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## Patients' Fear and Anxiety Associated with Planned Neurosurgery

### Niepokój i lęk pacjentów związany z planowanym zabiegiem operacyjnym w neurochirurgii

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#### Abstract

**Introduction.** Surgical treatment is a very difficult situation for the patient related to the state of feeling fear and anxiety. Anxiety in the pre-operative period may be associated with the course of the planned surgery, the risk of post-operative complications, or with histopathological diagnosis in the case of cancer.

**Aim.** The aim of the study was to examine whether the patients awaiting neurosurgical surgery experience anxiety and fear associated with the treatment and how they assess the level of anxiety in themselves.

**Material and Methods.** The study included 102 adult patients qualified for surgery at the Department of Neurosurgery of the 10th Military Clinical Hospital with the Polyclinic SP HCC in Bydgoszcz. The tests were carried out from 25/04/2017 until 30/06/2017 in the aforementioned Clinic, for which the consent of the Bioethical Commission at the L. Rydygier Collegium Medicum in Bydgoszcz NCU in Toruń (KB 341/2017) was obtained. The research method was a diagnostic survey, whereas the tool applied to assess patients was an original questionnaire containing a placard and basic questions related to the subject of the study.

**Results.** Over half of the respondents were concerned about the planned treatment: 31.4% ticked “yes”, 21.6% “rather yes”. Nearly 65% of respondents did not have concerns about their health status: “rather not” 34.3%, “no” 30.4%. 66.7% of the respondents were accompanied by a sense of fear every day. When assessing pre-operative anxiety, over 50% of patients rated anxiety at level 1 to 3 on a 10-point scale. The dependence of anxiety perception according to age was demonstrated ( $p \leq 0.05$ ). In addition, the level of perceived anxiety was higher in patients not burdened with other diseases ( $p \leq 0.05$ ).

**Conclusions.** Most neurosurgical patients experienced anxiety in the pre-operative period, more than half of the respondents assessed their anxiety at the low level. The age of patients has been a factor affecting the level of anxiety felt. Older patients were more anxious than younger patients. A higher level of anxious anxiety was demonstrated in patients not burdened with other diseases. (JNPN 2018;7(3):104–110)

**Key Words:** concern, anxiety, patient, surgery

#### Streszczenie

**Wstęp.** Leczenie operacyjne dla pacjenta jest sytuacją bardzo trudną, związaną z odczuwaniem niepokoju i lęku. Lęk w okresie przedoperacyjnym może być związany z przebiegiem planowanej operacji, ryzykiem pojawienia się powikłań pooperacyjnych, czy z rozpoznaniem histopatologicznym w przypadku nowotworów.

**Cel.** Celem pracy było zbadanie czy pacjenci oczekujący na zabieg neurochirurgiczny odczuwają niepokój i lęk związany z leczeniem oraz jak oceniają poziom lęku u siebie.

**Materiał i metody.** Badaniem objęto 102 pacjentów dorosłych, zakwalifikowanych do leczenia operacyjnego w Klinice Neurochirurgii 10 Wojskowego Szpitala Klinicznego z Polikliniką SP ZOZ w Bydgoszczy. Badania zostały

przeprowadzone w okresie od 25.04.2017 r. do 30.06.2017 r. w wyżej wymienionej Klinice, na które uzyskano zgodę Komisji Bioetycznej przy Collegium Medicum im. L. Rydygiera w Bydgoszczy UMK w Toruniu (KB 341/2017). Metodą badawczą był sondaż diagnostyczny, natomiast narzędziem wykorzystanym do oceny pacjentów była autorska ankieta zawierająca metryczkę oraz pytania zasadnicze związane z tematem pracy.

**Wyniki.** Ponad połowa badanych odczuwała niepokój w związku z planowanym leczeniem: 31,4% wskazało odpowiedź „tak”, 21,6% „raczej tak”. Blisko 65% badanych nie miało obaw w związku ze swoim stanem zdrowia: „raczej nie” 34,3%, „nie” 30,4%. 66,7% respondentom towarzyszyło na co dzień poczucie lęku. Oceniając lęk przedoperacyjny ponad 50% pacjentów oceniło u siebie lęk na poziomie od 1 do 3 w skali 10-stopniowej. Wykazano zależność odczuwania niepokoju względem wieku ( $p \leq 0,05$ ). Ponadto poziom odczuwanego lęku był wyższy u chorych nie obciążonych innymi schorzeniami ( $p \leq 0,05$ ).

