Analysis of sociodemographic and clinical factors determining experience and satisfaction with nursing care among cardiosurgical unit patients

Analiza czynników socjodemograficznych i klinicznych determinujących doświadczenia i satysfakcję z opieki pielęgniarskiej pacjentów oddziału kardiochirurgicznego

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Słowa kluczowe: opieka pielęgniarska, pacjent, satysfakcja pacjenta, zabiegi chirurgiczne układu krążenia.

Abstract

Introduction: Patient satisfaction with nursing care has become a key determinant of the quality of hospital care.
Aim of the research: To establish the level of patient experience and satisfaction with nursing care as well as their determinants in the cardiosurgical unit.
Material and methods: One hundred cardiosurgical patients were examined. The tools included the Newcastle Satisfaction with Nursing Scale (NSNS), the Numerical Rating Scale (NRS), and a self-written questionnaire.
Results: The average score for satisfaction with nursing care was 77.99 ±20.20 pts, whereas the average nursing care experience amounted to 77.29 ±15.10 pts. Pain being the most significant independent predicator of the two. Each point on the pain scale decreased satisfaction by approximately 2.384 pts (95% CI: –3.997; –0.772, $p = 0.005$), while experience by 1.168 pts (95% CI: –2.06; –0.276, $p = 0.012$). The higher the level of patients' satisfaction with pain management and its relief, the higher the level of their evaluation of experience ($r_s = 0.239$, $p = 0.017$) and satisfaction ($r_s = 0.261$, $p = 0.009$) with nursing care. The patients who were informed by the nurse on how to avoid pain, graded nursing care experience higher than those who were not informed ($p = 0.001$).
Conclusions: The cardiosurgical patients showed high levels of satisfaction and experience with nursing care. Pain was the main determinant of satisfaction and experience with care and 'soft skills' such as informing about pain-relieving methods, showing interest and sympathy, and assisting patients in repositioning appeared to be the crucial factors.

Streszczenie

Wprowadzenie: Satysfakcja pacjenta z opieki pielęgniarskiej stała się kluczową determinantą jakości opieki szpitalnej.
Cel pracy: Ustalenie poziomu doświadczeń i satysfakcji z opieki pielęgniarskiej pacjentów oddziału kardiochirurgii oraz ich determinantów.
Materiał i metody: Zbadano 100 pacjentów oddziału kardiochirurgicznego. Zastosowano *Skalę zadowolenia z pielęgnacji Newcastle* (NSNS), *Skalę numeryczną* (NRS) oraz ankietę własną.
Wyniki: Średnia wartość dla satysfakcji z opieki pielęgniarskiej wyniosła 77,99 ±20,20 pkt, a średnia wartość doświadczeń z opieki pielęgniarskiej – 77,29 ±15,10 pkt, a ich istotnym niezależnym predyktorem był poziom bólu. Każdy punkt na skali bólu obniżał satysfakcję z opieki pielęgniarskiej średnio o 2,384 pkt (95% CI: –3,997; –0,772, $p = 0.005$) i doświadczenia z opieki pielęgniarskiej średnio o 1,168 pkt (95% CI: –2.06; –0.276, $p = 0.012$). Im wyższy był poziom zadowolenia pacjenta z efektu uśmierzania bólu, tym wyższy był poziom jego doświadczeń z opieki pielęgniarskiej ($r_s = 0,239$, $p = 0,017$) i wyższy poziom satysfakcji z opieki ($r_s = 0,261$, $p = 0,009$). Badani, którzy byli informowani przez pielęgniarkę, jak unikać bólu, wyżej ocenili doświadczenia z opieki pielęgniarskiej w porównaniu z pacjentami, którzy nie byli o tym informowani ($p = 0,001$).
Wnioski: Pacjenci oddziału kardiochirurgicznego wykazywali wysoki poziom satysfakcji i doświadczeń z opieki pielęgniarskiej. Ból istotnie determinował poziomy satysfakcji i doświadczeń z opieki, a czynnościami o kluczowym znaczeniu dla oceny opieki były kompetencje miękkie, takie jak informowanie chorego o sposobach unikania bólu, okazanie pacjentowi zrozumienia i zainteresowania oraz udzielenie pomocy pacjentowi w zmianie pozycji.

Introduction

According to World Health Organization (WHO) 2019 data, cardiovascular diseases are the leading cause of death globally, taking an estimated 17.9 million lives each year [1]. The National Public Health Institute in Poland reported 395,000 deaths in 2020, of which 45% were caused by cardiovascular diseases [2]. However, it is worth highlighting that due to rapid interventional cardiology development in the late 20th century and expansion of new haemodynamic departments within the last few years, the death rate caused by heart infarct has been significantly reduced. Bearing in mind the demographic aging of European societies, we can expect an increased demand for cardiosurgical interventions due to acquired heart defects in the coming years. It is estimated to exceed 25,600 surgeries by 2029 [3].

One of the most commonly performed cardiosurgical procedures in Poland is coronary artery bypass grafting (CABG). This is a surgical procedure whereby arteries to the heart are replaced by blood vessels from another part of the body [4]. From 2006 to 2019 in Poland 188,972 patients undergoing CABG surgery were identified [5]. According to Eurostat, in the EU Member States there were 159,907 heart bypass operations in 2019. The highest procedure rates were in Belgium (59.6 per 100,000 inhabitants), Croatia (57.5 per 100,000 inhabitants), Lithuania (56.6 per 100,000 inhabitants), Cyprus (54.7 per 100,000 inhabitants), and Germany (54.6 per 100,000 inhabitants). Similarly, in Poland the frequency of CABG was 46.3 per 100,000. Depending on the type of procedure and the severity of the disorder, cardiovascular patients tend to spend a relatively lengthy period in hospital. In 2019 the average length of hospital stays for in-patients treated for a disease of the circulatory system ranged from 4.2 days in Bulgaria up to 12.7 days in Hungary (in Poland the average was 6.6 days) [4]. Therefore, the level of patients' satisfaction with nursing care appears to be an essential aspect of hospitalization.

