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VALIDATION AND PSYCHOMETRIC PROPERTIES OF THE POLISH VERSION OF THE FEAR OF COVID-19 SCALE AMONG ADOLESCENTS

Abstract

Objectives: Coronavirus leads to multiple tragic consequences not only in the dimension of people's physical functioning, but also in the psychological dimension. Due to the increased risk of morbidity among the older people, the researchers put the emphasis on the elderly. Nonetheless, it is unacceptable to disregard it in the group of young people who become ill with it and observe its consequences with respect to their close relatives. Accordingly, it is so important to undertake studies pertaining to mental health of children and that of youth during the pandemic. Prior to initiating the research, the adequate selection of research tools of high psychometric properties should be made.

Material and methods: Our objective was to adapt the Fear of COVID-19 Scale to Polish conditions. The study involved 380 randomly selected students aged 14-18 who were placed under the several months' national quarantine, i.e. they were taught online without the direct contact with peers.

Results: The obtained data point to a low intensity of the fear of coronavirus, but the moderate intensity of: satisfaction with life, depression symptoms, state anxiety. Moreover, the confirmation has been provided of high psychometric properties of the Fear of COVID-19 Scale in the Polish version.

Conclusions: The adapted scale can be successfully used in the comparative studies of the youth in Poland and in other countries (thanks to different linguistic versions of the scale) for the preventive and therapeutic measures.

Keywords: *youth, depression, anxiety, adaptation, Fear of COVID-19 Scale*

Background

The changes occurring in the world designate the direction for scientific research. The researchers adjust themselves to current needs of human beings. The year 2019 brought them a new challenge in the form of pandemic. The fiction of the television transformed itself into a real problem of the people from the whole world. The results of scientific research and statistical data confirm the large scale of the disease. By 5 September 2020 there have been 26 468 031 people infected, among whom 871 166 died (WHO, 2020). As regards Poland, 70 387 cases of the disease have been confirmed, including 2113 fatalities (Ministry of Health, 2020). Most frequently the symptoms of the coronavirus are as follows: strong dry cough, lack of sense of smell and taste, fever, breathlessness (Wang et al., 2020). Assuming that there is a strong correlation between the physical and mental health of human beings, it should be expected that the sick also experience negative effects of the disease in the sphere of mental functioning. The majority of the carried out studies concern physical health of human beings, among others vaccination and medication for COVID-19. However, the studies pertaining to mental health most often pertain to adults, and depict both the severity of depression symptoms and anxiety disorders (Amerio et al., 2020; Cullen, Gulati, & Kelly, 2020; Duan & Zhu, 2020; Khan et al., 2020; Panchal et al., 2020; Serafini et al., 2020; Thakur & Jain, 2020; Torales, O'Higgins, Castaldelli-Maia, & Ventriglio, 2020). It appears that the concurrent and continuous monitoring of their well-being is indispensable, in that the negligence of this area may produce dire consequences

in the future, e.g. the increase in the number of suicides. Thus, it is so important to develop research tools of high psychometric properties, which will be used later on in the diagnosis of single persons and in the comparative studies. In light of the above, the decision was made to adapt the Fear of COVID-19 Scale to Polish conditions, as it has already been applied in various countries.

According to the data of the Polish State Sanitary Inspectorate (SSI), the persons under 20 years old are the least vulnerable to the morbidity to COVID-19. In our country there were no fatalities among children and youth, but it do occurs in the world (e.g. by 4 September 2020 the persons under 18 represented 10% of all the sick in California) (CDPH, 2020). The risk of the disease of the persons aged 5-17 years old is approximately 9 times lower than in the case of the persons aged 18-19, and even over 12 times lower compared to persons aged 75 and older (CDC, 2020; NYC, 2020). Nevertheless, the young people experience the disease in the emotional dimension and in the form of death of their close relatives, i.e. of the parents and more frequently of their grandparents (SSI, 2020). Apart from that, the several months' national quarantine could exacerbate the negative effects of COVID-19 through the long-lasting isolation, the lack of contact with peers and a forced change of lifestyle. Hence, they may suffer from the effects of coronavirus in the long term.