**Wnioski.** Większość pacjentów neurochirurgicznych odczuwała niepokój w okresie przedoperacyjnym, ponad połowa badanych oceniła swój lęk na poziomie niskim. Wiek pacjentów okazał się czynnikiem mającym wpływ na poziom odczuwanego niepokoju. Pacjenci starsi częściej odczuwali niepokój niż pacjenci młodszy. Wyższy poziom odczuwanego lęku wykazano u chorych nie obciążonych innymi schorzeniami. (PNN 2018;7(3):104–110)

**Słowa kluczowe:** niepokój, lęk, pacjent, zabieg operacyjny

## Introduction

Hospitalization for every person is associated with the loss of autonomy, disorder of independence, the need to comply with certain requirements and intimacy interference. Such a person is also excluded from performing their previous social role. Planning for surgical treatment further distorts the aforementioned needs. Hospital stay and vision of surgery significantly affect one's emotional sphere [1,2].

Surgical treatment is a difficult situation for the patient, affecting their mental state, which might be manifested by the variability of feelings, e.g. from hope to anxiety. Patients, however, usually experience fear and anxiety in this period [2].

Anxiety in the pre-operative period may be associated with the risk of pain occurrence, post-operative complications, even the possibility of death, as well as with the result of histopathological diagnosis. In addition, patients may be concerned about general anesthesia and dependence on medical personnel. Patients' concerns are not always directly related to surgical treatment, hospitalization but also to their family and professional situation. It should be emphasized that anxiety is a natural situation in this period difficult for the patient, but it may disturb patient's preparation for surgery [3,4].

The type and intensity of emotions accompanying the surgery are conditioned by various factors, including the state of health of the person and their personality. It should be added here that the more serious the disease and its prognosis, the higher emotions accompany the patient in this difficult period [3].

In numerous patients, scheduled for surgical treatment, anxiety is one of the main problems faced by the ward staff and which has to be resolved [2]. The nursing team through their therapeutic and educational activities can reduce anxiety and concern of patients before the surgery. The aim of conducting education in the surgical ward is to provide the patient with knowledge and skills in

the field of self-care, self-control, self-education which has an impact on the further course of the disease, reduction of its effects, restoring and maintaining health [1].

Complete exclusion of anxiety is not possible. The level of anxiety controlled by the patient may be an element that motivates them to cooperate with the staff (nursing, medical) in the difficult perioperative period [5].

The aim of the study was to examine whether patients awaiting neurosurgical surgery experience anxiety and concern associated with treatment and how they assess the level of anxiety in their own lives, also to check whether demographic factors (gender, age, place of residence, occupational activity) and factors related to the disease (diagnosis of the disease, surgery undergone and the presence of comorbidities) are associated with anxiety.

## Material and Methods

Study included 102 adult patients qualified for surgery at the Department of Neurosurgery of the 10th Military Clinical Hospital with the Polyclinic Independent Public Health Care Centre in Bydgoszcz. The tests were carried out from 25/04/2017 until 30/06/2017 in the aforementioned Clinic, for which the consent of the Bioethical Commission at the L. Rydygier Collegium in Bydgoszcz, NCU in Toruń (KB 341/2017) was obtained. A diagnostic survey was the research method, whereas the tool applied to assess patients was an original questionnaire containing a specification and basic questions related to the topic of the study. The condition for inclusion in the study was to obtain a voluntary consent from the patient to conduct the survey, in addition, the patient had to remain logic and maintain verbal contact.

The study group consisted of 50 women and 52 men. The most numerous group included patients between

36 and 50 years of age, the second largest group were patients aged between 51 and 65 years. Over half of the respondents were residents of the city. Almost 50% of those surveyed are married and nearly 20 of them were in informal relationships. Taking into account the level of education, nearly 40% of the respondents had secondary education, over 27% had vocational education, and more than 23% higher one. The majority of patients (54%) were professionally active. Over 42% of patients were people planned for surgery due to CNS tumors, over 38% of those surveyed were people with spine diseases. 52% of respondents stated that they were struggling with other illnesses, 58% of patients had already undergone previous surgery (Table 1).