Satisfaction with nursing care is a prioritized indicator of the patient's content within the range of general care received in hospital. It is also the main component of health maintenance and rehabilitation [6]. During hospitalization, nursing care consumes most of the time, and therefore it creates opportunities for intensive patient-nurse contacts. To a considerable degree, it is the nurse who affects the patient's coping with a disease, getting through both the diagnosis and treatment and, finally, preparing for self-care at home [7, 8]. Consequently, patient satisfaction with nursing care has become a key determinant of the quality of hospital care [6]. The level of patient satisfaction with nursing services is an important indicator of health care, quality of life, mortality, and medical care costs. Thus, increased attention from professionals and decision-makers has recently been noticed in the field [9]. The evaluation of patients' satisfaction with nursing care together with simultaneous health care result monitoring might be effective in improving nursing care quality and establishing care standards [10]. That is why patient satisfaction should be measured constantly using valid, reliable assessment instruments to assess care quality.

A great number of definitions on 'patient satisfaction' can be found in the publications. Patient satisfaction has been defined as the patient's judgment on the quality and goodness of care [11]. It refers to the extent to which the patients perceive that their needs and expectations are met by the services provided [12]. In turn, patient satisfaction with nursing care has been defined as the perception by patients about the care received from nursing staff during their hospitalization [8]. Former studies report that the level of a patient's satisfaction with nursing care might be determined by many characteristics of the patient, such as gender, age, education, reported health status, and ethnicity as much as by duration of hospitalization, number of hospitalizations, faith and gratitude or perceptions of what constitutes a "good" healthcare professional, respect for patient preferences, involvement of family and friends, continuity of care, and physical comfort. The hospitalized frequently point out nurses' thoughtfulness, affection, caregiving, sympathy, and kindness as features that positively affect a patient's satisfaction but also decrease their fear and anxiety, especially among surgical patients. Other determinants of patient's satisfaction include personalized therapy, emotional intelligence skills of nurses, empathy, emotional support, need fulfilment, interpersonal communication, and unerring recognition of the patient's mood [12–14]. For example, Celik found a positive relationship between the satisfaction scores and emphatic concern, utilization of emotions, and emotional awareness subheadings of the patients [14].

Cardiosurgical wards belong to highly specialized units where procedures require the following of indispensable standards in order to provide patients with safety and proper quality of services [6]. The identification of variables that affect nursing care quality, establishing priority aspects, and the areas that require changes seem to be especially important in achieving high patient satisfaction [10]. A dissatisfied patient will no longer cooperate in the scope of treatment as well as cease it prematurely, seeking help elsewhere. It may result in losing a patient and covering high costs [7]. Therefore, it is important to carry out an extensive exploration of post-cardiosurgical patients' satisfaction with nursing care. This research is trying to bridge that gap.

Aim of the research

The study aimed to establish the level of patient experience and satisfaction with nursing care at the cardiosurgical unit, and the determinants that affect

them. It primarily focused on finding correlations between experience or satisfaction and (1) sociodemographic factors, (2) hospitalization and patient health condition factors, and (3) nurses' activity in the field of pain management.

Material and methods

Study design

The observational research was carried out among Cardiosurgical Unit patients at No. 4 Military Clinical Hospital in Wroclaw, where purposeful sampling was applied. The research was approved by the Bioethics Committee at the Public Higher Medical School in Opole (No. 101/PI/2018).

Participants

The invitation for the study was accepted by 112 patients who were hospitalized within the indicated period at the cardiosurgical unit and met the inclusion criteria, which included adulthood, patient's consent for the participation, spoken and written Polish, stay at the unit for at least 2 days, and maintaining logical communication. The individuals who did not meet the criteria were excluded from the study.

The research was conducted following the Helsinki Declaration and *Good Clinical Practice*. The co-author of the paper, employed at the unit, carried out the questioning personally. The respondents who underwent a surgical intervention were given the questionnaires one day before or on the day of discharge or transfer to another hospital unit. The documents were delivered in a white A4 envelope. After receiving the questionnaires and instructions on how to fill them out, the patients were also orally coached. In case of any doubts, they were allowed to ask for the examiner's help.

Variables

In order to conduct the analysis, the following variables were identified: (a) variables concerning satisfaction with nursing care in the cardiosurgical unit: nursing care experience and satisfaction; (b) sociodemographic variables: age, gender, education, place of residence, marital status, work status; (c) variables concerning hospitalization and patient's condition: past hospitalization experience, coexistence of chronic diseases, self-assessment of health condition, length of stay, having an assigned nurse; and (d) variables connected with nurses' activity regarding pain relief: self-assessment of the level of pain, nurses' reaction to reporting pain, level of satisfaction with pain management, and education and preparation for self-care.

Data sources/measurement

The research made use of a diagnostic survey with a direct questioning technique. The research tools included 2 standardized tests and a self-written questionnaire.

