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Electronic Medical Record Acceptance: A Literature Review

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ABSTRACT

The implementation of hospital information systems and electronic medical records can improve health care services in hospitals, but there are still many things that inhibits its user acceptance. The purpose of this study is to find out things that can support the acceptance of hospital information systems and medical records by electronic users and their obstacles. This is a literature review research and uses the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) methods. Relevant articles were obtained from PubMed in 1982 to June 2021. Articles were selected if they met the criteria in the form of discussing the acceptance of hospital information systems in the form of electronic medical records in hospitals. The result of this research showed that 1535 articles were obtained from PubMed. The same article was deleted with Zotero's delete duplicate feature and manually with the results of 215 relevant articles, 89 articles were selected through abstract reading and 22 articles were obtained for full text reading. A total of 21 journals were analyzed in this review. Factors that affect the acceptance of hospital information systems and electronic medical records are perceived usefulness, perceived ease of use, human-related factors, demographics and the human environment, technological factors, organizational and organizational environmental factors, effort expectancy and performance expectancy. Implementation of information systems and electronic medical records can be maximized by increasing user acceptance of the system so that health services can be provided optimally.

Keywords: *Acceptance, Behavior, Hospital Information System*

INTRODUCTION

One of the hospital's strategy in carrying out its duties as a service provider for the community is using an information system, so that patient's data can be properly recorded and documented. Some of the information systems that have been widely used in various hospitals are electronic office systems (e-office), Electronic Medical Records (ERM) and others. There are several important roles of information systems namely: supporting the health care service in hospitals, supporting hospital management in decision making and supporting various strategies for competitive advantage (Kisdianata et al., 2016). The role of the Hospital Management Information System (SIMRS) in managing hospital data is actually quite large and complex, both for patient medical data and administrative data owned by hospitals. So that if it is managed conventionally, it has the potential to cause duplication of data, resulting in the increasing of data storage capacity. Data that is not integrated can cause 'out of sync' in each part and cause the presentation of information that is late and less reliable. This finally will lead to human error. Out of sync data entry for the same patient or item will complicate data processing and often result in significant material losses for hospitals. (Handiwidjojo, 2009).

Regulation of the Minister of Health of the Republic of Indonesia Number 269 of 2008 article 2 states that a medical record is required to be made in writing, complete and clear or can be made in written form or in electronic form. Electronic medical records are files that contain all patient history. Records that must be written by a doctor or dentist and made electronically or digitally. A good medical record file can describe a good and valid health report. The roles of medical records are important as a collector, processor, and a presentation of health information, which can be done manually or electronically (Nuryati&Widayanti, 2015). The electronic medical record computerized system is expected to assist hospital management in documenting several things such as doctor's visits and the accuracy of providing care, so that it is expected to save time, cost, avoids duplication, shorten processing time, and provide effective and efficient services. There are several factors that influence the success of the electronic medical record implementation process such as thorough planning, dedicated team members and support from facility management, funders and computer system developers (Mashoka et al., 2019).

The successful application of electronic medical records in several developing countries has several obstacles, including those caused by limited resources, lack of necessary information technology support and stakeholder awareness to move in the implementation of the new system. In conducting an Electronic Medical Records (ERM) readiness assessment, 3 basic requirements are needed, including: architectural readiness, infrastructure readiness and process readiness. The four main things in conducting an electronic medical record

readiness assessment are: organizational culture, management and leadership, operational readiness and technical readiness (Ajami et al., 2011).

Evaluation of information systems is an effort to find out the conditions that occur in the field from the implementation of information systems. With this valuation, it is hoped that there will be a target in the implementation of information system activities so that later it can be known and also corrected in its application (Purwandi, 2018). There are many models that can be used to evaluate an information system. One of the usual and frequently used models in the evaluation of information systems is the Unified Theory of Acceptance and Use of the Technology (UTAUT) which is based on previous technology acceptance models such as Theory of Reason Action (TRA), Theory of Planned Behavior, Task Technology Fit Theory, and especially the Technology Acceptance Model (TAM). TAM, which was first introduced by Fred D. Davis in 1986, is an adaptation of TRA which was made specifically for modeling user acceptance of information systems. (Dillon, 2006). The purpose of this article review is to describe things that can support the acceptance of electronic medical records by users and the obstacles in using electronic medical records.