Table 1. Characteristics of the study group

Sociodemographic/clinical factors	N	%
1	2	3
<b>Gender</b>		
Woman	50	49.0
Man	52	51.0
Overall	102	100.0
<b>Age</b>		
Up to 20 years	1	1.0
21–35 years	16	15.7
36–50 years	43	42.2
51–65 years	33	32.4
Over 65 years	9	8.8
Overall	102	100.0
<b>Place of residence</b>		
Village	48	47.1
City	54	52.9
Overall	102	100.0
<b>Marital status</b>		
Single	18	17.6
Married	50	49.0
Widow/Widower	5	4.9
Lonely person	9	8.8
Informal relationship	20	19.6
Overall	102	100.0
<b>Education</b>		
Primary	7	6.9
Vocational	28	27.5
Secondary	39	38.2
Higher	24	23.5
Other	4	3.9
Overall	102	100.0

Table 1. Continued

	1	2	3
<b>Professional activity</b>			
Professionally active		56	54.9
Professionally inactive		46	45.1
Overall		102	100.0
<b>Diagnosis of the disease</b>			
Neoplasm OUN		43	42.2
Spinal diseases		39	38.2
Others		20	19.6
Overall		102	100.0
<b>Occurrence of coexisting disease</b>			
No		49	48.0
Yes		53	52.0
Overall		102	100.0
<b>Undergoing surgery in the past</b>			
No		43	42.2
Yes		59	57.8
Overall		102	100.0

The results were subjected to statistical analysis, in which the following tests were used: the Mann–Whitney U test for comparing two independent samples for the following variables: gender, place of residence, occupational activity, co-morbidities, surgical operation in the past); the Kruskal–Wallis rank test was applied to compare multiple independent tests for the recognition variable and the Spearman rank correlation test was used to analyze age groups. The significance level of  $p \leq 0.05$  was assumed to be statistically significant. All calculations were made with Statistica 10.0 program and Microsoft Excel spreadsheet using the standard functions of this program.

## Results

In the conducted studies related to the subject of the work, over half of the respondents indicated that they felt anxiety: 32 (31.4%) persons ticked the answer “yes”, 22 (21.6%) “rather yes”. 25 people (24.5%) ticked the answer “no”, the remaining patients chose the answer “rather not”.

The patients were also asked if they were worried about their health condition. Nearly 65% of the respondents indicated that they had no concerns about their health condition: “rather not” was indicated by 35 respondents (34.3%), “no” by 31 of those surveyed (30.4). The remaining respondents (35.3%) answered that they had concerns about their own health (“yes”

17 patients (16.7%), “rather yes” 19 respondents (18.6%).

The respondents were also asked if they were accompanied by a sense of fear every day. 43 people (42.2%) indicated that they experienced anxiety on a daily basis, 25 people (24.5%) ticked the answer “rather yes”. 14 people (13.7%) declared that they did not feel anxiety on a daily basis, the answer “rather not” was chosen by 20 patients (19.6%).

Patients were asked to assess their level of anxiety by marking a value on the 0–10 scale corresponding to their feelings at the time of the research being carried out. The highest number of respondents indicated the value of “2” — 22 patients (21.6%) and the value “1” — 19 people (18.6%), the grade “4” — 16 respondents (15.7%) and the grade “3” — 13 people (12.7%). The least often value chosen was “7” and “9” — by 2 persons each (2.0% each). The maximum intensity of anxiety — the value of 10 was indicated by 6 patients (5.9%) (Table 2). The mean result of the anxiety level perceived at the time of the research was — 3.86 points, SD 2.625.

It was checked whether there was a relationship between concern, fear, everyday anxiety felt, the level of patients’ anxiety perceived and demographic as well as clinical factors (Table 3).

The studies included a comparable number of men and women. Analyzing the relationship between the results obtained and the respondents’ gender, no statistically significant differences have been found between the respondents ( $p > 0.05$ ).

Examining the correlation of age and anxiety-related results, it was shown that the age of the neurosurgical

patients studied remained in statistically significant, low correlation with the results of anxiety perception ( $p \leq 0.05$ ). Older patients were more anxious than the younger ones. The correlation of the remaining results with age turned out to be statistically insignificant ( $p > 0.05$ ).

