficulties in self-personality functioning, and the pathological group had the highest score in (lack of) interpersonal functioning.

Discussion

The main objective of this research was to test the appropriateness of a global index of personality adjustment and trait indexes that represent a pathological-positive continuum in a single measure. In general, all indexes showed the expected associations with measures of mental health and personality functioning.

First, it was confirmed that higher scores in the Personality Adjustment Index (PAI) matched higher scores in positive traits and lower scores in pathological traits. In other words, the PAI accurately represented the traits' dimensions in a single measure. Then, correlations indicated that those with higher PAI scores showed higher well-being as well as fewer psychological symptoms and lack of personality functioning (self and interpersonal). The results of the multiple linear regression analysis also supported this finding since it was replicated even when controlling for gender and age. When PAI was studied with the four diagnosis groups, researchers found better mental health for the completely healthy personality group. This finding also supported the adequacy of the PAI

because it replicated the results obtained separately for positive and pathological traits (e.g., Bach et al., 2018; de la Iglesia & Castro Solano, 2018).

As for the trait continuum indexes, the initial exploratory correlations were as expected, with all trait continuum indexes being positively associated with well-being and negatively associated with psychological symptoms and lack of personality functioning (self and interpersonal). In the case of the multiple linear regressions, not all correlations were supported when controlling for gender and age. IOI and ICI were not statistically significant predictors of psychological symptoms, IOI, ARI and ICI did not predict lack of personality functioning, and ICI did not predict well-being. Also, ARI changed its sign and negatively predicted well-being. These findings suggest that it is highly important to consider the interaction between indexes since outcomes vary depending on whether studying them apart or together. A study of personality traits profiles could be an appropriate way to achieve this.

Then, when the differences in these variables were studied using the four diagnostic groups, the Emotional Management Index showed the same pattern as that of PAI for well-being and psychological symptoms, and the positive group (completely healthy in the case of PAI) had better mental health. However, the main difference in personality functioning was found between the positive and compensated groups versus the vulnerable and pathological groups. This suggests that the difference lies in the presence/absence of positive traits, which possibly function as a protective factor. The positive and compensated groups, both characterized by the presence of positive traits, had higher personality functioning in self and interpersonal aspects. This result replicates that obtained for the Dual Factor Model in the mental health arena, where the completely healthy and the troubled groups showed no differences in some of the studied aspects (e.g. Antaramian, 2015; Eklund et al., 2010; Guerra Vargas, 2017; Lyons et al., 2013; Smith, 2018; Suldo & Shaffer, 2008; Suldo et al., 2011). The result also reinforces the idea that positive traits function as protective factors (e.g. Kim et al., 2018).

Similar results were observed in the Interest in Others Index, where differences were found between all groups, or between the positive and compensated subjects together on one hand, and the vulnerable and pathological subjects together on the other hand. In particular for this index, it is interesting to note that the pathological group showed a substantially different and higher score in the lack of interpersonal personality functioning scale. This supports the adequacy of the IOI since the index was intended to represent the continuum of the humanity-detachment traits, and lower scores on IOI (pathological IOI) represent a lack of interest in other people, avoidance of relationships and social meetings (high detachment), and no sensitivity towards others' suffering or unwillingness to help others in need (low humanity), which is clearly related to interpersonal difficulties as conceived by DSM-5-TR (American Psychological Association, 2022). The same happens with the Adherence to Rules Index, where antisocial behaviors such as aggressiveness and deceitfulness combined with a sense of grandiosity (high antagonism) and lack of honesty, inability to assume one's own flaws and mistakes and lack of humility (low integrity), also relate to interpersonal difficulties. Additionally, in the case of self-personality functioning, the vulnerable group showed no differences from the positive and compensated groups. This was an unexpected finding and it could suggest that the problem lies in a high presence of antagonism combined with low integrity and that low integrity does not seem to be a problem if it is combined with low antagonism. Finally, the results obtained from the Environmental Control Index were more similar to EMI findings: the positive group had higher well-being, lower psychological symptoms, and a lack of personality functioning. Besides, in some cases, the diagnostic groups just differed in the absence or presence of positive traits: positive and compensated on the one hand, and vulnerable and pathological on the other. This finding suggests, again, the alleged protective role of positive traits (Kim et al., 2018).

Strengths and Limitations

This research does not lack its limitations. First, its cross-sectional design and non-probabilistic sampling limit the interpretation of the results obtained. It would be interesting to assess whether these indexes are stable over time and whether these results replicate in other samples characterized differently in socio-demographic variables. For example, the sample studied does not adequately represent the lower-middle and lower groups. Future sampling should take this limitation into consideration and attempt to represent those groups as well. Second, given that the measures were all self-report, social desirability may have had an effect that was not controlled in this study. Finally, the number of variables remained limited in the sense that normal trait measures were not included.

An important issue to consider is the fact that the strength of the hypothetically augmented reach achieved by an integrated measure of pathological and positive aspects constitutes its own weakness as well. Any change in an integrated measure, whether it is an increment or a decrement, will provide information regarding the complete personality continuum but will entail uncertainty regarding where the change occurred, whether it was the positive aspects, the pathological aspects or both. Therefore, any assessment should not be isolated from the consideration of positive and pathological aspects as well. It is suggested then to use the continuum measures as global indicators of individual personalities that may constitute an initial step to further assessment using partial and more detailed measures.

Conclusion, Implications, and Future Directions

To conclude, the PAI and the trait continuum indexes are potentially useful measures for psychological research and for applied fields. The possibility of combining pathological and healthy aspects in a single measure allows one to view individuals in an integrated manner, which possibly represents them more accurately in comparison to disaggregated measures. However, the indexes were studied in a highly educated sample and this constitutes a sample bias that should be considered. We have no evidence of how the indexes perform in a lower-educated population. This stands as an important issue since the measures are obtained by a self-report that requires comprehending and rating sentences to describe oneself. The FCPI was designed to be used with subjects having at least completed primary school. The assessment of individuals with lower educational levels would require a revision of the whole psychometric instrument.

For psychological researchers, these measures may simplify the number of variables included for statistical analysis. Also, the indexes could provide information of how this combination interacts with other relevant variables and this may potentially provide different results than those already known for pathological and positive traits separately. In the applied field, this measure could be used in any personality assessment (e.g. clinical, forensic). As mentioned in the limitations, the indexes should be considered global measures which could be further complemented with a disaggregated analysis, if needed. In any case, the aim of scientifically studying these composite scores attempts to complement or enrich the study of personality.

The field of integrated personality models is rather new and further research will be needed in many different areas. It would be interesting to verify whether the evidence currently available for pathological and positive personality traits obtained from research where these variables were studied separately is sustained when both aspects are studied conjointly.

Funding
This research was financially supported by the University of Buenos Aires grant number UBACyT 20020150100037BA.

Author contribution
Guadalupe de la IGLESIA: conceptualization, design, methodology, investigation, data management, formal analysis, interpretation, writing original draft, writing review and editing.
Alejandro CASTRO SOLANO: conceptualization, design, methodology, funding acquisition, investigation, project administration, interpretation, supervision, writing review and editing.

Declaration of interest statement
The authors declare no conflict of interest.

Ethical statement
The studies involving human participants were reviewed and approved by the Ethics Research Committee, Department of Psychology, University of Buenos Aires [Comisión para la evaluación de conductas responsables, Facultad de Psicología, Universidad de Buenos Aires].
All participants engaged in the research voluntarily and anonymously.
The participants provided their written informed consent to participate in this study.
Their data are stored in coded materials and databases without personal data.

Data Availability Statement
The data supporting this study's findings are available to the public.
We have policies in place to manage and keep data secure.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0010

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RESEARCH ARTICLE

Should I Move? The Benefits and Costs of Spatial Mobility for Different Groups of the Roma Population

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History
Received: 20 January 2022
Accepted: 26 July 2023
Published: 23 August 2023

Citation
Ember, Zs., Huszti, É., & Lénárt, I. (2023). Should I Move? The Benefits and Costs of Spatial Mobility for Different Groups of the Roma Population. European Journal of Mental Health, 18, 0010, 1–20. https: //doi.org/10.5708/EJMH.18.2023.0010

Introduction: Moving away can be motivated by a multitude of factors, just as the reasons for not moving away might be different. The individual's social situation greatly determines the chance of turning their life situation around through moving away.
Aims: We investigated the factors that affected the representatives of the three Roma groups researched here (Romungro, Vlach, Boyash) in their moving in the past and in their intentions to move in the future.
Methods: A SEM model was developed (N = 570) to analyze the differences between previous movers and non-movers in well-being, socioeconomic status, and social network. We also investigated the effect of the above variables on the intention to move. Data were collected via the "snowball method".
Results: Out of the Vlachs, those who had moved in the past have significantly fewer confidant relatives (p = .021) and also know significantly fewer people pursuing high-prestige vocations (p = .003), moreover, the fewer people pursuing moderate-prestige vocations they know, the more they would like to move away from their present residence (p = .031). Regarding the Boyash, the more favorable their socio-economic situation, the more they would like to move away (p = .007); while regarding the Romungro, the low level of their mental wellbeing (p = .019) and the relatively high number of their confidant relatives constitutes (p = .017) the incentive to change their residence.
Conclusions: The spatially mobile Roma who had moved before possess fewer confidant relatives and weak ties. The individual factors connect to the different Roma groups' moving intentions to various extents.

Keywords: Roma groups, mental health, spatial mobility, weak ties, CDN

Introduction

Spatial mobility constitutes an important feature of our present time, exerting significant effects on individuals, families, and communities of various sizes. Generally, under 'spatial mobility', moving within the country's borders is understood, with an emphasis on its local effects (Sik, 2003; Cseres-Gergely, 2013; Gödri, 2018), such as reducing spatial inequalities. The individual's social situation and status greatly determines the chance of improving their life situation by means of spatial mobility (Csizmady et al., 2020). According to the relevant literature (Hautzinger et al., 2014; Elekes, 2017, 2021; Husz, 2011; Ladányi, 2010; Kovács, 2014), moving is also associated with mental health risks, which may be vary among Roma groups of different socio-economic status and with different social networks.

ISSN 1788-7119 (online)

The Roma population constitutes Europe's largest and most vulnerable ethnic minority. WHO estimates their number in Europe around 12-15 million, out of which 10 million live in EU territory, and a significant number – about 1.5 million – live in Eastern-Central Europe (Cahn & Guild, 2008); out of these, almost 900,000 reside in Hungary (Pénzes et al., 2018).

Ever since arriving into Europe, Roma people have been characteristically experiencing discrimination and exclusion. As throughout in Eastern-Central Europe, also in Hungary, one of the largest loser groups of the post-Communist regime change (1990) is the Roma population, most strongly impacted by the unemployment that the transition and its consequences caused (Fésüs et al., 2012). Despite the development endeavors that were successfully implemented in the latter decades in Hungary, the Roma population continues to be characterized by low completed schooling and a low level of presence in the workforce market; as a consequence, many experience a low income and living in permanent poverty (Fésüs et. al., 2012; Diószegi et al., 2020). Poverty as a structural disadvantage is enhanced through a disadvantaged settlement structure and economic structure, as well as a big proportion of Roma population at a given location: many of them live in regions where advancement is impossible and thus, poverty is cemented (Babusik, 2007).

According to the latest statistics, Roma people in general are characterized by high levels of poverty and unemployment, and have mainly primary education (Bernát, 2019; KSH, 2021).

In spite of their large numbers and migratory lifestyle, which characterizes them even after settling down (Durst & Nagy, 2018; Durst, 2018; Virág, 2018; Elekes, 2021), numerous researches deal with their primarily employment oriented international migration that possesses a circular character – in the course of which, the contacts with their relatives and their social support does not get lost. However, their movement within country borders remains a less researched field. This constitutes an utterly different life situation than international migration: moving away is a mentally burdensome crisis situation that might negatively impact mental health, further exacerbated by low schooling levels. In the course of moving away, individuals and families may lose their social support and the control over their situation, while manifesting depressive symptoms and becoming isolated (Hautzinger et al., 2014).

The specific socio-economic situation of the Roma population in Hungary (low educational attainment, high unemployment rate, low employment rate, high risk of poverty), housing problems (poor quality houses/flats in economically underdeveloped settlements), poor mental health (e.g. high risk of depression) and their particular social network (relational vacuum) particularly justify an examination of their geographical mobility and the losses and gains in entails.

In this article, we examine the geographical mobility of the Roma population in Hungary in general while focusing on the differences between the three major subgroups of the Roma population; we try to capture characteristics that bring us closer to understanding different groups of the Roma population, which is otherwise treated as an ethnically homogeneous group. In this article, the "Roma" term is used according to the definition of the Council of Europe (2012).

Main Tendencies of Spatial Mobility in Hungary

However, the spatial mobility in Hungary shows an increasing trend, though the Hungarian population is still less mobile than inhabitants of other European countries: 79% do not plan to move and only 4-6% move to another settlement each year, mainly to the capital and Western Transdanubia (KSH, 2016; Kincses, 2014; Bálint & Obádovics, 2021; Csizmady et al., 2020). According to data from a large sample of representative research in 2018, 19.5% of those belonging to under-integrated social groups would like to move, but only very few of them manage to realize their intentions (Csizmady et al., 2020).

Since it is not even possible to give an exact number of the Roma population, providing an estimate about the Roma people's spatial mobility remains difficult. In Hungary, Roma people live in micro-villages where their proportion continues to grow as opposed to the majority population, the latter gradually moving out of these settlements due to the lack of job opportunities (Ladányi et al., 2010). In Hungary, disadvantaged people have very few opportunities to move to geographically more integrated territories. Generally, they live in low-quality, municipal social housing units, among very poor conditions. The Roma's spatial mobility opportunities are very limited, as no significant rental apartment developments occurred after the regime change, and no new rental apartments have been built (KSH, 2016). It is worth noting that a high rate of Roma people, when looking for housing (29%) (FRA [European Union Agency for Fundamental Rights], 2022), have felt discriminated against because of being Roma.

Roma Population Living in Hungary

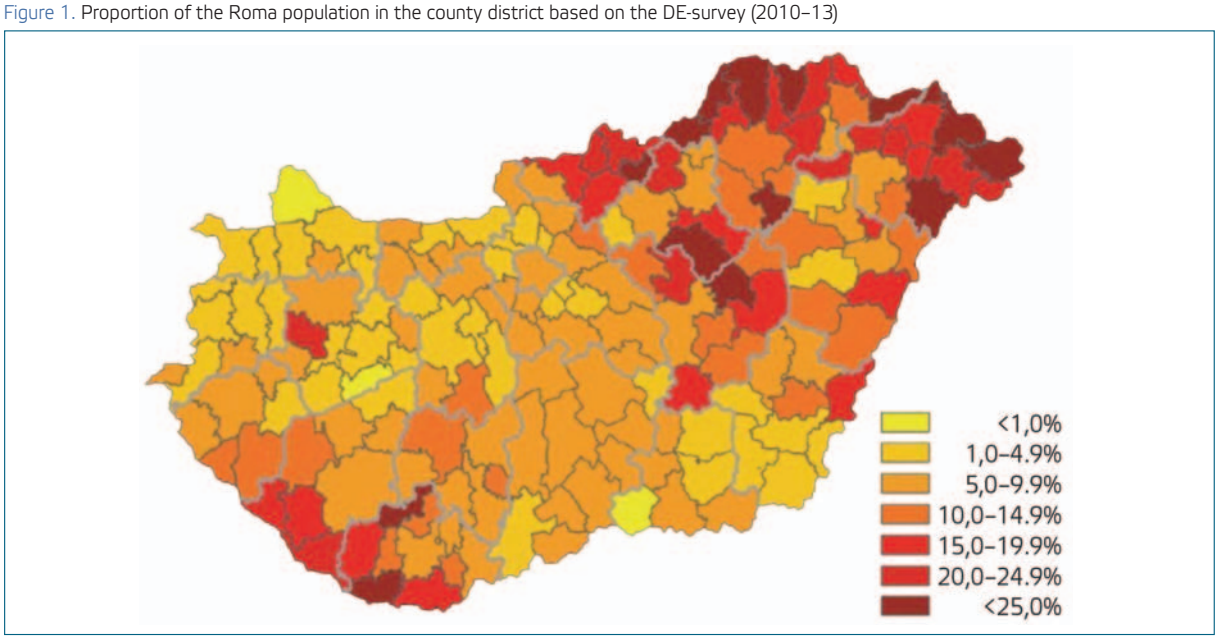
It is difficult to determine the exact number of the Roma population – since ethnic identity is considered to be a private affair in Hungary, and thus, for data protection reasons, it does not appear in the obligatory national data provision. At present, the number of the Roma population is estimated at 9% of the total population (Pénzes et al., 2018). They represent the most populous ethnic group in Hungary, and the only one whose number is continuously growing. This results in an unusual progressive population pyramid: many children and few old people. In terms of schooling, the proportion of those possessing no more than a primary school degree stands four times higher compared to the non-Roma population. The proportion of early school dropouts among the Roma amounts to six and a half times as many as among the non-Roma (60.8% vs. 9.3%) (KSH, 2021). They live mainly in less developed regions, in small settlements, and a high unemployment rate prevails among them. The unemployment rate among the Roma population amounts to 19.9%, while among the non-Roma population, this number is 3.7% (KSH, 2021). The rate of unemployment among the Roma population shows a more unfavorable picture than among the non-Roma population, with lower schooling levels (this proportion among the Roma population with a primary schooling level being 10.7% (KSH, 2021). Among these people, the inactivity rate is also high (44.9% vs. 34.1%) (KSH, 2021). Poverty and social exclusion afflict the Hungarian Roma population (Bernát, 2019). The risk of poverty rate is 77% among Roma while it is 12% among non-Roma people. The rate is higher among Roma children aged 0–17 (80%). Housing deprivation (requires at least one of the following dimensions: accommodation is too dark, has problems with humidity, has no shower/bathroom inside the dwelling or has no (indoor) toilet rate is 37% among Roma and 24% among non-Roma population. Furthermore, the rate of people living in overcrowded households stands at 91% among Roma and 20% among non-Roma people (FRA, 2022). In spite of many of them having been assimilated, the Roma tend to maintain and preserve their own cultural identity and traditions, which fundamentally determine their way of life, their lifestyle, and through that, their health attitude, as well (Nunes et al., 2018; Diószegi et al., 2020).

As individuals may show depressive symptoms, lose social support and become isolated when they move (Hautzinger et al., 2014), and as the Roma live in the most deprived regions while their housing situation has always been segregated (Kovács, 2014), it is important to understand the characteristics of Roma in terms of housing, health, and social network when analyzing their spatial mobility.

Geographical location and housing

In Hungary, the Roma's residences are mostly concentrated in economically disadvantaged regions. These territories are mainly located in Northern Hungary and some districts in the Southern regions (see Figure 1). Due to selective migration and high fertility, in the regions where the Roma represent a higher proportion of the population, a ghettoization has started (Pénzes et al., 2018).

Figure 1. Proportion of the Roma population in the county district based on the DE-survey (2010–13)



Note. Source: János Pénzes, Patrik Tátrai, István Zoltán Pásztor, Területi Statisztika (Territorial Statistics), January 2018.

According to the data of population census (2011), 1633 poor ethnic ghettos existed in Hungary, as well as 280-300 segregated territories, where several thousand people lived, constituting 3% of the Hungarian population (KSH, 2014).

The poorest Roma groups mainly live in economically backward, micro-village settlements, within colony-like conditions (in the country's Eastern, Northern and Southern Transdanubian regions); these settlements constitute coherent ghettoizing territories (Kovács, 2014). 40% of the Hungarian Roma live in such settlements (Husz, 2011). In some regions (such as Borsod-Abaúj-Zemplén County), spatially segregated ghettos have come into existence, which increases the interdependency of those living secluded, resulting in a kind of outsider social identity among them (Elekes, 2017). In the country's Southern part, the Roma population could better adapt to agricultural production, and although unemployment remains high even in this region, the Roma people complement their income with gardening and animal husbandry. As a fusion of the twofold value system, a more successful integration has been realized, with one reason being the increased helpfulness of the macrosocial milieu, and the other being the much stronger Roma integrational endeavors: their willingness to adapt is higher, they conform to universal values and are open towards heterophil relationships (Elekes, 2017). Space possesses an identity-forming power, which affects social integration. This is especially important in the case of Roma youth, who tend to increasingly define themselves as a counter-culture, so adapting universalistic values remains difficult to accomplish, and the strengthening of particular values remains typical, which is, however, the basis of disintegration (Elekes, 2017). In some Roma villages, the Romungro and the Vlachs distance themselves spatially and also with their special community lives as well as in their communication; conflicts between these two groups are frequent (Elekes, 2021).

In Hungary, every second Roma lives in a neighborhood where the majority of the other residents are also Roma (Virág & Váradi, 2017). These neighborhoods vary in terms of housing conditions and social contacts, depending on which territories and how large an area the residents occupy, and how typically social exclusion appears against them.

In terms of their health condition, those living in the colonies, also characterized by a low socio-economic situation (SES) and a backward infrastructural level, suffer the worst fate (Solymosy, 2007). In the seventies, two-thirds of the Roma in Hungary lived in segregated colonies, usually located at the end of the village or on the outskirts of larger settlements, frequently separated from the majority society by natural or physical borders (brook, river, railroad track, track crossing guards). In the latter decades, significant developments have been implemented in order to improve the Roma's housing conditions, as a result of which the number of Roma colonies reduced considerably. Despite this, however, the Roma's geographical segregation still continues to prevail (Janky & Kemény, 2004; Teller, 2011; Virág & Váradi, 2017).

Health condition

Besides the individual characteristics, peculiarities of the residence (such as the housing environment's poverty level) equally determine the health condition (Subramanian et al., 2003). The Roma population's highly disadvantaged health condition is determined both by their way of life and their bad social-economic situation (Forray, 2013; Kósa, 2006). The Roma's minority status carries numerous health drawbacks, fundamentally influenced by the living environment that is determined, among others, by bad housing and living conditions and overcrowded apartments; all this results in a ten years lower life expectancy among them, as compared to the majority population. Based on data from 2017, Roma women live 9 years fewer than women in the general population, and this number is 6.4 years among Roma men (FRA, 2022). Besides many of their typical illnesses – such as dental, public health, and locomotor diseases – their mental state can be considered the most alarming: 75% of them suffers from some form of depression (in contrast to the 20% proportion among the majority population) (Szabóné, 2018; ELEF, 2019). People belonging to the stratum wishing to assimilate and breaking up with their traditions as well as their old lifestyles, while experiencing failure in their adaptation endeavours, are frequently treated with depression, neurosis, suicidal intentions and attempts (Szabóné, 2008). The proportion of depression and neurosis stands high even among Roma intellectuals (in 66%, mild depression, in 8%, intermediate depression was found; in 29%, a treatment-requiring neurosis was identified); among Roma and non-Roma women with equal schooling levels, the investigations found depression to occur in Roma women at a double proportion compared to non-Roma women (50% vs. 25%) (Szabóné, 2008).

Since Roma-specific indicators are missing from Hungary's health statistics systems, we do not possess comprehensive, up-to-date data about the Roma population's health condition (Parliament Office, 2022). This holds

true to mental health indicators as well (Szabóné, 2008). However, if we take low schooling levels that are typical for the Roma population, their territorial location and bad financial situation, as a basis, then it becomes obvious that unfavorable mental health primarily characterizes these groups: the level of positive emotional state measured with the WHO-5 Well-Being Index mainly distinguishes those living in Northern Hungary, those with a low schooling levels and those belonging into the lowest income quintile. The proportion of those battling at least a mild depression stands higher among those possessing a maximum primary education level, among those belonging to the lowest income quintile, and those living in Northern Hungary as well as in villages and in the capital (ELEF, 2019).

Social network

Among the Roma population living in low social strata, contact poverty is typical; moreover, in recent years, among their confidants, the proportion of relatives is dwindling while they possess increasingly fewer friend contacts (Komolafe et al., 2022). This is all the more important because Roma without friends become isolated not only from mainstream society, but also from their own Roma community (Dávid et al., 2020). A considerable proportion of those who identify as Roma (40%) lives in a relationship vacuum; that is, they lack contacts with those from whom they could receive support (Messing, 2006; Messing & Molnár, 2011). The Roma population's social network is increasingly more homogeneous (Dávid et al., 2020; Huszti et al., 2021).

Among the Roma people, especially those living in segregated areas, social support differs from the average population: the more geographically isolated they live, the fewer friends and confidants they have, the worse their mental health; and the less connected they are to the representatives and institutions of the majority society (Huszti & Ember, 2019).

Roma ethnic groups

In Hungary, we can differentiate three larger Roma ethnic groups: 1. The Hungarian Roma, or Romungro, who identify themselves as Hungarian and speak Hungarian; 2. The Vlach Roma, who define themselves as Vlach, and besides Hungarian, mainly speak the Romani language; 3. The Boyash people, who identify themselves as Boyash and speak the archaic Romanian language (Kemény, 2005; Virág & Váradi, 2017). The proportion of these groups: Romungro (71%), Vlach (21%) and Boyash (8%) (Kemény & Janky, 2005, Pásztor et al., 2016). The Vlach Roma mostly live in the Counties Szabolcs-Szatmár-Bereg-, Hajdú-Bihar- and Békés, the Boyash primarily reside in Southern Transdanubia and around the capital, while the Romungro do not concentrate dominantly in any region (Kemény, 2000; Kahl & Nechiti, 2019).

Despite being viewed as a homogeneous ethnic group, significant differences exist among the Roma groups according to what they define themselves as, and what language they primarily speak. These factors also fundamentally determine their level of social inclusion into mainstream society (Havas, 1989; Virág & Váradi, 2017).

Aims

In our study, through the data gained from a large-sample research in Hungary, we examine the effects of spatial mobility among the Roma population. On the one hand, we are interested in what motivates Roma people to change their residence, and on the other hand, we would like to find out about the gains and losses of residential mobility among them, and how this affects their mental health. Through separately examining the three subgroups, our study contributes to enhancing the knowledge on Roma ethnicity.

According to the relevant literature (Hautzinger et al., 2014; Elekes, 2017, 2021; Husz, 2011; Ladányi, 2010; Kovács, 2014), moving also entails a mental risk, which may vary among Roma groups with different socioeconomic statuses, integrated and willing to integrate into society on different levels, and linked to society with differing networks. Based on this, considering how little knowledge we possess at present about the characteristics of different Roma groups, we set up the following hypotheses:

H1: A significant difference exists between those who have moved and those who have not, in terms of mental health, socioeconomic status, and contact network; this difference can also be detected in the three Roma groups separately.

H2: The Roma population's mental state, their financial situation and supporting networks considerably influence their intention to move, and this influence can be pointed out in the given Roma groups individually.

Methods

Sample and Data Collection

The data are drawn from a nationwide Roma survey, completed in 2019, in which the participants self-reported their Roma origin (N = 570). The Regional, Institutional Scientific and Research Ethics Committee approved the survey (SE RKEB number: 201/2018.)

In accordance with the researchers' expectations regarding ethnic Roma groups, the sample contains a close to identical proportion of respondents identifying as Romungro (36%), Vlach (34%) and Boyash (30%). The research goal was for all three groups to be represented in approximately equal proportions, which turned out successful. As the research is non-representative, our statements aren't appropriate for generalizing. The questionnaire-based survey's participants were selected via the "snowball method". The interviewers collected the data through face-to-face interviews.

Summary statistics are shown in Table 1 and Figure 2. The respondents' mean age is 43 years. Nearly half of the surveyed population (46.2%) remains under 40 years, typically with a maximum of an 8-year-primary school degree (92.6%). Their majority resides in smaller towns (41.2%), or villages (34.9%). Regarding their family status, nearly 60% of the respondents live in a relationship (36.3% of them being married, and 22.6% in a registered partnership). Based on sex, age, educational attainment, place of residence and economic activity, no statistically significant difference exists among the surveyed ethnicity groups.

The respondents came from the regions most densely inhabited by the Roma population, that is: from North-Eastern, Southern and Central Hungary (Figure 2).

Table 1. Respondents' socio-demographic characteristics (N = 570)

	N	%
Sex		
Male	269	47.2
Female	301	52.8
Age groups		
18-29	148	26.0
30-39	115	20.2
40-49	118	20.7
50-59	89	15.6
60+	100	17.5
Education		
Primary (8 classes)	528	92.6
Secondary or higher	42	7.4
Type of settlement		
Capital city	18	3.2
County towns	118	20.7
Other towns	235	41.2
Villages	199	34.9
Ethnicity groups		
Romungro	206	36.2
Vlach	194	34.0
Boyash	170	29.8
Employment status		
active	316	55.5
inactive	247	43.3
no data available	7	1.2
Marital status		
single/unmarried	145	25.4
married	207	36.3
registered partnership	129	22.6
divorced	38	6.7
widowed	49	8.6
NA	2	0.4

Measures

We normalized the quantitative variables on 0-5 interval scales and the scale scores were averaged. Three out of the four scales (WHO-5, resilience, PHQ-9) possess an excellent internal consistency (see Cronbach's α; Table 2). For the variables' main features, see Table 2.

