

Original Papers*Polish Psychological Bulletin*

2021, vol. 52(3) 289–298

DOI: 10.24425/ppb.2021.137891

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Significant predictors of psychological distress in the group of Polish young adults during the COVID-19 epidemic outbreak: Sequential mediation model

Abstract: The study was conducted to identify significant predictors of psychological distress in the group of young Polish adults during COVID-19 epidemic outbreak. The web-based cross-sectional survey was applied to 975 Polish respondents (755 female, 77.44%) aged 18-35 years. They were divided into two age groups: younger (18-25) and older (25-35). All participants completed: General Functioning Questionnaire (GFQ), COVID-19 Risk Perception Scale (C-RPS), State Anxiety Inventory (STAI-S), and General Sense of Threat to Life Scale (GSTLS). The Polish adults aged 18-25 years manifested significantly higher psychological distress, state anxiety, and a sense of threat to life, but they perceived less risk in COVID-19 epidemic compared to older participants. Risk perception and a sense of threat to life were indirectly related to state anxiety and psychological distress. Significant predictors of psychological distress in the group of young adult Poles during the COVID-19 epidemic are: state anxiety, risk perception, and a sense of threat to life, where risk perception and a sense of threat to life mediate the relation between state anxiety and psychological distress.

Keywords: *coronavirus; psychological distress; state anxiety; risk perception; young adults*

INTRODUCTION

The world has recently been facing a coronavirus pandemic which is caused by the SARS-CoV2 virus. In Poland the first viral infections were recorded on March 4. After 7 days the coronavirus epidemic was recognised by the WHO as a pandemic (WHO, 2020). At the beginning of April, the number of patients with the SARS-CoV-2 virus in Poland was 2.554 and there were 43 deaths in total. On April 23, a total of 10.511 people were infected, and 454 people died from the coronavirus. About 350 new infections manifested daily. Although the situation in Poland was not dramatic at the time, very disturbing data were coming from other countries on the growing morbidity and mortality figures, coupled by an increasing failure of health systems. Poles, like other nations, experienced an extraordinary situation: on the one hand, the threat of infection with an unknown and dangerous

virus and, on the other, many changes affecting everyday life. The purpose of the study is to determine how this experience was reflected in the mental lives of the respondents.

The analysis of the psychological condition of the public during the COVID-19 outbreak has shown that the pandemic is associated with mental changes in the general population, and particularly with an increased risk of psychopathological symptoms (Ahmed et al., 2020; Boyraz & Legros, 2020; Cao et al., 2020; Casagrande, Favieri, Tambelli, & Forte, 2020; Favieri, Forte, Tambelli, & Casagrande, 2021; Forte, Favieri, Tambelli, & Casagrande, 2020a; Forte, Favieri, Tambelli, & Casagrande, 2020b; Huang & Zhao, 2020; Sun et al., 2020). Global data started flowing in to indicate that the group of young adults was the most exposed to psychological stress (Ahmed et al., 2020; Gambin et al., 2020; Huang & Zhao, 2020; Qiu et al., 2020). Polish research demonstrates likewise: people aged 18-24

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years present significantly higher than other age groups levels of depression, generalized anxiety, and even suicidal and auto-aggressive thoughts (Gambin et al., 2020).

Various studies consistently point to differences between males and females in the psychological distress experienced during epidemics, e.g. women show greater psychological distress (Forte et al., 2020b; Qiu et al., 2020). Different results were obtained in the Polish study. They indicate a similar probability of a high risk of clinically significant exacerbation of depressive symptoms and symptoms of generalized anxiety disorder in the group of women and the group of men (Gambin et al., 2020). Hence the issue of gender differences in experiencing the pandemic among Poles remains unresolved.

Initially, after the declaration of a pandemic by the WHO, the anxiety response of the subjects significantly increased (Ahmed et al., 2020; Bareket-Bojmel, Shahar, & Margalit, 2020; Cao et al., 2020; Forte et al., 2020b; Fullana, Hidalgo-Mazzei, Vieta & Radua, 2020; Huang & Zhao, 2020). Much research into the psychological impact of the coronavirus pandemic has been devoted to various aspects of anxiety (Bareket-Bojmel et al., 2020; Cao et al., 2020; Forte et al., 2020b). Given the relatively short-lived situation of the coronavirus pandemic, testing the current level of state anxiety – a temporary reaction to adverse events (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983) – may be an appropriately sensitive method of capturing emotional difficulties. Moreover, a high state anxiety is associated with great vigilance to information about threats (Bradley et al., 2000), which seems particularly important during a pandemic.

