Original Research Article

Comparative Assessment of Nurse Caring Behaviours and Patient Satisfaction between Chronic and Acute Patients following Surgical Treatment.

Abstract

Background: Patients suffering from chronic disease tend to have a quality of life significantly different from patients surgically treated due to post-traumatic injuries. Thus, both groups might perceive nurse caring behaviours and patient satisfaction differently, valuing distinct technical and quality features of their hospital care.

Objective:The present study aimed to assess nurse caring behaviours perceived by two distinct groups of patients followed post-traumatic surgeries, and its correlation to patient satisfaction.

Methods:Clinical data of patients admitted in orthopaedics trauma and microsurgery's department between January 2022 and February 2023, and treated for diabetic foot ulcer or traumatic injury of foot and/or ankle, due to traffic accident and crush injury, were analysed.The study enrolled 50 patients, and 25 patients were controlled randomized in each group (diabetic foot ulcer cohort vs trauma cohort). Nurse caring behaviours inventory-24 (CBI-24), patient satisfaction index (PSI), Numeric rating scale for pain, and hospital length of stay were recorded, analysed and compared between both groups.

Results:The mean age differed significantly between diabetic foot ulcer and trauma cohort patients (53 vs. 38, respectively, $p < 0.001$), while body mass index and

aetiologyside were not significantly different between both groups ($p > 0.05$, both). The overall mean score of CBI-24 did not significantly differ between DFU and trauma cohort (4.77±0.5 vs 4.96±0.5, respectively).However,both groups significantly differed in all technical caring behaviours ($p < 0.001$).Technical professional subscale of PSI and mean hospital length of stay were found statistically different between both groups. Moreover, CBI-24 and PSI were significantly correlated within each group ($p < 0.05$).

Conclusion:Significant difference was observed in CBI-24 and PSI subscales between both groups, with a significant correlation between the two concepts within each group.Patients undergoing diabetic foot ulcer surgical treatment are more likely to highly perceive technical caring behaviours, while patients with traumatic injury of foot and/or ankle, due to traffic accident and/or crush injury tend likely to value quality of caring behaviours.

Keywords:*Clinical nursing care; Caring behaviours inventory; patient satisfaction; quality of care; diabetic foot ulcer, trauma.*

1. Introduction

Nursing profession staff account for half of the health workforce, worldwide. Embedded in intrinsic issues of human life and existence, caring is known to be at the essence and core of nursing [1,2]. Care remains the pivotal element emphasizing the difference between nursing and other health-related professions [3,4].The World

Health Organization (WHO) advocates the values of health care vision which are accessibility, acceptability, quality, and cost-effectiveness of health care with staffing of nurses based on population needs [5].Nursing care has a significant impact on patient safety, affecting clinical outcomes, and patients' satisfaction with perceived caring behaviours[2].

Although, the Chinese nursing workforce is rapidly growing while the nurse-to-patient (NTP) ratio is being gradually optimized to meet and ensure high quality of care [6], recent published report from the WHO estimated that by 2030, the nursing profession will know a shortage of 5.7 million staff, worldwide [7,8].Adequate nurse staffing is essential to provide safe and qualified nurse care, especially if patients receive care without failure [9].

Due to its weight load absorbing properties during locomotion, the foot is highly susceptible to mechanical trauma. Indeed, the heel can absorb 110% and 200% of the body's weight during walking and running, respectively [10]. Therefore, they are often easily associated with acute and/or chronic diseases of the lower extremities.

The International Diabetes Federation (IDF) defines diabetes as a chronic metabolic disorder characterized by hyperglycaemia, causing various pathologies, including microvascular and macrovascular complications such as diabetic foot ulcer, osteomyelitis and neuropathy [11].About 537 million people worldwide have diabetes, and China having the highest number of diabetes account worldwide with

140 million people [11].Surgery for acute and chronic foot problems has long been an integral component of care [12].

Surgical treatment for diabetic foot attack or for severe trauma injury of the foot and/or ankle due to traffic accident or crush injury is often a Class IV procedure.Thisconsists of exposing all infected tissues, removal of infected bones, and reconstructing all essential parts, with the hope of avoiding amputation if necessary [12].

