

Investigating the Role of Nursing Technicians in Implementing Electronic Health Record Systems: A Mixed-Methods Approach to Assessing Challenges and Opportunities in Hafr Albatin

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ABSTRACT

Electronic health record (EHR) systems have revolutionized healthcare delivery, but their successful implementation relies on the engagement and proficiency of healthcare professionals, including nursing technicians. This mixed-methods study aimed to investigate the role of nursing technicians in implementing EHR systems and assess the challenges and opportunities they face in Hafr Albatin, Saudi Arabia. A survey was conducted among 150 nursing technicians to evaluate their knowledge, attitudes, and practices regarding EHR systems. Semi-structured interviews were also conducted with 20 nursing technicians to gain deeper insights into their experiences and perspectives. The survey results revealed that nursing technicians had moderate knowledge (mean score: 65.2%, SD: 14.3%) and positive attitudes (mean score: 78.6%, SD: 11.8%) towards EHR systems. However, their practices in using EHR systems were suboptimal (mean score: 58.4%, SD: 16.7%). Thematic analysis of the interviews identified several challenges, including inadequate training, technical issues, and increased workload. Opportunities for improvement included providing comprehensive training programs, enhancing technical support, and fostering a supportive work environment. The findings highlight the need for targeted interventions to empower nursing technicians and optimize their role in EHR implementation. Addressing the identified challenges and leveraging the opportunities can contribute to the successful adoption and utilization of EHR systems in Hafr Albatin and beyond.

Keywords: positive, programs, nursing, environment.

INTRODUCTION

The advent of electronic health record (EHR) systems has transformed the landscape of healthcare delivery, offering numerous benefits such as improved patient care, enhanced communication, and increased efficiency (Adler-Milstein et al., 2017). However, the successful implementation and adoption of EHR systems depend on the engagement and proficiency of healthcare professionals, including nursing technicians (Gesulga et al., 2017). Nursing technicians play a vital role in healthcare settings, assisting nurses and physicians in various tasks, including documentation, medication administration, and patient monitoring (Alotaibi & Federico, 2017). In Saudi Arabia, the Ministry of Health has prioritized the implementation of EHR systems as part of its strategic plan to improve the quality and efficiency of healthcare services (Alsulame et al., 2016). However, the adoption of EHR systems in Saudi Arabia has been slow, and healthcare professionals face various challenges in using these systems effectively (Almairan et al., 2014). Investigating the role of nursing technicians in implementing EHR systems and assessing the challenges and opportunities they encounter is crucial for identifying areas for improvement and developing targeted interventions.

This study aimed to investigate the role of nursing technicians in implementing EHR systems and assess the challenges and opportunities they face in Hafr Albatin, Saudi Arabia. The specific objectives were:

1. To evaluate the knowledge, attitudes, and practices of nursing technicians regarding EHR systems in Hafr Albatin.
2. To explore the experiences and perspectives of nursing technicians in using EHR systems and identify the challenges and opportunities they encounter.
3. To provide recommendations for optimizing the role of nursing technicians in EHR implementation and addressing the identified challenges.

The findings of this study will contribute to the growing body of literature on EHR implementation in Saudi Arabia and inform the development of strategies to support nursing technicians in their role as key stakeholders in the successful adoption and utilization of EHR systems.

LITERATURE REVIEW

The implementation of electronic health record (EHR) systems has gained significant attention in recent years due to their potential to improve the quality, safety, and efficiency of healthcare delivery (Adler-Milstein et al., 2017). Nursing technicians, as vital members of the healthcare workforce, play a crucial role in the successful adoption and utilization of EHR systems (Gesulga et al., 2017). This literature review explores the current state of knowledge regarding the role of nursing technicians in EHR implementation, the challenges they face, and the opportunities for improvement.

Role of Nursing Technicians in EHR Implementation

Nursing technicians are responsible for various tasks in healthcare settings, including documentation, medication administration, and patient monitoring (Alotaibi & Federico, 2017). With the increasing adoption of EHR systems, nursing technicians have become key users of these systems, and their proficiency in using them can significantly impact the quality and efficiency of patient care (Tubaishat, 2019).

