The Journal of Neurological and Neurosurgical Nursing
Pielęgniarstwo Neurologiczne i Neurochirurgiczne

Wydawnictwo Państwowej
Uczelni Zawodowej we Włocławku
ul. Mechaników 3, pok. 20
87-800 Włocławek

eISSN 2299-0321 ISSN 2084-8021
https://apcz.umk.pl/PNIN

DOI: 10.15225/PNN.2021.10.3.2 JNNN 2021;10(3):96–104 **Original**

The Structure of Stress Experiences in Patients in the Lumbar Spine Pain Syndrome during the COVID-19 Epidemic in Poland

Struktura doznań stresowych pacjentów w zespole bólowym odcinka lędźwiowego kręgosłupa podczas epidemii COVID-19 w Polsce

Anna Mazur[1], **Karolina Adamek**[2], **Elżbieta Przychodzka**[3], **Danuta Zarzycka**[4], **Elżbieta Bartoń**[3]

❶ Laboratory of Psychoprophylaxis and Psychological Support, Faculty of Human Sciences University of Economics and Innovation, Lublin, Poland

❷ Faculty of Human Sciences University of Economics and Innovation, Lublin, Poland

❸ Department of Neurology, Neurological and Psychiatric Nursing, Faculty of Health Sciences, Medical University, Lublin, Poland

❹ Chair of Department of Pediatric Nursing, Faculty of Health Sciences, Medical University, Lublin, Poland

Abstract

Introduction. The rapid transmission of the SARS-CoV-2 coronavirus has prompted government officials from many countries around the world to introduce severe epidemic restrictions to reduce the risk of developing coronavirus disease (COVID-19). However, apart from the necessity to protect somatic health, it turned out in a relatively short time that the pandemic also posed a serious threat to the mental functioning of many people.
Aim. The aim of the study is assessing the structure of stressful experiences of women and men in the pain syndrome of the lumbar spine during the COVID-19 epidemic in Poland.
Material and Methods. The study sample consists of 102 patients hospitalized in the Department of Neurosurgery and Pediatric Neurosurgery of the Independent Public Clinical Hospital No. 4 in Lublin. The first group is women, the second is men. The research used the *KPS Questionnaire* and a proprietary questionnaire. Statistical analyses were carried out using the IBM SPSS 25 program using the two-factor analysis of variance in the mixed schema included in the multivariate OML model.
Results. In the group of women, 49.0% of patients feel high stress, 31.4% — moderate, and 19.6% — low. In the male population, 37.3% of the respondents exhibited high stress, 51.0% — average and 11.7% — low. Women exhibit lower emotional tension but higher external stress than men. In addition, the patients have the highest emotional tension and external stress, and the lowest — intrapsychic stress. In men, emotional tension dominates, next is external stress, and intrapsychic stress is significantly lower than them.
Conclusions. The obtained data suggest that when designing interventions supporting the mental functioning of this group of patients, consideration should be given to taking into account individual differences identified in the studies. **(JNNN 2021;10(3):96–104)**
Key Words: COVID-19, gender, stress

Streszczenie

Wstęp. Szybka transmisja koronawirusa SARS-CoV-2 skłoniła przedstawicieli rządów wielu państw na całym świecie do wprowadzenia surowych ograniczeń epidemicznych, mających na celu ograniczenie ryzyka rozwoju choroby koronawirusowej (COVID-19). Jednak poza koniecznością ochrony stanu zdrowia somatycznego, w stosunkowo krótkim czasie okazało się, iż występująca pandemia stanowi również poważne zagrożenie dla funkcjonowania psychicznego wielu osób.

Cel. Celem badań jest określenie struktury doświadczeń stresowych kobiet i mężczyzn w zespole bólowym odcinka lędźwiowego kręgosłupa podczas epidemii COVID-19 w Polsce.
Materiał i metody. Badaną próbę tworzy 102 pacjentów hospitalizowanych w Klinice Neurochirurgii i Neurochirurgii Dziecięcej Samodzielnego Publicznego Szpitala Klinicznego nr 4 w Lublinie. Pierwszą grupę stanowią kobiety, a drugą mężczyźni. W badaniach zastosowano *Kwestionariusz KPS* oraz ankietę. Analizy statystyczne przeprowadzono za pomocą programu IBM SPSS 25 z wykorzystaniem dwuczynnikowej analizy wariancji w schemacie mieszanym wchodzącej w skład wielozmiennowego modelu OML.
Wyniki. W grupie kobiet 49,0% pacjentek odczuwa wysoki stres, 31,4% — umiarkowany, a 19,6% — niski. W populacji mężczyzn 37,3% badanych ujawnia wysoki stres, 51,0% — przeciętny i 11,7% — niski. Kobiety wykazują niższe napięcie emocjonalne, ale wyższy stres zewnętrzny niż mężczyźni. Ponadto pacjentki w największym stopniu mają nasilone napięcie emocjonalne i stres zewnętrzny, a w najniższym stres intrapsychiczny. U mężczyzn dominuje napięcie emocjonalne, następnie jest to stres zewnętrzny, a stres intrapsychiczny jest istotnie od nich niższy.
Wnioski. Uzyskane dane sugerują, iż podczas opracowywania interwencji wspierających funkcjonowanie psychiczne tej grupy pacjentów należy rozważyć uwzględnienie zidentyfikowanych w badaniach różnic indywidualnych. **(PNN 2021;10(3):96–104)**
Słowa kluczowe: COVID-19, płeć, stres