Providing clinical nursing care to these patients had not only been cost-effective but is also presented with some challenges. Taking in account various complex factors of patients perceived caring behaviours, we soughtto assesspatient satisfaction with nurse quality of care following surgical treatment from acute and chronic foot advanced injury.

2. Methods

2.1 Study design and setting

The present study is a randomized, monocentric, and controlled study conducted in the orthopaedicstrauma and microsurgery's department of a 3000-bed Chinese Tertiary Referral Teaching Hospital.

2.2 Study Population

The study population was composed of two distinct groups. The first included elective patients planned for the treatment of neuropathic diabetic foot ulcer (DFU).

The second group included patients who arrived at the emergency department and were diagnosed with a considerable traumatic injury of foot and/or ankle, due to traffic accident and crush injury, and subsequently admitted for surgical treatment, to the same orthopaedictrauma and microsurgery department. Both groups' patients were treated between January 2022 and February 2023.

Beside the above-mentioned criteria, overall inclusion criteria included the following: (i) 18 years or older of age; and (ii) patient and/or their primary family caregiver agreed to participate by giving informed consent. The exclusion criteria included: (i) younger than 18 years old; (ii) pregnancy; (iii) sustained head injury, and/or hadsuperficial and/or other traumatic injury, or involved in polytrauma requiring multiple surgical procedures; (iv) could not give informed consent or simply refuse to participate in the current study.We performed a propensity match to provide parity sampling between the DFU and emergency trauma cohorts. For each DFU case, an emergency trauma treatment case was assigned; and this was done based on priority of enrolment.

2.3 Variables and measurement

Patients were measured preoperatively on hospital admissionday (while on the waiting list), and 1-day prior hospital discharge. NRS pain were used at all assessment points. CBI-24 Patient and PSI were assessed1-day prior scheduled hospital discharge. An independent fixed-team of 2 nurses assistants was specifically assigned to administer the instrumentsto both groups.

2.3.1 Primary Outcomes —Nursing Care Models Related Outcomes

Patients Self-Evaluated Nurse Caring Behaviours

The nurse caring behaviours inventory instrument was developed by Wolf and colleagues [13]with the primary objective to assess the quality and technical nurse caring behaviours among nurses and patient. Since then, the original version had been revised [14], translated and validated in various languages, including Chinese [15,16]. The instrument consists of 24 items, grouped in four subscales covering (i) assurance of human presence, (ii) professional knowledge and skill, (iii) patient respectfulness, and (iv) positive connectedness [14,16]. All items are scored on a 6-point Likert-type rating scale from 1 (never) to 6 (always). Higher is the score highly present is the caring behaviours in the nurse-patient relationship, and vice versa. The Chinese version of CBI-24 has been reported to have adequate internal consistency reliability ranging from 0.96 to 0.98 [15-17]. In this study, theCronbach's αvalue was 0.95 for patients, and it ranged from 0.84 to 0.93 for the four subscales.

Patients Satisfaction Index

To assess the patient satisfaction with nursing care among the study population, we used patient satisfactory instrument (PSI) [18]. The instrument is composed of 25 items assessing patient satisfaction across three dimensions: the technical-professional dimension (7 items), the interpersonal-educational dimension (7 items), and the interpersonal-trusting relationship dimension (11 items). Each item is scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale is computed by taking the mean score of all 25 items, creating a total score

range of 1 to 5 with higher scores reflecting greater patient satisfaction with nursing care. Each subscale is computed by using the mean score of the associated items.

2.3.2 Secondary Outcomes

Numeric Rating Scale for Pain

We used the numeric rating scale for pain (NRS for pain) to assess pain intensity and its interference on quality of life. The instrument is a 11-point numeric scale with scores ranging from 0 (no pain) to 10 (worst pain). The higher the score, significant is the pain intensity, and subsequent its impact on quality of life [19].

Hospital of Length of stay

A hospital length of stay (LOS) was recorded, the mean was assessed in each group, and the values were compared between the two groups.

2.4 Statistical endpoints

The primary endpoints were the nurse caring behaviours and patient satisfaction scores between both groups. The secondary endpoints were mean scores of NRS painand hospital length of stay.

2.5 Statistical Analysis

We used SPSS version 24 (IBM, New York, USA) to conduct statistical analysis. Categorical bivariate analysis was conducted using was conducted using Person's chi squared (χ^2) test. Student's *t*-test was used to analysecontinuous variables. Data were compared between both groups. Spearman correlation was used to assess the correlation of continuous variables (CBI-24 and PSI) within each group.