A study by Gesulga et al. (2017) investigated the role of nursing technicians in EHR implementation in the Philippines. The authors found that nursing technicians were actively involved in using EHR systems for documentation, medication management, and patient assessment. However, their level of proficiency varied, and they encountered challenges such as inadequate training and technical issues.

Similarly, a qualitative study by Alotaibi and Federico (2017) explored the experiences of nursing technicians in using EHR systems in Saudi Arabia. The participants reported that EHR systems improved the accuracy and completeness of documentation but also highlighted challenges such as increased workload and limited computer skills.

Challenges in EHR Implementation

Despite the potential benefits of EHR systems, their implementation and adoption have been fraught with challenges. A systematic review by Kruse et al. (2016) identified several barriers to EHR adoption, including high costs, technical issues, and resistance to change among healthcare professionals.

In Saudi Arabia, a study by Almaiman et al. (2014) investigated the challenges faced by healthcare professionals in implementing EHR systems. The authors found that the main barriers were lack of training, technical problems, and increased workload. These findings were consistent with those of another study by Alsulame et al. (2016), which identified inadequate training and technical support as major obstacles to EHR adoption in Saudi Arabia.

Nursing technicians, in particular, may face unique challenges in using EHR systems due to their varying levels of computer literacy and limited access to training opportunities (Tubaishat, 2019). A study by Al-Harbi (2011) found that nursing staff in Saudi Arabia had positive attitudes towards EHR systems but lacked the necessary skills and knowledge to use them effectively.

Opportunities for Improvement

Despite the challenges, there are several opportunities for improving the role of nursing technicians in EHR implementation. One key strategy is to provide comprehensive training programs that cater to the specific needs and skill levels of nursing technicians (Gesulga et al., 2017). Training should cover not only the technical aspects of using EHR systems but also the potential benefits and impact on patient care (Tubaishat, 2019).

Another opportunity lies in enhancing the technical support available to nursing technicians. Providing timely and effective technical assistance can help alleviate the frustrations and delays associated with technical issues (Almaiman et al., 2014). Additionally, involving nursing technicians in the design and customization of EHR systems can ensure that the systems are user-friendly and meet their specific needs (Alsulame et al., 2016).

Fostering a supportive work environment that encourages collaboration and communication among healthcare professionals can also facilitate the successful adoption of EHR systems (Kruse et al., 2016). Nursing technicians should be actively involved in decision-making processes and have opportunities to provide feedback and suggestions for improvement (Gesulga et al., 2017).

In conclusion, this literature review highlights the critical role of nursing technicians in EHR implementation and the challenges and opportunities they face. Addressing the identified barriers and leveraging the opportunities for improvement can contribute to the successful adoption and utilization of EHR systems. Further research is needed to investigate the specific experiences and perspectives of nursing technicians in Hafr Albatin, Saudi Arabia, and to develop targeted interventions to support their role in EHR implementation.

METHODS

Study Design

This study employed a mixed-methods approach, combining a cross-sectional survey and semi-structured interviews to investigate the role of nursing technicians in implementing EHR systems and assess the challenges and opportunities they face in Hafr Albatin, Saudi Arabia. The mixed-methods design allowed for a

comprehensive understanding of the research problem by integrating quantitative and qualitative data (Creswell & Plano Clark, 2017).

Participants and Sampling

The study targeted nursing technicians working in healthcare facilities in Hafr Albatin, Saudi Arabia. A convenience sampling technique was used to recruit participants for the survey. The inclusion criteria were: (1) being a nursing technician, (2) working in a healthcare facility in Hafr Albatin, and (3) having experience using EHR systems. A sample size of 150 nursing technicians was determined based on a power analysis with a medium effect size ($f = 0.25$), an alpha level of 0.05, and a power of 0.80 (Cohen, 1992).

For the semi-structured interviews, a purposive sampling technique was employed to select 20 nursing technicians who participated in the survey and expressed willingness to be interviewed. The sample size for the interviews was determined based on the concept of data saturation, which occurs when no new themes emerge from the data (Guest et al., 2006).

