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The Public Health Surveillance Well-Being Scale: Reliability and validity study of the Turkish version

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Abstract

Introduction: The Public Health Surveillance Well-Being Scale (PHS-WB) is a measuring tool developed by Bann and colleagues (2012) for determining the well-being status of a community, expressed in terms of physical, mental, and social well-being. This study aimed to adapt, translate and validate the PHS-WB from English into the Turkish language.
Methods: A questionnaire ad hoc for collecting socio-demographic characteristics of participants, the Public Health Surveillance Well-Being Scale (PHS-WS) and the Perceived Wellness Scale (PWS) were used in our study. For the validity of the PHS-WS language, the original language of the scale was first translated from English into Turkish, whereas the back translation of the final draft was carried out from Turkish to English by a different language expert. The Content Validity Index was calculated. For the scale (criterion) validity, the coincidental scale validation method was used. The structural validity was assessed by using the exploratory factor analysis (EFA).
Results: The scale showed a high internal consistency, as the Cronbach's alpha coefficient was 0.83 for the total score and 0.66, 0.76, and 0.69 for the physical, social and mental subscales, respectively. There was a total of 12 items in the final Turkish form of the PHS-WB, having the same factor structure as the original as result of the validity and safety studies performed.
Discussion and Conclusions: The validity and reliability of the Public Health Surveillance Well-being Scale was ensured. This questionnaire could be used by researchers for further investigation in different regions of Turkey, on larger sample groups and for evaluation of special groups, such as individuals with chronic illness and disability, or individuals employed in specific occupation (e.g., healthcare and social care professionals, unemployed, and students).

KEY WORDS: Health; public health, questionnaire; scale; Turkey; well-being.

Riassunto

Introduzione: Il questionario *Public Health Surveillance Well-Being Scale* (PHS-WB) è uno strumento di misura sviluppato da Bann e colleghi (2012) per determinare lo stato di salute di una comunità, espresso in termini di benessere fisico, mentale e sociale. Questa ricerca è stata mirata ad adattare, tradurre e validare questo strumento dall'inglese al turco.
Metodi: Un questionario ad hoc per la raccolta delle caratteristiche socio-demografiche dei partecipanti, il *Public Health Surveillance Well-Being Scale* (PHS-WS) ed il *Perceived Wellness Scale* (PWS) sono stati utilizzati nel nostro studio. Per la validità di linguaggio del PHS-WS, il questionario è stato prima tradotto dall'inglese al turco, mentre la back translation della bozza finale dal turco all'inglese è stata effettuata da un differente esperto linguistico. È stato calcolato l'indice di validità del contenuto. Per la validità di criterio della scala, è stato utilizzato il metodo di validazione casuale della scala. La validità strutturale è stata valutata attraverso l'analisi esplorativa fattoriale.
Risultati: Il questionario ha evidenziato un elevata consistenza interna, dal momento che l'alfa di Cronbach è risultata essere pari a 0,83 per l'intero questionario e pari a 0,66, 0,76 e 0,69 rispettivamente per le sottoscale relative al benessere fisico, sociale e mentale. La versione turca finale del PHS-WB è composta da 12 items ed ha lo stesso fattore strutturale di quella originale come risultato degli studi di validità effettuati.
Discussione e Conclusioni: La validità e l'affidabilità del questionario *Public Health Surveillance Well-being Scale* è stata ottenuta. Questo strumento potrebbe essere usato dai ricercatori per ulteriori indagini in altre regioni della Turchia, su campioni di persone più consistenti e valutare gruppi particolari, come gli individui affetti da malattie croniche e disabilità o le persone che svolgono specifiche professioni (per esempio, professionisti della salute ed operatori sociali, disoccupati e studenti).

TAKE-HOME MESSAGE

The Public Health Surveillance Well-being Scale was translated and validated in Turkish, showing good realiability and validity. This study will pave the way for further investigation in different regions of Turkey, on larger sample groups and for evaluation of special groups.

Competing interests - none declared.