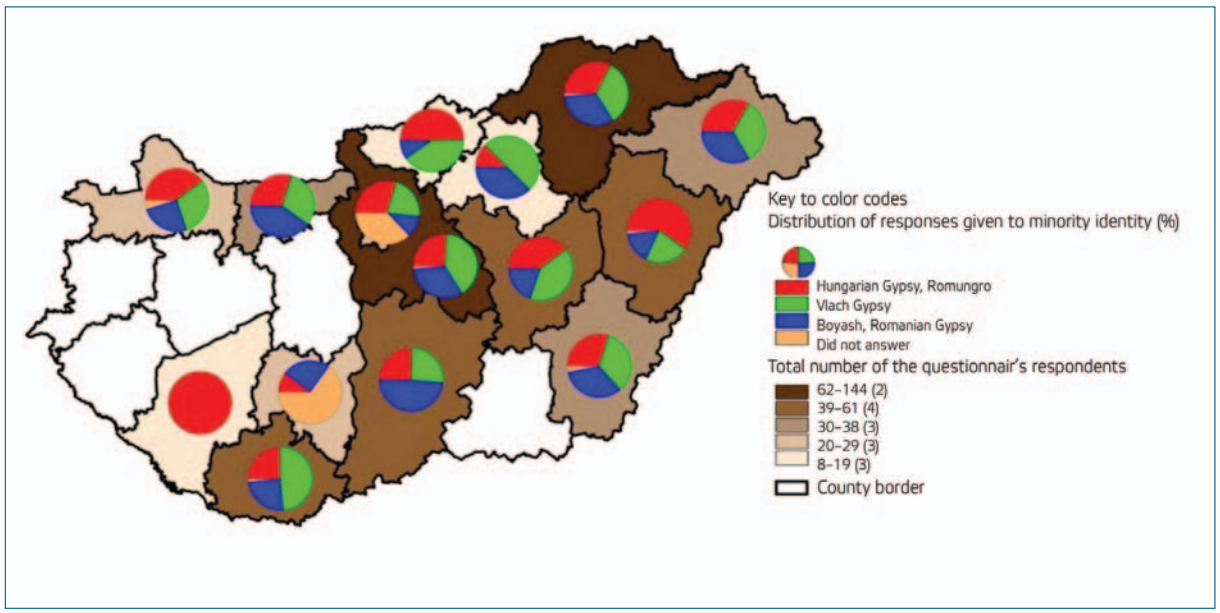
Subjective state of health

We investigated the subjective state of health with the single item, "What is your state of health in general?" (Winter et al., 2007; ELEF, 2019) An individual's subjective health perception (self-rated health) has been proven by researchers to be a trustworthy indicator of the objective state of health; it is also a more trustworthy predictor of death than any screening procedure (Kopp & Martos, 2011) (see Appendix 1).

WHO-5 Well-being Index

We measured mental health with the WHO-5 Well-being Index (5-item) (Topp et al., 2015). The scale measures general well-being and condition during the last two weeks. Validating the Hungarian-language version was based on the 2002 Hungarostudy survey (national, household based health survey; Cronbach's α = .85) (Susánszky et al., 2006) (see Appendix 2). In our study, Cronbach's α is .94.

Figure 2. Distribution of responses given to minority identity (%)



*Where the picture indicates the total number of the questionnaire's respondents, the data in parentheses show the number of affected counties.
Source: Roma survey, 2019 István Balcsók (edit.)

Table 2. Main features of variables

Scale	Cronbach's α	*N*	Min	Max	*M*	*SD*
How is your health in general?	NA	569	0	5	3.23	1.24
WHO-5	.94	565	0	5	3.09	1.24
Resilience	.98	564	0	5	3.18	1.08
PHQ-9	.93	563	0	5	1.88	1.26
SES	NC*	558	0	5	3.01	1.43
Confidant kin (Romungro)	NA	176	0	5	1.12	1.36
Confidant non-kin (Romungro)	NA	176	0	5	0.91	1.43
Confidant kin (Vlach)	NA	165	0	5	1.16	1.41
Confidant non-kin (Vlach)	NA	165	0	5	0.86	1.27
Confidant kin (Boyash)	NA	151	0	5	1.34	1.40
Confidant non-kin (Boyash)	NA	151	0	5	0.81	1.21
Confidant kin (all groups)	NA	492	0	5	1.20	1.39
Confidant non-kin (all groups)	NA	492	0	5	0.87	1.31
High prestige acquaintances (KSH)	NA	568	0	7	1.85	2.06
High prestige acquaintances (KSH) (without mayor)	NA	568	0	6	1.34	1.77
High prestige acquaintances (know/do not know)	NA	568	0	1	0.65	0.48
Medium prestige acquaintances (KSH)	NA	568	0	7	2.75	2.13
Low-prestige acquaintances (KSH)	NA	568	0	7	3.93	2.14

Min = Minimum, Max = Maximum, M = Mean, SD = Standard Deviation
*Since the index was constructed by examining different dimensions of socio-economic status, which cannot be assumed to be interrelated, internal consistency between them cannot be expected, hence Cronbach's α was not determined.

Connor-Davidson Resilience Scale

We measured resilience with the 25-item Connor-Davidson Resilience Scale (Connor & Davidson, 2003). Resilience is a mental resistance capacity, which helps successfully cope and adapt even in spite of difficult circumstances, besides diminishing the effects of distress. Related to positive emotions, it appears as a protective factor against depression and other psychiatric disorders; the scale investigates the measure of resilient behavior. (Kiss et al., 2015) The questions probe into how typical the items' statements were in the last month regarding the individual (see Appendix 3). In the Hungarian adaptation of the scale (Kiss et al., 2015), the Cronbach's α was .87, while in our study it is .98.

Patients Health Questionnaire

For assessing depressive disorders, we used the PHQ-9 (Patients Health Questionnaire) (Kroenke et al., 2001). This questionnaire has nine items and is highly suitable for screening depression in population surveys. Out of the nine items, we questioned eight items. (ELEF, 2019; Torzsa et al., 2009; Kósa & Bíró, 2018) (see Appendix 4). In the validation of the instrument (Kroenke et al., 2001), Cronbach's α was .89, while in our study it is .92.

SES index

The SES (socio-economic status) index was constructed by calculating the mean of the answers to the corresponding four items to measure families' financial state. (Havasi & Kóczé, 2010) (see Appendix 5).

Confidant ties

We investigated social relationships with the presence of strong ties, promoting microsocial integration, and weak ties, enhancing macrosocial integration. We measured the strong ties with the number of trusted relationships, and within those, the number/proportion of related and non-related trusted persons, with one question. ("Considering the past half year, who are the people with whom you discussed your important issues, problems, complaints?") (the possible answers see Appendix 6).

Position generator

We measured weak ties with a list containing 21 professions (position generator), on which the respondent had to indicate whether he or she knows anyone who pursues the given profession. Based on a prestige scale (21 item), we divided the listed professions into three groups (Janák, 2018): high-prestige professions, medium-prestige professions, and low-prestige professions (see Appendix 7).

Table 3 contains the main variables providing the starting point for investigating spatial mobility. More than half of the respondents were born in the settlement where they live now (52%), so they cannot be considered spatially mobile. Those who had moved earlier to their current location – that is, realized a spatial mobility – did so mostly for family reasons (53.2%). The overwhelming majority (63.6%) would not like to move away, while those who would still like to do so are essentially motivated by the hope of better housing conditions (46.1%). See Table 3.

Statistical Analysis

Since the number of elements for each group and sub-group reached 30, we assumed the normality distribution of the statistics calculated from the sample based on the central limit theorem. To compare means of sub-groups, we used analysis of variance (ANOVA), homoscedasticity was tested using the Levene's test. In each case, we have only shown the result of the parametric test corresponding to the test for homogeneity of variance. Relationships between nominal variables (similarity of the distribution of responses in different subgroups) were tested using the χ^2 test to test. The mental health, socio-economic and social network characteristics of the respondents, along with the fact of past moving and their impact on the intention to move, were examined using a structural equation model. All analyses were performed using IBM SPSS Statistics version 25.0 and Stata version 13.0, with a significance level set at 5%.

Table 3. Spatial mobility of respondents

	N	%
Were you born in the settlement where you live now? (*N* = 570)		
yes	297	52.1
no	273	47.9
Reason of moving (*n* = 269)		
family reasons	143	53.2
because of work	32	11.9
other reasons	31	11.5
because of better housing conditions	28	10.4
for financial reasons (such as high maintenance costs)	17	6.3
wanting to move to a settlement with a better infrastructure	11	4.1
schooling reason	7	2.6
Would you like to move away from here? If yes, then only from your apartment/house or also from the settlement? (*n* = 539)		
yes	196	36.4
no	343	63.6
What is your most important reason for wanting to move away? (*n* = 196)		
because of better housing conditions	91	46.1
financial reason	26	13.2
because of work	25	12.7
family reason	22	11.2
other reason	21	10.7
wanting to move to a settlement with a better infrastructure	10	5.1
schooling reason	1	0.5

Results

Subjective Health Status and Mental Health

On average, the respondents evaluated their health state ((*M(SD)* = 3.23(1.24)); a considerable part of them found their health state to be satisfactory, or good (84.6%). *Bad* and *very good* states appeared less typical. The three Roma groups' health states did not differ significantly from one another ($F(2, 566) = 2.05$, $p = .129$).

In terms of the entire sample, we can state that in general, the respondents had moderate mental well-being ((*M(SD)* = 3.09(1.24)) on the scale of 0 to 5 regarding the assessed mental dimensions: they felt moderately *merry, cheerful, active, vivid*; feeling *relaxed* is moderately typical, while *waking up rested* as well as *having interesting days* is a bit less typical. The three Roma groups' mental health does not significantly differ from one another ($F(2, 562) = 2.62$, $p = .074$).

The majority of respondents have a medium ((*M(SD)* = 3.18(1.08)) level of flexibility. The three Roma groups' resilience levels significantly differ from one another ($F(2, 561) = 3.64$, $p = .027$; $\eta^2 = .013$). A significant between-group difference can be observed between the Romungro and Boyash groups (Tukey HSD; $p = .024$), indicating that Romungros have higher levels of flexibility.

Concerning depressive disorders, we can state that these are moderately typical ((*M(SD)* = 1.88(1.26)) for the Roma groups' representatives, and no significant difference exists among the Roma groups ($F(2, 560) = 1.21$, $p = .300$).

Economic Status

A bad financial situation characterizes the majority of the respondents; a considerable part of them has experienced not having enough money for food. Furthermore, many of them have encountered problems with properly heating up the apartment or paying unexpected expenses as their own contribution. The three Roma groups' socioeconomic statuses did not significantly differ from one another ($F(2, 555) = 1.23$, $p = .295$).

Spatial Mobility

The proportion of non-mobiles (*Were you born on the settlement where you live now?*) manifests a significant difference depending on the minority group ($\chi^2(2) = 10.325$, $p = .006$, Cramer's V = .135). The most mobile are the Boyash (57.1%), while the least mobile are the Vlach (40.2%). Concerning the reason for moving, the three groups do not significantly differ from one another ($\chi^2(12) = 13.464$, $p = .336$).

The intention to move, however, does differ in terms of minority groups ($\chi^2(6) = 7.575$, $p = .023$, Cramer's V = .119): the Romungro are the most likely (36.4%), while the Boyash are the least likely (24.7%) to move away from their current residence. Regarding the reason for the intended move, the Roma minority groups do not significantly differ from one another ($\chi^2(6) = 23.002$, $p = .114$).

Social Relationships: Strong Ties And Weak Ties

The respondents have ((*M(SD)* = 2.02(1.35)) confidant persons on average, while 22% of them do not have any confidant relationships. The average of kin confidant is 1.20 (*SD* = 1.39), and the average of non-kin confidant is 0.87 (*SD* = 1.31). 42.7% have no confidant relatives, while 58.5% have no confidant non-relatives. One-quarter (24.8%) of the respondents has one confidant relative, and 18.7% has one confidant non-relative. We can state that no significant difference exists among the Roma groups regarding both confidant relatives ($F(2, 489) = 1.11$, $p = .329$), and confidant non-relatives ($F(2, 489) = 0.24$, $p = .788$).

Most of the respondents mainly know people pursuing low-prestige professions (unskilled worker, store assistant), with the exception of caregivers (54% know such), as well as local government representatives and mayors (51% know them). Among the three Roma groups, only one profession (waiter) appears to be different in this aspect: the Romungro know a bigger proportion of people pursuing this profession (55%) than those belonging to the other two groups (48 vs. 40%, respectively).

Table 4 illustrates the examined variables' group differences in mean and percentage values.

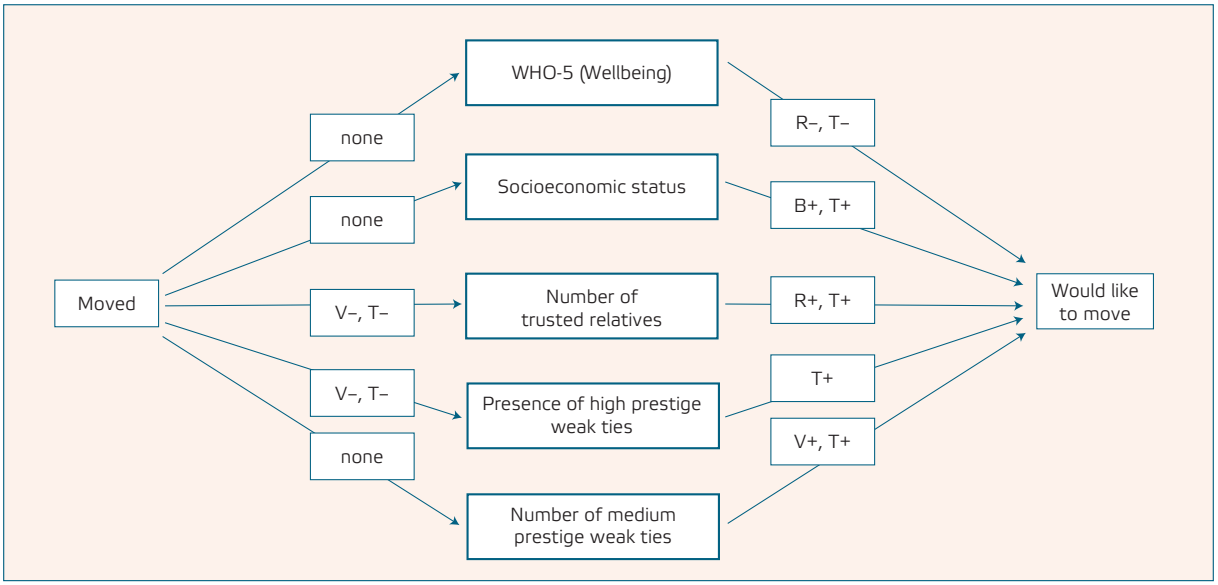
Table 4. Respondents' mean and percentage differences in the examined variables by ethnicity groups
(The letters after the means indicate the results of Tukey's post hoc tests. If the code consisting of the letters in parentheses belonging to one group contains the code in parentheses following the mean of the other group, they form a homogeneous subset, so there is no significant difference between them based on Tukey's post hoc tests. An example of this is if one group average is followed by an 'a' in the brackets and the other group average by an 'ab', or if the mean of both groups is followed by the same letter in the brackets ('a' and 'a'). In the case where the code following the group average in the table for two groups does not contain one another (e.g. 'a' and 'b'), a significant difference between them can be detected on the basis of the post-hoc test results.)

	Romungro	Vlach	Boyash	Total
What is your state of health in general?	3.6 (a)	3.7 (a)	3.5 (a)	3.6
WHO-5 (well-being)	3.2 (a)	3.2 (a)	2.9 (a)	3.1
Resilience	3.3 (a)	3.2 (ab)	3.0 (b)	3.2
PHQ9 (depressive symptoms)	1.4 (a)	1.4 (a)	1.6 (a)	1.5
SES (socio-economic status)	2.0 (a)	2.1 (a)	1.8 (a)	2.0
	%			
Has moved	47.6	40.2	57.1	47.9
Would like to move	36.4	26.3	24.7	29.5
Has a confidant relative	55.1	54.5	62.9	57.3
Has a confidant non-relative	40.3	42.4	41.7	41.5

Models of Moving Intentions

We arranged the intention to move and its influencing factors into a model by means of SEM – Structural Equation Modeling (see Figure 3). A theoretical SEM model was fitted both to the full sample and to the three Roma groups separately. The model only contains the significant variables, which practice a traceable effect on the ultimate end variables in case of the entire sample (that is: whether the respondent plans to move). The full model was not verified, only some of its paths. Significant paths are indicated in Figure 3 and statistics for all paths of all

Figure 3. SEM-model involved in illustrating connections with significant variables



Note. Meaning of abbreviations: none: no significant connection exists among the given variables; R/B/V/T: regarding the Romungro/Boyash/Vlachs/Total, a significant connection exists; +/-: indicates the strengthening or weakening role of significant connections. Table 5 contains the results of main connections.

four models are presented in Table 5. Out of the researched variables, WHO-5, the SES, the number of confidant relatives and the existence of high- and moderate-prestige contacts proved significant. We calculated the impact assessment of past movings with linear regression, while we used logistic regression for analyzing the connections regarding future moving intentions. This means that the first part of the path analysis is based on a multivariate linear regression (differences between those who had previously moved and those who had not moved, regarding well-being, SES, confidant relatives' count, presence of high prestige weak ties, count of medium prestige weak ties), and the second part is a relationship modeled by logistic regression, in which we modeled the effect of the dependent variables of the linear regression models on the intention to move. Since all the variables are included simultaneously in the model, their confounding effects on each other are eliminated because only their partial effects are present in the model.

The Effects of the Completed Move

The fact of a past, completed move did not have a significant effect on the respondents' financial-economic situation, whether examining the three Roma groups separately or in total: no significant difference existed between the financial situation of respondents who had previously moved and those who had not ($\beta = -.06$, $p = .132$). So, we can only assume that the fact of moving will not make a difference to the financial situation of the respondents, but we do not know whether their financial resources changed in the present, as opposed to the past, or not – such as a previously unemployed person becoming employed, or gone on maternity leave, or possibly receiving benefits since then. And even though no significant effects exist in this aspect: regarding the representatives of the Vlach group, a kind of tendency is worth mentioning: among them, the significance-value was on the threshold of the margin of error ($\beta = -.14$, $p = .051$), which indicates that the financial situation of those who have moved is worse than that of those who have not moved. (In the case of a large item number, the effect would be significant.)

Table 5. SEM model in illustrating the connections with significant variables

	Romungro	Vlach	Boyash	Total
SES <-				
moved	-.03 (.727)	.14 (.051)	.06 (.430)	.06 (.132)
constant	2.075 (<.001)	1.822 (<.001)	1.765 (<.001)	1.892 <.001)
WHO-5 <-				
moved	–.00 (.980)	.14 (.050)	.07 (.397)	.08 (.065)
constant	3.163 (<.001)	2.969 (<.001)	2.831 (<.001)	2.989 (<.001)
number of confidant kin <-				
moved	–.08 (.308)	**–.18 (.021)**	–.13 (.111)	**–.13 (.003)**
constant	1.220 (<.001)	1.456 (<.001)	1.484 (<.001)	1.380 (<.001)
high_prestige acquaintances (know/do not know_KSH) <-				
moved	–.06 (.435)	**–.25 (<.001)**	.04 (.635)	**–.09 (.028)**
constant	.708 (<.001)	.782 (<.001)	.608 (<.001)	.694 (<.001)
medium_macro_integrity (KSH) <-				
moved	.10 (.161)	–.13 (.071)	–.06 (.469)	–.02 (.600)
constant	2.656 (<.001)	3.051 (<.001)	2.742 (<.001)	2.801 (<.001)
would like to move <-				
SES	1.21 (.125)	1.04 (.777)	**1.45 (.007)**	**1.22 (.008)**
WHO_5	**.71 (.019)**	.82 (.167)	.86 (.253)	**.81 (.007)**
number_of_confidant kin	**1.37 (.017)**	1.02 (.858)	1.20 (.183)	**1.17 (.028)**
high_prestige_acquaintances (know/do not know_KSH)	1.96 (.142)	1.79 (.195)	1.17 (.753)	**1.74 (.033)**
medium_macro_integrity (KSH)	1.14 (.178)	**1.22 (.031)**	1.12 (.294)	**1.16 (.010)**
constant	.52 (.300)	.34 (.108)	.20 (.011)	**.31 (.001)**

Note. Data in brackets indicate significance and constant values. β values are shown for linear regression models and Exp(B) values for logistic regression models. Significant results are highlighted in parentheses

The difference in mental health as a result of having moved previously is neither significant for the whole sample (β = .08, p = .065), nor when examined separately (even though – again – among the Vlachs, we can observe a tendency-like improvement (β = .14, p = .050).

In terms of social support, for the Vlachs, a significant difference (β = –.18, p = .021) exists in the number of relative confidants, depending on whether the respondent has moved or not: those who have moved in the past have significantly fewer relative confidants. This probably means that these respondents left their supportive confidant relatives at their former residence, and at their current residence, they have been unable to replace these social contacts, which primarily offer emotional support. Viewing the three groups together, the comparison based on the fact of having moved in the past has a stronger negative significant effect on the number of confidant relatives than among the Vlach group (β = –.13, p = .003): those who had moved have considerably fewer confidant relatives (possibly for the very same reason as what we surmised concerning the Vlachs).

Researching the social support providing weak ties, we can state that out of the three groups, a past move only becomes a significant effect in the case of the Vlachs (β = –.25, p < .001) regarding whether, at present, these respondents know people pursuing high-prestige professions. The results show that among those who had moved, there were significantly lower proportions of those who had a high-prestige relationship. Looking at the three groups together, once again, a negatively directed significant effect can be stated (β = –.09, p = .028) in connection with this aspect.

The presence or absence of moderate-prestige acquaintances related to a past move did not indicate a significant relationship regarding the three Roma groups, whether we examined them separately or together (β = –.02, p = .600). This might signify that among the Vlach Roma, the number of contacts with relatives and the presence of high-prestige acquaintances amounted to a much stronger effect than with medium- or low-prestige acquaintances, and the diminishing number of these latter resulted in a motivation to move for them in the past.

Differences in Moving Intentions

Investigating the future intention to move, we can observe considerable differences among the three Roma groups. Among the Boyash, those who would like to move are in a significantly more advantageous socioeconomic situation (Exp(B) = 1.45, p = .007), and looking at the three Roma groups together, we can observe the same (Exp(B) = 1.22, p = .008). Among the Romungro, for those who would like to move, the lower level of their mental well-being (Exp(B)= .71, p = .019) and the higher number of their confidant relatives (Exp(B) = 1.37, p = .017) has proven significant. Finally, in the case of the Vlachs, the number of acquaintances with people pursuing medium-prestige professions significantly determines (Exp(B) = 1.22, p = .031) whether they would like to move or not. Investigating the three Roma groups together, regarding a future intention to move, all the variables appearing in the analysis had a significant effect (SES – Exp(B) = 1.22, p = .008; WHO-5 – Exp(B) = .81, p = .007; number of confidant relatives – Exp(B) = 1.17, p = .028; presence of high weak-tie acquaintance – Exp(B) = 1.74, p = .033; number of medium weak ties – Exp(B) = 1.16, p = .010).

Discussion

We developed a SEM to analyze the difference between previous movers and non-movers in wellbeing, socioeconomic status, the number of confidant relatives, the presence of high prestige weak ties and the number of medium prestige weak ties. We also investigated the effect of the variables above on the intention to move. Our analysis was carried out for all three Roma groups separately as well as for the whole sample.

Regarding the population investigated in our research, most of them typically live in poor conditions, struggling with financial difficulties. The biggest part of those desiring to move would do so mostly in the hope of better housing circumstances. They probably failed to adapt, proving unable to satisfy their housing-related needs and settle into the given conditions. In our model based on past moves, among the variables compared, we found significant differences only in the number of confidant relatives and in the presence of high prestige acquaintances. For both Vlachs and the total sample, there was a trend for those who had moved in the past to have fewer kin confidants and be less likely to know someone with a high prestige acquaintance. Consistent with the literature, this reflects the fact that family ties, and with them peer support, are often lost during the move, increasing the risk of isolation (Hautzinger et al., 2014; Dávid et al., 2020).

Well-being has a significant negative-, and socio-economic status has a significant positive effect on the intention to move; we find this true for the whole sample and in one variable for the Romungros (well-being) and the Boyash (socio-economic status). Socioeconomic status and mental health are also linked in literature: poverty remains the strongest predictor of poor physical and mental health (Zeman et al., 2003; Gordon, 2003; Parliament Office, 2022). Fully 75% of Roma people suffer from some form of depression (Szabóné, 2018). Depression is more common in women living in deprived housing, and antisocial behavior and drug use in men (Drukker et al., 2007). However, people who want to move, who are disadvantaged, have low educational attainment, financial difficulties, and are unemployed, such as the Roma, are the least likely to realize their intention to move (Csizmady et al., 2020) – many prefer to remain in poorer housing conditions due to job insecurity (Babusik, 2007).

The other three variables, on the other hand, reinforce the intention to move for the whole sample: the more confidant relatives, the more medium prestige weak ties, or presence of a high prestige weak tie, the more likely

someone is to plan to move. Among the Roma groups, the same positive effect was experienced among the Romungros in the case of confidant relatives and regarding the Vlachs in the case of medium prestige weak ties. Respondents in our research all identified themselves as Roma, and – according to the relevant literature – those who identify themselves as members of a Roma group have more supportive relationships, but their network of relationships is more closed and mostly composed of people of the same ethnicity (Messing & Molnár, 2011). These are bonding-type, cohesive, solidarity networks that often ensure survival (Messing & Molnár, 2011) and also provide security for those within them (Wacquant, 2012), for whom family and kinship support is thus also considered a "place-specific capital" (Kleinhans, 2009). However, Roma living in extreme poverty are characterized by relational poverty – for them, kinship and community ties are a substitute for institutional and other social ties (Messing & Molnár, 2011). The more isolated they live in an area, the more closed their network of contacts, the worse their mental health and the less connected they are to representatives and institutions of mainstream society. People living there can almost only rely on each other for financial, instrumental and emotional support (Huszti & Ember, 2019).

According to our first hypothesis, we can state the most significant difference between those who have already moved geographically and those who have not yet moved is the social network: those who have moved possess fewer confidants and weak ties. Among the three researched Roma groups, the Vlachs are the only one where a link can be detected between the number of confidants and high-prestige weak ties: those who have moved possess fewer confidant relatives and high-prestige weak ties. This may be because they live in more closed communities with a particular culture and are less open to heterophilic relationships (Elekes, 2017). Mental health and economic situation indicate no difference between the two groups (those who have moved and those who have not).

Regarding the second hypothesis, we can state that besides the contact system, factors such as mental health and economic situation also influence the intention to move. The individual factors influence the different Roma groups' moving intentions in varying ways.

Among the three Roma groups, significant motivational differences manifest in terms of the intention to move: while the Boyash would like to move in case of an improved financial situation, hoping to improve their finances, for the Romungro, a lower level of mental wellbeing is necessary to do this, as well as having the relatives' social support; finally, for the Vlachs, the number of medium-prestige weak ties determines this decision. These results adequately reflect the three examined Roma groups' cultural past and present. The Boyash and Vlach groups inherited an authentic way of life from their ancestors – out of these two, the Vlachs live in a more closed and rigid structure of traditions; they mainly base their moving intentions on their weak-tie acquaintances pursuing medium-prestige professions. The Boyash, who for a long time – until the end of World War II – had lived and sustained themselves close to nature, drawing from its resources (being woodworkers and shepherds) (Kahl & Nechiti, 2019; Kemény, 2000), lived, similarly to the Vlachs, off trading with the members of the majority society. The representatives of the Romungro, the group that has assimilated to and is endeavoring to fit in with majority values and lifestyle the most, and who have been living among Hungarian people for the longest time but still constitute the most "wavering" group, have different motivations for moving. They live "between two worlds" – on the verge of majority and minority existence – since besides social discrimination, the Vlachs also bear an aversion towards them (Chaudhuri-Brill, 2012). Romungros are the most likely to try to adapt and integrate into society (Kemény, 2000) and to break with their old traditions and way of life – but this effort is often associated with depression, neurosis and other psychiatric illnesses, as well as low levels of social support (Szabóné, 2008). For this reason, among them, weak mental health, the deficit of "I feel well" constitutes a real risk due to social exclusion, the lack of inclusion and acceptance (which might even motivate them to move); at the same time, a suitably strong contact network of confidant relatives constitutes a power resource for them to venture into a move that entails a lot of difficulties and expenses. An emphatic explanation could be that Roma people with a Hungarian mother tongue are the most likely to live in colonies (Cserti Csapó, 2003), as well as at settlements separated, segregated from society; thus, it is particularly important for them to possess a well-functioning, supportive contact network, and within that, a bonding-type, coherent, solidarity-filled social network, which may frequently guarantee their survival (Messing & Molnár, 2011).

