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Nurses' Experience Using Electronic Health Record: A Qualitative Study

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Abstract

Sharing information about nursing perceptions on electronic health record (EHR) is important. Nursing is a high utilizer of HER, yet without accurate and complete information of EHR the risk of patient safety is increased. The purpose of this article was to explore nurses' experiences using electronic health record (EHR). This study used descriptive phenomenology by conducting semi-structured interviews to 14 nurses working at the inpatient ward of a Jakarta hospital. The obtained data was analyzed using Colaizzi's thematic analysis method. The nurses used EHR at the inpatient room through the followings: 1) easy and accurate data processing; 2) constraints of using EHR; and 3) nurse communication to patients and other health workers. The nurses experienced positive experiences in the form of ease and accuracy of data perceived by them and negative experiences in the form of system, network, and technical barriers during the use of EHR in hospitals.

Keywords: patient safety, nursing service, technological-based care system

Pengalaman Perawat Menggunakan Electronic Health Record*: Sebuah Penelitian Kualitatif*

Abstrak

Berbagi informasi tentang persepsi keperawatan pada electronic health record (HER) itu penting. Keperawatan adalah pemanfaat EHR yang tinggi, akan tetapi tanpa informasi yang akurat dan lengkap mengenai HER menyebabkan risiko keselamatan pasien meningkat. Tujuan artikel ini adalah untuk mengeksplorasi pengalaman perawat menggunakan EHR. Penelitian ini menggunakan deskriptif fenomenologi dengan cara interview semi terstruktur pada 14 perawat yang bekerja di ruang rawat inap rumah sakit Jakarta. Data yang didapatkan dianalisis menggunakan metode analisis tematik Colaizzi. Perawat menggunakan EHR di ruang rawat inap melalui hal-hal sebagai berikut: 1) pemrosesan Data yang mudah dan akurat; 2) kendala menggunakan EHR; dan 3) komunikasi perawat kepada pasien dan tenaga kesehatan lain. Perawat mengalami pengalaman positif berupa kemudahan dan akurasi data yang dirasakan oleh mereka serta pengalaman negatif berupa hambatan sistem, jaringan, dan juga hambatan teknis selama penggunaan EHR di rumah sakit.

Kata Kunci: *keselamatan pasien, pelayanan perawat, sistem perawatan berbasis teknologi*

Introduction

Electronic Health Records (EHRs) are commonly employed in hospitals; as a result, documentation errors more frequently occur. Incorrect identification can result in medical errors and treatments for the wrong person, infringements of privacy, billing errors, insurance fraud, and identity fraud (Aseem et al., 2020). Furthermore, the World Health Organization (WHO) stresses the essential role of a patient's or family's participation at all levels of the patient identification process (Skagerström et al., 2017).

The EHR is beneficial to nursing services in improving patient safety. Firstly, the technology-based health care systems can increase response time, especially in the initial assessment of the patient, which may decrease risks of injury and mortality rates (Kurniawan & Hariyati, 2019). Secondly, few studies state a decrease in the potential for her misuses (Lavin et al., 2017; Murphy et al., 2019; Tubaishat, 2019). Moreover, another study states an increase in the quality and efficiency of documentation in implementing an EHR (Hariyati et al., 2016). EHR studies reveal other factors that make the application of the EHR ineffective, such as the level of patients' and family's knowledge about previous medical history, lack of integration when referring patients from the outpatient clinics to the inpatient ward (Taylor, 2017; Winter et al., 2017). Methods and protocols differ significantly across organizations and among nurses and are not performed systematically when no one can refute the values of maintaining correct patient identification. A study reveals that 24% of recorded errors are caused by putting electronic orders in the wrong patient chart, and this becomes the second most common cause of mistreatment(Hyman et al., 2012).

