Original Article

Simplicity and Completeness of Nursing Process Satisfaction Using Nursing Management Information System at the Public Health Service "X" Indonesia

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Abstract

Nursing information system is an important part on nursing process. Appropriate information system will improve continuity of care and nursing care quality. Information system which is applied on Public Health Center "X" is manually operated, since that human error was possibly occurred, important data were loose and continuity of care was disturbed. This research developed computer-based nursing information system, then exploring nurse 'satisfaction of that new system, to compare between before and after satisfaction on application computer-based information system. The number of nurses who are involved 27 people, by filling up questionnaire instrument. The result shows improvement on satisfaction of simplicity and completeness of nursing process after using computer-based nursing information system. Simplicity not statistically significant (p=0.73) and completeness of nursing process satisfaction is significant improved (p=0.019). Research result recommends for implementing nursing information system on the whole Public Health Center in Indonesia and improved nurse education for improving quality of documentation.

Key words: Nursing information system, Satisfaction, Simplicity, Public Health Center

Introduction

Nursing information system is a combination of computer science, information science, and nursing science which designed to assist the management and process of nursing data, information, and knowledge to support nursing practice and nursing care delivery (Saba & Cormick, 2001; Staggers & Thompson, 2002).

The use of nursing management information system in hospital and public health services will improve the effectiveness and efficiency of nursing services through the standardization of nursing care such as reporting systems of clinical data standards so that it will be more easy to use and quickly known (Scherb, 2003). Moreover, it can improve the quality of patient

information and simultaneously increase the time of nurses to focus on care delivery. In addition, nursing management information system maintains the accessibility and legality, so nurses will easily get information about the patient with full responsibility (Hariyati, Yani, Eryando, Hasibuan & Milanti, 2016).

Nursing management information system based on information technology also help nurses to improve nursing care because it reduces human error, improve human behavior, improve a patient safety and enhance the role of nurses so that nurses can improve care with high competency   supported   which   by   high technology (Yu, 2006).

In Indonesia, nursing management information system at Public Health Center is still on the way of   developing   (Hariyati,   Mulyono   & Delimayanti, 2011). Nursing care at public health center, such as assessment of the patient's condition, planning and implementation for health promotion has not been worked optimally. This   condition   caused   by   incomplete standardization of health care at public health center. On the other hand, nurses and other health provider are still lack of knowledge about what to be documented and how to make a right documentation (Hariyati, 2004).

Current nursing information systems mainly using paper documentation should be improved to electronic documentation systems   and telenursing to produce effective continuity of care and sharing the valid data; for example, discharge planning, supporting family caregivers and holistic team approach (Yu, 2006) .

Hariyati, Mulyono and Delimayanti (2010) and continued by Hariyati and Sahar, (2011) had developed prototype of Nursing Information System in Public Health Center. The test result of this prototype shows the system could be used to record   documentation   and   record   patient conditions (Hariyati, Mulyono & Delimayanti, 2010). This new system will contribute to decrease the risk of mistakes by nurses and enhance quality of life of patients and families. Nurses' effective use of health information technology has potential to produce a positive impact on nursing-sensitive patient outcomes, patient safety, and quality of care (Ruland& Ravn, 2003; Waneka & Spetz, 2010)**.** In addition, offering   health   data   using   information

communication and technology (ICT) will contribute to gain health literacy among the community population that will encourage desirable health behaviors and will reduce high medical cost (Waneka & Spetz, 2010). Multimanda, Hariyati and Afifah, (2018) also stated the benefit using electronic nursing documentation, "SIMPRO," at out patient that SIMPRO can improve completeness of nursing documentation.

The   effectiveness   and   efficiency   on implementing   information   nursing   system affected by some factors, such as nurse staff, organization, and technical factor (Brender, 2006). Organization and management support on implementing nursing information system really affect effectiveness and efficiency, so does infrastructure preparedness, either software, hardware and inter-connectivity (Brender,2006).

Nursing factor is the important component on implementing   nursing   information   system. Education background, knowledge, and skill become predisposition factor which affect quality of implementation nursing information system (Abdrbo, 2007). Furthermore, motivation factor, adaptation, and satisfaction of system are really influence continuity on implementation nursing information system (Layman, 2009).

Nurses' satisfaction on nursing information system   affects   effectiveness   and   efficiency system, vice versa, information system affects nurses'   satisfaction.   Nurses   are   generally satisfied with health information technology and have   positive   attitudes   about   it.   Nurses' satisfaction as an information system user will contribute on improvement and development nursing information system (Kuck, Dudeck & Stepwise, 2009).

