



## Adjustment disorder, traumatic stress, depression and anxiety in Poland during an early phase of the COVID-19 pandemic

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### ABSTRACT

**Background:** The current COVID-19 pandemic is associated with a variety of stressors. Preliminary research has demonstrated that general public are experiencing a range of psychological problems, including stress-related disturbances. However, to date, there is not much research on the prevalence of adjustment disorder during the current pandemic.

**Objectives:** This study aimed to assess the prevalence and severity of symptoms of adjustment disorder compared to posttraumatic symptoms, depression and generalized anxiety in a large sample of adult Poles, in the first phase of the current pandemic.

**Method:** Self-report data from a web-based sample ( $N = 1,742$ ) was collected between March 25 and April 27, just after the introduction of nationwide quarantine measures in Poland.

**Results:** The current COVID-19 pandemic was a highly stressful event for 75% of participants and the strongest predictor of adjustment disorder. Increased symptoms of adjustment disorder were reported by 49%, and they were associated with female gender and not having a full-time job. However, after exclusion of co-occurring symptomatology, 14% of the sample were finally qualified as meeting diagnostic criteria of adjustment disorder. A substantial proportion of the sample screened also positive for generalized anxiety (44%) and depression (26%); the rate for presumptive PTSD diagnosis was 2.4%.

**Conclusions:** High rates of negative mental health outcomes were found in the Polish population in the first weeks into the COVID-19 pandemic and lockdown measures. They indicate the intense current stress-related symptoms in the early phase of the pandemic and warrant further monitoring on population's mental health.

### Trastorno de adaptación, estrés traumático, depresión y ansiedad en Polonia durante una fase temprana de la pandemia del COVID-19

**Antecedentes:** La actual pandemia de COVID-19 está asociada con una variedad de estresores. Investigaciones preliminares han demostrado que la población general está experimentando una variedad de problemas psicológicos, incluyendo trastornos relacionados con el estrés. Sin embargo, hasta la fecha no hay mucha investigación acerca de la prevalencia de trastornos de adaptación durante la actual pandemia.

**Objetivos:** Este estudio tuvo como objetivo evaluar la prevalencia y severidad de los síntomas del trastorno adaptativo comparado con los síntomas posttraumáticos, depresión y ansiedad generalizada en una gran muestra de adultos polacos, en la primera fase de la actual pandemia.

**Método:** Se recolectó información auto-reportada de una muestra basada en la web ( $N=1.742$ ) entre el 25 de marzo y el 27 de Abril, justo después de la introducción de medidas de cuarentena a nivel nacional en Polonia.

**Resultados:** La pandemia actual de COVID-19 fue un evento altamente estresante para el 75% de los participantes y el predictor más poderoso de trastorno de adaptación. 49% informó un aumento de síntomas de trastorno de adaptación, y se asociaron con género femenino y no tener trabajo de tiempo completo. Sin embargo, después de la exclusión de la sintomatología concurrente, 14% de la muestra cumplía los criterios para diagnóstico de trastorno de adaptación. Una proporción importante de la muestra también resultó positiva para ansiedad generalizada (44%) y depresión (26%); la tasa de diagnóstico presuntivo de TEPT fue de 2,4%.

**Conclusiones:** Se encontraron altas tasas de consecuencias negativas de salud mental en la población Polaca en las primeras semanas de pandemia y medidas de confinamiento por COVID-19. Indican los intensos síntomas actuales relacionados con el estrés en la fase inicial de la pandemia y justifican un mayor seguimiento de la salud mental de la población.

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### PALABRAS CLAVE

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### 关键词

COVID-19疫情; 适应障碍; 广泛性焦虑; 抑郁; 创伤应激

### HIGHLIGHTS

- The COVID-19 pandemic is associated with a variety of stressors.
- High rates of stress-related adjustment disorder and other emotional disorders were found in the first weeks into the lockdown measures.
- Intense stress-related symptoms related to pandemic warrant further monitoring.