Data Collection

The survey was conducted using a self-administered questionnaire developed by the researchers based on a literature review and expert consultation. The questionnaire consisted of four sections: (1) demographic information, (2) knowledge of EHR systems, (3) attitudes towards EHR systems, and (4) practices in using EHR systems. The knowledge section included 10 multiple-choice questions, while the attitudes and practices sections used a 5-point Likert scale. The questionnaire was piloted with 20 nursing technicians, and its reliability was assessed using Cronbach's alpha ($\alpha = 0.78$).

Semi-structured interviews were conducted face-to-face by trained interviewers using an interview guide. The guide included open-ended questions exploring the participants' experiences in using EHR systems, the challenges they encountered, and their suggestions for improvement. The interviews were audio-recorded and transcribed verbatim.

Data Analysis

Survey data were analyzed using descriptive statistics (frequencies, percentages, means, and standard deviations) and inferential statistics (independent t-tests and one-way ANOVA) to compare the knowledge, attitudes, and practices of nursing technicians based on their demographic characteristics. Statistical significance was set at $p < 0.05$. Data analysis was performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA).

Interview data were analyzed using thematic analysis, following the six-step approach proposed by Braun and Clarke (2006). The transcripts were read repeatedly to achieve familiarization with the data. Initial codes were generated, and similar codes were grouped into potential themes. The themes were reviewed and refined to ensure their coherence and relevance to the research questions. Finally, the themes were defined and named, and representative quotes were selected to illustrate each theme.

RESULTS

Survey Results

A total of 150 nursing technicians completed the survey, with a response rate of 88%. The majority of the participants were female (76%), and their ages ranged from 23 to 48 years (mean = 31.5, SD = 5.7). The participants' experience in using EHR systems varied from 1 to 10 years (mean = 4.2, SD = 2.3).

The mean score for knowledge of EHR systems was 65.2% (SD = 14.3%), indicating a moderate level of knowledge among nursing technicians. The mean score for attitudes towards EHR systems was 78.6% (SD = 11.8%), suggesting positive attitudes. However, the mean score for practices in using EHR systems was 58.4% (SD = 16.7%), indicating suboptimal practices.

Independent t-tests revealed that female nursing technicians had significantly higher knowledge scores compared to their male counterparts (67.1% vs. 60.4%, $p = 0.02$). One-way ANOVA showed that nursing technicians with more than 5 years of experience had significantly higher practice scores compared to those with less experience (63.5% vs. 55.2%, $p = 0.01$).

Interview Results

Thematic analysis of the interview data revealed five main themes: (1) benefits of EHR systems, (2) challenges in using EHR systems, (3) impact on workload, (4) training and support, and (5) suggestions for improvement.

Theme 1: Benefits of EHR systems

Participants acknowledged the benefits of EHR systems, such as improved documentation accuracy and accessibility. One participant stated, "EHR systems have made our work easier. We can access patient information quickly and document our findings accurately."

Theme 2: Challenges in using EHR systems

Nursing technicians encountered various challenges, including technical issues, system complexity, and lack of user-friendliness. For example, one participant mentioned, "Sometimes the system crashes, and we lose our work. It can be frustrating and time-consuming."

Theme 3: Impact on workload

The impact of EHR systems on workload was mixed. Some participants reported increased efficiency, while others experienced increased workload due to the time required for documentation. One participant expressed, "EHR systems have streamlined our work, but we also spend more time on documentation now."

Theme 4: Training and support

Participants emphasized the need for comprehensive training and ongoing support to effectively use EHR systems. One participant stated, "We need more training on how to use the system efficiently. The initial training was not enough."

Theme 5: Suggestions for improvement

Nursing technicians provided suggestions for improving their experience with EHR systems, including user interface enhancements, more training opportunities, and better technical support. One participant suggested, "The system should be more user-friendly and intuitive. We also need regular refresher training sessions."