Introduction

The rapid transmission of the SARS-CoV-2 coronavirus has prompted government officials from many countries around the world to introduce severe epidemic restrictions to reduce the risk of developing coronavirus disease (COVID-19) [1]. However, apart from the necessity to protect somatic health, it turned out in a relatively short time that the pandemic also posed a serious threat to the mental functioning of many people [2–5].

The gradual deterioration of the mental health of the society observed in various regions of the world results from chronic, often severe stress that people have to face during a crisis [6–8]. According to the transactional theory, it is perceived as a state that exceeds human resources and threatens human well-being, which evokes strong negative emotions, such as fear, anxiety, anger or hostility. These experiences coexist with biochemical and physiological changes in the body [9].

The results of global studies carried out in a sample of 733 adults indicate that symptoms of severe stress, suggesting the probability of posttraumatic stress disorder (PTSD), are present in 34.1% of the respondents [10]. In turn, the empirical study from China showed that 8.1% of people experience increased or moderate stress, its mild intensity was diagnosed in 24.1% of people, and 2.6% of women and men showed strong symptoms of this type [11]. In Italy, high rates of stress were reportedin 18.6% of the population, and moderate in nearly 20.0% of people [12]. On the other hand, empirical evidence from Iran shows that 14.1% of respondents are characterized by high stressduring the pandemic, and its moderate level is shown in 47.0% of people [13].

Studies in various countries affected by the pandemic suggest that the risk of perceived emotional tension turning into chronic stress is determined by the circularity of several factors. Among them, fears of falling ill with COVID-19 and death as a result of its complicated course, negative anticipation of the future, economic difficulties, as well as the threat or actual loss of a job [14–16]. Excessive and often contradictory information concerning the pandemic [17] and the disorganization of organized educational and professional activities are also a significant stressor [18]. Social isolation and other life limitations that people encounter during the current epidemic situation are also important [18,19].

Moreover, gender has been shown to play an important role in the mental health of people affected by the pandemic. Both the results of meta-analyses, including data from various regions of the world, and the conclusions of studies conducted in Poland and Egypt indicate that women reveal a higher level of stress than men, which may be related to a number of individual differences determining the efficiency of coping with the experienced difficulties [20–25]. There is also a hypothesis that susceptibility to negative mental health effects of SARS-CoV-2 transmission is higher, inter alia, in people with a history of various chronic diseases, among which the exchange of patients in the lumbar spine pain syndrome [8,26].

This syndrome is one of the most common civilization diseases in the adult population and, according to estimated data, affects approximately 72.0% of Poles before the age of 40, and in later age it affects approximately 66.0% of men and 30.0% of women [27]. The disease is usually characterized by chronic and progressive pain, which can significantly reduce motor skills, resulting in inability to work and functional limitations in everyday life [28–30].

Changes in the intervertebral disc, intervertebral joints and ligaments of the spine play an important role in the pathogenesis of the syndrome. Moreover, regardless of the starting point of the perceived symptoms, pathological changes concern the motor segment of the

spine, and as the disease progresses, they gradually embrace its various structures, as well as adjacent and distant organs, often leading to full motor disability of patients [31–33].

For this reason, patients often require surgical treatment, and the pain syndrome of the lumbar spine is more and more often treated as an interdisciplinary problem, requiring multi-specialist management by neurosurgeons, physiotherapists, psychologists or psychotherapists whose task is to strengthen — often damaged by the disease and individual life experiences, often associated with the epidemic — the mental condition of patients [32,34,35].

The legitimacy of conducting psycho-preventive interventions in this clinical group is confirmed by numerous empirical evidence [36–38]. For example, in a population of 463 adults in Saudi Arabia, it has been shown that higher levels of stress are associated with the severity of pain in the course of the lumbar spine pain syndrome, and the highest levels of stress are reported by patients aged 35 to 49 years with a body mass index equal to or more than 30. Moreover, these people do not follow ergonomic recommendations and lead a sedentary lifestyle [36]. In Turkey, it was observed that the patients who most commonly complain about these types of mental and physical health symptoms are patients who, due to the current epidemic situation, are forced to perform their professional work at home [37]. On the other hand, in Italy, the coexistence of chronic pain in the lumbar spine with a weakened condition in the sphere of mental health was reported in 41.2% of people, while 52.4% of them experienced a significant increase in the above symptoms during the epidemic [38].

