Original Article

The Effect of Implementing 3S (SIND, SINO, SINI)-based Orthopedic Nursing Care Instrument in Improving Nursing Service Quality and Patient Safety in Indonesia Hospital

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ABSTRACT

Along with the increasing of orthopedic disorders incidence, the provision of orthopedic nursing care in Indonesia is also increasing. The Indonesian National Nurses Association (INNA) has published nursing care standards as a reference for nurses in providing nursing care and standardizing nursing care terminologies. Standard-based orthopedic nursing care instruments have been developed, but their effectiveness has not been investigated in improving the quality of nursing services and patient safety. This study aimed to identify the effect of the application of 3S-based Orthopedic Nursing Care (3S-ONC) on the quality of nursing services and patient safety. Descriptive quantitative analysis using a quasi-experimental method with a pretest and posttest with control group design, involving 106 respondents (53 control, 53 intervention), recruited by purposive sampling technique. In the intervention group, nurses provided nursing care by applying the 3S-based Orthopedic Nursing Care (3S-ONC) instrument. The study showed that in both groups, most of the nurses were in the early adult category, dominated by female sex and most of them had professional education level. There were significant differences in the quality of nursing services (p 0.046; α 0.05) and patient safety (p 0.000; α 0.05) between the intervention group and the control group after the application of the 3S-ONC instrument. The 3S-ONC instrument can improve the quality of nursing services and the safety of patients with orthopedic disorders in hospitals.The 3S-ONC instrument can be considered for the development of a paper-based or computer-based nursing care documentation system to further improve the quality of nursing services and patient safety in healthcare facilities, especially in hospital.

Keywords : Instrument; nursing care; nursing service quality; orthopedic; patient safety.

INTRODUCTION

Orthopedic disorders are a large and complex clinical condition, not only limited to bone fractures and soft tissue injuries, but also musculoskeletal conditions. Musculoskeletal problems contribute to a significant workload and massively increase the burden on hospitals.[1,2] The latest analysis of 2019 Global Burden of Disease (GBD) data showed that around 1.71 billion people worldwide are living with musculoskeletal conditions, including low back pain, neck pain, broken bones, other injuries, osteoarthritis, amputations, and rheumatoid arthritis. 3 The incidence of injuries that could lead to fractures showed an increasing prevalence, 8.2% in 2013 and 9.2% in 2018. The proportion of injured limbs is 67.9% of the lower extremities and 32.7% of the upper extremities.[4]

Orthopedic nursing care is a special nursing action for patients with cases of extremity fractures.[5,6] or orthopedic disorders involving bones, muscles and nerves, either due to disease or non-disease factors.[7,8] The scope of orthopedic nursing care varies greatly from simple fractures to multiple fractures, even

chronic bone and joint diseases.[9]

Orthopedic nursing care does not refer to standards, causing inconsistency in nursing diagnosis, outcomes, and interventions.[5,10] Orthopedic nursing care requires terminology standardization to unify the clinical language used in nursing practice.[11] Since 2016, the Indonesian National Nurses Association (INNA) has published the standard of Indonesian nursing diagnosis (SIND), standard of Indonesian nursing outcome (SINO), and standard of Indonesian nursing intervention (SINI), called the 3S. The 3S are expected to be a reference for Indonesian nurses in implementing consistent, accurate and unambiguous nursing care. Inaccuracies in decision-making and discrepancies in nursing care can be avoided.[11–13]

Aspects that can support the quality of nursing services include the use of standardized terminology and nursing care documentation instruments that are in accordance with nursing clinical practice standards.[14,15] In addition, the use of standards in the provision of nursing care is important in the successful integration of electronic-based nursing documentation.[16,17] Orthopedic nursing care instruments have been developed based on nursing care standards, namely the 3S-based Orthopedic Nursing Care (3S-ONC) instrument, but their effectiveness has not been investigated to improve the nursing service quality and patient safety.

The development of 3S-ONC instrument has been through the process of preparation, expert consultation and improvements. The preparation of the 3S-ONC instrument begins with the identification of the most common nursing diagnoses in orthopedic cases from various literatures/articles of orthopedic and/or medical-surgical nursing, which then formulate nursing outcomes and nursing interventions based on the identified nursing diagnoses. The components of nursing diagnosis, outcomes and interventions are reviewed and adjusted according to the terminology based on 3S. Then the instrument was consulted with experts and revised according to inputs from experts.

