Anxiety, aggression and alcohol consumption over six months among Poles in early adulthood – The follow-up study

Szymon Florek, Paweł Dębski, Magdalena Piegza, Piotr Gorczyca, Robert Pudlo

Abstract

Aim of the study: There are many studies about mental health during periods of various epidemics. In this study, it was decided to find how the studied parameters changed during six months in 2020.

Material and methods: A total of 105 results were obtained from respondents who met all inclusion criteria for the study. 84 people (80.00%) are women and 21 (20.00%) are men. The study included socio-demographic parameters and psychological scales: AUDIT — to determine alcohol consumption, GAD-7 — to measure the anxiety and the Buss-Perry Aggression Questionnaire.

Results: Anxiety levels decreased in the entire study population and some subgroups. Higher levels of anxiety were found among male respondents and health professionals. Increased levels of physical aggression were observed among respondents from small cities. A decrease in hostility was found among rural residents. A decrease in verbal aggression was noticed among those with secondary education. Increased levels of physical aggression were observed only among men, while verbal aggression and hostility were observed among those with secondary education. Higher alcohol consumption occurred among young people.

Discussion: The literature provides a wealth of data on various aspects of the mental health including aggression, anxiety and alcohol consumption. Our results are mostly in line with these, and show some features of adaptation in society.

Conclusions: Reductions in anxiety intensity may suggest some adaptive changes in society. Healthcare professionals are characterised by elevated anxiety levels relative to other respondents.

mental health; anxiety; aggression; alcohol consumption

Szymon Florek[1], Paweł Dębski[2,3], Magdalena Piegza[3], Piotr Gorczyca[3], Robert Pudlo[1]: [1]Department of Psychoprophylaxis, Faculty of Medical Sciences in Zabrze, Medical University of Silesia in Katowice, Tarnowskie Góry, Poland; [2]Faculty of Psychology, Humanitas University in Sosnowiec, Poland; [3]Department of Psychiatry, Faculty of Medical Sciences in Zabrze, Medical University of Silesia in Katowice, Tarnowskie Góry, Poland
Correspondence address szymon.florek@sum.edu.pl

INTRODUCTION

Mental health is still difficult to define unambiguously, as evidenced by a recent article attempting to derive a new, universal definition [1]. It is undoubtedly determined by many different variables. To date, a number of studies have been conducted to highlight changes in mental health during a number of different ep-

idemics [2,3] including the COVID-19 pandemic [4]. The results of these studies are inconclusive, and most of them have been conducted single-pointedly. Furthermore, the studies conducted cover different aspects of mental health. It can be noted that some place particular emphasis on the intensity of depressive symptoms [5], while others focus on personality disorders, for example [6,7]. Furthermore, studies correlating anxiety-depressive symptoms with potential protective factors such as psychological resilience are particularly valuable [8]. Alcohol consumption should also not be overlooked, which is being worked on in various countries, and there is increasing evidence that it is culturally determined [9,10].

The broadly understood aggression may be an important element of mental disorders. Here, it is important to note the well-studied mechanism of increased aggression as a result of increased anxiety [11]. Secondly, some individuals may exhibit aggressive behaviour as an expression of frustration at the constraints of the pandemic. Studies show that a derivative of anxiety may also be increased alcohol consumption, which in turn, at the pharmacological level, may trigger aggressive behaviour [12,13]. Of course, this model of the relationship between alcohol consumption, aggression and anxiety is not complete and does not take into account the many environmental factors that can significantly interfere with it. It is also worth noting the diagnostic problems of psychiatric disorders secondary to the COVID-19 pandemic. According to Heitzman, it is justified to create a new nosological entity, the pandemic acute stress disorder (ASD), which fits the criteria for ASD diagnosis, but the duration of symptoms (due to prolonged triggering of reactions) is prolonged. However, the author does not specify how long the symptoms he identified may persist [14]. The diagnostic criteria proposed by Heitzman do not fit into the diagnostic criteria F43.0 acute stress reaction according to ICD-10, where a strict duration of the disorder – from 8 to 43 hours – has been specified [9]. Nevertheless, according to the interpretation of the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders 5) classification, symptoms usually begin after the stressor has subsided and last from three days to one month. The new entity proposed by the au-

thor seems to be the closest to an extension of the American criteria for diagnosing ASD [15]. However, a complete novelty is the possibility of the appearance of symptoms already in the course of a stressor, which is not predicted by any of the listed international classifications of diseases [9,14,15]. It should be noted that the basis of the disorders in question is a prolonged anxiety response, prompting the study of anxiety and its derivatives in the face of the COVID-19 pandemic, even more so in a longitudinal study.