Even prior to the pandemic, the statistical data reflecting the high rate of depression among the youth was disquieting. It is estimated that from several up to over sixty percent of adolescents worldwide is infected (e.g. 25% in Columbia and 65% in Poland) (Dymowska & Nowicka-Sauer, 2015; Kessler et al., 2007; Kołodziejek, 2008; Modrzejewska & Bomba, 2010; Vinaccia et al., 2006). WHO (2019) reports that the depression represents the fourth most frequent disease of the young people between the ages of 15 and 19. Research findings of other scientists prove that depression is a serious problem of young people (Jane Costello, Erkanli, & Angold, 2006; Keenan-Miller, Hammen, & Brennan, 2007; Windfuhr et al., 2008). In addition, Boers, Afzali, Newton and Conrod (2019) have shown the increase of the depression symptoms by 0.64 unit among the youth. In Poland, such an increase concerns more often adolescents (2-15%) rather than children (Dymowska & Nowicka-Sauer, 2015). Besides that, the age in which the first depressive episode occurred has lowered during the recent years. At the age of 18 even 20% of the persons have gone

through at least one depressive episode, in particular the girls (Hammen, 2006; Kendall, 2004; Spence & Reinecke, 2005). The depression in the developmental period is frequently accompanied by anxiety disorders, which take the ninth place in the ranking of the diseases threatening the youth between the ages of 15 and 19 (Carr, 2004; WHO, 2019). Dymowska and Nowicka-Sauer (2015) discovered the anxiety syndrome with anxiety attacks (17.6%) and other anxiety disorders (17.6%) in the group of Polish young people studied by them.

The aforementioned information proves the need of undertaking studies pertaining to mental health of the youth, particularly in the times of pandemic when the risk of becoming ill is considerably escalated.

Participants and procedure

Participants

The adaptive study comprised 380 randomly selected students from 8 Polish public upper secondary schools and lower secondary schools. The respondents submitted via the Internet the questionnaire prepared in the Google form subsequently sent to schools by electronic mails. Its submission took approximately 20-25 minutes. The research lasted from 29 April 2020 to 28 June 2020 during the quarantine when students were engaged in distance learning. The decision on conducting research in an online form has been primarily made because of the period in which it was conducted. During the so-called *national quarantine* there were difficulties in the personal contact with respondents. The conduct of research in an online form and application of Google form for this purpose allowed to eliminate the so-called "lack of data" (the form had been developed in such a way so that the respondent was obliged to provide all the answers to each question, and only then sent it back). This form of the conduct of research is also justified by the possibility to access a wider group of recipients. "It decreases the impact of partiality and increases the sense of anonymity" (Hornowska & Paluchowski, 2007, pp. 67–68).

Measure

The Fear of COVID-19 Scale – FCV-19S (Ahorsu et al., 2020). This is a seven-item scale used to assess the fear of COVID-19. Each item is rated on a 5-point Likert scale, where 1 means *strongly disagree*, whereas 5 – *strongly agree*. The highest the score falling within the range of 7-35 points, the greater the fear of COVID-19. For the purposes of developing the Polish version of the Fear of COVID-19 Scale, the items have been translated compliant with the principle of linguistic equivalence (Brislin, 1970, 1980). Thus, the questionnaire was conveyed to two bilingual translators in order to render it into the Polish language and then, having agreed on the version, again into the English language. Prior to research commencement, the questionnaire has been subject to proofreading. The reliability coefficient of the original version of the questionnaire amounted to .82.

Satisfaction with Life Scale – SWLS (Diener, Emmons, Larsen, & Griffin, 1985). The scale consists of five items rated on a 7-point Likert scale, where 1 means *strongly disagree*, whereas 7 – *strongly agree*. The items allow for the assessment of the whole life. The overall result falls within the range from 5 to 35 points. It can be referred to sten norms. The reliability coefficient of the Polish version developed by Juczyński (2001) amounts to .81.