The nursing services quality consists of three stages, namely structure, process, and outcome. Structure is the interaction between the healthcare system and the patient. Structure evaluation involves assessing the number and categories of nursing staff, nurse-patient ratio, patient characteristics, availability of nursing care plans, and nursing staff training in the nursing process. Process refers to all interventions and interactions between patients and nurses. Process evaluation involves assessing procedures performed on patients, applying the nursing process, using nursing procedure guidelines, nurse-patient relationships, and documentation of nursing care. Structure and process will determine the outcome. Outcome evaluation focuses on patient outcomes as a result of services provided by nurses to patients. These outcomes include nurse job satisfaction, patient satisfaction with the services provided, and the level of patient participation in services.[18]

Patient safety consists of seven standards, namely patient rights, educating patients and families, continuity of care, using performance improvement methods, leadership roles, educating staff about patient safety, and communication.[19–21] This study aimed to analyze the effect of the application of 3S-based orthopedic nursing care instruments (SIND, SINO, SINI) on the quality of nursing services and patient safety in hospitals.

METHODS

This quantitative analytic-descriptive study used a quasi-experiment method with a pretest and posttest with a control group design. Respondents were divided into two groups, the intervention group and the control group. Respondents in the intervention group provided nursing care by implementing the 3S-ONC instrument, while respondents in the control group provided nursing care without implementing the 3S-ONC instrument. Before and after the implementation of the 3S-ONC instrument, both in the control and intervention groups, the quality of nursing care and patient safety was measured.

This study involved 106 respondents (n control 53 respondents, n intervention 53 respondents), recruited by purposive sampling technique. Inclusion criteria: working in the orthopedic unit for at least two years, education level minimum diploma (three years of vocational education), and permanent employee status.

Instruments

Some of the instruments used include the demographic questionnaire, the 3S-ONC instrument, the nursing service quality

questionnaire, and the patient safety questionnaire. The demographic questionnaire contains questions about age, gender, and last education level. The 3S-ONC instrument is the fill-text and checklist forms to facilitate nurses in conducting assessments, formulating nursing diagnoses, determining nursing outcomes and planning nursing interventions based on 3S. This instrument was developed by the authors through the following stages: identification of instrument development factors, focus group discussions, expert consultation, and instrument development.

Respondents in the control and intervention groups filled out demographic questionnaires, then the quality of nursing services and patient safety were measured. Respondents in the intervention group implemented the 3S-ONC instrument with four stages (socialization, externalization, combination and internalization). After the implementation of the 3S-ONC instrument, both in the control and intervention groups, the nursing service quality and patient safety were re-measured

The nursing service quality and patient safety questionnaire were developed by the authors. The nursing service quality consists of 38 statements to assess the aspects of acceptance, concern, responsibility, communication, patient satisfaction, and performance. The patient safety questionnaire consists of 17 statements to assess aspects of patient identification, effective communication, drug accuracy, surgical procedure accuracy, fall risk, and infection risk. Both questionnaires use a 4-level Likert scale (strongly disagree, disagree, agree, strongly agree).

Study Procedures

The pretest was conducted to measure nursing services quality and patient safety prior to intervention. In the intervention group, the following stages were carried out:

a. Socialization, respondents were given three days on the implementation of 3S-ONC instrument. The first and second day of training was held online with the topics: nursing process, patient safety, nursing service quality, orthopedic nursing care, 3S-based orthopedic nursing care (SIND, SINO, SINI), and application of 3S-ONC instrument. The third day of training was held offline in the classroom to demonstrate the implementation the 3S-ONS instruments.

b. Externalization, carried out for two weeks: bedsides teaching to implement the 3S-ONC instruments for patient with orthopedic disorder in inpatient rooms.

c. Combination, carried out for one week: respondents independently (without assistance or supervision) implement the 3S-ONC for patient with orthopedic disorder in inpatient rooms by respondents.

d. Internalization, carried out for two months: researcher observed respondents to find out how effective nurses used 3S-ONC instrument for orthopedic patients in inpatient rooms. Then, investigated the effect on the quality of nursing services and patient safety.

In the control group, respondents did not provide nursing care using instruments. After that, a posttest was carried out for the intervention and control groups to determine the nursing services quality and patient safety after the intervention.

Univariate analysis to identify the proportion of respondent characteristics (i.e. age, gender, level of education), nursing services quality and patient safety. Bivariate analysis to identify differences in effect between before and after the intervention using paired t tests on normally distributed data and the Wilcoxon test on non-normally distributed data. The difference in effect between the intervention group and the control group was analyzed by pooled t test on normally distributed data and Mann Whitney on non-normally distributed data.