Research results show the risk perception of a viral pandemic to be positively associated with feelings of anxiety (e.g., Bults et al., 2011; Wheaton, Abramowitz, Berman, Fabricant & Olatunji, 2012). Additionally, the Polish report on young adults from March 2020 demonstrated that risk perception of different aspects of COVID-19 increased the mental health symptoms of participants (Okruszek, Aniszewska-Stańczuk, Piejka, Wiśniewska & Żurek, 2020).

Measuring the severity of PTSD symptoms suggests that the coronavirus pandemic is widely recognized by researchers as a potentially traumatic stress stimulus that unexpectedly and quickly affected people at a global level. Both the fear of virus infection and measures to prevent the spread of infection can be seen as traumatic events (Hawryluck et al., 2004). This can lead to increased awareness of our mortality and is associated with a perception of a life threat that is positively correlated with PTSD (Ben-Zur & Zeidner, 2009). Recently it was proven that framing COVID-19 as an existential threat was linked with anxious arousal and could place people at risk for developing psychological distress and anxiety disorders (Tabri, Hollingshead & Wohl, 2020).

Hence, this study aims to answer the following questions:

1. What aspects of psychological distress did Poles experience the greatest difficulties in? Did the younger adult group experience more psychological stress than the older study participants?

2. Were there significant differences between men and women with regard to psychological distress, state anxiety, risk perception and the sense of threat to life?
3. Did threat to life and risk perception mediate the relationship between state anxiety and psychological distress?

To sum up, the main aim of the research was to identify significant predictors of psychological stress in the group of adult Poles during the COVID-19 pandemic.

METHOD

Participants

The web-based cross-sectional survey involved 1.576 young adult Poles. Only fully completed questionnaires (100% response rate) were accepted for further statistical analysis – representing 61.87% of all responses. Finally, 975 respondents aged 18 to 35 years living in Poland were included in the study: 755 women (77.44%) and 220 men (22.56%). Selected sociodemographic data are shown in Table 1.

Procedure

The study was organized and carried out through an online survey uploaded into Qualtrics – online survey platform. It was shared between April 1 and April 23, 2020. The link to the study was sent primarily through social media, institution profiles, and formal social networks (including student councils of a local university, polytechnic university, and medical university). The adopted distribution method was based on the snowball sampling. The survey took approximately 30 min. to complete. Participation was entirely voluntary and free of charge. The study was approved by the ethics committee of one of the Polish universities (dec. 31.03.2020).

Measures

The first part of the study concerned sociodemographic variables including gender, age, marital status, education, and place of residence. Then all participants ($N = 975$) completed four questionnaires. They evaluated their experience of the past seven days.

General Functioning Questionnaire (GFQ)

The questionnaire is a screening tool to assess the level of general functioning and the severity of psychopathological symptoms (Styla & Kowalski, 2020). The GFQ consists of thirteen scales including 58 items. Participants answered the questions by means of a five-point Likert scale, ranging from 1 (never) to 5 (almost always). The GFQ has sufficiently high validity and reliability. In the present study the items that were considered potentially psychologically aggravating and too time-consuming were excluded (scales for testing production symptoms, eating disorders, sexual disorders). Finally eight scales were used: Lack of entertainment, Cognitive impairments, Addictions, Depressive symptoms, Manic symptoms, Anxiety symptoms, Sleep problems, Somatic symptoms (39 items in total). High scores indicate a negative overall functioning and the presence of

Table 1. Sociodemographic data and variables related to the pandemic situation by gender (N = 975)

