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Emotional fuctioning of people who experienced COVID-19 infection - the moderating role of gender*

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 The COVID-19 pandemic had a significant impact on people's psychological functioning, altering emotional lives by increasing anxiety and lowering mood. The purpose of the present study was to analyze the impact of COVID-19 infection on anxiety and mood, and to examine the role of gender and the significance of the number of infections. The study was based on a questionnaire and involved 210 participants (n = 101 who contracted COVID-19 and n = 109 who never experienced the disease). The Anxiety and Depression Scale (HADS), a tool with good psychometric properties, was used for assessment.
Gender differences were observed in levels of anxiety and depression. Men reported higher levels of anxiety and depression compared to women. Interestingly, those who had not experienced COVID-19 reported higher levels of depression. The study indicated a moderating role of gender in the relationship between anxiety, depression, and the number of infections. Experiencing

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an infection may reduce tension and possibly increase feelings of better coping and greater self-confidence, which is particularly significant for men, given the persistence of stereotypical attitudes towards male and female roles in society.

The individual experience of COVID-19 infection, coupled with the unpredictability of the body's response, may foster a sense of uncertainty, exacerbating negative emotions. However, participants who had contracted the disease learned to cope with it and developed some immunity, which might explain the observed differences. This conclusion is important in the context of potential subsequent waves of the epidemic.

Depression is a mental disorder characterized by decreased energy, a depressed mood, and reduced activity, which often hinders normal functioning. Its symptoms include anhedonia, reduced motivation, somatic issues such as sleep disorders, body aches, decreased concentration, pessimism, and low self-esteem [Alladin 2013]. Depression significantly reduces quality of life and immunity, potentially leading to increased mortality [Hawton *et al*. 2013]. According to a WHO report, at least 280 million people worldwide suffer from depression, with women being affected nearly 50% more often than men [Woody *et al*. 2017].

Studies in the literature explore depression levels during pandemics or periods of isolation, showing that social isolation exacerbates depressive symptoms [Ausín et al., 2020; Fofana et al., 2020; Al Maqbali *et al*. 2024]. It is stated social isolation and quarantine have a significant impact on the occurrence of depression, particularly among young people [Gambin *et al.* 2021, Martins *et al*. 2022]. Additional research shows a relationship between depression levels and gender, with women experiencing higher levels of depression than men [Kulig-Kulesza *et al.* 2022].

Research indicates harmful negative psychophysiological effects of COVID-19 disease, such as depression [Shetty *et al*. 2023]. Anxiety, panic, and fear have always accompanied epidemics, including the COVID-19 pandemic [Zhu *et al.* 2023]. Research conducted on individuals subjected to social isolation due to the COVID-19 epidemic showed that anxiety symptoms were more prevalent among those experiencing strained relationships with loved ones, people fatigued by excessive responsibilities and a lack of privacy, and, most importantly, those affected by the uncertainty surrounding the spread of the virus [Gambin *et al.* 2021]. In one survey, 23% of participants reported severe anxiety disorders caused by social restrictions, limitations, and a sense of powerlessness and helplessness [Lopes and Nihei 2021]. An Iranian study revealed an even higher prevalence of anxiety symptoms, present in 51% of respondents [Babicki and Mastalerz-Migas 2020].

Research also indicated that individuals with COVID-19 exhibited significantly higher levels of anxiety and depression, as well as poorer sleep quality, compared to those without a history of infection [Yildizeli *et al*. 2023]. Moreover, contracting COVID-19 was identified as a risk factor for mental health disorders [Armitage and Nellums 2020]. International studies have further shown that the COVID-19 pandemic increased feelings of anxiety and depression, intensified panic attacks, and that being

in proximity to an infected person was linked to heightened anxiety [Drozdowski *et al*. 2020, Heitzman 2020, Porzak 2022].

The aim of the presented study is to address three main questions. Firstly, what is the impact of COVID-19 on the mental functioning of respondents in Poland? Secondly, is the number of COVID-19 infections a predictor of respondents' emotional functioning? Lastly, are there gender differences in the previously analyzed variables, depending on whether the respondent was infected with COVID-19?

Material and methods

Characteristics of the subjects

The study was conducted using a questionnaire method. The participants were adult Polish citizens, and the study received positive approval from the Scientific Research Committee. It was conducted in 2022.

A total of 210 participants took part in the study, with a predominance of women (52.38%) and city inhabitants. The mean age of participants was 35.14 years (SD = 15.90). Most respondents had secondary education (46.67%), and 53.33% (n = 112) of the participants were professionally active. Detailed characteristics of the respondents are presented in Table 1.

Table 1. Distribution of study subjects by sociodemographic factors

Item	Numbers	Percent
Sex		
female	110	52.38
male	100	47.62
Place of residence		
village	80	38.10
city	130	61.90
Education		
primary	3	1.43
vocational	21	10.00
secondary	98	46.67
university level	88	41.90

Table 2. Number of experienced COVID19 episodes

Item	n	Percent from the group of sick persons *	Percent of all those participants
1	59	58.42	28.10
2	27	26.74	12.86
3 =<	15	14.84	7.14
I didn't get sick	109	–	51.90
Total	210	100.00	100.00

*$n = 101$

More than half of the respondents declared that they had not contracted COVID-19, while the remaining participants reported having had the disease. Most of those who

contracted COVID-19 had it only once. Detailed information on this topic is presented in Table 2.