Further study is warranted due to the absence of qualitative research in this field and the inconsistencies between the different results-based studies. Technology, from a socio-technical perspective in the absence of end-user feedback, is often created or applied and thus results in the need to redesign user workflow to suit the technology from a highly technical perspective (Medley, 2017). Redesigning provider workflow to fit the technology, applied to a healthcare context, can cause clinicians to lose sight of the fundamental clinical intent of the software to improve patient safety. A framework designed from a highly technical point of view without a clear understanding of user requirements can also lead to major usability issues (Kaipio et al., 2020; Medley, 2017).

Although the literature on patient care policies is full of discussion on change measures, only few of them clearly discus the individual opinions of nurses. As other methods using pre-test variables are unable to capture the complexities of EHR usage in this context, a qualitative approach that allows for an in-depth analysis of the experience of nurses can be beneficial. An understanding of the experience of nurses with the use of EHR can lead to developing enhanced, novel approaches to the design and implementation of health IT.

Method

This research utilized a descriptive phenomenological method. Population and sample. The population of this study was 14 nurses in the inpatient room at a public hospital in Jakarta. The inclusion criteria of the research were: (1) the use of an EHR for more than two years; (2) ability to express life experiences; and (3) working on inpatient units. The exclusion criterion was nurses with work experience in less than two years in the current hospital.

Recruitment.

The research was conducted from March to September 2020. The interview was conducted at the hospital in Jakarta. This study employed purposive sampling to recruit participants. The researchers obtained a list of nurses' data from the head nurse. Researchers contacted the participants via email and WhatsApp and hosted private face-to-face interviews via Zoom Video Meeting to ensure privacy.

Ethical consideration.

This research obtained the ethical approval from the Ethics Commission of Health Research and Development Sint Carolus School of Health Sciences (038/KEPPKSTIKSC/IV/2020).

Data analysis.

This research, Collaizzi's thematic analysis was used. This method involved transcribing interview, reading transcript, formulating comments into codes or labels, creating categories

and themes, describing the phenomena's basic structure, and validating research results (Polit & Beck, 2012). In this research analysis, the interviews data was transcribed, then researcher read all participant transcript, following it then the transcript was converted into codes or labels based on the categories and themes.

Validity and reliability.

The researchers performed a trial interview on five nurses at Jakarta private hospital to assess the validity of research questions. Recordings and verbatim interviews were reviewed with observers and consultants. At the same time, the feedback and recommendations were collected that included modifying interview guidelines, concentrating questions submitted to participants on research targets, improving sampling (the method of optimizing questions), and improving bracketing during the interviews.

Before distributing the research questions to the participants, the researchers ensure the applicability of the research questions. The researchers and external observers reviewed the data to ensure the absence of apparent discrepancies. Furthermore, the researcher assessed the sample and verified the Indonesian transcriptions. The collected data were then analyzed for labeling, categorization, and thematic analysis.

Results

*Participant Demographic data***.**

The demographic details of the 14 nurses who participate in the study are illustrated in table 1.

Table 1. The Characteristics of Participants

Participants	Sex	Age	Work Experience	Education Level	Career Ladder
P1	Female	29	4 years	Diploma	Level 1
P2	Female	25	3 years	Diploma	Level 1
P3	Female	29	5 years	Ners	Level 2
P4	Female	27	3 years	Diploma	Level 1
P5	Female	23	2 years	Diploma	Level 1
P6	Female	28	4 years	Ners	Level 2
P7	Female	32	3 years	Ners	Level 2
P8	Female	40	10 years	Diploma	Level 3
P9	Female	38	8 years	Diploma	Level 3
P10	Male	27	2 years	Ners	Level 1
P11	Female	28	3 years	Ners	Level 2
P12	Female	31	4 years	Ners	Level 2
P13	Female	25	2 years	Ners	Level 1
P14	Female	32	8 years	Ners	Level 2

Fourteen nurses in inpatient room participated in the study. Among the 14 nurses, 13 were female. The age of the nurses ranged from 23 to 40 years old, with 2 to more than 10 years of working experience, and 8 nurses' level of education were Bachelor of Science in Nursing. More than half nurses caree ladder were Level 1 & 2.