The present study aimed to assess changes in anxiety, depression and alcohol consumption during six months in 2020.

MATERIAL AND METHODS

This article is a continuation of previous research and is based on a follow-up survey conducted online [16]. It was carried out in the period from July 17 to August 31, 2020, among Polish respondents. The study aims to detect changes and socio-demographic differences in the severity of anxiety, aggression and alcohol consumption between April and August 2020.

A total of 538 people took part in the entire project, which was recruited online through voluntary participation in an internet survey posted on websites such as Facebook [16]. The follow-up study consisted in sending questionnaire forms (https://forms.gle/HzPdgzPHt5yvFmRS7) via e-mail to people who declared their willingness to participate in that part of the project and provided researchers with their e-mail addresses. Once the email was sent, any email addresses were permanently removed from the database. Previously, this was the only data stored through which participants in the study could be identified in a limited way. A total of 283 people entered the follow-up phase, but 178 met the exclusion criteria for the study. 168 of them declared in the initial questionnaire the presence of major life changes (such as job change, marriage, divorce, or the birth of a child) in the last 12 months before the study, while the remaining 10 were under the care of a psychiatrist. These respondents were excluded from the study because potential changes in anxiety, aggression and alcohol consumption may have been due to

these factors. Prior to the study, a letter was sent to the Bioethics Committee at the Medical University of Silesia in Katowice, asking whether permission was required to conduct the study. The response was that the project did not require its consent.

The follow-up survey questionnaires were not modified in terms of the scales used about the previous study. Only the scope of questions in the pre-questionnaire was changed in such a way as to enable the correlation of the obtained results with the previous ones to perform appropriate comparative analyses. To assess the severity of anxiety, the GAD-7 (Generalize Anxiety Disorder – 7) developed by R.L. Spitzer, J.B.W. Williams, K. Kroenke and colleagues was used [17]. It contains 7 items scored from 0 to 3. The level of aggression was measured using the Polish version of the Buss-Perry Aggression Questionnaire, which includes 29 items scored from 1 to 5 on the Likert scale [18-20]. The alcohol consumption of the respondents was examined through the Polish version of the international AUDIT test, which contains 10 items scored from 0 to 3 [21]. These are the same scales as used in the previous study [16].

Statistical analyses were performed using Excel 2016 and Statistica version 13.3. The Shapiro-Wilk test was used to assess the normality of the distributions. Using the Student's t-test for parametric data and the Wilcoxon signed-rank test for non-normal distributions, the validity of the hypotheses about changes in the parameters under study (anxiety, aggression and alcohol consumption) in the population as a whole and separate socio-demographic groups was tested. The paired-t-test and the Mann-Whitney U-test for non-parametric variables were used, respectively, to highlight differences in the studied variables between the different subgroups. A significance level of $\alpha < 0.05$ was assumed in the statistical procedures.

RESULTS

The study group, comprised 105 subjects, of whom 84 (80.00%) were female and 21 (20.00%)

were male. Taking age as a criterion for dividing the study population yielded only two subgroups – that is, those aged 18 to 29 and those aged over 30 (Tab. 1).