Assessment of depressiveness in population – CESD-R (Eaton, Smith, Ybarra, Muntaner, & Tien, 2004). The Centre for Epidemiologic Studies Depression Scale (CESD-R) enables to determine the intensity of the depression symptoms due to 20 items describing the well-being and the behaviour of the studied individuals over the last two weeks. Each item is rated on a 5-point Liker scale, where 0 means *not at all or less than one day*, whereas 4 – *nearly every day for two weeks.* The results obtained in this way are summed up and, next, the possibility is provided to establish the degree of the severity of depression symptoms. The reliability coefficient of the Polish version, as developed by Koziara (2016), amounted to .95.

State-Trait Anxiety Inventory – STAI (Wrześniewski, Sosnowski, & Matusik, 2002). The inventory consists of two parts pertaining to state anxiety (X-1) and trait anxiety (X-2). Due to the fact that the adaptive study referred to external aspects (coronavirus pandemic) the scale X-1 has solely been applied.

Based on the obtained results, it is possible to establish the severity of anxiety „understood as specific external stimuli such as stressful situations, threat, new and unknown situations, etc." (Wrześniewski et al., 2002, p. 40). The X-1 scale consists of 20 items rated on a 4-point Likert scale, where 1 means *strongly disagree*, whereas 4 – *strongly agree*. The obtained results are summed up after the reversal of the scores assigned to 10 items (the sum falls within the range from 20 to 80 points) and, next, the reference is made to sten norms. The reliability coefficient in all the age groups exceeded .76.

Statistical analysis

Statistical analyses have been conducted with the IBM SPSS Statistics software Version 25 and with the use of IBM SPSS AMOS Version 25. With a view to verify the internal structure of the questionnaire both an exploratory factor analysis (EFA) and principal component analysis (PCA) with the orthogonal varimax rotation were used. Confirmatory factor analysis (CFA) has been performed to assess usefulness of the structure of coefficients as put forward by the authors of the scale. In light of the above, in order to examine the adjustment of the model, the following indices were used: root mean square error of approximation (RSMEA), confirmatory fit index (CFI), Tucker-Lewis index (TLI) and standardized root mean square residual (SRMR). The discrimination index and internal consistency of the questionnaire were determined. The analysis of the questionnaire's correlation with other variables has also been performed.

Results

Descriptive statistics

There were 380 people involved in the research, the majority of whom were females (77.9%). The remaining individuals were males (22.1%). Research participants were between the ages of 14 and 18 (M=16.58; SD=1.02). 38.9% of the youth lived in the village, 17.4% came from towns, whereas 43.7% from the cities.

The average overall result obtained based on the Fear of COVID-19 Scale amounted to 13.71 (SD=4.90), which points to the low intensity of the youth's fear of coronavirus (table 1). Instead, the average results from the remaining tools are indicative of moderate intensity of: satisfaction with life (M=18.90; SD=6.46), depression symptoms (M=26.96; SD=16.19) and state anxiety (M=43.61; SD=11.25).

In accordance with the data contained in table 1, the skewness of the Fear of COVID-19 Scale reached the value of 1.123 +/ – 0.125, whereas kurtosis 2.395 +/ – 0,250. Both values considerably exceed the range of <-1;1>, which indicates that the results are significantly divergent from the normal distribution. Given the above, *r*-Spearman coefficient has been employed to examine correlation.

