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Stress and Anxiety in Neurosurgical Patients before Surgery

Stres i lęk u pacjentów neurochirurgicznych przed zabiegiem operacyjnym

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Abstract

Introduction. Stress is an inevitable part of everyone's life. It is the body's response to unfamiliar and unpredictable situations that people often have to face. Hospitalisation and surgery are among the factors that contribute to stress and anxiety.
Aim. The aim of this study was to assess the severity of stress, anxiety and depression in neurosurgical patients before surgery and the factors affecting them.
Material and Methods. The study included 100 patients residing in the Department of Neurosurgery of the 10th Military Research Hospital with Polyclinic IP HCC in Bydgoszcz, who were qualified for surgery. The study was conducted using the author's questionnaire, the PSS-10 scale, the anxiety and depression subscales of the HADS-M questionnaire.
Results. In the study group, the mean stress score was 6.07±1.31 points, anxiety 9.73±2.84 points and depression 4.76±3.15 points. An increase in stress levels resulted in an increase in anxiety and depression levels ($p<0.001$). Talking to hospital ward staff about the planned surgery reduced depression levels ($p=0.045$), but had no effect on levels of perceived stress and anxiety. Anxiety and depressive disorders increased with the age of the subjects.
Conclusions. Preoperative assessment of stress, anxiety and depression can help to identify patients with high levels of these disorders and take appropriate measures to reduce them. **(JNNN 2023;12(2):55–62)**
Key Words: anxiety, depression, neurosurgery, stress, surgery

Streszczenie

Wstęp. Stres jest nieuniknioną częścią życia każdego człowieka. Jest to reakcja organizmu na nieznane oraz trudne do przewidzenia sytuacje, z którymi ludzie często muszą się mierzyć. Hospitalizacja, operacja należą do czynników przyczyniających się do powstawania stresu oraz odczuwania lęku.
Cel. Celem pracy była ocena nasilenia stresu, lęku i depresji u pacjentów neurochirurgicznych przed zabiegiem operacyjnym oraz czynników na nie wpływających.
Materiał i metody. Badaniem objęto 100. pacjentów przebywających w Klinice Neurochirurgii 10. Wojskowego Szpitala Klinicznego z Polikliniką SP ZOZ w Bydgoszczy, którzy zostali zakwalifikowani do zabiegu operacyjnego. Badania przeprowadzono za pomocą ankiety autorskiej, skali PSS-10, podskali lęku i depresji kwestionariusza HADS-M.
Wyniki. W badanej grupie wynik średni poziomu stresu wyniósł 6,07±1,31 pkt, lęku 9,73±2,84 pkt, depresji 4,76±3,15 pkt. Wzrost poziomu stresu powodował wzrost poziomu lęku i depresji ($p<0,001$). Rozmowa z personelem oddziału szpitalnego na temat planowanego zabiegu obniżała poziom depresji ($p=0,045$), ale nie miała wpływu na poziom odczuwanego stresu i lęku. Zaburzenia lękowe i depresyjne nasilały się wraz z wiekiem badanych.
Wnioski. Przedoperacyjna ocena stresu, lęku i depresji może pomóc w wyłonieniu pacjentów z wysokim poziomem tych zaburzeń i podjęciu adekwatnych działań zmierzających do ich redukcji. **(PNN 2023;12(2):55–62)**
Słowa kluczowe: lęk, depresja, neurochirurgia, stres, operacja

Introduction

Stress is an inevitable part of everyone's life. It is the body's response to unfamiliar and unpredictable situations that people often have to face. Nowadays, society enforces a very fast pace of life, to which one has to adapt for various reasons. As a result, people who are less resistant to stress often live under pressure. Everyone faces many challenges in their daily life, which are a result of their specific environment and personal needs. It is inevitable to cope with these in order to function in the best possible way. Hospitalization is one of the factors for creating stress and experiencing anxiety. For many people, they are caused by, among other things, a new environment, illness and anxiety about their condition. In surgical wards, patients additionally have to contend with the stress and anxiety that comes before a surgical operation, which is necessary for the condition to improve. The extent to which these feelings are exacerbated depends, among other things, on factors such as age, personality traits and a person's susceptibility to stress and anxiety in everyday life. The main fears of surgery include fear of anaesthesia and sudden awakening, fear of pain occurring after surgery, poor prognosis, fear of disability. Neurosurgical patients are a diverse group of patients who undergo both spinal surgery performed under local anaesthesia and many hours of central nervous system surgery under general anaesthesia. Therefore, proper preparation of the patient both physically and mentally for the operation improves their wellbeing and ensures a smoother recovery at a later stage. The competence of the entire medical staff is important in this respect; with their knowledge, empathy and skills, they should make the discomfort felt by patients as pleasant as possible [1–6].

