ORIGINAL RESEARCH

Effect of Nurse Performance in Patient Safety Target Based on Knowledge Management: SECI on Quality of Nursing Services

Harif Fadhillah*, Nursalam, Muhammad Hadi

*Master of Nursing Program, Faculty of Nursing Science,
Muhammadiyah University of Jakarta, Jalan Cempaka Putih Tengah I No.1
Jakarta Pusat 10510, Indonesia, Phone/Fax (021)42800364*

(Received: September 2017/ Revised: December 2017/ Accepted: December 2017)

Abstract

Appropriate knowledge management will improve nurse performance. There have been numerous studies on nurse performance, but studies on nurse performance of Knowledge management: SECI in Indonesia have not been widely reported and therefore researchers interested in conducting this study. This study aims at identifying the effect of performance in patient safety target based on Knowledge Management: SECI on the quality of nursing services in Jakarta Islamic Hospital of Pondok Kopi. The study employed quasi experimental design of pre and posttest with control group. The respondents were nurses who worked in the inpatient unit with a sample size of 24 respondents in the intervention group and 37 respondents in the control group. The instrument used to measure pre-posttest was patient safety developed by Nasution (2013) with validity value of 0.444-0.772 and reliability of Cronbach's Alpha of 0.950; and the adverse events developed by the researchers. Intervention protocols in the form of performance in patient safety target based on Knowledge Management: SECI were given through training. The analysis employed statistical tests of Mann Whitney and Wilcoxon. The study found that there was a change in patient safety before and after intervention in the intervention group rather than in the control group. There were differences in the scores of patient safety/quality of nursing care after treatment in the intervention group and the control group. The study recommends regular training for nurses concerning performance in patient safety target based on Knowledge Management: SECI, and further studies in different hospitals.

Keywords: Knowledge management: SECI; nurse; patient safety; performance

Introduction

The quality of hospital health services is determined by the quality of nursing services, which is a determinant factor of the image of health service institution in the society. This happens because nurse is a professional group which is the largest in number, foremost, closest and longest in contact with patients/clients and their family in the process of achieving their health. One of the indicators of the quality of nursing services is efforts to achieve patient safety.

High quality of nursing services can be achieved through efforts to improve health/nursing services. Such efforts provide health services efficiently and effectively in accordance with professional standards, which are implemented comprehensively according to the needs of patients, utilizing efficient technology and research results in the development of health/nursing services in order to achieve optimal health (Nursalam, 2015). Such efforts to achieve these qualities, which

*Corresponding author's e-mail: harifadh@gmail.com

would be measured using patient satisfaction levels and patient safety efforts performed by nurses in the hospital, are highly dependent on the optimal nurse's efforts or activities and these efforts show the achievement of work corresponding to expectations, which known as performance.

Nurse performance with high achievement of work is greatly affected by various factors such as work system applied to hospital/institution, adequate work-supporting sources, and nurses' characteristics. The factors of nurses' characteristic include knowledge, skills, ability to perform care, motivation, attitudes, norms and values adopted. Nurse's knowledge is the primary element of characteristics in achieving performance. Brown & Edward (2005) explain that service quality is associated with effectiveness, punctuality, benefits, efficiency, continuity, and consistency of nursing services provided to patients, families, and communities. This shows that the quality of nursing service is affected by nurse performance. Nurse performance is based on guidelines and standards that serve as the reference in nursing services. The reference of performance can also be seen from the aspect of patient safety, which is the achievement of Patient Safety target.

The ability to manage and organize the knowledge owned by nurses is one of the factors that can provide nurses opportunities to carry out more systematic and structured activities. The concept of Knowledge Management is currently receiving much attention from researchers as a new study in order to obtain other models in solving nursing management problems. The knowledge of a nurse in patient safety with six patient safety targets will have a positive impact on nursing services in general.

Studies in several hospitals in Indonesia recorded significant frequencies of adverse and sentinel events. A study conducted in 2004 at the Central General Hospital (RSUP) Dr. Sardjito found 60% errors of commission during the administration of antibiotic prophylaxis and 90.5% error of commission (Putri, 2004). A different study in Gunung Sitoli General Hospital of Nias on a study of malaria management discovered a total of 98 case of misdiagnosis, 89.13% of which consisted of 82 error of commission (Hulu et al., 2009).