Tools used in the study

In this study, the Hospital Anxiety and Depression Scale (HADS), known for its strong psychometric properties, was used to measure psychological variables. The scale was designed by A.S. Zigmond and R.P. Snaith, and the Polish version was developed by M. Majkowicz, K. de Walden-Gałuszko, and G. Chojnacka-Szawłowska [Majkowicz 2000].

The HADS scale was originally created as a screening tool for non-psychiatric patients and is currently used to assess individuals by measuring their psychological state, particularly focusing on symptoms of anxiety and depression. It is an effective tool for detecting anxiety and depression disorders and is frequently utilized in scientific research [Herrmann 1997, Mitchell *et al*. 2010, Bjelland *et al*. 2002].

The tool consists of 14 items, allowing the identification of anxiety and depression symptoms. Each subscale contains 7 statements, with respondents answering on a Likert scale ranging from 0 to 3. The higher the score on each subscale, the higher the level of anxiety and depression symptoms.

Statistical analysis

To answer the research questions, a moderation analysis was performed along with a two-way analysis of variance (ANOVA). The results were analyzed using a two-factor analysis of variance (ANOVA) for a 2x2 between-groups design, after verifying that the assumptions for this method were met [Bedyńska and Cypryańska 2013].

Hayes' PROCESS tool was used for moderation analysis, which allowed for the examination of interaction effects in regression analysis [Hayes 2018]. Statistical analyses were performed using IBM SPSS version 28. In the first step, the assumptions of the Kolmogorov-Smirnov test were verified. The results indicated that the analyzed variables followed a normal distribution ($p>0.05$). Meeting the assumption of normal distribution is a critical condition for the analysis of variance [Bedyńska and Cypryańska, 2013]. Descriptive statistics for the studied variables are presented in Table 3.

Table 3. Descriptive statistics of the studied variables

Item	Overall result	Anxiety	Depression
Numbers	210	210	210
Mean	23.09	10.61	20.10
Median	23.00	11.00	20.00
Standard deviation	4.757	3.027	3.59
Kolomogorov-Smirnov *p value*	>0.05	>0.05	>0.05

The next analysis focused on the impact of the number of COVID-19 cases on the emotional functioning of the respondents, as well as the moderating role of gender in this relationship. During data exploration, potential moderators influencing the mental

functioning of the participants were also examined. Using model 1 A. Hayes' PROCESS [Hayes 2018] was employed, with gender as the moderator of the relationship between the number of COVID-19 cases and the level of anxiety. The model demonstrated a good fit (R^2 = 0.1097, p<0.001). A significant effect of the number of COVID-19 cases on anxiety levels was observed (B = -1.439, p = 0.006). Additionally, a clear interaction between gender and the number of cases was found (B = 8.686, p = 0.003). The effect of the number of cases on anxiety levels was only evident in the group of men (B = 0.668, p = 0.018). The inclusion of the moderator increased the explained variance of the results by 8%. Figure 1 graphically presents the described relationship.
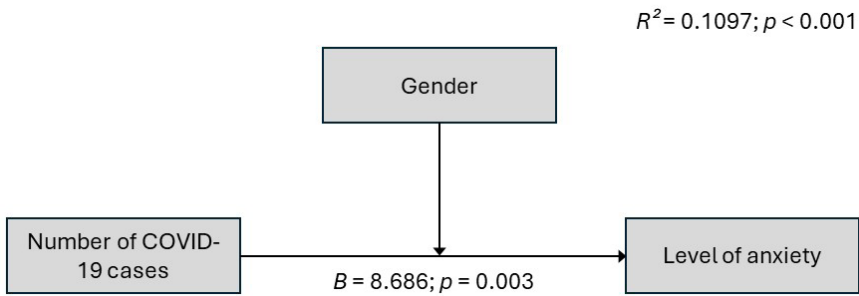
R^2 = 0.1097; p < 0.001

Gender

Number of COVID-19 cases

Level of anxiety

B = 8.686; p = 0.003

Fig 1. Visualization of the interaction model in regression between COVID-10 cases, gender and anxiety.

R^2 = 0.135; p < 0.001

Gender

Number of COVID-19 cases

Level of depression
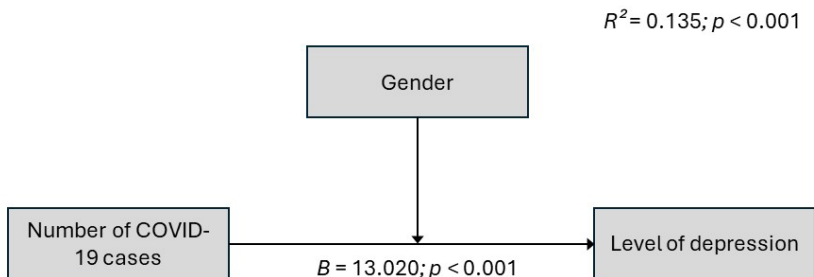
B = 13.020; p < 0.001

Fig. 2. Visualization of the interaction model in regression between COVID-10 cases, gender and depression.

