

Received: 2013.07.04

Accepted: 2013.08.06

Published: 2013.10.28

Patient satisfaction with nursing after surgery due to cervical or lumbar discopathy

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Source of support: This work was supported only by the Poznań University of Medical Science. We would like to warmly thank Poznan University of Medical Sciences for financing our research project

Background: Relationships between patient satisfaction with nursing and patient clinical data have not been fully resolved in a Polish sample. Our objectives were to determine clinical factors associated with patient satisfaction with nursing and investigate differences between patients treated surgically for cervical or lumbar discopathy and degenerative changes.

Material/Methods: This prospective and cross-sectional study included 63 consecutively selected patients treated surgically for lumbar discopathy and degenerative spine disease and 41 patients undergoing surgery for cervical discopathy and degenerative spine disease from 1st June 2009 to 31st September 2010 in the Department of Neurosurgery and Neurotraumatology of Poznan University of Medical Sciences. In the first stage of this study, socio-demographic data, medical history, and clinical patient characteristics were collected. A minimum 12-month follow-up formed the second part. Nineteen patients with lumbar discopathy were excluded because they were unable to answer the questionnaire. Finally, 44 consecutively selected patients treated surgically for lumbar discopathy and 41 patients undergoing surgery due to cervical discopathy were evaluated with the Polish version of the Newcastle Satisfaction with Nursing Scale (NSNS-PL).

Results: In patients with cervical and lumbar discopathy, the average Experiences of Nursing Care Subscale (ENCS) scores were 82.0 (SD 15.1) and 79.0 (SD 13.5), respectively, whereas the average Satisfaction with Nursing Care Subscale (SNCS) scores were 75.6 (SD 18.1) and 74.4 (SD 16.8), respectively. The study groups did not differ in regards to NSNS subscales. Associations between ENCS and SNCS scores were confirmed in both patient groups ($rS=.73$, $p<0.001$ and $rS=.73$, $p<0.001$, respectively).

Conclusions: Our study highlights the importance of assessing the association between patient characteristics and patient perception of quality of nursing care. Satisfaction with treatment outcome and conviction about undergoing the same treatment affected experiences and satisfaction with nursing in the cervical group only.

Key words: **lumbar discopathy • cervical discopathy • Newcastle Satisfaction with Nursing Scale**

Full-text PDF: <http://www.medscimonit.com/download/index/idArt/889526>

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Background

The quality of nursing care is the focus of research across a wide range of medical specialties, in hospitals and primary care, and also across a range of various diseases. Issues related to nursing care for hospitalized chronic low back pain patients due to spinal disc disease have not previously been specifically examined in Poland.

About 90% of the population has low back pain and cervical pain at some point in time and 30% of these will develop leg pain or arm pain. The most common cause of sciatica or cervico-brachial neuralgia is lumbar or cervical disc prolapse causing nerve root compression. Most patients achieve good pain relief with conservative treatment and less than 20% require surgery. Surgical interventions have been found to restore function, decrease pain, and enhance quality of life in properly selected patients [1–4].

Chronic pain is associated with an array of health problems and nursing care of pain patients in a variety of clinical settings. Patients expect nurses not only to help in maintaining hygiene and meeting biological needs, but also to help eliminate patient pain. Patients emphasize that they expect the following from the nursing team: punctuality, responsibility, kindness, good manners, reliable information on the activities undertaken, mental preparation for surgery, and information about their condition [5]. The results of a study by Wasilewski [6] carried out in part at our Department of Neurosurgery, also indicate the very important psychosocial aspect of social support involved in nurturing the sick. Measures of the support nursing staff provide to patients are very important. Patients experiencing pain and anxiety as well as concern about their future health often lack a sense of security. Psychosocial care includes measures ensuring improvement in the patient's mood, adaptation to a new social group (the patient's relationship with the staff), contact with family and loved ones, and showing interest in the patient's health problems, profession, and family. Respect for an individual's personal dignity is fundamental. A study of patients hospitalized due to lumbar disc herniation also points out the ability to provide for religious and spiritual needs [7].