Strengths and Limitations

Regarding the number of the examined population, we do not possess accurate data. Even in the national population census database, Roma identification is registered on a self-report basis. Thus, a representative sample collection remains impossible. Even social science surveys usually handle ethnic Roma groups as a homogeneous group, even though they manifest differently in numerous character traits. Our large-sample database grants the opportunity for the first time to examine and compare the three subgroups of the Roma population, progressing along the given questions, arguing that the individual subgroups differ in certain aspects.

Conclusion, Implications, and Future Directions

We examined a special sample, the Roma people, their moving intention and the benefits of moving realized. Studies and researches dealing with the Roma population's situation, including their health state, generally describe the Roma population as one large ethnic group; so, via separately examining the three subgroups, our study contributes to enhancing knowledge on Roma ethnicity.

With the Romungro respondents, a lower level of mental well-being, that is: the lack of a "feeling well" state proved to be a push factor regarding the move, and another such factor appeared to be the social support provided by the relatives, in order to complete the move. As opposed to this, no connection exists between their past moving and present well-being. The desire to move stands highest among the Romungro respondents, which might reflect the fact that among the Roma groups, they consist of the people who have been living in Hungary for the longest time and have been endeavoring the most to integrate into the majority society. Members of the majority society, however, frequently refuse these endeavors – mainly due to their negative experiences – so these people continuously seek their place in the spatial dimension, as well. The presence of strong support from relatives enhances their desire to move, since it ensures support for them even outside their residence. This is all the more important as these people may lose their social support in the course of the move, and they may end up isolated, which might negatively impact their mental health.

In the case of the Vlachs respondents, we can say that the more embedded they are, the more medium-prestige weak ties they possess – which guarantee the macro-social contacts – the more they would like to move away from their current residence. Out of these, those who had moved in the past typically possessed fewer high-prestige acquaintances. Unlike the Romungros, the Vlachs respondents – who are the most eager to preserve their Roma character traits and distance themselves culturally (using the Gypsy language, their own laws, attire, tradition-preserving habits and hedonistic lifestyle) not only from the Hungarians but other Roma groups, as well – appeared to be much less willing to move. This is primarily because among them, a stronger coherence remains more likely (as a result of the interdependence established during their centuries-long peregrination); thus, they could count more on each other's support, further enhanced by living spatially close to one another. Their separation endeavors are quite apparent from distancing themselves within the same settlement – spatially as much as regarding their communication and their peculiar community life – not only from those who represent the majority society but also from other Roma groups, which constitutes a source of the frequent conflicts among the groups. Since in their case, social embeddedness increases the desire to move, the lack thereof further enhances their separation.

Finally, we can state that among the Boyash respondents, more favorable economic situation urges them the most to move. Among the Boyash respondents, a similarly lower desire to move appears compared to the Romungro, probably rooted in the fact that they have settled down, having lived along the Southern border for centuries, successfully integrated into society and during this time, being able to count on each other's support, even from beyond the border – possessing well-extended and well-functioning social networks, even on an international level.

In the future, the research direction that has thus begun will be worth continuing; we should examine the Hungarian Roma groups separately, getting to know their characteristics, their similarities as well as their differences alike – after all, this effort might prove a very useful tool when elaborating and implementing effective social political directives and intervention methods that serve a successful social integration.

Acknowledgements
Authors would like to thank the following persons:
Beáta Dávid for advises – Semmelweis University, Institute of Mental Health; Director of the Institute; Associate Dean;
István Balcsók for the preparation of Figure 2 – University of Debrecen, Faculty of Humanities Institute of Political Science and Sociology;
Zsófia Crow and Ron Crow for proofreading.

Funding
This research was financially supported by Predoctoral Scholarship; grant number: EFOP-3.6.3-VE-KOP-16-2017-00009.

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Declaration of interest statement
The authors declare no conflict of interest.

Ethical statement
The studies involving human participants were reviewed and approved by by Semmelweis University Regional, Institutional Scientific and Research Ethics Committee, grant number: SE RKEB number: 201/2018.
All participants engaged in the research voluntarily and anonymously.
The participants provided their written informed consent to participate in this study.
Their data are stored in coded materials and databases without personal data.

Data Availability Statement
The data supporting this study's findings are available to the public.
We have policies in place to manage and keep data secure.

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Appendix

Appendix 1: Possible answers: *very bad; bad; satisfactory; good; very good*

Appendix 2: The WHO-5 questionnaire's items are: *Over the past two weeks…1. I have felt cheerful and in good spirits; 2. I have felt calm and relaxed; 3. I have felt active and vigorous; 4. I woke up feeling fresh and rested; 5. My daily life has been filled with things that interest me.* The possible answers were: *All of the time; Most of the time; More than half the time; Less than half the time; Some of the time; At no time.* (Topp et al., 2015)

Appendix 3: Questions of the resilience questionnaire *1. Able to adapt to change; 2. Close and secure relationships; 3 Sometimes fate or God can help; 4 Can deal with whatever comes; 5 Past success gives confidence for new challenge; 6 See the humorous side of things; 7 Coping with stress strengthens; 8 Tend to bounce back after illness or hardship; 9 Things happen for a reason; 10 Best effort no matter what; 11 You can achieve your goals; 12 When things look hopeless, I don't give up; 13 Know where to turn for help; 14 Under pressure, focus and think clearly; 15 Prefer to take the lead in problem solving; 16 Not easily discouraged by failure; 17 Think of self as strong person; 18 Make unpopular or difficult decisions; 19 Can handle unpleasant feelings; 20 Have to act on a hunch; 21 Strong sense of purpose; 22 In control of your life; 23 I like challenges; 24 You work to attain your goals; 25 Pride in your achievements.* The possible answers were: *Not true at all; Rarely true; Sometimes true; Often true; True nearly all of the time.* (Connor & Davidson, 2003)

Appendix 4: The questions asked in the questionnaire PHQ-9: *Over the last 2 weeks, how often have you been bothered by any of the following problems? 1. Little interest or pleasure in doing things; 2. Feeling down, depressed, or hopeless; 3. Trouble falling or staying asleep, or sleeping too much; 4. Feeling tired or having little energy; 5. Poor appetite or overeating; 6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down; 7. Trouble concentrating on things, such as reading the newspaper or watching television; 8. Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual; 9. Thoughts that you would be better off dead or of hurting yourself in some way.* The possible answers were: *At no time; For a few days; More than 7 days; Almost every day.* (Kroenke et al., 2001)

Appendix 5: Questions of SES variable: *In the last one year……have you experienced not having had enough money: for food?; …utilities? (heating, lighting, water etc.); …could he/she afford to heat up his/her apartment satisfactorily?; …was his/her household capable of paying for an unexpected higher amount of expense out of his/her own pocket?* Possible answers were: *yes*; *no.*

Appendix 6: The possible answers: *spouse/partner, child, grandchild, mother-in law/father-in-law, own or spouse's siblings, other kin, friend, acquaintance colleague, neighbor, other non-kin.*

Appendix 7: *I will read aloud a few professions; please tell about each one whether you personally know people pursuing these professions: teacher (secondary); driver; computer technician; accountant; mayor, clerical officer in local government; water and gas plumber; car mechanic; solicitor; waiter; engineer; entrepreneur, chief executive; lawyer; sales/shop assistant; journalist; actor/actress, musician; surgeon; administrator; nurse; scientist; unskilled worker; farmworker; security guard.*

High-prestige professions: mayor, clerical officer in local government, lawyer; engineer; chief executive; journalist; surgeon; scientist

Medium-prestige professions: teacher (secondary); driver; computer technician; accountant; actor/actress, musician; nurse; farmworker

Low-prestige professions: water and gas plumber; waiter; sales/shop assistant; car mechanic; administrator; unskilled worker; security guard

European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0011

BACK TO CONTENTS

RESEARCH ARTICLE

Exploring Awareness and Resistance to Nonattachment in Relation to Mental Health

A Qualitative Study in a UK-Based Yoga Community

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History
Received: 22 March 2023
Accepted: 24 August 2023
Published: 26 September 2023

Citation
Tremblay, L., & Van Gordon, W. (2023). Exploring Awareness and Resistance to Nonattachment in Relation to Mental Health. A Qualitative Study in a UK-Based Yoga Community. *European Journal of Mental Health, 18,* 0011, 1–16.
https://doi.org/10.5708/EJMH.18.2023.0011

Introduction: Nonattachment is a flexible and balanced way of relating to experiences that involves accepting or allowing, instead of clinging to, expectations or outcomes. Advancing the understanding of how people relate to nonattachment is important because of the associated mental health benefits.
Aims: To qualitatively explore awareness of, and resistance to, nonattachment in a UK-based yoga community.
Methods: A reflexive thematic analysis was conducted based on transcripts of ten semi-structured interviews.
Results: Findings indicated a general lack of consensus in understanding nonattachment, with explanatory themes of (i) resistance related to external forces conflicting with internal knowing, (ii) bracing for impact, and (iii) difficulty navigating how to embrace nonattachment. However, despite the participants' apparent implicit negativity towards nonattachment, they acknowledged its benefits for accommodating change.
Conclusions: These findings have important implications for the wider adoption and application of nonattachment in applied settings.

Keywords: nonattachment; surrender; reflexive thematic analysis; mental health

Introduction

According to the House of Commons Mental Health Statistics Report (Baker & Kirk-Wade, 2023), one in six adults living in England have experienced a common mental disorder such as depression or anxiety. Additionally, at 22.8%, poor mental health is the primary cause of disability throughout the UK, compared with 15.9% for cancer, and 16.2% for cardiovascular disease (Department of Health, 2011; World Health Organisation, 2022). Although the UK government spends an estimated £213 billion a year on health (UK public spending, 2022), the funds allocated to mental health by the NHS in 2020-2021 were £14.3 billion (NHS, 2017), or 6.71%. The apparent under-allocation of resources to mental health services and supports across the UK indicates an unmet need when it comes to addressing mental health issues. It therefore becomes important to consider how people might be able to nurture their own mental health and well-being, where possible. One area recently found to be worthy of additional attention and research for this context is nonattachment.

ISSN 1788-7119 (online)

Nonattachment, rooted in the Eastern contemplative traditions of Buddhism and Hinduism, dates back over 2,500 and 3,500 years, respectively (Whitehead et al., 2018a). Nonattachment is also one of the Mahavratas in Jainism, which reflect five major vows that Jain monks are expected to adhere to as part of a grander ascetic approach to life (Sethi, 2009). Buddhism asserts that suffering can be caused by fixations or attachments related to thoughts, perceptions of self, and how life 'should' be (Elphinstone & Whitehead, 2019). This may be due to the incompatibility and misalignment of static fixations and a reality in constant flux or change (Hanh, 1999). Nonattachment links to Buddhist wisdom principles such as wholeness, non-self and non-duality, based on the assumption that the self does not exist as an independent entity and that there is in fact nothing to truly be attached to (Van Gordon et al., 2019).

Nonattachment is generally understood to represent a flexible and balanced way of relating to experiences; relinquishing the need to cling to or suppress them (Sahdra et al., 2015). Becoming nonattached to outcomes removes the dependence one has on them (Chio et al., 2018). "When people are nonattached, their perceived sense of well-being is noncontingent – that is, not dependent on particular circumstances." (Sahdra et al., 2010, p. 118). Nonattachment is said to be a separate and independent construct from attachment styles posited by classic Attachment Theory (Ainsworth, 1978, 2015; Bowlby, 1982, 1998). Where classic Attachment theory posits styles of developmental and relational connectivity, nonattachment links to one's ability to simply experience, without the need to alter.

It remains unclear whether in practical application people have an agreed upon understanding of what nonattachment is. Relatively new to the attention of Western academia, the concept of nonattachment is still in infancy within the scientific literature. Compare this with, for example, 'emotion', which has been widely researched and expansively defined and debated amongst multiple cultures and languages (Russell et al., 2013). Nevertheless, emotion still has multiple meanings, within multiple applications, across multiple contexts. Therefore, it is perhaps premature for the academic community to project its own understanding of nonattachment onto the population at large. It may be that a key to understanding resistance to nonattachment lies in people's interpretation of it as well as their broader epistemological stance (Sosa, 2017).

There are also similarities between nonattachment (including nonattachment to self) and the transcendence of ego states or stages where the latter can involve significant personal struggle (Prebish, 1975). This struggle may be an opening to the totality of the self (Hidas, 1981), or, in psychotherapeutic language, surrender. 'Surrender' in this sense does not involve the waving of a proverbial white flag, but rather the antithesis of resistance to a new way of perceiving self and reality (Ghent, 1990). Surrender is often brought about by the catalyst of crisis and may commence outside of the ego-controlled or 'attached' mind: "Surrender involves a leap, a push, a giving-up, an abandonment of hope, a cleansing through painful purgation for which no exclusively rational process can substitute." (Hidas, 1981, p. 30).

Nonattachment also shares some overlap with Asceticism; a Graeco-Roman legacy characterized by withdrawal from environmental, physical, and sexual stimuli to focus on the pursuit of spiritual goals (Finn, 2009). Asceticism evolved through Abrahamic religions and took on a meaning of self-denial, self-punishment, and renunciation. In Eastern teachings, such as the Yogavāsiṣṭha, the meaning evolved to represent spiritual enlightenment accessible through detachment from closely held assumptions and interpretations of the real world (Horan, 2011). However, Asceticism in its original iteration of extreme dissociation has been criticized as potentially leading to maladaptive psychosocial functioning (Horan, 2011). Indeed, where the original behavior of the Ascetic individual might involve leaving behind worldly pursuits of material possessions and even family to seek enlightenment, in contemporary research, psychological wellbeing is frequently associated with a sense of belonging to a community and family (Cheung et al., 2017; Haggerty et al., 1992; Hill, 2006).

Nonattachment is arguably implicit within the practice of mindfulness (Shonin & Van Gordon, 2013), although nonattachment is also asserted to be a separate and distinct construct (Sahdra et al., 2016). Research indicates that nonattachment may act as a facilitator or mediator for the positive effects of mindfulness and mindfulness-based interventions (MBIs) (Sahdra et al., 2016). However, research has been unable to yield conclusive evidence of causality, and therefore the relationship between these two constructs remains somewhat unclear (Whitehead, 2019), perhaps in part because out of the approximately 100 studies of nonattachment to date, very few have employed qualitative methodologies. Indeed, as noted by Whitehead (2019) "To date, there has been no qualitative investigation on nonattachment to gain an understanding of how nonattachment (or attachment) presents, or is developed, in the general population." (Whitehead, 2019, p. 32).

The field of nonattachment research continues to grow and continues to demonstrate application involving a wide range of psychological benefits and outcomes (Whitehead et al., 2018a). For example, nonattachment has been positively correlated with overall well-being (Chao & Chen, 2013; Feliu-Soler et al., 2016; Sahdra et al., 2010) and pro-social behaviors by way of empathy, kindness (Sahdra et al., 2015) and adaptive psychosocial functioning (Van Gordon et al., 2019). Furthermore, nonattachment has been found to be a significant predictor of pro-nature conservation behaviour (Barrows et al., 2022), and has been correlated with fewer symptoms of depression, anxiety, and stress (Sahdra et al., 2010; Whitehead et al., 2018b), less psychological distress (Coffey & Hartman, 2008) and reduced suicidal rumination (Dvorak et al., 2013; Tran et al., 2014). Nonattachment has also been found to mediate associations between mindfulness, well-being, and psychological distress (Ho et al., 2022), and people higher in nonattachment may be less egoistic (Gupta & Agrawal, 2022).

Nonattachment also correlates with improved relationship harmony (Wang et al., 2016), which in turn is linked to reduced psychological distress and negative affect, and improved emotion regulation (Cebolla et al., 2018). Nonattachment has further been linked with mitigation of pain related to symptoms of physical illness such as fibromyalgia (Van Gordon et al., 2016, 2017). One study found that improved nonattachment scale scores were correlated with reductions in PTSD symptom severity, anxiety sensitivity, rejection sensitivity, and changes of the empathic concern and empathy's personal distress aspects (Joss et al., 2020). Furthermore, nonattachment is asserted to be a key mechanism by which mindfulness fosters salutary health outcomes, although multiple pathways may exist through which nonattachment is cultivated, beyond mindfulness (Whitehead et al., 2020).

Research has suggested that individuals suffering from mental health symptoms may be assisted by way of interventions designed to build nonattachment and reduce fixation on outcomes as they 'should' be, in particular via 'cognitive and experiential pathways' (Whitehead et al., 2020). Cognitive pathways entail a focus on acceptance and resolution of challenges. Experiential pathways entail intentional practice at cultivating wisdom related to the ever-changing nature of experience (Whitehead et al., 2020). However, the pathway to the pathways remains unknown. That is, we do not currently understand why some people embrace nonattachment, and others resist it.

This ambiguity may be viewed within the context of Reflective Connection and Intent Connection (Vallacher & Wegner, 1987). Reflexive Connection suggests that much like classic Self-Perception Theory (Bem, 1972), people search for causal stimuli from their environments and embrace a behavior when they find it. When causal relationships, such as that between nonattachment and mindfulness remain vague, the behavior is less likely to be performed. Contrastingly, Intent Connection (Vallacher & Wegner, 1987) holds cognitive representations of actions, such as embracing nonattachment, to function as templates for behavior. While this offers a helpful explanation for basic physical movements (e.g., I am thinking of sitting, so I sit), the link between cognition and action stands less clear. Action Identification Theory (AIT) comprises both theories and posits that the relationship between cognitive representation and behavior is not unidirectional, but cyclical (Vallacher & Wegner, 1987). Ultimately, AIT suggests that various identities exist to which people subscribe, which in combination with their understanding of the action (e.g., embrace nonattachment), and their ability to maintain the action, will produce or fail to produce it. It offers a perspective on the reciprocal feedback between thought and doing, and understanding what one is doing (Parkin et al., 2015). Therefore, understanding the concept or action becomes somewhat critical.

As discussed, nonattachment stems from the contemplative disciplines such as Buddhism and Hinduism, both of which are categorized for philosophical consideration as intellectual factions, but are in truth also religions (Derricourt, 2021). There is a profusion of reasons why people may hold anti-religious attitudes, or prejudices towards religions (Dawkins, 2008; Hitchens, 2008; Ross, 1990; Zuckerman, 2012), which are beyond the scope of this paper. Resistance due to religious connotations, however, has been observed for mindfulness and this cannot be ruled out as a factor influencing how people may view and contextualize nonattachment.

While nonattachment may have a growing consensus of definition within the academic community, it could be that a lack of clarity in the general population prevents a more prevalent embracing of its benefits. It might also be that prejudices, aversions, or capacities play a role in resistance. This study seeks to address these gaps in knowledge by exploring personal understandings of, and resistance to, nonattachment, including the degree to which personal perceptions of nonattachment align with the research community's definition. More specifically, this study aims to identify themes which may be used both for resistance explanatory purposes, and for the consideration of how to embrace nonattachment in the future.

Methods

Design

This study followed a qualitative design, utilizing a primarily deductive analysis through invoking existing theoretical constructs that provided the lens through which data were coded and themed. The focus of meaning tended towards the semantic, accepting the discourse of participants as true representations of their experiences. However, the qualitative framework was also critically orientated, with the analysis focusing on unpacking meaning around the topics (Braun & Clarke, 2021). The theoretical framework held a Social Constructionist perspective throughout, reflecting a consistent effort to analyze overall patterns expressed across the data set.

Participants

Participants were recruited from among individuals attending yoga practice centers in the UK, based on the fact that a degree of pre-existing exposure to contemplative wellbeing principles is typical of the profile of individuals who are likely to engage further with meditative teachings (Simonsson et al., 2020). A link was distributed via a monthly yoga newsletter inviting members to participate in the study. To ensure participants met the study eligibility criteria, they were screened for age (18+), residency within the UK, absence of current diagnosis of mental illness or recent (within three days) use of psychopharmacological recreational drugs. Participants (six female, four male) were between 31 and 76 years old [*M(SD)* = 45.7(13.9)].

Materials

Participants attended a semi-structured interview comprising eight exploratory open-ended questions by which researchers sought to gain an understanding of how the participants understood nonattachment, and what, if any, resistance to it they had. Questions were generated through consultations with two certified life coaches for the purpose of encouraging maximum understanding, engagement, and consideration. The final interview schedule comprised the following:

1. What does nonattachment mean to you?
2. How have you come to that understanding?
3. How does nonattachment show up for you in your daily life?
4. How do you know if nonattachment is a benefit, or if it is a drawback?
5. Are there times you feel an attitude of nonattachment might be problematic?
6. What do you think prevents you from a more nonattached attitude in your life?
7. How do you know when you are experiencing resistance to nonattachment?
8. How do you think you might be able to work through resistance to nonattachment?

Procedure

The Research Ethics Committee of the authors' academic institution, based in the East Midlands, UK, approved the research. The interview lasted for up to 60 minutes depending on participants' communication styles. Participants were interviewed exclusively online via Microsoft Teams and interviews were recorded and transcribed verbatim. The data were manually 'scrubbed' for digital transcription errors, which was considered part of the data familiarization process. All names and identifying information were removed. Qualtrics was used for administering the participant pre-screening form, consent form, and debrief form.

Analytical Strategy

The data were analyzed using the six-step method of Reflexive Thematic Analysis developed by Braun and Clarke (2006, 2019, 2021; see Table 1).

On an interview-by-interview basis, the primary researcher (LT) became familiar with the data to identify diversity of meaning and possible patterning across the dataset. This involved an active meaning making, challenging, and contrasting of items within the dataset. Analytic sensibility was also applied (Braun & Clarke, 2021),

Table 1. Reflexive Thematic Analysis (Braun & Clarke, 2016, p. 12)

Step	Summary
Data Familiarisation	This is an iterative process of transcribing, reading, immersing, and noting initial patterns.
Code generation	Noticing interesting features of the data and beginning the process of systematically coding and organizing these.
Theme generation	Clustering codes into potential themes and gathering all relevant supporting extracts from the data.
Theme review	Critically analyzing whether themes work with the coded extracts, generating a thematic map to understand where themes exist within the wider context of the entire dataset.
Meaning making	Ongoing clarification of the specifics of the theme, generating a clear, representative name/label, and understanding the lens through which meaning has been ascribed to the data.
Reporting	Further analysis of the theme itself and how it addresses the research question and engages with existing literature. Selecting the clearest and most poignant extract examples and producing a scholarly report.

which reflects a process of producing insights into the dataset beyond surface level content, and identifying connections to existing theory, research, and wider contexts. The analytical procedure began with identifying commonly made and meaning-connected statements across the interviews. This was a recursive process with multiple 'takes' demarcated by different coloured notes on printed transcripts. These notes were converted to 'codes' with a description of the meaning each code captured and a note about why that was important to the research. The codes were eventually clustered into themes grouped around a central organizing concept and interpreted through the researcher's knowledge of the data's wider context.

While the researchers acknowledge that no singular interpretation of the data exists, the socially constructed, semantic, and critically analytic approach adopted does not reduce the data to underlying causes or force them into theoretical formulations (Willig & Rogers, 2008). Additionally, methodological integrity may be assessed through fidelity to the subject matter and utility in achieving research goals (Levitt et al., 2018). Furthermore, this approach permitted the researchers to draw on relevant research and theory to add theoretical depth to the analysis. Themes were generated by the primary researcher and cross-checked with the second author for viability and validity. Themes then underwent a process of member-checking to enhance methodological integrity (Levitt et al., 2018), by way of an email sent to all participants detailing a high-level overview of the themes and soliciting feedback. Two of the ten participants offered additional feedback (one by way of a follow up interview) whereby they confirmed a strong level of overall theme agreement.

Results

The data analysis generated four themes as outlined in Table 2:

Theme 1: 'Living by consensus or by senses'

This theme represents societal, cultural, and external pressures, judgements, and expectations that appeared to impinge on participants' understanding and experience of nonattachment. It explores the ways in which participants' personal natures, human condition, own knowing, or personal compass was somehow squashed or contraindicated by a bigger, external force. Participants frequently commented on external forces, which were conveyed as somehow misaligned or even in direct conflict with their own internal knowing and/or desire to experience a state of being nonattached. Participants positioned their intuition, including as it relates to nonattachment, as something not immediately or easily accessible due to these external forces. For example, Participant 3 (P3) stated:

> "It's just the work of understanding yourself more and more to understand better what it is that, where your obstacles are".

Table 2. Thematic Construction

Theme	Explanation	Subthemes	Sample Quote
1. Living by Consensus or Senses	Captures the conflict between culture and personal intuition whereby external forces regularly act to supersede our own internal knowing.	• Context/perspective • Non judgemental • Removing Emotion • Should • Sentimentality • Internal moral compass	"I find their projections onto me as to the way to live their life. Sometimes I feel like I should be more like them".
2. Bracing for impact	Reflects how participants primed themselves for challenges ahead, somewhat similar to a state of hypervigilance.	• Independence from things & people • Acceptance/choice • Managing time • Removing emotion • What we want vs what we get	"I often challenge myself and think, right, you know, what if I lost this? You know, what would it be? The end of the world?"
3. Concept Confusion	Corresponds to a general lack of consensus among participants in understanding what nonattachment is and is not.	• "My" understanding • Experience • Maturity • Learning	"…it would be nice if somehow more of the population was aware and could practice this."
4. Active vs passive surrender – a balancing act	Captures the difficulty of finding the right line to walk between complete surrender to the universe and a continued attachment to steering outcomes.	• Need to control • Pulled by emotion • Intention • Apathy • The Universe's plans	"I personally think that if you were looking around and not just floating around that you can see opportunities a little bit quicker and that you can create a better life for yourself."

P3 speaks to the work of understanding oneself and adopting a more nonattached attitude as something that requires effort, and the obstacles appear to represent cultural forces that interfere with this understanding. This conflict was similarly represented by Participant 6 (P6), who commented as follows:

> "I find their projections onto me as to the way to live their life. Sometimes I feel like I should be more like them".

This appears to represent an idea whereby one's internal knowing, or one's desire to adopt a more nonattached attitude, isn't aligned with a culturally prescribed sense of 'should'. It therefore becomes important to understand more about what this external/socio-cultural force is. Maintaining a Social Constructionist approach to data analysis, it is helpful to see culture defined as a socially constructed concept. Culture is "a loosely integrated system of ideas, practices, and social institutions that enable coordination of a behavior in a population" (Morris et al., 2015, p. 632). Culture can map onto geographic regions, organizations, social classes, ethnicity, gender and sexuality, and much more (Hamedani & Markus, 2019), and it is important to understand that within cultural cycles individuals can influence cultures as much as cultures can influence individuals (Markus & Conner, 2014). However, as cultures are created and maintained by individuals, when they cease to serve diverse or non-dominant perspectives, this can be conceptualized as culture clash. That is, when the institutions of a given culture accrue enough power to influence it more heavily than the individuals themselves, then there is a potential for conflict. When P6 notes, "I find their projections onto me as to the way to live their life", this appears to connect with the idea of a power imbalance between his own sense of knowing, or desire to embrace nonattachment, and the external pressure to conform.

Institutions rich in power in Western society are undoubtedly capitalistic (Lasswell & Kaplan, 2017). This is true of organizations, religions, and governments. Their dominance provides the power to set terms under which other groups and classes should operate (Domhoff, 2018). This idea is touched on by Participant 8 (P8):

> "…Again the programming of our society and Western culture being go go go and just not having the skills, or yeah, the awareness. But there's other ways".

Here, P8 acknowledges the cultural pressure to "go go go" which, in a capitalist society, contributes to ongoing domination by the institutions in power. It would not serve powerful institutions to have members of society pausing to reflect and consider their own knowing, their own moral compass, or even who they really are outside

of the context in which they are culturally situated. Nor would it serve powerful institutions to lose the ability to prescribe a sense of 'should' to individuals. Specific to nonattachment, as it is so clearly connected to an idea of outcomes, or more specifically releasing connection to outcomes, one can see where powerful institutions might be best served when individuals all strive for a continuation of their power.

As cultures can map onto such a wide range of concepts, all of which are themselves arguably socially constructed, (e.g., a country, a gender, an organization; Burr, 2015), it is perhaps worth considering whether resistance to nonattachment might in any way be aided by considering who stands to gain when one acts against one's own knowing. P3 touches on this idea when referencing the work of better understanding what your obstacles are, as does P8 when she mentions not having the necessary awareness.

Theme 2: 'Bracing for Impact'

This theme captures the participant's predilection for either attachment or nonattachment by way of preparing, practicing, or priming for hard times, much like a state of chronic hypervigilance. As well as frequently commenting on anticipating future events and challenges, participants spoke to a practice of preparing for the future. They positioned this practice as something that might help them handle future challenges in a more nonattached way. A particularly salient example of this was offered by Participant 4 (P4):

> "I often challenge myself and think, right, you know, what if I lost this? You know, what would it be? The end of the world?"