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INTRODUCTION

Health indicators drive public health actions, measure health community levels, and provide valuable information for international comparisons [1]. Health and illness are made up of many components and have been defined by scholars in heterogeneous different ways. As they are not two completely separated concepts, in some studies they have been also considered as a whole [2]. The best way to measure the health level of individuals or communities is by directly evaluating the presence of well-being, which is considered as a positive construct according to the new WHO's health definition. According to WHO, all systems and structures that govern socio-economic and environmental conditions should consider implications of their activities in relation to their potential impact on individual and collective health and well-being [3]. Health is a positive condition [4], which is related to the capacity of individual to enjoy own life and to face health challenges; as a consequence, it is not merely the absence of disease. Negative health is associated with higher morbidity and mortality [5]. Therefore, in opposition to the pathogenic concept of health described by the biomedical model, Antonovsky thought about health as a 'continuum on an axis between total ill health (dis-ease) and total health (ease)'. Salutogenesis is the origin of health, and by focusing on resources, it is possible to maintain and improve the movement towards health [6]. Unfortunately, the level of health is often based upon measuring the extent of diseases and health disorders. Thus, the reduction in disease incidence is automatically perceived as an increased health level [7]. In other words, health indicators mistakenly identify health, which is a positive condition, by assessing negative conditions such as illness and disability, rather than measuring health directly [8]. For example, mortality and morbidity rates, which are negative health indicators, are often used to assess positive health conditions [9–12]. Instead, in order to decide the level of health, it would be advisable to directly assess the positive aspects of health, which can promote activities related to investigation and follow-up and are useful for improving health measurement tools. For this reason, it is preferable to study health levels by measuring the individual's perception of well-being [11]. Indeed, positive health is defined as a condition beyond the absence of disease, which can also be identified and measured [13]. In this way, some measurable criteria that can indicate the quality of wellbeing are the level of happy and peaceful time per person, the length of time without complaints, the average intelligence and efficiency level, the decrease in the need for treatment services in general and in crimes against human values [9].

Well-being [14], as a positive health condition, can be described as a feeling of well-being and an assessment of positive quality of life. Individuals with high well-being levels are more likely to be productive and contribute to growth and social development of their communities. In addition, physical, mental and social well-being give benefits for both the individual's and community's health, work, family, and economics status. For example, a high-level of well-being reduces the risk of illness, discomfort and injury, and accelerates healing by strengthening the immune system [15].

The well-being agenda is complex [16] and since the well-being is subjective [17] and there is no specific measure of subjective wellbeing [18], it can be only determined by the individual's own statements [15]. For this reason, it is difficult to define and measure well-being [19] because there are no objective tools and equipments to measure the abstract qualities of individuals. Therefore, there is a need for measuring tools, which indirectly embody well-being as an abstract concept [20].

This study aimed to adapt, translate and validate the Public Health Surveillance Well-Being Scale (PHS-WB) from English into the Turkish language. The PHS-WB is a measuring tool for determining the well-being status of a community, developed by Bann and colleagues (2012), in order to assess beliefs and attitudes on health and disorders, as well as on health behaviours and health risk

factors, by measuring the level of individual well-being, expressed in terms of physical, social, and mental characteristics [21].

METHODS

Study sample

Considering the age of participants enrolled in the original study, this research, which was carried out in 2015, comprised only adults aged 18 years and over. In the original version of the Public Health Surveillance Well-Being Scale, 34 judges were employed. In our study, a panel of 24 judges were used. Methodologists suggest different rules for determining the sample size necessary for correctly representing the study population. One of them is the '10 rule' (at least 10 participants per variable). Another rule is the '100 rule', and according to this, at least 100 individuals should be employed [22]. Accordingly, in our study we followed the '10 rule', thus, it was assumed that a sample of 340 people was sufficient to represent the study population in our research field.

The minimum sample volume was as n = 385, which was obtained within a mean of 1-point deviation from the 95% confidence interval of a 50 ± 10 score as the transformed T score in the original application of the scale.

For the selection of the study sample, a population-based cluster sampling method was used, which was based on the number of neighborhoods that were identified in alphabetical order along with their population. Then, a cumulative population column was created. To increase the representation of the universe, the volume that was collected from the neighborhoods was kept small (m = 7).

The following formula was applied:

Minimum number of participants to be sampled: 385

Cluster volume (m): 7

Number of clusters to be sampled: 385/7 = 55

Total population aged over 18: 45.330

Sampling interval (population / cluster ratio): 45.330/7 = 715.

