© Psychiatr Psychol Klin 2023, 23 (3), p. 141–148
DOI: 10.15557/PiPK.2023.0019

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Received: 17.08.2023
Accepted: 18.10.2023
Published: 27.12.2023

Stress and anxiety levels and factors affecting coping mechanisms in patients hospitalised with COVID-19

Poziom stresu i lęku a czynniki wpływające na radzenie sobie z nim u pacjentów hospitalizowanych z COVID-19

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Abstract

Introduction and objective: The purpose of the present study was to assess stress and anxiety levels during hospitalisation due to COVID-19 and the relationship between them and personality traits, and coping strategies among women and men, and assessment of stress predictors. **Materials and methods:** The study was conducted in a reference single-name hospital in Warsaw. The Perceived Stress Scale-10 (PSS-10), the BRIEF-COPE Questionnaire, the State and Trait Anxiety Inventory (STAI), and the Ten Item Personality Inventory (TIPI-PL) were used. **Results:** The study involved 60 patients (30 women and 30 men) aged 24 to 82 years (M = 52.42, standard deviation, SD = 12.94). Elevated stress levels were found in half of the subjects studied; state anxiety levels were increased in 70% of the participants, and trait anxiety in 77% of them. Compared to men, women had significantly higher levels of state anxiety, and lower levels of openness to new experiences. It was shown that reducing stress levels during hospitalisation depends on the use of either an Active Coping strategy or an avoidance of the Helplessness strategy, with the level of state anxiety being the moderator in both models. **Conclusions:** Half of the patients hospitalised with COVID-19 did not experience elevated stress levels; women felt state anxiety more intensely as a condition during their hospital stay than men, and 40% of the subjects had an increased level of trait anxiety. For lower stress levels and/or state anxiety, adaptive coping strategies and personality traits were crucial: conscientiousness and agreeableness for women, and openness to experiences and agreeableness for men.

Keywords: coping, sex differences, personality traits, COVID-19

Streszczenie

Wprowadzenie i cel: Ocena poziomu stresu i lęku w czasie hospitalizacji z powodu COVID-19, a także związku między nimi a cechami osobowości, strategiami radzenia sobie wśród kobiet i mężczyzn oraz ocena predyktorów stresu. **Materiał i metody:** Badanie przeprowadzono w referencyjnym szpitalu jednoimiennym w Warszawie. Zastosowano Skalę Postrzeganego Stresu-10 (Perceived Stress Scale-10, PSS-10), Kwestionariusz BRIEF-COPE, Inwentarz Stanu i Cechy Lęku (State and Trait Anxiety Inventory, STAI) oraz Inwentarz Osobowości (Ten Item Personality Inventory, TIPI-PL). **Wyniki:** W badaniu wzięło udział 60 pacjentów (30 kobiet i 30 mężczyzn) w wieku od 24 do 82 lat (M = 52,42, odchylenie standardowe –

standard deviation, *SD* = 12,94). Podwyższone poziomy stresu stwierdzono u połowy badanych osób, podwyższony poziom lęku jako stanu – u 70% badanych, a lęku jako cechy – u 77%. Kobiety w porównaniu z mężczyznami miały istotnie wyższy poziom lęku jako stanu, niższy poziom otwartości na nowe doświadczenia. Wykazano, że obniżenie poziomu stresu w trakcie hospitalizacji zależy albo od stosowania strategii Aktywnego Radzenia, albo od unikania strategii Bezradności, przy czym w obu modelach moderatorem był poziom lęku jako stanu. **Wnioski:** Połowa pacjentów hospitalizowanych z powodu COVID-19 nie odczuwała podwyższonego poziomu stresu; kobiety intensywniej odczuwały lęk jako stan w czasie hospitalizacji niż mężczyźni, 40% badanych miało podwyższony poziom lęku jako cechy. Dla niższego poziomu stresu i/lub lęku jako stanu istotne znaczenie miały adaptacyjne strategie radzenia sobie i cechy osobowości: sumienność i ugodowość dla kobiet, otwartość na doświadczenia i ugodowość dla mężczyzn.