Other similar study in 2011 found adverse event (AE) rate of 26.3% and sentinel event (SE) rate of 73.7% with types of event included misidentification of patients, errors in drug administration (wrong patient, type of drug), swapped patient's blood sample, and falling incident in patients (Mustikawati, 2011). The Indonesia Hospital Association also recorded data from insurance company and studies noting 37 cases of claims against medical treatment during 2007 in JABODETABEK (Jakarta-Bogor-Depok-Tangerang-Bekasi) dan 12 cases in January 2008 (Indonesian Hospital Association/PERSI, 2009). These data indicate that there were events related to patient safety in hospitals that require nurse's role in preventing and minimizing them.

There have been a lot of studies related to the improvement of nurse performance for the quality of nursing services which are limited to the correlational study. However, there has not been any report in the use of intervention with nurse performance approach of Knowledge management: SECI (socialization, externalization, combination, internalization) in order to identify the effect of nurse performance with knowledge management-based Patient Safety Target, which is one of the indicators that can reflect quality of nursing services. The existing interventions include providing information about patient safety. In addition, there have been many studies on nurse performance, but studies on nurse performance concerning Knowledge management: SECI in Indonesia have not been widely

reported. In general, this study aims at identifying the effect of nurse performance in Patient Safety Target based on knowledge management: SECI on quality of nursing services. In particular, this study aims at identifying the effect of performance in patient safety target based on Knowledge management: SECI on patient safety and incident of adverse events in Jakarta Islamic Hospital of Pondok Kopi.

Method

This study employed a quasi-experimental design with pre and posttest with control group which aimed to measure the effect of nurse performance in patient safety based on Knowledge management: SECI on the quality of nursing services (patient safety and incident of adverse events) by measuring the quality of nursing services before (pretest) and after (posttest) the intervention (Creswell, 2014; Polit & Hungler, 2001). The study respondents were nurses who worked in the inpatient unit, and were not on leave, study permits and office holidays. The exclusion criteria of the study were nurses who worked in midwifery, intensive care, operating room, and VIP/Main room. The sample size was 24 respondents (An Nur 1 room and An Nur 2 room) and control group consisting of 37 respondents (An Nas 1 room and An Nas 2 room) according to the inclusion criteria.

The instruments used were 1) questionnaire of characteristics of respondents containing demographic data from nurses such as age, income, employment status, education level, length of work, gender developed by the researchers based on need; 2) quality of nursing service consisting of patient safety and unexpected events. Patient safety used instruments developed by Nasution (2013) in the form of patient safety including Patient Identification Accuracy, Improvement of Effective Communication, Improvement of the Safety of High-alert Medications, Certainty of Proper Location, Proper Procedure and Proper Surgical Patients, Reduction of Infection Risk through 6 Handwashing Steps, Risk Reduction of Patient Falls by using Likert Scale. The test results showed that the instrument was valid with a range value of 0.467-0.99 and reliable with Cronbach's Alpha value of 0.930. Meanwhile, the incident of adverse events referred to undesirable events using observation sheets developed by researchers in the form of undesirable events measured in accordance with conditions found in the workplace based on the Home Accreditation guidebook; 3) Intervention in the intervention group in the form of patient safety and nurse performance in patient safety target based on knowledge management: SECI, while in the control group in the form of patient safety.

On the first day of the study, the objectives and benefits of the study were explained to the intervention and control groups which consisted of nurses as respondents (selected according to the inclusion criteria). Furthermore, respondents who were ready were asked fill in informed consent. Respondents subsequently fill in the patient safety questionnaire (pretest) and the researchers accompanied the respondents in the intervention group. For the control group, the researchers were assisted by the research assistants to give the respondent the same questionnaire as the intervention group (pretest). The research assistants consisted of 3 persons with nursing education who were from the hospital used as the research site and did not participate as the research respondents. The questionnaires and observation sheets were first explained to researcher's assistants in order to have the same perceptions. Afterwards, the respondents attended a training for 2 days.