As stated by Lin [8], there are many issues to be considered when patient satisfaction is used as an outcome variable. Many factors influencing patient satisfaction were revealed in the previous studies. Findik et al. [9] emphasized that the evaluation of the association between the level of satisfaction with nursing care and patients' characteristics is of particular importance since it would provide information useful for assessing the quality of nursing care, problem resolution, and the preparation of nursing care plans. For example, patient socio-demographic characteristics (e.g., sex, age, and marital status),

physical and psychological health, and expectations of care may be reflected in satisfaction results [10,11]. Socioeconomic status, educational level, and income of patients are important factors that also affect satisfaction [10,11]. In addition to these personal characteristics, the hospital ward in which the patient is being treated and the duration of hospitalization are also important factors [14]. The dimensions of nursing care that influence in-patient satisfaction include the provision of clear information, the opportunity for patients to participate in their own plan of care, nurse availability, care that is competent with regards to interpersonal relations, nursing knowledge, and technical skills [15].

Furthermore, Crow et al. [13] identified 61 studies that examined the relationship between patients' socio-economic and demographic characteristics and their reported satisfaction with health care. However, no firm conclusions were drawn about the relationship between reported satisfaction and patient gender. Alasad and Ahmad [16] found that females were more satisfied with care than males, whereas in a study of Findyk et al. [9], male patients were significantly more satisfied with the nursing care than female patients.

Considering other socio-demographic variables, differences were also found in age and education in relation to the level of satisfaction with care. Crow et al. [13] pointed out that older respondents were significantly more satisfied. Thi et al. [17] concluded that patient age is the most consistent characteristic that defines their satisfaction with the nursing care provided.

Some authors have confirmed relationships between patient satisfaction with health services and the health problem for which the patient is being treated, as well as the clinical results of treatment [12,14,18–21]. Other studies [22] have not shown any impact of patient satisfaction survey results on the improvement of healthcare delivery. To date, previous studies have failed to provide a full description of the interrelations between patient satisfaction with nursing and clinical, patient-related data, and are therefore unclear and inconclusive. We believe this issue needs further examination, specifically in regards to patients after surgical treatment for discopathy and degenerative spine disease in the cervical or lumbar spine. Furthermore, the design of the study should include evaluation of detailed patient clinical data, not analyzed in depth in the aforesaid patient samples, such as spine overload and neurological symptoms before treatment, number of discopathy levels, changes of signal intensity in spinal cord in MRI, sagittal dimension of vertebral canal on the discopathy level, Modic classification, smoking, and opioid use.

As researchers recognize, it is impossible to include all variables determining patient satisfaction with nursing in the study. Therefore, the specific objectives of the present cross-sectional

study are: (1) to examine the level of postoperative satisfaction with nursing in patients with cervical or lumbar discopathy, (2) to analyze the differences between postoperative satisfaction with nursing in patients with cervical or lumbar discopathy, and (3) to determine whether selective preoperative and postoperative patient characteristics, as well as socio-demographic factors, affect satisfaction with nursing.

Material and Methods

Study design

The study included 104 consecutive patients who were treated surgically from 1st June 2009 to 31st September 2010 in the Department of Neurosurgery and Neurotraumatology of Poznan University of Medical Sciences, due to disc herniation in the cervical or lumbar spine. The design of this prospective, cross-sectional study was approved by the Bioethics Committee.

Procedure

The inclusion criteria were: low back pain or neck pain lasting preoperatively for more than 3 months; surgical treatment due to lumbar or cervical discopathy and degenerative spine disease; a minimum 12-month follow-up; and age 18–60 years. All patients underwent a magnetic resonance imaging (MRI) Scan. The exclusion criteria were: tumors, metastases, spinal trauma, neurological and psychological disorders resulting in communication difficulties, pregnancy, and previous spine surgery.

The diagnosis of lumbar or cervical disc herniation was based on preoperative symptoms, clinical examination, and detection during MRI examination. The degenerative changes in the lumbar spine were evaluated according to the Modic scale [23]. Conservative treatment was applied first in all cases. All physical examinations and surgical treatment were performed by the same neurosurgeon.

Patients who fulfilled the study criteria received detailed information on the aim of the study. Participants were assured of anonymity and that a refusal to participate in the study would not affect further treatment. Participants signed a consent form before completing the questionnaire.

At the minimum 12-month follow-up, patients were asked to fill in the Polish version of the *Newcastle Satisfaction with Nursing Scale (NSNS-PL)* [24]. A phone-call follow-up was performed by a nurse, DG, the first author of the study. Patients were given detailed information about the study in case they required explanation or clarification and they were assured that the information they provided would remain anonymous and confidential. Then, questionnaires were sent to patients and

returned to the Clinic by mail. The data were collected according to the directions of the NSNS users' manual.