This research conducted to identify nurses' satisfaction in Public Health Center "X" on using nursing management information system. Public Health Center "X" is one of role-model Public Health Center in Jakarta, Indonesia. Before implementation of nursing information system, documentation activity was manual-based.

Most of documentation activities on nursing process in Indonesia do not run well, so Public Health Center "X" officer make a policy that documenting nursing process is a duty for every nurse. Every nurse should make nursing process

documentation at least two patient monthly. Complaints more often come because it was so manual-based that make the nurse really burdening and nurses often hard to find appropriate nursing diagnosis and intervention.

Based on that problem, communication information technology based- nursing information system solution is introduced so that nurses are helped to make appropriate nursing documentation.
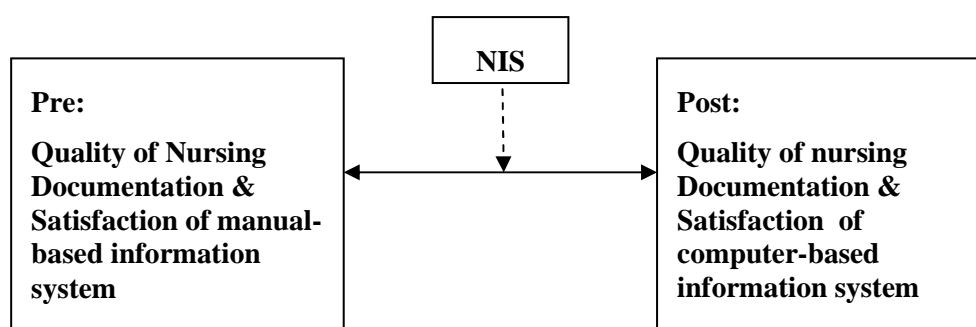
Research Purpose:

1.   To identify nurse characteristic based on gender, age, educational background and skill on using computer technology.
2.   To identify nurse characteristic based on experience of nursing documentation training and computer training.
3.   To identify difference quality of nursing documentation before and after using computer-based nursing information system.
4.   To identify difference satisfaction before and after using computer-based nursing information system.

Method and Research Design

This research was conducted by Cross-Sectional approach descriptive method. Research was started by identifying problems related to implementation of nursing information system in Public Health Center "X". The researcher explored available nursing information system, nurses' satisfaction of the system and factors which affecting nurses' satisfaction score. After that, there was computer-based nursing information system try out. On the last evaluation, quality of nursing documentation and nurses' satisfaction related to computer-based nursing information system would be evaluated. In this term, researcher is not focus on nursing information system development, but on user's satisfaction. On the last step, the researcher using pre and post design without control group to compare beginning satisfaction to nursing documentation before computer-based nursing information system was introduced and after nursing information implemented.

Whole research design shown as in Figure 1 below

Note: NIS: Nursing Information System

Figure 1 shows the researcher compared quality of nursing documentation and nurses' satisfaction on using nursing information system between manual and computer-based.

Sample and Sampling Method

Research sample collected as a whole number of nurses in Public Health Center "X". In the beginning, total number of nurses who are involved was 27 nurses, but on post evaluation, it decrease into 23 nurses because rest of them were absence and do home visit. Sample of documentations was 75 health records that was selected by purposive sampling. Inclusion criteria of health records is documents managed by nurses who were sampled from research during the research period.

Instrument and Research Analysis

Research instrument was questionnaire which Questionnaire had been tried on validity score 0.352 to 0.851 and 0.944 Alpha Cronbach

reliability score. Data analysis using statistic analysis in form of paired-t and Pearson correlation for normal distribution data and Wilcoxon Test and Spearman Correlation for not-normal distribution data.

Ethical Considerations

This research has passed ethical test from Nursing Faculty Ethic Commission. Before acquiring data, every respondent was asked to read research explanation and put a sign on informed consent if they are agree to involve. Ethic principle, respect for person, in this research was applied by giving participants its right to involve in this research voluntarily and writing signature after research's subject get clear description about purpose, method and benefit from this research. Research's subjects are allowed to leave anytime from this research involvement.