The intervention group was given knowledge about nurse performance in the patient safety target based on knowledge management: SECI for two days, i.e. the first day to receive knowledge about the patient safety target given by an expert of hospital patient safety and the second day to receive the material about the nurse performance in the patient safety target based on knowledge management: SECI given by the researchers. After receiving knowledge, the respondents applied the knowledge from the training independently for one week. Meanwhile, the control group only received knowledge about patient safety.

Furthermore, after applying it independently, the respondents of the intervention group were asked to conduct an evaluation by re-filling in the questionnaire of nursing service quality, i.e. patient safety (posttest) and the researchers accompanied the respondents. For the control group, the researchers were assisted by the research assistants to give the respondents the same questionnaire as the intervention group (posttest). The incidents of patient safety in the form of adverse events in the intervention group and control group were taken from room documentation data for 6 (six) months.

This research adopted the ethical principles of research including respect for person, beneficence, nonmaleficence and justice (Departemen Kesehatan RI, 2005). Meanwhile, the control group received the same treatment as the intervention group after the study was completed. This research also obtained an ethical clearance test from the ethical committee of the Faculty of Nursing Science, Muhammadiyah University of Jakarta.

Data were analyzed using univariate analysis and bivariate analysis. Univariate analysis was shown in two data sets, namely numeric data (mean, standard deviation and range, age, income, length of work) and categorical data (frequency and percentage of gender, education, employee status, patient safety, adverse events (patient safety incident). Bivariate analyzes included 1) analysis of equivalent test between intervention group and control group using Spearman and Chi-square test, and 2) statistical test using Wilcoxon and Mann Whitney.

Results

1. Patient Safety

The results of the study based on patient safety including Patient Identification Accuracy, Improvement of Effective Communication, Improvement of the Safety of High-alert Medication, Certainty of Accurate Location (side), Accurate Procedure and Accurate Surgical Patients, Reduction of Infection Risk through 6 Handwashing Steps, Reduction of Risk of Patient Falls are presented in Table 1.

Based on the results of the statistical test in Table 1, the highest scores of the intervention group and the control group are closely equal in the Certainty of accurate location (side), accurate procedure and accurate surgical patients, Reduction of infection risk through 6 handwashing steps, Reduction of Risk of patient falls. Meanwhile, the intervention group perceived less than the control group in terms of patient identification, improvement of effective communication, improvement of the safety of high-alert medications. The cut-of-point used median due to non-normal distribution.

Table 1. Distribution of frequency of respondents based on the accuracy of 6 patient safety target prior to intervention (n1=24, n2=37)

Variable	Intervention Group		Control Group	
	f	%	f	%
Patient Identification Accuracy				
- Less accurate	6	25	6	16.2
- Accurate	18	75	31	83.8
Improvement of effective communication				
- Less effective	13	54.2	9	24.3
- effective	11	45.8	28	75.7
Improvement of the safety of high-alert medications				
- Less	14	58.3	3	8.1
- Safe	10	41.7	34	91.9
Certainty of accurate location (side), accurate procedure and accurate surgical patient				
- Less accurate	0	0	1	2.7
- Accurate	24	100	36	97.3
Reduction of risk of infection through 6 hand washing steps				
- Less risk of infection	0	0	2	5.4
- Risk of infection	24	100	35	94.6
Reduction of risk of falling patients				
- Less risk of fall	4	16.7	8	21.6
- Risk of fall	20	83.3	29	78.4

2. Equivalent Test

The results of the study based on the characteristics of respondents including age, income, length of work are described in Table 2.

Based on the results of the analysis in Table 2, it was found that the average age of the intervention group and the control group was in the range of the end of young adult and entering the middle adult; average income of the intervention group was higher (Rp 5,529,166.67) than that of the control group (Rp 4,313,514.51) and the length of the intervention group was higher (15.88 years) than that of the control group (11.08 years). The result of equivalent test of the intervention group and the control group is equal to $p \text{ value} > 0.05$.