Table 1. *Descriptive statistics of the distribution of variables (N = 380)*

Scale	M	SD	Range	S (SE)	K (SE)
FCV-19S	13.71	4.90	7-35	1.123 (0.125)	2.395 (0.250)
SWLS	18.90	6.46	5-35	-0.003 (0.125)	-0.562 (0.250)
CESD-R	26.96	16.19	0-79	0.641 (0.125)	-0.053 (0.250)
STAI	43.61	11.25	20-73	0.269 (0.125)	-0.194 (0.250)

*Note***.** M – mean; SD – standard deviation; S (SE) – skewness (standard error); K (SE) – kurtosis (standard error)

Between the average results of females and males, with respect to fear of COVID-19, statistically significant differences were noticed $t(380)=3.82$; $p<.001$. These were females who achieved higher means ($M_{FCV\text{-}19S}=14.22$; SD=4.78), as compared to males ($M_{FCV\text{-}19S}=11.94$; SD=4.94). The size of the effect entails low correspondence of the fear of COVID-19 with the sex ($d=.39$) (cf. Bedyńska & Brzezicka, 2007, p. 196; Cohen, 1992). As for the age ($p>.001$) and the place of residence ($p>.001$), no statistically significant differences were inferred with reference to the average results obtained from FCV-19S.

Questionnaire reliability

The reliability of the validated tool has been estimated with the use of Cronbach's alpha. As it may be inferred from the data presented in table 2, the reliability coefficient amounted to .83, which in turn proves high internal consistency of the Fear of COVID-19 Scale (FCV-19S) (cf. Brzeziński, 2006, p. 506; Field, 2009, p. 681).

Table 2. *Analysis of reliability of the Fear of COVID-19 Scale (N = 380)*

Item number	*M*	*SD*	Scale Mean if Item Deleted	Scale Variance if item deleted	Cronbach's Alpha if Item Delteted
FCV1	2.16	1.009	11.56	18.073	.80
FCV2	2.58	1.194	11.13	16.977	.81
FCV3	1.47	0.773	12.24	19.698	.81
FCV4	1.89	1.042	11.82	17.569	.80
FCV5	2.73	1.234	10.99	16.926	.81
FCV6	1.31	0.695	12.41	19.962	.81
FCV7	1.58	0.923	12.13	17.832	.79
General coefficient					.83

*Note***.** M – mean; SD – standard deviation

The index of discrimination was calculated as a correlation of individual items with the overall result. The data reflected in table 3 show that the lowest correlation coefficient with the overall result has been obtained in reference to item 3 („My hands become clammy when I think about coronavirus-19") (r=.65; p<.001). The remaining correlation coefficients varied between .67 and .78, which means that they were statistically significant. These results confirm high discrimination index of the scale (cf. Brzeziński, 2006, p. 513).

Table 3. *The index of discrimination of items of the Fear of COVID-19 Scale*

Item number	*r-Pearson*	*r-Spearman*
FCV1	.70	.70
FCV2	.72	.75
FCV3	.65	.61
FCV4	.74	.71
FCV5	.71	.72
FCV6	.67	.52
FCV7	.78	.71

Note. $p < .001$

Exploratory factor analysis (EFA)

Every single item has been subject to exploratory factor analysis (EFA) using principal component analysis (PCA) with orthogonal varimax rotation. Both the KMO index (.835) and Bartlett's test of sphericity (χ^2=931.934; p<.001) confirmed the proper selection of the factor analysis model (George & Mallery, 2020, p. 268). The analysis of the diagonal of *Factor Score Covariance Matrix* has also confirmed the KMO criterion for individual values, because every value exceeded the value of .5 (Field, 2009, p. 647). The KMO index for individual items fell within the range between .774 (FCV2) and .869 (FCV6).

On the basis of EFA, the existence of one factor explaining 50,939% of variation was indicated, which is consistent with the original version of the scale. Instead, the values of factor loadings were higher and ranged from .66 to .82 (in the original version the values fell within the range of .66-.74).