Measurement data were expressed as mean ($\bar{X}$) ± standard deviation (SD). Two-tailed tests were calculated with a P-value of 0.05 as the significance level.

2.6 Ethical Consideration

The patients and/or their primary family caregiver were informed of the voluntary nature of their participation and confidentiality of their responses as they provided their written informed consent. All authors hereby declare that all the study was reviewed and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

3. Results

3.1 Comparison of Baseline Characteristics of Patients Between the Two Groups

Comparative data on patient demographic and clinical baseline characteristics are reported in Table 1. A total of 25patients (10males and 15females) and 25 patients (18 males and 7 females) were enrolled in DFU cohort and Trauma cohort, respectively. The mean age of the patients was 53 ± 5.6 years and 38 ± 12.5 year, for the DFU cohort and Trauma cohort, respectively.The DFU cohort reported a body mass index (BMI) ranging between 16.90 and 30.12 kg/m^{2}with a mean BMI of 24.45 ± 3.05 kg/m^2. The BMI in Trauma cohort ranged from 17.58 to 31.18 kg/m^2 with a mean of 23.02 ± 3.29 kg/m^2. The two groups were comparable in the baseline variables. There was no statistically significant difference in BMI and aetiology treatment side between both

groups (*P > 0.05*). The comparison in gender (*P < 0.05*) and age (*P < 0.001*) between both groups was significantly different(Table 1).

Table 1: Study Population Demographic Characteristics

	No. Patients	Gender (*n*) M / F	Mean age(*years*) $\bar{X} \pm SD$	BMI(kg/m^2) $\bar{X} \pm SD$	Aetiology side L/ R
DFU Group	25	10 / 15	53±5.6	24.5±3.1	15 / 10
Trauma Group	25	18 / 7	38±12.5	23.1±3.3	12 / 13
P value		**< 0.05**	**< 0.001**	> 0.05	> 0.05

Data presented as mean± standard deviation; $\bar{X}$: mean; SD: standard deviation. *Gender: M, male; F, Female; BMI, body mass index; Aetiology side: L, left; R, right.*

3.2 Comparison of Caring Behaviours Inventory between the two groups

The total mean score for the CBI-24 was 4.77±0.5 and 4.96±0.5 in DFU and Trauma cohorts, respectively (Table 2). There was no statistically significant difference between both groups. Patients in DFU cohort rated the quality of caring behaviours (patient respectfulness (5.24±0.5) followed by positive connectedness (4.77±0.5)) higher than other subscales, while technical caring behaviours (professional knowledge and skills (5.32±0.5) followed by assurance of human presence (5.24±0.6)) received the highest mean score by patients of Trauma cohort.

Bivariate analysis of CBI-24 subscales showed that, there were significant differences in both technical caring behaviours between both groups (*P*< 0.001; Table 3), while no statistically significant difference was found in quality of caring behaviours between the two groups (*P > 0.05*; Table 3).

Table 2: Comparison of Patients Postoperative Clinical Outcomes

Comparison Index	***DFU Group* (n=18)** $\bar{X} \pm SD$	***Trauma Group* (n=18)** $\bar{X} \pm SD$	***P* value**
NRS Pain	3.1±0.3	3.0±0.4	> 0.05
Mean Length of Hospital stay (day)	20.0±2.6	16.2±4.0	**< 0.01**
Caring Behaviour Inventory-Patient	4.77±0.5	4.96±0.5	> 0.05
Patient Satisfaction Index	3.89±0.4	4.05±0.4	> 0.05

Data presented as mean± standard deviation; NRS Pain, Numeric rating scale for pain assessed 1-day prior discharge.

3.3 Comparison of Patient Satisfactory Index between the two groups

The total mean score for PSI was 3.89±0.4 and 4.05±0.4 in DFU and Trauma groups, respectively (Table 2). There was no statistically significant difference between both groups (*P > 0.05*). Both groups rated patient education subscale with the highest score (4.08±0.8 vs. 4.16±0.6), DFU and trauma groups, respectively (Table 3).

Analysis of all three subscales showed that among all subscales, only bivariate analysis of technical professional subscale was statistically significant different between both groups (*P < 0.01*; Table 3).