Data collection

Preoperative data (socio-demographic, pain-related, and clinical data) were collected during hospitalization in the neurosurgical ward, and constituted the first part of the study. For the second part of the study, postoperative questionnaires about employment status, satisfaction with treatment outcome, and, in particular, satisfaction with nursing care, were mailed to patients. After surgery, the patients were asked to subjectively assess the result of the surgery, rating their satisfaction with the results of the treatment and if they would undergo the same treatment again if necessary (the possible answers were: definitely yes, rather yes, rather no, and definitely no). Furthermore, they were asked if they had returned to work after treatment (the possible answers were yes and no).

Comorbidities and smoking status were assessed as well. In the group treated for cervical discopathy, comorbidities such as hypertension, diabetes, venous thrombosis, gastric ulcer and hyperthyroidism were reported. In the group treated for lumbar discopathy, comorbidities such as hypertension, diabetes, asthma, hypothyroidism, glaucoma, coronary heart disease and arrhythmia were reported. Patients treated operatively due to lumbar (n=63) or cervical (n=41) discopathy and degenerative spine disease were asked to fill in both the preoperative (first part of the study) and postoperative (second part of the study) assessment packets.

Outcome measure

Newcastle Satisfaction with Nursing Scale. The NSNS, developed by Thomas et al. [15], measures patients' experiences of and satisfaction with nursing. A structured, self-completion questionnaire was developed by asking patients, through individual and focus group interviews, what they perceived was good or poor quality nursing. The major issues that emerged were related to the availability and attentiveness of nurses, the degree of individual treatment offered to patients, and the provision of reassurance and information. Points mentioned less frequently included the professionalism of the nurses, how knowledgeable they were, and the ward organization environment. The scales are incorporated into a self-completion questionnaire, which consists of 3 sections: (1) the *Experiences of Nursing Care Subscale*, (2) the *Satisfaction with Nursing Care Subscale*, and (3) a section providing demographic information [15,25].

Experiences of Nursing Care Subscale (ENCS): a series of 26 statements on aspects of nursing are presented and respondents are asked to indicate how true each is of their own experience,

using a 7-point Likert scale (1 disagree completely, 2 disagree a lot, 3 disagree a little, 4 neither agree nor disagree, 5 agree a little, 6 agree a lot, and 7 agree completely). The sum of the responses across all items is transformed to yield an overall 'experience score', with a potential range of 0–100, where 100 represents the best possible experience.

Satisfaction with Nursing Care Subscale (SNCS): 19 items are scored on a 5-point Likert scale (1 not at all satisfied, 2 barely satisfied, 3 quite satisfied, 4 very satisfied, and 5 completely satisfied). Summed total scores were transformed to yield an overall 'satisfaction score' of 0–100, where 100 denotes complete satisfaction/highest level of satisfaction with all aspects of nursing care [15].

Demographic information section, the final section, elicits information about the patient and details of the hospital stay. This section also includes 2 seven-point response scales about patients' overall evaluation of nursing care during their recent stay in the ward and their evaluation of the hospital stay.

Statistical analysis

Descriptive statistics were used to summarize the demographic and clinical characteristics of the patients. We analyzed means, minimal and maximal values, and standard deviations (SDs). In the quality field, we supplied the number of units for specific categories of a given characteristic and their relative percentage values. To verify the relation between quantitative features or features expressed on ordinal scale, we used Spearman's rank correlation coefficient (Spearman's rho – r_S). The Mann-Whitney test or the Kruskal-Wallis test was used to determine dependency between quantitative and qualitative characteristics. The Mann-Whitney U test was used to compare 2 groups in respect to certain quantitative features or features expressed on the ordinal scale as well.

We used logistic regression analysis to define the degree to which patient characteristics affect NSNS scores in both study samples. The satisfaction with nursing predictors were calculated with a stepwise regression analysis, in which the socio-demographic variables were entered in the first step. Preoperative clinical pain characteristics were entered in the second step, whereas postoperative clinical pain characteristics, conviction about the same treatment, and possibility to return to work were entered in the third step. Based on the lower and upper quartile distribution, the results of the NSNS were split into 2 categories: a "very good result" (from 75 to 100 points) and "lack of a very good result" (from 30.26 to 74.99 points). The critical *p* value was set at 0.05. Test results with a greater value than this were deemed to be statistically irrelevant. Statistical analysis was carried out using the Statistica program.

Results

Nineteen patients with lumbar discopathy failed to return the post-operative questionnaires. We assessed the clinical and demographic differences between the patients who completed the postoperative assessment packet and those who did not. This analysis revealed that the differences between the 2 sample groups with lumbar discopathy are significant in regards to weight only ($p=0.015$). There are no significant differences in regards to height, age, gender, back pain duration, Modic classification, number of discopathy level, and neurological symptoms. All patients treated due to cervical discopathy filled out the post-operative assessment packet.