Since a cluster of 7 (7 people) was sampled in a population including 715 members, it was calculated the number of clusters and from which district they should be taken by the population weight. The population unit was randomly determined by the package program in the electronic program by using the following formula: 1-715 (X = 592). Thus, it was decided how many samples from each region should be included in the study. As a result, questionnaires were administered to 385 adults, subdivided in 55 clusters.

Study instruments

Socio-Demographic Data Form

In the collection of research data, a Socio-Demographic Data Form containing 9 questions generated by the researchers was used. In the question form there were questions regarding gender, age, marital status, education level, occupation, self-assessed income level, people they lived with ('family' or 'friends'), self-assessed general health status ('good', 'fair', 'poor') and self-reported chronic diseases ('yes' or 'not').

Public Health Surveillance Well-Being Scale (PHS-WS)

This scale measures the extent of physical, social, and mental well-being experienced by individuals. It also assesses people's awareness of health information, health behavior and health risk factors, as well as their disease perception. The 34 items on the scale consisted of the judgments expressed on each of the three areas of well-being. The scale items reflected the mental well-being, life satisfaction, meaning in life, self-rule, competence, relativity, and positive and negative affective status. Positive affective status was 'being cheerful, in good spirits, extremely happy, calm and peaceful, satisfied and full of life'. Negative affective status was 'being so sad that nothing could cheer me up, hopeless, like everything is an effort, and worthless'. In terms of social health, items were selected from a broader range of measures of private life satisfaction, which are related to public health, as determined by content specialists. Physical items were selected from the Behavioral Risk Factor Surveillance System (BRFSS). The larger

values in the scale showed better results [21]. In this study, a panel of experts made some adjustments on the scale to contribute to the form of expression.

Perceived Wellness Scale (PWS)

The PWS was developed by Adams and his colleagues in 1997 to determine the level of well-being that individuals perceive. It was a 6-point Likert type scale with 36 items. A total score ranging from 36 to 216 can be obtained from this scale (low well-being level = ≤ 144; high well-being level = > 144). The Turkish version of the PWS was also found to be a valid and reliable inventory [23].

Application

The adaptation of the PHWS into Turkish was initiated with the required permission from Rosemarie Kobau, one of the scholars who developed the scale. For the validity of the PHWS language, the original language of the scale, which is in English, was first translated into Turkish. For this, the original English form was translated into Turkish separately by three experts, which were a faculty member, and two language experts. The resulting three translations were evaluated by the researchers and their supervisor, and the translation, which best fitted with each original item of the scale in terms of meaning and content, was determined. The final draft of the Turkish version was then back translated into English by a different language expert, who did not see the original scale, ignoring the previous language experts. The difference between the obtained English form and the original form was compared. The reversed form ensured the language validity by re-examining the Turkish expressions that created a different meaning from the original one. It was sent to Rosemarie Kobau, one of the authors of the study, who was asked support. The changes suggested by the author were made and rearranged to finalize the PHWS in the Turkish form. In order to evaluate the validity of the content and face validity of the scale translated into Turkish, the opinions of five specialists (psychiatry, public health, psychology, internal medicine, and sociology) who had sufficient equipment and knowledge in the subject area and understood the importance of the study were taken.

Written directions were presented to all participants, as approval for voluntary participation was obtained, whereas at the required points, the researcher gave explanations. A random street was identified for each cluster to be taken from a neighborhood. Starting from a random house in the street entered for each cluster, the questionnaires were applied to those who agreed to do the interview. The aim was to select an adult from each household. When the seven conversations that filled the cluster volume were carried out, the sampling on the street was terminated. The data was collected by researchers through face-to-face interviews for a total of 385 participants.

Statistical analysis

The descriptive statistics were summarized by percentages. For the internal consistency coefficient, the Cronbach alpha reliability coefficient; for the item-total analysis; the item - total score correlations were calculated. For language validity; English was translated into Turkish and Turkish was translated back into English. For the scope/content validity of the assessment of expert opinions; this was done by considering the Davis (1992) technique [24]. The Content Validity Index was calculated. For the scale (criterion) validity, the coincidental scale validation method, one of the criterion-related validity methods, was used. The structural validity was assessed by using the exploratory factor analysis (EFA). The significance level was taken as 0.05.