The researcher always keeps data safely, only use for research needs and not spread it out for another purpose. In this research, the researcher shows beneficence principle which sounds the result of this research is basic data to improve and develop computer-based nursing documentation. This research also helps documentation activity on nursing care. It is not maleficance, which means do not affect the nurses' working status and the result is secretly kept by anonimous identification. The researcher keeps respondents' information safely. The whole principle is sounded on informed consent and others ethical code as respect to other's opinion, asking question and allow to leaves anytime during research was held

Research Result

Nursing information system model was tried on Public Health Center "X" as an effort to improve nursing documentation quality and nursing care. Description of nursing information system model is shown on Figure 2 and 3.

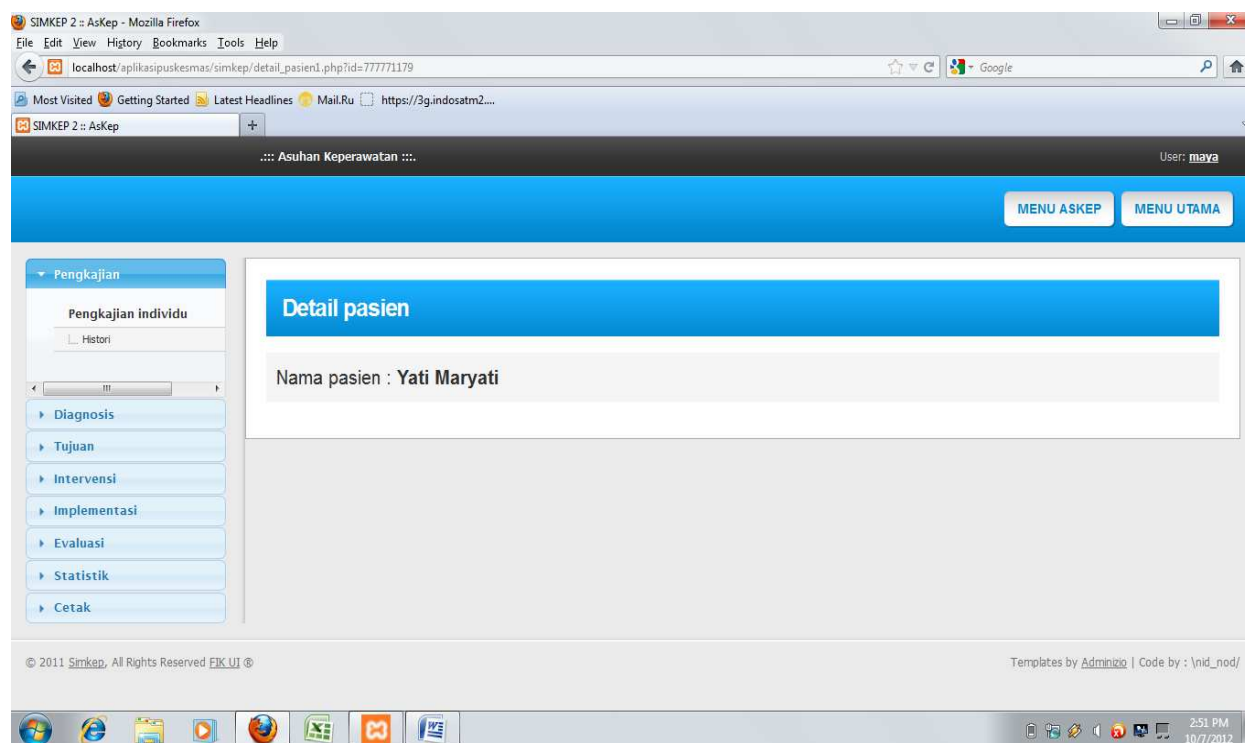## Figure 2. Individual Nursing Care Information System Model
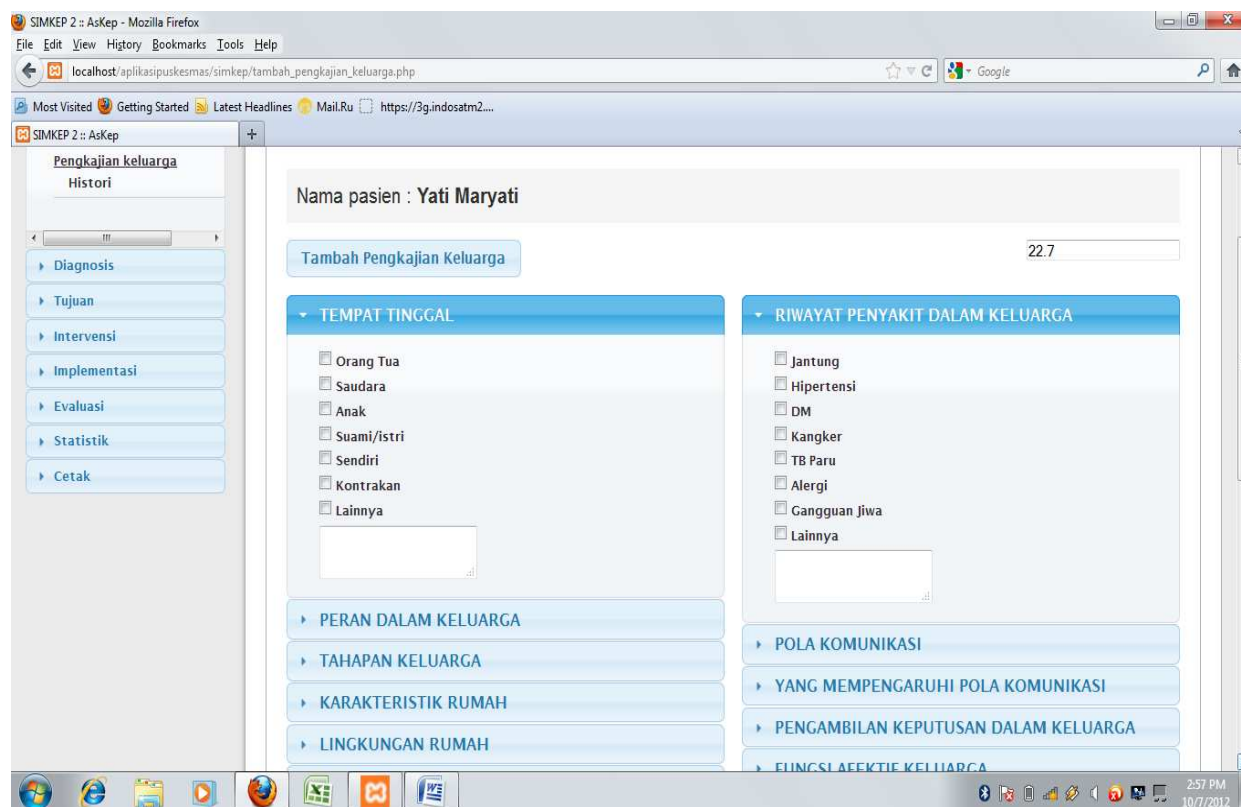
Figure 3. Family Nursing Assessment Form