While studying the correlation between the results associated with pre-operative anxiety and respondents’ place of residence according to the level of significance ( $p > 0.05$ ) there were no statistically significant differences observed between the inhabitants of the city and the country.

The professional activity of the respondents was not also a factor that had the influence on the occurrence of anxiety and pre-operative concern. Taking into account the level of significance ( $p > 0.05$ ), there were no statistically significant differences observed between professionally active and passive patients regarding these issues.

Over 40% of respondents were waiting for surgery due to CNS tumors, nearly 40% of patients were awaiting surgery due to spinal disease. According to the level of significance ( $p > 0.05$ ), there were no statistically significant differences observed between the groups as regarded the type of diagnosis related to the issues of concern, fear and anxiety perception.

In the study group, the majority of patients (53 people) were burdened with other diseases. It was examined whether this factor had an effect on the feeling of anxiety, concern and fears. When analyzing these issues, there was no statistically significant relationship observed ( $p > 0.05$ ). However, a statistically significant

Table 2. Level of anxiety perceived by patients

Scale	0—no anxiety	1	2	3	4	5	6	7	8	9	10—maximum anxiety
N	0	19	22	13	16	10	5	2	7	2	6
%	0.0	18.6	21.6	12.7	15.7	9.8	4.9	2.0	6.9	2.0	5.9

Mean 3.86; SD — 2.625

Table 3. Statistical analysis of the results of experienced anxiety, concerns, fear, anxiety level according to demographic and clinical factors

	Pain perceived		Concerns regarding health condition		Feeling anxiety on daily basis		Level of the anxiety perceived	
	Test result	p	Test result	p	Test result	p	Test result	p
Gender*	0.512	0.609	0.452	0.651	0.576	0.565	-0.646	0.518
Age**	-2.208	0.030	-0.463	0.644	-1.506	0.135	0.996	0.321
Place of residence*	-0.349	0.727	-0.258	0.796	-1.904	0.057	0.597	0.551
Professional activity*	-0.424	0.672	-0.514	0.607	0.114	0.909	-1.137	0.256
Clinical diagnosis***	0.193	0.908	0.125	0.939	0.094	0.954	0.618	0.734
Comorbidities*	-0.231	0.817	-1.045	0.296	-0.094	0.925	2.204	0.028
Surgery undergone in the past*	0.268	0.789	0.014	0.989	-0.427	0.669	0.149	0.881

\*Test U Manna–Whitneya; \*\*Test Spearmana; \*\*\*Test rang Kruskala–Wallisa;  $p \leq 0.05$

difference was found between the group of patients burdened with other diseases and the group of respondents with no burden regarding the level of perceived anxiety ( $p \leq 0.05$ ). The higher mean result of perceived anxiety level was noted in the group including those without other diseases — 4.31 points. The average value of anxiety perceived in the group of patients struggling with other disease units was 3.45 points.

Most patients (59 people) had had surgery in the past. After the analysis, according to the level of significance ( $p > 0.05$ ), there were no statistically significant differences reported between the groups regarding the issues of concern, fear and anxiety.

## Discussion

The most frequent patients of the neurosurgery ward are patients with central nervous system tumors as well as those with spine diseases. Also, there might be patients with vascular diseases of the nervous system (with aneurysms or other vascular malformations) or patients planned to have stimulators implanted (in diseases of the extrapyramidal system, in neuropathic pain). Most neurosurgical patients are people scheduled for surgery, in the case of injuries associated with damage to the nervous system and their consequences, such patients are usually treated in the mode of emergency.

Central nervous system neoplasms are usually located intracranially, to a much lesser extent they are found in the spinal canal (15% of primary tumors of the central nervous system). The most frequent intracranial tumors are those of neuroepithelial origin, which constitute from 40–50% of tumors, followed by metastatic tumors (approximately 30%) and meningiomas (18–19%) [6]. Symptomatology of brain tumors is very rich. In patients there can be observed general symptoms resulting from intracranial hypertension syndrome and focal symptoms associated with tumor localization. Patients may display anxiety and depression, particularly when the structures of the hippocampus and of limbic system are damaged [7]. The basic treatment of brain tumors is surgical treatment, which allows to determine the final histopathological diagnosis of proliferative lesions, also allows to quickly reduce the tumor mass, which will reduce or exclude patient's neurological symptoms [8]. In the case of lesions located in the vicinity of important nervous or difficult to access structures, in order to minimize the risk of post-operative damage, modern advanced medical technologies are applied, including: neuronavigation, functional intraoperative mapping, and even operations with awakening the patient [7].