Table 1. Demographic structure of the study population of adult Polish people

	Participants (n)	Percentage of whole study population (%)
Number of study population (N)	105	100
Sex:		
• men	21	20.00
• women	84	80.00
Age:		
• 18-29 years	72	68.57
• 30-49 years	29	27.62
• 50+ years	4	3.81
Place of residence:		
• village	13	
• town <50 000 inhabitants	18	12.38
• city 50 000 – 200 000 inhabitants	17	17.14
		16.19
• city >200 000 inhabitants	57	54.29
Education:		
• primary	1	0.95
• secondary	42	40.00
• higher	60	57.14
• no answer	2	1.90
Work in health care:		
• yes	17	16.19
• not	88	83.81

A statistically significant reduction of the severity of anxiety was observed in the whole study population in the groups of women, people with secondary education, respondents not working in healthcare and those declaring no change in mental state and both age groups. The level of anxiety increased in the healthcare group, but this result occurred not to be statistically significant. These changes are presented in Table 2 (Tab. 2).,

Table 2. Statistically significant reductions of anxiety's levels among different subgroups of study population
(The Wilcoxon Signed-Ranks Test)

Group/Variable	Mean	SD	Variance	N	T	Z	r	p
Whole study group:				96				
• Anxiety	7.656	5.115	26.165					
• Follow-up anxiety	6.063	4.931	24.312		1426.500	3.294	0.336	<0.001*
Surveyed women:				75				
• Anxiety	7.960	4.944	24.444					
• Follow-up anxiety	6.480	4.752	22.577		901.500	2.764	0.319	<0.01*
Surveyed men:				21				
• Anxiety	6.571	5.680	32.257					
• Follow-up anxiety	4.571	5.381	28.957		63.000	1.825	0.398	0.068
Age 18-29 years:				66				
• Anxiety	7.727	5.414	29.309					
• Follow-up anxiety	6.409	5.150	26.522		765.000	2.175	0.268	<0.05*
Age 30+ years:				30				
• Anxiety	7.500	4.470	19.983					
• Follow-up anxiety	5.300	4.396	19.321		100.000	2.725	0.498	<0.01*
Secondary education:				39				
• Anxiety	7.744	5.169	26.722					
• Follow-up anxiety	5.231	3.996	15.972		136.000	3.545	0.568	<0.001*
Higher education:				54				
• Anxiety	7.648	5.100	26.006					
• Follow-up anxiety	6.741	5.429	29.479		588.000	1.330	0.181	0.183
Cities with a population 50.000-200.000				15	49.000	0.625	0.161	0.532
• Anxiety	6.067	5.470	29.924					
• Follow-up anxiety	5.667	5.420	29.381					
Cities with a population more than 200.000				53	520.000	1.731	0.238	0.084
• Anxiety	6.604	4.180	17.475					
• Follow-up anxiety	5.547	4.656	21.676					
Healthcare professionals:				13	44.500	0.070	0.019	0.944
• Anxiety	8.923	4.425	19.577					
• Follow-up anxiety	9.077	5.155	26.577					
Non-healthcare professionals:				83	958.500	3.562	0.391	<0.001*
• Anxiety	7.458	5.211	27.154					
• Follow-up anxiety	5.590	4.755	22.611					
Subjective changes in mental health:				42	298.000	1.919	0.296	0.055
• Anxiety	8.905	5.050	25.503					
• Follow-up anxiety	7.381	4.711	22.193					
No subjective changes in mental health:				54	424.000	2.742	0.373	<0.01*
• Anxiety	6.685	4.997	24.974					
• Follow-up anxiety	5.037	4.895	23.961					
SD – standard deviation; * – statistically significant								

The higher level of anxiety and lower level of physical aggression among female respondents were shown in the follow-up phase (Tab. 3).

The decrease in the level of anxiety was noted only among people living in cities with a population of less than 50,000 (Tab. 4).

Table 3. Statistically significant differences between the female and male study groups (The Mann-Whitney U Test)

Variable	Men n=21			Women n=84			Z	Cohen's d	p
	Mean	SD	Median	Mean	SD	Median			
Anxiety	5.381	4.571	2.000	6.548	4.900	5.000	2.155	0.431	<0.05*
Verbal aggression	14.667	3.168	14.000	13.762	3.804	13.000	-1.085	0.214	0.278
Physical aggression	17.762	5.205	17.000	15.119	4.264	15.000	-2.167	0.434	<0.05*
Hostility	20.571	6.384	18.000	20.548	7.228	20.000	-0.024	0.005	0.981
Alcohol consumption	5.810	5.076	5.000	3.440	2.366	3.000	-1.883	0.375	0.060
SD – standard deviation; * – statistically significant									