Variables	Total	Women	Men
Age range, n (%)			
18-25 years old	498 (51.08)	390 (51.66)	108 (49.09)
26-35 years old	477 (48.92)	365 (48.34)	112 (50.91)
Education, n (%)			
Primary	7 (3.16)	5 (0.67)	2 (0.91)
Secondary	320 (35.11)	222 (29.40)	98 (44.54)
Higher	648 (61.73)	528 (69.93)	120 (54.55)
Marital status, n (%)			
Single	397 (40.72)	296 (39.21)	101 (45.91)
In a relationship	364 (37.33)	276 (36.56)	88 (40.00)
Married	197 (20.21)	168 (22.25)	29 (13.18)
Divorced	15 (1.54)	13 (1.72)	2 (0.91)
Widowed	2 (0.20)	2 (0.26)	0
Place of residence, n (%)			
Rural	158 (16.20)	140 (18.54)	18 (8.18)
Rural-urban (up to 50,000 inhabitants)	183 (18.77)	156 (20.67)	27 (12.27)
Urban (over 50,000 inhabitants)	634 (65.03)	459 (60.79)	175 (79.55)

pathological symptoms. In the present study the GFQ had excellent internal consistency reliability (Cronbach's alpha = .91). Study testing reliability and validity of Polish adaptation revealed strong relations between the GFQ-58 and quality of life ($p < .001$; $\rho = -.81$). Another study also showed relationships between the GFQ-58 and tools measuring various psychopathological symptoms ($p \leq .001$; $r = .43-.86$). Reliability of the overall score was high (Cronbach's $\alpha = .89-.92$).

State Anxiety Inventory (STAI-S)

The STAI-S includes 20 items to evaluate how participants feel about anxiety at the present moment. In this study the STAI-S was applied to measure anxiety as a result of the coronavirus experience. The items are rated on a four-point Likert scale, ranging from 1 (not at all) to 4 (very much so). Higher scores indicate greater anxiety levels. The tool has high reliability and validity (Spielberger et al., 1983; Sosnowski, Wrześniewski, Jaworowska & Fecenec, 2006). Internal consistency for the inventory in the present study was excellent (Cronbach's alpha = .91).

COVID-19 Risk Perception Scale (C-RPS)

The C-RPS is a 10-item self-report tool that examines how one perceives the risk of COVID-19. It is based on the assumption that the experience of coronavirus pandemic activates the evaluation of COVID-19 infection risk relating to both oneself and the loved ones which makes the C-RPS a dyadic tool; five items measure the risk perception referring to the participant and the remaining five to their significant others. Risk perception is assessed by three variables: 1) perceived severity (PS), 2) perceived likelihood (PL), and 3) perceived vulnerability (PV). The items are rated on a seven-point Likert scale, ranging from 1 (strongly disagree or never) to 7 (strongly agree or very likely). Higher scores indicate a greater extent of risk perception. The C-RPS was based in part on the items described by H. Cho and J. Lee (2015). In the present study, internal consistency for the full C-RPS was acceptable (Cronbach's alpha = .75) and for three

subscales: acceptable ($\alpha_{PS} = .75$), good ($\alpha_{PV} = .84$), and excellent ($\alpha_{PL} = .91$). The English version of C-RPS is available in Appendix (A).

General Sense of Threat to Life Scale (GSTLS)

The GSTLS is a 10-item tool for assessing the intensity of a sense of threat to life. It was constructed and developed with regard to COVID-19. Participants ranged the extent to which they agreed with each item on a 7-point Likert, rating from 0 (strongly disagree) to 6 (strongly agree). Exploratory factor analysis revealed three structures: 1) threat to life of significant others (TLSO), 2) threat to world stability (TWS), 3) threat to one's own life (TOOL). All the factors explain 70.21% of the variance, including the explanation variance of each factor: respectively, 26.9%, 23.35%, 19.96%. In the present study, the full GSTLS and the first two subscales showed good internal consistency reliability (Cronbach's alpha = .88; $\alpha_{TLSO} = .88$; $\alpha_{TWS} = .79$), and acceptable one for the third subscale ($\alpha_{TOOL} = .71$). The English version of the GSTLS is available in Appendix (A).

Statistical analyses

The main statistical analysis was based on a sequential mediation model. Mediation is typically used when exploring potential mechanisms (Hayes, Montoya, & Rockwood, 2017). The serial mediation model was examined via bootstrapping, a resample technique that has been developed in order to reduce Type I error rates. The indirect effects were computed with 5000 interactions of bootstrapping and 95% confidence intervals. Statistical significance was determined if the confidence intervals did not include zero. Analyses were performed with IBM SPSS Statistics 25.