Table 1. Description of Nurses' Characteristic based on Gender, Educational Background and Experience of Training

Variable	Number	Percentage
Gender		
• Man	4	14.8
• Woman	23	85.2
Education Background		
• Nursing Senior High School	2	7.4
• Nursing Diploma	25	92.6
Documentation Training		
• Never	26	96.3
• Yes	1	3.7
Computer Training		
• Never	21	77.8
• Yes	6	22.2

Table 2. Description Nurses' Characteristic based on Age and Computer Skill

Variable	Mean	Min-Max	CI (95%)
• Age	34.92	24-51	31,61-38.23
• Working experience	13.47	2-30	10.58-16.37
• Computer skill	11.05	0-25	8.7-13.4
• IT skill adaptation	19.84	16-23	19.22-20.47

Table 3. Nurse Satisfaction on Completeness of Nursing Process Before and After Using Computer-based Nursing System

Variable	Mean/Mean Rank	p
Simplicity		
o Pre	14.09	0.73
o Post	15.64	
Nursing process satisfaction		
• Total		
o Pre	13.88	0.019*
o Post	16.76	
• Assessment		
o Pre	6.50	0.012*
o Post	7.09	
• Diagnosis		
o Pre	6.00	0.012*
o Post	7.18	
• Goal		
o Pre	5.50	0.005*
o Post	6.59	
• Intervention		
o Pre	6.00	0.058
o Post	8.10	
• Implementation		
o Pre	5.00	0.088
o Post	6.38	
• Evaluation		
o Pre	4.50	0.013*
o Post	5.61	
• Nursing resume		
o Pre	4.50	0.021*
o Post	5.06	

Figure 2 shows nursing care information system model for individually in Public Health Center. This model consisted from 9 business process on nursing process: assessment, nursing diagnosis, purpose, intervention, evaluation, other business process as statistic for survey needs and decision making and facility for printing.

