Validation and psychometric evaluation of the Polish version of the FCV–19S in children and adolescents

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Summary

Aim. The COVID–19 pandemic might have impacted the psychological well-being of children and adolescents in Poland. The epidemiological situation is constantly changing and it is difficult to predict its further course. There are ongoing discussions about the possible benefits and consequences of children returning to school. For this reason, it is justified to develop a Polish version of an uncomplicated and easy-to-use diagnostic tool for fear assessment, which will enable the identification of children requiring special psychological support. The aim of the study was to develop the Polish adaptation of the recently published Fear of COVID–19 Scale and to examine the psychometric properties of the Polish version among the population of children and adolescents.

Method. The sample included 167 participants aged 10 to 17 years. On-line surveys were conducted in three groups – patients with a psychiatric diagnosis, students and children from group homes.

Results. The analysis of the collected data showed that the Polish version of the FCV–19S has good psychometric properties. Confirmatory factor analysis confirmed the one-way structure of the scale. The reliability of the total score proved satisfactory (Cronbach's $\alpha = 0.831$). In addition, group comparison analyzes showed that children from group homes reported highest fear of coronavirus.

Conclusions. Our results suggest that the Polish version of the FCV–19 Scale is a valid and reliable tool which can be used in the psychological assessment of the severity of fear of COVID–19 among children and adolescent.

Key words: COVID–19 pandemic, psychiatric disorders, child and adolescent psychiatry

Introduction

In January 2020, the world was informed about a new strain of the coronavirus that is rapidly spreading from person to person [1]. The disease it caused spread quickly

in China, then it found its way to South Korea, Thailand, Japan [2], it crossed continents [3], and finally it affected almost the whole world. In Poland, the first case of COVID-19 was detected on March 4, 2020 [4]. On March 12, all schools were closed. On March 24, a stay home policy was introduced [5]. There was no doubt that this state of affairs may influence the mental health of people [6–8]. Families with children also faced additional problems. They had to adapt themselves in the new situation, reorganize and plan their everyday life anew. While working at the Department of Child and Adolescent Psychiatry, psychiatrists and psychologists got numerous inquiries on this matter from parents of children with psychiatric diagnoses. Parents paid attention to many problems of children, such as lack of contact with peers, inability to go outside, school difficulties. According to their reports, they often spent the whole day at home with their children, which on the one hand allowed the family to spend time together, and on the other hand, often caused conflicts. Interestingly, not all patients were negatively affected by this situation. For example, according to parents' reports, in some children lack of school and avoidance of peers initially reduced the severity of anxiety and improved well-being. Taking into account all the obtained information, we hypothesized that the epidemiological situation and the resulting social isolation might have impacted the psychological well-being of children and adolescents.

Since it is the first epidemic on such a scale in a hundred years in Poland, there are not many studies that have explored the above issues in relation to Polish reality. At the time of conducting this study, we did not have any research results that could objectively confirm this information and scientifically explain the emerging relationships. Comprehensive psychological and psychiatric assistance to families and children in such situations requires a better exploration of the existing dependencies, understanding child's perception of reality and awareness of coexisting family problems and the strength of the impact of various components on the mental state of individuals. To be able to objectively evaluate these elements, first of all, diagnostic tools are needed. Using reliable questionnaires can help identify people who need psychological support faster.

For this purpose, we decided to adapt the Fear of COVID–19 Scale (FCV–19S) [9]. This scale in its original language version is characterized by good psychometric properties, which was confirmed by studies in the adult population of Iranians. Numerous adaptations have been published in many other languages: English [10], Persian [9], Bangli [11], Italian [12], Hebrew [13], Arabic [14], Russian [15], Turkish [16], Greek [17], Malay [18], Spanish [19], Japanese [20], and others. Most of them have been validated and studied in healthy adult populations, but studies have also been conducted in adults with a psychiatric diagnosis (Chinese version) and adolescents (Bengali and Japanese versions). At the time of writing this manuscript, there were no publications available on the adaptation of the scale in Polish, the psychometric properties of which would be tested in the population of children and adolescents. So far, no studies have been published among children with a psychiatric diagnosis. This study was intended to fill this gap.