In medicine, anxiety is part of treatment and the doctor-patient relationship. The patient's condition is particularly affected by pending surgical treatment, which is significantly emotionally taxing and anxiety-inducing. There may be abnormalities in physiological parameters before and during surgery. Long-term, high-intensity anxiety can cause more post-operative complications and, consequently, lead to a longer hospital stay. The most important causes of anxiety that patients feel before surgery include loss of control and complete dependence on the surgeon, mutilation of the body, the possibility of discovering another disease or even death during surgery. Hence, it is important to adequately prepare the patient for surgery, including detecting high levels of negative emotional states [2,7].

The aim of this study was to assess the severity of stress and anxiety and depressive disorders in neurosurgical patients before surgery and the factors influencing them.

Material and Methods

The study was conducted in 2021 among 100 patients admitted to the Department of Neurosurgery at the 10th Military Clinical Hospital with Polyclinic IP HCC in Bydgoszcz qualified for surgery.

A self-administered questionnaire, the anxiety and depression subscale of the HADS-M questionnaire (modified Hospital Anxiety and Depression Scale) and the PSS-10 scale (Perceived Stress Scale) were used for the study.

The author's questionnaire concerned basic demographic and social information such as gender, age, place of residence, education or occupational activity. The questionnaire also included questions relating to the purpose of the stay in the Neurosurgery Clinic, whether the respondent had ever been hospitalised in such a department, what he or she feared most during surgery and after its performance. A question was also asked regarding the conversation with the medical staff about the planned neurosurgical procedure and whether it was helpful.

The HADS-M scale is one of the screening tools used to detect anxiety disorders, depression and irritability. It cannot be used to make a specific clinical diagnosis, but only to detect whether a person has these disorders. It consists of 14+2 different statements to which the subject responds on a four-point Likert scale. For the purposes of the study, an anxiety subscale consisting of seven statements and a depression subscale also consisting of seven statements were used. Each statement is scored from 0 to 3 points. The final score for each subscale ranges from 0 to 21 points. The higher the score, the greater the severity of the symptoms. If the respondent scores below 7 it means that no disorder is found, 8–10 points indicate a borderline condition and 11 points and above means that disorder is present [8,9].

The PSS-10 scale consists of 10 questions on a number of subjective feelings that are related, among other things, to problems and events in the respondent's personal life and ways of coping with them. It is used to assess the intensity of stress that is related to the respondent's own life situation over the past month. The respondent provides his/her answers by entering the appropriate number (0 — never, 1 — almost never, 2 — sometimes, 3 — quite often, 4 — very often). The overall scale score is the sum of all scores between 0 and 40. The higher the score, the greater the intensity of the stress experienced. The overall index, once transformed into standardised units, is subject to interpretation according to the properties characterising the sten scale. Scores between 1 and 4 sten are considered low scores, while 7–10 sten are considered high scores. Scores within 5 and 6 sten are considered average [10].

Results were analysed using Statistica 13. Qualitative data were presented as the number of individuals (N and the percentage of a given factor (%) in a given subgroup. Data on levels of stress according to the PSS-10 questionnaire and anxiety and depression according to the HADS-M were analysed using non-parametric tests such as the Mann–Whitney U test, the Kruskal–Wallis test and Spearman's rank correlation, as the conditions for parametric tests were not met. Quantitative data by individual subgroups that were compared with each other are presented as mean value and standard deviation. In addition, minimum and maximum scores and quartiles with median (Q1, Q3 and Me) are presented. All differences between the results were indicated as significant when $p<0.05$ for the statistical test performed.

Results

There were 100 participants in the study, 47 women and 53 men. The characteristics of the study group are shown in Table 1.