RESULTS

As shown by Table 1, most of the individuals accepted into the study were in the 40-49 (31.9%), and 30-39 (28.8%) age groups. Less than half of participants were women (42.9%) and highly educated (42.6%). Most of them (71.4%) were married, currently employed (70.9%) and were living with their family (93.2%). More than half of them (59.7%)

Table 1. Socio-demographic characteristics of participants (*n* = 385).

Variables		**N**	**%**
Gender	Female	165	42.9
	Male	220	57.1
Age	29 and aged below	87	22.6
	30-39	111	28.8
	40-49	123	31.9
	50 and above	64	16.6
Marital status	Married	275	71.4
	Single	91	23.6
	Divorced / Dead wife/husband	19	4.9
Education level	Primary school	79	20.5
	Secondary education	130	33.8
	Higher education	164	42.6
	Master / PhD	12	3.1
Working status	Employed	273	70.9
	Unemployed	112	29.1
Who lived with	With family	359	93.2
	With friend	26	6.8
Income level	Insufficient (lower than expense)	99	25.7
	Sufficient (equal to expenses)	230	59.7
	Good (more than expense)	56	14.5
Occupation	Civil servant	109	28.3
	Workman	102	26.5
	Housewife	48	12.5
	Farmer	10	2.6
	Tradesman, Trader, Own business	74	19.2
	Student	28	7.3
	Unemployed	14	3.6
Self-assessed Health Status	Good	36	9.4
	Fair	214	55.6
	Poor	135	35.1
Self-reported chronic disease	Yes	48	12,5
	No	337	87.5

stated their income level was equal to expenses. Overall, most of them were civil servants (28.4%) and workmen (26.5%).

With respect of their self-reported health status, a few of them (9.4%) declared a 'good health status level', whereas most of them reported 'fair' (55.6%) or 'poor' (35.1%) health status. 87.5% of participants declared not to be affected by any chronic diseases.

Factor structure

As a result of the Explanatory Factor Analysis (EFA) aimed to evaluate the factor structure of PHWS, it was showed that the original three sub-dimensional structure of the scale coincides with the structure obtained in this study**.**

The scale has mental, social and physical sub-dimensions. The resulting factor loads are given in Table 2. In order to get a high score on a subscale together with the factor loads obtained in this study, items 19, 21, 23, 27 in the mental subscale and item 33 in the physical subscale were inverse coded, taking into account the wellbeing criteria in that health state. During the analyzes, the other scored scales of 10 were converted to scales of 5 as the scales were made originally. Well-being

Table 2. EFA results of Public Health Surveillance Well-being Scale

Item	General factor load	Area factor load
01. In most ways my life is close to ideal	.567	.593
02. My life has a clear sense of purpose	.533	.572
03. I generally feel free to express my ideas and opinions	.475	.507
04. The conditions of my life are excellent	.636	.624
05. I feel like I am free to decide for myself how to live my life	.521	.536
06. I am satisfied with my life	.614	.641
07. So far, I have gotten the important things I want in life	.604	.606
08. If I could live my life over, I would change almost nothing	.551	.562
09. I have a good sense of what makes my life meaningful	.565	.599
10. I have discovered a satisfying life purpose	.619	.650
11. I get along well with people I come into contact with	.563	.599
12. I feel like I can pretty much be myself in daily situations	.638	.672
13. People I know tell me I am competent at what I do	.630	.666
14. I often feel very capable	.625	.654
15. I consider the people I regularly interact with to be my friends	.500	.537
16. Most days I feel a sense of accomplishment from what I do	.618	.638
17. People in my life care about me	.552	.580
18. I feel cheerful	.601	.568
19. I feel hopeless	.002	.001
20. I feel satisfied	.636	.606
21. I feel worthless	.058	.077
22. I feel in good spirits	.587	.542
23. I feel that everything was an effort	.129	.135
24. I feel extremely happy	.574	.539
25. I feel calm and peaceful	.492	.473
26. I feel full of life	.600	.560
27. I feel so sad that nothing could cheer me up	.045	.053
28. I'm satisfied with my family life	.467	.769
29. I'm satisfied with my friends and social life	.516	.832
29a. I'm satisfied with my social life out of friends and family	.511	.821
30. I'm satisfied with my ability to help others	.422	.747
31. I'm satisfied with my energy level	.494	.790
32. I'm satisfied extent able to carry out my daily activities	.466	.794
33. I'm satisfied with my health status	.141	.175
34. I'm satisfied about/with my number of days I felt very healthy and full of energy	.407	.712

Table 3. Correlations of Public Health Surveillance Well-being Scale subscales and Cronbach's Alpha coefficients.