Prior to data collection, prospective respondents were explained about study purpose, then asked for their willingness to become respondents voluntarily. Any data provided by the respondent is kept confidential by not including the respondent's name in the study document. The data provided by the respondents are only used for study purposes. This study was carried out after obtaining Ethical Approval No: 2540-KEPK issued by the Research Ethics Committee of the Faculty of Nursing, Universitas Airlangga on June 3, 2022.

RESULTS

Table 1 shows that, in both the intervention and control groups, most of the nurses were in the early adult category, dominated by women, and most had professional nurse education (4 years bachelor + 1 year of clinical practice).

Table 1. Distribution of Nurse Characteristics (n=53)

Nurse Characteristics	Group		Total	Homogenity
	Intervention (n=53)	Control (n=53)		
Age				
Adolescene	2 (3.8%)	1 (1.9%)	3 (2.8%)	
Early adulthood	33 (62.3%)	35 (66%)	68 (64.2%)	
Late adulthood	10 (18.9%)	15 (28.3%)	25 (23.6%)	0.172[*]
Early senior	8 (15.1%)	2 (3.8%)	10 (9.4%)	
Gender				
Man	15 (28.3%)	18 (34%)	33 (31.1%)	
Woman	38 (71.7%)	35 (66%)	73 (68.9%)	0.529[*]
Education Level				
Diploma	24 (45.3%)	20 (37,7%)	44 (41.5%)	
Professional	27 (50.9%)	33 (62.3%)	60 (56.6%)	0.227[*]
Master	2 (3.8%)	0 (0%)	2 (1.9%)	

*) Homogent on α 0.05

Table 2 shows a significant difference in the nursing services quality before and after the implementation of the 3S-ONC instrument in the intervention group (p 0.000; α 0.05). The nursing services quality in the control group showed no significant difference (p 0.198; α 0.05) between the two groups. Furthermore, there was a significant difference in patient safety between before and after the application of the 3S-ONC instrument in the intervention group (p 0.000; α 0.05). Patient safety in the control group showed no significant difference between the two groups (p 0.869; α 0.05).

Table 2. Analysis of Differences in the Nursing Services Quality and Patient Safety Before and After Intervention (n=53)

Variable	Observations							
	Intervention (n=53)		Δ	p	Control (n=53)		Δ	p
	Pre	Post			Pre	Post		
Nursing Service Quality								
Mean ± SD	105.9±8.6	115.3±8,9	12.03	0.000[a]	116.6 ± 7.9	118.7±8,3	2.1	0.198[b]
Min-Max	91-132	100-136			90-129	90-130		
Patient Safety								
Mean ± SD	57.6 ± 7	68.8 ± 9.8	13.45	0.000[a]	61.9 ± 4.2	62±4.4	3.96	0.869[a]
Min-Max	39-68	51-91			48-68	48-68		

[a]Wilcoxon test, [b]Paired t test

Table 3 shows a significant difference in the quality of nursing services between the intervention group and the control group after the implementation of the 3S-ONC instrument (p=0.046; α 0.05). In addition, there was also a significant difference in patient safety between the intervention group and the control group after the implementation of the 3S-ONC instrument (p=0.000; α 0.05).

Table 3. Analysis of Differences in Nursing Services Quality and Patient Safety After Intervention (n=53)

Variabel	Group		Δ	p
	Intervention	Control		
Nursing Service Quality				
Mean ± SD	115.3 ± 8.9	118.7 ± 8.3	9.86	0.046[a]
Min-Max	100-136	90-130		
Patient Safety				
Mean Rank	65.9	41.1	10.00	0.000[b]
Min-Max	51-91	48-68		

[a]Pooled t test, [b]Mann Whitney test

DISCUSSION

This study showed that the majority of nurses have a professional nurse education level. Klemetti et al. (2018) revealed that orthopedic nurse education needs to be strengthened to increase the knowledge, competence, and skills of nurses in providing evidence-based nursing care and education to patients with orthopedic disorders.[22] Rahman, Jarrar and Do (2015) also revealed that nursing knowledge and skills are required to sustain quality of care and patient safety.[23] The systemic review by Sibandze and Scafide (2018) concluded that nurses with higher educational levels adhere to professional values as the basis for quality of nursing service. Health and academic institutions should support nurses in increasing education to higher level that reinforces professional values, thus improving service quality and patient safety.[24]

This study showed that, in the intervention group, there was a significant effect on the implementation of 3S-ONC instrument on the nursing services quality. The nursing services quality requires meeting the needs and expectations of patients, through conformity of nursing care with existing or relevant nursing care standards.[25] Furthermore, nursing services quality will increase patient satisfaction, reduce costs, and increase nurse productivity due to increased morale and standardization of nursing care processes.[26] Seeing this, the authors argue that the use of the 3S-ONC instrument will increase the standardization of nursing care delivery, which will ensure the consistency of the quality of nursing services in every patient with orthopedic disorders.