The hypotheses of the study are presented in the sequential mediation model with two mediators based on Model 6 for Process macro v3.5 developed by Andrew F. Hayes (2017).

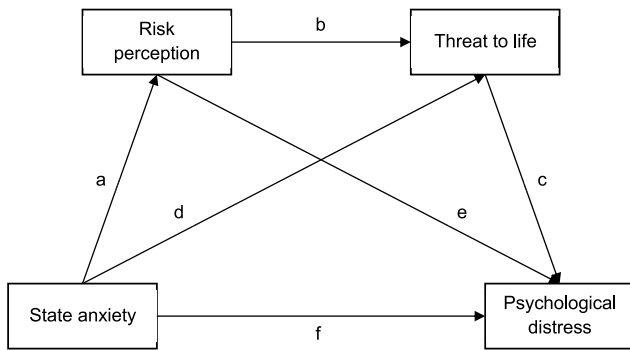


Figure 1. Hypothetical mediation model of the study

According to this model (see figure 1) there are two mediating variables (M1- risk perception and M2 – a general sense of threat to life) positioned between the independent variable (IV – state anxiety) and the dependent variable (DV – psychological distress). The tested hypothesis is whether the effect of state anxiety on psychological distress is mediated by both risk perception and a general sense of threat to life. Figure 1 presents the indirect effects model along the three indirect paths: indirect effect 1 (path a * path e), indirect effect 2 (path d * path c) and indirect effect 3 (path a * path b * path c). The total indirect effects computed as: $Ind1 + Ind2 + Ind3$. Path f shows the total effect model between state anxiety and psychological distress.

RESULTS

Preliminary Analyses

Means, standard deviations, and correlations of the variables (state anxiety, risk perception, a general sense of threat to life, and psychological distress) are presented in Table 2.

Three pairs of the variables were highly positively correlated. Whereas the strength of the relationships between state anxiety and risk perception, as well risk perception and psychological distress were quite weak. The value of the correlation between risk perception and a general sense of threat to life indicated a moderate strength of the relation.

In the next step of statistical analysis mean differences of variables (state anxiety, risk perception, general sense of threat to life, and psychological distress) were assessed by age. The independent *t* tests examined the differences between the two age groups: the first group aged 18-25 years and the second 26-35 years (see table 3). The first group reported significantly higher mean scores in a general sense of threat to life and a sense of threat to world stability. In comparison to older participants they showed more intensive psychological distress as well, especially in such domains as cognitive impairment, depressive symptoms, manic symptoms, and sleep problems. The only mean score significantly lower in the younger group was risk perception.

The Mann-Whitney *U* Test was performed to examine mean differences between the sex groups of

Table 2. Correlations, means, and standard deviations of variables of interest (total N = 975)

Variables	1.	2.	3.	4.
1. State anxiety	–	.344**	.628**	.693**
2. Risk perception		–	.440**	.279**
3. General sense of threat to life			–	.605**
4. Psychological distress				–
<i>M</i>	43.64	15.78	3.22	2.11
<i>SD</i>	12.12	3.62	1.31	.52

Note. ** $p < .01$

Polish young adults (see table 4). Compared to male participants, female young adults reported higher scores in all the variables of interest, except one dimension of psychological distress, namely, addiction.

The main analysis

The main object of the study was to test the hypothetical mediation model with two mediators. The outcomes of statistical analysis showed that there was a significant positive indirect effect of state anxiety on psychological distress intermediated by risk perception and a general sense of threat to life (see table 5).

State anxiety variable was a significant positive predictor of risk perception, which in turn was a significant predictor of a general sense of threat to life which, in its turn, had a significant impact on psychological distress (effect = .0011, 95% CI [.0008, .0015]). The only variable that was not significantly related to psychological distress was risk perception ($p = .26$) and, consequently, the indirect effect 1 (path a * path e) was nonsignificant as well (effect = -.0004, 95% CI [-.0012, .0004]). It means that risk perception as a single mediator didn't mediate the relationship between state anxiety and psychological distress, but in the sequential mediation model, together with the second mediator (GSTL), it did mediate significantly the relationship between IV and DV. The indirect effect 2 (path d * path c) was significant and positive (effect = .0067, 95% CI [.0054, .0083]). A general sense of threat to life mediated significantly the relationship between IV and DV.