Thus, the observed regularities suggest that for many people, the direct consequence of long-term stress, in addition to deteriorating mental health, may also be a higher risk of exacerbated pain syndrome of the lumbar spine [36–38]. However, during the COVID-19 pandemic, the structure of stress in patients treated with neurosurgery has not been analyzed so far, which seems to be particularly important in the context of conducting effective preventive interventions that are tailored to the individual needs of people affected by this crisis.

For this reason, a cross-sectional pilot study was planned, which focused on the assessment of the structure of stressful experiences of women and men in the lumbar spine pain syndrome during the COVID-19 epidemic in Poland.

Material and Methods

The studies included two groups of patients hospitalized in the Department of Neurosurgery and Pediatric Neurosurgery of the Independent Public Clinical Hospital No. 4 in Lublin (N=102). The first is made up of women (N=51), and the second is made of men (N=51). The detailed characteristics of the studied patients are presented in Table 1.

In the group of women, the youngest patient is 30 years old, the oldest is 68 years old, while their average age is almost 41 years. The highest percentage of the group are the respondents living in large cities, more than one third of women come from small towns, and the least numerous group lives in suburban towns. More than half of the patients declare that they have secondary education, an equal percentage of the respondents obtained higher or vocational education, and the smallest

Table 1. Sociodemographic characteristics of the studied patients

Variables	Group				Group comparison	
	Women		Men			
	M	SD	M	SD	t	p
Age	40.96	10.17	39.72	15.75	0.85	0.395
Number of hospitalizations	3.22	1.39	3.18	0.97	0.16	0.869
Period of hospitalization	5.14	4.01	5.38	4.07	1.17	0.246
	N	%	N	%	χ^2	p
Place of residence						
Village	2	3.9	0	3.9		
City up to 100 000 inhabitants	19	37.3	19	37.3	0.00	1.000
City over 100 000 inhabitants	30	58.8	32	58.8		
Education						
Primary	1	0.5	14	18.9		
Vocational	6	21.4	18	24.3	7.19	0.066
Secondary	15	50.6	28	37.8		
Higher	6	24.1	14	18.9		
Marital status						
Single	122	34.2	130	34.6		
Married	147	51.8	137	38.4		
Cohabitation	36	10.1	35	9.8	2.27	0.687
Widow/Widower	5	1.4	2	0.6		
Divorced	47	13.2	53	14.8		

proportion of them completed their education at the primary school stage. The respondents were hospitalized three times on average. Their average stay in the neurosurgery ward is 5 days.

In the male population, the youngest patient is 33 years old, the oldest one is 61 years old, and their average age is nearly 40. The largest percentage of the group are patients living in large cities, while the smallest number of people come from suburbs. More than one third of men declare that they have secondary education, nearly a quarter of the group graduated from vocational schools, and the least numerous and comparable proportion of patients received primary and higher education. On average, the respondents stayed in the hospital three times, while their average stay in the neurosurgery ward was 5 days.

The conducted comparative analyses showed that the analyzed groups of women and men are homogeneous due to age, number of hospitalizations and period of hospitalization, place of residence, education and marital status.

The research used the *KPS Questionnaire* by M. Plopa and R. Makarowski [39] and a self-made questionnaire.

The *KPS questionnaire* is used to study the structure of stress, which consists of emotional tension — a sense of anxiety, hypersensitivity, difficulties in relaxing, lack of energy to act; external stress — a feeling of helplessness, frustration and fatigue, the belief that the challenges encountered exceed the resources available, and intrapsychic stress — the belief that you are mentally weak, constantly present fears and worries about the situation experienced. The test sheet contains 27 statements that are referenced on the basis of a five-point Likert scale. Due to the satisfactory psychometric properties, the tool can be used in individual diagnosis and in scientific research. Cronbach's *alpha* internal consistency coefficients calculated in the studied group of women range from 0.73 to 0.81, and in the male population they range from 0.75 to 0.80. The questionnaire has sten norms. The results within the range of 1 to 3 levels are interpreted as low. The results ranging from 4 to 6 sten indicate the average severity of a given dimension, and the results ranging from 7 to 10 sten are considered high [39].

The survey includes questions about basic sociodemographic and medical data (gender, age, education level, marital status, hospitalization period, number of hospitalizations).