Here, P4 conveys a sense of practice through her reference to frequency when she says she will "often challenge" herself. She offers deeper insight into her context and meaning when she shares:

> "I can't imagine my life without her in it um, so again, yeah, challenging those thoughts and how would I be? And I guess in a sense you're kind of then preparing yourself for the outcome if you can kind of learn that in the now […] It's going to help you later on in the event that it happens."

P4 seems to understand in a hard, real world context that a difficult situation looms on the horizon and that embracing nonattachment is likely to help her when the time comes. This seems to draw on an element of attaching to the future, which stands contrary to the true essence of nonattachment, that is, an interaction with experience free of fixation or need for it to be a certain way (Whitehead, 2019). Fixating on or practicing for a future situation, even within the context of reducing attachment to it, is arguably attachment to nonattachment. This forward focused state of bracing or preparing for a time or situation where one might need to adopt an attitude or position of nonattachment appears to parallel hypervigilance. Hypervigilance is a "behavioral, cognitive and physiological state of hyperarousal and alertness for a potential threat" (Kleshcova et al., 2019, p. 1). Threat detection neural circuitry connected with the amygdala is known to mediate the cognitive (increased alertness/threat forecasting) component of hypervigilance (Yoon & Weierich, 2016). Exposure to traumatic events can result in hypervigilance even in the absence of threats (Kimble et al., 2013). Previous experiences inevitably influence how we respond to new situations (Whitehead, 2019). P3 represents this idea as follows:

> "I think it's perhaps trying to recognize those things and recognize why you're feeling a certain way, why you're experiencing life in a certain way based on the experiences that you've had in the past and it's making you act that way."

This reaching back in time to negative events and using them to guide oneself in the present in preparation for inevitable future negative events, when viewed through a lens of hypervigilance, could indicate that nonattachment carries an implicit negativity which may prevent wider adoption. Although nonattachment was consistently viewed by participants as a primarily positive construct, it was not usually positioned as a necessary practice for positive or stress-free situations.

Alternatively, there may exist a process at play similar to amygdala habituation (Kim et al., 2019), in which the adaptation of the amygdala to chronic or repeated stress contributes to an involuntary state of hypervigilance. The key implication of that kind of parallel is the involuntary nature of it. Effectively, it could indicate that 'bracing for impact' is involuntary and therefore precludes some people from a more successful adoption of nonattachment.

Theme 3: 'Concept confusion'

This theme captures a lack of consensus in participants' understanding of nonattachment, what it means, what its antonym is, and a consistent positioning of nonattachment as existing on a scale. Participants generally deemed nonattachment to be a quality one embodies on a sliding scale, not as a binary construct. This is consistent with the existing research regarding the development of the nonattachment scale (Chio et al., 2018; Elphinstone et al., 2020; Sahdra et al., 2010), which captures the extent to which one embodies qualities of nonattachment. Aside from some general confusion around what being nonattached really meant, there were also a variety of concepts against which it was contrasted. Where the definition of nonattachment itself often hovered around the psychological research community's definition of it, it was interesting to observe the variation of antonyms. Consider the following from P8:

> "Most humans in general don't practice nonattachment. I can think of, you know, a handful of friends off the top of my head and my dad, people that are control freaks and I, I'm also one, and I work on it as often as I can but just, you know, it would be nice if somehow more of the population was aware and could practice this."

P8 positions nonattachment as oppositional to control. She speaks to a need to work on moving away from control and towards nonattachment and also notes her experience that most people don't do this, but she indicates that she wishes they would. This differs from Participant 1 (P1), who positions nonattachment as oppositional to expectations of outcome:

> "I'll go and I'll do that for you, not because next time he'll do it for me, but just because it's a nice thing to do for somebody that I love and it helps him."

This differs again from P3 who positions nonattachment as oppositional to judging experiences:

> "…A place whereby events and life can sort of pass through you and by you without, uh, judgements or connecting to those events and thoughts."

These extracts represent a few of several constructs against which nonattachment was contrasted and do not necessarily represent understandings of nonattachment itself. Related to nonattachment itself versus its antonym, Participant 5 (P5) speaks to an understanding of nonattachment which more closely aligns with being 'unattached'. This construct is demarcated in Sahdra et al.'s (2010) research as distinct from nonattachment by way of being detached or withdrawn from one's environment.

> "I look at a situation and be like I don't care anymore. I put too much emotion into it before where it drained me where now the drawback could be where I'm just so unattached that I may have taken it to the extreme or that there's a fine line."

P5 describes her sense of being unattached as something she invokes as a self-protection measure in stressful situations, like a tool in her armory. Participant 9 (P9) also speaks to the conflation of nonattachment and detachment:

> "But I think for many years like nonattachment was kind of co-opted by our own like egoic tendencies and it's like 'Oh you know I'm all spiritual and nonattached' but really no, you're just a detached and like spiritual bypassing asshole."

These variances in definition and opposition are important, particularly when viewed from a Social Constructionist perspective because "Without discourse there is no social reality, and without understanding discourse we cannot understand our reality, our experiences, or ourselves" (Phillps & Hardy, 2002, p. 2). Furthermore, the ambiguity around nonattachment's antonym may reinforce the lack of understanding regarding the concept. Antonymy, the mechanism of opposites in language, acts as a key discourse acquisition mechanism from childhood onward (Jones, 2007). Research supports the cognitive importance of antonymy noting that thought works in opposition (Cixous, 1997; Colston, 2019). In other words, if we are unclear on the antonym, we may also be unclear on the original concept.

Theme 4: 'Active Vs Passive Surrender – A Balancing Act'

This theme represents the difficulty of a balancing act associated with surrendering to the flow of life instead of resisting inevitable change and believing or trusting that things will be ok if you let go, accept, and allow (i.e., core principles of nonattachment). In the context of nonattachment, one must be open, but not too open. It is not a contradiction so much as finding the right narrow line to walk and was often labeled "intention" or "being intentional". Participant 8 (P8) explains the surrender quality:

> "I just know without a doubt that when you do surrender and stop resisting, things will turn out better than when you try to control things too much […] realizing that maybe what I'm thinking is best isn't what's best and just kind of letting go and letting life sort of guide you."

P8 expresses a solid belief when she says, "I just know without a doubt" that surrender to the flow of life will yield positive outcomes. She alludes to passive surrender here when she mentions letting life guide you. P8 conveys a position of being all in on nonattachment and how she sees it manifesting as surrender. This is further explained when she says:

> "I think for me the way I think about nonattachment is in terms of surrender and letting go of resistance to what's happening in my life and around me, and yeah, surrender's my main word when it comes to nonattachment."

This passive surrender to go with the flow of life was touched on but somewhat corralled into more of an active surrender by other participants. For example, consider this extract from Participant 10 (P10):

> "I personally think that if you were looking around and not just floating around that you can see opportunities a little bit quicker and that you can create a better life for yourself."

P10 offered this idea within the context of maintaining a sense of direction towards a goal but relinquishing a tight grip on a specific outcome. This is clarified when she says:

> "I think it can be negative if you're attached to nonattachment, so if you're just floating through life, using it like, well, life will provide or what will be will be without having a conscious position in your life."

In one of the few clear positionings of nonattachment as potentially negative in some situations, P10 offers interesting insight into how she feels that it could be taken too far, and that a certain amount of active engagement is still necessary. Finding the right balance was typically positioned as a work in progress. This is represented by Participant 7 (P7):

> "…And it always comes back to self, coming back to center and paying attention and being intentional about those things, right? …Those things are definitely tools and definitely get more refined through practice and in daily life."

Here, P7 is describing his conscious use of intention as a tool for walking the line between active and passive surrender. He conveys a sense that a certain awareness or conscious intentionality is invoked, and these are practices requiring effort to become more refined. This idea loosely connects with those of Prebish (1975) and Hidas (1981) in which transcendence of ego states can involve effort, which may be an opening to the totality of the self, known in psychotherapy as surrender. However, it does not appear to be positioned as a painful shattering of sense of self, or as an adoption of emptiness, which is said to most characterize surrender (Hidas, 1981). Here, the effort seems more closely aligned with the practice of walking a tightrope. The intentionality and effort align with the idea of habituation, although clearly not in the involuntary sense as seen in bracing for impact, but in the practice of work one might associate with habit building such as cycling for cardiovascular health (Clark et al., 2007).

Discussion

This study sought to address a research gap by qualitatively exploring perceptions and personal understandings relating to the potential for nonattachment to foster mental health. The primary outcomes of the analysis indicated a general lack of consensus in understanding the definition of nonattachment, along with themes of (i) external forces clashing with internal knowing, (ii) a potentially implicit negativity associated with bracing for impact, (iii) and the difficult task of determining how completely one ought to embrace nonattachment. Each of these individually or in combination might contribute to an explanation of resistance to nonattachment. Additionally, the effects of researcher conceptualisation, coding, and meaning making must be acknowledged (Braun & Clarke, 2021). As a female immersed in the field of STEM, the first researcher is sensitive to concepts connecting with intuition (internal knowing), and systemic or cultural biases arising from patriarchal design, which may have informed meaning making within the first theme.

A novel finding was that in addition to a general lack of consensus regarding the definition of nonattachment, there are also undertones of potential negativity toward adopting an attitude of nonattachment in daily life. All participants referenced a conflict between external forces and internal knowing, which might be understood through the lens of adult development models. Criticized as too heavily influenced by social forces (Levenson et al., 2001), Sociogenic models challenge the premise that adult development occurs in universal developmental stages. They focus instead on pathways of adult development influenced by culture, social structure, and social interaction (Ardelt & Grunwald, 2018; Dannefer, 1984). The goal of adult development within Sociogenic models is to overcome social injustices to allow individuals to reach their full potential (Dannefer, 2015). From this perspective, institutions with enough power to influence thoughts and behaviors in individuals become the targets of advanced psychological development and therefore cannot be expected to cede power back to personal intuition, which is the crux of the conflict of theme 1. Sociogenic models have been criticized as being more Social Learning Theory than Adult Development Theory (Levenson et al., 2001). This is interesting in the context of the current research because where socialization teaches us how to function within our cultures, adult development may actually be the transcendence of the socialized or socially constructed self (Levenson et al., 2001). Arguably, this self is the very thing to which we are striving to become nonattached. Therefore, within a sociogenic framework, true nonattachment may not be attainable at all.

Adult Development Theory (Levenson & Crumpler, 1996) may also frame the difficulty of determining how completely one ought to embrace nonattachment. Conceptualized as active versus passive surrender, theme four generated insights related to navigating a fine line between choosing to let go completely or taking a more active role. Participants drew upon a variety of experiences and representations to illustrate their navigation, while using language such as 'surrender', 'go with the flow', 'accept' and 'allow' to signal thoughts around this concept. A qualitative link was also evident between how participants used passive surrender language and their age. That is, older participants tended to attenuate or confine their constructions of nonattachment less than younger participants; older participants used language that indicated more comfort with embracing nonattachment completely.

This remains consistent with existing research indicating nonattachment being positively associated with age (Mahlo & Windsor, 2021). It may therefore be that an ontogenetic framework of stage progression offers better insight into resistance to nonattachment. For example, Erikson (1963) outlines eight psychosocial crises to be resolved over a lifespan so that one may progress to the next developmental stage. Resolving the crisis of each stage contributes to all future crisis resolution. Failure to resolve any one crisis, therefore, may halt future stage progression. This framework is interesting because it fixes the first four stages in childhood and connects them firmly to traditional Western conceptualisations of attachment (e.g., Bowlby, 2004). This could account for some of the concept confusion related to nonattachment and its antonym. Additionally, crises are known to precipitate the therapeutic work of surrender (Hidas, 1981) and therefore crises corresponding with ontogenetic stages like those of Erikson (1963) may be catalysts for the adoption of nonattachment. This echoes findings by Whitehead et al. (2020) related to post-traumatic growth.

The findings represented by theme 2 also yielded a conceptual parallel between an involuntary state of neurological bracing for impact (hypervigilance) and mental or emotional bracing for impact. Participants frequently referenced time frames beyond the present and positioned 'current' mental states as directly influenced by prior experiences. Although this may constitute an involuntary state, comparable to a process like amygdala habituation (Kim et al., 2019), it may also be a changeable state, like neuroplasticity: the brain's ability to adapt and

modify neural pathways through thoughts, actions, and experiences (Constandi, 2016). If so, it becomes a question of how to encourage or facilitate the practice of adopting a nonattached attitude or making it habitual. This could be difficult because as noted, participants generally positioned nonattachment as a helpful practice for negative more so than positive situations.

Habit Theory maps onto a wide variety of thoughts, behaviors, and processes (Clark et al., 2007), although generally, the process of habit forming occurs through a gradual shift towards intentional automatic processes and away from conscious cognitive control (Nilsen et al., 2012). Conscious thought and habit can act together to support intentional changes (Clark et al., 2007) much like exercising to get fit, or making better nutritional choices to become healthier. These are practices and involve consistent effort, which participants signaled by employing language such as 'striving' and 'work' in relation to adopting nonattachment. None of the participants discussed an attitude of nonattachment as something easy, or as a default position. On the contrary, most spoke to external socialization factors as their primary guidelines for how to operate in the world. Nonattachment was something to be worked towards or habituated. The challenge in using Habit Theory to facilitate the adoption of nonattachment is that "habitual behaviors are inextricably linked to the cues or contextual features that give rise to them" (Hagger, 2018, p. 4). That is, habits are most successfully adopted with contextual consistency. The variety of situations in which an attitude of nonattachment might be adopted is extensive. This could offer a partial account for why an attitude of nonattachment may be so difficult to adopt.

Analysis also revealed a general lack of consistency in understanding the definition of nonattachment (i.e., theme 3). While this has already been discussed within the context of the lexical paradigm, it is worth revisiting Action Identification Theory (AIT; Parkin et al., 2015) to consider whether it might yield any further explanatory benefit. AIT holds that the identities to which one subscribes in combination with their understanding of an action, such as embracing nonattachment, and their ability to maintain the action, are the determinants of whether that action is produced (Parkin et al., 2015). Within the current context, it could therefore be that due to individually constructed definitions of nonattachment, individuals cannot truly adopt it. That is, unless an individual's understanding of what it means to embrace nonattachment is accurate, they may be unable to do so. The challenge here is that AIT assumes a realist perspective of a knowable truth in the definition of nonattachment. The solution to this cannot lie in an ontological shift towards realism because of the clear variety in conveyed understandings of the concept.

Along similarly challenging lines stands the balancing act of how completely one ought to embrace nonattachment. As discussed, too little may negate the benefits, but too much may steer us dangerously close to a definition of asceticism the world has moved on from, and risk too passive a state of surrender. In fact, even within the cultural context of ancient Eastern contemplative traditions – where emphasis was placed on a decentred conception of the self and its corresponding objects of attachment – there are documented concerns that an over or incorrect adoption of nonattachment could lead to nihilistic or nonchalant attitudes (Shonin et al., 2014). Therefore, as evidenced by theme 4, given the fact that the study was conducted in a country which largely follows an individualistic culture, it is perhaps unsurprising that participants were aware of the risks associated with overly embracing nonattachment. The tricky task of navigating the 'right amount' of a behavior, virtue, or attitude is not new. Eastern philosophy, through Confucius, offers the principle of *Jen tau* meaning 'the way of man' to describe the right balance to strike in any given behavior or virtue (Lawrenz, 2021). For Confucius, to be truly virtuous, one must be ready to release cravings should one be unable to satisfy them, which is said to be much better than clinging. In Western philosophy, through Aristotle, we are offered the principle of the Golden Mean. Essentially, we must all face a choice about how completely to embrace a behavior or virtue, and the right choice is the mean of excess and deficiency (Lawrenz, 2021). However, the mean remains relative to each individual and does not exist as an objective (realist) knowable absolute (Lawrenz, 2021). While this favors a constructionist or relativist theoretical framework for discovery over a realist or essentialist approach, it fails to provide an explanation of resistance to nonattachment beyond essentially positioning the construct as objectively unknowable.

Findings from this study also suggest that participants harbored a degree of implicit negativity toward nonattachment due to a state of mental or emotional hypervigilance. These findings offer unique and novel insights into the ways that a seemingly positive construct might be experienced in a negative manner due to the perceived need to 'brace for impact'. While embracing nonattachment might feel right, good, or necessary, it remains a behavior or attitude which is discussed as most important for any negative situations on the horizon. Furthermore, little practical guidance exists to support people on their path to the right amount of nonattachment adoption. The

fine line is hard to find, despite existing research linking cognitive and experiential pathways to the adoption of nonattachment (Whitehead et al., 2020).

Strenghts and Limitations

While critics have argued that qualitative research can leave out contextual sensitivities and focus too heavily on participant meaning and experiences (Silverman, 2014), this was mitigated to a certain extent by a more critically analytic theoretical framework (Braun & Clarke, 2021), which connected interview data to existing theory and research to account for context. As with most qualitative studies, concerns around sample size, and therefore generalisability, arise (Harry & Lipsky, 2014; Thompson, 2011). For this reason, the current study may be considered preliminary. Qualitative researchers have argued, however, that the unit of attention as the phenomenon under investigation is more meaningful than the number of participants, and therefore the sample is arguably much larger than it appears (Darlington & Scott, 2002). Lastly, with a qualitative approach, participants themselves have greater influence over the nature of analysis (Rahman, 2016), which was appropriate within the context of a search for explanatory themes.

Another potential limitation of the study included the participant sample being solicited from a somewhat narrowly defined community. Specifically, members of the UK yogic community were targeted for interview on the premise that they may be more likely than others to have previously considered the topic. This limits generalisability and future research may benefit from investigating a more varied cohort base to limit the potential for sample selection bias. Furthermore, all interviews were conducted online instead of in person. Research on the true efficacy of online qualitative data collection still remains in its infancy (Archibald et al., 2019), and therefore answers may have been skewed by the environment or platform of exchange. Given that the scope of the current research had been limited to exploring resistance to nonattachment, future research may benefit from investigating affinity or desire to embrace nonattachment.

A critical element of Reflexive Thematic Analysis involves taking into consideration the researcher's effect on the process (Braun & Clarke, 2021; Guest et al., 2012). Both authors of this study have undergone yoga and meditation teacher training and subscribe to the general values and principles associated with each. Therefore, notwithstanding the previously outlined steps taken to maximize methodological rigor and validity, this may have informed the generation of codes and code labels where distinct constructs such as surrender often overlapped with nonattachment.

Conclusion, Implications, and Future Directions

Findings of concept confusion and apparent negative implicit bias towards nonattachment have important implications for the wider adoption of nonattachment, and its employment in applied settings. While nonattachment holds a variety of key benefits for mental and physical health, findings from this study suggest that it may be important to assess people's personal understandings of the concept to aid its adoption. Key findings included a general inconsistency in understanding the concept, evidenced by a variation in conveyed understandings. Another key finding was the participants' apparent implicit negativity towards nonattachment, whilst also acknowledging its benefits for accommodating change. These findings have important implications for the wider adoption and application of nonattachment in applied settings.

Key implications suggest that while people may realize the benefits of a more nonattached attitude for mental health, this does not necessarily attract wider adoption. This may be a function of varied understandings, or implicit negative biases toward a loosened attitude of control. Another interesting finding was that age appears to support an easier adoption of nonattachment. Future research may investigate whether this is a function of time, age, life experience, wisdom, or other criteria. Future research may also benefit from investigating affinity toward nonattachment, or what promotes a desire to embrace it. Additionally, given the importance of being able to nurture one's own mental health due to limited public resources, the current study findings may be used to guide self-reflections on nonattachment along with its meaning and potential benefits.

Acknowledgements
We thank the participants who gave so vulnerably and kindly of their time and experiences, and the reviewers of this study.

Funding
The authors received neither financial nor non-financial support for the research (including data acquisition) and/or authorship and/or publication of this article.

Author contribution
Lindsay TREMBLAY: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, writing original draft, writing review and editing.
William VAN GORDON: conceptualization, supervision, writing review and editing.

Declaration of interest statement
The authors declare no conflict of interest.

Ethical statement
The studies involving human participants were reviewed and approved by the University of Derby, College of Health, Psychology and Social Care Research Committee research authorisation number: ETH2021-4458.
All participants engaged in the research voluntarily and anonymously.
The participants provided their written informed consent to participate in this study.
Their data are stored in coded materials and databases without personal data.

Data Availability Statement
The data supporting this study's findings are available to the public.
We have policies in place to manage and keep data secure.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0012

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REVIEW ARTICLE

Assessing Your Strengths – Hungarian Validation of the 24-Item Values in Action Inventory of Strengths on a Large Sample

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History
Received: 31 May 2023
Accepted: 11 September 2023
Published: 27 October 2023

Citation
Zábó, V., Oláh, A., Erát, D., & Vargha, A. (2023). Assessing Your Strengths – Hungarian Validation of the 24-Item Values in Action Inventory of Strengths on a Large Sample.
European Journal of Mental Health, 18, e0012, 1–16.
https://doi.org/10.5708/EJMH.18.2023.0012

Introduction: Several studies have shown the inconsistent factorial structures of the Values in Action Inventory of Strengths between cultures.
Aims: This paper describes an adapted Hungarian version of the 24-item Values in Action Inventory of Strengths for adults.
Methods: Participants in three online self-report questionnaire-based cross-sectional studies (Σn = 10,911) filled in the 24-item Values in Action Inventory of Strengths, the Global Well-being Scale, Huppert's and Diener's Flourishing Scales, and the Positivity Scale.
Results: The exploratory factor analyses provided evidence for four factors: Wisdom and Knowledge; Humanity; Temperance; and Spirituality and Transcendence. The scales showed excellent internal consistency values in each study. The confirmatory factor analyses of the subsamples also showed a good fit. Low discriminant but excellent content validity was proved. Participants rated themselves highest on Humanity and lowest on Temperance. Women reported significantly higher values on both the Humanity and the Spirituality and Transcendence virtue scales than did men. The Wisdom and Knowledge virtue showed a positive correlation with education level. Among those living alone, Humanity was significantly lower, while the level of Humanity among married people stood significantly higher than in any other group.
Conclusion: Our results suggest that the Hungarian version of the 24-item Values in Action Inventory of Strengths for adults serves as a suitable measure for assessing character strengths and virtues.

Keywords: character strengths, virtues, mental health, positive psychology, positive psychology assessment measure

Introduction

Our study presents the psychometric properties regarding the Hungarian version of the 24-item Values in Action Inventory of Strengths (VIA-H), which is a new, short measure of character strengths (Furnham & Lester, 2012). We also describe the interrelationship among character strengths, virtues, mental health, and demographic indicators.

ISSN 1788-7119 (online)

Positive psychology has been defined as the science of happiness and human strengths (Seligman & Csíkszentmihályi, 2000). The goal of this new psychological trend in the twenty-first century is to promote human flourishing at individual, community, and institutional levels (Seligman, 2002, 2011). It aims to contribute toward sustainable positive functioning by encouraging the use of personal strengths, developing individual strategies that preserve happiness, and improving positive institutions. One of the most significant results produced by the movement involves the creation of the taxonomy of virtues and character strengths (Dahlsgaard et al., 2005; Peterson & Seligman, 2004).

The Values in Action Inventory of Strengths (VIA-IS; Peterson & Seligman, 2004) classifies positive character traits and virtues according to a hierarchical system. Virtues are abstract cultural principles that, regardless of time, location, or culture, are indicators of a "well-lived life." The six overarching virtues endorsed by almost every culture worldwide are Wisdom and Knowledge, Courage, Humanity, Justice, Temperance, and Spirituality and Transcendence (Peterson & Seligman, 2004). Virtue must also be demonstrated in a person's behavior for them to be considered truly virtuous. Behavioral manifestations of these six virtues are referred to as character strengths, which can be measured as psychological variables. Peterson and Seligman (2004) identified 24 character strengths in total. One character strength example is integrity, which includes the positive character traits of honesty, authenticity, and trustworthiness.

The importance of studying character strengths lies in their positive relationship to physical (Ai et al., 2022; Weziak-Bialowolska et al., 2021), emotional (Azañedo et al., 2021; Wagner et al., 2020; Weziak-Bialowolska et al., 2021), social (Azañedo et al., 2021; Wagner et al., 2020; Weziak-Bialowolska et al., 2021) and spiritual (Ai et al., 2022; Jacobs et al., 2021) aspects of well-being. The character strengths of curiosity, enthusiasm, love, gratitude, and optimism consistently reveal strong correlations with subjective well-being (Wagner et al., 2021). In addition, integrity, persistence, kindness, social intelligence, self-control, and humor have a strong positive correlation with general psychological well-being (Hausler et al., 2017). By acting and thinking according to our character strengths, we can therefore contribute to our own well-being and that of our peers (Wagner et al., 2020; Weziak-Bialowolska et al., 2021). The authors of a longitudinal study for these linkages reported that character strengths remain stable over a longer period, meaning that the correlations between strengths and aspects of well-being are not merely cross-sectional phenomena (Gander et al., 2020).

Furthermore, research and meta-analyses have shown a positive correlation between strengths and satisfaction with life (Baumann et al., 2020; Blasco-Belled et al., 2018; Hassaniraad et al., 2021; Schutte & Malouff, 2019; Lee et al., 2021). Empirical results have also demonstrated the general relevance of character strengths not simply in terms of well-being and life satisfaction but also in terms of flourishing (Cherif et al., 2020; Hausler et al., 2017; Green, 2022; Wagner et al., 2020; Wagner et al., 2021; Weziak-Bialowolska et al., 2021) and other desirable consequences, experienced in different areas of life (e.g., the workplace: Harzer & Ruch, 2014; Heintz & Ruch, 2019; and education: Lounsbury et al., 2009; Wagner & Ruch, 2015). Finally, studies have shown that character strengths are predictors of resilience (Blanchard et al., 2021; Martínez-Martí & Ruch, 2017; Shoshani & Slone, 2016) and contribute to the reduction of psychological vulnerability by mediating resilience (Demirci et al., 2021). In sum, the possession of strengths and virtues leads to positive mental health and high (subjective) quality of life.

To our knowledge, 14 cross-cultural adaptations of the original Values in Action Inventory of Strengths exist in the empirical literature (Peterson & Seligman, 2004). Several abbreviated versions of the original 240-item questionnaire (containing 24, 48, 72, 96, 120, and 192 items) have also been developed (see, e.g., Furnham & Lester, 2012; McGrath, 2019; Neto et al., 2014; Peterson & Seligman, 2004). However, the results of questionnaire measuring character strengths and virtues by factor analyses indicated solutions with varying numbers of factors (virtues) that deviate from the classification proposed in the original VIA model (Peterson & Seligman, 2004); this model defined six virtues and certain character strengths associated with them. Results highlight potential inconsistencies that merit attention. According to these studies, solutions with three factors (Brdar & Kashdan, 2010; Duan & Bu, 2017; Shryack et al., 2010), four factors (Macdonald et al., 2008; McGrath, 2015; McGrath & Walker, 2016; Park & Peterson, 2006; Shryack et al., 2010), five factors (Azañedo et al., 2021; McGrath, 2015; Park & Peterson, 2006; Peterson et al., 2008; Ruch et al., 2010), six factors (Furnham & Lester, 2012; Leontopoulou & Triliva, 2012; Ng et al., 2017; Ruch & Proyer, 2015; Ruch et al., 2010), and seven factors (Furnham & Lester, 2012) are equally possible.

A Hungarian version of adult strengths measures has not yet been developed. The purpose of our study was therefore to examine the reliability and validity of a 24-item strengths measure developed by Furnham and Lester (2012) on a Hungarian adult sample. An additional goal consisted in providing further evidence for the positive correlation of character strengths and virtues with markers of mental health (prosperity, well-being, positivity, and

psychological immune system). The study also explored the relationship between virtues and sociodemographic indicators among the Hungarian adult population.

Methods

Sample

Three online self-report questionnaire–based cross-sectional studies (Σn = 10,911) were conducted to confirm the factor structure of the VIA-H (Σn = 10,911). Data collection was carried out in the framework of the 2019, 2020, and 2021 research stages of the Happiness Map of Hungary program using convenience sampling.

In all three cases, the same 123-item questionnaire package, which can be filled out on an online platform created specifically for this purpose, was used for data collection. The link was shared via email, as well as on social media platforms (Facebook, LinkedIn) that are frequently visited by adults with diverse demographic characteristics (age, occupation) and varied interests.

Since online data collection was used, the sample cannot be considered representative of the Hungarian population. Participation in the study was voluntary and anonymous; the participants gave their informed consent and did not receive compensation of any kind. The first wave of data collection took place in January-March 2019, the second in January-March 2020, and the third in January-March 2021. The Research Ethics Committee at the Faculty of Education and Psychology of Eötvös Loránd University granted ethical approval for the study (permission numbers: 2015/284, 2017/285, and 2019/61).