The moderating role of gender in the impact of the number of COVID-19 cases on the level of depression among individuals who had been infected with the coronavirus was also examined. Once again, A. Hayes' PROCESS analysis was utilized [Hayes, 2018]. The analysis showed that gender moderates the effect of the number of COVID-19 cases on depression levels. The model demonstrated a good fit (R^2 = 0.135, p<0.001). A significant impact of the number of cases on depression levels was observed (B = -1.849, p = 0.003). Additionally, a clear interaction between gender and the number of cases was found (B = 13.020, p<0.001). The effect of the number of cases on depression levels was only evident in the group of men (B = 1.175, p<0.001). Figure 2 graphically illustrates the described relationship.

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The analyses allow us to conclude that the increase in the number of COVID-19 cases led to a decrease in symptoms of anxiety and depression only among men. The number of cases was a predictor of emotional functioning solely in the male group.

Additionally, gender differences related to the presence or absence of COVID-19 infection were examined in terms of the previously analyzed variables. To determine whether gender differences exist depending on the infection status in relation to anxiety levels, a two-factor analysis of variance (ANOVA) for a 2x2 between-groups design was conducted. The analysis revealed a significant main effect of gender, $F(1, 206) = 8.005$, $p = 0.005$, $\eta^2 = 0.04$. Men exhibited significantly higher levels of anxiety (mean = 11.02, SD = 0.35) than women (mean = 9.7, SD = 0.3). No main effect of the disease was observed. However, a statistically significant interaction between both factors was found in relation to anxiety levels, $F(1, 206) = 5.50$, $p = 0.02$, $\eta^2 = 0.026$. A closer examination of simple effects showed that men who had not contracted COVID-19 had significantly higher anxiety levels ($p = 0.025$) (mean = 11.08, SD = 0.33) compared to men who had (mean = 10.23, SD = 0.62). Other mean comparisons turned out to be insignificant. Figure 3 illustrates these relationships.
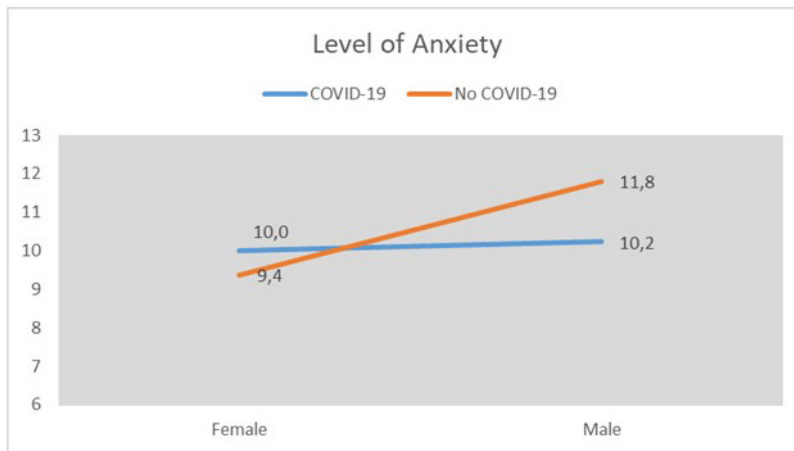

Fig 3. Interaction between gender, COVID- 19 and anxiety.

The next step was to examine gender differences in depression levels based on the presence or absence of the disease. The analysis revealed a significant main effect of gender, $F(1, 206) = 5.14$, $p = 0.024$, $\eta^2 = 0.024$. Men had significantly higher levels of depression (mean = 20.32, SD = 0.41) compared to women (mean = 19.07, SD = 0.37). A significant main effect of the disease was also observed, $F(1, 206) = 4.49$, $p = 0.035$, $\eta^2 = 0.021$, with infected individuals showing significantly lower levels of depression (mean = 19.11, SD = 0.41) compared to those who were not (mean = 20.28, SD = 0.37). A statistically significant interaction effect between both factors on depression levels was found, $F(1, 206) = 9.10$, $p = 0.003$, $\eta^2 = 0.042$. A closer look