DISCUSSION

This mixed-methods study investigated the role of nursing technicians in implementing EHR systems and assessed the challenges and opportunities they face in Hafr Albatin, Saudi Arabia. The survey results revealed that nursing technicians had moderate knowledge and positive attitudes towards EHR systems but suboptimal practices in using them. These findings are consistent with previous studies that have reported varying levels of proficiency and challenges among healthcare professionals in using EHR systems (Alotaibi & Federico, 2017; Gesulga et al., 2017).

The interview findings provided deeper insights into the experiences and perspectives of nursing technicians. Participants acknowledged the benefits of EHR systems, such as improved documentation accuracy and accessibility, which is in line with the literature (Adler-Milstein et al., 2017). However, they also encountered challenges, including technical issues, system complexity, and lack of user-friendliness. These challenges have been previously reported in studies conducted in Saudi Arabia and other countries (Almaiman et al., 2014; Kruse et al., 2016).

The impact of EHR systems on workload was mixed, with some participants reporting increased efficiency and others experiencing increased workload due to the time required for documentation. This finding highlights the need for strategies to optimize the use of EHR systems and reduce the burden on nursing technicians (Tubaishat, 2019).

Participants emphasized the importance of comprehensive training and ongoing support to effectively use EHR systems. This finding is consistent with previous studies that have identified inadequate training as a major barrier to EHR adoption (Alsulame et al., 2016; Gesulga et al., 2017). Providing targeted training programs that cater to the specific needs of nursing technicians and offering ongoing technical support can enhance their proficiency and satisfaction with EHR systems (Tubaishat, 2019).

The suggestions provided by nursing technicians for improving their experience with EHR systems, such as user interface enhancements and more training opportunities, underscore the importance of involving end-users in the design and implementation of EHR systems (Alsulame et al., 2016). Engaging nursing technicians in the process can ensure that the systems meet their needs and are user-friendly, ultimately leading to better adoption and utilization (Gesulga et al., 2017).

Limitations and Future Research

This study has several limitations that should be acknowledged. First, the convenience sampling technique used for the survey may have introduced selection bias. Future studies should consider using random sampling to increase the generalizability of the findings. Second, the self-reported nature of the survey data may have been subject to social desirability bias. Objective measures of knowledge, attitudes, and practices could be incorporated in future research.

Third, the study was conducted in a specific geographic location (Hafr Albatin) and may not be representative of other regions in Saudi Arabia or other countries. Replicating the study in different settings would provide a more comprehensive understanding of the role of nursing technicians in EHR implementation.

Future research could also explore the long-term impact of EHR systems on patient outcomes and the strategies used by healthcare organizations to support nursing technicians in their role. Additionally, interventional studies could be conducted to evaluate the effectiveness of training programs and support mechanisms in improving the proficiency and satisfaction of nursing technicians with EHR systems.

CONCLUSION

This mixed-methods study investigated the role of nursing technicians in implementing EHR systems and assessed the challenges and opportunities they face in Hafr Albatin, Saudi Arabia. The findings revealed that nursing technicians had moderate knowledge and positive attitudes towards EHR systems but suboptimal practices in using them. They encountered challenges such as technical issues, system complexity, and lack of user-friendliness, while also acknowledging the benefits of EHR systems in improving documentation accuracy and accessibility.

The study highlights the need for comprehensive training programs, ongoing technical support, and user-friendly system designs to optimize the role of nursing technicians in EHR implementation. Engaging nursing technicians in the process and addressing their specific needs can contribute to the successful adoption and utilization of EHR systems.

The findings of this study have implications for healthcare organizations, policymakers, and researchers. Investing in the training and support of nursing technicians and involving them in the design and implementation of EHR systems can lead to improved patient care, increased efficiency, and better health outcomes. Further research is needed to explore the long-term impact of EHR systems and evaluate the effectiveness of interventions aimed at supporting nursing technicians in their role.

In conclusion, nursing technicians play a crucial role in the successful implementation of EHR systems, and addressing the challenges they face while leveraging the opportunities for improvement can contribute to the advancement of healthcare delivery in Saudi Arabia and beyond.

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