Study I consisted of 4,614 Hungarian adults (988 men and 3,626 women) (see Appendices Table A). Although the sample consisted predominantly of women (78.6%), it included a sufficiently large number of men (988) to make it heterogeneous enough to draw valid conclusions regarding the VIA-H. The mean age was 42.91 years (*SD* = 16.02). The sample was also balanced in terms of settlement type and in each profession category. More than 94% of the respondents had graduated from high school. With respect to marital status, 73.7% of the sample were living in a relationship (40.3% of whom were married). More than half the sample (60.6%) had children. Half the respondents (54.5%) were employees, although the sample also included a significant proportion of pensioners (14.8%). Most of the participants (67.4%) considered their financial situation to be average, although a significant proportion also existed who considered themselves to be well-off (21.7%). A small proportion of respondents described themselves as poor (1.9%) or rich (1.2%).

Study II comprised 3,029 Hungarian adults (842 men and 2,187 women) (see Appendices Table A). Although most of the respondents (72.2%) were women, there were sufficient men (842) for the results to be generalizable. The average age came to 49.69 years (*SD* = 14.73). The sample was also balanced according to settlement type, and the number of respondents exceeded 400 in each profession category. More than 97.9% of the respondents had graduated from high school. With respect to marital status, 77.4% were living in a relationship (52.6% of whom were married). Most of the respondents (72.8%) had children. More than half (53.9%) were employees, although there was also a significant proportion of pensioners (25.9%). Most respondents (67.7%) considered their financial situation to be average, although a notable proportion (17.0%) declared themselves to be well-off. A small proportion of respondents declared themselves to be poor (2.6%) or rich (1.1%).

Study III consisted of 3,268 adult Hungarians (681 men and 2,587 women) (see Appendices Table A). Most of the respondents (79.2%) were women, although the number of men (556) in the sample stood large enough for valid conclusions to be drawn. The average age of the sample came to 48.64 years (*SD* = 16.12). The sample was balanced according to settlement type and profession category. Nearly all the respondents (96.8%) had graduated from high school. With respect to marital status, 79.1% of the sample were living in a relationship (55.5% of whom were married). More than half the respondents had children (73.2% of the sample) and were employed (55.9% of the sample), although there were also a significant proportion of pensioners (23.6%). Most respondents (70.9%) considered their financial situation to be average, although a notable proportion (17.4%) declared themselves to be well-off. A small proportion of respondents declared themselves to be poor (2.3%) or rich (0.7%).

Respondents who provided complete and valid responses exclusively made up the three samples.

Measures

The same questionnaires were used for data collection in all three cases. Fourteen of the questions referred to sociodemographic data (gender, age, place of residence, etc., see Appendices Table A). The surveys included the measures described below.

Values in Action Inventory for Hungary (VIA-H)

A short 24-item strengths measure (Furnham & Lester, 2012) measures six universal virtues and 24 related character strength based on the classification devised by Peterson and Seligman (2004). The abbreviated Hungarian name of the measuring device is VIA-H (and not VIA-IS-H), because it is a translation of Furnham and Lester's (2012) measurement, which is not derived directly from the VIA-IS measurement tool developed by Peterson and Seligman. The shortened, 24-item version was translated into Hungarian using the standard translation/back translation procedure (Brislin, 1986). Two independent translators carried out the rendition from English to Hungarian, after which a language expert with a degree in English created a version by combining the two translations back into the original language. The shortened Hungarian questionnaire measures the 24 character strengths on a six-point Likert scale (1 = not typical at all to 6 = completely typical), with one positive item prototypically representing each strength.

Global Well-being Scale

The Global Well-being Scale (GWS, Oláh, 2019; Oláh et al., 2020) is a measuring tool that operationalizes the holistic bio-psychosocial-spiritual model of well-being that employs the Emotional, Psychological, Social, and Spiritual subscales. It emphasizes that complete well-being requires functioning well in all aspects of one's human nature while feeling comfortable with oneself. The questionnaire contains 17 items, which the respondent rates on a six-point Likert-type scale (1 = not typical at all to 6 = completely typical). A higher score on the subscales indicates a higher degree of global well-being. The theory of global well-being was confirmed using confirmatory factor analysis (CFA) on a Hungarian sample by Oláh, Vargha, Csengődi, Bagdi, and Diósi in 2020 (12,378 men and women, average age: 44.4 [*SD* = 14.5] years; SRMR = .038; RMSEA (CI90) = .064 (.063–.066); CFI = .949; TLI = .936). High Cronbach's α values (Oláh, 2016) confirmed the internal reliability of the subscales. The structural validity and internal reliability of the GWS on the 2019–2022 pooled sample of the Happiness Map of Hungary program (Σn = 11,914) were confirmed by the results of the CFA (SRMR = .034; RMSEA (CI90) = .064 (.063-.066); CFI = .953; TLI = .942) and internal consistency indicators (see Table 1).

Diener's Flourishing Scale

The eight-item Diener's Flourishing Scale (Diener et al., 2010) operationalizes an improved version of Diener's subjective well-being concept, in which – in addition to life satisfaction and the dominance of positive emotions – the need for competence, optimism, contribution to the well-being of others, life purpose, self-esteem, and positive relationships is highlighted. Items (e.g., "I have a purposeful and meaningful life") are evaluated on a seven-point Likert-type scale (1 = not typical at all to 7 = completely typical). A higher score on the scale indicates positive mental health. The internal reliability of the unidimensional Diener's Flourishing Scale was supported by the internal consistency indicators (Σn = 11,914) obtained from the 2019-2022 pooled sample of the Happiness Map of Hungary program (Σn = 11,914) (see Table 1).

Huppert's Flourishing Scale

Huppert's Flourishing Scale (Huppert & So, 2013) measures the indicators of positive mental health and flourishing: emotional stability, commitment, meaning, optimism, positive emotions, positive relationships, resilience, self-esteem, and vitality. From the nine-item questionnaire, seven items are graded on a five-point Likert-type scale (endpoints: 1 = not typical at all, 5 = completely typical), and two items ("I was full of energy last week" and "I felt calm and peaceful last week") are graded on a four-point Likert-type scale (endpoints: 1 = not typical at all, 4 = completely typical). A higher score on the questionnaire indicates positive mental health. The internal

Table 1. Cronbach's α and McDonald's ω Values Showing the Internal Consistency regarding the Scales of the Questionnaires used in Studies I, II, III and in the pooled sample

Scale, Subscale		Cronbach's α				McDonald's ω			
		Study I (*n* = 4,614)	Study II (*n* = 3,029)	Study III (*n* = 3,268)	Pooled sample	Study I (*n* = 4,614)	Study II (*n* = 3,029)	Study III (*n* = 3,268)	Pooled sample
Global Well-being Scale	Emotional well-being	.90	.92	.92	.913	.91	.93	.92	.91
	Psychological well-being	.85	.88	.87	.867	.85	.88	.87	.87
	Social well-being	.88	.88	.89	.883	.88	.89	.89	.88
	Spiritual well-being	.89	.89	.90	.891	.89	.89	.90	.89
Diener's Flourishing Scale		.93	.93	.94	.931	.93	.93	.94	.93
Huppert's Flourishing Scale		.87	.87	.87	.808	.85	.86	.85	.85
Positivity Scale		.90	.87	.87	.869	.90	.86	.86	.90

reliability of the unidimensional Huppert's Flourishing Scale was supported by the 2019-2022 pooled sample of the Happiness Map of Hungary program (Σ*n* = 11,914) (see Table 1).

Positivity Scale

The eight-item Positivity Scale (P Scale, Caprara et al., 2012) measures the disposition to view life and experiences positively. Respondents evaluate the items (e.g., "I look at my future with enthusiasm and hope") on a five-point Likert scale. In several studies (Oláh et al., 2018, 2019, 2020), the Positivity Scale has already been applied to a Hungarian sample. The publication of the Hungarian version adapted to a large sample and with excellent reliability indicators is under preparation.

The above scales all showed excellent internal reliability: Cronbach's α and McDonald's ω values above .74 were obtained in Studies I, II, and III (Table 1).

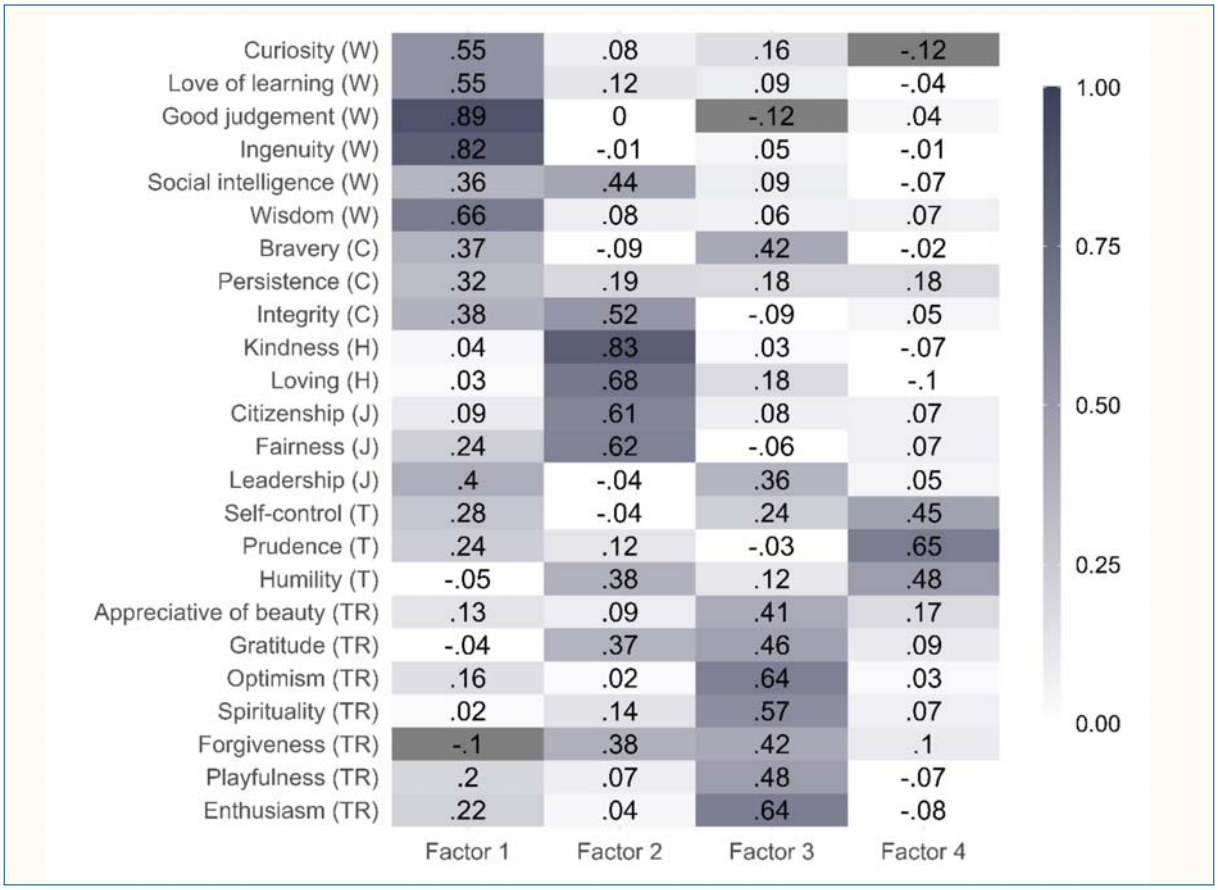
Statistical Analysis

Statistical analyses were performed using Mplus (Muthén & Muthén, 1998-2011), ROPstat (Vargha, 2016), and ROP-R (Vargha & Bánsági, 2023) statistical software. To analyze the internal structural validity of the 24-item VIA-H, we calculated the items' intercorrelations and then conducted an exploratory factor analysis. For further analyses, we created four mean scales based on the 20 items that clearly belonged to each of the four factors and checked the internal consistency of the scales indicated by Cronbach's α and McDonald's ω values. To verify the four-scale solution, we conducted confirmatory factor analyses on Samples I, II, and III and the Pooled Sample. We tested the external and content validity of the VIA-H by examining the four virtue scales' level of correlation with other often used mental health measures. To analyze discriminant validity, we used multiple linear regression models on the pooled sample. The dependent variables of these models were the four scales of the VIA-H, and the independent variables were the other three scales of the VIA-H in all instances. In the last step of our study, we examined differences along the four scales of the VIA-H among several sociodemographic groups in the pooled sample.

Results

To validate the VIA-IS, we tested structural validity as well as external and content validity, and examined the relationship with sociodemographic indicators.

Figure 1. Factor Loadings of the Original 24 VIA-H Items: Pooled Sample



Note. We based the factor analysis on robust maximum likelihood estimation with geomin rotation. Our interpretation of the factors is based on the weight above 0.40, along which the factors differ significantly ($p < .001$). Analyses were run on the pooled sample (n = 10,911) of the three original subsamples. Parentheses indicate the virtues to which the given item belongs in the original measurement tool: W = Wisdom and Knowledge; C = Courage; H = Humanity; J = Justice; T = Temperance; TR = Spirituality and Transcendence.

Structural Validity of the VIA-H

To analyze the internal structural validity of the 24-item VIA-H, we calculated the items' intercorrelations and then conducted an exploratory factor analysis (EFA) to compare our results to the original validity analysis performed by Furnham and Lester (2012). The majority of items (94.0%) had weak to moderate positive intercorrelation (0.30-0.50).

The results of our EFA are presented in Figure 1 in the form of a heatmap. As most items had a non-normal distribution ($p < .001$), we used the Principal Axis factor extraction method with Promax rotation to allow a correlation between individual factors (Hattori et al., 2017). According to multiple fit statistics (see Table 3), our results indicate a four-factor model as the best fit, with a 61.7% cumulative variance explained. The eigenvalues of the first four principal components were: 10.82, 1.68, 1.21, 1.09, and the explained variances after the Promax rotation: 4.03, 3.62, 3.29, and 2.09, respectively. In our interpretation, we assigned a given item to a factor if the loading stood above 0.40. Therefore, our analysis indicates that the items Temperance, Spirituality and Transcendence, as well as Wisdom and Knowledge (with one exception) load to distinct factors. For these, we retained the original nomenclature. Our new, fourth factor, however, which we called Humanity, we created from overlapping items and contains values belonging to the virtues Humanity and Justice and character strength integrity (which in theory belongs under Courage).

On a six-point scale, we observed the highest mean values for fairness [*M(SD)* = 5.12(0.96)], integrity [*M(SD)* = 5.11(0.97)], kindness [*M(SD)* = 5.09(1.01)], loving [*M(SD)* = 5.02(1.10)], and citizenship [*M(SD)* = 4.95(1.11)]. On the other hand, self-control [*M(SD)* = 4.18(1.22)], spirituality (*M(SD)* = 4.40(1.40)], humility [*M(SD)* = 4.42(1.21)], gratitude (*M(SD)* = 4.53(1.16)], and optimism [*M(SD)* = 4.52(1.36)] were rated lowest.

Table 2. Cronbach's α and McDonald's ω Values Showing the Internal Consistency regarding the Scales of the Questionnaires used in Studies I, II, III and in the Pooled Sample

Scale (number of items)	Study I (*n* = 4,614)		Study II (*n* = 3,029)		Study III (*n* = 3,268)		Pooled sample (*n* = 10,911)	
	Cronbach's α	McDonald's ω	Cronbach's α	McDonald's ω	Cronbach's α	McDonald's ω	Cronbach's α	McDonald's ω
Wisdom and Knowledge (5)	.86	.86	.88	.88	.87	.87	.87	.87
Humanity (5)	.86	.87	.88	.89	.88	.88	.88	.88
Temperance (3)	.74	.74	.76	.76	.77	.78	.76	.76
Spirituality and Transcendence (7)	.86	.87	.87	.87	.88	.88	.87	.87

Table 3. Main Model Fit Indices in the Exploratory Factor Analysis and Confirmatory Factor Analysis of the Four-Factor Model of the VIA-H on Studies I, II, and III as well as the Pooled Sample

Model (sample)	RMSEA	RMSEA CI0.90	pClose	CFI	TLI	SRMR
EFA – Pooled Sample (*n* = 10,911)	.059	.058-.060	< .001	.924	.888	.029
CFA – Study I (*n* = 4,614)	.050	.049-.052	.347	.935	.922	.043
CFA – Study II (*n* = 3,029)	.049	.047-.052	.692	.939	.927	.043
CFA – Study III (*n* = 3,268)	.049	.046-.051	.847	.945	.934	.042
CFA – Pooled Sample (*n* = 10,911)	.051	.050-.052	.135	.940	.928	.042

For further analyses, we created four mean scales (with values ranging from 1 to 6) based on the 20 items that clearly belonged to each of the four factors. In Table 2, the measures of internal consistency regarding these new scales (Cronbach's α and McDonald's ω) exhibit adequate consistency for all three subsamples and the pooled sample. Humanity received the highest self-rated scores [*M(SD)* = 5.10(0.85)], followed by Wisdom and Knowledge [*M(SD)* = 4.62(0.85)], Spirituality and Transcendence [*M(SD)* = 4.61(0.93)], and Temperance [*M(SD)* = 4.40(0.97)].

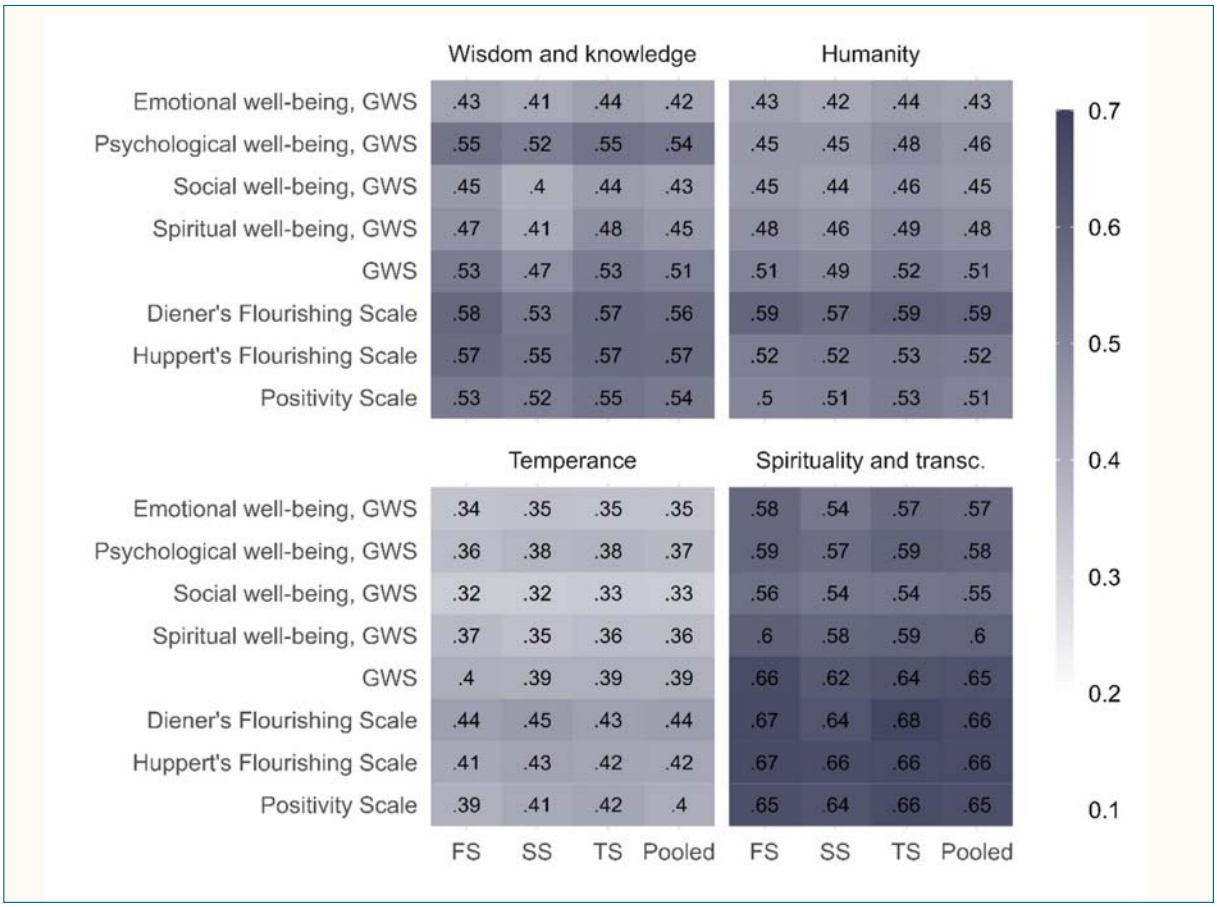
To verify the new four-scale solution based on the 20 items selected according to the EFA as presented above, we conducted a CFA using the maximum likelihood mean variance method to account for the items' non-normal distribution. Because of their high modification index, we included the residual covariance of four items from the Wisdom and Knowledge questions, three from the Spirituality and Transcendence questions, and one from the Temperance questions. We also allowed an item from the Courage questions that loads to the new Humanity factor, to also load to the Wisdom and Knowledge factor. Table 3 shows the fit statistics for the CFAs on the separate and pooled samples. Based on all the available indicators, the fit of the CFA models is adequate (RMSEA < .06, pClose > .05, CFI and TLI close to .95). In short, the CFA verifies the four-factor, 20-item VIA-H solution.

External and Content Validity of the VIA-H

Next, we looked at the validity of our new 20-item VIA-H scales by examining their level of correlation with other often used mental health measures. As the scales of the VIA-H are not normally distributed, we calculated Spearman's rank correlation coefficients. Our results are summarized in Figure 2 in the form of a heatmap.

Firstly, the content of the scale measuring Wisdom and Knowledge correlates strongly with Diener's and Huppert's Flourishing Scales. Secondly, the Humanity scale revealed strong correlations with Diener's Flourishing Scale (which measures positive emotions, optimism, contribution to other people's well-being, self-respect, and positivity), Huppert's Flourishing Scale, the Positivity Scale, and the overall measure for the GWS. Other correlations were of medium strength. Thirdly, medium-level correlations were found between Temperance and the two flourishing scales, the Positivity Scale, and the GWS. Fourthly, the Spirituality and Transcendence scale also correlates well with the GWS, the flourishing scales, and the Positivity Scale. Taken together, these results confirm the validity of the VIA-H's four virtue scales.

Figure 2. Correlations of the Virtues Scales of the 20-Item VIA-H with Other Scales and Subscales (Spearman's Rank Correlations)



Notes. All the presented correlation coefficients are statistically significant ($p < .001$). FS = first sample (n = 4,614); SS = second sample (n = 3,029); TS = third sample (n = 3,268); Pooled = Pooled sample (n = 10,911).

Discriminant Validity of the VIA-H

Lastly, to analyze discriminant validity, we used multiple linear regression models on the pooled sample. The dependent variables of these models were the four scales of the VIA-H, and the independent variables were the other three scales of the VIA-H in all instances. The adjusted R-square values (demonstrating the proportion of explained variance) were .459, .779, .416, and .604, with an average value of .431 for unexplained variance. Altogether, these results show that the unexplained, unique variance of the four major scales of the VIA-H stands fairly low and is probably due to the high levels of correlation between the items that are the building blocks of the VIA-H scales. The lowest level of uniqueness belongs to the Humanity factor, followed by Wisdom and Knowledge, while the highest level belongs to Temperance, with Spirituality and Transcendence being in the middle.

The VIA-H and its Linkage to Sociodemographic Indicators

In the final part of our study, we examined differences along the four scales of the VIA-H among several sociodemographic groups in the pooled sample. We revealed significant differences ($p < .001$ in all cases) between genders (Table 4), most notably between values for the Humanity and Spirituality and Transcendence factors.

Additional differences were found with respect to age group, educational attainment, number of children, occupation, and economic status, although the effect size was often small ($P < |0.20|$, $R^2 < 0.06$, $\omega^2 < 0.01$, $\eta^2 < 0.01$; University of Cambridge, 2023). Two exceptions should be highlighted: first, Wisdom and Knowledge were positively associated with educational attainment ($P = 0.211$, $p < .001$), and Humanity remained relatively low for single persons compared to those who were in a relationship or widowed, with married persons achieving the highest mean value ($p < .001$ according to Games-Howell pairwise comparison, [$M(SD)$ = 5.14(0.78)].

Table 4. Results of T-tests with the Four Virtue Scale per Gender

Scales of VIA-H	Men (n = 2,511)		Women (*n* = 8,400)		Comparison of gender
	M	*SD*	*M*	*SD*	
Wisdom and Knowledge	4.752	0.878	4.844	0.837	$t(3,970.8) = -4.627$, $p = .000$, d : −0.108
Humanity	4.813	0.916	5.131	0.809	$t(3,756.0) = -15.641$, $p < .001$, d: 0.378
Temperance	4.269	0.99	4.405	0.964	$t(4,036.5) = -6.095$, $p = .000$, d: −0.141
Spirituality and Transcendence	4.412	0.974	4.682	0.907	$t(3,900.9) = -12.394$, $p < .001$, d: 0.293

Note: d denotes the test statistic of Welch's two-sample robust t-test.

Discussion

In this paper, we have presented the Hungarian version of the 24-item Values in Action Inventory of Strengths for adults (Furnham & Lester, 2012) (VIA-H). The questionnaire's psychometric characteristics were investigated in three adult samples. We also examined the relationship of virtues and character strengths with mental health and sociodemographic indicators.

Similarly to other studies (e.g., McGrath, 2019), the majority of items (94%) had weak to moderate positive intercorrelation (0.30-0.50), verifying the notion that character strengths have a positive correlation among them (Furnham & Lester, 2012; McGrath, 2019).

The structure of the VIA-H was identified using EFA on the pooled sample (see Figure 1 and Table 3) and was also confirmed separately using CFA on the three study samples (see Table 3). According to multiple fit statistics (see Table 3), compared to the classification proposed in the original VIA model (Peterson & Seligman, 2004), which defined six virtues and certain character strengths associated with them, our results indicate a four-factor model as the best fit. Based on the excellent internal consistency indicators (see Table 2), the four-factor structure (see Figure 3) proved stable both in the pooled sample and the individual subsamples. In summary, the results of the EFA differed from the theoretical expectations (Peterson & Seligman, 2004). However, the EFA corroborated other empirical studies (Dahlsgaard, 2005; Macdonald et al., 2008; McGrath, 2015; McGrath & Walker, 2016; Park & Peterson, 2006; Brdar & Kashdan, 2010; Shryack et al., 2010), which, like ours, also revealed a four-factor structure to be the best fit (see Table 3, row 2).

In order to understand and confirm the unique meaning of the VIA-H scales, five tests were used in the correlation analyses performed on the subsamples and the pooled sample. Wisdom and Knowledge were highly correlated with Diener's Flourishing Scale and Huppert's Flourishing Scale, which indicates that possessing the virtue of Wisdom and Knowledge is closely associated with flourishing in terms of mental health. The strong positive correlations obtained via the psychological well-being subscale of the GWS and the Positivity Scale confirm this result. Based on the correlation demonstrated with Diener's Flourishing Scale and the Positivity Scale, possession of the virtue Humanity is accompanied by the experience of positive emotions, an optimistic attitude towards oneself and the world, healthy self-esteem, positive relationships, and contribution to the well-being of other people. Humanity is

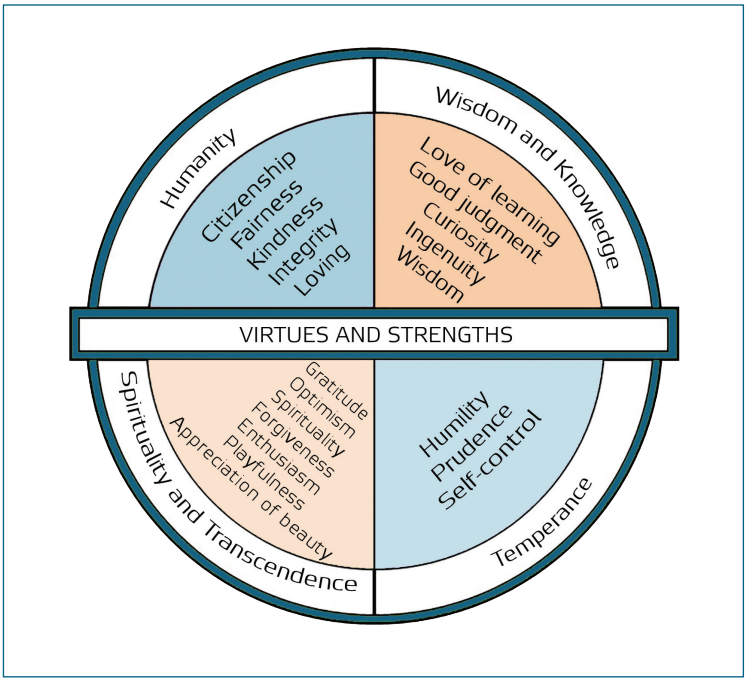


Figure 3. Taxonomy of the Four Virtues and 20 Character Strengths of the Hungarian Adult Sample

closely related to well-being experienced in the biological, psychological, social, and spiritual areas of life. A moderately strong positive relationship was found between the virtue of Temperance and flourishing, positivity, general well-being, and coping. This indicates that leading a happy and balanced life requires humility, prudence, and self-control. The moderately strong correlations and the fact that the value of this virtue came out lowest compared to the other virtues suggest that living according to the virtue of Temperance does not play a central role in positive mental health in Hungarian society. The high correlations of the Spirituality and Transcendence scale with the GWS, and specifically with the Spirituality subscale, as well as with the two flourishing scales and the Positivity Scale, clearly indicate an important correlation between this virtue and positive mental health. All these results strongly confirm the virtue scales criterion validity of the VIA-H. We also examined the scales' discriminant validity using multivariate linear regression. Despite the relatively strong correlations between the virtues scales of the VIA-H, a significant unique part exists in each of the four separate virtue scales (on average 43.1%) that the other three scales do not cover.