The Newcastle Satisfaction with Nursing Scale

The Newcastle Satisfaction with Nursing Scale (NSNS) was developed by Thomas *et al.* in 1969 [15]. Subsequently, Gutysz-Wojnicka and Dyk adapted it to Polish standards [16]. The Anaesthesiology and Intensive Care Nursing Unit at the Faculty of Health Sciences in the Poznan University of Medical Science approved the application of NSNS. The test consists of 3 parts. The first refers to nursing care experience and comprises 26 statements, of which 15 are positive and 11 negative. While grading the statements, the respondents used a 7-degree Likert scale ranging from 'I totally disagree' to 'I absolutely agree'. They could score a total of 0 to 100 pts (0 – the worst conceivable experience, 100 – a very good experience). The second part contains opinions on nursing care. The patients specified their subjective level of satisfaction regarding 19 aspects of nursing care using a 5-degree Likert scale, from 'totally satisfied' to 'completely dissatisfied'. The total score in this part ranges from 0 to 100 pts (0 – no satisfaction, 100 – satisfaction with all aspects of care). The third part refers to sociodemographic data such as age, gender, education, and length of hospitalization. The scale also contains 2 separately analysed questions. The respondents graded nursing care in the unit on a 7-degree scale (horrible, very bad, bad, satisfactory, good, very good, excellent). The latter referred to the overall assessment of the stay in the unit and was graded accordingly. Internal cohesion of the Polish version of the scale was evaluated with the use of the u-Cronbach coefficient. It amounted to 0.91 for experience and 0.96 for satisfaction [7].

Numerical Rating Scale (NRS)

To access the level of pain, an 11-degree numerical scale was applied (0–10) in which 0 refers to no pain and 10 to unbearable pain. The tool helps patients assign a specific number to the pain they experience. The scale is characterised by repeatability of outcomes. It is easy to use and may be applied orally, on the phone, or in written form. Its drawbacks include its limitation to intensity, but it may be used to access severe and chronic pain [17].

Self-written questionnaire

The self-written questionnaire contains 16 questions in 3 different areas such as sociodemographic features not included in NSNS (place of residence, work status, marital status), selected clinical variables and nursing activities related to pain management, education, and preparation for self-care after a surgery.

Statistical analysis

The comparison of quantitative variables for both groups was made with the Mann-Whitney test and for 3 and more groups of variables with the Kruskal-Wallis test. After statistically essential differences had been discovered, the post-hoc analysis was performed with Dunn's test to identify statistically different groups. The correlations between quantitative variables were analysed with Spearman's correlation coefficient, and the multifactorial analysis of impact of many variables on one quantitative variable with the linear regression method. The results were presented in the form of model regression parameter values with 95% confidence interval. The level of statistical significance was assumed at $p < 0.05$, and the analysis was made using R software (version 4.0.5). The correlations between quantitative variables were analysed with the use of Spearman's rank correlation coefficient. To interpret the strength of correlation the following criteria were adopted: $0 < r < 0.1$ – faint correlation, $0.1 \leq r < 0.3$ – weak correlation, $0.3 \leq r < 0.5$ – average correlation, $0.5 \leq r < 0.7$ – high correlation, $0.7 \leq r < 0.9$ – very high correlation, $0.9 \leq r < 1$ – almost complete correlation, $r = 1$ – complete correlation [18].

Results

Initially, 112 patients participated in the study; however, 7 of them resigned at the point of completion of the questionnaires and 5 questionnaires did not comply to the analysis because they were not fully completed. Finally, the analysis was performed on the basis of the results received from 100 patients (33 (33%) females and 67 (67%) males).

Descriptive data

The average respondents' mean age was 60.44 ±14.36 years. The youngest patient was 23 years old, and the oldest was 84. A majority of them were married or in an informal relationship (n = 75; 75%) and resided in cities (n = 75; 75%). The examinees with secondary education amounted to 37 (37%) and higher education to 32 (32%). Half of the group were retired people (n = 50; 50%), and the rest were professionally active (n = 41; 41%), pensioners, or unemployed. Most of the patients were admitted on schedule (n = 64; 64%) while 36 (36%) as a matter of urgency. They mostly evaluated their own condition as good (n = 44; 44%) or average (n = 40; 40%), 10 of them as very good (10%), 5 as bad (5%), and 1 as very bad (1%). The patients stayed in hospital for 6.13 ±2.57 days on average. The shortest stay was 2 days and the longest was 23 days. The largest group (26 respondents, 26%) spent 6 days in the ward, and only 1 (1%) person spent 2 days on the ward. The procedures performed on them varied as follows: 55 patients underwent coronary bypass grafting (CABG), 29 – aortic valvuloplasty, 14 – ascending aorta aneurysm extraction, 10 – mitral valvuloplasty, and 1 received a different procedure. The average pain evaluation after surgery was estimated at 5.27 ±2.63 pts. When asked about pain relief effects, 63% of the patients were satisfied (n = 63), 36% were quite satisfied (n = 36), and 1 was quite dissatisfied (1%).

Main results

Experience and satisfaction with nursing care vs. sociodemographic data

The overall average value of satisfaction with nursing care amounted to 77.99 ±20.20 pts (min.–max.; 3.05–100), while in the case of experience it was 77.29 ±15.10 pts. The score ranged from 17.11 to 100 pts. Most respondents graded the overall stay in the unit as very good (n = 49; 49%) and excellent (n = 28; 28%). The others evaluated it at a good (n = 17; 17%) and satisfactory (n = 5; 5%) level. Only 1 (1%) patient assessed it as bad. Nursing care was also highly valued. The majority of the patients graded it as very good (n = 53; 53%) and excellent (n = 28; 28%). The others marked it as good (n = 12; 12%) and satisfactory (n = 7; 7%). The variables such as age, gender, place of residence, and marital or work status did not affect the level of experience or satisfaction with nursing care. However, it was noticed that experience was graded much higher in people with primary and vocational rather that higher education (mean (M) = 75.21 ±9.87 vs. M = 68.19 ±11.79, p = 0.044) (Table 1).