Table 1. Characteristics of the study group according to selected socio-demographic factors

Variable	N	%
1	2	3
Gender		
Women	47	47
Men	53	53
Age		
Up to 40 years	23	23
41–65 years	56	56
Over 65 years	21	21
Place of residence		
Village	31	31
City	69	69
Marital status		
Single	23	23
Married	77	77
Type of residence		
Alone	14	14
With partner	23	23
With family	63	63
Education		
Basic	7	7
Professional	32	32
Medium	32	32
Higher	29	29
Professional activity		
Unemployed	8	8
Active at work	47	47
Pension	22	22
Retirement	23	23

Among the subjects, 34% had a radiofrequency ablation, the same percentage had a brain tumour removal, and 32% had surgery for lumbar or cervical discopathy. During the procedures carried out, general anaesthesia was used in 65% of the operated patients and local anaesthesia in 35%. 72% of patients had not been hospitalised once before. Among the remaining 28%, there were those who had been hospitalised previously one (16%), two (9%), three (2%) or four (1%) times.

Patients were asked whether family support helped them to reduce the severity of perceived stress and anxiety associated with surgery. A 94% positive response was obtained. In contrast, 96% also had a conversation with medical staff about their planned surgery, with 88% stating that this conversation also reduced their feelings of anxiety and stress.

The PSS-10 standardised questionnaire was used to assess the level of stress. A higher score obtained on this questionnaire indicates a higher level of perceived stress. The average level of perceived stress among the study group was 6.07±1.31 points. The median value recorded for this parameter was 6 points. The results of the subjects are presented in Figure 1.

The HADS-M standardised questionnaire was used to assess the severity of anxiety and depression, with two subscales assessing both conditions. A higher score obtained in each subscale of this questionnaire indicates greater severity of anxiety or depression symptoms. The average level of anxiety experienced by the subjects in the study group was 9.73±2.84 points. The median value recorded for this parameter was 10 points. This is shown in Figure 2.

When analysing the results of the study, anxiety disorders were found in 42% of the subjects. Borderline anxiety states occurred in 38% of the subjects. Only 20% of the respondents did not show any anxiety disorders.

On the other hand, the average level of depression experienced by people in the study group was 4.76±3.15 points, with a median of 5 points (Figure 3).

It was noted that 74% of respondents showed no symptoms of depression. 25% of the respondents showed borderline depressive states and 1 person (1%) had a depressive disorder.

The statistical analysis examined whether there was a correlation between the subjects' PSS-10 questionnaire scores for stress, and results from the HADS-M questionnaire indicating the severity of anxiety and depression were correlated. It turned out that both anxiety and depressive disorders were related in a directly proportional manner (R>0) to the subjects' stress level scores. The first (stress level vs. anxiety level) of the relationship was of weak strength (R=0.351), the second (stress level vs. depression level) of medium strength (R=0.409). An increase in stress level resulted in an increase in anxiety and depression. Spearman's rank correlation statistical test showed that both identified relationships were statistically significant (p<0.001). Figures 4 and 5 show the distribution of anxiety and depression scores according to the HADS-M in relation to stress level scores according to the PSS-10.

In order to test the hypothesis of a possible effect of gender on the scores achieved by the subjects in the PSS-10 and HADS-M questionnaires, they were subjected to a detailed statistical analysis. Using the Mann–Whitney U test, the mean scores of men and women for stress, anxiety and depression were compared. In none of the cases was there a significant effect of gender (p>0.05) on scores. Male and female scores for stress (6.1±1.3 vs. 6.1±1.4), anxiety (9.8 ±2.8 vs. 9.7±2.9) and depression (5.1±3.2 vs. 4.4±3.1) were similar to each other.

Using the Kruskal–Wallis test, the mean scores of people under 40 years of age, people aged 41–65 years and older people over 65 years were compared for stress, anxiety and depression. Age had no effect on the level of stress experienced by the respondents (p=0.412). However, a significant effect was found in the results for anxiety (p=0.040) and depression (p=0.021), which increased with age.