This study showed that there is no significant effect on the application of 3S-ONC instrument on patient safety in the control group, whereas, in the intervention group, there was a significant effect on the application of 3S-ONC instrument on patient safety. The study by Widiasari, Handayani and Novieastari (2019) showed that 80.5% of patient safety has been implemented by nurses, but the application of patient safety aspects in the form of patient fall risk reassessment and dimensions of reliability (giving instructions, giving explanations) when carrying out nursing actions still not optimal. [27] This is inseparable from perception, which is a personal aspect that is owned by each individual and which describes the assessment of the object of concern.[28,29] The service quality consists of responsiveness, assurance, physical evidence, empathy and reliability. Moldskred, Snibsøer and Espehaug (2021) revealed that service quality is prepared by individual nurses, and continuous quality improvement is a process of active learning and improvement, rather than a process of passive improvement by individual nurses.[30]

In addition, the expected service quality is strongly influenced by various perceptions of word-of-mouth communication, personal needs, past experiences and external communications, establishing the concept of service quality. Satisfaction felt by patients is inseparable from the ability of nurses to provide nursing services according to standards, where the research standards referred to by researchers are related to patient safety goals, one of which is identifying patients with a caring approach carried out through therapeutic communication techniques. This is influenced by a significant relationship between the quality of nursing services and patient safety.[20,31] Patient satisfaction with nursing care is the most important predictor of overall satisfaction with hospital care and an important goal of any healthcare facility.[32]

The quality of nursing services has a relationship with patient safety. To achieve quality nursing services, it is necessary to achieve indicators such as health promotion behavior, quality of life management of signs and symptoms, patient mortality and morbidity rates. By achieving these indicators, patient safety can be guaranteed at the same time.[33–35]

Patient safety is accepted as one of the most important indicators of quality of patient care worldwide and, furthermore, one of the most fundamental principles of nursing care.[36] Patient safety in orthopedics is increasingly important and has been considered a core concept of service quality. Besides that, patient safety is the cornerstone of high-quality nursing services. Most aspects of patient safety focus on preventing harm and negative outcomes from treatment, such as mortality and morbidity. Nurses play an important role in supervising and coordinating to reduce the harm and adverse negative outcomes. However, there is still much work to be done in evaluating the impact of nursing care on indicators of the quality of nursing services, such as proper self-care and other actions to improve health status.[21,34,35] Basically, a health service

organization should have a positive safety culture which also has a patient safety culture dimension. The patient safety culture dimension consists of four dimensions, namely open culture, reporting culture, just culture, and learning culture.

The 3S-ONC instrument can improve the quality of nursing services and patient safety. The results show that the nurse factor and quality improvement factor can directly improve the quality of nursing services. Nurse factors also directly improve patient safety. Furthermore, the care process factor directly enhances 3S-ONC instrument. The 3S-ONC instrument can directly improve the quality of nursing services and indirectly improve patient safety. Furthermore, the quality of nursing services directly improves patient safety. The relatively small sample size in this study requires discretion to generalize the results to the population.

The 3S-ONC instrument can provide practical contributions as follows: as input material for healthcare institutions in improving the quality of existing 3S-based nursing care documentation systems to further improve quality of nursing services; as the development of medical-surgical nursing instruments using an appropriate and targeted approach to improve the quality of nursing care for orthopedic patients. The results of this study can be used as standard to improve the quality of nursing care and orthopedic patient safety

CONCLUSION

The implementation of the 3S-ONC instrument has an effect on improving the quality of nursing services and patient safety in hospitals. The 3S-ONC instrument can be considered for the development of a paper-based or computer-based nursing care documentation system to further improve the quality of nursing services and patient safety in healthcare facilities, especially hospitals. In this study, the 3S-ONC instrument was applied to the adult patient population. Further studies are needed to investigate the effectiveness of this instrument in other populations.

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