Material and method

Characteristics of the FCV–19S (the Fear of COVID-19 Scale)

The study used the FCV–19S scale. The original version [9] was published in March 2020 and examined through online surveys on a group of 717 adult Iranian participants. The final version of the questionnaire consisted of 7 questions checking the fear of SARS-CoV-2. Responses to each item were made on a five-point Likert-scale (from 1 – "strongly disagree" to 5 – "strongly agree"). Each answer was scored from 1 to 5, which gives a maximum score of 35 points. A higher value meant a stronger fear of coronavirus. This scale had good psychometric values in the studied population, acceptable item-total correlation and strong factor loadings. The internal consistency (Cronbach's alpha) was good ($\alpha = 0.82$) and composite reliability was acceptable.

Adaptation of the FCV–19S into Polish

Upon receiving the permission of the authors of the original questionnaire, we started the translation process consistent with recommendations in the literature [21–23]. We had the items translated by two independent translators. One of them was a medical doctor, the other had no medical background. Both were native speakers of Polish. Their translations were then synthesized and sent over to two other translators (native speakers of English without medical training) for back-translations. The results of all translations have been evaluated by experts. The items were also consulted with an infectious disease specialist. The Polish version was initially piloted on 30 volunteers. The most significant change in the adaptation process was the replacement of the original phrase "coronavirus–19" with the term "coronavirus". This is due to the widespread use of such a name for SARS-CoV-2 in Polish television, radio and social media. Also, according to the respondents, it was clearly understood by everyone and did not raise any doubts. After having completing all the steps, the final version of the questionnaire was obtained and an analysis of its psychometric properties was performed.

Participants

Three groups of children and adolescents participated in the study. The first group were patients of stationary and daytime psychiatric wards for children and adolescents (hereinafter referred to as 'patients') in the Mazowieckie voivodship (central region of Poland) discharged from January 2019 to the end of April 2020. After analyzing the age structure, a group of 318 patients born in the years 2003–2010 was selected for study out of 338 patients. Children diagnosed with intellectual disability and those who were not fluent in Polish (34 people in total) were excluded from the study. We managed to contact 259 parents and caregivers by phone, of which 218 agreed to have the questionnaires sent to them. The most frequent reason for refusal was re-hospitalization of a child in another hospital during the research (10 patients) and the child's stay in

a care facility (8 patients). 23 people did not give their reasons for refusal. In total, we received 76 completed questionnaires.

The second group consisted of students from grades 6–8 of primary schools (hereinafter referred to as 'students') from six selected schools in the Mazowieckie voivodship, in which the principals agreed to send the surveys to parents and children. In this group, school authorities declared that 1,179 students were informed about the study, but only 61 decided to submit their answers.

The third group were children staying in group homes for children (hereinafter referred to as 'group homes') in the Mazowieckie voivodship, born in 2003–2010. We contacted the managers of these institutions. In response, we received 31 completed questionnaires.

The study involved a total of 167 participants from three groups – 75 patients, 61 students and 31 children from group homes. The mean age for the whole sample was 13.78 years (*SD* 1.62). The groups were similar in this respect – the mean age was 13.83 (*SD* 1.63) in the group of patients, 13.64 (*SD* 1.02) for students and 13.94 (*SD* 2.41) in the group of children from group homes.

Procedure

Due to the epidemiological situation and in order to exercise the greatest caution, we decided to conduct the survey on-line. Informed consent of the participants was required to complete the questionnaire. The form consisted of two parts and contained only closed questions. The first part was addressed to the child's parents and caregivers. It contained questions about the family circumstances of the SARS-CoV-2 pandemic (for example, COVID-19 infection in the family, undergoing quarantine, feeling protected in the current job, access to green areas), demographic data and information directly related to the child (age, gender, the manner of implementing compulsory education). The second part of the survey was addressed to children and adolescents and included the Polish version of the Fear of COVID–19 Scale (FCV–19S) [9]. We collected the completed questionnaires from May 6 to June 26, 2020. The study was conducted after obtaining an appropriate statement of the Bioethics Committee of the Medical University of Warsaw, no. AKBE/98/2020.