Słowa kluczowe: strategie radzenia, różnice płciowe, cechy osobowości, COVID-19

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic began in 2020. It is estimated that since then there have been 769,369,823 confirmed cases of COVID-19, including 6,954,336 deaths, as reported to the World Health Organisation (WHO) (World Health Organization, 2023). The first case of COVID-19 in Poland was detected on 4 March 2020; since that time, the disease has been confirmed in 6,518,400 people, and 119,636 patients have died [Raport zakażeń koronawirusem (SARS-CoV-2), 2023].

Since the beginning of the pandemic, its negative consequences for mental health have been observed in various countries, and there is ample evidence indicating an increase in the prevalence of mental disorders worldwide, particularly in the severity of symptoms of stress, anxiety, and depression in both general populations and in different age and occupational groups (Gruber et al., 2021). The occupational group most exposed to the negative consequences of the pandemic are healthcare professionals, primarily due to chronic stress caused by contact with infected patients (Greenberg et al., 2020), which is superimposed by emotional problems resulting from the specificity of work in this population (Barczak et al., 2021).

However, as shown by a meta-analysis comparing the level of anxiety among different social groups, the group most at risk of developing anxiety disorders are patients hospitalised with COVID-19. More than 43% of them have symptoms of anxiety, while in the group of healthcare professionals the rate is 29% (Wu et al., 2021). Most of the research describing the impact of the COVID-19 pandemic on mental health has been done on the general population. Reports focusing on the mental health of COVID-19 patients are in a minority. One study reported that about 30% of patients affected by COVID-19 had symptoms of post-traumatic stress disorder (PTSD), and it was more common in women (Janiri et al., 2021). Other studies have shown anxiety symptoms in more than one-third of patients hospitalised with COVID-19, with significantly higher rates recorded in women, people over 50 years of age, with a lower level of education, and with COVID-19 infections in the family (Kahve et al., 2021). The results of another study found that patients with low oxygen saturation levels were more likely to have symptoms of increased anxiety (Ngasa et al., 2021), and older age was an additional risk factor for the severity of symptoms and death (Kong et al., 2020). Oxygen saturation is a key indicator of COVID-19 severity (saturation ≤93% at rest classifies individuals as severe patients) (Yang et al., 2020).

The limited available studies of COVID-19 patients have also shown that they use both adaptive and maladaptive coping strategies. Adaptive coping strategies included planning, emotional support, and religious coping, while maladaptive strategies manifested themselves in disengagement, self-distraction, venting, substance use, and self-blame. The use of adaptive strategies by patients was associated with lower severity of anxiety symptoms (Kandeğer et al., 2021). Another study found that the coping methods employed by patients, such as problem-solving, social support, self-distraction, denial, avoidance, and positive appraisal of situation, helped to reduce symptoms of psychological distress during hospitalisation (Chew et al., 2020). Available studies of patients hospitalised due to COVID-19 focus primarily on assessing the levels of anxiety or depression. There is still little research on the importance of personality traits for anxiety or stress levels in patients hospitalised with COVID-19 and their coping mechanisms. In contrast, studies of the general population during the pandemic showed that higher levels of neuroticism and extraversion were associated with elevated stress levels compared to pre-pandemic data (Liu et al., 2021).

The aim of our study was to assess the level of stress experienced during hospitalisation in the COVID-19 ward and the relationship between stress levels and trait and state anxiety, personality traits, and coping strategies among women and men, to compare differences between them, and to assess stress predictors. The results of our study may help understand the determinants of the mental state of COVID-19 patients and the importance of psychological interventions to improve mental health during the subsequent waves of the disease.

MATERIALS AND METHODS

Subjects

The study involved 60 patients (30 women and 30 men) aged 24 to 82 years (*M* = 52.42, standard deviation, *SD* = 12.94)

DOI: 10.15557/PiPK.2023.0019

		Overall		Women		Men	
		N	%	*n*	%	*n*	%
Sex	Women	30	50	30	100		
	Men	30	50			30	100
Age	24–45	17	28.33	9	30.00	8	26.67
	46–60	23	38.33	8	26.67	15	50.00
	61+	20	33.33	13	43.33	7	23.33
Place of residence	Country	14	23.33	7	23.33	7	23.33
	City under 300,000 inhabitants	18	30.00	9	30.00	9	30.00
	City over 300,000 inhabitants	28	46.67	14	46.67	14	46.67
Education	Primary school	8	13.33	3	10.00	5	16.67
	Secondary school	20	33.33	9	30.00	11	36.67
	College student	2	3.33	1	3.33	1	3.33
	Graduate	30	50.00	17	56.67	13	43.33
Marital status	Married	38	63.33	16	53.33	22	73.33
	Unmarried	10	16.67	6	20.00	4	13.33
	Widowed	6	10.00	5	16.67	1	3.33
	Divorced	6	10.00	3	10.00	3	10.00