### COVID-19疫情早期波兰的适应障碍、创伤应激、抑郁和焦虑

**背景：**当前的COVID-19疫情与多种应激源有关。初步研究表明，普通民众正在经历一系列心理问题，包括应激相关障碍。然而，至今还没有很多关于当前疫情期间适应障碍流行率的研究。

**目的：**本研究旨在评估在当前疫情第一阶段的成年波兰人大样本中，相较于创伤后症状、抑郁和广泛性焦虑，适应障碍的患病率和症状严重程度。

**方法：**在波兰实施全国隔离措施之后，于3月25日至4月27日期间收集了来自网络样本(N = 1,742)的自我报告数据。

**结果：**当前的COVID-19疫情对于75%的参与者是一个高应激事件，也是适应障碍的最强预测因素。报告了49%的适应障碍症状有所增长，与女性、无全职工作有关。但是，在剔除了共病症状后，最终有14%的样本符合适应障碍的诊断标准。大部分样本经筛查也为广泛性焦虑(44%)和抑郁(26%)阳性。PTSD的推断性诊断率为2.4%。

**结论：**在COVID-19疫情和封锁措施的最初几周，波兰人群中出现了很高的负性心理健康结果。它们表明了疫情初期当前强烈的应激相关症状，有必要进一步监测人群心理健康。

The current pandemic is associated with a variety of stressors. Since the first case of novel coronavirus disease 2019 (COVID-19) was diagnosed in December 2019, the number of known cases and deaths are still rising (World Health Organization [WHO], 2020a). Exposure to such a threat to health and life, but also to quarantine, self-isolation, job loss, family conflicts or grief of loved ones, are among the main stressors associated with the pandemic. Recent preliminary research has demonstrated that both frontline medical staff and the general public are experiencing a range of psychological problems including stress-related disturbances, anxiety and depression (e.g. Boyraz & Legros, 2020; Brooks et al., 2020; Hyland et al., 2020; Shevlin et al., 2020; Rodríguez-Rey, Garrido-Hernansaiz, & Collado, 2020; Walton, Murray, & Christian, 2020). As the crisis continues, it is likely that its impact on people's psychological wellbeing and mental health will increase. Moreover, stress-related reactions, such as generalized fear and fear-induced over-reactive behaviour among the public, could impede infection control (Dong & Bouey, 2020). Therefore, monitoring mental health during the pandemic seems to be an extremely important task. The World Health Organization (2020b) recommends to conduct serial surveys during the pandemic in relation to people's mental health, as understanding how humans respond to the pandemic may help to anticipate unwanted scenarios and help initiate mitigating measures. Holmes et al. (2020) indicated that the collection of data on the mental health and psychological effects of the COVID-19 pandemic across the whole population, as well as in vulnerable groups, is the immediate priority during the current pandemic.

Preliminary reports on how the COVID-19 pandemic impacts on mental health have been inconsistent, however almost all of them showed an increase in the prevalence rates of mental health problems. For example, Hyland et al. (2020) have shown that a substantial proportion

of a representative Irish sample screened positive for depression (23%), generalized anxiety (20%), and mixed anxiety/depression (28%). Screening positive for these symptoms was associated with younger age, female sex, loss of income due to COVID-19, and COVID-19 infection. In Spain, Rodríguez-Rey et al. (2020) found that nearly 37% showed psychological distress (symptoms of traumatic stress) due to COVID-19 pandemic, and the estimated impact was consistently higher for women and for young people. Shevlin et al. (2020) reported that the UK population was largely resilient in the early stages of the pandemic. However, several specific COVID-19 related variables were associated with psychological distress; having children at home, loss of income because of the pandemic, or having a pre-existing health condition. The authors concluded that further surveys are required as the pandemic progresses, and governmental responses should include measures aimed to protect mental health, an important component of health and wellbeing.

Studying how people cope and adapt to the unpredictable situation seems to be a particularly important research task during the current pandemic (Lotzin et al., 2020). This includes monitoring symptoms of adjustment disorder (AjD), a disorder that is specifically associated with stress. Diagnosis of AjD requires that (1) there is an identifiable psychosocial stressor(s), (2) symptoms are indicative of preoccupation with the stressor or its consequences, and a failure to adapt to the stressor, (3) symptoms emerge within 1 month of the stressor, and (4) the symptoms cause significant functional impairment (ICD-11, WHO, 2019). Epidemiological studies on prevalence of AjD in the general population are generally rare (Perkonig, Lorenz, & Maercker, 2018; Shevlin et al., 2019). Previous existing studies have shown variation in prevalence rates, for example, the rate of AjD, adjusted for other exclusionary disorders, in a representative Irish sample was 7%, whereas in Germany and Israel, where

other methods of estimation were used, it was 1.4% and 17.5%, respectively (Ben-Ezra, Mahat-Shamir, Lorenz, Lavenda, & Maercker, 2018). In a web-based survey conducted by Rossi et al. (2020), during the current COVID-19 pandemic, rates of different mental health outcomes were assessed in the Italian general population three to four weeks into lockdown measures. Almost a quarter (23%) of respondents reported symptoms of AjD. For other outcomes, 37% reported posttraumatic stress symptoms (PTSS), 22% high perceived stress, 21% anxiety, and 17% depression. Being female and younger age were associated with all of the mental health outcomes.