Statistical analysis

We conducted a confirmatory factor analysis (CFA) to verify whether our seven-item scale was consistent with the original construct. Then we attempted to check the reliability of the scale. Split-half reliability coefficients (i.e., split-half coefficient and Guttman's coefficient) were calculated.

Finally, the results obtained from the three groups were compared using the Kruskal Wallis test with Dunn's post-hoc test. The significance threshold of $\alpha = 0.05$ was adopted.

All statistical analyses were performed using IBM SPSS Statistics (Amos) and Statistica.

Results

The authors of the FCV–19S pointed to a single-factor structure of the scale [9]. Subsequent studies of other scale adaptations have confirmed this [11, 12, 14]. Confirmatory factor analysis was used to examine the factor structure of the Polish versionof the FCV–19S. Figure 1 shows the result of this analysis. Factor loadings of items K1–K7 ranged between 0.61 and 0.72 except for K3 ($\lambda = 0.49$). The following values were obtained: RMSEA 0.1; CMIN = 83.846; $p < 0.01$; GFI = 0.857. The RMSEA result was influenced by the lower value of the factor loading for item K3. However, the removal of this item did not significantly improve this model fit coefficient. The model is therefore strong enough as confirmed by GFI = 0.857.

We calculated Cronbach's α coefficients to evaluate the internal consistency of the scale. Table 1 presents the results of that analysis. Alpha values in the groups of patients ($\alpha = 0.840$) and students ($\alpha = 0.863$) were high. Similarly, the reliability of the total score proved satisfactory ($\alpha = 0.831$). Internal consistency within the group homes sample was slightly below the 0.7 threshold ($\alpha = 0.693$). For the first two groups, split-half reliability was satisfactory, and for the group homes it was moderate. Based
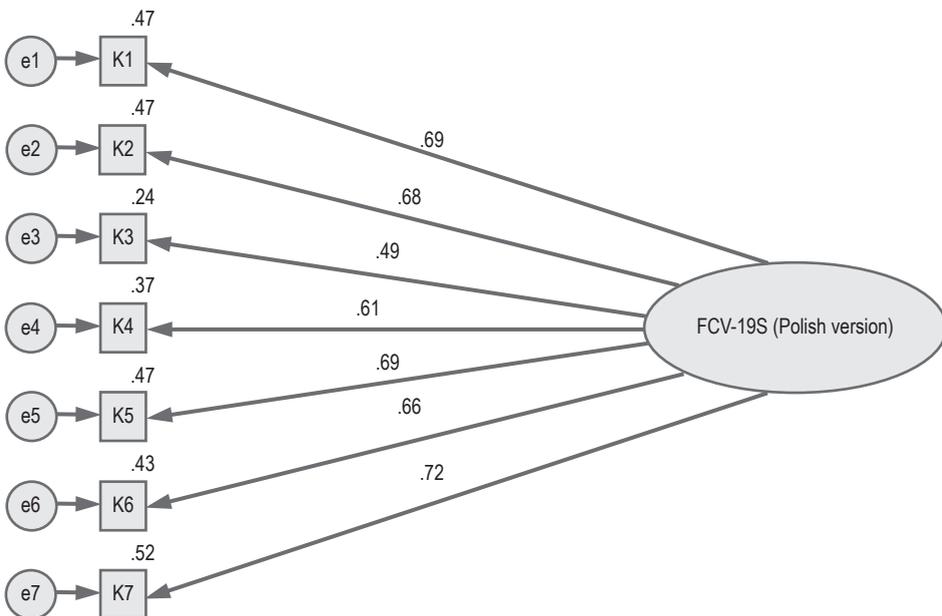

Figure 1. **The results o the confirmatory factor analysis**

on the data, we can conclude that the Polish adaptation of the FCV–19S is appropriate and repeatable in Polish conditions.