Table 4. Statistically significant decrease in anxiety level in the group of people from cities with less than 50.000 inhabitants (The Student's t-test)

Variable	Mean	SD	N	Different	SD Different	t	df	p	95% CI
Countrysides									
• Anxiety	11.154	6.026	13	2.846	5.970	1.719	12	0.111	-0.761-6.454
• Follow-up Anxiety	8.308	6.613							
Cities less than 50.000									
• Anxiety	9.889	6.009	18	3.000	3.865	3.293	17	<0.01	1.078-4.922
• Follow-up Anxiety	6.889	4.945							
SD – standard deviation; N – numbers of people; CI – confidence interval									

Comparative analysis also noted higher levels of anxiety among healthcare workers (Tab. 5).

According to the alcohol consumption, a higher level was observed in the group of 18-29 years old (Tab. 6).

Table 5. Significantly higher levels of anxiety among healthcare workers (The Mann-Whitney U Test)

Variable	Healthcare workers n=17			Non-healthcare workers n=88			Z	Cohen's d	p
	Mean	SD	Median	Mean	SD	Median			
Follow-up anxiety	8.471	4.989	8.000	5.705	4.948	5.000	-2.262	0.454	<0.05*
SD – standard deviation; * – statistically significant									

Table 6. Significantly higher levels of consuming alcohol among 18-29 years old respondents (The Mann-Whitney U Test)

Variable	18-29 age n=72			30+ age n=33			Z	Cohen's d	p
	Mean	SD	Median	Mean	SD	Median			
Follow-up alcohol consumption	4.250	3.262	4.000	3.182	3.025	2.000	2.119	0.423	<0.05*
SD – standard deviation; * – statistically significant									

A decrease in verbal aggression was visible in the group with secondary education (Tab. 7).

Table 7. Statistically significant decrease in verbal aggression in the group of people with secondary education (The Student's t-test)

Variable	Mean	SD	N	Different	SD Different	t	df	p	95% CI
VA	15.595	3.8386							
Follow-up VA	14.952	3.8188	42	0.6429	1.961	2.125	41	<0.05	0.0318-1.254

VA – verbal aggression; SD – standard deviation; N – numbers of people; CI – confidence interval

Significantly differences were identified for verbal aggression and hostility, which were higher among respondents with secondary education (Tab. 8).

Table 8. Comparative analysis of the studied variables with the division of the study population by level of education (The Student's t-test)

Variable	Secondary education n=42 Mean SD		Higher education n=60 Mean SD		t	Cohen's d	p variances	p
Generalized aggression	71.286	15.627	66.167	17.196	-1.836	0.372	0.522	0.069
Physical aggression	15.738	3.630	15.617	5.208	-0.559	0.115	<0.05*	0.577
Verbal aggression	14.952	3.819	13.250	3.554	-2.309	0.405	0.606	<0.05*
Anger	18.143	5.842	17.233	6.264	-0.847	0.171	0.731	0.399
Hostility	22.500	6.553	19.083	7.136	-2.653	0.544	0.162	<0.01*
SD – standard deviation; * – statistically significant								

The level of physical aggression increased in cities with a population of less than 50.000 (Tab. 9).

The decrease in the level of hostility was noted among the respondents living in the countryside (Tab. 10).

Table 9. Statistically significant increase in physical aggression among people living in cities with a population of less than 50.000 (The Student's t-test)

Variable	Mean	SD	N	Different	SD Different	t	df	p	95% CI
PA	13.389	3.1275							
Follow-up PA	15.556	4.0761	18	-2.167	2.834	3.244	17	<0.01	-3.576-(-0.7575)

PA – physical aggression; SD – standard deviation; N – numbers of people; CI – confidence interval

Table 10. Statistically significant increase in hostility in the group of people living in the countryside (The Student's t-test)

Variable	Mean	SD	N	Different	SD Different	t	df	P	95% CI
H	21.692	6.1017							
Follow-up H	19.846	7.7658	13	1.846	2.824	2.357	12	<0.05	0.1397-3.553

H – hostility; SD – standard deviation; N – numbers of people; CI – confidence interval

This study also analysed respondents' answers regarding subjective changes in mental health since participating in the first phase of the study, as well as subjective concerns about the pandem-

ic. An affirmative response to the first question was given by 48 respondents out of a total pool of 105, representing 45.71%. These individuals scored higher on follow-up anxiety (Table 11).