Figure 3 shows nursing information system model not only accommodate individual nursing care but also family nursing care as one of main nurses' duty in Public Health Center like role of family, communication style, decision maker in family and home and health environment.

Before exploring nurses' satisfaction related to system, there was identification process of nurses' characteristic. The characteristic are based on gender, educational background and skill experience as shown on Table 1

Table 1 shows most nurses in Public Health Center "X" are woman (85.2%), all of them are not bachelor degree, majority of them have not participated in documentation training (96.3%) and computer training (77.8%).

Table 2 shows nurse age on productive age range (95% are between 31-38 years old), mostly they have enough working experience (more than 10 years working), able to operate computer 13.47 (0.498% from total skill score) and able to adopt technology development 19.84 (55% from total adaptation score).

Table 3 shows nurse perception related to satisfaction on simplicity after using computer-based system is improved, but not statistically significant different (p=0.73). Satisfied perception toward completeness nursing process as a whole, shows significantly difference before and after using computer (p=0.019), which there is improvement of satisfaction after using computer. Perception satisfaction at five item process are assessment, diagnosis, goal, evaluation and nursing resume. Intervention and Nursing implementation also improved but not statistically significant.

Discussion

Research shows improvement on perception on completeness and simplicity after using nursing electronic documentation. Perception satisfaction at five item process are assessment, diagnosis, goal, evaluation and nursing resume. Intervention and Nursing implementation also

improved but not significantly. The result of research supported previous research. Satisfaction of information system had been researched on respondent from Alexandra hospital, National University Hospital, NGH Polyclinic and Tan Tock Seng Hospital Singapore by assessing 4 component includes easy to use, facilitate job efficiency, increase service quality and helpful. This research reports positive correlation between information system which sounds more increased nurse satisfaction, ratability more improved (r=0.736, r=0.741), skill improved (r =0,731 r= -0.717) (Tan, Flores & Tay, 2010). Another research related to satisfaction is conducted to evaluate a virtual medical imaging which leads to continuity, integration improvement around health profession, clinical data and client. Previous research showed user satisfaction is really high (Sicotte, Pare, Moreaulth & Laverdure, 2010).

This research is supported from another research Waneka and Spetz, (2010) which health information technology (HIT) positively affected to nurse satisfaction and adoption. Ruland and Ravn (2003) also state that nursing informatics system effectiveness is scored by complexity. Complexity more explained as easy to use and satisfaction on using system. Furthermore, Ruland and Ravn (2003); Kuck and Dudeh (2009) had evaluated nursing information system application which evaluated componentt includes motivation, perception on using system, hope to job simplicity, time saving and quality improvement.

Discussion on this research referred to theory and previous research conclude that implementation of nursing information system affect nurse satisfaction. Satisfaction relates to system complexity, so that it become user friendly system, simple and support nursing care delivery and continuity (Sicotte, Pare, Moreaulth & Laverdure, 2010).

Research also shows after using computer-based nursing information system, satisfaction of simplicity is improved. Perception of simplicity increased but not statistically significant, this condition may be because of the adaptation off new system needed of time. This condition may be related with nurse education and majority of nurse not yet conducting in documentation and computer training. These findings were similar to

previous research results which reported that the new system took some processes to be well-accepted in an institution (Bloom & Huntington, 2010; Tilahun & Fritz, 2015; Whittaker, Aufdenkamp. & Tinley, 2009). Previous studies showed that on the adaptation phase nurses often felt dissatisfied and stressed out with duplication of work as they had to do both paper and electronic documentation. These feelings and behaviors can lead to nurses' resistance to transition to computerized documentation.

Limitation of the Research

Limitations of the study is the number of respondents took a total sample and a small amount. Nurses who participated in the training and the introduction of electronic documentation did not participate in post evaluation due to illness so that the number of participants decreased. This small amount makes the research results can not be generalized in general conditions in Indonesia, but can be used as a learning material for the condition of the area which is almost the same as the Public Health Center. The number of documents taken is not random so that the bias of the data during sampling may occur.

Conclusion and Recommendation

Nursing information system is essential part on nursing care. Implementation of nursing information system is needed to ensure continuity of care and improve service effectivness and efficiency. The research result shows nurses' satisfaction and perception toward nursing process completeness is really improved after use nursing information system. Researcher suggest that implementation of nursing information system in Public Health Center will be continued, and following research of documenting product quality, effectiveness and efficiency of nursing information system in Public Health Center will be conducted.

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