at specific simple effects showed that men who were not infected had significantly higher levels of depression ($p < 0.001$) (mean $= 21.73$, SD $= 0.34$) compared to men who were infected (mean $= 18.91$, SD $= 0.72$). Figure 4 illustrates these relationships.
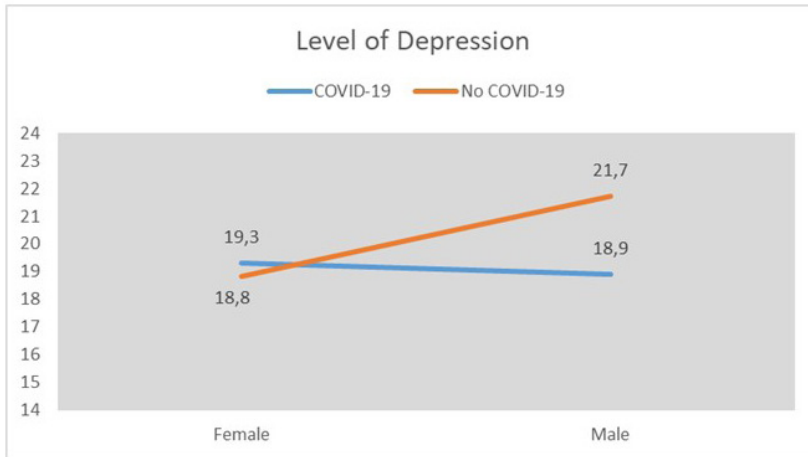

Fig. 4 Interaction between gender, COVID- 19 and depression.

The analyses carried out using a two-factor analysis of variance revealed gender differences in the levels of perceived anxiety and depression. Men generally experienced higher levels of anxiety and depression than women. The analysis of simple effects clearly highlighted gender differences in the indicators of the HADS questionnaire. Women reported significantly lower levels of depression and anxiety compared to men.

The analyses also showed differences in perceived depression levels based on illness status. Individuals who had not been infected with COVID-19 had higher levels of depression compared to those who had contracted the disease. Significant differences were observed between men who had experienced COVID-19 and those who had not, in terms of both anxiety and depression. Men who had contracted the disease reported lower levels of anxiety and depression compared to those who had never been infected.

Additionally, an analysis was conducted to explore whether there was a relationship between age and declared anxiety levels, distinguishing between those who had experienced COVID-19 and those who had not. The results indicated no correlation between age and the studied variables in the group that had contracted the disease. However, in the group of individuals who had not experienced COVID-19, a significant positive relationship between age and anxiety levels was found ($r = 0.361$, $p < 0.001$), with more than 13% of the variance in anxiety levels explained by age ($R = 0.361^2$ x 100%). A significant relationship between age and depression levels was also observed ($r = 0.360$, $p < 0.001$), with approximately 13% of the variance in

depression levels explained by age ($R = 0.360^2$ x 100%). Both correlations were weak in strength.

Conclusions: The study showed that people who experienced COVID 19 infection declared a lower level of depression. Broken down by gender, in the group of men who had been infected with coronavirus, the level of anxiety and depression was lower than in men who had not experienced the infection. The analyzes conducted allow us to conclude that the increase in the number of Covid-19 cases leads to a reduction in symptoms of anxiety and depression only in men. The number of illnesses is a predictor of emotional functioning only in the group of men. The study allows us to note a significant relationship between age and anxiety as well as age and depression in the group of people who have not experienced infection. The level of anxiety and depression increased with age in this group. No such relationship was noted in the group of people who survived COVID-19 infection.

The study shows that experiencing a Covid-19 infection does not affect overall feelings of anxiety. However, the interaction shown in the study shows that the interaction of two variables - infection and gender - is important for the declared sense of anxiety. Men generally reported higher levels of anxiety, and men who had experienced Covid-19 reported feeling less anxious than men who had never had the disease.

A similar interaction was observed when analyzing the impact of disease infection and gender on the reported feeling of depression. Higher scores on this scale were declared by people who had never been ill. Men, compared to women, also scored higher on the depression scale. The study shows that anxiety levels were similar in people who had survived Covid-19 and those who had never had the disease. However, the disease differentiated the groups in terms of the level of depression. These results contradict other studies conducted on a similar topic [Al Maqbali *et al.* 2024, Gambin *et al.* 2021, Yildizeli *et al.* 2023, Zhu *et al.* 2023].

An explanation may be the timing of the study conducted. The data was collected after two years of the pandemic. This means that during the announced reversal of epiphthosis.

Some of the restrictions that could have contributed to an increase in the sense of threat and fear have been lifted (forced isolation of patients - quarantine, sanitary supervision of patients, control of patients by law enforcement, penalties for non-compliance with quarantine, etc.). According to the literature, it was social isolation that had a huge impact on the severity of symptoms of, among other things, anxiety [Ausín *et al.* 2020, Fofana *et al.* 2020, Santini *et al.* 2020, Lopes and Nihei 2021].

Removing the blockage gives respondents a sense of less threat to their life and health. The ability to renew, even truncated social contacts, contributes to improved psychological functioning in society.

The information chaos introduced by the media also has decreased. And it is the misinformation, the lack of guidance in dealing with the public, that exacerbates feelings of helplessness and depression [Drozdowski *et al.* 2020, Heitzman 2020].

A vaccine was invented and made available, which alleviated the symptoms of the disease, thus reducing the risk of death. In addition, the impact of the outbreak of war in Ukraine has helped shift attention from pandemic threats to those associated with the global political situation [Porzak 2022].