Table 11. Differences in the level of anxiety and alcohol consumption between people who answered YES and NO (The Mann-Whitney U Test)

Variable	YES answer n=46			NO answer n=59			Z	Cohen's d	p
	Mean	SD	Median	Mean	SD	Median			
Anxiety	8.500	5.006	7.500	6.915	5.276	5.000	-1.799	0.357	0.072
Follow-up anxiety	7.109	4.591	7.000	5.407	5.276	4.000	-2.257	0.452	<0.05*
Alcohol consumption	3.630	2.984	3.000	4.085	4.137	3.000	0.323	0.064	0.747
Follow-up alcohol consumption	3.783	3.018	3.000	4.017	3.381	4.000	0.417	0.082	0.677
SD – standard deviation; * – statistically significant									

DISCUSSION

In the study, the most relevant changes are those related to a reduction in anxiety among the entire study population, as well as in individual subgroups. It is worth mentioning that anxiety can be defined in two different ways. The first refers to anxiety as a mental disorder manifested by cognitive, emotional and physiological disturbances. The second treats anxiety as a natural phenomenon accompanying an adaptive response [22]. The observations on the overall decrease in anxiety made in this study lead to the conclusion that anxiety during pandemics plays the latter role. Heitzman treats the phenomenon of anxiety in the context of COVID-19 in the same way in his article, in which he describes anxiety as one of the symptoms of the pandemic acute stress response. In this article, the author extends the duration of ASD symptoms due to the equally persistent epidemic situation [14]. The decrease in anxiety found in our study as one of the symptoms of the proposed nosological entity may suggest its disappearance during the period of the study.

A significant reduction in anxiety only in the group of women suggests that they react with a stronger fear of new unknown situations. This view is reflected in the literature [23]. One might wonder about the rate of adapting to new situations by women as compared to men. Although these considerations might be interesting, it seems that they go beyond the scope of this study. As found in the present study, women were characterised by significantly higher levels of anxiety than men. Comparing this result to research carried out outside of the pandemic period, as well as at the beginning of the pandemic, it can be concluded that there was no change in this respect [24,25]. The situation is similar in terms of physical aggression and levels of alcohol consumption. As studies conducted to date indicate, the level of physical aggression may increase in men with the escalation of pandemic-related restrictions [26]. Nevertheless, a significant difference in the level of physical aggression between boys and girls can already be seen in adolescence [27]. Thus, the pandemic did not disrupt this difference, but may only have contributed to its widening. In terms of alcohol consumption, it appears that men were already consuming more alcoholic beverages before the pandemic [28].

In our study, we showed that the level of anxiety decreased significantly in both analysed age groups. This seems to be like a natural adaptive response that occurs regardless of age. However, the age distribution was forced by the structure of the study group (Table 1) and does not reflect differences in biological development, as discussed in the limitations of the paper. The studies conducted so far have focused only on differences in the severity of anxiety at one selected point in the pandemic period, and the results of these studies in relation to the age of the respondents are ambiguous, as some indicate a higher level in younger respondents [29], while others do not show any statistically signif-

icant differences [30]. Higher alcohol consumption among young people is also not surprising and somehow coincides with observations made before the pandemic period [31]. As shown in a large Brazilian study, the overall level of alcohol consumption in the population increased during the pandemic period. However, when analysing the differences between younger and older people, it can be seen that the observed increase did not disrupt the structure described above – young people in this study also consumed more alcohol than older people [32].

An interesting observation is that the severity of anxiety decreased only in those with secondary education, while there was no statistically significant change in those with higher education. Previous studies that took place at the onset of the pandemic showed no statistically significant differences according to educational level [33]. This suggests that people who left education at an earlier stage adapted more quickly to the new situation. Nevertheless, this situation was associated with experiencing relatively more severe ASD pandemic symptoms. In contrast, the group of individuals with higher education probably did not experience such a strong adaptive response due to the pandemic period, despite possibly greater knowledge of COVID-19. This may be due to more developed psychological defence mechanisms in these individuals. In our project, we identified a statistically significant difference in verbal aggression and hostility, which were more severe among those with secondary education. Likely, this difference was not influenced by the pandemic period, as may be evidenced by a study among schoolchildren, which found that more aggressive people perform worse academically [34].