Nurses, during intervew, perceived an decreased risk to patient safety and experienced it in some instances. However, it became apparent that patient safety issues outweighed potential benefits and so these concerns were enabled to arise unrestrained by the interviewer. There are four themes in the subsequent subsections.

Theme 1: Easy and accurate data processing

Sub-theme: Convenient and accurate data on the EHR

Most of the participants agree that employing EHRs makes the data documentation simpler, smoother, and less time-consuming compared to using handwritten records. Furthermore, utilizing EHR makes the data documentation more convenient for nurses because many nurses deal with paper records only before introducing them to EHRs. Consequently, the comparison of the two types of systems is accurate.

> ".....It is beneficial because we just have to type it, and then the birth date or medical number or record number appears. We don't have to look for manual medical records anymore...." [P6]
>
> "....So it's not really hard to write if we were in the hospital before, we really used paper, everything was a bit tensed, but now, we just have to click on it (EHR) to make it easier.". [P3]
>
> "....for patients, the data is more concise. In the past, we had to look for files in the medical record rooms and go there. Now we just have to look at the patients' medical history on EHRs....". [P3]

"... To search for patient data, we just have to type in the patient's medical record numbers, then everything appears immediately, such as name, date of birth, date of admission to the hospital, and the person in charge of the patient.." [P10]

"... there is the patient's name, room number, the doctor-in-charge, what is the pain in the application (EHR). So it is beneficial for us as nurses...." [P11]

The participants raised the issue of availability and easy accessibility of patient data. Healthcare professionals in multiple settings can view and monitor any of the patient data systems including the history of prior admissions, health care plans, several appointments, laboratory test results, prescriptions, and medical history. All of the open data will ensure the quality of patient care and help the health staff make informed clinical decisions based on reliable evidence. Consequently, risks to patients can be reduced.

".....Very accurate. When we look for data, write down patient's name and date of birth, then get the medical record of the patient, then adjust the age and date of birth, just confirm again. Oh, this is this. So there is no double data....." [P6]

"... For example, there is a new patient; we just need to open the patient's history in the EHR then type the medical record numbers. For example, there were many patients before, but we don't know the date, and who the doctor-in-charge was, we have to search ..." [P9]

"... The interface on the monitor makes it easier for us too because it is clear. There are integration records, nursing records, laboratory results, radiology. All of those have appeared in the system..." [P10]

Sub-theme: Input patient data on EHRs

The majority of the participants argue that there are minimal possibilities for errors in data entry, as the template us straightforward, and the nurse is encouraged to complete all the relevant data. Thus, there is no possibility that the data is incomplete or inexact. The following note from one of the interviewed persons exemplifies this:

"....the appearance is quite easy, simple, large icons. All menus are clear, ..." [P7]

The system of data entry methods that mainly involve the use of tick boxes and drop-down menus is regarded to elevate the risks of inputting errors. Particularly under time constraints, it is considered too easy for clinicians to tick the wrong box.

".....When doing the patient assessment, we cannot type the nursing note (in EHR). We only click on the assessment, we click (tick box) all patient assessments, such as respiratory systems or cardiovascular systems by checklist. We can type, for example, in the option 'other,' click. Then type in the information we want to enter...." [P7]

"Easier and faster in doing the work because it is already set and we only need to click (thick box)" [P8]

The participants state that there is a situation that nurses can create data entry errors. Therefore, nurses express that it is necessary to ensure patient safety and establish the most reliable information of the patients. The errors can occur accidentally and are made by the participants unintentionally. When the nurses are aware of the mistake, they feel personally responsible to correct the mistake.