Table 1. **The results of the analysis of the reliability**

Coefficient	Items	Patients	Students	Group homes	Total
Cronbach's alpha	K1-K7	0.840	0.863	0.693	0.831
Cronbach's alpha if deleted	K1	0.819	0.841	0.572	0.794
	K2	0.810	0.849	0.610	0.797
	K3	0.832	0.863	0.740	0.830
	K4	0.827	0.838	0.720	0.816
	K1	0.812	0.843	0.634	0.805
	K2	0.814	0.839	0.664	0.811
	K3	0.811	0.834	0.650	0.801
Split-half correlation	K1-K7	0.706	0.706	0.341	0.604
Guttman's split-half coefficient	K1-K7	0.820	0.813	0.487	0.727

Next, we calculated the statistics of the Shapiro-Wilk test in order to verify the normal distribution of the Polish adaptation of the FCV–19S. Due to the fact that the distribution of results was not close to the normal distribution, we used the non-parametric Kruskal-Wallis test with Dunn's post-hoc test to compare the group results. Table 2 presents the differences in the obtained questionnaire results between the three groups.

Table 2. **Statistics of differences between the three groups for variable: FCV–19S results**

	Group			
	a – patients	b – students	c – group homes	Total
Mean	14.36	15.41	19.94	15.78
n	75	61	31.00	167
Standard deviation	6.05	6.26	5.88	6.40
Median	14.00	15.00	20.00	15.00
Minimum	7.00	7.00	7.00	7.00
Maximum	35.00	35.00	32.00	35.00
Skewness	1.14	0.91	-0.38	0.69
Kurtosis	1.66	0.64	0.18	0.12
Kruskal-Wallis test	$H=18.99$; $p<0.001$			-
Post-hoc Dunn's test	c>a (p<0.001) a=b (p=0.931)	c>b (p=0.002) a=b (p=0.931)	c>b (p=0.002) c>a (p<0.001)	-

We found that the differences between the groups were statistically significant ($H = 18.99$; $p< 0.001$). Post-hoc analysis showed that children from group homes ($M = 19.93$; $Md = 20.00$) scored higher in the FCV–19S than patients ($M = 14.36$; $Md = 14.00$) and students ($M = 15.41$; $Md = 15.00$). There were no statistically significant differences between the patient and student groups. Figure 2 illustrates these differences.

Discussion

Numerous adaptations of the FCV–19S have been published in different languages and performed mainly in adult psychiatric patient populations (and in a group of children and adolescents). According to our current knowledge, however, no research has been conducted on the use of this tool in the population of children with a psychiatric diagnosis. The above analysis shows that Polish adaptation can be successfully used in children and adolescents, including children from various backgrounds and with a psychiatric diagnosis. The results of the analyzes indicate a good adjustment of the
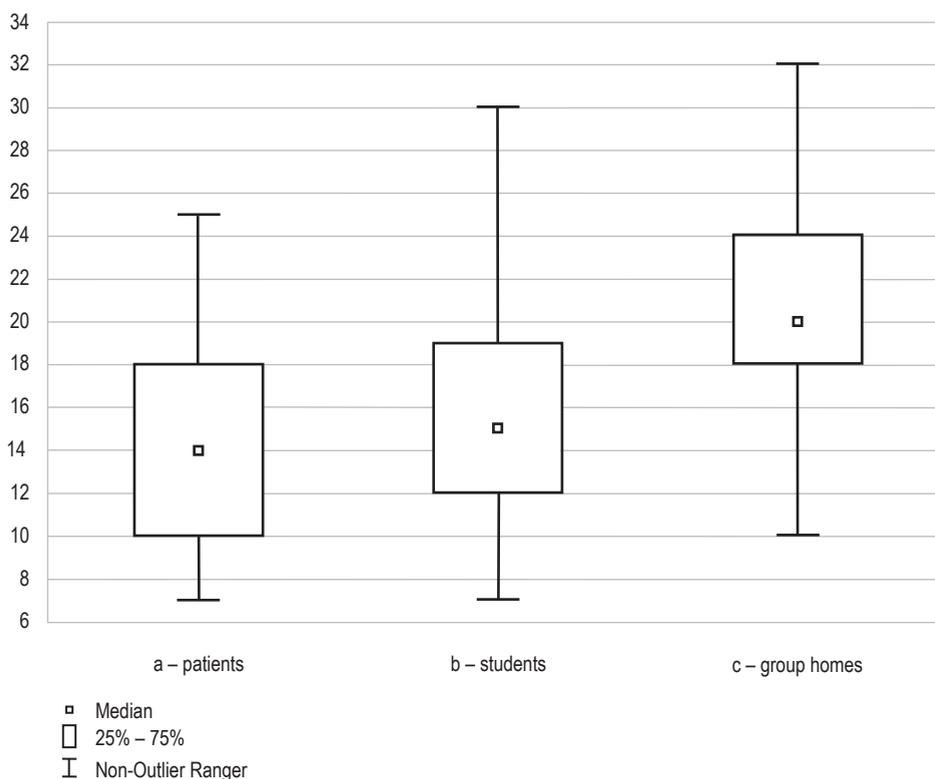

