Nursing Leadership Style, Training Methods, and Use of Electronic Health Records by Nurses in Jordanian Hospitals: A Descriptive Study

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Abstract

AIM: The study aimed to assess the level of practice of nursing leadership characteristics during the implementation of electronic health records as perceived by nurses.

METHOD: A cross-sectional survey design was used in this study. The study recruited 213 nurses from five hospitals which had recently implemented electronic health solution. Data was collocated using self-administrated questionnaire composed of three sub-domains. The study was granted from the Ethics Committees of the investigators universities and the Jordanian Ministry of Health. Descriptive and correctional statistics were used for data analysis.

RESULTS: Data were collected from 213 nurses, the majority of participants (72.3%) were female. Of them, 45% reported receiving full support from their leaders in using electronic health records. Classroom-based training was the most frequently used teaching method during the implementation of electronic health records (59.6%).

CONCLUSION: The study demonstrated that diverse leadership styles were practiced during the implementation process of the electronic health records: setting directions, developing people, and redesigning their organizations. The most commonly practiced item was clarifying the reasons for using electronic health records. Such information could enhance the effective adoption of electronic health records by nurses.

Keywords: Electronic health records, leadership characteristics, level of use, teaching methodologies

Introduction

Implementing electronic health records (EHRs) touches almost every aspect of any healthcare institution. Most healthcare institutions worldwide are either engaged in or about to be engaged in the process of implementing the EHR systems (Sherer et al., 2016), the technology that is used to document, monitor, and manage healthcare delivery (Akhu-Zaheya et al., 2018). The current evidence supports the fact that EHRs provide high-quality services to patients (Alanazi et al., 2020; Black et al., 2011; Bowman, 2013; Hägglund & Scandurra, 2017; Hatef et al., 2019). Traditionally, the selection and implementation of software systems have been the responsibility of hospitals’ information technology departments (Sittig et al., 2018). However, nurses and other healthcare professionals are crucial elements of any successful implementation of EHRs (Afshari et al., 2009), requiring the full participation of nursing leadership and executive teams. Moreover, implementing EHRs successfully and effectively depends on the degree of nursing leadership engagement and on the process adopted to increase nurses’ uptake and implementation of the system (Booth et al., 2017). Previous studies emphasized that the nursing leadership style plays an essential role in the acquisition, implementation, and optimization of EHR applications (Strudwick et al., 2019).

In addition to the nursing leadership style, the effective implementation of EHRs in clinical institutions needs well-planned training for healthcare providers, including the nurses (Thompson et al., 2020), to build their competence in using the EHRs effectively and to increase the likelihood of full adoption. Using effective methods of training will optimize learning, promote clinicians’ efficiency, and enhance patient safety (Burgener, 2020). Another essential issue to be considered by nursing leadership is providing a safe environment for nursing staff, the primary users of the EHRs (Collins et al., 2017). The organizational environment, including providing a safe clinical environment, can foster the effective adoption of EHRs. Collaborative experiences among nurses and exchange of knowledge and ideas are core professional skills that provide great opportunities in using EHRs. In conclusion, the nursing
leadership style, providing proper training, creating a safe environment, and knowledge exchange between nurses are considered as motivational forces that appear to have exclusive effects on nurses’ engagement in the professional clinical environment (Martínez et al., 2021).

Understanding how nursing leadership handles change management is vital to the success of the implementation of EHRs (Ingebrigtsen et al., 2014). During the transition to the electronic system in the healthcare institution, nursing leaders, agents of change, play a salient role in the effective adoption, reception, and implementation of EHRs by nurses and other healthcare providers. The clinical workflow knowledge and decision-making ability of nursing leaders, and their proactive ability to establish an organizational culture for utilizing new technology, contribute significantly to implementing and maintaining high-quality use of EHRs in clinical settings (Sassi & Chebir, 2021). For example, a recent systematic review paper about adopting and using EHRs in Arab Gulf countries stresses the significant role of nursing executives in the adoption of EHRs, such as enhancing the communication among clinicians, giving constructive feedback related to patient care and safety, and ensuring software functionality (Alanazi et al., 2020). Two other studies conducted to provide insight into leadership skills found that leaders who employ the transformational style make an exemplary change in their organizations. This change takes place through using accountability and acquiring data to drive instructions, challenge the status quo, and serve as instructions to mentor and motivate the staff to achieve maximum benefits for the patients and organization (Bush et al., 2020).