DISCUSSION

Summary of the findings

The main aim of the study was to determine significant predictors of psychological distress in the group of Polish adults during the COVID-19 epidemic outbreak. The research objects were pursued in two analytical steps; the first – a preliminary investigation into the relevant research questions, which paved the way to the second step – the main analysis based on the hypothetical model of sequential mediation.

With regard to the first research question concerning the psychological distress and the extent in which the Polish young adults experience it as the consequence of the

Table 3. Mean differences of the variables of interest between the two age groups of Polish young adults: the independent samples *t* test

Variables	Age range of young adults								Significance of differences	
	18-25 (n = 498)				26-35 (n = 477)				<i>t</i> (973)	<i>p</i>
	<i>M</i>	<i>SM</i>	<i>Min</i>	<i>Max.</i>	<i>M</i>	<i>SM</i>	<i>Min.</i>	<i>Max.</i>		
State anxiety	43.93	12.05	20	78	43.33	12.20	20	77	.78	.438
Risk perception	15.41	3.51	4	25	16.17	3.69	4	33	-3.31	.001
Perceived severity	3.43	.81	1	6	3.45	.81	1	7	-.52	.601
Perceived vulnerability	2.99	1.29	1	7	3.41	1.26	1	7	-5.14	.001
Perceived likelihood	2.13	1.36	1	7	2.40	1.50	1	7	-2.84	.01
General sense of threat to life	3.30	1.34	1	6.70	3.13	1.28	1	6.90	2.06	.04
Threat to life of significant others	4.20	1.75	1	7	4.08	1.76	1	7	1.09	.277
Threat to world stability	3.29	1.58	1	7	3.00	1.47	1	7	2.99	.003
Threat to one's own life	2.41	1.35	1	7	2.34	1.31	1	7	.75	.455
Psychological distress	2.18	.50	1	3.59	2.04	.52	1	4.34	4.14	.001
Lack of entertainment	2.74	.94	1	5	2.77	.97	1	5	-.55	.579
Cognitive impairments	2.64	.96	1	5	2.28	.91	1	5	5.87	.001
Addictions	1.34	.58	1	4.25	1.33	.56	1	5	.42	.676
Depressive symptoms	2.20	.72	1	4.83	2.09	.73	1	5	2.36	.018
Manic symptoms	2.18	.66	1	4.17	1.96	.58	1	4.50	5.38	.001
Anxiety symptoms	2.11	.74	1	4.50	2.04	.76	1	4.75	1.47	.142
Sleep problems	2.33	1.04	1	5	2.04	.98	1	5	4.49	.001
Somatic symptoms	1.87	.72	1	4.75	1.81	.74	1	5	1.46	.144

Table 4. Means, standard deviations, and ranks differences of the variables of interests between the sex groups of Polish young adults: the Mann-Whitney U test

Variables	Sex of young adults						Significance of differences	
	women (n = 755)			men (n = 220)			U	<i>p</i>
	<i>M</i>	<i>SM</i>	<i>Range</i>	<i>M</i>	<i>SM</i>	<i>Range</i>		
State anxiety	45.27	12.26	20-77	38.04	9.74	20-67	54479.5	.001
Risk perception	16.05	3.59	4-33	14.85	3.55	4-26	66367	.001
Perceived severity	3.51	.81	1-7	3.21	.77	1-5	63656.5	.001
Perceived vulnerability	3.19	1.27	1-7	3.21	1.37	1-7	82711.5	.926
Perceived likelihood	2.33	1.41	1-7	2.02	1.48	1-7	70292	.001
General sense of threat to life	3.43	1.33	1-6.9	2.47	.95	1-5.3	47908	.001
Threat to life of significant others	4.24	1.04	1-7	3.73	1.06	1-6.67	59281	.001
Threat to world stability	3.35	1.56	1-7	2.47	1.25	1-7	55429.5	.001
Threat to one's own life	2.54	1.39	1-7	1.81	.09	1-5	56477	.001
Psychological distress	2.16	.53	1.03-4.34	1.93	.44	1-3.36	62148	.001
Lack of entertainment	2.79	.98	1-5	2.64	.86	1-5	75933.5	.052
Cognitive impairments	2.55	.95	1-5	2.17	.89	1-5	64111.5	.001
Addictions	1.29	.51	1-5	1.51	.72	1-4.25	69160.5	.001
Depressive symptoms	2.23	.74	1-5	1.87	.62	1-4	58578.5	.018
Manic symptoms	2.08	.64	1-4.5	2.04	.61	1-4	80927.5	.562
Anxiety symptoms	2.17	.77	1-4.75	1.76	.57	1-3.75	55824.5	.001
Sleep problems	2.27	1.05	1-5	1.92	.85	1-5	67787.5	.001
Somatic symptoms	1.92	.76	1-5	1.56	.56	1-4.25	59741.5	.001