Experiences and satisfaction with nursing care vs. variables related to hospitalization and patient's condition

The number of coexistent diseases, type of procedure, length of hospitalization, having an assigned nurse, and past hospitalization experience did not affect neither patients' satisfaction or experience. However, there was a significant correlation found between the self-assessment of health condition and satisfaction with nursing care (r_s = 0.201; p = 0.045) (Table 2).

Pain and nurses' activity connected with pain relief vs. experience and satisfaction with nursing care

It was noted that the higher the level of pain experienced by a patient after a surgery, the lower the level of experience (r_s = –0.288, p = 0.004) and satisfaction with nursing care (r_s = –0.318, p = 0.001). However, the higher the level of patients' satisfaction with pain management, the higher the score of experience (r_s = 0.239, p = 0.017) and satisfaction with nursing care (r_s = 0.261, p = 0.009). In addition, the study proved a statistically significant correlation between education and preparation for self-care and the value of experience (r_s = 0.502; $p < 0.001$) or satisfaction with

Table 1. The evaluation of experience and satisfaction with nursing care vs. socio-demographic data

NSNS		**Age**				
Experiences with nursing care		r_s = 0.027, p = 0.791				
Satisfaction with nursing care		r_s = 0.146, p = 0.148				
NSNS		**Gender**				***P*-value***
		Men (*N* = 67)	**Women (*N* = 33)**			
Experiences with nursing care	M ± SD	72.75 ±10.99	69.72 ±10.94			0.139
	Median	75.64	71.79			
	Q1–Q3	65.06–80.77	60.9–77.56			
Satisfaction with nursing care	M ± SD	78.92 ±20.79	76.33 ±18.78			0.294
	Median	82.89	77.63			
	Q1–Q3	73.03–96.05	68.42–92.11			
NSNS		**Occupational status**				***P*-value***
		Professionally active (*N* = 41)	**Professionally inactive (*N* = 59)**			
Experiences with nursing care	M ± SD	69.75 ±12.57	73.14 ±9.66			0.346
	Median	69.87	75.64			
	Q1–Q3	60.9–79.49	68.27–80.13			
Satisfaction with nursing care	M ± SD	72.43 ±24.67	81.98 ±15.19			0.11
	Median	76.32	82.89			
	Q1–Q3	56.58–94.74	75.66–94.74			
NSNS		**Education**				***P*-value****
		Primary/occupational – A (*N* = 31)	**Secondary – B (*N* = 37)**	**High – C (*N* = 32)**		
Experiences with nursing care	M ± SD	75.21 ±9.87	71.93 ±10.53	68.19 ±11.79		0.044
	Median	77.56	75.64	70.51		
	Q1–Q3	71.15–82.37	64.1–79.49	60.74–77.4		A > C
Satisfaction with nursing care	M ± SD	82.35 ±20.33	79.21 ±17.56	72.59 ±21.91		0.116
	Median	86.84	80.26	76.32		
	Q1–Q3	76.32–96.71	71.05–93.42	55.92 - 90.79		
NSNS		**Place of residence**				***P*-value****
		Village (*N* = 25)	**City < 50,000 residents (*N* = 30)**	**City > 50,000 residents (*N* = 45)**		
Experiences with nursing care	M ± SD	73 ±9.09	69.94 ±12.12	72.26 ±11.29		0.572
	Median	75	73.72	76.92		
	Q1–Q3	66.03–79.49	60.58–78.04	64.1–81.41		
Satisfaction with nursing care	M ± SD	79.24 ±18.36	78.33 ±19.36	77.23 ±21.8		0.995
	Median	77.63	82.89	80.26		
	Q1–Q3	73.61–94.74	76.32–91.78	64.47–97.37		
NSNS		**Marital status**				***P*-value****
		Miss/bachelor (*N* = 6)	**In relationship (*N* = 75)**	**Divorced (*N* = 6)**	**Widow/widower (*N* = 13)**	
Experiences with nursing care	M ± SD	69.87 ±9.83	72.17 ±10.58	69.55 ±10.49	71.2 ±14.78	0.849
	Median	68.27	75	70.51	78.85	
	Q1–Q3	61.38–76.6	65.06–80.45	61.06–78.53	57.05–80.13	
Satisfaction with nursing care	M ± SD	71.71 ±21.2	78.26 ±19.7	67.34 ±26.78	84.83 ±17.96	0.317
	Median	71.05	81.58	68.42	89.47	
	Q1–Q3	56.58–86.51	71.71–94.74	54.61–85.2	77.78–97.37	

p – Mann-Whitney test, p** – Kruskal-Wallis test, M – mean, SD – standard deviation, Q1 – first quartile, Q2 – third quartile, r_s – Spearman's rank correlation.*

Table 2. The evaluation of experience and satisfaction with nursing care vs. selected variables related to hospitalization and patient's health condition