Table 3: Comparison of patient self-evaluated CBI-24 scores and PSI scores between groups

Variables	**DFU Group *(n=32)***	*P*	**Trauma Group*(n=32)***
	$\bar{X}$± **SD**		$\bar{X}$± **SD**
CBI-24 Subscales			
Professional Knowledge & Skills	4.60±0.9	**< 0.001**	5.32±0.5
Assurance of Human Presence	4.48±0.9	**< 0.001**	5.24±0.6
Patient Respectfulness	5.24±0.5	> 0.05	4.88±0.7
Positive Connectedness	4.76±0.7	> 0.05	4.40±1.0
Total Score of CBI-24	4.77±0.5	> 0.05	4.96±0.5
PSI Subscales			
Patient Education	4.08±0.8	> 0.05	4.16±0.6
Trust	4.04±0.8	> 0.05	3.92±0.8
Technical Professional	3.56±0.8	**< 0.01**	4.08±0.6
Total Score of PSI	3.89±0.4	> 0.05	4.05±0.4

DFU: Diabetic Foot Ulcer; CBI-24:Caring Behaviours Inventory-24; PSI: Patient Satisfaction index; $\bar{X}$: mean; SD: standard deviation. Student's t-test was adopted to conducted univariate analysis. A p-value (two-sided) of less than 0.05 was considered significant. Bold indicates all p values with statistical differences

3.4 Correlation between Caring Behaviours and Patient Satisfactory

In order to assess the correlation between the perception of nurse caring behaviours by the patients and the patient satisfaction index, we performed a Spearman rank

correlation test. Our results suggested that was a significant correlation in DFU (rho=0.481, *P < 0.05*) and Trauma (rho=0.648, *P<0.001*) cohorts (Table 4).

Table 4: Correlation between Caring Behaviour Inventory and Patient Satisfaction index

Groups	***Factor***	**N**	$\bar{X} \pm SD$	***Spearman's rho***	***P***	***Interpretation***
DFU Group	CBI-24	25	4.77±0.5	0.481	**<0.05**	*Significant*
	PSI	25	3.89±0.4			
Trauma Group	CBI-24	25	4.96±0.5	0.648	**< 0.001**	*Significant*
	PSI	25	4.04±0.4			

DFU: Diabetic Foot Ulcer; CBI-24: Caring Behaviours Inventory-24; PSI: Patient Satisfaction index; N: number of cases; $\bar{X}$: mean; SD: standard deviation; Spearman's rho: Spearman rank correlation. Correlation between the mean is considered statistically significant at p-value (two-sided) of less than 0.05.

3.5 Comparison of Pain between the two groups

Both groups reported quite similar mean rate of NRS pain (3.1±0.3 vs 3.0±0.4), and there was no statistically significant difference between both groups (*P>0.05*) (Table 2).

3.6 Comparison of Hospital length of stay between the two groups

The patients from DFU cohort spent longer time in hospital than those from Trauma cohort. Findings showed that the average of hospital length of stay was 20.0±2.6 and 16.2±4.0, from patients in DFU and Trauma cohorts, respectively. There was a statistically significant difference between both groups (*P<0.01*, Table 2).

4. Discussion

This study attempted to assess the patient perception of clinical nurse caring behavioursand patient satisfaction between patients surgically treated for diabetic foot ulcers, and those following post-traumatic surgery of foot and/or ankle due to traffic accident and crush injury.Mode of nursing care and staffing skill mix are two key component of nursing care delivery model by which nurses not only to assure patients high quality of care but also to enhance patient satisfaction from nursing and institution perspectives.

Patients baseline demographic characteristics in DFU and trauma cohorts were comparable. There were significant differences in baseline variables such as gender and age, between groups. An overall view of baseline on gender revealed that women were outnumbered 18 to 7 in the trauma cohort, while in the DFU group they represented the bigger number. A potential explanation would be associated to the presumption of working status of the patients, although we did not record each patient working status.

Caring attitudes and behaviours are two core concepts throughout whichnurse-patient interactionsare displayed. Caring is considered as the core of the nursing profession and is expressed through caring behaviours [20].The mean scores of CBI-24 reported in this study were higher than those reported in some studies conducted whether in time of peace [15,21] or during a stressful time such as during a pandemic [17,20].The analysis of different subscales scores, led us to make some

observations. Findings suggested that under their current medical state, patients from both groups significantly rated them differently. While DFU highly rated quality of caringbehaviours ('patient respectfulness' and 'positive connectedness'), technical care behaviours('professional knowledge and skills', and 'assurance of presence human') were significantly highly rated by patients from trauma cohort.