Patients treated for cervical discopathy and degenerative spine disease

Of the patients treated for cervical discopathy, 48.8% were female (20 patients) and 51.2% (21 participants) were male. The average age was 49.5 years (SD 8.6), range 30–67. The average duration of preoperative pain in the cervical spinal region was 46.4 months (SD 66.9), range 3–360. At the follow-up, patients were available at a mean of 22.2 months (SD 4.0) after surgery (range 15–28 months); 43.9% of patients returned to work after treatment and 93% of patients would undergo the same treatment again if necessary. For detailed socio-demographic and clinical characteristic of both study groups, see Tables 1 and 2.

Patients treated for lumbar discopathy and degenerative spine disease

Females made up 34.1% of study participants (15 patients) and males constituted 65.9% (29 participants). The average age was 42.83 years (SD 11.4), range 23–62. The average duration of preoperative pain in the lumbo-sacral spinal region was 35.7 months (SD 43.7), range 3–180. At follow-up, patients were available at a mean of 23 months (SD 2.47) after surgery (range 16–27 months); 54.5% of patients returned to work after treatment and 80% would undergo the same treatment again if necessary.

Patients with cervical and lumbar discopathy differed in regards to age ($p=0.013$), length of hospital stay ($p=0.036$), number of discopathy levels ($p=0.029$), and return to work after surgical treatment ($p=0.030$) only.

Descriptive statistics of the NSNS

Table 3 presents the score distribution of the NSNS in both analyzed subgroups. In the group of patients with cervical discopathy, the average ENCS score was 82.0 (SD 15.1) and the average SNCS score was 75.6 (SD 18.1). The patient evaluation of

Table 1. Socio-demographic characteristics of study participants.

Characteristics	Mean (SD), range*/ No. (%)**	
	Patients with lumbar discopathy	Patients with cervical discopathy
Gender (M/F)	29 (65.9)/15 (34.1)	21 (51.2)/20 (48.8)
Age	42.83 (11.37), 23–62	49.54 (8.64), 30–67
Employment status		
Employed: full/part time	28 (63.6)	16 (19.0)
Retired	1 (2.3)	4 (9.8)
Receiving a disability pension	10 (22.8)	18 (43.9)
Unemployed	5 (11.4)	3 (7.3)
Marital status		
Single	7 (15.9)	3 (7.3)
Married	31 (70.5)	31 (75.6)
Divorced	4 (9.1)	3 (7.3)
Widowed	2 (4.55)	4 (9.8)
Educational level		
Elementary	3 (6.8)	2 (4.88)
Vocational	15 (34.1)	13 (31.7)
Secondary	15 (34.1)	21 (51.2)
University	11 (25)	5 (12.2)
Place of residence		
Country	14 (31.8)	12 (29.3)
City below 25, 000 inhabitants	13 (29.5)	11 (26.8)
City between 25,000 and 200, 000 inhabitants	7 (15.9)	3 (7.3)
City over 200,000 inhabitants	10 (22.7)	15 (36.6)

* For continuous data; ** for categorical data; Males (M), Females (F).

nursing average was 5.9 (SD 0.8) and the average evaluation of their hospital stay was 5.7 (SD 1.0). In patients with lumbar discopathy, the average ENCS score was 79.0 (SD 13.5) and the average SNCS score was 74.4 (SD 16.8). The average of patient evaluations of nursing was 5.8 (SD 0.5) and the average evaluation of their hospital stay was 5.7 (SD 0.6).

The 2 study groups did not differ in regards to NSNS subscales, patients' overall evaluations of nursing care during their recent stay in the ward, and evaluations of hospital stay (for details, see Table 3).

Correlations between NSNS and patient characteristics in patients with cervical discopathy

When we examined the relationships between patient characteristics and patient satisfaction (ENCS and SNCS scores), we found that the ENCS and SNCS scores showed a correlation with age of patients ($r_S=0.31, p=0.045$ and $r_S=0.33, p=0.034$, respectively). Furthermore, the ENCS score was related to opioid use ($p=0.019$). Patients using opioids scored higher in the Experiences Subscale. The ENCS score was associated with changes of signal intensity in the spinal cord in

Table 2. Clinical characteristics of patients.