Tab. 1. Sociodemographic characteristics

hospitalised at the Central Clinical Hospital of the Ministry of the Interior and Administration in Warsaw due to COVID-19 infection. The characteristics of the research sample in terms of sociodemographic variables are presented in Tab. 1. All patients were diagnosed with COVID-19 in accordance with the WHO guidelines, and hospitalised for six to 80 days (M = 16.60, SD = 10.29). In total, 38.33% of people received passive oxygen therapy, and no patients in the study group were supported by a ventilator. 78.33% of subjects had comorbidities, most commonly hypertension and diabetes. As oxygen saturation is an important clinical indicator for assessing the severity of COVID-19 patients, 56.67% of participants with saturation levels less than or equal to 93% at rest were classified as severe disease. The severity of the disease was also assessed using the modified MEWS (Modified Early Warning Score) scale (Subbe et al., 2001), which includes the assessment of a) systolic blood pressure, b) heart rate, c) respiratory rate, d) temperature, e) neurological symptoms (conscious, voice reaction, pain reaction, unresponsive), f) saturation, g) urine output (millilitres/kilogram/hour) measured as a score from 0 to 3 points. The patients' medical data are presented in Tab. 2.

		Overall		Women		Men	
		N	%	*n*	%	*n*	%
Hospitalisation length	Up to 7 days	2	3.33	1	3.33	1	3.33
	8–14 days	14	23.33	1	3.33	13	43.34
	15–21 days	22	36.67	11	36.67	11	36.67
	Over 3 weeks	18	30.00	14	46.67	4	13.33
	No data available	4	6.67	3	10.00	1	3.33
Passive oxygen therapy	No	33	55.0	20	66.67	13	43.33
	Yes	23	38.33	7	23.33	16	53.33
	No data available	4	6.67	3	10.00	1	3.33
Saturation	Up to 93%	34	56.67	17	56.67	17	56.67
	94%+	22	36.67	10	33.33	12	40.00
	No data available	4	6.67	3	10.00	1	3.33
MEWS	0 pts	24	40.00	13	43.33	11	36.67
	1 pt	15	25.00	7	23.33	8	26.67
	2+ pts	17	28.33	7	23.33	10	33.33
	No data available	4	6.67	3	10.00	1	3.33
Comorbidities	No	11	18.33	3	10.00	26.67	26.67
	Yes	47	78.33	26	86.67	70.00	70.00
	No data available	2	3.33	1	3.33	1	3.33

Tab. 2. Characteristics of the presented population: medical variables

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Stress level	Women		Men		Overall	
	n	%	*n*	%	*N*	%
Low	14	46.7	15	50	29	48.3
Medium	9	30	10	33.3	19	31.7
High	7	23.3	5	16.7	12	20
Overall	30	100%	30	100%	60	100%

Tab. 3. Stress levels in the study subjects measured by the PSS-10 scale

Procedure

The study was approved by the Ethics Committee (Decision No. 104/2020). Only those patients who gave their informed consent were included in the study. A qualification to the examination of patients was also determined by the attending physicians, depending on the patient's health condition. The study was conducted in COVID-19 wards in the sanitary regime by psychologists using special telephones. Sociodemographic data were collected using separate questions created for the study. Medical data were obtained from hospital records.

Scales

To evaluate:

- Stress levels, we used the Polish version of the Perceived Stress Scale-10 (PSS-10) (Juczyński and Ogińska-Bulik, 2012). It contains ten questions about various subjective feelings related to personal problems and events, behaviours, and ways of coping.
- Coping strategies, we used the Polish version of the BRIEF-COPE Questionnaire (Juczyński and Ogińska-Bulik, 2012). It consists of 28 statements that define 14 different strategies (two statements for each strategy). For the analysis, the scale was divided by the authors of the Polish adaptation into seven factors: (1) Active Coping (includes Active Coping, Planning, and Positive Reframing strategies), (2) Helplessness (includes strategies for Substance Use, Behavioural Disengagement, and Self-Blame), (3) Seeking Support (Emotional Support and Instrumental Support), (4) Avoidance Behaviour (Self-distraction, Denial, and Venting), (5) Religion, (6) Acceptance, and (7) Humour.
- Anxiety levels, we used the Polish version of the State and Trait Anxiety Inventory (STAI) (Wrześniewski et al., 2011). The inventory consists of two subscales, one of which is used to measure the anxiety state (i.e. a transitional, situationally conditioned state in which a person experiences anxiety) and the other is designed for evaluating the anxiety trait (i.e. a permanent personality trait characterised by the tendency to react with anxiety in various situations). Each subscale consists of 20 items, to which the respondent answers by selecting one of four categorised answers.
- Personality traits, we used the Polish version of the Ten Item Personality Inventory (TIPI-PL) in the Big Five model (Sorokowska et al., 2014). It contains ten statements on an eight-point scale from 0 (strongly disagree) to 7 (strongly disagree). It allows the assessment of five personality traits: extroversion, agreeableness, conscientiousness, neuroticism, and openness.

Statistical analysis

Nonparametric correlations of Spearman's rho, nonparametric *U* Mann–Whitney and Kruskal–Wallis assays, factor analysis, and step regression analyses were used for the analyses. The analyses were conducted in the IBM SPSS statistical program.

RESULTS

Stress level in the group of hospitalised patients

Increased stress levels were found in half of the examined patients (high and moderate results), and low levels of perceived stress were determined in the remaining patients. The results are presented in Tab. 3.

Among the studied patients, elevated levels (moderate and high) of anxiety were found both as a state and as a trait, as only about one-third of patients had low levels of both types of anxiety. The distribution of results is shown in Tab. 4.

State anxiety	Women		Men		Overall		Trait anxiety	Women		Men		Overall	
	n	%	*n*	%	*N*	%		*n*	%	*n*	%	*N*	%
Low	7	23.3	11	36.6	18	30	Low	5	16.7	12	40	17	28.3
Medium	9	30	14	46.7	23	38.3	Medium	15	50	9	30	24	40
High	14	46.7	5	16.7	19	31.7	High	10	33.3	9	30	19	31.7
Overall	30	100%	30	100%	60	100%	Overall	30	100%	30	100%	60	100%

Tab. 4. State and trait anxiety levels in the study population

DOI: 10.15557/PiPK.2023.0019

Significant differences in psychological variables between women and men during hospitalisation due to COVID-19

The results of the analysis of sex differences showed that women, compared to men, had:

- significantly higher levels of state anxiety (STAI) (Mf = 39.97, SD = 8.78; Mm = 35.03, SD = 8.39, $t(58) = 2.22$, $p = 0.03$; $d = 0.57$);
- lower levels of openness to new experiences (TIPI-PL) (Mf = 3.55, SD = 1.40; Mm = 4.45, SD = 1.15; $U = 295.5$, $p = 0.02$).

In the remaining scales, no statistically significant differences linked to sex were obtained. However, in view of differences in some psychological variables, separate correlations were established for each sex.

Relationship between stress assessed by the PSS-10 scale and other psychological variables

In the group of women, the following significant correlations with stress levels (PSS-10) were found between:

- trait anxiety (STAI) (rho = 0.66, $p < 0.001$) – the higher the level of the trait anxiety, the higher the level of perceived stress;
- coping strategies (BRIEF-COPE): with Helplessness (rho = 0.60, $p < 0.001$) and Avoidance Behaviour (rho = 0.46, $p < 0.05$) – more frequent use of strategies consisting of Helplessness (Substance Use, Behavioural Disengagement, and Self-Blame) and Avoidance Behaviour (Self-distraction, Denial and Venting) were associated with higher levels of perceived stress.

For male participants, significant correlations with stress levels (PSS-10) were found between:

- trait anxiety (STAI) (rho = 0.48, $p < 0.01$) and state anxiety (rho = 0.52, $p < 0.01$) – the higher the levels of trait and state anxiety, the higher the level of stress experienced;
- the personality trait: openness to new experiences (TIPI-PL) (rho = −0.38, $p < 0.05$) – greater intensiveness of openness to new experiences was associated with a lower level of perceived stress.