When assessing the effect of marital status, it was found that the results of single and living in a stable relationship determining the levels of stress (6.0±1.4 vs. 6.1±1.3), anxiety (9.2±3.1 vs. 9.9±2.8) and depression (4.6±3.5 vs. 4.8±3.1) were similar to each other (p>0.05). Occupational activity also did not significantly affect the level of stress experienced by the respondents

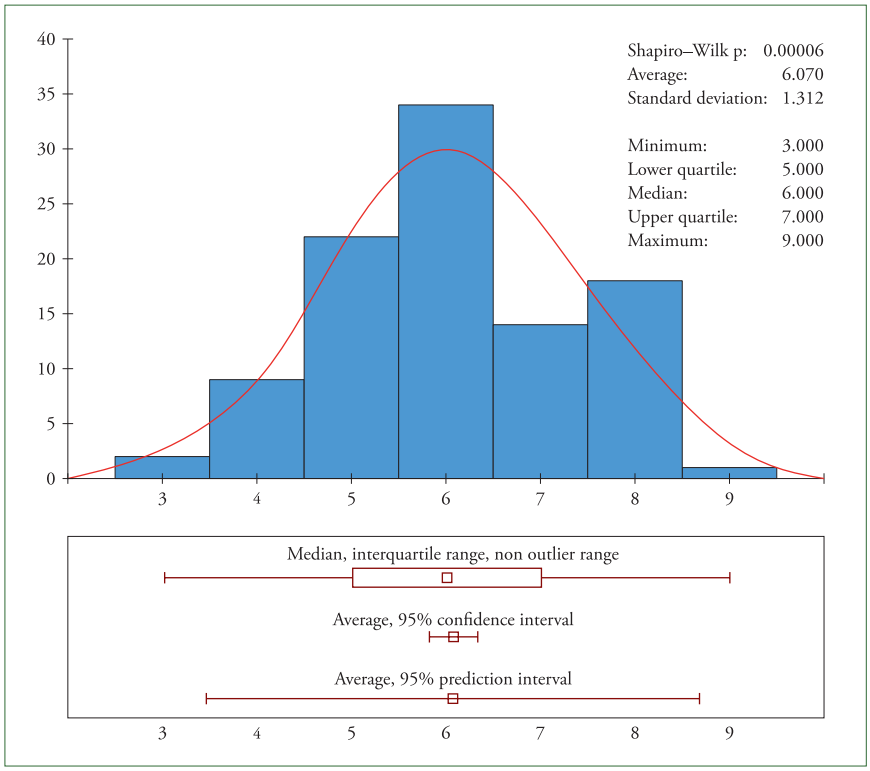