Characteristics	Mean (SD), Range*/ No. (%)**	
	Patients with lumbar discopathy	Patients with cervical discopathy
Pain duration before treatment (months)	35.7 (43.7), 3–180	46.4 (66.9), 3–360
Height	173.8 (9.1), 150–189	168.7 (8.9), 150–185
Weight	82.1 (13.6), 55–118	74.0 (15.7), 40–104
BMI	27.1 (3.4), 20.7–34.1	25.8 (4.5), 17.8–38.2
Spine overload before treatment	20 (45.5)	13 (31.7)
Symptoms before treatment		
Lumbalgia	6 (13.6)	---
Ischialgia	17 (41.46)	---
Motor and sensory abnormalities	3 (6.8)	---
Ischialgia and motor and sensory abnormalities	13 (31.7)	---
Local cervical (neck) pain	---	5 (12.2)
Cervicobrachialgia	---	17 (41.5)
Myelopathy	---	6 (14.6)
Cervicobrachialgia and myelopathy	---	13 (31.7)
Number of discopathy levels		
1 level	25 (56.8)	13 (31.7)
2 or more levels	19 (43.2)	28 (68.3)
Changes of signal intensity in spinal cord in MRI	---	10 (24.4)
Sagittal dimension of vertebral canal on the discopathy level		
>9 mm	---	18 (43.9)
≤9 mm	---	23 (56.1)
Modic classification		
Type 1	17 (38.6)	---
Type 2	3 (6.8)	---
Type 3	24 (54.5)	---
Smoking	20 (45.5)	26 (63.4)
Physical therapy	28 (63.6)	24 (58.5)
Opioid application	14 (31.8)	7 (17.1)
Returned to work after treatment	24 (54.5)	18 (43.9)
Result of surgery performed by patient:		
Satisfaction with treatment outcome		
Definitely yes	21 (47.7)	19 (46.3)
Rather yes	12 (27.3)	20 (48.8)
Rather no	8 (18.2)	1 (2.4)
Definitely no	3 (6.8)	1 (2.4)
Would undergo the same treatment again if needed		
Definitely yes	21 (47.7)	20 (48.8)
Rather yes	14 (31.8)	18 (44.0)
Rather no	7 (15.9)	3 (7.3)
Definitely no	2 (4.5)	0 (0)
Length of hospital stay (days)	14.1 (4.48), 7–26	11.1 (5.6), 5–35

* For continuous data; ** for categorical data.

Table 3. Descriptive statistics of Newcastle Satisfaction with Nursing Scale in patients with cervical and lumbar discopathy.

NSNS subscales	Patients with cervical discopathy		Patients with lumbar discopathy		p value
	Mean (SD)	Range (Min–Max)	Mean (SD)	Range (Min–Max)	
ENCS	82.0 (15.1)	44.2–100.0	79.0 (13.5)	47.4–99.4	$p=.230$
SNCS	75.6 (18.1)	36.8–100.0	74.4 (16.8)	30.3–100.0	$p=.625$
Patient's overall evaluation of nursing care	5.9 (0.8)	4.0–7.0	5.8 (0.5)	5.0–7.0	$p=.613$
Evaluation of hospital stay	5.7 (1.0)	3.0–7.0	5.7 (0.6)	4.0–7.0	$p=.667$

Newcastle Satisfaction with Nursing Scale (NSNS), Experiences of Nursing Care Subscale (ENCS), Satisfaction with Nursing Care Subscale (SNCS).

MRI ($p=0.002$) as well. Patients whose MRI examination indicated changes of signal intensity in the spinal cord scored higher in the Experiences Subscale.

The satisfaction with treatment outcome was associated with ENCS and SNCS scores ($rS=-.34$, $p=0.032$ and $rS=-0.42$, $p=0.006$, respectively). Similarly, conviction about undergoing the same treatment again was related to the ENCS and SNCS scores ($rS=-0.36$, $p=0.022$ and $rS=-0.44$, $p=0.004$, respectively). Satisfaction with treatment outcome was associated with patient's overall evaluation of nursing care and evaluation of hospital stay ($rS=-0.39$, $p=0.013$ and $rS=-0.51$, $p=0.001$). Similarly, conviction about undergoing the same treatment again was associated with the patient's overall evaluation of nursing care and evaluation of hospital stay ($rS=-0.39$, $p=0.012$ and $rS=-0.49$, $p=0.001$, respectively) (Table 4).

Strong associations between the ENCS and SNCS scores were confirmed in this group of patients ($rS=0.73$, $p<0.001$) and patient overall evaluation of nursing was strongly associated with ENCS and SNCS scores ($rS=0.62$, $p<0.001$ and $rS=0.80$, $p<0.001$, respectively). Evaluation of hospital stay correlated to both ENCS and SNCS scores ($rS=0.65$, $p<0.001$ and $rS=0.73$, $p<0.001$, respectively) and patient overall evaluation of nursing ($rS=0.64$, $p<0.001$) (Table 4).