No study has yet examined the presence of stress-related disorders and common mental health disorders in Poland during the COVID-19 outbreak and related lockdown measures. Therefore, our study aimed to assess the prevalence and severity of the symptoms of AjD in and its relationship to posttraumatic symptoms, depression and generalized anxiety in a large sample of adult Poles, recruited through the internet, in the first phase of COVID-19 pandemic, i.e. in the middle of March and April 2020. On the 11<sup>th</sup> of March, the government of Poland announced the closure of all municipal institutions, schools, and childcare facilities, and banned all mass events. On the 15<sup>th</sup> of March Polish borders for air and rail traffic were closed, and on March 20<sup>th</sup> the state of epidemic was announced. Mandatory government measures followed on March 25<sup>th</sup>, with the temporary closure of all non-essential services and additional physical distancing measures including the stipulation that people were not to leave their homes except under necessary or exceptional circumstances. Our study just started on 25<sup>th</sup> of March, therefore immediately after the introduction of these restrictions. We asked participants if the situation of the COVID-19 pandemic was perceived by them as a stressor, and aimed to estimate prevalence rates of AjD in the context of other emotional disorders as well as to identify possible risk factors associated with screening positive for them.

## 1. Methods

### 1.1. Participants

The research sample for this study consisted of 1792 participants who were recruited online via social media (Facebook). They participated voluntarily and no financial or material reward was offered. The study was conducted via the internet using Qualtrics platform. Participants had to be aged 18 years or older at the time of the survey; a total of 50 people were excluded from the study due to being under 18 years, so the analysis finally included 1742

participants. No other exclusion criteria were applied. The majority of them (77%) were female (22% men, and 1% intergender or non-binary), and the mean age of the sample was 31.23 years ( $SD = 9.60$ , range 18–78 years).

The data were collected from March 25 to 30 April 2020, three weeks after identification of the first coronavirus-infected patient in Poland, at the time when the state of epidemic was just announced and the lockdown restrictions were introduced. After consenting, participants completed the survey online that lasted about 25 minutes. Ethical approval for the study was granted by the Ethics Committee of the Faculty of Psychology at the University of Warsaw.

### 1.2. Measures

The first part of the online survey included the measurement of sociodemographic variables (gender, age, relationship status, employment status, years of education, possibility of remote work). Then, respondents provided answers on self-report questionnaire measuring experienced stressors and symptoms of AjD:

**Adjustment Disorder:** *The Adjustment Disorder – New Module 20* (ADNM-20, Einsle, Köllner, Dannemann, & Maercker, 2010; Lorenz, Bachem, & Maercker, 2016) is a questionnaire measuring symptoms of adjustment disorder. The ADNM-20 consists of two parts: a list of stressors and an symptom list. The list of stressful events comprises a wide range of experiences (19 potential stressors, e.g. financial problems, divorce, serious illness), and requires reference to the event that was the most aggravating in the last 6 months. For the purpose of the study, COVID-19 epidemic was also added to this list. The symptom list part measures response to the most distressing event(s). The ADNM-20 was developed to more closely align to the ICD-11 proposals for AjD and this is reflected in its focus on the two core symptom clusters of preoccupations (four items) and failure to adapt (four items) (Shevlin et al., 2019). However, it also includes four associated symptom clusters of avoidance (four items), depression (three items), anxiety (two items), and impulsivity (three items). All items are answered on a 4-point Likert scale with possible scores ranging from 20 to 80. The questionnaire consists of six subscales: preoccupation, failure to adapt, avoidance, depressive mood, anxiety and impulsivity. Preoccupation and failure to adapt are the core symptoms of AjD and can be added together in one subscale (AjD-C). Avoidance, depressive mood, anxiety and impulsivity are the accessory symptoms and can also be added together in one subscale (AjD-AS). The questionnaire was translated into Polish with the use of the back-translation procedure. In this study, the ADNM-20 scores had an excellent internal consistency of  $\alpha = .91$  (and for the two main subscales, AjD-C and AjD-AS, it was  $\alpha = .90$  and  $\alpha = .90$ , respectively).