Spine diseases are also referred to as spinal insufficiency, which cause degenerative-strain changes of the intervertebral disc (discopathy) and of accompanying

structures (spondyloses). The changes may affect the cervical, thoracic and lumbar segments. In the case of spine diseases, conservative and surgical treatment is applied. In the absence of conservative treatment efficiency or neurological deficit symptoms appearance, surgical treatment is recommended [6]. The most common symptom observed in patients with spine diseases is pain, which may be of acute or chronic nature [9,10]. The factor that modifies the experience of chronic pain is, unfortunately, anxiety. Anxiety is a reaction to pain, but also a factor that increases its perception. Research indicates a statistically significant correlation between the anxiety experienced and the intensity of pain sensations [10].

Anxiety is the most common emotional state in people and is a derivative of a state of danger. The surgical treatment involves a very high emotional burden, caused by many circumstances which threaten and trigger anxiety [11]. Anxiety seems to be a natural reaction, unfortunately it is not a factor that is conducive to preparing the patient for surgery [3]. Presence of anxiety before surgical treatment may translate into physiological parameters of the patient (also during surgery) as well as within the postoperative period, disturbing its course, increasing the frequency of complications, pain perception and even extending patient's stay in hospital [2].

In the research carried out more than half of neurosurgical patients experienced anxiety in the pre-operative period, nearly 67% of the respondents indicated that their anxiety accompanied them every day. Although most patients were accompanied by anxiety and fearful, 65% of respondents had no concerns about their health condition. According to Turbiarz and Babiarczyk [4], recognition and consideration of concerns and causes of anxiety are of great importance, which affects its reduction and increases the sense of safety of the patient operated on. Patients' concerns may vary in the pre-operative period, e.g. can be associated with anesthesia, pain, and wound.

Neurosurgical patients surveyed, assessed the level of perceived anxiety on a scale from 0 to 10. Following the example of Sniecikowska [3], who in her research used the Visual-Analogue Scale (VAS) adopted to assess anxiety level and in the analysis of results she adopted values meaning: "0" Lack of anxiety, 1–3 a low level of anxiety, 4–7 an average level of anxiety, and values of 8–10 a high level of anxiety, we can indicate that in the majority of neurosurgical patients anxiety was low, every third patient indicated an average level of anxiety experienced at home, nearly 15% of respondents perceived a high level of anxiety.

Anxiety of low intensity may be a beneficial feeling for the patient, which contributes to the mobilization of the body's defenses. On the other hand, a high level of anxiety can interfere with human defense functions

[3,12]. Motyka et al. [13] in their studies proved that in patients with a higher anxiety level in the pre-operative period there occurred more problems of psychological care in the early postoperative period (removal of drain, intravenous injection, dressing), moreover, patients revealing higher preoperative stress experienced more medical problems after the surgery (from I to III day following the surgery), which included: blood pressure increase over 140/90 mmHg, more frequent use of analgesics, sedatives and sleeping pills. The studies carried out by the aforementioned authors did not concern neurosurgical patients, but they prove that surgery is an important source of stress for patients; also a high level of stress/anxiety in the pre-operative period adversely affects the postoperative period [13]. In the study conducted by Lewicka, women had an average level of anxiety before the surgery [14], similarly the average level of anxiety was typical for patients in the studies carried out by Augustyniak et al. [5], in Snieciowska's studies, female patients experienced a moderate and high level of anxiety [3].

In the conducted research, sociodemographic factors including respondents' gender, place of residence, and professional activity were not related to the perception of everyday anxiety, fears, and the level of anxiety perceived. It is emphasized in literature, however, that the female gender may be an independent factor conducive to the presence of pre-operative anxiety in adults [5].

In studies, the age of patients has turned out to be an important factor associated with anxiety. Older patients, ie over 50 years of age, were more anxious compared to younger patients (up to 50). In the studies carried out by Augustyniak et al. the severity of anxiety in the pre-operative period was also observed in the elderly [5]. According to Jermola et al. anxiety arises in the elderly with age, mainly against disability, loss of health and dependence on others [15].