Figure 2. **Graph of statistics of three groups for variable: FCV–19S results**

scale and its one-factor structure, which is in line with the intention of the authors of the original Iranian version of the scale. This is proved by the performed confirmatory analysis and reliability.

The strength of the study were three research groups of children differing in terms of psychological burden. On the other hand, the groups were very similar in age and demographic, which is particularly important due to the different number of cases in individual regions.

The methodological limitation was the small number of respondents in particular groups (especially the group homes) compared to the size of the groups in other adaptations of this scale. However, the Kaiser-Meyer-Olkin measure was 0.50, which is the limit of acceptability of the group size [24]. The Bartlett's test of sphericity reached statistical significance ($p < 0.001$) supporting the suitability for factor analysis of the collected data. The reason for the small size of the groups could be their specificity and difficult access to these environments due to epidemiological isolation. Nevertheless, the low frequency of responses sent in the group of students was puzzling. It could probably be related to the school situation of children and their parents in Poland during the pandemic. The closure of the schools forced the caregivers to stay at home with the children. In a large part of schools, the school curriculum at that time was implemented online by filling out numerous worksheets for each subject. This often resulted in overloading with a large amount of school material and, consequently, reluctance to complete additional tasks, such as internet surveys. In addition, due to social isolation, we could not establish direct contact with students and we had to count on the help of intermediary principals and teachers. Therefore, we were not completely sure that the questionnaires actually reached the declared number of students. The above considerations may also confirm how extremely important it is for diagnostic tools measuring the impact of a pandemic on the mental state of children and adolescents to be effective but also short and easy to use.

It should also be remembered that the mental state of the youngest is influenced not only by the epidemiological situation itself, but also by the influence of other factors such as school, peers, financial situation, the development of addictions and others. In future research, it would be worthwhile to deepen the analysis with their impact on individual groups of children, as well as to check the correlations of the results of the Polish version of the FCV–19S with other anxiety and depression scales used in the diagnosis of children and adolescents. Although the researchers have already observed the presence of positive correlations in the older age groups [9, 13], it can be expected that the situation in children is not so clear-cut. Expanding research is also important in terms of opportunities for more targeted and better care for children.

Conclusions

The Polish adaptation of the FCV–19S is a good and fast research tool with good psychometric properties. It can be successfully used in children and adolescents.

However, deeper research and analysis of the influence of other factors on the score on this scale are needed to better understand children's perception of the current epidemiological situation.

Appendix

Polish version of the Fear of COVID–19 Scale

Skala niepokoju w związku z koronawirusem SARS-CoV-2, wywołującym COVID-19

1. Koronawirus jest czymś, czego obawiam się najbardziej.
2. Czuję się nieswojo, gdy myślę o koronawirusie.
3. Na myśl o koronawirusie pocą mi się ręce.
4. Obawiam się o swoje życie z powodu koronawirusa.
5. Kiedy oglądam wiadomości na temat koronawirusa lub czytam o nim w mediach społecznościowych, staje się niespokojny lub poddenerwowany.
6. Mam problemy ze snem, ponieważ obawiam się zakażenia koronawirusem.
7. Kiedy myślę o zakażeniu koronawirusem, odczuwam przyspieszone bicie serca.

Odpowiedzi: zdecydowanie się nie zgadzam, raczej się nie zgadzam, nie mam zdania, raczej się zgadzam, zdecydowanie się zgadzam

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