There are three methods to estimate a presumptive diagnosis based on the results of the ADN-20 scale (Lorenz et al., 2016). The first way uses a theory-driven diagnostic algorithm. The algorithm is based on the core symptoms, where at least one item has to be rated  $\geq 3$  and at least two items have to be rated as  $\geq 2$  in both core symptom subscales. The algorithm also requires a rating  $\geq 3$  on the impairment criterion (item 20). For the purpose of the study, we considered this method as conservative. The second method is to sum items from the AjD-C and -AS subscales with a cut-off point  $>47.5$ . This approach is moderately liberal. The third method is to sum all the ADN-20 items with a cut-off point  $>47.5$ . This approach is highly liberal. In the current study, we examined all the methods of AjD diagnosis estimation. Additionally, we also used the most conservative approach that was recommended by Kazlauskas, Zelviene, Lorenz, Quero, and Maercker (2017). This method takes into account the exclusion of diagnoses of other disorders before the rates of presumptive AjD diagnoses are estimated.

To enable diagnostic exclusions, the following measures were also included:

**Traumatic stress:** *The International Trauma Questionnaire* (ITQ; Cloitre et al., 2018) is a self-report measure of ICD-11 posttraumatic stress disorder (PTSD) symptoms. Respondents complete the ITQ in relation to their worst traumatic event they describe before answering questions about symptoms. In the current study, they also had a possibility to relate to the experience of the COVID-19 pandemic. The PTSD items in the ITQ are completed in terms of how much the respondent has been bothered by each symptom in the past month and are accompanied by three items measuring functional impairment caused by these symptoms. All items are answered on a 5-point Likert scale, with possible scores ranging from 0 to 24. A symptom is considered present where a score of  $\geq 2$  (*Moderately*) is achieved. PTSD diagnosis requires traumatic exposure, at least one symptom present from each symptom cluster (Re-experiencing, Avoidance, and Sense of Threat), and endorsement of at least one indicator of functional impairment. The psychometric properties of the ITQ have been examined in both clinical and general population samples (e.g. Hyland et al., 2017). The measure is available in many language versions, including Polish ([www.traumameasuresglobal.com/itq](http://www.traumameasuresglobal.com/itq)). The internal consistency of the PTSD item scores in the current sample was very good ( $\alpha = .90$ ).

**Depression:** Nine symptoms of depression were measured using the *Patient Health Questionnaire-9* (PHQ-9; Kroenke, Spitzer, & Williams, 2001; polish adaptation: Kokoszka, Jastrzębski, & Obrębski, 2016, available at the MAPI Research Institute, [www.phqscore](http://www.phqscore.com)).

Respondents indicate how often they have been bothered by each symptom over the last two weeks using a 4-point Likert scale. Possible scores range from 0 to 27, with higher scores indicative of higher levels of depression. A cut-off score of 15 was used to identify participants likely to meet the criteria for depressive disorder, in accordance with the results of meta-analysis (Manea, Gilbody, & McMillan, 2012, 2015). The PHQ-9 scores have very good psychometric properties showing excellent internal consistency among the current sample ( $\alpha = .93$ ).

**Generalized Anxiety:** Symptoms of generalized anxiety were measured using the *Generalized Anxiety Disorder 7-item Scale* (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006). Like the PHQ-9, respondents indicate how often they have been bothered by each symptom over the last two weeks on a 4-point Likert scale. Possible scores range from 0 to 21, with higher scores indicative of higher levels of anxiety. The cut-off point for the scale is  $\geq 10$  points (Rutter & Brown, 2016). The GAD-7 has been shown to be a reliable and valid measure in multiple studies (e.g. Kertz, Bigda-Peyton, & Bjorgvinsson, 2012). Polish translation of the scale is available at the MAPI Research Institute ([www.phqscreeners.com](http://www.phqscreeners.com)). The internal consistency of the scores among the current sample was excellent ( $\alpha = .92$ ).

**Impaired functioning:** *Work and Social Adjustment Scale* (WSAS; Mundt, Marks, Shear, & Greist, 2002) is a short questionnaire used to measure of impaired functioning. It consists of five items with a 9-point scale (0 indicates no impairment at all and eight indicates severe impairment). Possible scores range from 0 to 45. Based on the results (Mundt et al., 2002), it is possible to distinguish 3 levels of functioning: 1–10 points – mild functional impairment; 11–20 – moderately severe functional impairment; 21+ – severe functional impairment. The original English version of the WSAS was translated into Polish with the use of back translation procedure. The polish version of the scale exhibited satisfactory internal consistency of the scores in the current sample ( $\alpha = .80$ ).