Correlations between NSNS and patient characteristics in patients with lumbar discopathy

A relation between the ENCS score and smoking emerged ($p=0.046$) (patients addicted to smoking scored higher in the ENCS Subscale). Patient's overall evaluation of nursing care was associated with gender ($p=0.030$) (women tended to be more satisfied with nursing care) and opioid use ($p=0.050$) (patients using opioids tended to be less satisfied with nursing care). Furthermore, patients' evaluation of their hospital stay correlated with the duration of pain symptoms before surgery ($rS=-0.38$, $p=0.012$) and spine overload before treatment

($p=0.023$) (patients who reported spine overload gave a lower evaluation of hospital stay).

Evaluation of hospital stay was associated with satisfaction with treatment outcome and conviction about undergoing the same treatment again ($rS=-0.53$, $p<0.001$ and $rS=-0.37$, $p=0.013$, respectively). Patient overall evaluation of nursing correlated to ENCS, SNCS, and evaluation of hospital stay scores ($rS=0.37$, $p<0.012$; $rS=0.49$; $p=0.001$; and $rS=0.77$, $p<0.001$, respectively). Evaluation of hospital stay correlated with ENCS and SNCS scores ($rS=0.30$, $p=0.045$ and $rS=0.32$, $p=0.033$, respectively). As in the cervical group, strong associations between ENCS and SNCS scores were confirmed in patients with lumbar discopathy ($rS=0.73$, $p<0.001$) (Table 4).

The logistic regression analysis

The logistic regression model derived from the first step of calculations revealed that in the group with cervical discopathy, only age had a statistically significant ($p=0.012$) influence on the probability of achieving a "good result" in the SNCS. An increase of 1 year in age increased the probability of a "good result" by 14%. In the group of patients with lumbar discopathy, only educational level had a statistically significant ($p=0.038$) influence on the probability of achieving a "good result" in the SNCS. An increase of 1 category of educational level decreased the probability of a "good result" by 60%. The logistic regression model for the third step of calculations revealed that conviction about undergoing the same treatment again has a statistically significant ($p=0.012$) influence on the probability of achieving a "good result" in the group with cervical discopathy in regards to the ENCS. An increase of 1 category within this variable increased the probability of a "good result" 4-fold. Similarly, conviction about undergoing the same treatment again has a statistically significant ($p=0.014$) influence on the probability of achieving a "good result" in the SNCS. An increase of 1 category within this variable increased the probability of a "good result" over 5-fold.

Table 4. Associations between Newcastle Satisfaction with Nursing Scale subscales and postoperative data in patients with cervical and lumbar discopathy.

	ENCS	SNCS	Patient's overall evaluation of nursing care	Evaluation of hospital stay
Patients with cervical discopathy				
Postoperative data				
Satisfaction with treatment outcome	rS=-.34 p=.032*	rS=-.42 p=.006*	rS=-.387 p=.013*	rS=-.513 p=.001*
Undergoing the same treatment	rS=-.36 p=.022*	rS=-.44 p=.004*	rS=-.389 p=.012*	rS=-.486 p=.001*
Length of hospital stay (days)	rS=.07 p=.688	rS=.01 p=.929	rS=.02 p=.914	rS=.01 p=.988
NSNS subscales				
ENCS	---	---	---	---
SNCS	rS =.73 p=.001	---	---	---
Patient's overall evaluation of nursing care	rS=.62 p<.001*	rS =.80 p<.001*	---	---
Evaluation of hospital stay	rS =.65 p<.001*	rS =.73 p<.001*	rS=.64 p<.001	---
Patients with lumbar discopathy				
Postoperative data				
Satisfaction with treatment outcome	rS=-.09 p=.960	rS=-.06 p=.683	rS=-.002 p=.987	rS=-.529 p<.001*
Undergoing the same treatment	rS=-.10 p=.526	rS=-.01 p=.935	rS=-.264 p=.084	rS=-.371 p=.013*
Length of hospital stay (days)	rS= -.02 p=.914	rS=.01 p=.988	rS=-.002 p=.987	rS=.098 p=.528
NSNS subscales				
ENCS	---	---	---	---
SNCS	rS =.73 p=.001	---	---	---
Patient's overall evaluation of nursing care	rS =.37 p=.012*	rS =.49 p=.001*	---	---
Evaluation of hospital stay	rS =.30 p=.045*	rS =.32 p=.033*	rS=.77 p<.001	---

Newcastle Satisfaction with Nursing Scale (NSNS), Experiences of Nursing Care Subscale (ENCS), Satisfaction with Nursing Care Subscale (SNCS) * p<.05.