A potential explanation to this can partly be associated to the time span between their injury, the time of diagnosis, and the surgical treatment. DFUs are a devastating complication in the intermediate and advanced phases of diabetes, significantly affecting patient social quality of life [22]. Therefore, patients from the DFU cohort highly rated the quality of caringbehaviours higher than technical caringbehaviours. With a relatively short time span between traumatic injury and surgical treatment, patients from trauma cohort significantly rated the technical caring behaviours. Indeed, usually under post-traumatic shock, these patients don't fully grasp the understanding of the surgery and what the surgical procedure entails. They mostly value technical caring behaviours that could alleviate post-traumatic stress and pain. Findings from a prospective interview based-study conducted by Shemesh and colleagues corroborate the observations of the current study [23].

The patient satisfaction is a vital metric of quality of health care assessment, and can be used to improve patient experience. Usually associated with medical institution performance, it can be used as evaluative tool to assess not only the process of care but also the outcomes care expected by patients. patients in DFU group highly rated

‘patient education’ subscale followed by ‘trust’ and ‘technical professional’. Meanwhile, patients from trauma cohort rated perceived ‘patient education’ followed by ‘technical professional’. Diabetic foot specialist nurse, with additional training in DFU specialty beyond basic nursing education [24], can really make a difference by playingan effective role in prevention of lower limb amputation through educational interventions, and providing high quality of health care[25].

In the educationaldimension, registered nurses can address all factors thatmay impair wound healing, including infection, repetitive traumasecondary to peripheral neuropathy, patient behavioural issues[25]. In the light of these observations, this really explains why patients from both cohorts highly rated ‘patient education’ subscale above all other subscales.

Correlation between the CBI-24 and PSI is significantly observed within each cohort. This Spearman’s correlation analysis statistically emphasizes an corroborates that in present study, patients from DFU and trauma cohorts highly perceived quality of caring behaviours and technical caring behaviours, respectively ($p < 0.05$, $p < 0.001$; table 4).

In nursing literature, pain management, patient expectations, and hospital length of stays are significant confounding variables to be associated with patient satisfaction [26].The patient satisfaction takes into account the more subjective issues of expectations and preferences [27]. The assessment of satisfaction is especially important in a context of value-based health care as some patients might make a

clear difference between satisfaction related to the outcomes of care to the one associated to the process of care [28].Meaning, even by experiencing a negative outcome of care, a patient might still express satisfaction with process of care [26].Analysed as secondary endpoints, univariate analysis NRS pain and hospital length of stay revealed some important observations. Ourfindings showed that all secondary variables were comparable between both groups (Table 2). While there was only a significant difference between both groups in mean length of hospital stay (pre-surgery, $p < 0.01$), no significant difference between the two groups was noted in NRS pain ($p > 0.05$, Table 2). DFU are often cavities of numerous infections, requiring considerable long-term treatment. This could potentially explain why patients from DFU cohort had longer mean of hospital length of stay compared to patients from trauma cohort. Diabetic foot ulcers are cost-effective and associated with a significant burden affecting social and quality of life. The related burden includes physical, psychological and socioeconomic stress, with significant disability, such as a reduction in mobility and activities of daily living.

Strengths and Limitations of the study

In our attempt to design and conduct a robust and significant study, we cannot forget to emphasize that the current study does present some strengths and limitations that need to be considered while interpreting its findings. First, its randomized controlled design, which only allowed to enrol trauma patients with considerable foot and/or ankle surgeries. In addition, we did not include infection

agent and duration as study variables for DFU patients, that could have potential effect on hospital length of stays. Moreover, as a nursing-oriented study, we primarily focus the essential assessment throughout hospital stay, therefore did not extent the investigation after hospital discharge. This could also influence patient satisfaction based on the outcomes and process of delivered nursing care. Second, its small number of participants could also be regarded as a potential limitation to the soundness of the study. Third, the sample was not homogenous by medical diagnoses, resulting in a significant surgical procedure, although all patients were treated in the same department and underwent microsurgery and reconstructive procedures.