Figure 1. Distribution of stress scores according to the PSS-10

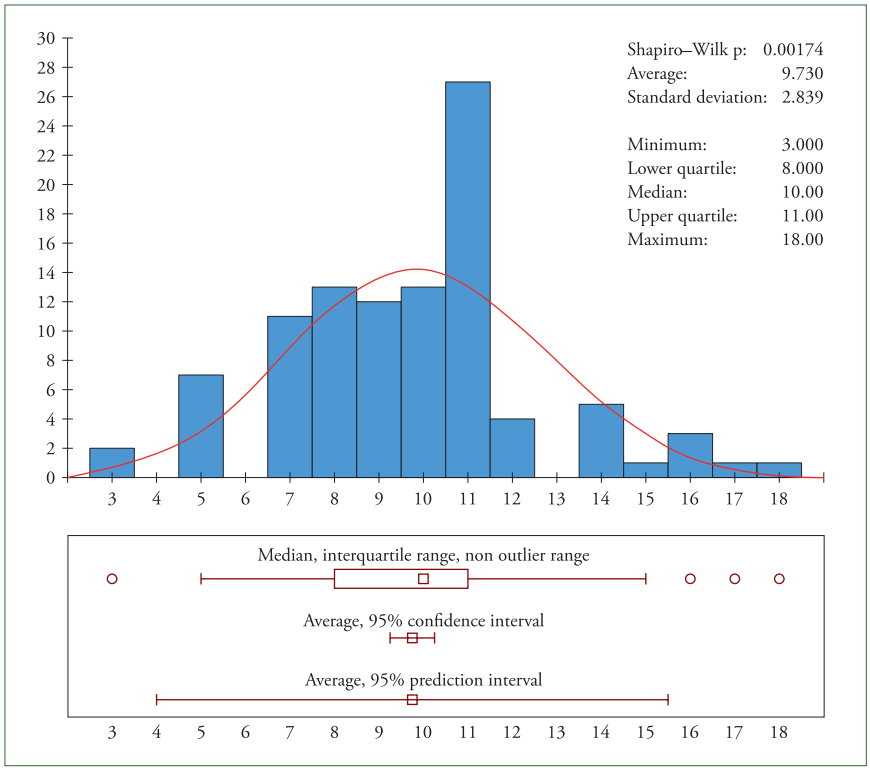

Figure 2. Distribution of anxiety scores according to HADS-M

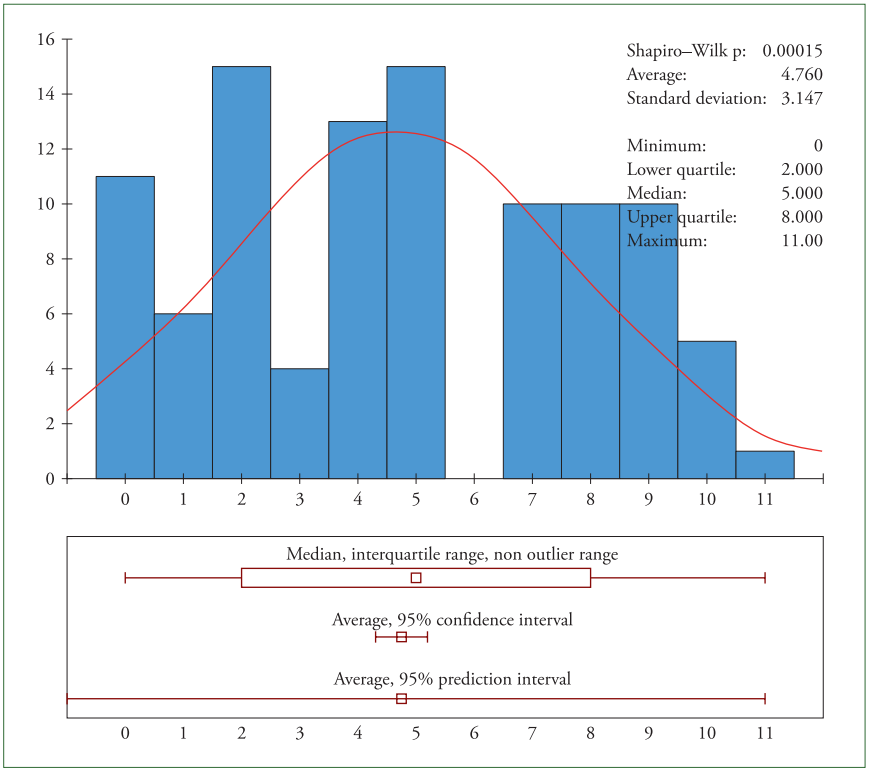

Figure 3. Distribution of depression scores according to HADS-M

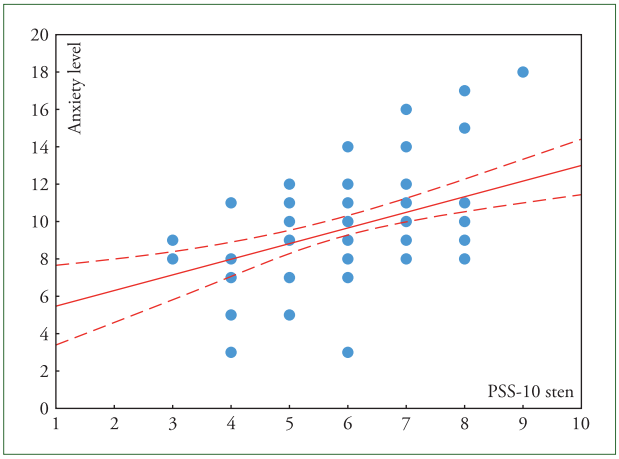

Figure 4. Distribution of HADS-M anxiety scores in relation to PSS-10 stress scores