Another observation in our study is a statistically significant reduction in the severity of anxiety only among inhabitants of small towns (less than 50,000 inhabitants). In the available literature, no data on the severity of anxiety depending on the size of the city of residence were found. Given this, it cannot be ruled out that the described a statistically significant decrease in anxiety in this population is a coincidence and has no real translation in reality. Nevertheless, this topic requires further research to rule out or confirm this variability and, further, to look at potential reasons for it.

Certainly, more attention should be paid to the statistically significant decrease in anxiety severity among non-healthcare workers, as well as higher levels of anxiety among health care workers. This situation is similar to other publications – Pappa reports in his meta-analysis that both anxiety severity and symptoms of depression and insomnia were significantly overestimated among healthcare professionals [35]. Of course, this may be due to a number of different reasons, one of which may be the relatively low awareness of the epidemiological situation in the country and in hospitals. Vindegaard, in his review of the early period of the pandemic, points to high levels of depression, anxiety and severe sleep disorders among health care workers [36]. The lack of a significant decrease in anxiety in this group (or even a slight increase in anxiety) may be a reflection of the nature of the work, which involves continuous exposure to the effects of the pandemic. In addition, the much greater awareness of the seriousness of the situation and the real risk of contracting COVID-19, as well as infecting others, should be taken into account. Nevertheless, as a study of healthcare workers showed, perceived anxiety decreased with increasing age, years of work and number of children [37], suggesting that those starting their careers in the profession feel the most anxiety. In another study, anxiety among health professionals was measured using the State-Trait Anxiety Inventory scale. The authors highlighted a statistically significant higher intensity of anxiety both as a trait and as a state among professionals with chronic diseases and a positive test for SARS-CoV-2 compared to healthy individuals who were not tested and were negative. Furthermore, in terms of anxiety, higher scores were obtained by those who had a close relative tested for COVID-19 and cared for patients with the disease compared to those who did not have a tested colleague or relative and those who did not care for patients infected with SARS-CoV-2 [38]. Another study indicates that the level of medical knowledge is not statistically significant in terms of perceived anxiety [39]. It is likely that the level of anxiety decreases with seniority and increases in health professionals directly or indirectly affected by the pandemic. The level of medical knowledge does not play a key role in this pattern, in contrast to

personal experience. Therefore, it is advisable to systematically monitor the mental health status of health professionals, as well as to provide them with appropriate psychological care that can mitigate the potential effects of a prolonged stress reaction. It should also be taken into account that, in light of these results, health professionals may be at increased risk of developing post-traumatic stress disorder (PTSD) related to the current situation and their work. Furthermore, the first survey did not show any statistically significant differences in anxiety between health professionals and other respondents. This may mean that anxiety was elevated at the start of the pandemic in the vast majority of respondents, while it remained high only among health professionals during the control phase.

Statistically significant changes were also noted in some components of generalized aggression, such as hostility, verbal aggression and physical aggression. At present, it is difficult to say unequivocally whether these changes are only the result of small group size. For this reason, their interpretation should be approached with caution, bearing in mind that further research is needed in this area.

Reducing the level of verbal aggression among people with secondary education is probably associated with a reduction in the severity of anxiety in this group. Moreover, our study found that there was a significant increase in the level of physical aggression in small towns below 50,000 inhabitants, and interestingly also in these cities, the level of anxiety was reduced. However, such a situation may occur due to the nature of small towns, where people are more likely to meet each other and exchange often unverified information. In this case, reducing anxiety may trigger an increase in physical aggression due to low frustration tolerance to numerous restrictions imposed by authorities in connection with the pandemic period. The last observation concerns the decrease in the level of hostility among the inhabitants of the countryside. This can be due to many different factors, such as more time spent with family and neighbours, and less stress – compared to city dwellers.