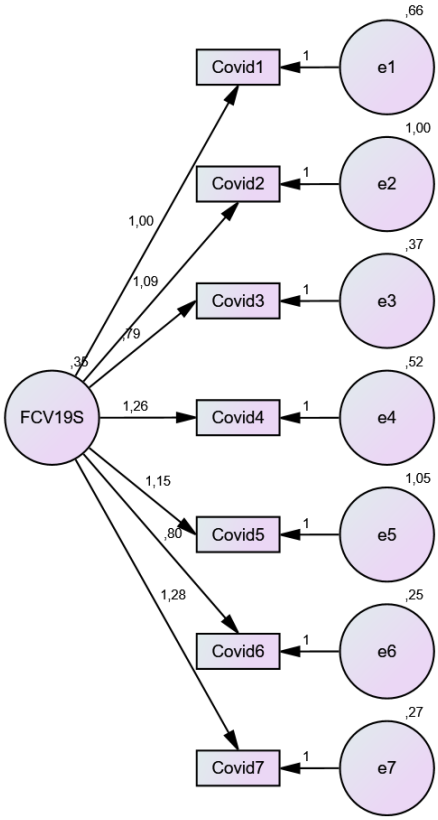
Confirmatory factor analysis (CFA)

CFA was performed so as to determine if the underlying variable describes the data properly. The obtained CFA results are as follows: $\chi^2(14, N=380)=115.429$; p<.001; $\chi^2/df=8.245$. Despite the fact that standardised chi-square exceeded the maximum value (Januszewski, 2012, p. 240), the decision was made to analyse

the remaining CFA coefficients. The RMSEA index slightly exceeded the maximum permissible value of *.1* (Browne & Cudeck, 1992, p. 239), and equalled RMSEA=.139, 90% CI [.116, .162], $p<.001$. The CFI index amounted to .89, TLI – .83, whereas SRMR fell within the range from .05 to .08, and amounted to .0644, which implies that the model is properly adjusted to data (cf. Hair, Black, Babin, & Anderson, 2014, p. 584).

By conducting the analysis of the qualitative factor model (figure 1) it was proven that the values of factor loadings fall within the range of .79-1.28, which should be interpreted as really good (Bedyńska & Książek, 2012). The percentage of the explained variance for most of the questions exceeded the value of .4.

Figure 1. *Resultant path diagram of the CFA model*



External validity

The establishment of psychometric properties of the tool comprised external validity, too. It was determined via correlation of the Fear of COVID-19 (FCV-19S) with satisfaction with life (SWLS), depression symptoms (CESD-R), and state anxiety (STAI). According to expectations both state anxiety (r=.28; p<.001) and depression symptoms (r=.21; p=.001) positively correlate with the fear of coronavirus. Apart from that it was concluded that there is a weak negative correlation (r=-.24; p<.001) between the fear of coronavirus and sex. It came as a surprise that there is no any statistically significant correspondence with satisfaction with life (table 4).

Table 4. *Results of the correlation of the Fear of COVID-19 with other variables (N = 380)*

	1	2	3	4	5	6	7
FCV-19S	1						
SWLS	.03	1					
CESD-R	.21**	-.42**	1				
STAI	.28**	-.47**	.98**	1			
Sex	-.24**	-.02	-.20**	-.06	1		
Age	-.03	-.03	-.04	.03	-.02	1	
Place of residence	-.01	.08	.02	-.01	.08	-.08	1

Note. ** p < .01

Discussion

The objective of this study consisted in the development of the Polish version of FCV-19S and its verification among the Polish adolescents. The results of the statistical analyses revealed that the Polish version of FCV-19S is the single-factor model of good psychometric properties, which enables the diagnosis of young people towards the experienced fear of coronavirus.

The conduct of studies was dictated by the necessity to adapt the Fear of COVID-19 Scale to Polish conditions because as Ahorsu et al. (2020)

claim – the authors of the tool – there is a lack of adequate research instruments while they are extremely necessary in the times of pandemic. The researchers invented the scale of high psychometric properties (the reliability index amounted to .82). The psychometric properties of the scale adapted to Polish conditions do not deviate neither from the original version of the instrument nor from its other adaptations (e.g. USA – .91; Greece, Italy, Nepal – .87; Russia and Belarus – .81, Malaysia – .89) (O. Ahmed, Faisal, Sharker, Lee, & Jobe, 2020; Pang et al., 2020; Perz, Lang, & Harrington, 2020; Reznik, Gritsenko, Konstantinov, Khamenka, & Isralowitz, 2020; Soraci et al., 2020; Tsipropoulou et al., 2020). In spite of using the single-factor tool in the above-mentioned linguistic versions, the two-factor model FCV-19S along with the emotional (α=.71) and physiological (α=.82) dimensions were developed on the basis of the findings of the statistical analyses conducted in Japan (Masuyama, Shinkawa, & Kubo, 2020).