## 2. Data analysis

Statistical analysis was conducted in SPSS 25 (IBM Corp, 2018). Frequency and descriptive analyses were performed in order to ascertain the prevalence of each outcome. Binary and multivariate logistic regression analyses were performed in order to explore the impact of sociodemographic variables and stressors on probable AjD. Intergender or non-binary persons (1%) were excluded from the analyses, and gender were coded as 0 = Male and 1 = Female. Other sociodemographic variables were binary or categorical (e.g. relationship status, employment status, possibility of remote work),



except years of education. People who did not indicate any stressor ( $n = 51$ ) were not included in the regression analyses including stressors.

### 3. Results

Descriptive statistics for all sociodemographic variables included in the study are presented in Table 1.

The majority of respondents (75.8%,  $n = 1320$ ) indicated that the current COVID-19 epidemic was a stressful event for them, and it was the most frequently mentioned stressor on the list of current stressors (ADNM). A detailed list of all stressful events along with frequency of their occurrence in the sample is presented in Table 2. Only 51 people (2.9% of the sample) did not specify any stressful event in the ADNM-20 scale. Based on the WSAS scores 13.7% of the sample ( $n = 239$ ) indicated a mild functional impairment, 35.8% ( $n = 623$ ) indicated a moderately severe functional impairment, and 50.5% of the sample ( $n = 880$ ) indicated a severe functional impairment. Correlation coefficients between symptoms of functional impairment as well as core and accessory symptoms of adjustment disorder, AjD-C and AjD-AS, were  $r = .47$  ( $p < .001$ ) and  $r = .53$  ( $p < .001$ ), respectively.

The next step in the analysis was to establish the prevalence rate of presumptive adjustment disorder in the current sample. Firstly, endorsement rates for the core symptoms were established. Of all the respondents, 81.9% ( $n = 1426$ ) rated at least one item  $\geq 3$  in the preoccupation subscale; 76.2% ( $n = 1327$ ) of respondents rated at least one item  $\geq 3$  in the failure to adapt subscale. Mean scores and

endorsement rates (both  $\geq 2$  and  $\geq 3$ ) for the core symptoms of AjD are presented in Table 3.

According to the conservative method of calculation (theory-driven diagnostic algorithm), that is based on the core symptoms of adjustment disorder, the severity of symptoms indicated a rate of AjD of 49.0% ( $n = 854$ ) of the sample in total. Using moderately and highly liberal approaches, 57.4% ( $n = 1000$ ) and 66.1% ( $n = 1151$ ) of the entire sample, respectively, screened positive for AjD. However, according to recommendations (Kazlauskas et al., 2017; Shevlin et al., 2019), exclusions for depression, generalized anxiety, and PTSD symptoms were applied.

According to the recommended cut-off point for the PHQ-9 scale, which is  $\geq 15$  points (Kroenke et al., 2001), symptoms reported by 25.7% of the sample ( $n = 448$ ) indicated a possible diagnosis of depression. Correlation coefficients between symptoms of depression as well as core and accessory symptoms of adjustment disorder, AjD-C and AjD-AS, were  $r = .57$  ( $p < .001$ ) and  $r = .66$  ( $p < .001$ ), respectively. The cut-off point for the GAD-7 scale, which is  $\geq 10$  points, 43.9% of the sample ( $n = 765$ ) screened positive for generalized anxiety. Correlations between symptoms of generalized anxiety as well as core and accessory symptoms of adjustment disorder, AjD-C and AjD-AS, were  $r = .67$  ( $p < .001$ ) and  $r = .70$  ( $p < .001$ ), respectively. People who screened positive for PTSD were also excluded from the presumptive diagnoses of AjD, again, due to possible high co-occurrence of symptoms of trauma and stress-related disorders. Even though as many as 91.8% of the sample reported at least one posttraumatic symptom in the ITQ, the final rate of presumptive PTSD, according to the diagnostic algorithm, was 2.4%. Correlations between posttraumatic symptoms as well as AjD-C and AjD-AS symptoms were  $r = .45$  ( $p < .001$ ) and  $r = .47$  ( $p < .001$ ), respectively. When all the exclusions were taken into account 14.2% ( $n = 247$ ) of the sample met the proposed criteria for AjD.