NSNS		Number of coexistent diseases			*P*-value
		None (*N* = 33)	1 disease (*N* = 28)	2 or 3 diseases (*N* = 39)	
Experience with nursing care	M ± SD	71.5 ±10.82	71.52 ±12.95	72.12 ±9.9	0.916
	Median	73.72	76.6	74.36	
	Q1–Q3	64.74–78.85	60.1–81.57	66.03–79.49	
Satisfaction with nursing care	M ± SD	79.76 ±18.9	76.2 ±21.26	77.97 ±20.6	0.906
	Median	82.89	77.63	82.89	
	Q1–Q3	73.61–96.05	60.36–93.75	70.39–94.74	
NSNS		**Coronary artery bypass graft (CABG)**			***P*-value***
		No (*N* = 45)		**Yes (*N* = 55)**	
Experience with nursing care	M ± SD	70.66 ±12.3		72.65 ±9.85	0.524
	Median	75		75	
	Q1–Q3	61.54–78.85		64.42–80.77	
Satisfaction with nursing care	M ± SD	75.17 ±21.58		80.43 ±18.64	0.230
	Median	77.63		84.21	
	Q1–Q3	62.5–94.74		71.71–96.71	
NSNS		**Aortal valvuloplasty**			***P*-value***
		No (*N* = 71)		**Yes (*N* = 29)**	
Experience with nursing care	M ± SD	72.07 ±10.99		70.95 ±11.21	0.521
	Median	75.64		73.72	
	Q1–Q3	64.42–80.77		61.54–77.56	
Satisfaction with nursing care	M ± SD	78.3 ±21.07		77.49 ±17.79	0.516
	Median	82.89		77.63	
	Q1–Q3	68.42–95.39		73.61–94.74	
NSNS		**Mitral valvuloplasty**			***P*-value***
		No (*N* = 90)		**Yes (*N* = 10)**	
Experience with nursing care	M ± SD	72.22 ±10.48		67.56 ±15.01	0.398
	Median	75		75.64	
	Q1–Q3	64.26–80.61		53.85–77.4	
Satisfaction with nursing care	M ± SD	79.65 ±18.41		63.81 ±28.92	0.089
	Median	82.89		74.96	
	Q1–Q3	71.38–95.72		39.14–83.55	
NSNS				**Health Self-Assessment**	
Experience with nursing care				$r_s = 0.084$, $p = 0.407$	
Satisfaction with nursing care				$r_s = 0.201$, $p = 0.045$	
NSNS				Number of days spent in the unit	
Experience with nursing care				$r_s = -0.095$, $p = 0.348$	
Satisfaction with nursing care				$r_s = -0.028$, $p = 0.780$	

Table 2. Cont.

NSNS		Having an assigned nurse			*P*-value**
		Yes (*N* = 9)	No (*N* = 73)	I am not sure (*N* = 18)	
Experience with nursing care	M ± SD	68.45 ±12.39	71.81 ±10.47	73.15 ±12.71	0.391
	Median	74.36	75	77.88	
	Q1–Q3	57.05–79.49	64.74–79.49	66.51–83.17	
Satisfaction with nursing care	M ± SD	86.26 ±14.37	76.53 ±19.86	80.19 ±23.06	0.165
	Median	86.84	77.78	85.53	
	Q1–Q3	82.89–98.68	68.42–93.42	75–98.68	
NSNS		**Past hospitalization experience**			***P*-value***
		No (*N* = 86)		**Yes (*N* = 14)**	
Experience with nursing care	M ± SD	77.57 ±15.35		75.55 ±13.86	0.484
	Median	75		75	
	Q1–Q3	64.26–80.13		61.38–78.69	
Satisfaction with nursing care	M ± SD	77.58 ±20.81		80.45 ±16.34	0.05
	Median	81.58		81.58	
	Q1–Q3	68.42–94.74		76.32–90.79	

p – Mann-Whitney test, p** – Kruskal-Wallis test, M – mean, SD – standard deviation, Q1 – first quartile, Q2 – third quartile, r_s – Spearman's rank correlation.*

nursing care (r_s = 0.417; $p < 0.001$). The first correlation mentioned above was strong, while the latter was average (Table 3). The level of nursing care experience was found to be significantly higher in patients who were assisted in repositioning by nursing staff, in comparison to those who were not (M = 82.48 ±10.85 vs. M = 74.73 ±6.27, $p = 0.031$). Similarly, the level of satisfaction with nursing care was much higher when the assistance in repositioning was provided, as opposed to when it was not (M = 85.45 ±13.55 vs. M = 74.31 ±21.94, $p = 0.013$). The patients who were informed by nurses how to avoid pain evaluated nursing care experience higher than those who were not ($p = 0.001$). Additionally, the patients who received nurses' interest and sympathy graded experience ($p = 0.019$) and satisfaction ($p = 0.003$) much higher than those who did not (Table 4).

Experience and satisfaction with nursing care – multifactorial analysis

The multifactorial model of linear regression proved that the level of pain experienced after a surgery was an independent predicator of nursing care experience. The regression parameter amounted to –1.168, and each point at the scale of pain decreased the experience value approximately by 1.168 pts (95% CI: –2.06; –0.276, $p = 0.012$) (Table 5). The R^2 coefficient was 28.815 for this model, which means that 28.81% of the experience variations were explained by the variables applied to the model. The remaining 71.19% depended on variables that were not included or random factors. The level of pain constituted an essential independent predicator of satisfaction with nursing care, as well. The regression parameter was –2.384, which means that each point at the pain scale decreased satisfaction with nursing care by 2.384 pts on average (95% CI: –3.997; –0.772, $p = 0.005$) (Table 5).

The R^2 coefficient for the model was 30.10%, which proves that 30.10% of satisfaction variation values were explained by the variables applied in this model. The remaining 69.90% depended on variables that were not included in the model or random factors.