The three most typical character strengths in our Hungarian (pooled) sample were fairness, integrity, and kindness. The respondents reported that temperance, spirituality, and appreciation of beauty were the least characteristic of them. The participants in the study considered Humanity to be their strongest virtue, followed by Wisdom and Knowledge and Spirituality and Transcendence. Temperance was rated as the least typical virtue. In contrast to other results, the virtues of Courage (strengths of courage, steadfastness, and integrity) and Justice (strengths of fairness, leadership, and a sense of duty) did not form an independent factor in the Hungarian sample.

The ambivalent and/or relatively distanced relationship between the sample and these latter three virtues and their related character strengths can be explained by the results of research examining the Hungarian nation's state of mind. Based on these findings, our results might be explained firstly by a low level of belief in a just world (Sallay & Krotos, 2004); secondly, by lacking a sense of perceived control and adaptive stress management (Kopp & Réthelyi, 2004; Kopp & Skrabski, 2009; Szabó et al., 2020); thirdly by learned helplessness (Kopp & Réthelyi, 2004; Piko, 2004); fourthly by an ambivalent and negative attitude towards competition (Fülöp, 2008); and fifthly by self-destructive behavior (Piko, 2004).

Regarding the relationship between the four virtue scales and the sociodemographic indicators, we revealed significant differences ($p < .001$ in all cases) between genders (Table 4) thereby corroborating previous evidence (Brdar et al., 2011; Linley et al., 2007). Women reported appreciably higher values for the Humanity as well as the Spirituality and Transcendence virtues. Single people reported a lower Humanity level and married people a higher Humanity level. Correlations with sociodemographic variables suggest the need for further investigations employing a different methodological approach. One such alternative procedure might be an evaluation of situations that activate the 24 character strengths, or an evaluation of the extent to which individual character strengths fulfill the six functions that are related to the virtues (Ruch et al., 2021).

In sum, the measures' psychometric analysis confirmed the four-factor model and the content validity regarding the Hungarian version of the 24-item Values in Action Inventory of Strengths via the help of three large samples. Importantly, the Hungarian four-factor structure is in line with the results of other studies (see, e.g., Kor et al., 2019). Moreover, based on our results, the present study stands in line with research undertaken in other countries (Singh & Choubisa, 2010; Ruch & Proyer, 2015; Ruch et al., 2021), in which it has been proposed to revise the assignment of the positive character strengths to the virtues due to the inconsistency of the empirical results with the theoretical concepts.

Strenghts and Limitations

The study benefits from a large sample size, which enhances the findings' generalizability and increases confidence in the questionnaire's validity. Although the research did not validate the VIA-IS developed by Seligman and Peterson (2004), but rather Furnham's and Leister's questionnaire (2012), a short scale is available for research in Hungary, which allows for efficient data collection and potential application in various research and practical settings. The practical nature of the instrument is also among the study's benefits.

The present study is not without limitations. The cross-sectional research design does not permit us to draw causal conclusions, although the correlations can inspire future developmental and longitudinal studies. The VIA-H, like all self-report questionnaires, remains to a certain extent liable to the respondents' conscious and unconscious response tendencies. In addition, the VIA-H should be validated using data other than those collected online by means of self-report questionnaires. The reliance on convenience sampling may introduce potential bias and may limit the findings' generalizability. Although all our samples were large and the factor structure of the

VIA-H stayed very firm in both the EFA and CFA, it would be worth confirming this structure by conducting analyses on new, independent samples. The women's representation in the sample limits the generalizability of the questionnaire's findings to a broader population. Future studies should aim for more balanced, more diverse and representative samples in order to enhance the questionnaire's external validity and to ensure the questionnaire's applicability to both men and women.

Conclusion, Implications, and Future Directions

The Hungarian 20-item version of the Values in Action Inventory of Strengths for adults (VIA-H) proved to be a reliable and valid tool for measuring character strengths and virtues. The virtue scales of the VIA-H (Wisdom and Knowledge, Humanity, Temperance, and Spirituality and Transcendence) contain five, five, three, and seven items respectively (see Appendices Table B). The value of each virtue subscale is defined as the average of the items in the scale. The questionnaire measures character strengths and virtues with a short completion time of 10-12 minutes. Another important advantage of the test is that it works as a brief, easy-to-use, and economical measuring tool. As a result, researchers can use it in epidemiological surveys, as well as in the case of large-scale, representative survey programs. The important message to be gleaned from the obtained results is that the possession and appropriate use of character strengths goes hand in hand with the constructs of well-being, happiness, and optimal personality.

Funding
The present study was supported by a research grant from the Faculty of Humanities, Károli Gáspár University of the Reformed Church in Hungary (Person- and Family-Oriented Health Study, grant number 2018/20643B800), by the National Research, Development, and Innovation Office of Hungary (grant number K 116965), and by the New National Excellence Program of the Ministry for Innovation and Technology from the National Research, Development, and Innovation Fund (grant number ÚNKP-21-3).

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Declaration of interest statement
The authors declare no conflict of interest.

Ethical statement
All participants engaged in the research voluntarily and anonymously.
The participants provided their written informed consent to participate in this study.
Their data are stored in coded materials and databases without personal data.

Data Availability Statement
The data supporting this study's findings are available to the public.
We have policies in place to manage and keep data secure.

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Appendix

Table A. Demographic Characteristics of Participants in Study I (*n* = 4,614), Study II (*n* = 3,029), and Study III (*n* = 3,268)

		Study I	Study II	Study III
Age (years)	18-25	20.1% (*n* = 926)	5.8% (*n* = 177)	10.7% (*n* = 351)
	26-35	14.2% (*n* = 655)	14.9% (*n* = 452)	13.4% (*n* = 439)
	36-50	30.4% (*n* = 1401)	28.4% (*n* = 860)	27.0% (*n* = 883)
	51-65	27.7% (*n* = 1277)	36.1% (*n* = 1093)	31.8% (*n* = 1039)
	66-100	7.7%* (*n* = 355)	15.4% (*n* = 466)	17.0% (*n* = 556)
Number of children	0	39.4% (*n* = 1817)	27.2% (*n* = 823)	26.8% (*n* = 875)
	1	17.6% (*n* = 814)	20.0% (*n* = 606)	18.8% (*n* = 613)
	2	29.7% (*n* = 1370)	36.2% (*n* = 1098)	37.5% (*n* = 1225)
	3+	13.3% (*n* = 612)	16.6% (*n* = 502)	17.0% (*n* = 554)
Settlement type	village	19.0% (*n* = 875)	21.8 % (*n* = 661)	26.5% (*n* = 865)
	small town	17.1% (*n* = 787)	19.3% (*n* = 585)	20.1% (*n* = 658)
	medium and large town	44.7% (*n* = 2064)	41.3% (*n* = 1250)	13.5% (*n* = 440)
	capital	19.2% (*n* = 884)	17.5% (*n* = 530)	9.2% (*n* = 302)
Education	primary	5.4% (*n* = 249)	2.1% (*n* = 63)	3.2% (*n* = 106)
	secondary	40.3% (*n* = 1860)	39.2% (*n* = 1187)	33.8% (*n* = 1105)
	college	29.9% (*n* = 1380)	32.8% (*n* = 993)	36.1% (*n* = 1208)
	university	24.4% (*n* = 1125)	25.9% (*n* = 786)	26.0% (*n* = 849)
Marital status	lives alone	22.4% (*n* = 931)	14.8% (*n* = 402)	14.4% (*n* = 425)
	civil partnership	29.2% (*n* = 1217)	24.8% (*n* = 673)	23.6% (*n* = 696)
	married	44.3% (*n* = 1844)	52.6% (*n* = 1425)	55.5% (*n* = 1640)
	widow	4.2% (*n* = 173)	7.7% (*n* = 210)	6.5% (*n* = 193)
Profession	employee	54.5% (*n* = 2515)	53.9% (*n* = 1633)	55.9% (*n* = 1827)
	retired	14.8% (*n* = 685)	25.9% (*n* = 784)	23.6% (*n* = 772)
	entrepreneur	10.9% (*n* = 501)	8.4% (*n* = 253)	6.5% (*n* = 213)
	unemployed	2.9% (*n* = 135)	3.4% (*n* = 103)	3.3% (*n* = 109)
	other	17.1 % (*n* = 788)	5.7% (*n* = 173)	10.6% (*n* = 347)
Financial status	poor	1.9% (*n* = 88)	2.6% (*n* = 78)	2.3% (*n* = 74)
	below average	7.9 % (*n* = 363)	11.6% (*n* = 350)	8.7% (*n* = 285)
	average	67.4% (*n* = 3108)	67.7% (*n* = 2051)	70.9% (*n* = 2317)
	well-off	21.7% (*n* = 1001)	17.0% (*n* = 516)	17.4% (*n* = 568)
	rich	1.2% (*n* = 54)	1.1% (*n* = 34)	0.7% (*n* = 24)

*66-90 years old in the case of Study I

Table B. Character Strength Test (VIA-H)

Below, you will find different strengths that characterize people. Please indicate to what extent each strength characterizes you on a 6-point scale.

very much unlike me	unlike me	a bit unlike me	a bit like me	like me	very much like me
1	2	3	4	5	6

1. Curiosity: Interested in, intrigued by many things	1	2	3	4	5	6
2. Love of learning: Knowing more, reading, understanding	1	2	3	4	5	6
3. Good judgment: Critical thinking, rationality, open-mindedness	1	2	3	4	5	6
4. Ingenuity: Originality, practical intelligence, street smart	1	2	3	4	5	6
5. Wisdom: Seeing the big picture, having perspective	1	2	3	4	5	6
6. Integrity: Honesty, genuineness, truthfulness	1	2	3	4	5	6
7. Kindness: Generosity, empathy, helpfulness	1	2	3	4	5	6
8. Loving: Able to love & be loved; deep, sustained feelings	1	2	3	4	5	6
9. Citizenship: Teamwork, loyalty, duty to others	1	2	3	4	5	6
10. Fairness: Moral valuing, equality, and equity	1	2	3	4	5	6
11. Self-control: Able to regulate emotions, non-impulsive	1	2	3	4	5	6
12. Prudence: Cautious, far-sighted, deliberative, discreet	1	2	3	4	5	6
13. Humility: Modest, unpretentious, humble	1	2	3	4	5	6
14. Appreciative of beauty: Seeking excellence, experience of awe/wonder	1	2	3	4	5	6
15. Gratitude: Thankful, grateful	1	2	3	4	5	6
16. Optimism: Hopefulness, future-mindedness, positive	1	2	3	4	5	6
17. Spirituality: Faith, philosophy, sense of purpose/calling	1	2	3	4	5	6
18. Forgiveness: Mercy, benevolence, kindness	1	2	3	4	5	6
19. Playfulness: Humor, fun, childlikeness	1	2	3	4	5	6
20. Enthusiasm: Passionate, zestful, infectious, engaged	1	2	3	4	5	6

The scales are calculated by averaging the corresponding items.
Wisdom and Knowledge: items 1-5.
Humanity: items 6-10.
Modesty: items 11-13.
Spirituality and Transcendence: items 14-20.

European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0013

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RESEARCH ARTICLE

Motivations for Smoking Among Hungarian Police Students

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History
Received: 5 June 2023
Accepted: 2 October 2023
Published: 24 November 2023

Citation
Erdős, Á. (2023). Motivations for Smoking Among Hungarian Police Students. *European Journal of Mental Health, 18,* e0013, 1–11. https://doi.org/10.5708/EJMH.18.2023.0013

Introduction: Police officers' job is one of the most stressful professions. Job stress, unpredictability, and physical strain can increase the prevalence of smoking among police officers. Investigating the motivations behind smoking stands, therefore, as a critical question, especially in high-risk populations, like police officers.
Aims: The aim of the study was to investigate the smoking motivations of Hungarian police students.
Methods: Employing a cross-sectional approach, we conducted a questionnaire-based survey among Hungarian police students between January and April, 2022. The study sample (N = 270) consisted of 57.4% male (n = 155) and the average age of students was 21.8 years (SD = 2.13). The survey examined smoking status, frequency and intensity of smoking. Smoking intensity is generally based on self-reported average cigarettes per day. The Substance Use Coping Inventory (SUI) was used to examine motivational attitudes.
Results: The lifetime prevalence of smoking among police students reached 77.0%. Female police students were more likely to have tried smoking than males, however, the difference was not significant (p = .114). Among current smokers, male police students demonstrated higher scores than female police students in both the self-confidence motives (p = .009) and boredom relief motives (p = .010). When comparing regular and occasional smokers, we found significant differences in all motivational scales, except for social motivators. However, logistic regression results indicate that boredom relief motives are the only significant predictors of regular smoking among police students (OR = 1.45; p < .001).
Conclusions: The motivational patterns of smoking vary between males and females, as well as between regular and occasional smoker police students. A pivotal inquiry in the context of preventing regular smoking among police students revolves around identifying alternative solutions to effectively occupy their leisure time and alleviate boredom.

Keywords: smoking, motivations, law enforcement, police students, behavioral epidemiology

Abbreviations: CPD = cigarettes per day; GBD = Global Burden of Disease Study; LUPS FLE = Ludovika University of Public Service, Faculty of Law Enforcement; SUI = Substance Use Coping Inventory; WHO = World Health Organization

Introduction

Smoking remains one of the most significant health risk factors. Tobacco use was responsible for 8.71 million deaths and 229.77 million disability-adjusted life years globally in 2019 (He et al., 2022). Global Burden of Disease Study (GBD) shows that cigarette smoking serves as a major and entirely preventable cause of disease burden among adult Hungarian men. Among women aged 20-54-year-old, smoking was the top risk factor for the greatest burden of disease in Hungary. (Vitrai & Bakacs, 2021).

ISSN 1788-7119 (online)

Despite the obvious risks of smoking, more than a fifth of the world's population (22.8%) smoke (WHO, 2019). One explanation for this is that substances that cause harmful addictions always serve some key function in an individual's life, a function that drives and sustains their addiction. (Németh, 2011; Pikó, 2012). Investigating the motivations behind smoking is therefore a critical question from a health psychology perspective, as it brings us closer to understanding the role of the substance in an individual's life. Exploring motivations becomes particularly important in predicting substance use and problematic consumer behavior. Previous studies indicate that the motivational structure of substance use is a multidimensional phenomenon in which social influences, affect regulation, self-confidence and boredom relief play the most important role (Pikó & Varga, 2014). According to theories of motivation, the consumer motive remains essential for the initiation of consumption, as it is the basis for the individual's decision whether or not to use a substance (Cox & Klinger, 1988). A combination of motivations increases the risk of substance use and the risk of multiple drug use, and even leads to problematic behavior (Pikó &Varga, 2014). Motivation is also as a high predictor of later problematic substance use and its associated consequences (Cox & Klinger, 1988; Cooper, 1994).

Investigating the motivation for smoking is particularly important in high-risk populations. Police officers are considered a high-risk group, with a higher prevalence of alcohol consumption, smoking and other harmful health behaviors compared to the general population (Basaza et al., 2020; Ramakrishnan et al., 2013; Richmond et al., 1998; Smith et al., 2005). Researchers have examined the prevalence of smoking among Hungarian police officers a few times. According to the results of these surveys, 43.6% of the total Hungarian police population (Ritter, 2004) and 33.4% of the police officers in the capital city smoke (Mácsár et al., 2017). Significant causal factors of smoking consists of occupational 'job context' stress, and the fact that police are regularly exposed to "job content" stressors beyond the range of normal human experiences (Shane, 2010). Police stressors are usually multi-faceted and most of these stressors play an important role in smoking, such as shift-work (Brown et al., 2020), an unpredictable work schedule, or high level of stress (Smith et al., 2005).

Smoking among police officers correlates with the higher prevalence of hypertension (Sen et al. 2014), reduced performance on physical tests (Boyce, et al., 2006), a higher risk of developing prostate disease (Zhou et al., 2018); it also imposes extra additional costs on the employer (the state) (Basaza et al., 2020). Smoking raises important questions about the mental or physical suitability of police officers as well. For example, before 2021, in Hungary, the diagnosis of any mental and behavioral disorder caused by smoking (e.g. dependence) led to the unsuitability of police officers (Erdős, 2020).

Hungarian police students are exposed to considerable physical and psychological stress from the beginning of their training (Pesti, 2021). In addition, police students are not only university citizens, but also members of a professional culture where smoking remains typical (Basaza et al., 2020). The aim of the present study was to investigate the smoking motivations of Hungarian police students. We examined differences in motivational structure by sex and by frequency of substance use.

Methods

Participants and Procedure

A cross-sectional, questionnaire-based online survey was conducted among Hungarian police officer students at the Ludovika University of Public Service, Faculty of Law Enforcement (LUPS FLE) in Budapest, Hungary. The sampling frame consisted of a population table of LUPS FLE police students (N = 417). A complete query was performed because the population is homogeneous, finite in number and spatially concentrated. The data were collected using the address-list enquiry method, based on the database of the Unified Study System. The data were collected using a licensed questionnaire program that complies with the methodological requirements and ensures the technical conditions necessary for the validity of the research (http://www.online-kerdoiv.com). The research was conducted between January and April, 2022. A total of 270 people took part in the survey (response rate: 64.8). All respondents were included in the final sample.

Participation was voluntary and anonymous. Participants were informed in writing about the survey's aims, the procedure, and privacy policy. They also had the opportunity to ask any questions about the research before involvement. Data collection was conducted on the students' free time. Participation in the research could be refused at any time. This study does not require institutional ethical review board approval in accordance with institutional policies. The research was carried out in compliance with the Ludovika University of Public Services' Ethical Code (Code of Ethics adopted by the Senate of the University of Public Service by Resolution 32/2019 (VII. 10.). The study has been prepared in accordance with the LUPS' Code of Ethics, as well.

Measures

Smoking status/frequency of smoking

Characteristics of smoking were assessed by questions based on international recommendations (EMCDDA, 2002), and national research (Elekes & Domonkos, 2020; Paksi et al., 2017, 2021). We determined lifetime prevalence by posing the question, "Have you ever smoked in your life?" and assessed the current use by asking, "Do you smoke every day or occasionally?" For the second question, participants were given a choice of three answers, "Yes, regularly [every day]" or "Yes, occasionally" or "Not at all". Within the group of current smokers, we made a distinction between those who smoked regularly (daily) and those who smoked occasionally.

Smoking intensity

We investigated smoking intensity, which is generally based on self-reported average cigarettes per day (CPD). CPD use is a key smoking behavior indicator that reflects smoking intensity. (Hovanec et al., 2022; Jena et al., 2013) That means the number of cigarettes smoked per day defines smoking intensity. Smoking intensity was measured in standard ways using the following question, "How many cigarettes do you usually smoke a day?" No consensus exists on how to best define various types of regular smokers (Schane et al., 2010). Based on previous studies (Husten, 2009), in this study, regular (daily) smokers were subdivided into two groups: light (daily) smokers (who smoked less than 10 cigarettes/day) and moderate-to-heavy (daily) smokers (who smoked at least 10 cigarettes/day).

Smoking motivations

To examine motivational attitudes, the Hungarian version (Pikó, 2004) of the Substance Use Coping Inventory (SUI) (Wills & Cleary 1995) was used. Participants who indicated they had some experience with smoking answered items about their reasons for smoking. Responses were coded on 5-point Likert scales with anchor points '1 = Not at all true for me' and '5 = Very true for me'. The SUI uses four subscales to identify motives for substance use: (1) social motives/social pressure (four items, e.g. "Smoking helps you fit in with other people"), (2) self-confidence motives (four items, e.g. "Smoking makes you feel more self-confident", (3) boredom relief motives (two items, e. g. "Smoking is something to do when you're bored"), (4) affect regulation (coping) motives (four items, e.g. "Smoking cheers you up when you're in a bad mood"). The internal consistency of SUI has been found to be very good (Cronbach's α = .8–.9) in almost all sub-dimensions in previous Hungarian studies (Pikó, 2010; Pikó & Varga, 2014; Varga, 2016). The researchers found relatively low (Cronbach's α < .70) scores only on the boredom relief dimension (Pikó & Varga, 2014; Varga, 2016). However, in the survey of police students, internal consistency was satisfactory on all four scales of the SUI (for social motives Cronbach's α = .79, for self-confidence motives Cronbach's α = .82, for boredom relief motives Cronbach's α = .85, and for affect regulation (coping) motives Cronbach's α = .87).

Socio-demographic variables

Age, sex, academic year, residence type, religiosity, marital status, and subjective socio-economic status of the student's family were also assessed in the questionnaire.

Statistical Analysis

Data were subjected to a Kolmogorov-Smirnov (KS) test for normality. Parametric and non-parametric tests were selected based on the results of the KS test. We used the chi-square (χ^2) test to assess the relationship between smoking status, frequency and intensity of smoking and socio-demographic variables. The association relationship between the test values was measured using the Cramer V (V) and Phi (ϕ) coefficient. For the metric variables Fischer's F-test, two-sample t-test (t) and Cohen's effect size index (d) were used. The difference between the mean age and SUI score among smokers was analyzed using the t-test. Effect sizes of the difference of SUI subscales were estimated using Cohen's d statistic, for which values of 0.2, 0.5, and 0.9 are considered small, medium, and large effects, respectively. Results were analyzed using the Mann-Whitney U test, when the assumptions for using

an independent t-test were not upheld. The Mann-Whitney U-test (due to the non-normality of the data) was used to examine the difference in the number of cigarettes smoked by males and females. The significance level was taken as $p < .050$. Multiple logistic regression analysis was used to examine the relationship between smoking prevalence (dependent variable) and motivation (independent variable).

Results

The final study sample (n = 270) consisted of 57.4% male (n = 155) and 42.6% female (n = 115). The average age of students was 21.8 years (SD = 2.13, 95% CI: 21.52–22.03). The majority of participants hailed from small towns (38.9%) and villages (33.0%). More than half (52.5–86.1%) of students from each academic year group participated in the survey. The majority of participants came from middle-class families (69.3%) and 57.4% consider themselves to be religious in some form. Table 1 shows other socio-demographic data.

According to survey results, more than three quarters (77.0%) of police students have ever tried smoking in their lifetime. Women were slightly more likely than men to have experimented with smoking in their lifetime, but the difference was not significant (81.7% vs 73.6%, respectively; $\chi^2(1) = 2.50$, $p = .114$, $\phi = 0.10$). Almost half of the students (47.8%) had smoked in the previous year. However, there was no significant sex difference in the prevalence of smoking within the past year. The prevalence of current smoking was 35.6% (n = 96), meaning

Table 1. Socio-demographic characteristics of the study sample (n = 270)

	Variables	n	%
Sex	male	155	57.4
	female	115	42.6
Residence type	capital	31	11.5
	county seat	45	16.7
	town*	105	38.9
	village**	89	33.0
Marital status	single	147	54.4
	in relationship	121	44.8
	married/ registered partnership	2	0.7
	divorced	0	0.0
Religiosity	religious, following the teachings of your religion	25	9.3
	religious in its own way	130	48.1
	not religious	110	40.7
	NA	5	1.9
Subjective classification of the family's social situation	lower or lower-middle class	39	14.4
	middle class	187	69.3
	upper or upper-middle class	40	14.8
	No answer	4	1.5
Academic year	1st-year	72	26.7
	2nd-year	69	25.6
	3rd-year	68	25.2
	4th-year	61	22.6

*town: number of inhabitants ≥ 10,000
**village: number of inhabitants < 10,000

Table 2. Main indicators of smoking by sex (%)

Smoking indicator	Males (n = 155) %	Feales (n = 115) %	χ^2(df)	p-value	ϕ
Lifetime smoking	73.6	81.7	2.50(1)	.114	0.10
Past 12 month smoking	45.8	50.4	0.56(1)	.452	0.05
Current smoking	32.9	39.1	1.11(1)	.291	0.06
Regular smoking	16.1	26.1	0.49(1)	.480	0.04
Occasional smoking	16.8	13.0	3.48(1)	.062	0.11
Moderate-to-heavy (daily) smokers	52.0	60.0	0.24(1)	.062	0.08

Table 3. Differences in motivational structure among current smokers by sex (n = 96)

Motives	Males (n = 51) *M(SD)*	Females (n = 45) *M(SD)*	t	df	Cohen's d
Social	9.54 (3.84)	8.11 (3.92)	1.80	94	.4
Self-confidence	7.41 (3.71)	5.62 (2.85)	2.66**	92	.5
Boredom relief	6.49 (2.65)	5.11 (2.50)	2.60*	94	.5
Affect regulation (coping)	11.03 (4.65)	9.68 (4.39)	1.45	94	.3

* p < .050; **p < .010 related to a two-sample t-test

Table 4. Differences in motivational structure among current smokers by smoking frequency (n = 96)

	Regular smokers (n = 40) *M (SD)*	Occasional smokers (n = 56) *M (SD)*	t	df	Cohen's d
Social	9.75 (4.24)	8.25 (3.59)	1.86	94	.3
Self-confidence	7.72 (3.46)	5.75 (3.20)	2.87*	94	.6
Boredom relief	7.27 (2.29)	4.82 (2.44)	4.97**	94	.0
Affect regulation (coping)	11.9 (4.04)	9.33 (4.64)	2.80*	94	.6

*p < .010; **p < .001 related to a two-sample t-test

that more than one-third of police students smoked daily or occasionally. Current smoking prevalence was non-significantly higher among women compared to men (39.1% vs 32.9%, respectively; $\chi^2(1) = 1.11$, $p = .291$, ϕ = 0.06). The proportion of regular (daily) smokers in the study sample was 14.8% (n = 40). Although a higher proportion of daily smokers existed among men compared to women, the difference was not significant (16.1% vs 13.0%, respectively; $\chi^2(1) = 0.49$, $p = .480$, ϕ = 0.04). Table 2 shows the main prevalence values. There were no significant differences by type of residence, marital status, religiosity, subjective classification of the family's social situation and academic years for either current smoking or regular (daily) smoking.

On average, regular smoker police students smoke about half a pack (9.4 cigarettes; SD = 5.1) of cigarettes per day. No significant difference appeared in the number of cigarettes smoked by males and females (males: 8.9 CPD; SD = 5.20 vs females: 10.0 CPD; SD = 5.07; U = 164, $p = .522$). Regular smokers were subdivided into light (daily) smokers (n = 18, 45.0%) versus moderate-to-heavy (daily) smokers (n = 22, 55.0%). The results suggest that a similar proportion of male and female regular smokers were classified as moderate-to-heavy (daily) smokers (males: 52.0% vs females: 60.0%; $\chi^2(1) = 0.242$, $p = .622$, ϕ = 0.08).

The structure of smoking motives was analyzed by determining the mean and standard deviation values of the motivation scales among current smokers by sex (Table 3), by smoking frequency (Table 4), and by smoking intensity (Table 5). Comparing the mean scores on the motivation scales by sex, male students (n = 51) scored higher than females (n = 45) on both the self-confidence motives and boredom relief motives for current smoking. For males and females, significant, medium effect size differences existed between the mean scores of self-confidence motives (7.41 vs 5.62; $t(92) = 2.66$, $p = .009$, Cohen's d = .5) and boredom relief motives (6.49 vs. 5.11;

Table 5. Differences in motivational structure among current smokers by smoking intensity (n = 40)

	Light smokers (n = 18) *M (SD)*	Moderate-to-heavy smokers (n = 22) *M (SD)*	*t*	df	Cohen's d
Social	8.27 (3.73)	10.95 (4.33)	–2.06*	38	.6
Self-confidence	7.33 (2.95)	8.04 (3.87)	–0.64	38	.2
Boredom relief	7.55 (2.20)	7.04 (2.39)	0.69	38	.2
Affect regulation (coping)	11.2 (3.87)	12.4 (4.19)	–0.95	38	.3

*p < .050 related to a two-sample t-test

$t(94)$ = 2.60, p = .010, Cohen's d = .5). Comparing smoking frequency, the results indicated significant differences in mean scores, with medium and large effect sizes on all motivational scales, except for social motives. Regular smokers (n = 40) exhibited significantly higher mean scores for self-confidence motives (7.72 vs. 5.75; $t(94)$ = 2.87, p = .004, Cohen's d = .6), boredom relief motives (7.27 vs. 82; $t(94)$ = 4.97, p < .0001, Cohen's d = 1.), and affect regulation motives (11.9 vs. 9.33; $t(94)$ = 2.80, p = .006, Cohen's d = .6) compared to occasional smokers (n = 56). However, the results indicate that social motives have a similar influence on regular and occasional smokers' smoking habits. As for smoking intensity, social motives served as the only dimension indicating a significant difference among current smokers. That is, moderate-to-heavy smokers (n = 22) were more likely to smoke for social reasons than light smokers (n = 18) (10.95 vs 8.27; $t(38)$ = -2.06, p = .044, Cohen's d = .6).