The study presented here showed that men experience higher levels of anxiety and depression than women. The study also presented that there was a correlation between the number of COVID-19 infections and levels of anxiety and depression, seen only in the male group. Gender here appeared to be a moderator of the aforementioned correlations. This result stands in opposition to the results of studies known from the literature, which indicated that women were more likely to experience higher levels of anxiety and depression [Al Maqbali *et al*. 2024, Firat *et al*. 2021, Gambin *et al*. 2021, Yildizeli *et al*. 2023, Maslakçı 2024].

An explanation for this pattern of results may be that men have a higher risk associated with death during COVID-19 infection than women, according to the studies. This fact is consistent with differences in sex hormone activity, immune function, higher prevalence of vascular disease and less healthy lifestyles [Moulton 2018, Capuano, 2020, Conti and Younes 2020]. In addition, men experience depression differently from women. In men, depression is strongly associated with traditional roles culturally assigned to them. As research shows, in men, symptoms of depression are less frequently noticed and thus less frequently treated. Men, compared to women, are less likely to seek help from specialists in this area and are less well cared for [Rutz *et al.* 1995, 1997, Krug *et al*. 2002, Cochran and Rabinowitz 2003, Ye *et al*., 2020]. Less frequent use of help, especially in crisis situations, which certainly include the COVID-19 pandemic, can take its toll on men's mental health with redoubled force.

Another explanation for the results may be that society has strict expectations of men, different from those of women. Society builds a cultural image of men as strong men who will not admit weakness. This attitude is reinforced by stereotypes that assume that a real man is independent, ambitious, enterprising, mentally and physically resilient, and self-sufficient [Bem 1974, Pleck *et al.* 1994, Magovcevic and Addis 2008]. Consequently, the image of a sick person succumbing to the burden of illness (remember that the way COVID-19 is experienced is highly individual and difficult to predict) can be highly anxiety-producing and depressive for men. In addition, men's perception of their inability to perform culturally imposed tasks and social roles plays a huge role in the development of depression.

For this reason, each successive illness increases feelings of anxiety and depression among men. Each successive occurrence of COVID-19 infection, which prevents the fulfilment of culturally accepted male roles, causes men to perceive themselves as weak, insufficient, thus lowering their mood. This includes the issue of doing gainful employment and supporting a family. This is a social role very strongly culturally assigned to men. Those who are quarantined or self-isolated or infected are not allowed to work. The household budget is depleted. A sick man cannot fully fulfil the social role of financially supporting his family.

The COVID-19 pandemic has had a major impact on the economic situation of society. Studies show that among the causes of depression in the male group, work-related troubles, i.e. the amount of earnings, play a very large role [Addis and Mahalik 2003]. One might be tempted to say that for men, a sense of agency and self-efficacy is an element that is very important for psychological well-being. And it is precisely the pandemic that has brought huge limitations in this area. Feelings of pandemic anxiety can lead to lower feelings of self-efficacy and achievement [De la Fuente *et al.* 2019]. Studies show a negative relationship between anxiety and coping. Experiencing severe anxiety is associated with lower engagement and greater discouragement [Barrow *et al.* 2013]. The pandemic of isolation that society has experienced until recently, finding oneself in a new reality whose demands are still high, although their implementation is quite different, leads to a lower sense of efficacy and generates feelings of insecurity [Huarcaya-Victoria 2020, Navarro-Mateu *et al.* 2020, Xiao 2020].

It is known that a low sense of self-efficacy is associated with higher levels of anxiety and helplessness. A study involving nurses working during the COVID-19 pandemic clearly shows that self-efficacy negatively correlated with feelings of anxiety in this situation. Thus, it can be concluded, citing the above studies, that the COVID-19 pandemic increased feelings of anxiety and decreased feelings of self-efficacy.

It is worth referring here to Moos and Schafer's concept based on personal resources. This concept encapsulates that personal resources such as life satisfaction are an individual's resources that support them in coping with the consequences [Moos and Schaefer 1993, Xiong *et al.* 2020].

Research shows that older people who do not directly experience the risk of job loss due to the pandemic, and therefore also loss of income, declare lower levels of anxiety [Bidzan-Bluma *et al.* 2020]. The presented report obtained slightly different results. There was no significant relationship between anxiety or depression level and age in the group of people who had coronavirus infection. However, in the group of people who have not experienced infection, there is a positive correlation between the indicated variables. This means that with age, the level of anxiety and depression also increases. This phenomenon may be explained by the influence of various media transmitting information about the increased health risk posed by COVID-19 infection among older people. It is worth adding that increased exposure to media information about COVID-19 was associated with increased fears and anxieties among society [Iberszer *et al.* 2023].

Older people are more likely to have comorbidities that contribute to a more severe course of the disease [Salive 2013, Mohile *et al.* 2017, Yang *et al.* 2020, Simon *et al.* 2021]. As we know, age correlates with the number of comorbidities [Anteneh *et al.* 2023]. Information from the mass media has stoked fear and anxiety, indicating the risk of a more severe course of infection with the presence of comorbidities.