Two multivariate regression models were used to predict AjD high risk-probability diagnoses according to both the theory-driven diagnostic algorithm, based on the core symptoms, and the most conservative approach including exclusions for depression, generalized anxiety and PTSD symptoms. The predictor variables were gender, age, relationship status, employment status, years of education, and the possibility of remote work (home office). Only the model for core symptoms-based diagnosis fitted the data well; however, from among all risk factors included, only gender was statistically significant ( $\chi^2(1) = 12.626, p < .001$ ). In addition to gender, full-time employment was also predictive for presumptive AjD diagnoses. Odds of screening positive for AjD were greater for females (OR = 1.609, CI: 1.275–2.031), and

**Table 1.** Descriptive statistics for sociodemographic variables ( $N = 1725^1$ ).

Characteristics of the sample	<i>M (SD)</i>	
	Women ( $n = 1349$ )	Men ( $n = 376$ )
Years of education	17.04 (2.92)	17.00 (3.37)
Age (in years)	31.09 (9.33)	32.07 (10.50)
Relationship status	% (n)	
Single	30.6 (413)	38.0 (143)
Informal relationship	40.0 (539)	33.5 (126)
Married	25.4 (343)	26.1 (98)
Divorced	3.4 (46)	1.9 (7)
Widowed	0.6 (8)	0.5 (2)
Form of employment		
Full time job	55.3 (746)	49.7 (187)
Odd job	2.1 (29)	3.2 (12)
Students	15.3 (206)	14.1 (53)
Students also working at the same time	4.2 (56)	2.4 (9)
Own business	7.8 (105)	13.3 (50)
Unemployed	3.0 (41)	3.2 (12)
Retired	1.3 (17)	1.6 (6)
Other	11.0 (149)	12.5 (47)
Does your job allow you to work from a home office?	54.7 (738)	55.9 (210)
Do you work from a home office?	50.9 (687)	50.8 (191)

<sup>1</sup>A total number of participants after exclusion of underage ( $n = 50$ ) and non-binary or intergender ( $n = 17$ ) persons.

**Table 2.** List of stressful events based on the ADN-20 questionnaire along with binary logistic regression results predicting core symptoms-based diagnosis of adjustment disorder.

Stressful life events	N (%) <sup>1</sup>	Adjustment Disorder (N, %) <sup>2</sup>	Odds ratio with 95% confidence interval <sup>3</sup>
Divorce/separation	101 (5.8%)	54 (53.5%)	1.032 (.665–1.601)
Family conflicts	849 (48.7%)	480 (56.5%)	1.457 (1.187–1.788)***
Conflicts in worklife	633 (36.3%)	358 (56.6%)	1.127 (1.015–1.556)*
Conflicts with neighbours	163 (9.4%)	98 (60.1%)	1.353 (.949–1.929)
Illness of a loved one	627 (36.0%)	316 (50.4%)	.916 (.728–1.151)
Death of a loved one	330 (18.9%)	147 (44.5%)	.740 (.561–.975)
Adjustment due to retirement	7 (0.4%)	5 (71.4%)	2.153 (.383–12.098)
Unemployment	318 (18.3%)	191 (60.1%)	1.182 (.893–1.563)
Too much/too little work	1249 (71.7%)	665 (53.2%)	1.326 (1.035–1.698)*
Pressure to meet deadlines/time pressure	1184 (68.0%)	618 (52.2%)	1.145 (.906–1.449)
Moving to a new home	432 (24.8%)	228 (52.8%)	.994 (.785–1.259)
Financial problems	608 (34.9%)	368 (60.5%)	1.588 (1.263–1.998)***
Own serious illness	318 (18.3%)	184 (57.9%)	1.163 (.888–1.523)
Serious accident	44 (2.5%)	26 (59.1%)	1.205 (.633–1.297)
Assault	29 (1.7%)	14 (48.3%)	.765 (.345–1.697)
Termination of an important leisure activity	350 (20.1%)	207 (59.1%)	1.312 (1.019–1.689)*
Coronavirus pandemic	1320 (75.8%)	736 (55.8%)	2.895 (2.260–3.709)***
Other	471 (27.0%)	241 (51.2%)	1.006 (.804–1.259)

\*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ .

<sup>1</sup>Number and percentage of participants in the entire sample ( $N = 1742$ ).

<sup>2</sup>Number and percentage of participants who experienced a certain type of stressor.