RESEARCH METHODOLOGY

This study employs a literature review method combined with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach. The method is conducted systematically by adhering to proper stages and research protocols. The literature reviewed in this study was obtained from an electronic database, specifically PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/>). The article search utilized advanced search features to focus the results, using keywords such as "hospital information system" and "behavior." Duplicate journals were removed, and titles and abstracts were screened. Research journals deemed eligible underwent full-text screening for detailed review. The inclusion criteria for this study were: articles in English, published between 1982 and June 2021, articles published internationally, and articles discussing hospital information systems, particularly electronic medical records, in a hospital setting. Ethical review approval was not required for this study.

The following section presents the list of search results from PubMed along with the PRISMA diagram:

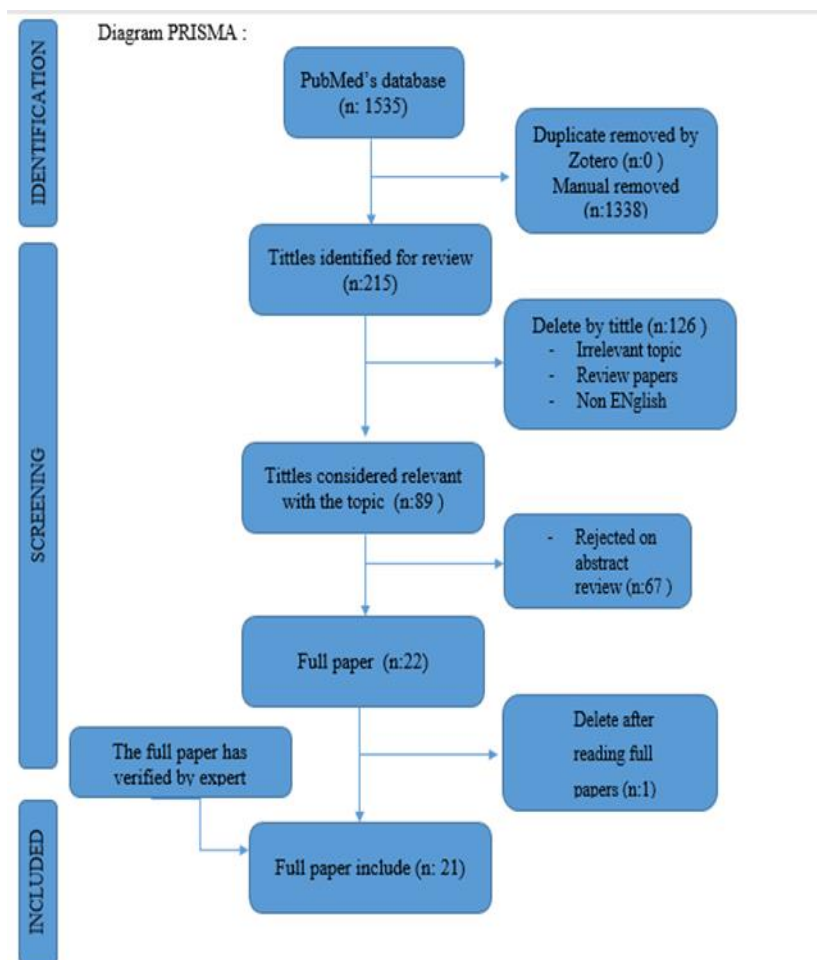


Figure 1. Data-Based Search System
Source: Processed Data by Researchers

RESULT AND DISCUSSION

At the start of the search, we identified 1,553 articles from PubMed. Duplicate articles were removed using Zotero's "delete duplicate" feature and manual verification, with no duplicates found. After screening titles for relevance, 215 articles remained. Abstract reviews narrowed the selection to 89 articles, and full-text reading resulted in 22 articles. A total of 21 research articles were analyzed, focusing on user acceptance of technology implementation, particularly Electronic Medical Records (EMRs) in hospitals. These studies are summarized in Table 1. User acceptance of EMRs and hospital information systems was measured using different questionnaires, resulting in diverse factors influencing acceptance. These factors were categorized into perceived usefulness, perceived ease of use, human-related factors, demographics and environment, technological

factors, organizational and environmental factors, effort expectancy, and performance expectancy.