The pandemic has had a huge impact on society. It is the cause of many mental disorders and emotional difficulties [Andaregie and Astatkie 2021]. The presented

research report shows that it affects women and men differently. There are also differences in psychological functioning between people who have experienced infection and those who have avoided it. When focusing on the care of people who have experienced COVID-19 infection, it is worth taking a look at the psychological situation of people who remain healthy. As this research shows, they also experience emotional difficulties related to the new situation, which is difficult for them to predict.

REFERENCES

1. ADDIS M.E., MAHALIK J.R., 2003 - Men, masculinity, and the contexts of help seeking. *American Psychologist* 58, 5-14.

2. ALLADIN A., 2013 - The power of belief and expectancy in understanding and management of depression. *American Journal of Clinical Hypnosis* 55, 3, Placebo, Hypnosis, and Antidepressants.

3. AL MAQBALI M., MLSAYED A., HUGHES C., HACKER E., DICKNES G.L., 2024 - Stress, anxiety, depression and sleep disturbance among healthcare professional during the COVID-19 pandemic: An umbrella review of 72 meta-analyses. *PlosOne* 19(5).

4. ANDAREGIE A., ASTATKIE T., 2021 - COVID- 19 impact on jobs at private schools and colleges in north Etiopia. *International Journal of Educational Development* 85, 102456.

5. ANTENEH R., DESSIE A., AZANNAW M., ANLEY D., MELESE B., FELEKE S., ABEBE T., MUCHE A., 2023 - The psychological impact of COVID-19 pandemic and associated factors among college and university students in Ethiopia: a systematic review and meta-analysis. *Frontiers Public Health* 13, 11, 1136031.

6. ARMITAGE R., NELLUMS L.B., 2020 - COVID-19 and the consequences of isolating the elderly. *Lancet* 5, E256.

7. AUSÍN B., GONZALEZ- SANGUINO C., CASTELLANOS M.A., MUNOZ M., 2020 - Gender-related differences in the psychological impact of confinement as a consequence of COVID-19 in Spain. *Journal of Gender Studies, 30*(1), 29-38.

8. BABICKI M., MASTALERZ- MIGAS A., 2020 - The occurrence of anxiety disorders among Poles during the COVID-19 pandemic. *Psychiatria Polska* 188, 1-13.

9. BARROW J., DUNN S., LLOYD C.A., 2013 - Anxiety, self-efficacy, and college exam grades. *Universal Journal of Educational Research* 1(3), 204-208

10. BEDYŃSKA S., CYPRYAŃSKA M., 2013 - Drogowskaz statytyczny. Praktyczne wprowadzenie do analizy wariancji. (Statistical Guidepost: A Practical Introduction to Analysis of Variance.) In Polish. Wydawnictwo Akademickie SEDNO.

11. BEM S.L., 1974 - The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology* 42(2), 155-162.

12. BIDZAN-BLUMA I., BIDZAN M., JUREK P., BIDZAN L., KNIETZSCH J.,STUECKM., BIDZAN M., 2020 - A Polish and German Population Study of Quality of Life, Well-Being, and Life Satisfaction in Older Adults During the COVID-19 Pandemic. *Frontiers in Psychiatry* 17:11:585813.

13. BJELLAND I., DAHL AA., HAUG TT, NECKELMANN D., 2002 - The validity of the Hospital Anxiety and Depression Scale: An updated literature. *Journal of Psychosomatic Research* 52, 69-77.

14. CAPUANO A., ROSSI F., PAOLISSO G., 2020 - Covid-19 Kills More Men Than Women: An Overview of Possible Reasons. *Frontiers Cardiovascular Medicine* 7, 131.

15. COCHRAN S.V., RABINOWITZ F.E., 2003 - Gender-sensitive recommendations for assessment and treatment of depression in men. *Professional Psychology: Research and Practice* 34, 132-140.

16. CONTI P., YOUNES A., 2020 - A.Coronavirus COV-19/SARS-CoV-2 affects women less than men: clinical response to viral infection. *Journal of Biological Regulators and Homeostatic Agents* 34(2), 339-342.

17. DE LA FUNTE J., MARTINEZ-VICENTE J., PERALTA-SANCHEZ F., GARZON-UMERENKOVA A. VERA M., PAOLONI P., 2019 - Applying the SRL vs. ERL Theory to the Knowledge of Achievement Emotions in Undergraduate University Students. *Frontiers in Psychology* 10, 2070.

18. DROZDOWSKI R., FRĄCKOWIAK M., KRAJWESKI M. ET AL., 2020 - Życie codzienne w czasach pandemii. Raport z drugiego etapu badań. Wersja pełna. (Everyday Life in Times of the Pandemic: Report from the Second Stage of Research. Full Version.) In Polish. UAM 2020. Retrieved from https://socjologia.amu.edu.pl/publikacje/504-zycie-codziennew-czasach-pandemii-pelny-raport.

19. FOFANA N.K., LATIF F., SARFRAZ S., BASHIR M.F., KOMAL B., 2020 - Fear and agony of the pandemic leading to stress and mental illness: An emerging crisis in the novel coronavirus (COVID-19) outbreak. *Psychiatry Research* 291, 113230.