The research was carried out at the Department of Neurosurgery and Pediatric Neurosurgery of the Independent Public Clinical Hospital No. 4 in Lublin during the COVID-19 epidemic in Poland from November to January 2021. They were carried out in accordance with the provisions of the Helsinki Declaration of 1995, as amended in 2013. They were voluntary, and each subject gave written informed consent to participate in them. The participants were provided with all necessary information and explanations about the conducted research. In addition, individuals were informed about the confidentiality of the data provided and about the possibility of receiving feedback on individual results. In case of doubts, they had the opportunity to obtain additional explanations. The research time was not limited, in practice it lasted 10 minutes.

The obtained data was entered in an anonymized format into the IBM SPSS 25 statistical program, which was used to perform statistical analyzes. The characteristics of the studied sample were based on the analysis of the percentage distributions of the frequency of occurrence of qualitative data and the values of descriptive statistics — the mean, standard deviation, minimum and maximum quantitative parameters. The significance level of intergroup differences in terms of qualitative data was verified using the chi² test. The shape of the variable distribution was estimated on the basis of the Shapiro–Wilk test. The verification of intergroup differences was carried out using the Student's t-test for independent data, the statistically significant results of which were supplemented by estimating the size of the effects using Cohen's d statistic. Characterization of the stress experienced by the respondents was made based on the percentage distributions of the frequency of the given categories. The interaction effect was tested using a two-factor analysis of variance in a mixed scheme: 3 × (structure of stress experiences: emotional tension vs. external stress vs. intrapsychic stress) 2 (gender: women vs. men) included in the multivariate OML model. the borderline error rate of the first type is 0.05 [40].

Results

The first stage of the research focused on the analysis of the general stress experienced by the examined patients. The characteristics of this variable were divided into three severity categories (high vs. average vs. low) according to gender as presented in Figure 1.

The highest level of stress (N=25) is the most frequent in the female population, its moderate level was noted in 16 women, and 10 subjects experienced low stress.

When analyzing the categories of stress that characterize the group of men, it was observed that the average intensity of stress dominates in this group (N=26), high stress occurred in 19 subjects, and its low intensity was experienced by 6 patients.

The results of the comparisons of stress experienced by the respondents are presented in Table 2.

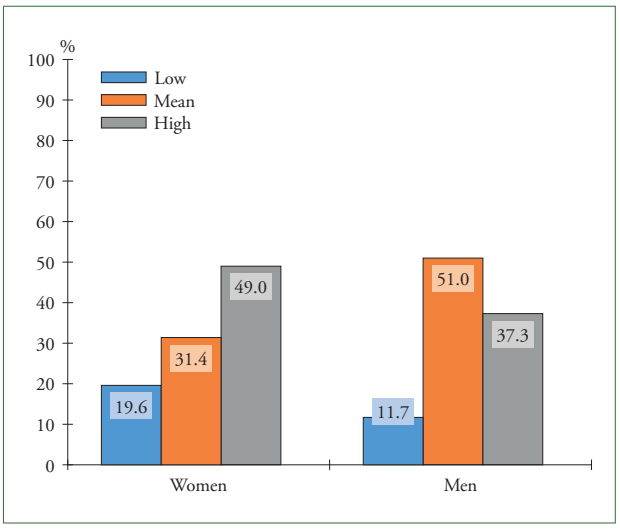

Figure 1. Stress intensity categories in the studied patients

As a result of the conducted analyses, statistically significant average effects of emotional tension and external stress for gender were obtained. Women experience lower emotional stress than men, but higher external stress. On the other hand, the general level of stress and the patients' intrapsychic stress remain at a comparable level.

The performed calculations also confirm a statistically significant strong effect of the interaction of the stress structure and gender, which indicates that in the group of women and in the population of men, the configuration of individual components of stress experiences is different. The obtained interaction effect is presented in Figure 2.

The performed calculations show that in the group of women the intensity of emotional tension and external stress remains at a comparable level and each of these dimensions is higher than the intrapsychic stress experienced by the respondents. However, in the male population, emotional tension is dominant, followed by external stress, and intrapsychic stress is statistically significantly lower.