Discussion

The study aimed to establish the level of experience and satisfaction with nursing care and their determinants among cardiosurgical unit patients. On the scale from 0 to 100 pts the average satisfaction with nursing care amounted to 77.99 ±20.20, while the average nursing care experience was 77.29 ±15.10. The variables that significantly affected experience and satisfaction included patient's education, level of post-surgery pain, patient satisfaction with pain relief management, self-assessment of health condition, education, and preparation for self-care. The analysis of multifactorial linear regression showed that the level of pain experienced by a patient after a surgery was a significant independent predicator of experience and satisfaction with nursing care. Additionally, such nursing activities as assistance in repositioning, informing how to avoid

Table 3. The correlation between pain and the effects of its management vs. experience and satisfaction with nursing care values

Variables		r_s	*P*-value
Experience with nursing care	Pain level after surgery	–0.288	0.004
Satisfaction with nursing care	Pain level after surgery	–0.318	0.001
Experience with nursing care	Pain management satisfaction	0.239	0.017
Satisfaction with nursing care	Pain management satisfaction	0.261	0.009
Experience with nursing care	Education and preparation for self-care	0.502	< 0.001
Satisfaction with nursing care	Education and preparation for self-care	0.417	< 0.001

rs – Spearman's rank correlation, p – statistical significance.

Table 4. The level of experience and satisfaction with nursing care related to nurses' reaction to pain reporting

Variables	Activities of nurses	*N*	*M*	*SD*	*U*	*Z*	*P*-value	*r*
Experience with nursing care	Pain evaluation	22	79.92	13.04	769.5	–0.74	0.461	0.017
	No pain evaluation	78	74.73	16.27				
Satisfaction with nursing care	Pain evaluation	22	75.59	22.34	792.0	–0.55	0.582	005
	No pain evaluation	78	78.66	19.66				
Experience with nursing care	Assisted repositioning	33	82.48	10.85	811.5	–2.16	0.031	0.22
	Not assisted repositioning	67	74.73	16.27				
Satisfaction with nursing care	Assisted repositioning	33	85.45	13.55	766.0	–2.49	0.013	0.25
	Not assisted repositioning	67	74.31	21.94				
Experience with nursing care	Information how to avoid pain	34	84.39	9.88	684.5	–3.18	0.001	0.32
	No information how to avoid pain	66	73.63	16.05				
Satisfaction with nursing care	Information how to avoid pain	34	83.74	16.39	874.0	–1.81	0.071	0.18
	No information how to avoid pain	66	75.02	21.42				
Experience with nursing care	Showed interest and sympathy	54	81.14	11.93	902.0	–2.35	0.019	0.24
	No showed interest and sympathy	46	72.77	17.18				
Satisfaction with nursing care	Showed interest and sympathy	54	83.72	15.57	812.5	–2.97	0.003	0.30
	No showed interest and sympathy	46	71.25	22.94				
Experience with nursing care	Administered analgesics	22	77.11	15.20	754.05	–0.13	0.895	0.01
	Not administered analgesics	78	78.07	15.05				
Satisfaction with nursing care	Administered analgesics	22	78.22	20.26	728.0	–0.37	0.715	0.04
	Not administered analgesics	78	77.1	20.45				

M – mean, SD – standard deviation, U – Mann-Whitney test, Z – standardized value, p – statistical significance, r – strength of the effect.

Table 5. Multifactorial analysis for nursing care experience

Feature		Parameter	95% CI		*P*-value
Gender	Men	Ref.			
	Women	–0.852	–6.213	4.509	0.756
Age	[years]	–0.222	–0.465	0.021	0.077
Education	Primary/occupational	Ref.			
	Secondary	–2.821	–8.369	2.726	0.322
	High	–4.882	–11.806	2.042	0.171
Continuing education	Yes	Ref.			
	No	5.856	–4.407	16.12	0.267
Number of nights spent on the ward		–0.897	–1.787	–0.007	0.052
Having an assigned nurse	Yes	Ref.			
	No	5.455	–2.425	13.334	0.179
	I am not sure	4.543	–4.853	13.938	0.346
Place of residence	Village	Ref.			
	City < 50,000 residents	–1.831	–8.123	4.46	0.57
	City > 50,000 residents	1.156	–4.949	7.26	0.712
Marital status	Miss/bachelor	Ref.			
	In relationship	1.257	–8.311	10.825	0.798
	Divorced	0.402	–12.404	13.207	0.951
	Widow/widower	5.015	–6.591	16.622	0.4
Occupational status	Professionally active	Ref.			
	Unemployed/professionally inactive	4.794	–1.344	10.932	0.13
Number of coexistence diseases	None	Ref.			
	1 disease	–0.312	–6.785	6.161	0.925
	2 or 3 diseases	0.76	–4.636	6.156	0.783
Performed procedure: coronary artery bypass graft (CABG)	No	Ref.			
	Yes	3.478	–7.409	14.365	0.533
Performed procedure: aortal valvuloplasty	No	Ref.			
	Yes	–0.125	–9.706	9.456	0.98
Performed procedure: mitral valvuloplasty	No	Ref.			
	Yes	–2.29	–12.756	8.175	0.669
Performed procedure: aneurysm of the ascending aorta	No	Ref.			
	Yes	6.146	–2.819	15.111	0.183
Pain level after surgery		–1.168	–2.06	–0.276	0.012*

*p – multivariate linear regression, *statistically significant relationship (p < 0.05).*

pain, and showing interest and sympathy were crucial while evaluating experience and satisfaction.