Table 6. Results of multiple logistic regression regarding regular smoking among current smokers (n = 96)

Motives	Regular smoking, OR (CI: 95%)
Social	0.96 (0.82 – 1.12)
Self-confidence	1.10 (0.92 – 1.30)
Boredom relief	1.45 (1.16 – 1.80)*
Affect regulation (coping)	1.01 (0.89 – 1.14)
χ^2	23.11
p	< .001

* p < .001

The relationships between regular smoking and motivational items are presented in the logistic regression results (Table 6). The results indicate that boredom relief motives offered the only significant predictor of regular smoking among police students (OR = 1.45; p < .001). Boredom relief motives increased the odds of regular smoking by 1.45 times among current smokers.

Discussion

Differences in smoking behavior between women and men have decreased over time (Peters et al., 2014). In general, however, smoking prevalence stays higher among males than females (Dai et al., 2022; Wang et al., 2019). Globally, the smoking prevalence among males stands four times higher than that among females (West, 2017). In this study, we found that current smoking prevalence was non-significantly higher among females compared to males. Although there was a higher proportion of daily smokers among males compared to females, the difference was also not significant. These results may be explained by studies suggesting that sex difference is smaller in younger individuals, especially in Western populations (Giovino et al., 2012). A significant causal factor of current smoking could be the professional culture, too. According to previous studies, female police are generally more likely to smoke than males (Gu et al., 2012; Hartley et al. 2014; Violanti et al., 2016).

Our results regarding motivations for smoking indicated that social influences play a dominant role in police students' smoking, regardless of sex and frequency of smoking. This may be explained by the fact that smoking among young adults, especially university students, is mostly motivated by social influences (Moran et al., 2004; Schane et al., 2010). Previous results show that friends' smoking habits is an independent risk factor for smoking among young males and females (Mandil et al., 2010). Although no significant difference was found in the present study, the effect size calculation for the difference in mean scores exhibited a greater than trivial difference (Cohen's d = 0.4), suggesting sex differences. This suggests that male police students may be more likely to be social smokers. These findings are consistent with previous research showing that men are more likely to smoke for social reasons (Berg et al., 2011; Schane et al., 2010).

The findings of this study indicate that smoking among male police students is more likely motivated by boredom relief and self-confidence compared to female students, which may suggest that males are more likely than females to smoke during boring situations. A previous research among Hungarian soldiers also showed that, among the motives for smoking, there are sex differences for the boredom relief motive. Male soldiers were more likely to smoke because they experienced boredom than female soldiers (Urbán, 2005). Regarding self-confidence, a similar difference was observed for this motive, suggesting that men endorse greater importance to the confidence-boosting effect of smoking. In the case of addictions, the self-confidence motivation is based on the perception that as a result of substance use the consumer becomes more confident (Wills & Cleary, 1995). In an earlier study of adolescents, Pikó (2004) found that young people with low self-esteem and self-confidence are more likely to smoke. Current smoker male police students who may therefore be more motivated to smoke due to their lower self-esteem and self-confidence when compared to their female counterparts.

Consistent with expectations derived from theoretical models, significant differences in the motivational structure of occasional and regular smokers were also confirmed. Regular smokers exhibited significantly higher mean scores for affect regulation, self-confidence as well as boredom relief motivation. The link between affect coping and regular substance use is well documented (Kiluk et al., 2011; Sinha, 2009; Wills & Hirky, 1996). Emotion-focused coping also plays an important role in the case of regular smoking, which is also confirmed by the current results. According to Ismail and colleagues (2021), low self-esteem and a negative self-image are also common among young people who regularly use substances. Consistent with this, our results indicate that low self-confidence motivated smoking is more prevalent among police students who smoke daily than among occasional smokers.

Previous research has also found that boredom is a common motive for regular substance use (Pikó, 2004; Pikó & Varga, 2014; Szécsi, 2017). Smoking offers an ideal substitute for a ritual to cover up the feeling of emptiness caused by boredom (Pikó & Piczil, 2004). The current results suggest that the most significant role of regular smoking among police students lies in relieving boredom. We found that boredom increased the odds of regular smoking by 1.4 times among current smokers.

Strengths and Limitations

One of the important strengths of the present study is that the motivations of smoking were examined for the very first time among police students in Hungary. The topic of this study bears great importance for law enforcement agencies, police academies, and higher education, as well. Motivation of consumption serves as an important predictor of any substance use; therefore, our findings also support the development of prevention strategies. Furthermore, the SUI, used in this study to measure motivations for smoking, has not been used before in this specific (police professional) population.

Despite the strengths of the present study, this research has some limitations that should be acknowledged. First, our findings were based on a cross-sectional study, self-reported smoking characteristics, and online data collection. Future prospective studies could provide more reliable results. Second, substance use and addictive behavior remain sensitive issues, especially in the police population. This can lead to a deliberate bias in responses. Third, the results of the research apply only to students in higher education in law enforcement. We did not include students at secondary police schools in the survey. Finally, this study did not measure specifically the use of alternative tobacco products such as e-cigarettes or heated tobacco products.

Conclusion, Implications, and Future Directions

Young people in their early twenties face a number of risk factors related to health behaviors (e.g. stress, unhealthy lifestyle, lack of time, and many temptations) that can lead to health risk behaviors such as irregular and unhealthy eating, high intake of sweets or smoking (Kontor et al., 2016). Health risk behaviors, however, are not only prevalent among young people, but also in certain professions. Police work, by nature, involves highly unpredictable and stressful situations. Research has shown that stress, particularly occupational stress, leads to an increase in tobacco consumption (Burke, 1994; Conway et al., 1981).

Compared to the general population, police officers are expected to have higher physical standards. However, previous research has revealed that smokers exhibit a significantly poorer physical performance (Giraldo-Buitrago et al., 2001) and consistently perform worse on various tests of respiratory capacity in comparison to non-smokers

(Bernaards et al., 2003; Higgins et al., 1991). Police students must attend a regular physical test. A significant proportion of them smoke occasionally or regularly. The results also lead to an interesting finding about motivational structure. In contrast to adolescence, when social influences play an important role to predict smoking (Pikó & Varga, 2014), boredom was identified as a significant predictor for smoking among police students. Therefore, the key question in the prevention and treatment of regular smoking among police students focuses on how students could structure and spend their time when they feel empty or they are bored. This is particularly true for students' compulsory periods of service (law enforcement duties, professional training, 24-hour guard duties), which are generally characterized by a high degree of monotony. In the future, it would be necessary to examine differences in the motivational structure on the basis of other substance use indicators – i.e. quantity, degree of dependence, intensity, using an indicator other than CPD, eg. Heaviness of Smoking Index.

Acknowledgements
The author would like to thank the participants for taking part in the research and thank the reviewers of the article.

Author contribution
Ákos ERDŐS: conceptualization, design, methodology, funding acquisition, investigation, project administration, data management, formal analysis, interpretation, writing original draft, writing review and editing.

Declaration of interest statement
The author declares no conflict of interest.

Ethical statement
The research was carried out in compliance with the University of Public Services' (UPS) Ethical Code (Code of Ethics adopted by the Senate of the University of Public Service by Resolution 32/2019 (VII. 10.) and amended by Resolution 23/2020 (I. 29.)). The study has been prepared in accordance with the UPS' Code of Ethics (7. §).
All participants engaged in the research voluntarily and anonymously.
The participants provided their written informed consent to participate in this study.
Their data are stored in coded materials and databases without personal data.

Data Availability Statement
The data supporting this study's findings are available to the public.
We have policies in place to manage and keep data secure.

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European Journal of Mental Health
https://doi.org/10.5708/EJMH.18.2023.0014

BACK TO CONTENTS

RESEARCH ARTICLE

Financial Strain and Prenatal Depression Among Pregnant Women in Ibadan, Nigeria

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History
Received: 3 June 2023
Accepted: 24 October 2023
Published: 13 December 2023

Citation
Wellington, O. A. (2023). Financial Strain and Prenatal Depression Among Pregnant Women in Ibadan, Nigeria.
European Journal of Mental Health, 18, e0014, 1–16.
https://doi.org/10.5708/EJMH.18.2023.0014

Introduction: Although mothers' mental health is receiving more attention, little remain known about the impact that financial strain may have on the mental health of expectant mothers. This is crucial in low- and middle-income countries because vulnerable populations are disproportionately affected by high rates of poverty, insufficient social safety nets, and unstable economies.
Aims: This study examined the potential role that financial strain may play in prenatal depression while also taking into account the potential mediating roles of food insecurity, intimate relationship violence, and social support.
Methods: To gather the data, a cross-sectional survey of 519 pregnant women in the second and third trimesters were selected methodically from a pool of women awaiting routine antenatal care from one primary health care center in each of the five urban local government areas of Ibadan metropolis. The Edinburgh Postnatal Depression Scale was used to measure prenatal depression. Using parallel and serial mediation models, the relationship between the variables – financial strain, intimate partner violence, food insecurity, social support, and prenatal depression – was examined.
Results: Of the participants in this study, 28.1% reported having symptoms of depression during their pregnancy. The results also show that prenatal depression and financial strain are related, with each of the three mediators operating in a parallel and sequential causal order. The results of the mediation point to a causal chain with moderate effects.
Conclusions: Interventions should evaluate the effects of integrating mental health services and social needs assessments into antenatal and primary health care.

Keywords: pregnancy, financial strain, depression, social support, psychosocial stressors

Introduction

Perinatal depression poses a considerable global health challenge given its adverse immediate and long-term effects on mothers and infants (Kariuki & Newton, 2022). Estimates indicate that pregnancy-related depressive disorders are more prevalent in nations with low or middle incomes than in higher income nations (WHO, 2017). The incidence of prenatal depression is estimated to be 26.3% in sub-Saharan Africa (Dadi et al., 2020), with estimates for Nigeria ranging from 14.1% to 26.6% (Thompson & Ajayi, 2016; Gadanaya et al., 2018; Adeoye et al., 2022; Wegbom et al., 2023). As a result, knowing what factors contribute to the risk of prenatal depression remains crucial for developing effective interventions. Severe and mild bouts of depression in gestation (prenatal/antenatal depression) or within a year after birth (postnatal depression) are called perinatal depression. This study examines prenatal depression.

According to the U.S. National Institute of Mental Health (2020), perinatal depression causes intense feelings of despair, unworthiness, anxiety, and fatigue. It severely impacts daily tasks, self-care, and caregiving for others. The

ISSN 1788-7119 (online)

condition is linked to symptoms such as cognitive impairment, difficulty concentrating, memory loss, and difficulty making decisions. Furthermore, sleep issues, such as difficulty falling asleep or excessive sleep duration, are common, as is abnormal eating, which leads to overeating or loss of appetite, according to Van Niel and Payne (2020).

The findings of the studies by Shamblaw et al. (2019), James-Hawkins et al. (2019), Luo et al. (2022), and Yang et al. (2022) highlight several key predicting variables associated with depressive symptoms during the perinatal period. As Shamblaw et al. (2019) emphasize, abuse emerges as a consistent predictor. Financial difficulties and a decrease in the perception of general support are recurring themes in James-Hawkins et al. (2019), Luo et al.'s (2022) and Yang et al.'s (2022) systematic reviews and meta-analyses. All studies highlight that the adverse effects of financial strain and a lack of social support regarding perinatal mental health increases the risk of both anxiety and PD. A Nigerian study by Adeoye et al. (2022) also identified low income as a predictor of antepartum depression.

James-Hawkins et al. (2019), Luo et al. (2022) and Yang et al. (2022) identify various unique predictors besides these standard variables. James-Hawkins et al. (2019) study suggests a negative association between education and prenatal depression. According to Luo et al. (2022), specific risk factors for prenatal depression include under-education, unemployment during pregnancy, chronic physical illness before pregnancy, and smoking. Meanwhile, Yang et al. (2022) expand the list of correlated factors to include educational level, family economic status, a history of mental illness, perinatal smoking or drinking, and multiparity.

The studies quoted above identify negative and stressful life experiences, such as socioeconomic disadvantage and deprivation in relation to maternal depression during pregnancy. Financial strain, in particular, is recognized as a stressor exposure separate from the effect of poverty, with significant effects on mental and physical health (Lange et al., 2017; Marshal et al., 2021). This present study conceptualizes financial strain as perceived difficulties in making ends meet and paying bills for necessities (French & Vigne, 2018). The empirical literature interchangeably employs the terms financial/economic strain, financial/economic difficulties, and financial/economic hardship.

One of the explanations for the association between socioeconomic deprivation and mental health problems is the social causation theory (Wickham et al., 2017; Lund & Cois, 2018) which argues that conditions of poverty may cause new depressive symptoms or worsen existing depression. The link between low income and maternal depression may be influenced by social and psychological factors, according to relevant empirical literature (James-Hawkins et al., 2019; Adeoye et al. 2022; Luo et al., 2022).

Individuals experiencing poverty are vulnerable to additional social stressors such as food insecurity, intimate partner violence, inadequate social support, higher risks of complications during pregnancy, and traumatic experiences (Bedaso et al., 2021; Yenerall & Jensen, 2021; Umukoro & Okurame, 2022). The above additional social stressors add to the financial burden that pregnant women already face. These factors can potentially exacerbate stress levels, foster a sense of helplessness and anxiety, and even elevate the likelihood of mental health conditions, including prenatal depressive symptoms (Mitchell & Christian, 2017; Abrahams et al., 2018).

In 2016, Nigeria experienced a recession, and the COVID-19 outbreak with its associated aftermath caused a further economic decline (Adam et al., 2020; Folayan et al., 2021). Due to extensive economic hardship and little social protection to strengthen economic resilience, many Nigerians find themselves in dire straits (World Bank, 2020). Data from the Nigerian Bureau of Statistics for 2018–19 and 2022 indicate that many Nigerian families face financial strain and vulnerability. The report estimates that 40.1% (4 in 10) and 63.0% (133 million) Nigerians – many of whom are women – are considered to be poor; moreover multidimensionally poor (National Bureau of Statistics, 2020; 2022). Rising food and energy inflation as well as a pervasive insecurity in the country have intensified problems with food security, public health, and employment, especially impacting people experiencing poverty and the vulnerable (Mitchell & Christian, 2017; Ladan & Badaru, 2021). Through an examination of the various pathways by which financial strain impacts the mental well-being of pregnant women, we can expand our understanding and make valuable contributions to the creation of focused interventions that address the intricate obstacles that these women encounter in resource-limited environments.

Previous research on financial strain has focused on outcomes such as health-related quality of life (Garey et al., 2017), infant birth weight, and fetal growth (Mitchell & Christian, 2017; Goin et al., 2021), psychological distress among U.S. adults (Ryu & Fan, 2022), as well as parenting and mental health (Marcil et al., 2020). The author was able to locate one study that investigated financial stress as a primary predictor of prenatal depression: Thayer and Gildner (2021) investigated the possibility of a link between financial strain caused by the COVID-19 pandemic and an increased likelihood of prenatal depression in the United States. According to their findings, 43.0% of the participants reported financial stress due to the pandemic, while 24.0% had clinically significant depression scores. The authors discovered an association between COVID-19-related financial stress and an increased likelihood of obtaining a clinically significant depression score. This association remained even after controlling for various covariates, such as the participants' educational and income levels. The author could

not identify other studies that have examined the mediator variables of food insecurity, intimate partner violence, and social support in the pathway of financial strain and prenatal depression.

Present Study

To contextualize this study, previous research has shown that a correlation exists between financial strain and unfavorable health consequences in females, such as heightened mental distress, an increased risk of malnourishment, diminished self-assessed health, and recurrent cardiovascular incidents (Samuel et al., 2012; Mitchell & Christian, 2017; Marshall & Tucker-Seeley, 2018). In addition, according to van Heyningen et al. (2016), maternal depressive disorder is mainly due to social rather than biological factors. Unwanted pregnancies, low education and social support, lack of the partner's financial support and poverty are contributing factors.

In Sub-Saharan Africa, notably Nigeria, several studies have examined the occurrence of sociodemographic factors influencing depressive symptoms in pregnant women. However, as far as the author knows, no studies have investigated the mechanism that connects financial strain and the risk of developing prenatal depressive symptoms. This holds particular significance in nations with low and medium income levels where poverty rates are elevated, social safety nets are insufficient or absent, and economic instability disproportionately impacts vulnerable populations. The results of this study are also potentially relevant particularly for Nigeria, where a large gap exists between the availability and demand for mental health care services.

The present study is significant because it remains imperative to investigate the mechanisms of financial strain in populations beyond Western societies to evaluate whether the causal pathways linking financial strain and mental health outcomes are comparable or distinctive in other social contexts. Notably, by simultaneously investigating the effects of multiple psychosocial factors, this study seeks to elucidate the significant risk factors associated with financial strain and the risk of prenatal depressive symptoms among women living in social contexts characterized by endemic poverty. It is noteworthy that several Nigerian studies on prenatal depression fail to account for the impact of food insecurity (Thompson & Ajayi, 2016; Gadanaya et al., 2018; Adeoye et al., 2022; Wegbom et al., 2023).

The present study therefore endeavored to examine the variations in maternal depressive symptoms associated with the experience of financial strain, and test the mediating effects of food insecurity (FI), intimate partner violence (IPV), and social support (SS) in the pathway from financial strain (FS) to prenatal depression (PD) symptoms among a cohort of pregnant women.

Methods

Study Design and Participants

This cross-sectional research study was conducted in Ibadan, the state capital of Oyo, in southwestern Nigeria. Ibadan is the capital and largest city of Oyo State, Nigeria. With an estimated total population of 3,756,000 as of 2022 (Macrotrends, 2023), it is Nigeria's third-largest city by population after Lagos and Kano. Ibadan is a diverse city with a Yoruba majority and clusters of people from other tribes, such as Igbo and Hausa. Ibadan serves as home to Nigeria's premier higher education institution, The University of Ibadan, and several other institutions. Ibadan's economic activities include agriculture, commerce, handicrafts, manufacturing, and service industries.

Study participants were selected from a pool of pregnant women awaiting routine antenatal care from Primary Health Care (PHC) centers located in the metropolis's five urban local government areas (LGAs). The author chose one health facility from each LGA using a simple random selection technique through balloting. The roster of primary health care facilities was inscribed on small slips of paper that were subsequently placed in a hat and shuffled. The hand drawing technique was employed to randomly select one sheet of paper for each LGA, after which the corresponding healthcare facilities were visited to gather data.

The minimum sample size was calculated utilizing a single proportion formula, incorporating a proportion of 50.0%, a margin of error of 5.0%, a non-response rate of 10.0%, and a confidence interval of 95.0%. The minimum number of participants required was 421; the final number of participants was 519.

Pregnant women were enrolled in the study using a k = 3 sample frame. Utilizing the assistance of nursing staff, a participant was selected randomly from a roster of women who received antenatal care during the researcher's visits to the study site. Subsequently, every third female on the roster was selected for further participation. The inclusion criteria included: aged ≥ 18 years, women ≥ 14 weeks' gestation without severe health problems, women

carrying single fetuses, and having the ability to complete the questionnaire. Eligible pregnant women were informed of the study's objectives and procedures and allowed to withdraw from the interview at any time.

Enrolment and data collection was carried out between 14 March and 21 April 2022. The confidentiality and privacy of all participants who gave verbal or written informed consent was maintained using an anonymous questionnaire and conducting the interviews in a secluded room. The questionnaire was prepared in English and translated to the local Yoruba language and back-translated into English. It was administered in the English language for the majority of the women except for the few who favored the local language. The questionnaire was self-administered except for participants who indicated the need for assistance from the research team. This study adhered to the principles established in the Declaration of Helsinki. This study protocol was approved by the Redeemer's University Ethical Review Committee (REC/30/08/2021/RUN/11). The Oyo State Ministry of Health and participating Primary Health Care centers permitted the author to conduct the study.

Measures

Edinburgh Postnatal Depression Scale (EPDS)

Prenatal depression was ascertained using the Edinburgh Postnatal Depression Scale (EPDS) by Cox et al. (1987). The EPDS is a ten-item self-reporting tool used primarily to evaluate prenatal depression and anxiety symptoms (Levis et al., 2020). Responses are rated 0, 1, 2, or 3 according to the increasing severity of the symptoms. Women are required to respond to each question based on their experiences throughout the previous seven days. Items 3 through 10 are scored in reverse (i.e., 3, 2, 1, and 0). The cumulative score, calculated by summing the individual scores for each of the 10 items, resulted in a total score that can range from 0 to 30. A score ≥ 12 indicates prenatal depression, as specified in another Nigerian study (Adeoye et al., 2022). The internal consistency of the EPDS was determined to be 0.89 using Cronbach's α.

Financial strain

The key independent variable was financial strain. The index comprises six items adapted from earlier research (Conger & Elder, 1994). Participants were asked if, at any point within the preceding year, they or their household had experienced difficulties paying for basic needs such as 1) utilities; 2) childcare expenses; 3) housing costs; 4) medical care; and 5) maintaining the standard of living. An additional question asked 6) how often participants borrowed money from family or friends to help pay bills. The financial strain variable was created by summing responses rated on a Likert-type scale from 0 (never) to 4 (frequently) having a total range of 0 to 24, with higher scores indicating greater financial strain. This scale's Cronbach's α coefficient was 0.81.

Household Food Insecurity and Access Scale (HFIAS)

Household food insecurity was ascertained using the Household Food Insecurity and Access Scale (Coates et al., 2007), widely used in countries with low or middle incomes. The tool consists of nine questions, each with a recall span of one month. Participants rate the frequency of the corresponding event on a Likert-type scale of 0 to 3, with 3 being the most frequent occurrence. Cronbach's coefficient of the scale was 0.92. The overall scale score ranges from 0 to 27, with higher scores indicating households having greater food insecurity. As a categorical variable, households are categorized as food secure (0-1), mildly food insecure (2-7), moderately food insecure (8-14), or severely food insecure (15-27).

Hurt, Insult, Threaten, Scream (HITS) Instrument for Intimate Partner Violence

The HITS instrument for Intimate Partner Violence screening created by Sherin et al. (1998) was used to assess intimate partner violence. It is a basic instrument with four questions answered on a Likert-type scale: 1 = never, 2 = rarely, 3 = sometimes, 4 = fairly often, and 5 = frequently. The questions inquire about the frequency with which respondents experience physical hurt, insults, threats of harm, and screaming from their partner. There is no recall span indicated for the scale. The overall scores on this scale vary from 1 to 20, with a score above 10 indicating intimate partner violence. However, because the range of scores for this study was 0-10, the sores were dichotomized into "no" and "yes" groups. This corresponds to women who scored "0" across all items and those who scored ≥1. Cronbach's α coefficient for this instrument was 0.78.

Social support

Social support was assessed using seven questions adapted from Nguyen et al. (2018). Four questions measured instrumental support, one measured informational support, and two measured emotional support for the women since the start of their pregnancy. Each item included five response options ranging from 1 = never, 2 = rarely, 3 = some of the time, 4 = most of the time, and 5 = always. The total score of seven questions (0 to 35) was computed, and according to the scale's authors, adequate social support is determined if the participant scored at least 28. Cronbach's α for this instrument was determined to be 0.88.

Statistical Analysis

The **s**tatistical analysis was performed using the SPSS version 25. Outliers and normalcy were initially studied in data from 579 people. Univariate outliers (z scores greater than 3.29 and less than -3.29) were omitted from analyses (n = 32), as were participants with missing values (n = 28), yielding a sample of 519 participants. Collinearity was evaluated before conducting the regression test, and none of the variables had a variance inflation factor (VIF) greater than 4 or a tolerance value greater than 0.25 (Tabachnick & Fidell, 2013).

The descriptive statistics summarized the prevalence of prenatal depression symptoms and the participants' sociodemographic characteristics. Independent sample t tests were also used to examine the statistical significance between means of continuous variables. The bivariate analysis used the chi square (χ^2) test to compare the proportions of women who experienced symptoms of prenatal depression and those who did not. Depression symptoms during pregnancy constituted the dependent variable in the multivariate analysis. The odds ratios (ORs) for prenatal depression risk variables were calculated and provided in their crude and adjusted forms, along with their 95% confidence intervals.

The PROCESS macro for SPSS version 4.2 was utilized to conduct the mediation analyses (Hayes, 2022). Models 4 and 6 were used for the parallel and serial multiple mediations. In these analyses, mediation is considered significant should zero not fall between the lower and upper boundaries of the 95% bias-corrected and accelerated CIs for the indirect effect (IE). Parallel and serial mediation studies are statistical techniques used in mediation analysis to explore the relationships between variables and the mechanisms by which they influence one another.

When examining the relationship between an explanatory independent variable (IV) and a response dependent variable (DV), parallel mediation analysis considers several mediators that function independently along the causal pathway while controlling for others. The critical assumption is that the effects of any one mediator are independent of the others and that they operate simultaneously. This clarifies the relative contributions of each mediator in explaining the relationship between the IV and DV. Serial mediation analysis, on the other hand, entails a series of mediators in which the effect of the IV on the DV is transmitted via multiple mediators in a causal chain. Each mediator in the chain has the potential to influence the next, establishing a sequential or serial relationship. In summary, parallel mediation analysis presumes the simultaneous operation of independent mediators, whereas serial mediation analysis presumes the sequential operation of dependent mediators.

Confounding variables were considered in all mediation models: marital status, educational level, income, maternal and partner work status, and pregnancy wantedness. Statistical significance was defined as a p-value below .050.

Results

Sociodemographic and Psychosocial Characteristics of Participants

Tables 1 and 2 display the socio-demographic and psychosocial characteristics of the participants based on the prevalence of prenatal depression (PD) symptoms. The mean age stood at 28.14 (SD = 5.19) years, the mean parity came to 2.72 (SD = 1.33) children, and 70.9% of the women were in their second trimester. As shown in Table 1, the prevalence of PD symptoms in this study was 28.1%. The study findings indicate a statistically significant association between PD symptoms and certain demographic factors, specifically, an unmarried status (50.0%), maternal unemployment (55.3%), and lowest income levels (57.8%). It was also found that PD prevalence decreases with each higher level of schooling.