"If the patients' data are incorrectly inputted, we will correct them. For example, when we enter the patient's drug name incorrectly, then we continue to correct the data directly in the EHR....." [P6]

"....Many sheets that must be filled in and recorded. And data of nursing interventions on patients make nurses overwhelmed and their energy constraints...." [P12]

"...We can fill in again at another time if there is a missing assessment form to fill in. Besides, the nurses said that too many forms to fill out during the identification process takes time" [P13]

Theme 2: Constraints of using EHR

Sub-theme: Physical limitations

Some situations can create distraction for nurses. For example, nurses forget to check patient identification because of the hectic environment,

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excessively fast pace, or fatigue. Nurses possibly report incomplete patient data because of the limited access to the computer.

> ".....My room is only facilitated with two computers. If the conditions are crowded, sometimes we don't have time to hold it, it's impossible, it takes time to fill it" [P1]
>
> "... The ratio between computers and nurses is imbalanced. And we share the computers in this room..." [P5]
>
> ".... there are not many computers in this room. So sometimes you still have to wait for each other ..." [P10]

Incomplete patient data makes the nurses or other nurses on the next shift have to fill the data in EHR.

> ".....For example, in the afternoon we don't have it, maybe tomorrow it will be completed again or the nurse who is afterward (next shift nurse)" [P2]

Sub-theme: Technical problems

Most participants state that there are not many technical problems. This research reveals that during the first implementation of EHRs, nurses face some technical issues. However, during the times, the frequency of errors decreases constantly. Several categories of technical issues listed are an unstable internet connection, device failures, and freezes. These issues will contribute to higher downtimes. The safety risks associated with the inaccessibility to patient data, which in turn may endanger patients, particularly in emergencies where prompt actions are needed that should be dependent on patient data in the system. Nevertheless, the interviewees deny some machine downtime. The respondents, however, stated that any system downtime in their hospitals occur briefly and quickly as it is fixed.

Furthermore, some participants argue that there is a straightforward solution to this problem. During the downtime period of the electronic health record, nurses will use the paper-based medical records as a backup mechanism. Utilizing paper forms for recording patients' data must be kept by nurses until the EHRs start and eventually put all the accumulated data back into the electronic framework.

> ".... At that time, there was probably a problem in the central system. Therefore, it (EHR) couldn't be opened. In the end, we wrote the data manually again (Patient Data). But it only took a day to run out, the hospital's IT support team immediately handled it...." [P3]
>
> '..when the nurse enters the room (patient room), 'blepp', the signal disappears. The signal can only be received in the lobby and nurse station. Besides, the computer sometimes is slowly responding.." [P5]
>
> "...if the system is slow, it's troublesome. If there are more patients, the system requires some upgrades. That's complicated because if the system is an error, we have to record manually and then retype it. It really takes a lot of time..." [P9]
>
> "...when the computer is operated simultaneously by several health workers, it automatically freezes" [P14]

Furthermore, the nurse reveals that the system takes a long time to search for a file of the patient who has been admitted for a long time.

> "...The patient has been in the ICU for a long time; the data has been opened for a long time, it's hard to search for data of old patient.." [P9]

Theme 3: nurse communication to patients and other health workers

Sub-theme: poor use of communication channels in the system.

Participants suggested that the system had contact channels. System users cannot send each other clinical messages about the care of a patient. This problem is, therefore, actually a weakness in the way nurses deal with the system, and not a fault of the system itself. One of the participants highlighted the potential for the optimal use of the system's electronic communication channels:

> "... When the patient's laboratory test results show abnormal, the laboratory staff will notify the nurse by telephone and the nurse will notify the doctor by telephone..." [P6]

Sub-theme: communicating with the patient, family and HCPs

The admission, discharge and transfer process are variable, non-linear and requires skilled communication on the part of the nurse and other Healthcare Professionals (HCPs) to ensure safe and effective medication management. EHR is configured in modules for the admission, discharge and transfer processes using EHR. The medication information contained within each module informs decisions made by the prescriber, but is also reviewed by other HCPs; therefore, incomplete or inaccurate EHR information may lead to erroneous medication orders affecting the patient's plan of care. In addition to the nurses, the patient and the family are also part of the patient's care team. As such, they are asked to provide medication information upon the patient's admission to the hospital. The patient and family will also be entrusted with the appropriate post-discharge care at home by referring to medication information on the discharge summary. For these reasons, participants have described EHR as a communication tool for themselves, other HCPs and the patient and family. There are times when communication via EHR may not be effective which will be discussed later.