20. FIRAT M., OKANLI A., KANBAY Y., UTKAN M., GOKMEN B.D., 2021 - The prevalence of pandemic anxiety, anxiety and depression during the COVID-19 pandemic in Turkey. *Psychiatry and Clinical Psychopharmacology* 2, 198-205.

21. GAMBIN M., SĘKOWSKI M., WOŹNIAK- PRUS M., WNUK A., OLEKSY T., CUDO A., HASEN K., HUFLEJT- ŁUKASIK M., KUBICKA K., ŁYŚ A.E., GORGOL J., HOLAS P., KMITA G., ŁOJEK E., MAISON D., 2021 - Generalized anxiety and depressive symptoms in various age groups during the COVID-19 lockdown in Poland. Specific predictors and differences in symptoms severity. *Comprehensive Psychiatry* 105, 152222.

22. HAWTON K., CASANAS I.C., HAW C., SAUNDERS K., 2013 - Risk factors for suicide in individuals with depression: A systematic review. *Journal of Affective Disorders*, 147(1-3), 17-28.

23. HAYES A.F., 2018 – Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach (Methodology in the Social Sciences) (2nd ed.). New York, NY: The Guilford Press.

24. HEITZMAN J., 2020 - Impact of COVID-19 pandemic on mental health. *Psychiatria Polska* 2, 187-198.

25. HERRMAN C., 1997 - International experiences with the Hospital Anxiety and Depression Scale – A review of validation data and clinical results. *Journal of Psychosomatic Research* 42, 17–41.

26. HUARCAYA-VICTORIA J., 2020 - Mental health considerations about the COVID- 19 pandemic. *Revista Peruana Medicina Experimental Y Salud Publica* 327-3.

27. IBERSZER K., LITWINIUK M., ZANIUK M., KURAKAŁA K., ANTONIK D., DENTS B., GÓRA K., ZDZIENNICKI W., ZIMNICKI P., LATO M., 2023 - Influence of social media on the fight against COVID - 19 pandemic – literature review. *Journal of Education, Health and Sport* 39(1), 17-28.

28. PLECK J., SONENSTEIN F., KU L., 1994 - Attitudes toward male roles among adolescent males: A discriminant validity analysis. *Sex Roles* 30(7), 481–501.

29. KRUG E.G., DAHLBERG L.L., MERCY J.A. ZWI A.B., LOZANO R., 2002 - World report on violence and health. *Lancet* 60, 1083-8.

30. KULIG- KULESZA M., SOBIERAJ A., WOJTYCZKA D, GRACA M., SARA N., KLUCZEWSKA E., 2022 - Assessment of the level of COVID-19 anxiety perceived by internet users and factors affecting its increase at the first stage of pandemic in Poland. *Medycyna Ogólna i Nauki o Zdrowiu* 28 (2), 142–148.

31. LOPES A., NIHEI O., 2021 - Depression, anxiety and stress symptoms in Brazilian university student s during the COVID-19 pandemic: Predictors and association with life satisfaction, psychological well-being and coping strategies. *PLoS One* 13, 16(10), e0258493.

32. MAGOVCEVIC M., ADDIS M.E., 2008 - The Masculine Depression Scale: Development and psychometric evaluation. ***Psychology of Men & Masculinity*** *9*(3), 117-132.

33. MAJKOWICZ M., 2000 – Praktyczna ocena efektywności opieki paliatywnej - wybrane techniki badawcze. (Practical Assessment of Palliative Care Effectiveness – Selected Research Techniques) In: DE WALDEN- GAŁUSZKO K., MAJKOWICZ M., (red.): Ocena jakości opieki paliatywnej w teorii i praktyce. (Assessment of Palliative Care Quality in Theory and Practice.) In Polish. Gdańsk, Akademia Medyczna Gdańsk, Zakład Medycyny Paliatywnej, 21-42.

34. MARTINS S., FERREIRA A.R., FERNANDES J., VIERA T., FONTES L.COMBIRA I., PAIVA J.A., FERNANDES L., 2022 - Depressive and anxiety symptoms in severe COVID-19 survivors: a prospective cohort study. ***Psychiatr Q*** 93(3), 891-903.

35. MASLAKÇI I A., SURUCU L., 2024 - Gender Effects on Depression, Anxiety, and Stress Regarding the Fear of COVID-19. ***Trends in Psychology*** 32, 152–164.

36. MITCHELL AJ., MEADER N., SYMONDS P., 2010 - Diagnostic validity of the Hospital Anxiety and Depression Scale (HADS) in cancer and palliative settings: A meta-analysis. ***Journal of Affective Disorder*** 126, 335-348.

37. MOHILE S.G., DALE, W.,HURRIA A., 2017 - Geriatric oncology research to improve clinical care for older adults with cancer. ***Journal of Clinical Oncology*** 35(24), 2576-2582.

38. MOOS R.H., SCHAEFER J.A., 1993 - Coping resources and process: current concepts and mesasures. In: Goldberger L, Breznits S (red.) Handbook of stress: Theoretical and clinical aspects. New York: The Free Press, 234.