The psychosocial stress variables had a dose–response relationship with the PD status (Table 2). The prevalence of PD symptoms declined for women who reported low financial strain (84.8%) and no experience of intimate

Table 1. Sociodemographic characteristics of participants' by their depressive status (*N* = 519)

Characteristics		Prenatal symptoms	Depression	Unadjusted results			Adjusted results		
	Total (519) *n* (%)	No *n* = 373 (71.9%)	Yes *n* = 146 (28.1%)	OR	95% CI	*p*-value	OR	95% CI	*p*-value
Maternal age									
<25	145 (27.9)	105 (72.4)	40 (27.6)	0.91	0.48, 1.69	.760	1.02	0.41,	.970
25-34	303 (58.4)	218 (71.9)	85 (28.1)	0.93	0.53, 1.64	.798	1.07	2.25	.849
≥ 35	71 (13.7)	50 (70.4)	21 (29.6)	1			1	0.52,	
M*(SD)*	28.14*(5.19)*	28.19*(5.15)*	28.00*(5.33)*					2.23	
χ^2 *p* = .953									
Marital status									
Married	451 (86.9)	329 (75.2)	112 (24.8)	1	1.79, 5.09	.000	1	0.78, 3.05	.215
Single	68 (13.1)	34 (50.0)	34 (50.0)	3.03			1.54		
χ^2 *p* = .000									
Maternal Education									
Primary	101 (19.5)	44 (43.6)	57 (56.4)	1	0.17, 0.43	.000	1	0.31, 1.33	.231
Secondary	275 (53.0)	204 (74.2)	71 (25.8)	0.27	0.06, 0.21	.000	0.64	0.29, 1.96	.569
Tertiary	143 (27.6)	125 (87.4)	18 (12.6)	0.11			0.76		
χ^2 *p* = .000									
Maternal Work									
Employed	443 (85.4)	339 (77.9)	104 (23.5)	1	2.44, 6.66	.000	1	0.66, 2.36	.489
Unemployed	76 (14.6)	34 (44.7)	42 (55.3)	4.03			1.25		
χ^2 *p* = .000									
Partner Work									
Regular	417 (80.3)	325 (77.9)	92 (22.1)	1	2.53, 6.25	.000	1	0.52, 2.16	.879
Irregular	102 (19.7)	48 (47.1)	54 (52.9)	3.97			1.06		
χ^2 *p* = .000									
Family Size									
1 – 4	334 (64.4)	267 (79.9)	67 (20.1)	1	1.99, 4.41	.000	1	0.49, 1.44	.529
≥ 5	185 (35.6)	106 (57.3)	79 (42.7)	2.97			0.84		
χ^2 *p* = .000									
Household income									
<NGN50, 000	192 (37.0)	81 (42.2)	111 (57.8)	1	0.07, 0.19	.000	1	0.09, 0.26	.000
NGN50,001 – NGN100,000	221 (42.6)	190 (86.0)	31 (14.0)	0.12	0.01, 0.08	.000	0.15	0.01, 0.11	.000
>NGN100,000	106 (20.4)	102 (96.2)	4 (3.8)	0.03			0.04		
χ^2 *p* = .000									
Gestation									
Second	151 (29.1)	116 (76.8)	35 (23.2)	1	0.92, 2.22	.109	1	0.66, 1.90	.681
Third	368 (70.9)	257 (69.8)	111 (30.2)	1.43			1.12		
χ^2 *p* = .000									
Parity									
0	54 (10.4)	40 (74.1)	14 (25.9)	1	0.48, 1.80	.837	1	0.43, 2.71	.879
1 – 3	329 (63.4)	248 (75.4)	81 (24.6)	0.93	0.85, 3.45	.132	1.07	0.47, 4.03	.563
≥4	136 (26.2)	85 (62.5)	51 (37.5)	1.71			1.37		
M*(SD)*	2.72*(1.33)*	2.61*(1.24)*	3.01*(1.51)*						
χ^2 *p* = .018									
Want pregnancy									
Yes	413 (79.6)	319 (77.2)	94 (22.8)	1	2.09, 5.09	.000	1	0.77, 2.48	.278
No	106 (20.4)	54 (50.9)	52 (49.1)	3.27			1.38		
χ^2 *p* = .000									

Note: Chi-square test (χ^2) was conducted to assess differences in prenatal depression scores across sociodemographic variables, and all tests were statistically significant except for maternal age.
M Mean; SD Standard deviation; CI Confidence interval; 1 Reference Category
Each adjusted odds ratio displayed is adjusted for all the other variables listed on the table except for the variable currently being examined.

Table 2. Distribution of psychosocial stressors by participants' depressive status (*N* = 519)

Characteristics		Prenatal symptoms	Depression	Unadjusted results			Adjusted results		
	Total (519) *n* (%)	No *n* = 373 (71.9%)	Yes *n* = 146 (28.1%)	OR	95% CI	*p*-value	OR	95% CI	*p*-value
Financial strain									
Low	328 (63.2)	278 (84.8)	50 (15.2)	1			1		.677
High	191 (36.8)	95 (49.7)	96 (50.3)	5.62	3.72, 8.49	.000	1.13	0.63, 2.03	
M(SD)	7.91*(3.66)*	6.94*(3.22)*	10.38*(3.56)*						
χ^2 p = .000									
Food insecurity									
Secure	92 (17.7)	91 (98.9)	1 (1.1)	0.004	0.001, 0.03	.000	0.08	0.08, 0.92	.042
Mildly insecure	165 (31.8)	147 (89.1)	18 (10.9)	0.05	0.02, 0.10	.000	0.17	0.06, 0.46	.000
Moderately insecure	198 (38.2)	117 (59.1)	81 (40.9)	0.27	0.15, 0.50	.000	0.35	0.17, 0.69	.003
Severely insecure	64 (12.3)	18 (28.1)	46 (71.9)	1			1		
M(SD)	8.00*(5.74)*	6.23*(5.12)*	12.54*(4.65)*						
χ^2 p = .000									
IPV									
No	211 (40.7)	186 (88.2)	25 (11.8)	1			1		
Yes	308 (59.3)	187 (60.7)	121 (39.3)	4.81	2.99, 7.75	.000	1.19	0.65, 2.17	.578
M(SD)	2.16*(2.47)*	1.60*(2.08)*	3.58*(2.81)*						
χ^2 p = .000									
Social support									
Low	292 (56.3)	149 (51.0)	143 (49.0)	1			1		
Adequate	227 (43.7)	224 (98.7)	3 (1.3)	0.01	0.004, 0.05	.000	.03	0.01, 0.12	.000
M(SD)	24.56*(5.31)*	25.99*(5.08)*	20.90*(3.94)*						
χ^2 p = .000									

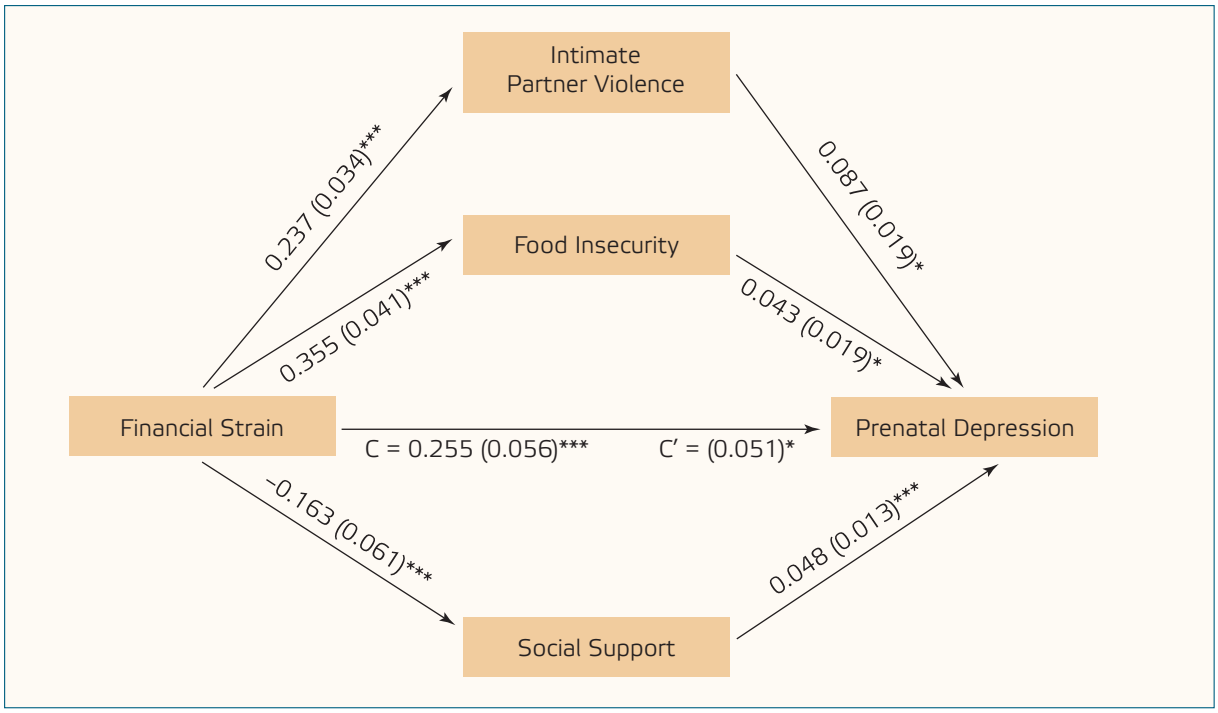
Note: Chi-square test (χ^2) was conducted to assess differences in prenatal depression scores across the psychosocial stress variables, and all tests were significant at $p < .001$.
SD Standard deviation; CI Confidence interval; 1 Reference Category; IPV Intimate partner violence.
Each AOR is adjusted for all the other variables listed on the table except for the variable currently being examined.

partner violence (IPV) (88.2%). Furthermore, PD symptoms increased with higher food insecurity (FI) and declined with better social support (SS). A supplementary one-way analysis of variance test was performed to compare the variations of PD symptoms across the different household income levels and the psychosocial variables (see Appendix). Overall, the data indicates a correlation between income levels and all psychosocial factors: Higher household income was typically linked to lesser financial strain, decreased occurrences of IPV, stronger social support, reduced food insecurity, and a lowered likelihood of PD symptoms**.**

Crude and Adjusted Predictors of Prenatal Depressive Symptoms

Table 1 and Table 2 also present crude and adjusted associations between maternal sociodemographic and psychosocial factors and the odds of reporting PD symptoms. The adjusted logistic regression model for Table 1 was statistically significant, χ^2 (15, N = 519) = 154.11, p = .000. The model explained 37.0% (Nagelkerke R^2) of the variance in PD symptoms and correctly classified 78.0% of the cases. Only household income remained statistically significant in the adjusted model: pregnant women reporting higher incomes indicated lower odds of PD symptoms respectively (*OR* = 0.15, 95% CI [0.09, 0.26] and *OR* = 0.04, 95% CI [0.01, 0.11]). When other variables were adjusted, the odds of reporting PD symptoms lowered with increasing food security and adequate social support (*OR* = 0.34, 95% CI [0.01, 0.12) as presented on Table 2. The adjusted logistic regression model for Table 2 was statistically significant, χ^2 (6, N = 519) = 209.62, p = .000. The model explained 48.0% (Nagelkerke R^2) of the variance in PD symptoms and correctly classified 77.0% of the cases.

Figure 1. Parallel mediation model (*N* = 519)



This figure illustrates the indirect effect of financial strain on prenatal depression through IPV, food insecurity, and social support. The model is controlled for covariates. Standardized effects are presented.
C′ is a direct effect of financial strain on depression; c is the total effect of financial strain on depression.
The mediation analysis is adjusted for marital status, educational level, income, maternal and partner employment status, and pregnancy intention.
*p < .050, ***p < .001.

Parallel Mediation Model

Based on 10,000 bootstrapped samples, the overall effect of financial strain (C = 0.26, SE = 0.06, p < .001) and the direct effect (C' = 0.12, SE = 0.05, p < .05) on PD were significant, and there are also indirect effects (Figure 1). The three mediators collectively partially mediate the relationship between financial strain and PD (IE_{total} = 0.18, 95% CI: LL = 0.12 to UL = 0.24), which implies that participants with higher financial strain scores also tend to experience more IPV, FI, less social support and symptoms of PD. All three mediators significantly contributed to the indirect effects. For example, financial strain and PD symptoms are statistically related indirectly through food insecurity (b_1 = 0.36, 95% CI: LL = 0.48 to UL = 0.64), such that participants reporting elevated levels of financial strain were more prone to experiencing food insecurity. As a result, it can be inferred that these women exhibited a tendency to report more PD symptoms.

Serial Mediation Model

The findings demonstrate that a serial causal chain with no specified order of mediators partially mediates the association between financial strain and PD symptoms (IE_{total} = 0.27; 95% CI: LL = 0.12 to UL = 0.24). The overall indirect effect is the same as in the earlier-explored parallel mediation model. The three mediators generated six distinct causal order models, as presented in Table 3. The significant paths of each unique arrangement of the mediating variables created were compared across all six models. Of the seven possible paths, SMM 2 and 4 generated only four significant indirect paths, SMM 3 and 6 generated six significant paths, and SMM 1 and 5 generated seven.

All six models produced a significant (although weak) indirect path, including all three mediators in the chain of causation. The path Financial strain->FI→IPV→Social support→PD in SMM 2 yielded the highest indirect effect, 0.009 (95% CI 0.003 to 0.016) among the six models (Table 3). Five of the six SMMs had statistically significant results for the indirect paths involving social support and FI: The most robust findings were observed in SMM 2 and SMM 3.

Table 3. Standardized indirect effects for the paths on the Serial Mediation Models (*N* = 519)

Effect	B	Boot SE	Boot LLCI	Boot ULCI
SMM1: FS → IPV → SS → FI → PD				
FS →IPV → PD	0.09	0.02	0.05	0.13
FS → SS → PD	0.03	0.01	0.01	0.06
FS → FI → PD	0.04	0.02	0.01	0.07
FS → IPV → SS → PD	0.01	0.00	0.01	0.02
FS → IPV → FI → PD	0.01	0.00	0.00	0.01
FS → SS → FI → PD	0.00	0.00	0.00	0.00
FS → IPV → SS→ FI → PD	0.00	0.00	0.00	0.00
SMM2: FS → FI → IPV → SS → PD				
FS →FI → PD	0.04	0.02	0.01	0.08
FS → IPV → PD	0.02	0.02	-0.01	0.07
FS → SS → PD	0.02	0.01	-0.01	0.05
FS → FI→ IPV → PD	0.06	0.01	0.04	0.09
FS → FI → SS → PD	0.02	0.01	0.00	0.03
FS → IPV → SS → PD	0.00	0.00	-0.00	0.01
FS → FI → IPV→ SS → PD	0.01	0.00	0.00	0.02
SMM3: FS → IPV → FI → SS → PD				
FS → IPV → PD	0.09	0.02	0.05	0.13
FS → FI → PD	0.04	0.02	0.01	0.07
FS → SS → PD	0.02	0.01	-0.01	0.04
FS → IPV→ FI → PD	0.01	0.00	0.00	0.01
FS → IPV → SS → PD	0.01	0.00	0.01	0.02
FS → FI → SS → PD	0.02	0.01	0.00	0.03
FS → IPV→ FI→ SS → PD	0.00	0.00	0.00	0.00
SMM4: FS → FI→ SS→ IPV→ PD				
FS → FI → PD	0.04	0.02	0.01	0.08
FS → SS → PD	0.03	0.02	-0.01	0.05
FS → IPV → PD	0.02	0.02	-0.02	0.06
FS → FI→ SS → PD	0.03	0.01	0.01	0.04
FS → FI → IPV → PD	0.06	0.01	0.04	0.08
FS → SS → IPV→ PD	0.01	0.00	-0.00	0.01
FS → FI → SS → IPV → PD	0.01	0.00	0.00	0.01
SMM5: FS → SS → IPV→ FI → PD				
FS → SS → PD	0.05	0.01	0.02	0.07
FS → IPV → PD	0.07	0.02	0.04	0.11
FS → FI → PD	0.04	0.02	0.01	0.07
FS → SS → IPV → PD	0.01	0.01	0.01	0.02
FS → SS → FI → PD	0.00	0.00	0.00	0.00
FS → IPV → FI→ PD	0.00	0.00	0.00	0.01
FS → SS → IPV → FI → PD	0.00	0.00	0.00	0.00

(continued on the next page)

Table 3. continued

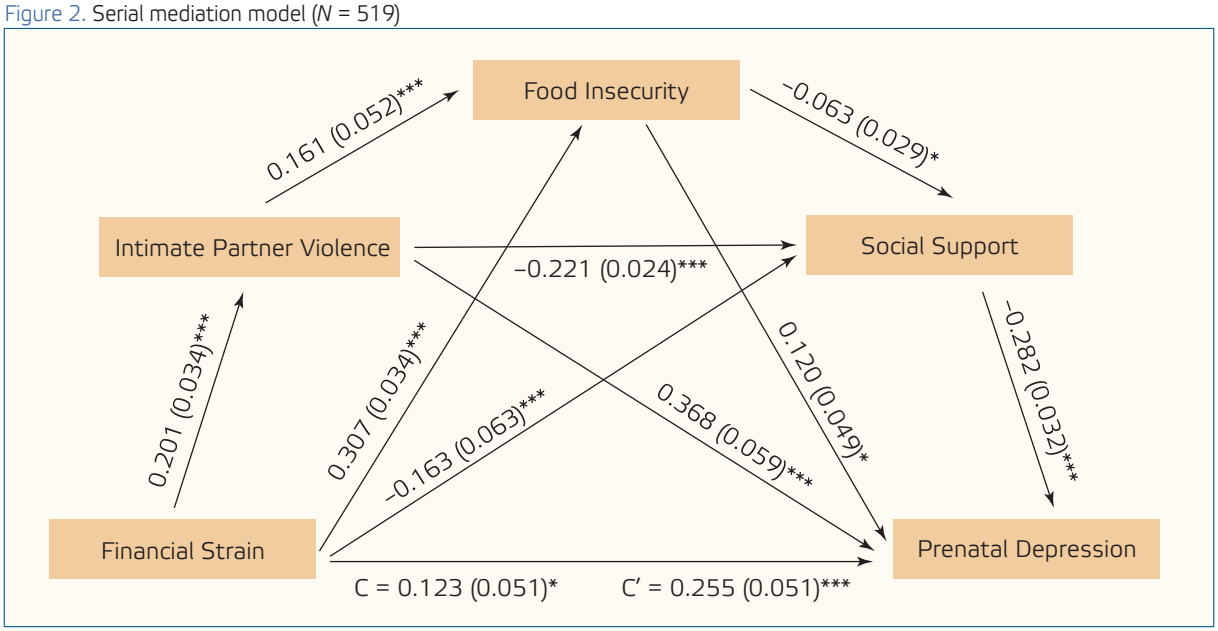
Effect	B	Boot SE	Boot LLCI	Boot ULCI
SMM6: FS → SS → FI → IPV→ PD				
FS → SS → PD	0.05	0.01	0.02	0.07
FS → FI → PD	0.04	0.02	0.01	0.08
FS → IPV → PD	0.02	0.02	-0.02	0.06
FS → SS → FI → PD	0.00	0.00	0.00	0.01
FS → SS → IPV→ PD	0.01	0.01	0.00	0.02
FS → FI → IPV → PD	0.05	0.01	0.04	0.08
FS → SS → FI→ IPV→ PD	0.00	0.00	0.00	0.01

The table shows standardized indirect effects with bootstrapped SEs of the serial mediation models; Values in bold indicate significant bias-corrected bootstrap 95% confidence interval above zero. SMM: Serial multiple mediation; PD: Prenatal depression; FS: Financial strain; FI: Food insecurity; IPV: Intimate partner violence; SS: Social support; LL- Lower Limit; UL- Upper Limit.
The mediation analysis is adjusted for marital status, educational level, income, maternal and partner work status, and wantedness of pregnancy.

The indirect paths involving SS and IPV (in both directions) were statistically significant in all SMMs. This result means that higher FS lowers SS (increases IPV), which increases IPV (lowers SS), resulting in an increased likelihood of reporting PD symptoms. These two mediators had a significant causal effect in sequence, regardless of their order of occurrence. Moreover, the indirect paths involving IPV and FI (in rotation) were statistically significant in five SMMs. The paths with FI before IPV (SMM 4 and SMM 6) had the strongest indirect effect.

Figure 2 displays the direct pathways that link FS to the individual mediators and between all mediators from SMM 5. All direct and indirect effects achieved statistical significance. Positive signs of direct effects indicate increased IPV and FI caused by FS. Conversely, the negative sign of the direct effect indicates a lower SS resulting from a higher FS. The indirect paths from FS through IPV and FI to PD are positive, showing the increase in PD through the increase in the levels of the mediators. The indirect path through social support is negative, indicating that reduced social support increases PD. The results of SMM 5 show that higher financial strain lowers social support; low social support resulted in higher IPV, and higher IPV led to greater levels of FI, which in turn contributed to higher levels of PD symptoms.

Figure 2. Serial mediation model (*N* = 519)



This figure illustrates the serial mediation of IPV, food insecurity, and social support, in the relationship between financial strain and prenatal depression. Standardized effects are presented.
C′ is a direct effect of financial strain on depression; c is the total effect of financial strain on depression
The mediation analysis is adjusted for marital status, educational level, income, maternal and partner employment status, and pregnancy intention.
* $p < .050$, ***$p < .001$.

Discussion

This study examined expectant women to determine the prevalence of PD symptoms and the psychosocial factors contributing to its development. The findings show that pregnant women with symptoms of PD have a clustering of risk factors; including financial strain, low social support, intimate partner violence, and food insecurity. The finding suggests that these factors need to be addressed collectively by devising and implementing a comprehensive intervention plan to address socioeconomic disadvantages among pregnant women.

In this study, 28.1% of participants reported symptoms of PD. This prevalence was higher than that estimated for earlier Nigerian studies (Thompson & Ajayi, 2016; Gadanaya et al., 2018; Adeoye et al., 2022; Wegbom et al., 2023). However, some of the studies used different tools for measuring depression [the Mini International Neuropsychiatric Review (MINI 6.0) and the Depression, Anxiety, and Stress Scale (DASS) having varying thresholds for diagnosing depression. The study with the closest value was that of Gadanya et al. (2018), which reported a prevalence of 26.6%.

According to results from the parallel mediation analysis, the three mediators (IPV, SS, and FI) partially mediate the association between FS and PD symptoms. All three variables significantly contributed to the overall indirect effect. Serial mediation found a causal chain between single mediations of FI and SS and serial mediations of IPV through FI and SS, respectively, in the association between FS and PD symptoms. In accordance with empirical evidence from Western and other African societies, this study found that household FI, SS, and IPV contribute to the causative processes between FS and PD symptoms. It is also important to note that bidirectional links exist between participants reporting symptoms of PD, IPV, FI, and SS.

FS emerged as an essential stressor that directly and indirectly affected PD symptoms in the current study, even after controlling for participants' self-reported objective income status and other covariates. There is proof of a complex link between FS and IPV (Lucero et al., 2016; Umukoro & Okurame, 2022). Relationships and family dynamics may suffer from FS. Conflicts and tension about money management, financial responsibilities, and decision-making may become more frequent among families or couples going through financial hardship. These interpersonal stressors may produce a hostile or unwelcoming environment that affects the pregnant woman's mental health and the unborn child's overall well-being. Women are more likely to continue in violent relationships when they depend financially on their partners (Stylianou, 2018).

Furthermore, IPV can cause mental and physical health difficulties, making it harder for women to keep their jobs and contributing to the ongoing cycle of economic inequality between the genders (Breiding et al., 2014). It has been hypothesized that men living in impoverished conditions are prone to engaging in domestic violence because they lack the financial and social resources to deal with daily stressors. This dynamic takes on further significance in patriarchal societies like Nigeria, where males who fail to fulfill the conventional breadwinner role sometimes resort to violence to establish control (Benebo et al., 2018). Moreover, prior research has shown that women who encounter IPV are at an increased risk of experiencing depression compared to those who do not (Schneider et al., 2018; Woldetensay et al., 2018; Reesor-Oyer et al., 2021).

Studies have also shown that FI is a component of FS, suggesting that people vulnerable to FI are also exposed to other forms of FS, such as those associated with financial difficulties (Drewnowski, 2022). IPV also compromises the ability of a household to effectively manage its financial and material resources, which can contribute to FI (Awungafac et al., 2021). Thus, short-term and long-term exposure to FI can affect psychological and physiological well-being (Abrahams et al., 2018). Depression is also cited as a mediator between maternal exposure to IPV and FI (Hernandez et al., 2014; Barnett et al., 2019), which suggests that a woman who experiences IPV is more likely to be depressed, which in turn hinders her ability to guarantee household food security. This can be explained through how depression impairs a woman's resource management: Depression can make food shopping and preparation difficult, prevent women from working, and increase emotions of hopelessness associated with abuse, making it harder for women to discover, access, and seek SS.

Research further shows that the adverse effects of stressors like FS, FI, and IPV on health are mitigated by SS, which can take the form of tangible, informational, or emotional assistance (Lubbers et al., 2020). Current research results demonstrate that pregnant women with lower income and higher FS reported lower SS. These results corroborate earlier research that established an association between lower socioeconomic status and structural isolation stemming from inadequate SS (Schafer & Vargas, 2016).

Furthermore, research reveals that social networks are primarily homogeneous regarding socioeconomic status; this means that pressures impacting one lower SES person may affect others in his or her network (Riley & Eckenrode, 1986). Most poor and vulnerable Nigerians are not protected by social security nets (Shadare,

2022), and many have to rely on their kin and friends for informal support. Therefore, even if a woman has an extensive SS network, helpers may be unable to provide adequate practical assistance if they also have a low socioeconomic position, which may further isolate the pregnant woman from her SS network and exacerbate her depression symptoms. There is also a good chance that depressed people underestimate the help they can access because they tend to withdraw from their social circles and experience interpersonal difficulties (Bedaso et al., 2021).

Strengths and Limitations

This study's major limitation is its cross-sectional methodology; consequently, causation and a definitive model for the observed associations cannot be concluded. It is also probable that those who suffer mental health problems may be more prone to experience financial difficulties than the larger population (a phenomenon known as the "social selection effect"), which could lead to inaccurate estimates of their actual financial burdens. However, several Western studies support the social causation concept that FS affects mental health. Because the findings are based on self-reported data from study participants, they are susceptible to recall bias. Non-evaluation for the length of financial difficulties may also confound the study findings. Women's prenatal mental health may also have been negatively impacted by exposure to other material and life stressors not examined in the current study (i.e., neighborhood disadvantage or job strain). In addition, this research was restricted to a single geographical region in Nigeria, limiting its scope. The study sample was also concentrated in metropolitan healthcare facilities and only PHCs. Thus, the findings may not generalize to pregnant women in rural areas or women attending other categories of healthcare facilities (public tertiary and private health centers), who may possess different socioeconomic characteristics.

Despite its limitations, this may be the first indigenous study to test a three-mediator model for the relationship between different types of psychosocial stress and prenatal depression symptoms. The systematic sampling procedure adopted for this study is a significant strength, as it improves the study's representativeness and decreases selection bias, enhancing its methodological rigor. The study findings also represent a vital step toward identifying possible clinical and public health intervention targets and set the foundation for more robust empirical inquiries.

Conclusion, Implications, and Future Directions

The findings of this study have implications for programs in Nigeria aimed at preventing and treating prenatal depression. Accounting for potential confounding variables, this study found statistical evidence for FI, SS, and IPV as mediators in the causal pathway from FS to participants reporting PD symptoms. The data from this research indicates that these stressors interact cumulatively, increasing the potential for adverse outcomes regarding pregnant women. Policies and structural changes that address economic instability and household financial pressures like work, housing, food, and healthcare should be implemented as public health interventions to mitigate psychosocial distress. Research and interventions must evaluate the effects of integrating mental health services into antenatal care alongside the assistance for social needs like financial aid, food security, protection from domestic abuse, and family functioning in general. This is important as prenatal care visits could serve as crucial intervention points: By educating policymakers on their patients' experiences, healthcare professionals may help improve household financial security and maternal health. Also, multidisciplinary mental health teams (i.e., psychiatrists, psychologists, and social workers) should be integrated into local primary health care.

In order to determine the direction of causation between FS and PD symptoms, future research should employ longitudinal analyses to elucidate the temporal order of events. Other indicators of FS, such as asset ownership and debt profile, may provide additional information on the potential heterogeneity between FS and symptoms of PD. The researcher also recommends a similar study that would include women from rural communities in Nigeria where the incidence of socioeconomic disadvantage stands higher.

Abbreviations

PHC: Primary Health Care
PD: Prenatal depression
FS: Financial strain
IPV: Intimate partner violence
FI: Food insecurity

Acknowledgements
The author expresses gratitude towards the staff and women who participated in the research at every Primary Health Care Center.

Funding
The author received neither financial nor non-financial support for the research; including data collection, authorship or publication of this article.

Author contribution
Olubukola A. WELLINGTON: conceptualization, design, methodology, investigation, project administration, data management, formal analysis, interpretation, supervision, writing original draft, review and editing.

Declaration of interest statement
The author declares no conflict of interest.

Ethical statement
All participants engaged in the research voluntarily and anonymously.
The participants provided their written informed consent to participate in this study.
Their data are stored in coded materials and databases without personal data.
This study protocol was approved by the Redeemer's University Ethical Review Committee (REC/30/08/2021/RUN/11).

Data Availability Statement
The data supporting this study's findings are available to the public.
We have policies in place to manage and keep data secure.

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Appendix

Table 1. Descriptive characteristics of key study variables by maternal household income (*N* = 519)

Variables	Income level			*p*-value
	≤ NGN50,000 (*n* = 192)	NGN50,000 – NGN100,000 (*n* = 221)	> NGN100,000 (*n* = 106)	
	M*(SD)*	M*(SD)*	M*(SD)*	.000
Financial strain	10.13*(3.34)*	7.28*(3.15)*	5.20*(2.78)*	.000
Intimate Partner Violence	3.71(2.73)	1.64*(1.86)*	0.42*(1.17)*	.000
Social support	20.95(4.57)	25.35*(4.75)*	29.46*(2.03)*	.000
Food insecurity	12.92(4.29)	6.67(4.26)	1.89*(2.30)*	.000
Prenatal depression	12.45(4.56)	6.59(4.08)	1.89*(2.58)*	.000

The table shows standardized indirect effects with bootstrapped SEs of the serial mediation models; Values in bold indicate significant bias-corrected bootstrap 95% confidence interval above zero. SMM: Serial multiple mediation; PD: Prenatal depression; FS: Financial strain; FI: Food insecurity; IPV: Intimate partner violence; SS: Social support; LL- Lower Limit; UL- Upper Limit. The mediation analysis is adjusted for marital status, educational level, income, maternal and partner work status, and wantedness of pregnancy.