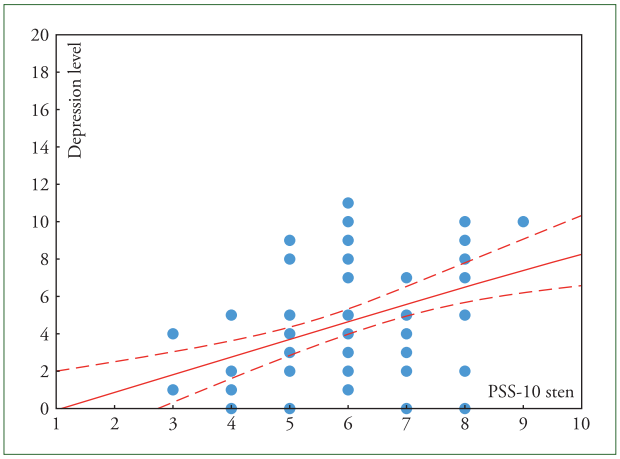

Figure 5. Distribution of HADS-M depression scores in relation to PSS-10 stress scores

(p=0.255) and anxiety (p=0.252). However, a significant effect was found for depression (p=0.023). Pensioners had the highest scores in this area.

There was no statistically significant effect of the type of neurosurgical procedure performed during the current hospitalisation on the levels of stress (p=0.384), anxiety (p=0.499) and depression (p=0.290) experienced by the subjects. Similarly, there was no such effect of family support and its contribution to reducing perceived anxiety and stress (p>0.05). Talking to hospital ward staff about the planned surgery did not have a statistically significant effect on the level of stress felt by the subjects (p=0.835) or anxiety (p=0.879), but did have an effect on the severity of depressive symptoms (p=0.045). Those who had a conversation with medical staff about their planned surgery had lower scores (7.8±1.9 vs. 4.6±3.1).

When asked whether having a conversation with staff about the procedure did or did not reduce negative feelings, there were no significant differences between the scores determining stress levels (p=0.935). Significant differences were found between the results indicating anxiety level (p=0.044) and depression level (p=0.040). Those who claimed that talking to staff reduced their feelings of anxiety and depression actually had lower anxiety (9.5±2.7 vs. 11.6±3.0) and depression (4.5±3.2 vs. 6.5±2.5) scores than those who held the opposite view.

Discussion

Stress and anxiety are feelings that accompany the patient at every stage of illness and treatment. It is an integral part of hospitalisation. This is due, among other things, to the fact that the sick person fears for his or her own health and even life. They are in a completely new environment with medical staff whom he or she has to trust to a certain extent. Surgical treatment belongs to a special form of treatment that places a significant strain on the patient's psyche and emotional state. If the patient is not adequately prepared for the surgery by the medical staff and does not have the support of family and relatives, it may even result in prolonged hospitalisation after the surgery and psychological problems.

This paper presents findings on the stress and anxiety that occurs before neurosurgery. Neurosurgical patients are a diverse group of patients. Some of them are struggling with an oncological diagnosis. They undergo a variety of procedures, whether performed under local or general anaesthesia.

Królikowska et al. [11] also studied anxiety levels in neurosurgical patients who were scheduled for surgery. They found that more than half of the subjects felt anxious about the planned treatment. They showed the effect of feeling anxiety according to age. Older patients were more likely to experience anxiety than younger patients. They noted no differences in levels of perceived anxiety between patients scheduled for brain and spinal surgery. The authors also compared the level of anxiety before surgery in patients who had already been hospitalised in a neurosurgery unit or in another surgery unit, but there was no statistically significant effect. In contrast, an interesting relationship emerged in relation to the presence of comorbidities. It appeared that patients who did not have comorbidities showed more anxiety before surgery than those who had comorbidities. It is likely that patients who did not have a previously diagnosed other disease found themselves in a completely new situation in their lives, which put a great strain on their mental state.

The psychological sphere of patients was highlighted by Niechwiadowicz-Czapka [7]. According to the author, the loss of independence and dependence on people one does not know, the change of environment and the lack of contact with the family as the primary source of support cause a sense of threat and loss of security. Surgical treatment occupies a unique place in this respect and causes a particularly heavy emotional burden on patients. The patient's mental state before surgery is variable, with feelings of hope as well as fear, confidence and anxiety. The dominant emotion, however, is fear and anxiety. The author highlighted the importance of the patient-nurse relationship. She outlined the qualities she should possess and how to care for the patient in terms of the psychological sphere. Medical staff especially in surgical wards should inspire trust in patients through their professionalism and empathy. In the present study, almost all patients talked to the medical staff about the operation before the surgery. Moreover, the respondents felt that talking to the staff reduced their feelings of anxiety and stress.