Table 5. Model summary of the indirect effect of state anxiety on psychological distress through risk perception and general sense of threat to life

Predictors	Outcome								
	M1 – Risk perception			M2 – Threat to life			Y – Psychological distress		
	<i>B</i>	<i>SE B</i>	<i>p</i>	<i>B</i>	<i>SE B</i>	<i>p</i>	<i>B</i>	<i>SE B</i>	<i>p</i>
State anxiety	.10	.01	.001	.06	.01	<.001	.02	.01	<.001
Risk perception	–	–	–	.09	.01	<.001	-.01	.01	.26
Threat to life	-	-	-	–	–	–	.11	.01	<.001
Constant	11.30	.41	<.001	-.80	.16	<.001	.84	.06	<.001
	R ² = .12			R ² = .45			R ² = .53		
	F(1, 973) = 130.70, <i>p</i> < .001			F(2, 972) = 398.71, <i>p</i> < .001			F(3, 971) = 363.10, <i>p</i> < .001		
	<u>95% Confidence Interval</u>								
Indirect effect	<i>B</i>		Boot <i>SE</i>		Lower Limit		Upper Limit		
Total effect	.0296		.0010		.0276		.0315		
Total indirect effect	.0073		.0009		.0057		.0091		
Indirect effect 1.	-.0004		.0004		-.0012		.0004		
Indirect effect 2.	.0054		.0083		.0067		.0008		
Indirect effect 3.	.0011		.0002		.0008		.0015		

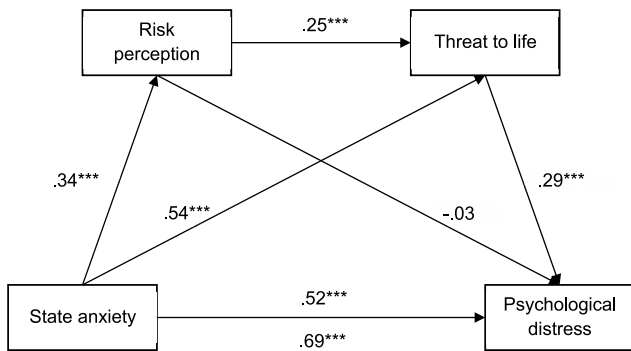


Figure 2. Sequential Mediation Model Results (standardized coefficients)

Notes. ****p* < .001 (two-tailed significance)

COVID-19 epidemic outbreak, it has been found that the mean scores of psychological distress in both research groups were moderate. Taking a cut-off point of 3 to detect clinically significant symptoms for the GFQ (Styla & Kowalski, 2020), in both age groups there were few participants that showed severe psychopathological symptoms (6.2%, 5%, respectively). The vast majority of the respondents displayed low and moderate level of psychological distress that didn't fulfil the parameters of psychiatric symptoms. Unfortunately, the GFQ tool used in the study is not normalized, so it is not possible to precisely relate the results to data from the general population.

An interesting finding is that the younger group of Polish adults compared to the Poles aged 25-35 years showed a significantly higher level of psychological distress in general. In both groups the most often reported psychological problems were: lack of entertainment and cognitive impairments. These results are generally consistent with the conclusions of other studies from many countries (Ahmed et al., 2020; Huang & Zhao, 2020; Qiu et al., 2020), including the Polish study of people aged 18-24, who turned out to have a significantly higher level of psychological difficulties than older groups during the first weeks of the COVID-19 pandemic (Gambin et al., 2020). Therefore, changes in psychological distress in the group of young people related to the pandemic require further research.