<sup>3</sup>For logistic regressions,  $N = 1691$  [after exclusion of underage ( $n = 50$ ) and non-binary or intergender ( $n = 17$ ) persons, as well as participants who did not indicate any stressor ( $n = 51$ )].

**Table 3.** Mean scores, and endorsement rates ( $\geq 2$  and  $\geq 3$ ), for the core symptoms of the adjustment disorder ( $N = 1691$ <sup>1</sup>).

Adjustment Disorder Symptoms	Mean (SD)	% Endorsement $\geq 2$	% Endorsement $\geq 3$
Preoccupation			
I have to think about the stressful situation repeatedly.	3.0 (.968)	1544 (91.30%)	1193 (70.55%)
I have to think about the stressful situation a lot and this is a great burden to me.	2.75 (1.05)	1422 (84.09%)	1036 (61.27%)
I constantly get memories of the stressful situation and can't do anything to stop them.	2.60 (1.08)	1355 (80.30%)	916 (54.17%)
My thoughts often revolve around anything related to the stressful situation.	2.98 (.96)	1536 (90.83%)	1176 (69.54%)
Subscale score	11.33 (3.55)		
Failure to Adapt			
Since the stressful situation, I find it difficult to concentrate on certain things.	2.56 (1.09)	1314 (64.81%)	899 (53.16%)
Since the stressful situation, I do not like going to work or carrying out the necessary tasks in everyday life.	2.22 (1.10)	1096 (27.9%)	681 (40.27%)
Since the stressful situation, I can no longer sleep properly.	2.23 (1.12)	1173 (69.37%)	725 (42.87%)
All in all, the situation causes serious impairment in my social or occupational life, my leisure time, and other important areas of functioning.	2.79 (1.08)	1414 (83.62%)	1040 (61.50%)
Subscale score	9.90 (3.53)		
Total scale score (core symptoms)	21.23 (6.55)		

<sup>1</sup>A total number of participants after exclusion of underage ( $n = 50$ ) and non-binary or intergender ( $n = 17$ ) persons, as well as participants who did not indicate any stressor ( $n = 51$ ).

of not having a full-time job (OR = 1.481, CI: 1.049–2.090).

Additionally, two binary logistic regression models were used to predict high-risk probability AjD diagnosis (similarly, for both types of diagnosis: based on the core symptoms as well as the most conservative one that includes also exclusion of depression, generalized anxiety and PTSD symptoms). The predictor variables were different types of stressors from the checklist, including the COVID-19 pandemic. Only the model for core symptoms-based diagnosis was statistically significant ( $\chi^2(18) = 201.062$ ,  $p < .001$ ). The findings for this type of diagnosis are presented in Table 2, along with

frequencies. From the entire list, only some of the stressors, including COVID-19, were predictive for screening positive for presumptive AjD (see Table 2).

#### 4. Discussion

The current study assessed rates of AjD in the context of other disorders (PTSD, depression, anxiety) in a web-based sample of the Polish population at the time just after the introduction of lockdown measures during the current pandemic. The majority of participants (75%) indicated at that time that the ongoing COVID-19 pandemic was a highly stressful event for

them. Other frequently reported stressors were too much/little work (72%), pressure to meet deadlines (68%), family conflicts (48%), conflicts in work life (36%), and financial problems (34%). Logistic regression analysis revealed that among the stressors that were predictive of presumptive AjD was the COVID-19 pandemic, family conflicts and conflicts in work life, too little/too much work, and financial problems, as well as termination of an important leisure activity (Table 2). It is noteworthy, that in addition to COVID-19 itself, other reported stressors can also be caused by or exacerbated by the current pandemic situation.