Perceived usefulness, defined as the belief that technology improves work performance, and perceived ease of use, defined as the belief that the system is user-friendly, were significant factors in system acceptance. These were identified in studies by Nadri et al. (2018), Barzekar et al. (2019), Alipour et al. (2019), Abdekhoda et al. (2019), Hwang et al. (2019), Thit et al. (2020), Omar et al. (2017), Elahi et al. (2020), Jauk et al. (2021), and Litwin et al. (2018). Research at Zahedan University Hospital confirmed these factors using a validated questionnaire (Alipour et al., 2019). Similarly, the acceptance of Electronic Prescribing Decision Support Systems (EPDSS) among pediatricians at Karolinska University Hospital was influenced by these perceptions (Omar et al., 2017). These findings align with a review indicating interconnected relationships between perceived usefulness, ease of use, behavioral intentions, and actual use (Putri & Sevdiyani, 2020).

Human-related factors, including demographics and environmental influences, were significant in studies by Abdekhoda et al. (2019), Nadri et al. (2018), Alipour et al. (2019), and others. For instance, research in France on smartphone-based Ecological Momentary Assessment (EMA) revealed demographic variations in acceptance. Gender and age significantly impacted perceptions, with younger groups expressing concerns over therapeutic relationships and older groups highlighting usability benefits (Bourla et al., 2020).

Technological factors, including hardware and system quality, were discussed in studies by Ahmadian et al. (2017), Sheikhtaheri et al. (2020), and others. Challenges like inadequate hardware and user experience barriers were prominent. Improved system quality enhanced satisfaction, leading to better individual performance (Sheikhtaheri et al., 2020).

Organizational and environmental factors also played a key role in influencing acceptance. Studies noted the importance of organizational support, training, and managerial commitment in improving perceived usefulness and ease of use (Abdekhoda et al., 2019; Jahanbakhsh et al., 2017). Managers' attitudes significantly affected system implementation success, leading to better patient safety, service quality, and reduced costs.

Effort and performance expectancy, as described in studies by Sheikhtaheri et al. (2020) and Ahmed et al. (2020), were essential in motivating health workers to adopt EMRs. These findings align with the Unified Theory of Acceptance and Use of Technology (UTAUT), which emphasizes the influence of these factors on user acceptance of technology.

Several obstacles hindered system acceptance, including computer anxiety, transition costs, and insufficient training or infrastructure. Computer anxiety negatively impacted perceived usefulness and ease of use, reducing users' motivation. Solutions such as psychological interventions, training, and additional

experience were suggested to mitigate these barriers (Chien, 2008; Baysari et al., 2018). Other barriers included lack of perceived benefits, operational difficulties, and insufficient incentives. Enhancing awareness, financial support, and infrastructure were recommended to improve adoption (Ahmed et al., 2020).

This analysis highlights the critical factors influencing the acceptance of EMRs and hospital information systems. Addressing barriers and emphasizing user-centric design, organizational support, and training can significantly enhance adoption and utilization.

CONCLUSION

Things that can be an obstacle in receiving electronic medical records and hospital information systems are workers who experience computer anxiety, the feeling of lacking in benefit in office workers, low education and work experience, problems in the initial model of the system, slow systems, and the lack of understanding about the legality of the information system used. Several things support the acceptance of hospital information systems are the benefits felt by user, perceived ease of use, human-related factors, technological factors and organizational factors, monetary incentives and attitudes in using EMR. Gender is an indirect factor in perceived ease of use. Training and support from the information technology department as well as involving users in the system formation process.

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