As regards clinical factors, the diagnosis of the disease in the conducted studies was not an important factor associated with the sensation of anxiety. It should be emphasized that brain tumors are a factor in the development of affective disorders, which include depression, anxiety or panic attacks. Anxiety disorders often affect patients with primary brain tumors, but this is probably related to the location of the cancer and not to its histopathological diagnosis. In the studies by D'Angelo et al. before brain tumor surgery, 62.5% of patients had an anxious state, 50% of patients showed anxiety, and 9.7% of patients showed depression. After the surgery, there occurred an increase in patients with depression [16]. In the studies carried out by Mainio et al. patients with right cerebral hemisphere tumor had statistically significantly higher mean anxiety scores compared to patients with the left hemisphere tumor

in the preoperative period. The study confirms that anxiety symptoms in primary brain tumors are associated with the right hemisphere of the brain [17].

Taking into consideration patients with pain in the spine, Turkiewicz-Maligranda et al. showed an increase of anxiety symptoms in 60.82% of respondents, depressive symptoms in 22.66%. Anxiety and depression symptoms were also more frequently manifested by women and the elderly [10]. In the studies conducted by Jabłońska et al. concerning patients with discopathy (lumbar and cervical), symptoms of depression before surgery were observed in 47.4% of the patients, whereas in the early postoperative period they concerned 25% of the respondents. According to the author, the patients had mild or moderate level of depression [9].

Taking into account the factor which is the burden of other diseases, the presented studies showed a statistically significant relationship between the level of perceived anxiety. Patients not burdened with other units showed a higher level of anxiety compared to those who were still struggling with other diseases.

In the presented studies, previous surgical procedures did not affect the feeling of concern, fear and anxiety. Bernad et al. emphasize that undergoing surgery does not affect the reduction of pre-operative anxiety. In their studies, the patients who had previously undergone surgery were characterized by a higher level of anxiety compared to those who were scheduled for surgery for the first time. This might have been related to negative experiences that were associated with the surgery and postoperative period [12].

In the literature dealing with the subject of anxiety, authors emphasize that lack of knowledge or having unprofessional information about surgical treatment may intensify negative patient's emotions. Therefore, patients require professional support from the medical or nursing staff [3,12].

Nurses, as members of the nursing team, with their attitude, behavior, way of communication and observance of the patient's rights can affect the minimization of anxiety and fear. The best-performed surgery will not produce positive results if the patient is not properly prepared for it and will not have professional post-operative care. Therefore, the nursing team is to prepare the patient for the surgery in terms of both physical as well as psychological aspects [2].

## Conclusions

1. Most neurosurgical patients experienced anxiety in the preoperative period and fear every day, more than half of the respondents assessed their anxiety at the low level, every third examined person at the medium level.

2. As regards demographic factors only the age of patients turned out to be a factor affecting the level of perceived anxiety ( $p \leq 0.05$ ). Older patients were more anxious than younger ones.
3. A higher level of anxiety perceived was shown in patients who were not burdened with other diseases ( $p \leq 0.05$ ). Previous surgery and diagnosis of the disease turned out to be factors that did not correspond to fear, anxiety and concerns perception in the pre-operative period.

## Implications for Nursing Practice

Concern and anxiety of patients in the pre-operative period may be one of the main problems that should be recognized by nursing staff. The task of the nursing team is to prepare the patient for the surgery in terms of both physical as well as mental aspect. Therefore, the nursing staff should make every effort to ensure that the problem of anxiety and fear has been recognized and nursing activities should contribute to the highest possible degree to its minimization.