This study did not cover the characteristics of quality of nursing services (patient safety and incident of adverse events) after giving the intervention of nurse performance in Patient Safety Target based on knowledge management: SECI because the small number of research samples.

Table 2. The equivalent test of respondents based on age, income and length of work (n1 = 24, n2 = 37)

Variable	Mean	Median	SD	Minimum, Maximum	95%CI	p value
Age						
- Intervention group	38.33	40.00	6.71	25.48	35.50-41.17	0.345
- Control group	33.41	34	6.26	23.47	31.32-35.49	
Incomes						
- Intervention group	5,529,166.67	5,000,000	1,561,348.13	3,500,000 8,000,000	4,869,867.1- 6,188,466.16	0.725
- Control group	4,313,514.51	4,000,000	847,598.62	3,500,000 6,000,000	4,030,910.0- 4,596,116.96	
Length of work						
- Intervention group	15.88	16.50	6.81	3 26	13.00-18.75	0.824
- Control group	11.08	11	5.93	1 25	9.10-13.06	

3. Bivariate Test

The bivariate test conducted to answer the specific objectives and hypotheses of the Second Phase of the study was as follows:

a. Changes in Patient Safety Before and After Being Given the Intervention of Nurse Performance in Patient Safety Target Based on Knowledge Management: SECI.

The results of bivariate test using the Wilcoxon statistical test to see the changes in patient safety before and after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI are Table 3 below:

Table 3. Statistical test of the changes in patient safety before and after the interventions of nurse performance in patient safety target based on knowledge management: SECI (n1 = 24, n2 = 37)

Variable	SD error	SD statistical test	p value
Patient safety before and after the intervention in the intervention group	26.091	3.53	<0.001
Patient safety before and after the intervention in the control group	26.384	1.57	0.116

n1 = Intervention group, n2 = Control group

Based on statistical test results in Table 3, it was found that a change in positive understanding of patient safety in the intervention group increased after the intervention compared to the control group, with nearly similar standard deviation of error. The results of the analysis showed that there was a change of patient safety before and after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI in the intervention group ($p < 0.001$), while in the control group there was no change in patient safety before and after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI ($p = 0.116$).

b. Differences in Patient Safety in the Intervention Group and Control Group After Being Given the Intervention of Nurse Performance in Patient Safety Target Based on Knowledge Management: SECI

The results of bivariate test using Mann Whitney statistical tests to see the differences of patient safety in the intervention group and the control group after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI are presented in Table 4 below:

Table 4. The statistical test of the differences of patient safety in the intervention group and the control group after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI ($n_1 = 24$, $n_2 = 37$)

Variable	Mean rank	Test statistic	SD Error	SD statistical test	p value
Patient safety after the intervention in the intervention and control group		33.5	14.67	-2.32	0.021
- Poor	16.28				
- Good	10.23				

n_1 = Intervention group, n_2 = control group

Based on the results of statistical test in Table 4., it was found that the understanding of patient safety in the intervention group was better than that in the control group after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI, with standard deviation of error of 14.67. The results of the analysis showed that there was a difference of patient safety in the intervention group and the control group after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI ($p = 0.021$).

c. Adverse Event in the Intervention Group and the Control Group After Being Given the Interventions of Nurse Performance in Patient Safety Target Based on Knowledge Management: SECI

The results of statistical tests of adverse event in the intervention group and the control group after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI are presented in Table 5 below:

Table 5. Distribution of the number of Patient Safety Incidents in Islamic Hospital Jakarta July 2017

Variable	percentage
Adverse event	0.08
Reportable Circumstance	0
No harm incident	0
Near miss	0
Sentinel	0

Based on the results of percentage in Table 5, it was found that adverse event was only 0.08%, that the incident of infection was still found after the intervention when the patient was discharged from the hospital, while other variables were not found.