We have found that both the younger and the older group similarly revealed a relatively high level of state anxiety. A cut point of 39-40 has been suggested to detect clinically significant symptoms for the STAI-S, however, other studies has suggested a higher cut score of 54-55 (e.g. Knight, Waal-Manning & Spears, 1983). Taking into account an even the higher cut point (>54) it was found that in both study groups about 23% of the participants (23.1% and 22.4%, respectively) experienced the intensity of state anxiety that bordered on clinical symptoms. It means that close to one in four Polish young adults aged 18-35 years suffered from severe anxiety as a reaction to the COVID-19 epidemic outbreak. The results of this study, similarly to the reports from China (Ahmed et al.,

2020; Huang & Zhao, 2020) and European countries (Fullan et al., 2020; Forte et al., 2020b) indicate an increase in anxiety symptoms in the first weeks of the coronavirus pandemic. Also they supplement the reports from the Polish population study on increased generalized anxiety (Gambin et al., 2020) with data on increased state anxiety.

Concerning risk perception of being infected by the COVID-19 in the near future, it has been found that the study groups differed significantly. The group of younger participants perceived the COVID-19 epidemic in general as relevantly less risky than the age group of 26-35 years. Out of three aspects in risk perception, two of them i.e. perceived vulnerability and perceived likelihood scored significantly higher in the group of older participants. The Polish adults aged 26-35 years, compared to the younger participants, recognized in the coronavirus epidemic a much more serious source of infection to themselves and to their loved ones. Additionally, they didn't assess their own and their close relations' ability to protect themselves from COVID-19 so high as the younger participants.

Similarly to the previous variables of psychological distress and state anxiety, the Polish adults aged 18-25 years revealed a significantly more intense general sense of threat to life than the older participants. In particular, they reported a relevantly higher level of threat to world stability ($p < .01$). Interestingly, the participants of both age groups, without significant differences between them, reported a very high level of threat to life to their loved ones. Their mean scores of this variable were nearly twice as high as the mean scores of threat to their own life. In the face of the COVID-19 pandemic outbreak Polish young adult participants experienced first of all the threat to life to their dearest persons. Only in the third place in terms of intensity, after the threat to world stability, did they sense a threat to their own lives. Overall, the results of this study are similar to the reports from Poland which showed that mental difficulties among young adults were not associated with a sense of threat to their own health and life but were positively correlated with other variables, like restrictions on freedom, boredom, difficult relationships in the family, a sense of loneliness, fatigue of the situation, lack of privacy (Gambin et al., 2020) or concern about the collapse of healthcare system (Okruszek et al., 2020).

Almost in all measured variables the Polish females of the study groups presented significantly higher mean scores than the Polish males. The exceptions were perceived vulnerability (one of the aspects in risk perception) and manic symptoms; in both these variables there weren't significant differences between gender groups. Additionally, female participants showed only significantly lower mean scores in the addiction variable. These results are consistent with most of the results available globally and demonstrate that women react more negatively to the outbreak of the coronavirus pandemic than men (Forte, 2020b; Gerhold, 2020; Qiu et al., 2020). Although these outcomes are only partially consistent with the Polish results that indicate a similar probability of

a high risk of clinically significant exacerbation of psychological difficulties in the group of women as well as men (Gambin et al., 2020). It is known that the prevalence of psychological distress is higher in women than in men in most countries across all age groups (Drapeau et al., 2012). Therefore, the relationship between gender and psychological distress in the group of Poles in a pandemic situation requires further research.

The purpose of the present study was to examine the hypothetical model of relevant predictors of psychological distress as the mental consequences of the COVID-19 epidemic outbreak. To our knowledge there are no studies that have endeavored to identify the pathways by which state anxiety leads to psychological distress. As anticipated, the hypothetical model of sequential mediation found support in that both risk perception and a general sense of threat to life were indirectly related to state anxiety and psychological distress. It means that state anxiety significantly predicted an increase in the COVID-19 risk perception, which in turn was a significant predictor of a general sense of threat to life that eventually made a significant impact on psychological distress. However, risk perception as a single mediator didn't mediate the relationship between state anxiety and psychological distress, but in the sequential mediation model together with the second mediator – general threat to life – did mediate significantly the relationship between the independent and the dependent variable. The present study provides some initial insights into the crucial problem of the psychological mechanism behind the impact of the COVID-19 epidemic outbreak. The COVID-19 mental consequences as a form of psychological distress could be predicted on the basis of the intensity of state anxiety. The prediction may be even more precise if the other two variables, notably risk perception and threat to life, are taken into consideration.