> "....It is also easier for patients to get information and it is easier for us to explain..." [P3]
>
> ".....For example, the patient's family needs to be referred to another hospital, the nurse asked for the results of the x-ray, oh, I'll call the radiologist first, so we just need to call the patient's household number." [P3]

Sub-theme: coordinating care and collaborating with other HCPs

In one department, interprofessional collaboration for the purposes of EHR is typically between the Nurse and a fellow. Consistent with the experiences of other nurses in this study, each nurse department is responsible for the care their own patients. In the following example, P5 conveyed the way in which the role of the fellow and the Nurse differ for this department.

> "...when we did the handover, we felt very helpful because we could easily double-check what the nurse had said....' [P5]
>
> "...if the patient has moved to another room, the nurse can only access patient data through the computer in the patient's room.." [P14]

Sub-theme: no clinical alerts

Some of the participants cited as a safety concern the no clinical warnings that occur on the system. In certain cases, abnormally high or low results of laboratory tests require immediate action; a timely alert is therefore required. The system used by nurses does not yet have this feature; that is, no clinical messages are automatically produced and sent directly to the users about laboratory test results. In such cases, and according to the participants, nurses have two options: either verify the results of the laboratory test individually, or rely on the laboratory technician to inform them of any suspicious results by phone. This is a method that takes time. The nurse will be notified by the technician, and the latter will notify the doctor, who is responsible for informing the consultant of the patient..

> ".... in the EHR system, there is no notification regarding the normal value of the patient's lab results, so, nurses must be more careful in seeing the lab results..." [P13]
>
> ".... If there is a patient's laboratory value that is not normal, the laboratory staff will notify the nurse by telephone..." [P11]

During this long chain of staff contact, the time lost can delay the adequate care given to patients. If the scheme has a feature that sends warning notifications of something abnormal to all those directly involved in the treatment of a patient, it would save time and facilitate safer care. This refers not only to the findings of laboratory studies, but also to all patient-requested examinations, treatments, and clinical orders.

Discussion

The results of this qualitative study revealed various perceptions of patient identification of EHRs among staff nurses. The participants commonly believe that the use of EHRs has increased patient safety. Some participants, however, pointed to system deficiencies in this regard. However, it is essential to understand that the different opinions emerge because of the variety length of time that the system uses.

The findings showed that information on EHRs is readily available, open and searchable, and it is understood that this would have a positive effect on patient safety. Such quick access to patient information will improve clinical decision-making, improve the safety and quality of treatment and

minimize the risk of patients receiving faulty care. (Alotaibi & Federico, 2017; Clarke et al., 2016; Kelsey & Claus, 2016; Thenu et al., 2016). EHR users can immediately refer to a wide variety of data and information, and the time saved can be spent improving the quality of patient care. (Lavin et al., 2017; Tubaishat, 2019). The available information shows that nurses can formulate educated care plans for their patients easily. (Ehrenstein et al., 2019; Evans, 2016; Walker et al., 2018). A systematic approach to health care and clinical decision making that supports patient safety can be assured by the completeness of the data supported by EHRs, including, for example, medical diagnosis, list of medications, and history of allergies..