Relationship between trait anxiety, and state anxiety (STAI) and other psychological variables

In the female group, significant correlations were shown between state anxiety:

- and conscientiousness (rho = −0.51, $p < 0.01$) and agreeableness (rho = −0.40, $p < 0.05$) – lower intensity of conscientiousness and agreeableness traits was associated with higher levels of state anxiety;
- and Acceptance coping strategy (BRIEF-COPE) (rho = −0.41, $p < 0.05$) – the less frequently the Acceptance strategy was used, the higher the level of state anxiety.

Significant correlations were shown between trait anxiety:

- and Active Coping strategy (Active Coping, Planning and Positive Reframing strategies) (BRIEF-COPE): (rho = −0.45, $p < 0.05$), Helplessness (Substance Use, Behavioural Disengagement, and Self-Blame strategies) (rho = 0.65, $p < 0.001$), and Avoidance Behaviour (Self-distraction, Denial and Venting) (rho = −0.43, $p < 0.05$) – the less often Active Coping strategies, and more often Helplessness and Avoidance Behaviour strategies are used, the higher the level of trait anxiety.

In men, negative correlations were found between trait and state anxiety (STAI) and:

- openness to new experiences and Helplessness (rho = −0.39, $p < 0.05$) – greater openness to experience was associated with less frequent use of the Helplessness strategy;
- conscientiousness and Helplessness (rho = −0.39, $p < 0.05$), Avoidance Behaviour (rho = −0.45, $p < 0.05$), and Acceptance (rho = −0.45, $p < 0.05$) – increased conscientiousness was associated with less frequent use of the Helplessness, Avoidance Behaviour and Acceptance strategies.

Relationship between personality traits assessed by the TIPI-PL scale and other psychological variables

A significant correlation was shown between personality traits and coping strategies exclusively for women (no significant associations were found in men):

- between openness to new experiences and Helplessness (rho = −0.39, $p < 0.05$) – greater openness to experience was associated with less frequent use of the Helplessness strategy;
- between conscientiousness and Helplessness (rho = −0.39, $p < 0.05$), Avoidance Behaviour (rho = −0.45, $p < 0.05$), and Acceptance (rho = −0.45, $p < 0.05$) – increased conscientiousness was associated with less frequent use of the Helplessness, Avoidance Behaviour and Acceptance strategies.

Medical variables included the saturation level, the use of passive oxygen therapy, the MEWS scores on first day, and the length of hospitalisation. No significant associations were found between these medical variables and the levels of stress, trait and state anxiety, and personality traits for both women and men. With respect to coping strategies among women, one strong positive correlation was obtained between the length of hospitalisation and the Religion as a coping strategy (rho = 0.70, $p < 0.001$) – the longer the patients were hospitalised, the more commonly they relied on this strategy.

Using the step regression method, it was shown that reducing stress levels during hospitalisation depended on the use of either Active Coping (Active Coding, Planning and Positive Reframing) or on avoiding Helplessness strategies (Substance Use, Behavioural Disengagement, and Self-Blame), with both models moderated by the level of state anxiety.

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Independent variables	*B*	*SE*	*T*	*p* <
STAI_state anxiety	0.22	0.08	2.88	0.01
Active Coping	–1.65	0.85	–1.93	0.06
STAI_state anxiety × Active Coping	–0.36	0.12	–3.04	0.01
$R = 0.51, R^2 = 0.26, F_{(3,56)} = 6.63, p < 0.001$.				

Tab. 5a. Stepwise regression results for stress level during hospitalisation (PSS-10). Predictors: level of state anxiety (STAI_state anxiety), Active Coping, and their interaction

Independent variables	*B*	*SE*	*T*	*p* <
STAI_state anxiety	0.18	0.08	2.32	0.05
Helplessness	2.25	0.69	3.26	0.01
STAI_state anxiety × Helplessness	0.15	0.08	1.94	0.06
$R = 0.56, R^2 = 0.32, F_{(3,56)} = 8.70, p < 0.005$.				

Tab. 5b. Stepwise regression results for stress level during hospitalisation (PSS-10). Predictors: level of state anxiety (STAI_state anxiety), Helplessness, and their interaction

During hospitalisation in patients with high levels of state anxiety, the stress level is decreasing if their use of adaptive strategies is frequent, with the less use of the Helplessness strategies. However, it increases with the use of avoidance or omitting the adaptation strategies.