Discussion

Patient satisfaction is a multidimensional construct, the level of which is influenced by patient and health care variables [12]. The objective of nursing care for Polish patients with discopathy and osteoarthritis of the spine, investigated in the present study, is to assist in the implementing the set treatment program, as well as to facilitate a patient's progress toward return to everyday life. Pre-operative nursing care is primarily focused on decreasing pain, neurological assessment, and ensuring adherence to a proper diet. A nurse's duties include providing the patient with information on how to prepare for surgery, postoperative care, and reassuring the patient. The first problems that occur after surgery are related

to the patient's physical reaction to general anesthesia; care at this stage is centered on alleviating the symptoms. In the immediate postoperative period, it is necessary to monitor vital signs and observe the surgical wound. Attention should be paid to the patient's neurological condition and include an assessment of pain intensity, active range of limb motion, and sensory and bladder function. The nurse participates in physiotherapy aimed at the prevention of thromboembolic and respiratory complications, and conducts physiotherapy to help the patient regain mobility. Nursing care also provides basic information on treatment following the patient's release from the hospital. Any patient anxiety associated with the near future can be decreased through discussion with the nurse, who can also provide guidance on lifestyle, continuation of medical

treatment, and physiotherapy. The nurse can help the patient and supply information on the musculoskeletal system to support the patient's physiotherapy program, especially in cases of chronic pain and neurological damage. This is particularly important information to help the patient maintain normal body weight and in the treatment of chronic diseases [25–28].

The objectives of nursing care for patients with discopathy in the cervical and lumbar spine are similar. Some aspects that are different and specific to the cervical or lumbar spine concern neurological symptoms resulting from pressure on the spinal cord, nerve roots caused by a herniated disc bulging into the spinal canal, and the presence of degenerative changes, and these need to be taken into account. The differences relate to patient positioning and immobilization of the spine in the immediate postoperative period, action undertaken leading to the mobilization of patient, and information procedures regarding the release of patients from hospital.

Considering the level of patient satisfaction with nursing care in general, Findik et al. [9] showed that the patients were satisfied, in general, with the nursing care they received; the ENCS and SNCS scores were as high as 81.5 and 81.6, respectively. Tengilimoglu et al. [29] found that 81% of the patients they studied evaluated the caring ability and experience of the nurses as excellent. Rönnerberg et al. [30] demonstrated that patients undergoing lumbar disc herniation surgery were mostly satisfied with the care provided before and after surgery. The aforementioned results comply with the results of the present research, in which patients with cervical discopathy scored 82.0 and 75.6 in regards to experiences and satisfaction with nursing, respectively. The corresponding values were as high as 79.0 and 74.4 in patients treated due to lumbar discopathy, respectively. In addition, discrepancies between lumbar or cervical spinal region in regards to patient experiences, satisfaction, and overall evaluation of hospital stay were investigated in the current study, but the indicated differences were statistically insignificant. However, we confirmed that the analyzed patient groups differ in regards to associations between the ENCS and SNCS scores, and satisfaction with treatment outcome or conviction about undergoing the same treatment again, and these were confirmed in the cervical group only. Furthermore, evaluation of hospital stay was associated with satisfaction with treatment outcome and conviction about undergoing the same treatment again, as well as experiences and satisfaction with nursing care, in both analyzed patient subgroups.

Considering socio-demographic variables, in the present study associations between gender and patients' overall evaluation of nursing care were confirmed, as in the study by Alasad and Ahmad [16]. We found that women tend to be more satisfied with nursing care than men. However, this correlation was confirmed in the group of patients with lumbar discopathy only.

According to Crow et al. [13], the effect of level of education on satisfaction was considered by 31 investigators. Education was not found to have a significant influence on satisfaction in 15 studies. A higher level of education was associated with significantly less satisfaction in 11 studies and significantly more satisfaction in 5 other studies. Interestingly, our study supported associations between age of patients and educational level, and satisfaction with nursing. Older patients with cervical discopathy and patients with a higher educational level treated due to lumbar discopathy were more satisfied with nursing care.