Discussion

Patient Safety Performance

Based on the result of the research, it was found that the preliminary knowledge of the intervention group and the control group was almost similar. This is consistent with the theory that humans generally receive information from the environment through the same process, therefore in understanding perception there should be a process in which there is information obtained through the memory of living organisms. This fact facilitates the improvement of individual perceptions, a stimulus that affects the individual that triggers an experience of the organism, resulting in thinking that in the perceptual process is the highest process (Graham, 1999 in Hitchcock, Schubert, & Thomas, 2003).

Patient safety is in accordance with the Regulation of Minister of Health Number 11 of 2017 stating that every hospital must seek fulfillment of Patient Safety Target. Patient Safety Target include the achievement of the following items:

1. Accuracy of patient identification;
2. Improvement of effective communication;
3. Improvement of the safety of high-alert medications;
4. Certainty of accurate location, accurate procedure, accurate surgical patients;
5. Reduction of risk of infection related to health services; and
6. Reduction of risk of the falling patient.

Things to be improved are effective communication, safety of high-alert medications, risk of falling patients and reduction of infection through 6 handwashing steps. Those components are attached to the nurse in improving the performance through self-awareness to change so that the patient safety will improve, so that it needs a standard in the form of patient safety target.

Patient Safety Target is a requirement to be applied in all hospitals accredited by the Hospital Accreditation Commission. The formulation of this target refers to the Nine Life-Saving Patient Safety Solutions of the World Health Organization (WHO) in Sutanto (2014), which is also used by the Hospital Patient Safety Committee of PERSI (KKP-RS, PERSI), and from Joint Commission International (JCI). The purpose of the Patient Safety Target is to encourage specific improvements in patient safety. The target highlights the problematic issues in health services and explains evidence

and solutions of evidence-based consensus and expertise on this issue.

Changes in Patient Safety Before and After Being Given the Intervention of Nurse Performance in Patient Safety Target Based on Knowledge Management: SECI

The results of the study showed that the changes in patient safety before and after being given the intervention of nurse performance in Patient Safety Target based on knowledge management: SECI in the intervention group had reached 75% (score of 18) compared to the changes in patient safety before and after being given the intervention of nurse performance in Patient Safety Target based on knowledge management: SECI in control group 32,43% (score of 12). This means that there is an improvement in the intervention group after obtaining understanding and knowledge through training activities from before getting the intervention of nurse performance in Patient Safety Target based on knowledge management: SECI, different from the control group that had not obtained understanding and knowledge about nurse performance in Patient Safety Target based on knowledge management: SECI.

This is due to perception, which is a process in which individuals choose, organize, and interpret the stimulus received through sensory organ into a meaning. However, the meaning of such process of perception is also affected by the past experience of the individual (Rangkuti, 2008). The mechanism of perception is a physical event and an external process that generates perceptions that affect eyes, nerves in the visual cortex, which gives effect to the environment that can affect and be affected by the central nervous system (Wilson & Cheak, 2000).

In addition, perception is also affected by stimulus that affects the experience which has been obtained (Graham, 1999 in Hitchcock, Schubert, & Thomas, 2003), in which there are 3 components that affect the relevance of the perception process, namely: 1) Learning from the organism's experience towards the stimulus, 2) Memory from organism, and 3) Through from component one and two (learning and memory).

Another cause is the concept of Knowledge Management, which requires the internal self-ability in managing knowledge and internalizing the knowledge received. This affects the knowledge of a nurse in the patient safety with six patient safety targets which will be able to give a positive impact for nursing service in general, which is in the form of performance.

Performance is result of work achieved by a person or a group of persons within an organization in accordance with their respective authorities and responsibilities in order to achieve the objectives of the organization legally, pursuant to law and in accordance with moral or ethics (Nursalam, 2015). Performance is a display of personal work in terms of quality and quantity in an organization. Job satisfaction as a general attitude of the individual to his/her work. Performance is an effort (activity) added with work results (Supriyanto & Ratna, 2007).

This was supported by the statistical test that there were changes in patient safety before and after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI which was very significant in the intervention group ($p < 0.001$) compared to that in the control group ($p = 0.116$)

Knowledge Management is a technique to build a learning environment, so that people in it are continuously motivated to continue to learn, utilize existing information, and eventually want to share new knowledge. The process of knowledge management includes, among others, learning (individuals, organization, collaboration), and knowledge sharing. It can be simply concluded that Knowledge Management deals with human being to continue to productively learn and share knowledge owned (Sintaasih et al., 2011).