Data entry errors, specifically the use of template checkboxes that can cause errors in incongruity, are one of the concerns. This view is in agreement with Clarke et al. (2016). They argue that it is easy to tick the wrong boxes that can lead to incorrect symptoms or to report outcomes, potentially impacting patient care and eventual length of stay. Many other participants, however, have the opposite view and assume that there is no chance of error in the template. Templates encourage the completeness and accuracy of knowledge that can support patient safety (Hydari et al., 2015).

The results of the current study show that technical issues are a concern that could have an indirect effect on patient safety. These issues are difficult to handle on certain occasions and pose a continuing danger to patient safety. Due to data unavailability during device downtime, errors can occur (Wondmieneh et al., 2020). The other issue is the confusion of nurses on how and when to report the incident in the event of a patient safety incident without access to an electronic patient record (Clarke et al., 2016).

Furthermore, the research results show that limited computer facilities hamper the identification data input process. Therefore, it demands more time to complete. The lack of IT facilities and equipment is commonly tagged in the literature as a hurdle in implementing EHR systems. The technical or IT infrastructure for the EHR system to operate effectively should be available (Gesulga et al., 2017). High-quality EHRs require compatible laptops, tablets, computers, or smartphones for health care professionals (Winter et al., 2017).

The findings of the current study indicate that technical issues are a problem that can impact patient safety indirectly. In fact, these concerns are difficult to resolve on certain occasions and represent a continuing threat to patient safety. For instance, device crashes lead to limited access to critical patient data, thus endangering protection (Schopf et al., 2019). It is consistent with the findings of Wondmieneh et al. (2020), who report that errors during system downtime might occur due to the unavailability of data.

EHRs must rely on high-performance servers and networks. It holds not only for their use in inpatient care but also for clinical research usage (Winter et al., 2017). Furthermore, the excellent application of EHRs is significant for the integration of big data. The basis for decision support requires large RAM, fast disk resources, super-efficient search and compression algorithms, and high-speed servers and networks (Zadvinskis et al., 2018). Clinicians can create personalized electronic lists of their patients. Nurses still need to organize and process such data into relevant information, knowledge, or wisdom so that patients can receive better holistic care. (Ang, 2019)

Processes relating to clinician communication are complex and vulnerable to breakdown. In the EHR-enabled healthcare environment, providers rely on technology to support and manage their complex inter-clinician communication processes. If implemented and used correctly, EHRs have potential to improve the safety and safe use of clinician communication (Chase et al., 2014; Matthew-Maich et al., 2016).

Communication is a key aspect of nearly all patient care processes and has enormous potential to impact patient safety (Esquivel et al., 2012; Saxena et al., 2011). Communication breakdowns between clinicians are one of the most common causes of medical errors and patient harm. Communication processes have become increasingly integrated into EHRs (Murphy et al., 2019; Tubaishat, 2019). These include sending and receiving referral and consult communication, communication about transitioning a patient from the inpatient to the outpatient setting, and communicating clinical messages with the EHR. Several attributes of EHR-based communication can result in a disconnect between the sender and the receiver of clinical information, including the sender's uncertainty about whether or when a message has been received, and a mismatch between single patient versus multiple patient interactions. Messages may be incomplete, misdirected, or directed to an

unavailable clinician, and may overload the recipient (Mold et al., 2015; Zhu et al., 2019).

Cunclusion

The recent research examines this topic as viewed by staff nurses who are end-users of the

and can accurately assess the effects. The addressed the beneficial effects of EHRs. The discussion includes convenient and accurate finding patient data on EHR and easiness to input patients' data. Nevertheless, some of the participants cited safety concerns, such as workplace distractions and technical problems. All of which can in some respects jeopardize patient safety. These vulnerabilities can be related to either unreliable internet networks or restricted workplace computer facilities. Right patient data support foundational concepts for nursing and nursing informatics. The concept includes data, information, and knowledge complemented by wisdom that contribute to conceptual clarifications, depict clinical processes in sufficient detail to support clinical judgments, and enhance patient safety. The research provides a benchmark for future improvements in the electronic health record system in the hospital.

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