Both models were well matched to the data, with slightly greater predictive power characterised by the model on the Helplessness's negative impact on the perceived stress level during hospitalisation.

A detailed description of the models is presented in Tabs. 5a, 5b.

DISCUSSION

Our results indicate that half of the patients hospitalised with COVID-19 did not experience elevated levels of stress, which means that the subjects were significantly less stressed than the healthcare professionals who were treating them at the time. It was noted that only 12.9% of doctors and 7.4% of nurses experienced low-stress levels (Barczak et al., 2021). This is also in contradiction with other reports suggesting elevated stress levels in more than 90% of hospitalised patients (Kancherla et al., 2021), though other studies have indicated that elevated levels of perceived stress were observed in 40% of patients hospitalised with COVID-19 (Moseholm et al., 2022).

The level of state anxiety in our hospitalised COVID-19 patients was comparable to the findings of previous studies, where low anxiety levels were present in about one-third of the people studied. The situation is slightly different in the case of trait anxiety as more than half of the respondents hospitalised for other reasons had a low level of anxiety, in contrast to our group, where low levels of anxiety were felt by only less than a third of COVID-19 patients. High levels of trait anxiety were present in almost 40% of our patients, as opposed to 27% of patients hospitalised for other reasons (Augustyniuk et al., 2013). These findings suggest that it was not the hospitalisation itself that increased anxiety levels; however, anxiety disorders (trait anxiety) were likely one of the comorbid factors present in hospitalised patients, regardless of the reason for hospital admission. It is confirmed by the results of a population study, suggesting that anxiety disorders co-occurred in 28% of patients hospitalised due to COVID-19 infection (Kompaniyets et al., 2021).

Our results showed significant differences in state anxiety levels between women and men hospitalised with COVID-19, suggesting that despite the absence of differences in trait anxiety levels, women felt anxiety more intensely during hospitalisation, which is consistent with the available data (Tsukamoto et al., 2021). This is also confirmed by the observed less openness to new experiences as a personality trait in women, which may have further promoted the increase in state anxiety during the stay in the COVID-19 ward.

Previous reports have shown sex-related differences in anxiety levels and stress management strategies in the general population (Kelly et al., 2008). However, the available data highlighted that the factors influencing anxiety levels varied according to the gender of COVID-19 patients: men whose coworkers were also infected with COVID-19 tended to have increased anxiety due to work concerns. On the other hand, women had greater anxiety depending on the severity of their physical symptoms (Li et al., 2021). Our results suggest that women experience significantly more stress during hospitalisation if they have higher trait anxiety and use maladaptive coping strategies. Trait anxiety is one of the constant components of personality, and its increased level means that in difficult situations, people may experience stronger negative emotions, including an increase in stress levels, than people with lower levels of trait anxiety. The use of ineffective coping strategies by stopping activities, blaming themselves, and using psychoactive substances (Helplessness) and self-distraction, denial, and venting (Avoidance Behaviour) will increase the stress experienced by patients in difficult situations. This conclusion is consistent with the results of other studies that have shown

DOI: 10.15557/PiPK.2023.0019

that hospitalised COVID-19 patients were most likely to use self-blame among maladaptive coping strategies, which worsened their mental state (Kandeğer et al., 2021).

In our study, we noted that hospitalised patients had lower levels of state anxiety if they were more agreeable and conscientious. Agreeableness is a trait that accounts for a positive attitude toward people, with agreeable people being typically perceived as warm, cooperative, and open to others. This trait can be helpful in coping with a difficult situation through a positive attitude. Conscientiousness, on the other hand, is a tendency to show self-discipline and persistently strive to achieve set goals. Such people are dutiful and meticulous, which can help in coping with the experience of hospitalisation. Conscientiousness in our patients was also important for coping strategies. The more conscientious the women were, the more commonly they used the Acceptance strategy and the less often the strategies of Helplessness and Avoidance. Openness to experiences as a personality trait also proved to be important for coping strategies because the more frequently observed it was in our patients, the less often they used Helplessness strategies. It was also found that the more often the women used the Acceptance strategy, the lower their level of anxiety as a condition was during hospitalisation. In contrast, higher levels of trait anxiety were associated with less frequent selection of this strategy and much more common application of the strategies of Helplessness and Avoidance Behaviour. Our data confirm that, in general, maladaptive strategies are associated with a deterioration in mental health (Meyer, 2001). It has also been shown that adaptation strategies, e.g. focused on solving problems, are associated with better mental well-being during the COVID-19 pandemic (Rogowska et al., 2020), which was also confirmed in our hospitalised patients.