39. MOULTON V.R., 2018 - Sex hormones in acquired immunity and autoimmune disease. ***Frontiers in Immunology*** 9, 2279.

40. NAVARRO- MATEU D., ALONSO- LERZA L., GOMEZ DOMINGUEZ M., PRADO GASCO V., VALERO- MORENO S., 2020 - I' m not good for anything and thas's why i'm stressed: analysis of the effect of self- efficacy and emotional intelligence on student stress using SEM and QCA. ***Frontiers in Psychology*** 11, 295.

41. PORZAK R., 2022 – Ocena psychosopołecznych następstw izolacji społecznej w pandemii COVID19 i stresu związanego z atakiem Rosjii na Ukrainę wśród uczniów szkół puławskich, ich rodziców i nauczycieli. Raport badań przeprowadzonych w 2022 roku. Puławy 2022; Retrieved from: https:// www.pulawy.eu/pl/aktualnosci/sprawy-spoleczne/prezentacja-raportu-badan-dotyczacych-stresuwobec-sytuacji-zwiazanej-z-pandemia-i-wojna-na-ukrainie-1.html (ccess: 06.07.2023). (Assessment of the Psychosocial Consequences of Social Isolation during the COVID-19 Pandemic and Stress Related to Russia's Attack on Ukraine among Students, Parents, and Teachers in Puławy Schools. Research Report Conducted in 2022. Puławy 2022.) In Polish.

42. RUTZ W., VON KNORRING L., PIHLGREN H., RIHMER Z., WALINDER J., 1995 - An educational project on depression and its consequences: is the frequency of major depression among Swedish men underrated, resulting in high suicidality? ***Primary Care Psychiatry*** 1, 59-63.

43. RUTZ W., WALINDER J, VON KNORRING L., RIHMER Z., PIHLGREN H., 1997 - Prevention of depression and suicide by education and medication: impact on male suicidality. An update from the Gotland study. ***International Journal of Psychiatry in Clinical Practice*** 1, 39-46.

44. SALIVE M.E., 2013- Multimorbidity in older adults. ***Epidemiologic Reviews***, *35*(1), 75-83.

45. SANTINI Z., JOSE P., CORNWEL E., KOYANAGI A., NIELSEN L., HINRICHSEN C., MEILSTRUP C., MADSEN K.R., KOUSHEDE V., 2020 - Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): a longitudinal mediation analysis. ***Lancet Public Health*** 5, e62-70.

46. SHETTY P.A., AYARI L., MADRY J., BETTS C., ROBINSON D., KIRMANI B., 2023 - The relationship between COVID-19 and the development of depression: implications on mental health. ***Neuroscience Insights*** 18.

47. SIMON K., RORAT M., JAKOCHA -LITWIN J., PAZGAN- SIMON M., 2021 - Zakażenie SARSCoV-2: etiopatogeneza, obraz kliniczny, aktualne możliwości postępowania terapeutycznego – doświadczenia własne. (SARSCoV-2 infection: etiopathogenesis, clinical picture, current therapeutic options - own experience.) In Polish. ***Biuletyn Polskiego Towarzystwa Onkologicznego Nowotwory*** 6(1), 38-42

48. WOODY CA., FERRARI AJ., SISKIND DJ.,WHITEFORD DJ., HARRIS MG., 2017 - Systematic review and meta-regression of the prevalence and incidence of perinatal depression. ***Journal of Affective Disorder***; Institute of Health Metrics and Evaluation. Global Health Data Exchange, 219, 86-92.

49. XIAO C., 2020 - A novel approach of consultation on 2019 novel coronavirus (COVID- 19)- Related psychological and mental problems: structured letter therapy. ***Psychiatry Investig*** 17, 175-176.

50. XIONG H., YI S., LIN Y., 2020 - The Psychological status and self-efficacy of nurses during COVID-19 outbreak: A cross-sectional survey. ***Inquiry***. 57, 0046958020957114.

51. YANG J., KOH H., MOON S., YOOI.K., HA E.K., YOU S., KIM S.Y., YON D.K., LEE S.W., 2020 - Allergic disorders and suscep-tibility to and severity of COVID-19: A nation-wide cohort study. ***Journal of Allergy Clinical Immunology*** 146, 790-798.

52. YE Q., WANG B. MAO J., FU J., SHANG S., SHU Q., ZHANG T., 2020 - Epidemiological analysis of COVID-19 and practical experience from China. ***Journal of Medical Virology*** 92, 755-769.

53. YIDIZELI S.D., SAYLAN Y., TASTEKIN G., YILDIZ S., AKBAL S., SUMEYRA O., ARIKAN H., KARAKURT S., 2023 - Anxiety, Depression, And Sleep Disorders After COVID-19 infection. ***Cureus*** 15(7), e42637.

54. ZHU C., ZHANG T., LI Q., CHEN X., WANG K., 2023 - Depression and anxiety during the COVID-19 pandemic: epidemiology, mechanism, and treatment epidemiology, mechanism, and treatment. ***Neuroscience Bulletin*** 39, 675-684.