In the authors' own study it was established that there is a positive correlation between the fear of coronavirus as experienced by Polish adolescents on the one hand, and the depression and state anxiety on the other hand, which upholds the findings of many previous research explorations (M. Z. Ahmed et al., 2020; Sprang & Silman, 2013; Taylor, Agho, Stevens, & Raphael, 2008; Thakur & Jain, 2020). Furthermore, numerous researchers draw the attention to many other negative psychological consequences of the pandemic in the context of social isolation (DiGiovanni, Conley, Chiu, & Zaborski, 2004; Hawryluck et al., 2004; Reynolds et al., 2008; Rubin & Wessely, 2020; Xiao, Zhang, Kong, Li, & Yang, 2020). Except that, it was determined that suicide attempts will represent one of the most serious negative consequences of the mental condition in the longer timeframe (De Berardis et al., 2020; Orsolini et al., 2020; Sher, 2020; Stickley & Koyanagi, 2016). Accordingly, it is so important to permanently monitor the well-being of the youth, especially during the quarantine periods, when there is no direct contact with peers. Hence, the Ministry of National Education in Poland adopted the decision that irrespective of high epidemiological danger the students will go back to schools from September 2020. In the nearest future it will turn out if this decision was the right one.

Limitations

This study has its limitations, as usual. The data was not collected on the sample representative youth aged 14-18. It was conducted via the Internet, which implies that its users participated therein. Unfortunately, it was not possible to gather the data in another way because of the several months' quarantine. Considering that it was the sample youth, the adaptation for other age groups of the Polish people has already been carried out. It is also worth conducting the longitudinal study in which such variables as the time or course of the illness in the family could be taken into account. In addition, the data was gathered on the non-clinical sample, which is why it is advisable to use the clinical sample in order to validate the scale for the clinical purposes.

Conclusions

All things considered, the adaptive study indicates that the Polish single-factor version of FCV-19S has good psychometric properties. Thus, its application is recommended among the youth, with the account taken of diverse variables.

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Appendix 1. *Skala Lęku przed Coronavirus-19*

Instrukcja

Poniżej podano kilka stwierdzeń, z którymi możesz się zgodzić lub nie. Używając skali od 1 do 5 wskaż – w *jakim stopniu zgadzasz się z każdym stwierdzeniem* zaznaczając **X** odpowiednią cyfrę. Bądź szczery w swoich odpowiedziach.

1. zdecydowanie nie zgadzam się;
2. nie zgadzam się;
3. ani zgadzam się ani nie zgadzam się;
4. zgadzam się;
5. zdecydowanie zgadzam się.

Najbardziej obawiam się koronawirusa-19 samego w sobie.	1	2	3	4	5
Czuję się niekomfortowo, gdy myślę o koronawirusie-19.	1	2	3	4	5
Moje ręce stają się lepkie, kiedy myślę o koronawirusie-19.	1	2	3	4	5
Obawiam się, że stracę życie przez koronawirusa-19.	1	2	3	4	5
Staję się poddenerwowany/a i zaniepokojony/a, gdy oglądam wiadomości i filmy w mediach społecznościowych na temat koronawirusa-19.	1	2	3	4	5
Nie mogę spać, ponieważ martwię się, że zachoruję na koronawirusa-19.	1	2	3	4	5
Moje serce przyspiesza i kołacze na myśl o tym, że mogę zachorować na koronawirusa-19.	1	2	3	4	5