PHWS	Physical	Social	Mental	Cronbach Alpha
Physical				0.66
Social	0.57*			0.76
Mental	0.43*	0.38*		0.69
Total	0.78*	0.77*	0.81*	0.83

* $P < 0.001$

Table 4. The item-total correlations of the items of Public Health Surveillance Well-being Scale and the Cronbach's Alpha coefficients when the items were excluded.

Item no	Item	Item-total correlation	Cron. Alpha when items are eliminated
1	In most ways my life is close to ideal	0.49	0.90
2	My life has a clear sense of purpose	0.46	0.90
3	I generally feel free to express my ideas and opinions	0.42	0.90
4	The conditions of my life are excellent	0.58	0.90
5	I feel like I am free to decide for myself how to live my life	0.46	0.90
6	I am satisfied with my life	0.54	0.90
7	So far, I have gotten the important things I want in life	0.53	0.90
8	If I could live my life over, I would change almost nothing	0.49	0.90
9	I have a good sense of what makes my life meaningful	0.50	0.90
10	I have discovered a satisfying life purpose	0.54	0.90
11	I get along well with people I come into contact with	0.50	0.90
12	I feel like I can pretty much be myself in daily situations	0.57	0.90
13	People I know tell me I am competent at what I do	0.56	0.90
14	I often feel very capable	0.56	0.90
15	I consider the people I regularly interact with to be my friends	0.44	0.90
16	Most days I feel a sense of accomplishment from what I do	0.54	0.90
17	People in my life care about me	0.51	0.90
18	I feel cheerful	0.55	0.90
19	I feel hopeless	0.09	0.90
20	I feel satisfied	0.60	0.90
21	I feel worthless	0.13	0.90
22	I feel in good spirits	0.54	0.90
23	I feel that everything was an effort	0.03	0.90
24	I feel extremely happy	0.53	0.90
25	I feel calm and peaceful	0.45	0.90
26	I feel full of life	0.55	0.90
27	I feel so sad that nothing could cheer me up	0.13	0.90
28	I am satisfied with my family life	0.44	0.90
29	I am satisfied with my friends and social life	0.53	0.90
29a	I am satisfied with my social life out of friends and family	0.52	0.90
30	I am satisfied with my ability to help others	0.36	0.90
31	I am satisfied with my energy level	0.47	0.90
32	I feel extent able to carry out of my daily activities	0.42	0.90
33	I am satisfied with my health status	0.15	0.90
34	I am satisfied with my number of days I felt very healthy and full of energy	0.38	0.90

score was obtained by summing up scores taken from questionnaire items forming related extent.

Reliability

Internal consistency

The general Cronbach's alpha coefficients of the raw PHS-WS scale (34 items) showed a very high internal consistency; in the total of 0.90 PHWS, and 0,56 physical, 0,68 social, and 0,89 mental dimension. In this study, it was determined a high internal consistency in the last form of the scale, with a Cronbach's alpha coefficient being 0.83 for the total score and 0.66, 0.76, and 0.69 for physical, social and mental subscales, respectively. The correlation between PHWS sub-dimensions was significant to the highest degree (Table 3).

Item-Total Analysis

Item-total score correlations of items scale 5., 7., 10., 13., 19., 26., 28., 29., 29a., 31., 32. and 34. ranged between 0.09-0.56 (excluding items 1., 2., 3., 4., 6., 8., 9., 11., 12., 14., 15., 16., 17., 18., 20., 21., 22., 23., 24., 25., 27., 30. and 33.). Excluded item increased Cronbach alpha coefficient (Table 4).

Validity

For the language validation, the scale was translated from English into Turkish, and then back from Turkish into English. The Content Validity Scale was assessed according to Davis (1992) and was then evaluated by five specialists in order for them to scale the items by evaluating the content validity of the Public Health Surveillance Well-being Scale, which was found to be 0.80. The CVS of the scale was found to be 0.97 (excluding 23 and 34 items) and the scores of 23rd and 34th items were below 0.80. For this reason, items 23 and 34 were excluded from the scale in terms of scope/content validity.