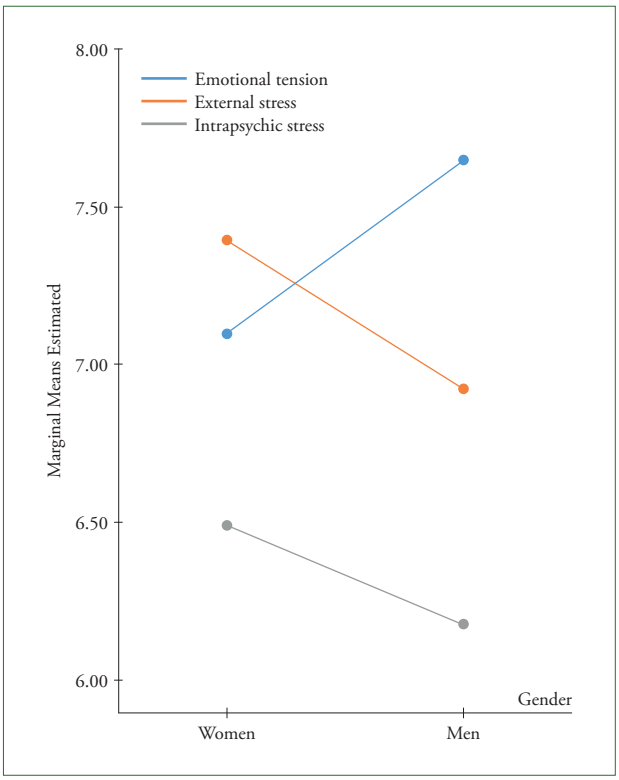

Figure 2. Effect of interaction of the structure of stress experiences and gender in the studied patients

Table 2. Stress intensification in the studied patients

Dimension	Group				Inter group comparisons		
	Women		Men				
	M	SD	M	SD	t	p	d
Stress — Overall Score	6.99	0.71	6.91	0.52	0.64	0.527	–
Emotional tension (1)	7.10	0.98	7.54	0.69	3.26	0.002	0.65
External stress (2)	7.39	0.80	6.92	1.20	2.33	0.022	0.67
Intrapsychic stress (3)	6.49	1.33	6.18	1.05	1.32	0.190	–
	General with in-subject comparisons						
	F		p		η^2		
Stress * gender	7.56		0.001		0.16		
	Detailed with in-subject comparisons						
	1–2		1–3		2–3		
Women	0.382		0.005		0.001		
Men	0.001		0.001		0.003		

Discussion

The conducted studies were aimed at determining the structure of stressful experiences in patients with lumbar spine pain syndrome during the COVID-19 epidemic in Poland, depending on gender. The obtained data show that almost half of the surveyed women (49.0%) exhibited a high level of stress, nearly one third moderate (31.4%), and less than a fifth (19.6%) — low. On the other hand, in the male population, average stress was the most common (51.0%), while its moderate level was noted in 37.5% of patients, and over one-tenth of the group (11.8%) experienced low stress.

When attempting to relate the observed regularities to the conclusions drawn from empirical studies carried out

during the transmission of the SARS-CoV-2 coronavirus in other countries, it can be noted that the indicators obtained in our own research seem to be higher than in populations without chronic diseases [13,41,42]. This thesis is confirmed by the results of the empirical work of Maarefvand and colleagues, which showed that the highest stress during the pandemic was shown by subjects diagnosed with various chronic diseases. Moreover, its high intensity was maintained in people who, for various medical reasons, did not use face protection with a mask, as well as in women excluded from professional activity [43].

Research conducted in China using the new Covid-19 Peritraumatic Distress Index (CPDI) questionnaire shows that 5.1% of adults exhibited high stress, and moderate — 29.3%. In addition, it was shown that Iranians experienced it less severely than those in China [13]. The variables positively related to stress were remote work and the absence of a job, and optimal physical activity turned out to be a protective factor [13,44]. However, the most interesting observations seem to be that the stress levels of people diagnosed with COVID-19 and other study participants were comparable. It has also been shown that women were characterized by a higher intensity than men. It should be added, however, that in these studies the structure of stressful experiences was not considered and only the overall result was assessed [13].

In the authors' own research, which dealt with the issue of stress, extended by the analysis of its individual components, it was observed that despite the fact that gender does not differentiate the general index of stress and intrapsychic stress, women, compared to men, exhibited higher external stress and lower emotional tension. Moreover, it was proved that, depending on the sex, the structure of the stress experiences of the respondents was different. In the group of women, emotional tension and external stress remained at a comparable level and these factors were higher than intrapsychic stress. In turn, in the male population, emotional tension was most pronounced, followed by external stress, and intrapsychic stress had the lowest intensity.

When analyzing the causes of the noted sexual dimorphism, one should refer to the indications of contemporary research, which suggest that it may be the result of differences in the structure of the brains of men and women, determining the neurophysiological response to the challenges encountered. Gender has been reported to differentiate both the size of many cortical and subcortical areas and the density of neurons in certain parts of the cerebral cortex that are involved in the control of processes in the central nervous system. As a result, women are more susceptible than men to stress-generating factors and, consequently, to a higher risk of developing various types of reactive mental disorders [45–47].

The above-mentioned conditions are related to the emotional and cognitive processing of stimuli coming from the environment, which, depending on the sex, trigger different physiological processes. Therefore, it can be assumed that these reactions, activated by stress mobilization and constituting one of the basic factors contributing to the genesis of mental disorders, in a manner characteristic for women and men, shape the intensity and structure of stressful experiences during the epidemic [21,23–25,48,49].