The obtained results are similar to the conclusions of the Polish report from March 2020, according to which the risk perception of COVID-19 among young Poles enhanced mental health symptoms of participants, both directly and by fortifying their affective response to the situation, with both effects having a similar strength (Okruszek et al., 2020).

Strengths and limitations

The strength of this study was the large group of respondents who completed several time-consuming questionnaires covering many areas of their current (non-retrospective) pandemic experience. The use of the GFQ-58 method allowed for a multidimensional analysis of psychological distress in young women and men in Poland. An important and innovative contribution of the conducted research appears to be two-fold: to highlight a sense of threat to life as an important predictor in the assessment of psychological distress and to create a reliable method for its assessment in the overall score and in subscales. Importantly, the identified dimensions of the sense of threat among young adult Poles enabled a preliminary analysis of the domains that were particularly important in

the formation of an emotional response to the pandemic situation.

The present study exhibits several potential limitations. Despite the relatively large sample size, the limitations of the cross-sectional online study, including selection bias in recruiting participants, were not overcome. This tendency is manifested by a greater number of women in the study, of persons with higher education, coming from major Polish cities. These limitations no doubt reduce the representativeness of findings. However, an online survey was the best solution when social distancing reduced the possibility of collecting data outside the Internet (cf. Forte et al., 2020a). Furthermore, in the absence of a direct contact with participants, the assessment of their mental state was self-reported, which can produce inadequacies and an uncontrolled influence of the social approval factor. Also, due to the cross-sectional format it was not possible to control the potential impact of pre-pandemic psychological distress. It should also be emphasized that the research methods used in the study have not been fully verified psychological tools. In addition, the strength of the findings is diminished by a deliberate reduction in one of the tools (GFQ).

Conclusion

Our study showed that young adult Poles experienced heightened levels of psychological distress, state anxiety, risk perceptions (perceived severity) and a general sense of threat to life (and especially a threat to the lives of others). This group may arguably be considered as being at risk and therefore potentially in need of psychological screening. This study also provides preliminary data on the significant links between state anxiety and psychological distress as mediated by risk perception and a general sense of threat to life among young adult Poles. According to the results, the perception of risk and the general sense of life threatening may be variables that should be focused on in order to prevent psychological stress of young adult Poles. The results can be used in the construction of public messages about pandemic situations (which should be informative but not frightening) by scientists, healthcare representatives and public authorities. Also the results can be used to design support programs for people who struggle with mental disorders due to their pandemic experience.

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APPENDIX A**COVID-19 Risk Perception Scale (C-RPS)**

The items are rated on a seven-point Likert scale, ranging from 1 (strongly disagree or never) to 7 (strongly agree or very likely).

1. If I get infected with the coronavirus, it'll be a mild case.
2. If I fall ill, I will surely die.
3. If I fall ill, I will recover but some of my organs will be permanently damaged.
4. I am sure I'll be able to ward off COVID-19 if I take all the precautions.
5. How likely is it that you will get COVID-19 in the near future?
6. If a person dear to me gets infected with the coronavirus, it'll be a mild case.
7. If a person dear to me falls ill, they will surely die.
8. If a person dear to me falls ill, they will recover but some of their organs will be permanently damaged.
9. I am sure that a person dear to me will be able to ward off COVID-19 if they take all the precautions.
10. How likely is it that a person dear to you will get COVID-19 in the near future?

General Sense of Threat to Life Scale (GSTLS)

The items are rated on a 7-point Likert, rating from 0 (strongly disagree) to 6 (strongly agree).

1. I can't stop thinking about the threat to my loved ones.
2. I fear that I will die.
3. I am tormented by the visions of losing my loved ones.
4. I fear for my loved ones.
5. I get haunted by the visions of my death.
6. When I learn about another death caused by the coronavirus, I fear more.
7. I feel like being in a disaster movie.
8. I feel panicked.
9. I feel helpless in relation to the current pandemic situation.
10. I get an impression that things are about to fall apart.