The results of the correlation between the PHWS (final version) and the PWS scale showed a significant positive correlation at a further stage ($P < 0.001$).

As a result of the analysis conducted, a new 12-item scale was created. While choosing scale items, the final scale items were determined by selecting at least 3 items for each of the 3 -main sub-dimensions (i.e., mental, social, and physical), representing each sub-dimension in the main measure (9 items); which have a higher factor load (> 0.40) [21, 25], core values (Eigen Value) greater than 1 [26], an item-total correlation average greater than the average (r > 0.50) [27, 28], answer choices varied and not clustered [21], more clear in terms of expression [29], differentiated by demographic variables, not exceedingly low or high in the mean, and the subdimension which is thought to best reflect the scale subdimension. The social subdivision was represented by two items on the original scale. However, according to expert opinions, since with the 29th question 'Friends and your social life' two questions were asked in one, it was presented as two separate items on the final scale. Since the competence and relationship subdivision met at the same factor, the 15th question was removed and was represented on the scale with one item and decreased to 12 items. The 10-point Likert-type questions were converted into a 5-point Likert for both ease of responding and the evaluation by the participant. The scale was in its final state. The remaining 12 items of the scale were originally assessed by converting the answers with more than 5-point Likert into 5 points scale Likert [21].

DISCUSSION AND CONCLUSION

In this study, the adaptation of the Public Health Surveillance Well-being Scale developed by Bann and his colleagues (2012) into Turkish and the validity and safety of the Turkish form was conducted. The consistency or reproducibility of the measurements obtained from the measurement means reliability showed that certain interpretations and usages made from the measurements obtained through the measurement tools are appropriate and sufficient for validity [30]. There was a total of 12 items in Turkish form, which was determined to have the same factor structure as the original as a result of the validity and safety studies performed. There were 6 items in the mental subscale of the questionnaire, 3 items in the social subscale, and 3 items in the physical subscale. There was a total of 1 item that was scored inversely. While the total score to be taken from the scale was calculated, it was necessary to inversely score the item in the mental dimension (Item 19, and item 2 present at the end of the scale). The items of the scale were evaluated based on the Likert type scale as follows: In the first question the scores of each item were formed by choices of '1 = I strongly disagree, '2 = I disagree', '3 = Neither agree nor disagree', '4 = I disagree', '5 = I strongly agree'; in the second question, each item was formed by the options of '1 = Never', '2 = Rarely', '3 = Sometimes', '4 = Mostly', '5 = Always'. In the third question, each item was formed by grading from one to ten; the fourth question was '1 = None/

Zero', '2 = I do not know / Not sure'. Only question 4 consisted of two item parts. In the second part of the 4th question, there was an open-ended question asking for the number of days. The lowest score that can be taken from the scale 12; the highest score was 82. The increase in scores on the scale indicates that the well-being of the people is good. The application of the adapted scales to Turkish communities in different cultures and settlements and in different geographical regions will contribute to the validity and reliability of the scale. On the validity of the content, an expert opinion was taken (the Davis technique applied) and the Content Validity Index was calculated. It was determined that there is a consensus among experts and test represents the area to be measured. The results of the factor analysis for the PHWS, which was adapted for the study, can be interpreted as that the expressions in the adapted scale show an easy and culturally appropriate structure for the Turkish culture. In addition, the relevance of the items to the subscale scores is significant as this reveals the homogeneity of the targeted structure to be measured. If the alpha coefficient is below 0.40, the developed test is unreliable [18]. Cronbach's α of PHWS was 0.83 and, thus, showed high reliability. Considering the number of eigenvalues that account for 80-85% of the total variance, the number of factors providing 65% in some areas is also considered as the number of valid factors [31].

CONCLUSION

As a result of our study, the validity and safety of the Turkish version of the 'Public Health Surveillance Well-being Scale' was ensured. This questionnaire could be used by researchers for further investigation in different regions of Turkey, on larger sample groups. Furthermore, it could be used for the evaluation of special groups, such as individuals with chronic illness and disability, or individuals employed in specific occupation (e.g., healthcare and social care professionals, unemployed, and students).

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