In addition, it is assumed that gender is a factor that may modulate the preference for the used remedies. During the pandemic in the United States, it was found that the most frequently reported coping strategies were distraction, active coping, and seeking emotional support, with men more frequently in a task-oriented approach to the challenges they encountered [50].

Summing up the discussion, it should be emphasized that the obtained results seem to be promising in the context of psychoprophylaxis of stress in the population of patients in the lumbar spine pain syndrome, although due to the pilot nature of the research, the reported effects require further empirical verification. Nevertheless, taking into account the regularities observed in our own research, which confirm the gender differences in the structure of stressful experiences, it seems reasonable to consider taking into account these individual differences, which may create an opportunity to intensify the benefits of the implemented impacts.

Conclusions

The studies carried out during the COVID-19 epidemic in the population of patients in the lumbar spine pain syndrome allow for the following conclusions:

- in the group of women, 49.0% of patients exhibit high stress, 31.4% — moderate, and 19.6% — low;
- in the male population, 37.5% of patients experienced moderate stress, 51.0% — high, and 11.8% — low;
- women in comparison to men show lower emotional tension and higher external stress, and the intensity of the general index of stress and intrapsychic stress is comparable in the analyzed groups;
- female patients have the highest emotional tension and external stress, and intrapsychic stress remains at the lowest level;
- the dominant dimension of the structure of stressful experiences in the group of men is emotional tension, then it is external stress, and the least intense is intrapsychic stress;

— the obtained data suggest that the effectiveness of psycho-prophylactic interventions supporting the functioning of patients in the lumbar spine pain syndrome during the COVID-19 epidemic can be enhanced by taking into account gender differences in the developed programs.

Implications for Nursing Practice

Taking into account the results of the research carried out in the population of patients diagnosed with the lumbar spine pain syndrome, which suggest that about half of women and men experience severe stress during the COVID-19 pandemic, it seems reasonable to include the analyzed population in appropriate psychoprophylactic interventions.

In nursing practice, they should be focused on monitoring symptoms suggesting increased psychological tension in patients, as well as providing them with information about the possibilities of obtaining professional help in this regard. For this reason, it would be valuable to supplement the interview with patients with questions about the sense of perceived stress and related symptoms, as well as the use of standardized research tools to assess intrapsychic functioning in this area.

Early detection of undesirable symptoms in patients will increase the chances of implementing appropriate preventive measures, which, as a result, should not only contribute to the improvement of their well-being and mental health, but may also minimize the risk of exacerbated pain syndrome of the lumbar spine.

References

[1] Fiani B., Siddiqi I., Lee S.C., Dhillon L. Telerehabilitation: Development, Application, and Need for Increased Usage in the COVID-19 Era for Patients with Spinal Pathology. *Cureus*. 2020;12(9):e10563.

[2] Talevi D., Socci V., Carai M. et al. Mental health outcomes of the CoViD-19 pandemic. *Riv Psichiatr*. 2020;55(3):137–144.

[3] World Health Organization. *WHO Coronavirus (COVID-19) Dashboard*. Retrieved January 5, 2021, from https://covid19.who.int/

[4] Loades M.E., Chatburn E., Higson-Sweeney N. et al. Rapid Systematic Review: The Impact of Social Isolation and Loneliness on the Mental Health of Children and Adolescents in the Context of COVID-19. *J Am Acad Child Adolesc Psychiatry*. 2020;59(11):1218–1239.e3.

[5] Altena E., Baglioni C., Espie C.A. et al. Dealing with sleep problems during home confinement due to the COVID-19 outbreak: Practical recommendations from a task force of the European CBT-I Academy. *J Sleep Res*. 2020;29(4):e13052.

[6] Tsamakis K., Rizos E., Manolis A.J. et al. COVID-19 pandemic and its impact on mental health of healthcare professionals. *Exp Ther Med*. 2020;19(6):3451–3453.

[7] Chevance A., Gourion D., Hoertel N. et al. Ensuring mental health care during the SARS-CoV-2 epidemic in France: A narrative review. *Encephale*. 2020;46(3):193–201.

[8] Lazarus R.S., Folkman S. *Stress, Appraisal, and Coping*. Springer Publishing Company, New York 1984.

[9] Kar N., Kar B., Kar S. Stress and coping during COVID-19 pandemic: Result of an online survey. *Psychiatry Res*. 2021;295:113598.

[10] Wang C., Pan R., Wan X. et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain Behav Immun*. 2020;87:40–48.

[11] Moccia L., Janiri D., Pepe M. et al. Affective temperament, attachment style, and the psychological impact of the COVID-19 outbreak: an early report on the Italian general population. *Brain Behav Immun*. 2020;87:75–79.