Experience and satisfaction with nursing care vs. sociodemographic data

The results of research on experience and satisfaction with nursing care can be found in Polish and international scientific papers. One of the tools applied in many studies is the Newcastle Satisfaction Nursing Scale (NSNS) adapted to Polish conditions by Gutysz-Wojnicka and Dyk [16]. The results of their examinations conducted among patients treated conservatively and surgically demonstrated that the average level of satisfaction with nursing care amounted to 74.98 ±20.83 and experience amounted to 73.22 ±16.03. The research pinpointed age and gender as differenti-

ating the NSNS scale. Patients over the age of 60 years gave the highest scores pertaining to experiences, while younger patients, under the age of 40 years, gave lower scores. In turn, patients under the age of 40 years assessed satisfaction with nursing care significantly lower than patients in the age 40–60 years group. Men obtained higher values, both in the case of experience of nursing care and satisfaction with nursing care. The self-reported study did not find age or gender to have any impact on any of the NSNS subscales. However, education proved statistically significant. The evaluation of nursing care experience was much higher among patients with primary and vocational education rather than higher education [19]. These results correspond positively with the findings by Wierzbicka and Jankowska-Polańska, who led the research among the patients of angiological, nephrological, and cardiological wards. The authors concluded that the level of education affected the score on the experience scale because highly-educated patients are more demanding in terms of provided care. The research, however, revealed lower scores on the satisfaction (69.26) and experience (63.66) scales [20].

Because the self-reported study was conducted on the cardiosurgical unit, the findings of similar studies ought to be discussed as well. The research carried out at the Neurosurgical and Neurotraumatological Faculty and Clinic of the Poznan University of Medical Sciences examined patients treated surgically due to neck discopathy, who evaluated nursing care experience at 82.01 ±15.10 and satisfaction at 75.60 ±18.07 pts, while those treated due to lumbar discopathy rated them at 79.04 ±13.52 and 74.40 ±16.84 pts, respectively [21]. In comparison, the self-reported study revealed lower scores for experience and higher for satisfaction on average. However, research by Grochowska *et al*. showed that the patients of the General Surgery Department assessed the level of satisfaction at a similar level to our study (78.67 ±18.19 pts). The coincident coefficient was very high (n = 53; 53%), whereas the approximate one was good (n = 30; 30%). The level of experience was estimated slightly lower than in our study (76.31 ±15 pts) [22]. Another research performed by Hreńczuk *et al*. examined kidney transplantation patients who graded both experience (89.5) and satisfaction (91.1) very high. What is more, a higher percentage of the respondents evaluated overall care as very good (62.9%) and excellent (34.3%) than the self-reported study. Although the assessment of experience and satisfaction with nursing care was the highest of all those quoted above, the research did not find age, gender, education, or length of hospitalization essential in influencing the experience and satisfaction grades [23].

In the study by Fafara *et al*., examining satisfaction of day and night nursing care in clinical hospitals, the average satisfaction (60.3) and experience (63.7) results were lower in comparison to the self-reported study. Higher scores for satisfaction were given by the unemployed, retired, and village residents [24]. The patients who were operated on under epidural (spinal) anaesthesia assessed nursing care experience at 74.98% and satisfaction at 64.80%. Additionally, the sociodemographic data did not affect the scores in this study at all [25]. Age, gender, marital status, and education did not differentiate patient satisfaction significantly, as was reported in our study [21–24]. Therefore, our results partly correspond to the findings above except for the 'respondents' education level'.

The examinations based on NSNS were also conducted worldwide. In England, the patients graded satisfaction with nursing care (M = 84.1; Me = 88.2) and experience (M = 84.6; Me = 87.8) quite highly [15]. Converging results were also reported among patients from Cyprus, Czechia, Greece, Finland, Hungary, and Italy. The patients there were mostly satisfied or very satisfied, and the assessment involved nurses' behaviours as well [26]. Spanish research noted that their patients were generally satisfied with nursing care. What is more, males with chronic diseases were more satisfied than females. The overall satisfaction was assessed at a good level [27]. In Turkey, the patients of a university hospital assessed the average satisfaction score at 62.08 ±20.94 and experience at 71.97 ±11.97 [28], and in surgical clinics the results supplied by females were higher (50.25 ±18.58) than those from males (45.75 ±18.22). There were no statistically significant differences found between satisfaction and age, education, or income [29]. However, clinical hospital patients achieved higher scores for satisfaction (79.86 ±19.31), and a statistically significant difference was reported between the average satisfaction score and level of education, chronic diseases, type of hospitalization, or the number of patients in a room [30]. The average satisfaction score among CABG patients was at a moderate level (52.87 ±22.54) [31]. Higher scores were achieved by Gezer and Arslan researching one-day clinic patients, who graded satisfaction at 82.4 ±19.2 and experience at 84.4 ±18.1 on average. However, again no significant correlation was found between age, gender, marital status, or past hospital experience [32]. Cross-sectional studies carried out in specialist and clinical hospitals in Ethiopia reported the average satisfaction score at 47%, and it was considered low [33]. Higher scores were found in reference hospitals, and they amounted to 63.9 ±17 pts, where 49.2% of the patients were satisfied with nursing care and 64.7% were satisfied with the overall services in the unit. The factors influencing satisfaction included education, i.e. highly-educated patients showed lower satisfaction than those with primary education [34]. Brazilian research conducted among surgical patients showed that the average experience score was 90.5 ±7.8 and satisfaction was 84.7 ±5.0. However, the authors found some correlations between experience and age, education level,

overall satisfaction with nursing care, and overall satisfaction with hospitalization [35].

On the basis of the findings mentioned above, it might be concluded that surgery unit patients express various levels of experience and satisfaction with nursing care; however, it is commonly estimated at 60 pts. As the NSNS authors do not provide any clear interpretation of the results, the following, suggested by Garczyk [21], might be adapted: 0–25% – unsatisfactory grade, 26–50% – satisfactory grade, 51–75% – good grade, and 76–100% – very good grade. Thus, in reference to the studies above and the self-reported one, it might be deduced that the level of experience and satisfaction with nursing care was at a good and very good level, both in Poland and worldwide. The sociodemographic fluctuations across studies might stem from cultural differences and research groups (sample size, focus-group selection, type of hospital, etc.).