This is supported by a review and meta-analysis by Ruiz Hernández et al. [12], who confirmed the positive impact of nursing interventions in the treatment of preoperative anxiety in adults.

Rusiecka et al. [4] analysed patients' fear of planned general anaesthesia, which accompanies many surgical procedures. Based on the results presented by the authors, it appeared that the vast majority of respondents (78.3%) felt anxious about planned general anaesthesia. More than half of the respondents (54.7 per cent) felt anxious about waking up during surgery, and almost 40 per cent felt their fear of surgery was exacerbated by the experiences of other patients. One important aspect of alleviating anxiety during hospitalisation is proper communication with the patient. The appropriate amount and quality of information communicated prevents the negative impact of emotions on the patient's health. In the present study, it was observed that, irrespective of the type of surgery performed, the patient felt stress and anxiety in the same way and feared for their own health and life. Gender, age or marital status did not affect the severity of the stress felt in any way. This is because the patient, finding himself in a completely new environment, does not fully know what to expect. However, stress and anxiety are alleviated if the medical staff has a conversation with the patient about the planned procedure.

Robaszkiewicz-Bouakaz et al. [13] analysed the severity of anxiety in patients in a surgical ward. They used the Polish adaptation of the Standardised State-Trait Anxiety Inventory (STAI) questionnaire to measure the intensity of anxiety as a state and as a trait. In the conclusions of their study, the authors identified determinants that exacerbated anxiety as a state, and these were: gender, lack of family support and the reason for hospitalisation. In contrast, the increase in anxiety as a trait was intensified by age, gender, education, place of residence, level of support and cause of hospitalisation. It was noted that the older the patient was, the stronger the feelings of anxiety. The same relationship occurred in the present study. The authors also noted that women experienced anxiety before surgery to a greater extent than men. In contrast, based on the results presented in this study, it was noted that gender had no effect on perceived anxiety, depression and stress. Women and men experienced the aforementioned emotions in a similar way before the planned surgery. Differences in results may have been influenced by the research tools used; the authors of the cited article used a different scale to measure perceived anxiety, which allowed the research problem to be viewed from a different perspective.

Papiernik [14], on the other hand, in her dissertation, examined the relationship between the level of anxiety as a state and anxiety as a trait and the experience of pain in patients in the perioperative period. As above, she observed an increase in the severity of anxiety as a trait with the age of the subjects and no effect of gender.

In their study, Sioma-Markowska et al. [15] assessed the severity of preoperative anxiety and analysed the impact of anxiety on the incidence of complications in the postoperative period. The study was based on the Amsterdam Preoperative Anxiety and Information Needs Inventory Scale (APAIS) and analysis of medical records

among women undergoing surgical treatment for gynaecological conditions. The authors noted a correlation between perceived anxiety and the degree of need for information. The higher the level of perceived anxiety, the higher the need for information regarding anaesthesia and the course of surgery. As in the study conducted in this thesis, the sense of anxiety of the women interviewed increased with their age.

Following an analysis of our own research and that of other authors [16,17], certain regularities can be observed. Surgery is a very mentally and physically taxing treatment. Each patient should be approached individually because of the variety of emotional states they present. Particular care must be given to the elderly.

Conclusions

1. In the study group, an increase in stress levels exacerbated feelings of anxiety and depression.
2. The respondents' feelings of anxiety and depression increased with age.
3. Those on pension manifested higher levels of depression than those who were economically active or unemployed.
4. Talking to medical staff about the procedure was a factor that significantly reduced depression, but had no effect on the level of perceived stress and anxiety.
5. Subjects who confirmed that talking to medical staff reduced their feelings of anxiety had significantly lower anxiety and depression scores, for stress no significant differences were shown.
6. Gender, marital status, type of neurosurgery carried out and family support were not factors that significantly modified levels of perceived stress and anxiety and depression.

Implications for Nursing Practice

Every patient who is hospitalised in a treatment unit fears for their health and life. Anxiety contributes to increased pain and a higher incidence of early postoperative complications. Hence, the psychological preparation of the patient before surgery by the medical staff is so important.

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