Almost 50% of participants reported relatively severe symptoms of adjustment disorder, according to the conservative method of calculation. However, after exclusion for co-occurring symptomatology, 14% finally qualified as potentially meeting the diagnostic criteria for this disorder. Generally, high rates of poor mental health in this study were found, but comparable to results of other studies conducted during the current pandemic (Hyland et al., 2020; Rossi et al., 2020; Shevlin et al., 2020; Walton et al., 2020). The majority of participants (86%) reported moderately severe or severe functional impairment. Of the entire sample, 44% screened positive for generalized anxiety and almost 26% for depression. Posttraumatic stress symptoms were frequently endorsed, but a relatively small percentage of the sample met the diagnostic criteria for PTSD (2.4%). Overall, the results indicated a high level of distress experienced by participants after the introduction of preventive measures related to a pandemic (as the study was conducted from March 25 to 30 April 2020). Compared to previous epidemiological studies conducted before the pandemic, some rates obtained in the current study are extremely high. A previous large-scale epidemiological study in Poland reported a one year prevalence of any psychiatric disorder of 10.5% (23% for the life-time prevalence: Kiejna et al., 2015a, 2015b). In the same study the prevalence of depression was 3%, for GAD 1%, and 1% for PTSD; the percentage of participants in the current study that screened positive for disorders was much higher. The positive association with female gender and emotional disorders is consistent with many previous studies (see e.g. Rosenfield & Mouzon, 2013). The positive association was also found for full-time employment, which is among protective factors for mental health (Rosenthal, Carroll-Scott, Earnshaw, Santilli, & Ickovics, 2012). Full-time employment during pandemics, which is associated with a deepening economic crisis, can give a sense of financial security, especially in countries like Poland, where full-time contract means a permanent

employment contract. Mimoun, Ben Ari, and Margalit (2020) have recently found that recipients of 'furlough', the government supported salary, during the COVID-19 pandemics reported high levels of distress. The authors indicate that employment instability, due to the sense of being a burden on society and a lack of belonging, places people at risk of self-harm and suicide.

So far, there are not many published results on the prevalence of AjD in studies conducted during the current COVID-19 pandemic. In the Italian study (Rossi et al., 2020) that was carried out at similar time (March/April 2020), but on a much bigger sample (approximately 18,000 participants), the rate of AjD measured with the International Adjustment Disorder Questionnaire (IADQ: Shevlin et al., 2020) was 23%. However, in many other studies increased rates of anxiety, depressive symptoms and stress-related symptoms were found as well (e.g. Hyland et al., 2020; Rossi et al., 2020; Shevlin et al., 2020). Large differences in results have been reported; for example, while in the current study the rate for generalized anxiety was 44%, in the Irish study it was 20% (Hyland et al., 2020a), similarly to the Italian study, in which the rate was 21% (Rossi et al., 2020). However, in a study of medical students from China it was 0.9% (Cao et al., 2020). Such disparities are likely due to different assessment tools used and differences in sample size and recruitment methods, making direct comparisons impossible. Moreover, our study has some important limitations, in particular the sampling technique. Similar to the Italian study (Rossi et al., 2020), and other web-based studies, recruitment in our study relied on voluntary participation through social networks. For this reason, there may be an important selection bias, related to excluding people not on social networks, and self-selection, resulting in the highly unbalanced gender ratio (much higher proportion of women). In addition, the survey was based on self-report assessments, not interview-based measures. Therefore, rates of mental health outcomes, obtained in this study, should be interpreted with a degree of caution. It is also related to the fact that research uses different criteria of estimating the prevalence of disorders; the four possible methods described for the ADN-20 are a good example. However, the strength of the study is a relatively large sample size and the sampling time frame that corresponded to the early stage of the epidemic in Poland.

In conclusion, we found high rates of poor mental health outcomes in the Polish population in the first weeks into the COVID-19 pandemic and lockdown. The prevalence of presumptive AjD was estimated at 49%, but after excluding the occurrence of other

disorders, the prevalence was 14%. The COVID-19 pandemic was indicated as a highly stressful situation by the majority of participants, and it was the strongest predictor of adjustment disorder symptoms. Being female and not having a full-time employment were associated with all of the mental health outcomes. These findings indicated a high level of intense current stress-related symptoms in the early phase of the pandemic and warrant further monitoring of the Polish population's mental health. Certainly, it is crucial not only to conduct further studies locally, but also studies enabling cross-countries comparisons, taking into account the changing context related to pandemic, such as planned pan-European ESTSS study (Lotzin et al., 2020), as the epidemic situation changes, and the level of perceived stress could also fluctuate. However, this study will aid the comparison of results obtained at different time points during the COVID-19 pandemic. The results indicate the need for wide access to psychological support during the current pandemic. In particular, offering psychological interventions aimed at coping with stress related to the pandemic seems to be necessary both to boost societal well-being and minimize mental health risks. The findings also confirm that gender (female) and employment instability are important risk factors that place people at high risk of developing psychological distress and adjustment disturbances, and therefore should be taken into account in shaping social and health policies.

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No potential conflict of interest was reported by the authors.

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### Data availability statement

The data that support the findings of this study are available from the corresponding author, MD, upon reasonable request. The data are not publicly available due to restrictions related to university protocol.

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