Experience and satisfaction with nursing care vs. variables concerning hospitalization, patient health condition, and nurses' reactions to reporting pain

It is worth highlighting that, according to the results of the study, self-assessment of health condition, level of pain, and nurses' activity in relieving pain affected the evaluation of nursing care considerably. The patients assessed their pain at 5.27 ±2.63 pts on the VAS scale. The multifactorial linear regression model found that the post-surgical level of pain is a significant independent predicator of experience and satisfaction. Each point on the scale decreased satisfaction by 2.384 pts and experience by 1.168 pts. Similar findings were presented by Sayin *et al.* The satisfaction evaluation was lower in patients who underwent a serious surgery, experienced pain, and movement or nutrition limitations [29]. Post-surgical pain, lack of appetite, nausea, and post-CABG wound symptoms also correlated negatively with satisfaction in Bozkurt and Saglam [31]. Similarly, Sillero and Zabalegui, who measured the satisfaction of surgical patients with perioperative nursing care, also showed that patients with high levels of pain had lower satisfaction with nursing care, and the recovery process of pain slowed down [27]. Therefore, it might be noticed that persistent physical symptoms may essentially affect the patient's assessment of nursing care. On this background, the role of a nurse in managing pain seems to be a significant determinant of patient satisfaction.

The research also proved nurses' activities in relieving pain as fundamental for the patients' evaluation of experience and satisfaction. Their levels substantially increased along with the increase of patient satisfaction with the effects of pain management, education, and preparation for self-care. However, the pain assessment itself and the administration of pain-relieving medications did not affect experience and satisfaction to any significant degree. On the other hand, assisting patients in repositioning, informing about pain-avoiding methods, and showing interest or sympathy appeared to be crucial in the evaluation of experience and satisfaction. The results suggest that it is possible to increase cardiosurgical patient experience and satisfaction scores if patients are treated subjectively, not objectively or instrumentally (only pain evaluation and medicine administration). Additionally, the correlation found between education and preparation for self-care and satisfaction or experience corresponds with other findings, as well. For instance, Lai *et al.* reported that post-surgery education affected the level of patient satisfaction with nursing care [36]. Similarly, the information passed to a patient and their families, in an intensive care unit, after elective cardiac surgery, was related to higher satisfaction with nursing care [37]. The research among patients after radical prostatectomy showed that positive experience and satisfaction might be linked to the educational role of nursing staff, their communicational skills, and respect for privacy [38].

It all leads to the conclusion that patients expect to be treated as members of therapeutic teams and to be prepared for self-care. It all requires high levels of medical knowledge, caring, didactic and communicational skills, as well as the relevant amount of time. Although the knowledge and skills can be acquired or trained, the question of time seems to be problematic due to staff shortages in Poland. According to the Health at a Glance report in 2019 there were 5.1 practising nurses per 1000 population in Poland (compared to the average 8.8 for 38 OECD countries). The best situation is seen in Sweden and Norway, with the indicators 18.0 and 17.9 per 1000 population, respectively [39].

Important factors affecting experience and satisfaction with nursing care also include those connected with hospitalization. The study did not find past hospitalization experience to be significant. Similar findings were reported by Gezer and Arslan [32]. However, opposite results were found by Mensa *et al.* They proved that patients with past hospitalization experience were less satisfied with nursing care than first-time hospitalized patients [40]. Conversely, Sharew *et al.* reported past hospitalization patients as more satisfied [34]. The research by Grochowska and Arslan found patients with assigned nurses to be more satisfied with nursing care [22], but the self-reported study results were contradictory. Having an assigned nurse did not affect the level of experience and satisfaction with nursing care. What is more, Grochowska *et al.* proved that the length of stay did not correlate with the evaluation of experience and satisfaction [22], which was also confirmed in the research by Eyasu *et al.* [11], and our study complies with the above in

this respect. In contrast, Hreńczuk *et al*. reported divergent results – the longer the patients spent in the unit, the lower their satisfaction with nursing care [23].

Patients' assessment of their health condition and its impact on the evaluation of satisfaction with nursing care also seem to be worth discussing. The self-reported results showed that the patients who evaluated their health condition as good assessed their satisfaction higher as well. The studies mentioned above also report that patients in good health were twice as likely to evaluate satisfaction higher than those who graded their health condition as bad [11]. Analogical findings were noted in the research by Bacon *et al*. Patients who evaluated their condition as good were very satisfied with nursing care [41]. However, all the differences in the presented results might come from different group sizes, patients' ages, and socio-economic situations.

One of the limitations is the fact that the research was carried out only in one unit. Another is the small sample size. However, this is a pilot study, and we are planning to conduct multi-centre interventional research aimed at measuring the effectiveness of interventions related to shaping 'soft skills' among nursing staff.

Conclusions

Evaluations of both experience and satisfaction with nursing care at the cardiosurgical unit were at a very good level. The levels of experience and satisfaction increased significantly with the level of patients' education, pain-relieving activities, education, and preparation for self-care. Persistent post-surgical physical pain appeared to be an essential independent predicator of experience and satisfaction. The nursing activities that fundamentally affected the variables included assistance in repositioning, informing how to avoid pain, and showing interest or sympathy. We recommend periodic and reoccurring evaluations of patient satisfaction with nursing care at surgical wards, with the use of standardized tests. Both hospital management and nursing staff need to be aware that the determinants revealed in the study may be improved by developing and improving 'soft skills' among nursing staff. The skills ought to be included in pre- and postgraduate educating programmes.

Conflict of interest

The authors declare no conflict of interest.

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