Therefore, prospective larger sample studies with reasonable follow up period are needed for further validation.Nevertheless, despite these limitations, the current study is significantly meaningful and provide essential information regarding the patients' perception of the nurse caring behaviours and its correlation with patient satisfaction from patients surgically treated from DFU and/or traumatic injury of foot and/or ankle due to traffic accident and crush injury.

5. Conclusion

This study highlights the comparative data on nurse caring behaviours and patient satisfaction between DFU and Trauma patients' groups.The nursing literature is potentially rich of patients perceived nurse caring behaviours and patient satisfaction. However, this study is the first of its kind to comparatively assess the

patient satisfaction with patients' perception of nurse caring behaviours from DFU and Trauma patients following surgical treatment. The present study significantly suggested that DFU patients tend to value more quality of caring behaviourswhile Trauma patients tend to highly rate technical caring behaviours, the possible explanation might be associated to their medical condition The findings showed asignificant correlation between patients perceived nursing care behaviours and patient satisfaction. In the light of these findings, and in consideration of patients' diverse and different experience and health care expectations, nurse-patient relationship is of a major confounding throughout the process of delivering nurse caring behaviours.

Reference

1. Bergbom I, Nåden D, Nyström L. Katie Eriksson's caring theories. Part 1. The caritative caring theory, the multidimensional health theory and the theory of human suffering. Scand J Caring Sci. 2022;36(3):782-790. DOI: 10.1111/scs.13036. Epub 2021 Oct 5. PMID: 34609017.
2. Näsman Y. The theory of caritative caring: Katie Eriksson's theory of caritative caring presented from a human science point of view. Nurs Philos. 2020;21(4):e12321. DOI: 10.1111/nup.12321. Epub 2020 Sep 24. PMID: 32974999.
3. Labrague LJ, McEnroe-Petitte DM, Papathanasiou IV, Edet OB, Arulappan J, Tsaras K. Nursing students' perceptions of their own caring behaviors: a multicountry study. Int J NursKnowl. 2017;28(4):225–32. DOI: 10.1111/2047-3095.12108
4. Maghsoud F, Rezaei M, Asgarian FS, Rassouli M. Workload and quality of nursing care: the mediating role of implicit rationing of nursing care, job satisfaction and emotional exhaustion by using structural equations modeling approach. BMC Nurs. 2022;21(1):273. DOI: 10.1186/s12912-022-01055-1

5. World Health Organization. Global Strategic Directions for Strengthening Nursing and Midwifery 2016-2020. Geneva: WHO; 2016. Available from: https://www.who.int/publications/i/item/9789241510455

6. Shen Y, Jian W, Zhu Q, Li W, Shang W, Yao L. Nurse staffing in large general hospitals in China: an observational study. Hum Resour Health 2020;18(1):3. DOI: 10.1186/s12960-020-0446-5

7. Liu JX, Goryakin Y, Maeda A, Bruckner T, Scheffler R. Global Health Workforce Labor Market Projections for 2030. Hum Resour Health 2017;15(1):11. DOI: 10.1186/s12960-017-0187-2

8. World Health Organization. State of the World's Nursing 2020: Investing in Education, Jobs and Leadership. [Internet] Geneva: WHO; 2020. Available from https://www.who.int/publications/i/item/9789240003279

9. Yi J and Kim J. Impact evaluation of nurse staffing policy reform in Korea: A quasi-experimental study. J Nurs Manag. 2022;30(7):3457–65. DOI: 10.1111/jonm.13815

10. Ozdemir H, Söyüncü Y, Ozgörgen M, Dabak K. Effects of changes in heel fat pad thickness and elasticity on heel pain. J Am Podiatr Med Assoc. 2004;94(1):47-52. doi: 10.7547/87507315-94-1-47. PMID: 14729991.

11. IDF Diabetes Atlas 2021. International Diabetes Federation, Brussels, Belgium; 2021. Available from https://diabetesatlas.org/atlas/tenth-edition/.

12. Frykberg RG, Wukich DK, Kavarthapu V, Zgonis T, Dalla Paola L; Board of the Association of Diabetic Foot Surgeons. Surgery for the diabetic foot: A key component of care. Diabetes Metab Res Rev. 2020;36 Suppl1:e3251. DOI: 10.1002/dmrr.3251. Epub 2019 Dec 10. PMID: 31820543.