Other studies on the perception of COVID-19 risk have shown that people with high levels of anxiety, using an ineffective coping strategy (avoidance), less open to experience, were significantly concerned about the risk of contracting COVID-19 (Tagini et al., 2021). Similar associations were observed in our study group, with openness to new experiences correlating with lower stress levels, but only for men. There were no such correlations among the women who had significantly lower levels of openness to new experiences than men and, at the same time, much higher levels of state anxiety. It was also shown that the longer patients were hospitalised, the more often they turned to religion, i.e. the more severe their clinical condition was, the more often the patients sought spiritual support and/or solace in faith.

It was also noted that in male patients lower levels of trait and state anxiety were associated with higher levels of agreeableness and openness to experience. Such people were more inclined to accept the new difficult situation and their emotions, and had a more positive attitude towards people and more willingness to cooperate, which is essential in the situation of hospitalisation. However, the higher the men's state anxiety levels, the more frequently they used ineffective Helplessness strategies and the less often they applied the Acceptance strategy. This finding corroborates the available data (Kandeğer et al., 2021), suggesting that adaptive coping strategies reduce the severity of anxiety.

Our group-wide analysis showed that stress levels depended on coping strategies including Active Coping, Planning, and Positive Reframing, with high state anxiety levels. More frequent use of these strategies will reduce stress levels during hospitalisation but their discontinuation may result in a resurgence of stress levels. These results are consistent with the data obtained by other researchers who have shown that anxiety levels were negatively associated with the use of adaptive coping strategies (such as emotional support, planning, humour, and acceptance). In addition, implementing maladaptive strategies, especially substance use, significantly increases anxiety levels (Kandeğer et al., 2021). According to the researchers, the life-threatening situation of COVID-19 may have activated adaptive coping strategies in some patients, thereby reducing the severity of anxiety. Results from studies conducted during previous epidemics (severe acute respiratory syndrome, SARS) also suggest that patients' use of adaptive coping strategies reduces anxiety levels (Mak et al., 2009).

CONCLUSION

Our study showed that among patients hospitalised with COVID-19, about 40% had elevated levels of trait anxiety, i.e. they probably suffered from anxiety disorders. In contrast, half of the subjects did not experience elevated stress levels, which is an exciting result. The data suggest that patients who experience higher levels of stress and state anxiety during hospitalisation may often have undiagnosed anxiety disorders, which may affect the course of the disease, treatment, and cooperation with medical staff. Thus, it is essential to monitor the mental health of patients who are hospitalised, not only due to COVID-19 infection, and find ways to increase their mental resilience. Current research points to the importance of assessing psychological factors such as personality traits, coping strategies, and social support, as they mediate between stress factors (i.e. pandemic) and mental health (Serafini et al., 2020). Hence, it is necessary to employ psychologists in various hospital departments to diagnose and support patients with anxiety disorders.

STUDY LIMITATIONS

The study had some limitations, including sample size and selection. In addition, the study was voluntary and conducted in a sanitary regime in one centre (single-name hospital). In contrast to population studies, the relatively small number of patients makes it difficult to generalise the results. Another disadvantage is the lack of a control group; however, the study was conducted in a facility where only COVID-19 patients were hospitalised, and the authors did

 DOI: 10.15557/PiPK.2023.0019

not have access to patients hospitalised due to other reasons. Moreover, studying psychological variables using only self-report scales, sensitive to errors that cannot be controlled, is another a limitation. Nevertheless, due to the situation and condition of the studied subjects, all the data obtained make a valuable contribution to understanding the coping mechanisms in this specific group of patients.

Conflict of interest

The authors do not report any financial or personal connections with other persons or organizations that could negatively affect the content of this publication and claim authorship rights to this publication.

Author contributions

Original concept of study: AB, MLS, DK, MD. Collection, recording and/or compilation of data: MLS, AM, JS. Analysis and interpretation of data: BH, AKK. Writing of manuscript: BH. Critical review of manuscript: AB, AKK. Final approval of manuscript: BH, MD.

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