[12] Jahanshahi A.A., Dinani M.M., Madavani A.N., Li J., Zhang S.X. The distress of Iranian adults during the Covid-19 pandemic — More distressed than the Chinese and with different predictors. *Brain Behav Immun*. 2020;87:124–125.

[13] Hao F., Tan W., Jiang L. et al. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. *Brain Behav Immun*. 2020;87:100–106.

[14] Shigemura J., Ursano R.J., Morganstein J.C., Kurosawa M., Benedek D.M. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry Clin Neurosci*. 2020;74(4):281–282.

[15] Vindegaard N., Benros M.E. COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain Behav Immun*. 2020;89:531–542.

[16] Zandifar A., Badrfam R. Iranian mental health during the COVID-19 epidemic. *Asian J Psychiatr*. 2020;51:101990.

[17] Troyer E.A., Kohn J.N., Hong S. Are we facing a crashing wave of neuropsychiatric sequelae of COVID-19? Neuropsychiatric symptoms and potential immunologic mechanisms. *Brain Behav Immun*. 2020;87:34–39.

[18] Mamun M.A., Ullah I. COVID-19 suicides in Pakistan, dying off not COVID-19 fear but poverty? — The forthcoming economic challenges for a developing country. *Brain Behav Immun*. 2020;87:163–166.

[19] Pappa S., Ntella V., Giannakas T., Giannakoulis V.G., Papoutsi E., Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Immun*. 2020;88:901–907.

[20] Rajkumar R.P. COVID-19 and mental health: A review of the existing literature. *Asian J Psychiatr*. 2020;52:102066.

[21] Bohlken J., Schömig F., Lemke M.R., Pumberger M., Riedel-Heller S.G. [COVID-19 Pandemic: Stress Experience of Healthcare Workers — A Short Current Review]. *Psychiatr Prax*. 2020;47(4):190–197.