The lack of a statistically significant decrease in the level of alcohol consumption in society may raise some concerns about the amount of alcohol consumed daily. According to the available studies, the period of the COVID-19 pandemic contributed to the increase in the level of alcohol consumption [40,41]. However, there are reports that people get drunk less during a pandemic [42]. This could mean that people are consuming more alcohol in more frequent and smaller doses. This approach seems to have a psychological basis – during the lockdown period, people had more time off, fewer chores, and less work-related stress, meaning they might not have needed to relieve stress by drinking alcohol. Referring to the AUDIT test used in this study, it can be stated that the questions in it are much more focused on the problems related to drinking large amounts of alcohol, and slightly less emphasis on the frequency of its consumption. On the other hand, there are grounds to suspect that the model of increased alcohol consumption became established in society for a slightly longer time.

Also noteworthy is the analysis of the structure of the responses to the question on subjective changes in mental health during the COVID-19 pandemic. Less than half of the respondents (44.5%) stated that they had experienced a significant change between the first and second surveys. Interestingly, in these individuals, no statistically significant difference of a longitudinal nature was noted in the scales examined. Anxiety severity decreased significantly among those who saw no change in their mental health. Of course, this could be due to several different factors, but it seems that individual adaptability is the most important here. These people probably did not experience any change because, when exposed to stress, they quickly went through a period of adaptation and, at the time of the second survey, their mental state had returned to the pre-pandemic norm. As is well known, there are different ways of coping with stress and their use by an individual is determined by, among other things, personality type, environmental factors and, finally, attitudes towards life events [43]. Furthermore, if we consider the response to the pandemic in the category of adaptive disorders, it seems that the timing of the second study was adequate for the resolution of the pandemic in people who were more resilient to stress [44]. In contrast, it is difficult to address the thesis proposed by Heitzman regarding the specific form of acute stress reac-

tion (ASD) resulting from the COVID-19 pandemic. In his study, the author focuses on prolonged exposure to the stressor without specifying the time within which the stress reaction he mentions should subside [14]. The rationality of the presented analysis seems to be confirmed by the data summarised in Table 10 (Tab. 10), as it shows that both groups presented anxiety intensity at a similar level in the first phase of the study with no statistically significant differences.

Limitations and strengths

The main limitation of this work was the number of people who took part in the survey. Although the study group in the first survey consisted of 538 people, only 105 people provided complete answers to all questions in the follow-up survey. This was because not everyone provided their email address when first completing the survey, which meant that they did not agree to participate in the follow-up format. At this point, it should be noted that both in the first survey and in the follow-up phase, respondents were not a group representative of Polish adult society. Moreover, 105 respondents in follow-up also were no representative of whole study population. As described previously – the inclusion and exclusion criteria for the study were exactly the same for both terms. Secondly, not all people who provided their email addresses when first participating in the survey responded. The structure of the study group is also important, with a majority of 80% being women. For this reason, gender-based analyses may be somewhat biased. It is also clear that all other divisions were not equal, which may also generate further inaccuracies, as pointed out in the discussion. Thirdly, the statistical analysis in this paper is primarily based on data extracted from the raw scores of the scales used. A final limitation of the study is the age structure of the respondents. Perhaps, because the research was conducted online, most older people were unable to participate. Moreover, a certain problem in the statistical analysis may be found in comparing the group of people who are healthcare professionals to the remaining respondents. As can be seen in Table 1 (Tab. 1), only 17 healthcare workers

participated in this study compared to the group of 88 other respondents. It is also worth highlighting the fact of multiple analyses, often conducted for small subgroups of the study population, which can result in alpha-inflation. In order to minimise it, the hypotheses and research questions are described in detail and the tests used to clarify them are explained.

CONCLUSIONS

1. Reductions in anxiety intensity may suggest some adaptive changes in society, what requires further research.
2. Healthcare professionals are characterised by prolonged elevated levels of anxiety relative to other respondents, what may carry negative consequences for their mental health. For this reason, this group should be given special psychological support.
3. The observed changes in aggressive behaviour are inconclusive and there is a need for further research to determine changes over different time periods of all elements of aggression, as well as on the pattern of alcohol consumption.

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