Patient satisfaction also depends on the health problem for which the patient is being treated and the duration of hospitalization [14,21]. Crow et al. [13] found that the level of satisfaction decreased in patients with chronic health problems, whereas Tokunaga and Imanaka [31] showed that the level of satisfaction increased with prolonged hospitalization. Interestingly, our study shows that duration of pain symptoms before surgery and reporting spine overload before surgery decreased evaluation of hospital stay in patients treated due to lumbar discopathy, indicating the significance of medical history and state of patient confirmed in radiological examination for patient satisfaction with nursing care.

The present study supported findings that in patients with MRI of the cervical spine showing changes in signal intensity in the spinal cord as an ischemic spinal cord injury (10 patients) and greater compression of spine due to a spinal stenosis, measurements of spinal canal carried out in the sagittal line (23 cases of patients) were significantly higher in patients with higher estimation of the experiences of nursing care. This is a group of patients with neurological deficits. We believe that co-existing neurological symptoms resulted in higher scores of experience with nursing care.

Furthermore, our study also showed that patients with pre-operative cervical disc herniation who had been taking pain killers acting on the opioid receptors, reported significantly higher satisfaction with nursing care. Pain relief was achieved in all patients after surgery, resulting in no further need for opioids. So far, no attempt has been made use these data to evaluate the clinical experience of nursing care, even though the number of patients receiving large doses of opioids presenting for surgery is increasing as opioids gain a wider utilization in the treatment of chronic pain [32]. A few studies have examined the effect of mental health on physical satisfaction with nursing care. Interestingly, a study by Crow et al. [13] showed that the level of satisfaction with nursing care decreased with the advancement of chronic health problems in patients.

Additionally, we found that nicotine-addicted patients treated surgically for lumbar disc herniation assessed the experience of nursing care higher than non-smokers. The established

deleterious effects of cigarette smoking on the musculoskeletal system include: contributing to osteoporosis, impairment of wound and fracture healing, and non-union in spinal fusions [33]. Smoking has been implicated in low back pain and intervertebral disc degeneration [34]. The nicotine in cigarette smoke has a severe vasoconstrictive effect on the microvasculature. A number of studies have shown that smoking has a negative influence on outcome in the surgical treatment of lumbar disc surgery [35]. Until now, the aforesaid studies were not conducted in terms of patient satisfaction with nursing care, which justifies our research project, providing a detailed description of the interrelations between patient satisfaction with nursing and clinical, patient-related variables in the course of surgical treatment due cervical or lumbar discopathy and degenerative spine disease.

Considering the practical implications, in order to assess satisfaction with nursing care in different groups of patients, the use of a single measurement as provided by the application of Newcastle Scale seems to be helpful as a way to facilitate cooperation between the staff of different wards, enabling the identification and implementation of strategies to improve health care services provided by nurses.

Study limitations

Socio-demographic, clinical, and radiological characteristics of patients and their satisfaction with nursing care were evaluated in the present study; however, other characteristics affecting satisfaction (eg, nursing competence and clinical experience, patient psychological state, or level of experienced spinal pain) were not investigated. This makes it difficult to understand the effects of patient characteristics on satisfaction with nursing care and, therefore, might limit the generalizability of the study findings to the investigated features only. Another limitation of the present study was that patients filled out the NSNS on one occasion only (after surgery), which makes it difficult to determine whether postoperative satisfaction with nursing is associated with preoperative experiences and patients' psychological state. Therefore, this issue warrants further research.

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Future research implications

Considering future research implications, a detailed evaluation of each individual item of both the ENCS and the SNCS subscales would enable us to state hypotheses on which elements of nursing care should be corrected and improved in the investigated patient groups [36]. A detailed analysis of each individual question, especially those with the lowest scores, should be carried out in order to make appropriate changes and to improve nursing care. In addition, an analysis of the highest scores in regards to individual items would serve to indicate the nursing interventions that are evaluated the highest by the patient and which should be preserved and possibly enhanced.

Conclusions

Our study highlights the importance of assessing the association between patient characteristics and perception of quality of nursing care. It demonstrated that patients' assessment of experience and satisfaction with nursing care was high in groups with cervical or lumbar discopathy, and that there was no significant difference between the patient groups in regards to satisfaction, experiences of nursing, and evaluation of hospital stay. Socio-demographic, medical history-related, and clinical data determined patient satisfaction with nursing. Furthermore, evaluation of hospital stay was associated with satisfaction with treatment outcome, conviction about undergoing the same treatment again, and experiences and satisfaction with nursing care in both analyzed patients subgroups. However, satisfaction with treatment outcome and conviction about undergoing the same treatment again affected experiences and satisfaction with nursing in the cervical group only.

Conflict of interests

The authors declare they have no competing interests.

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