## References

- [1] Niechwiadowicz-Czapka T. Rola i zadania pielęgniarki w zakresie przygotowania psychicznego pacjenta do operacji. *Puls Uczelni*. 2014;8(2):36–44.
- [2] Niechwiadowicz-Czapka T. Wybrane zagadnienia opieki pielęgniarskiej w aspekcie przygotowania psychicznego pacjenta do zabiegu chirurgicznego. *Piel Zdr Publ*. 2014;4(2):155–159.
- [3] Śniecikowska B. Czynniki generujące poziom lęku w okresie okołoperacyjnym u pacjentek zakwalifikowanych do operacji w obrębie gruczołu tarczowego. *Probl Pielęg*. 2013;21(2):228–234.
- [4] Turbiarz A., Babiarczyk B. Obawy pacjentów operowanych w systemie chirurgii jednego dnia — przegląd literatury. *Probl Pielęg*. 2015;23(2):265–268.
- [5] Augustyniuk K., Pawlak J., Jurczak A. et al. Ocena poziomu lęku u pacjentów hospitalizowanych. *Fam Med Primary Care Rev*. 2013;15(2):73–75.
- [6] Grzelak L., Wiszniewska M. Wybrane zagadnienia kliniczne chorób układu nerwowego leczonych operacyjnie. W: Jabłońska R., Ślusarz R. (Red.), *Wybrane problemy pielęgnacyjne pacjentów w schorzeniach układu nerwowego*. Wyd. Continuo, Wrocław 2012;133–146.
- [7] Nagańska E., Dytus-Cebulok K. Neuroonkologia. W: Fiszer U., Michałowska M. (Red.), *Podstawy neurologii z opisami przypadków klinicznych*. Wyd. Termedia, Poznań 2010;193–220.
- [8] Ręclawowicz D., Stempniewicz M., Biernat W., Słoniewski P. Nowe spojrzenie na klasyfikację i terapię nowotworów glejowych II stopnia złośliwości wg WHO — przegląd piśmiennictwa. *Neurol Neuroch Pol*. 2008;42(6):536–545.

- [9] Jabłońska R., Swincow A. Stan emocjonalny chorych leczonych operacyjnie z powodu dyskopatii kręgosłupa. *Pielęg Neurol Neurochir*. 2012;1(3):103–108.
- [10] Turkiewicz-Maligranda A., Rymaszewska J. Lęk i depresja a odczuwany ból u osób z chorobą dyskową odcinka krzyżowo-lędźwiowego charakteryzujących się różnym stylem przywiązania. *Piel Zdr Publ*. 2012;2(4):277–286.
- [11] Ziębicka J., Gajdosz R. Wybrane aspekty lęku u chorych oczekujących na operację. *Anest Intens Ter*. 2006;1:41–44.
- [12] Bernad D., Stolińska A., Szukała E., Szeremiota A. Wpływ personelu medycznego na obniżenie poziomu lęku u pacjentów leczonych chirurgicznie w okresie przedoperacyjnym na Oddziale Chirurgii Głowy i Szyi i Onkologii Laryngologicznej. W: Pasek M., Dębska G. (Red.), *Interdyscyplinarna opieka nad pacjentem z chorobą nowotworową*. Wyd. Krakowska Akademia im. Andrzeja Frycza Modrzejewskiego, Kraków 2010;93–101.
- [13] Motyka M., Kamińska M., Kochman M. Stres przed zabiegiem operacyjnym a przebieg okresu pooperacyjnego u pacjentów po wszczepieniu endoprotezy stawu biodrowego. *Prz Lek*. 2016;73(1):25–28.
- [14] Lewicka M., Makara-Studzińska M., Wdowiak A., Sulima M., Kanadys K., Wiktor H. Poziom lęku i depresji w okresie okołoperacyjnym a kategoria zabiegu operacyjnego w grupie kobiet leczonych z powodów ginekologicznych. *MONZ*. 2012;18(2):107–111.
- [15] Jermołaj A., Halicka M. Hospitalizacja jako czynnik stresujący pacjentów w starszym wieku. W: Krajewska-Kułak E., Sierakowska M., Lewko J., Łukaszuk C. (Red.), *Pacjent podmiotem troski zespołu terapeutycznego*. Tom 1. Wyd. Akademia Medyczna w Białymstoku, Wydział Pielęgniarstwa i Ochrony Zdrowia, Białystok 2005;211–219.
- [16] D'Angelo C., Mirijello A., Leggio L. et al. State and trait anxiety and depression in patients with primary brain tumors before and after surgery: 1-year longitudinal study. *J Neurosurg*. 2008;108(2):281–286.
- [17] Mainio A., Hakko H., Niemelä A., Tuurinkoski T., Koivukangas J., Räsänen P. The effect of brain tumour laterality on anxiety levels among neurosurgical patients. *J Neurol Neurosurg Psychiatry*. 2003;74(9):1278–1282.

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