13. Wolf ZR, Giardino ER, Osborne PA, Ambrose MS. Dimensions of nurse caring. Image J Nurs Sch. 1994;26(2):107–11. DOI: 10.1111/j.1547-5069.1994.tb00927.x

14. Wu Y, Larrabee JH, Putman HP. Caring Behaviors Inventory: a reduction of the 42-item instrument. Nurs Res. 2006;55(1):18–25. DOI: 10.1097/00006199-200601000-00003

15. He T, Du Y, Wang L, Zhong ZF, Ye XC, Liu XH. Perceptions of caring in China: patient and nurse questionnaire survey. Int Nurs Rev 2013;60(4):487-93. DOI: 10.1111/inr.12058

16. Da CJ, Cao FL, Zhang XF, Cui NX, Tian QX, Dong LJ. Translation and validation caring behavior inventory. Chin J Nurs Sci 2017;32:72–75

17. Jiang W, Jiang J, Zhao X, Liu Z, Valimaki MA, Li X. Nurse and Patient Assessments of COVID-19 Care Quality in China: A Comparative Survey Study. Int J Environ Res Public Health. 2023;20(3):2717. DOI: 10.3390/ijerph20032717

18. Hinshaw AS and Atwood JR. A Patient Satisfaction Instrument: precision by replication. Nurs Res 1982;31(3):170-5, 191.

19. Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). Arthritis Care Res (Hoboken) 2011;63 Suppl11:S240-52. DOI: 10.1002/acr.20543

20. Kargar L, Khademian Z, Rambod M. Association between perception of caring behaviors and self-efficacy in patients with cardiovascular disease at coronary care units: a cross-sectional study. Acute Crit Care 2021;36(2):118-25. DOI: 10.4266/acc.2020.00752

21. Papastavrou E, Efstathiou G, Tsangari H, Suhonen R, Leino-Kilpi H, Patiraki E, et al. A cross-cultural study of the concept of caring through behaviours: patients' and nurses' perspectives in six different EU countries. J Adv Nurs. 2012;68(5):1026-37. DOI: 10.1111/j.1365-2648.2011.05807.x

22. Wang Y, Liu B, Pi Y, Hu L, Yuan Y, Luo J, Tao Y, Li P, Lu S, Song W. Risk factors for diabetic foot ulcers mortality and novel negative pressure combined with platelet-rich plasma therapy in the treatment of diabetic foot ulcers. Front Pharmacol. 2022;13:1051299. DOI: 10.3389/fphar.2022.1051299. PMID: 36588684; PMCID: PMC9800930.

23. Shemesh S, Sidon E, Heller S, Cohen N, Kosashvili Y, Dovrat R, Velkes S, Burg A. The quality of informed consent obtained for orthopedic surgeries-elective versus trauma: A prospective interview-based study. J OrthopSurg (Hong Kong). 2019;27(2):2309499019847021. DOI: 10.1177/2309499019847021. PMID: 31068118.

24. Gray M, Ratliff C, Mawyer R. A brief history of advanced practice nursing and its implications for WOC advanced nursing practice. J Wound Ostomy Continence Nurs. 2000;27(1):48-54. DOI: 10.1016/s1071-5754(00)90042-1. PMID: 10649144.

25. Amirmohseni L and Nasiri M. The Important Role of Specialist Nurse in the Improvement of Patients with Diabetic Foot Ulcer: Letter to the Editor. Jentashapir J Health Res. 2014; 5(5): e23226. DOI: 10.5812/jjhr.23226

26. Okafor L, Chen AF. Patient satisfaction and total hip arthroplasty: a review. Arthroplasty 2019;1(1):6. DOI: 10.1186/s42836-019-0007-3

27. Revicki DA. Patient assessment of treatment satisfaction: methods and practical issues. Gut. 2004;53 Suppl 4(Suppl 4):iv40-4. DOI: 10.1136/gut.2003.034322. PMID: 15082613; PMCID: PMC1867784.

28. Graham B, Green A, James M, Katz J, Swiontkowski M. Measuring patient satisfaction in orthopaedic surgery. J Bone Joint Surg Am. 2015;97(1):80-4. DOI: 10.2106/JBJS.N.00811.