[22] Bodecka M., Nowakowska I., Zajenkowska A., Rajchert J., Kaźmierczak I., Jelonkiewicz I. Gender as a moderator between Present-Hedonistic time perspective and depressive symptoms or stress during COVID-19 lockdown. *Pers Individ Dif*. 2021;168:110395.
[23] Bartoszek A., Walkowiak D., Bartoszek A., Kardas G. Mental Well-Being (Depression, Loneliness, Insomnia, Daily Life Fatigue) during COVID-19 Related Home-Confinement-A Study from Poland. *Int J Environ Res Public Health*. 2020;17(20):7417.
[24] El-Zoghby S.M., Soltan E.M., Salama H.M. Impact of the COVID-19 Pandemic on Mental Health and Social Support among Adult Egyptians. *J Community Health*. 2020;45(4):689–695.
[25] Bao Y., Sun Y., Meng S., Shi J., Lu L. 2019-nCoV epidemic: address mental health care to empower society. *Lancet*. 2020;395(10224):e37–e38.
[26] Depa A., Drużbicki M. Ocena częstości występowania zespołów bólowych lędźwiowego odcinka kręgosłupa w zależności od charakteru wykonywanej pracy. *Prz Med Uniw Rzesz*. 2008;1:34–41.
[27] Balasubramanya R., Selvarajan S.K. *Lumbar Spine Imaging*. Retrieved January 18, 2021, from https://www.ncbi.nlm.nih.gov/books/NBK553181/
[28] Xu J., Ding X., Wu J. et al. A randomized controlled study for the treatment of middle-aged and old-aged lumbar disc herniation by Shis spine balance manipulation combined with bone and muscle guidance. *Medicine (Baltimore)*. 2020;99(51):e23812.
[29] Pilśniak J., Ślusarz R. Epidemiology of Traumatic Brain Injuries in its Own Material of Emergency Service Rypin: A Retrospective Study. *J Neurol Neurosurg Nurs*. 2013;2(1):4–8.
[30] Riley S.P., Swanson B.T., Cleland J.A. The why, where, and how clinical reasoning model for the evaluation and treatment of patients with low back pain. *Braz J Phys Ther*. 2021;25(4):407–414.
[31] Willems P. Decision making in surgical treatment of chronic low back pain: the performance of prognostic tests to select patients for lumbar spinal fusion. *Acta Orthop Suppl*. 2013;84(349):1–35.
[32] Markman J.D., Czerniecka-Foxx K., Khalsa P.S. et al. AAPT Diagnostic Criteria for Chronic Low Back Pain. *J Pain*. 2020;21(11–12):1138–1148.
[33] Fillingim R.B., Bruehl S., Dworkin R.H. et al. The ACTTION-American Pain Society Pain Taxonomy (AAPT): an evidence-based and multidimensional approach to classifying chronic pain conditions. *J Pain*. 2014;15(3):241–249.
[34] Mutubuki E.N., van Helvoirt H., van Dongen J.M. et al. Cost-effectiveness of combination therapy (Mechanical Diagnosis and Treatment and Transforaminal Epidural Steroid Injections) among patients with an indication for a Lumbar Herniated Disc surgery: Protocol of a randomized controlled trial. *Physiother Res Int*. 2020;25(1):e1796.
[35] Šagát P., Bartík P., Prieto González P., Tohănean D.I., Knjaz D. Impact of COVID-19Quarantine on Low Back Pain Intensity, Prevalence, and Associated Risk Factors among Adult Citizens Residing in Riyadh (Saudi Arabia): A Cross-Sectional Study. *Int J Environ Res Public Health*. 2020;17(19):7302.
[36] Toprak Celenay S., Karaaslan Y., Mete O., Ozer Kaya D. Coronaphobia, musculoskeletal pain, and sleep quality in stay-at home and continued-working persons during the 3-month Covid-19 pandemic lockdown in Turkey. *Chronobiol Int*. 2020;37(12):1778–1785.
[37] Moretti A., Menna F., Aulicino M., Paoletta M., Liguori S., Iolascon G. Characterization of Home Working Population during COVID-19 Emergency: A Cross-Sectional Analysis. *Int J Environ Res Public Health*. 2020;17(17):6284.
[38] Plopa M., Makarowski R. *Kwestionariusz poczucia stresu*. Wyd. Vizja Press & IT, Warszawa 2010.
[39] Rehman U., Shahnawaz M.G., Khan N.H. et al. Depression, Anxiety and Stress Among Indians in Times of Covid-19 Lockdown. *Community Ment Health J*. 2021;57(1):42–48.
[40] Flaskerud J.H. Stress in the Age of COVID-19. *Issues Ment Health Nurs*. 2021;42(1):99–102.
[41] Maarefvand M., Hosseinzadeh S., Farmani O., Safarabadi Farahani A., Khubchandani J. Coronavirus Outbreak and Stress in Iranians. *Int J Environ Res Public Health*. 2020;17(12):4441.
[42] Callow D.D., Arnold-Nedimala N.A., Jordan L.S. et al. The Mental Health Benefits of Physical Activity in Older Adults Survive the COVID-19 Pandemic. *Am J Geriatr Psychiatry*. 2020;28(10):1046–1057.
[43] Baranyi A., Amouzadeh-Ghadikolai O., von Lewinski D. et al. Revisiting the tryptophan-serotonin deficiency and the inflammatory hypotheses of major depression in a biopsychosocial approach. *PeerJ*. 2017;5:e3968.
[44] Beis D., Holzwarth K., Flinders M., Bader M., Wöhr M., Alenina N. Brain serotonin deficiency leads to social communication deficits in mice. *Biol Lett*. 2015;11(3):20150057.
[45] Hall E., Steiner M. Serotonin and female psychopathology. *Womens Health (Lond)*. 2013;9(1):85–97.
[46] Liu N., Zhang F., Wei C. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. *Psychiatry Res*. 2020;287:112921.
[47] Wong S.Y.S., Zhang D., Sit R.W.S. et al. Impact of COVID-19 on loneliness, mental health, and health service utilisation: a prospective cohort study of older adults with multimorbidity in primary care. *Br J Gen Pract*. 2020;70(700):e817–e824.
[48] Park C.L., Russell B.S., Fendrich M., Finkelstein-Fox L., Hutchison M., Becker J. Americans' COVID-19 Stress, Coping, and Adherence to CDC Guidelines. *J Gen Intern Med*. 2020;35(8):2296–2303.
[49] Van Doren N., Soto J.A. Paying the price for anger: Do women bear greater costs? *Int J Psychol*. 2021;56(3):331–337.
[50] Samulowitz A., Gremyr I., Eriksson E., Hensing G. "Brave Men" and "Emotional Women": A Theory-Guided Literature Review on Gender Bias in Health Care and Gendered Norms towards Patients with Chronic Pain. *Pain Res Manag*. 2018;2018:6358624.

Corresponding Author:
Anna Mazur
Laboratory of Psychoprophylaxis and Psychological Support,
Faculty of Human Sciences
University of Economics and Innovation, Lublin, Poland
Projektowa 4 street, 20-209 Lublin, Poland
e-mail: annamazur0@o2.pl

Conflict of Interest: None
Funding: None
Author Contributions: Anna Mazur[A–I], Karolina Adamek[A–I], Elżbieta Przychodzka[C, F], Danuta Zarzycka[G], Elżbieta Bartoń[A, E–H]

A — Concept and design of research, B — Collection and/or compilation of data, C — Analysis and interpretation of data, D — Statistical analysis, E — Writing an article, F — Search of the literature, G — Critical article analysis, H — Approval of the final version of the article, I — Acquisition of assets [eg financial]

Received: 29.07.2021
Accepted: 2.09.2021