Differences in Patient Safety in the Intervention Group and the Control Group After Being Given the Intervention of Nurse Performance in Patient Safety Target Based On Knowledge Management: SECI

The result of the analysis showed that there was a difference of patient safety in the intervention group and the control group after being given the intervention of nurse performance in patient safety target based on knowledge management: SECI ($p = 0.021$).

Nurse performance will give high achievement result which is affected by various factors such as work system applied to hospital/institution, adequate work-supporting resources, and nurse characteristic factor such as knowledge, skill, ability to do, motivation, attitudes, norms and values adopted. Nurse knowledge is the main element of nurse characteristics in achieving performance. Brown & Edward (2005) explain that service quality is correlated with effectiveness, punctuality, benefit, efficiency, continuity, and consistency of nursing services provided to patients, families, and communities. This shows that the quality of nursing services is affected by nurse performance.

According to Frappaolo & Toms (2000), there are five functions of knowledge management application in an organization, namely: 1) Intermediation: the role of intermediation of knowledge transfer between provider and knowledge seeker. The role is to optimally match the needs of knowledge seekers with knowledge sources. Thus, intermediation guarantees that the transfer of knowledge goes more efficiently; 2) Externalization: the transfer of knowledge from the owner's mind to the external repository, in the most efficient way. Therefore, externalization is to provide knowledge sharing; 3) Internalization: is the "extraction" of knowledge from external repository, and filters the knowledge to be made available to relevant seekers. Knowledge must be presented in the form that is better suited to the users' understanding. Therefore, this function includes interpretation and/or reformatting the presentation of knowledge; 4) Cognition: is a function of a system for making decisions based on the availability of knowledge. Cognition is an application of knowledge that has changed through three previous functions; 5) Measurement: knowledge management activities to measure, map and quantify corporate knowledge and performance of knowledge management solutions. This function supports four other functions, which is to manage the knowledge itself.

Differences of Adverse Event in the Intervention Group and the Control Group After Being Given the Intervention of Nurse Performance in Patient Safety Target Based on Knowledge Management: SECI

Based on the results of the percentage, the adverse event was only 0.08%, namely the infection incident was found after the intervention when the patient was discharged from the hospital, while other variables were not found. The number was obtained from the infection incident of the observed

patient that would be discharged from the hospital. This also could not indicate whether there was an incident of nosocomial infections because there was no guarantee that the patients entering the hospital were free of infection. However, this figure can be a benchmark for improvement intervention in infection prevention and control in hospitals, especially in inpatient rooms.

This research still needs to be followed up in terms of the need to increase the number of respondents and comparison between hospitals that have the same type in order to observe the effectiveness of the intervention of nurse performance in Patient Safety Target based on knowledge management: SECI.

Conclusion and Recommendation

On average, nurse performance in patient safety target based on knowledge management: SECI (socialization, externalization, combination and internalization) was approximately similar. Accordingly, the changes in patient safety before and after being given the intervention of nurse performance in Patient Safety Target based on knowledge management: SECI in the intervention group was better and more significant than that in the control group. The adverse event was still found and the infection control and prevention need to be improved.

Accordingly, it is necessary to do the following things: increasing nurse ability through scientific activities in the form of training, learning from literature sources, discussion of ability related to the performance of patient safety target; nurse leaders regularly organize training on nurse performance in Patient Safety Target based on knowledge management: SECI; education to develop educational applications in the form of subjects that teach nurses in Patient Safety Target based on knowledge management: SECI. Eventually, nurse performance in Patient Safety Target based on knowledge management: SECI can build a learning-by-doing process for nurses to improve their soft skills.

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Author Profile

Harif Fadhilah, S.Kp., SH., M.Kep is the president of Indonesian National Nurses Association (INNA), a professional organization for nurses in Indonesia. His research interests are nursing management and health law. He is also actively involved in Indonesia Hospital Association (IHA) at national level.