Although EHRs were introduced in Jordan during the last decade, they have not yet been fully implemented (Tubaishat & Al-Rawajfah, 2017). Several institutions are working on introducing complex health information systems with many modules in different healthcare settings in order to handle the expanding technology. Currently, introducing EHRs in the public healthcare sector is an integral part of a national initiative program called the electronic health solution (EHS) system. The national EHS system aims at increasing the effectiveness of medical management, reaching the best international standards, and improving workflow procedures in hospitals and healthcare centers (Akhu-Zaheya et al., 2018).

Many relevant studies have discussed the importance of automating in healthcare institutions; however, these studies revealed the complexity and potential harm of this technology when it is not applied appropriately (Cohen et al., 2019; Layman, 2020; Ratwani et al., 2018). All nurses in their role as healthcare providers are responsible for documenting, synthesizing, and interacting with patients’ data, so it is important to describe their level of use of EHRs and to learn their preferences for the type of training appropriate to their level. This study is a step toward efficient adoption of EHRs to promote the highest-quality services for patients. Despite the importance of the topic, no study to date has described the nursing leadership styles, training methods for nurses, and the level of use of EHRs by nurses in Jordan. This study therefore aims to fill this gap.

A pilot EHS system (Hakeem or EHS) was introduced in government hospitals in Jordan in October 2009. The pilot phase (2009–2015) of the EHS system that covered 14 hospitals, 22 comprehensive health centers, and 52 primary healthcare centers (The National Strategy for Health Sector in Jordan, 2015–2019) was presented as a project derived from an open-source health information system known as the VistA program. VistA is composed of many applications linked to large databases, including patient administration records, radiology, pharmacy, and nursing documentation systems (Tubaishat & Al-Rawajfah, 2017). The study aims at describe the nursing leadership styles, training methods for nurses, and the level of use of EHRs by nurses in Jordan.

Research Questions
1. What is the level of practice of nursing leadership characteristics during the implementation of EHRs as perceived by nurses?
2. What is the level of nurses’ use of the EHRs?
3. Which training methodologies were used most frequently when implementing EHRs?
4. Which is the most effective training methodology?

Method

Study Design
A cross-sectional survey design was used in this study.

Sample
Data were collected from five public hospitals with a total registered nurses of 658 (n = 658), distributed as follows: hospital 1 (n = 148), hospital 2 (n = 121), hospital 3 (n = 118), hospital 4 (n = 130), and hospital 5 (n = 141). The number of willing nurses to participate from each hospital was as follows: hospital 1 (n = 49), hospital 2 (n = 48), hospital 3 (n = 34), hospital 4 (n = 42), and hospital 5 (n = 42). The present study was conducted in selected Jordanian public hospitals that used EHS. It surveyed five large hospitals in the northern part of Jordan which have been using the EHRs system for almost 7 years. There are two teaching hospitals: a gynecologic and obstetric hospital and a pediatric referral hospital serving over 25% of the Jordanian population with a current capacity of 120 beds, recognized as a Health Care Accredited Council hospital. The third public hospital had a total of 110 beds and an occupancy rate of 45.6%; while the fourth hospital in the middle of the country is the largest in the kingdom, with 1110 beds, receiving thousands of people through both the emergency department and outpatient clinics. Finally, the fifth hospital located in the northeast region has 70 beds with an occupancy rate of 71.5% (MOH, 2016).

Data Collection
Data were collected from 213 nurses recruited from the five hospitals that had recently implemented EHS. Invitations to take part were issued to all nurses in these hospitals who had been present during the implementation process and had used
the EHS system for at least 6 months and who had received training in the computerized system.

**Data Collection Tools**

The data collection took place over 6 months. A questionnaire composed of three sub-domains was adapted from Janssen (2011). These sub-domains are related to leadership styles, teaching methodologies, and the level of EHRs use. A panel of bilingual experts translated the questionnaire into Arabic, with back-translation until compatibility between the Arabic and English versions was reached.

The leadership sub-domain is composed of three categories related to leadership practice: setting directions, developing people, and redesigning the organization (Leithwood & Jantzi, 2006), with nine items overall; each item was measured using a 5-point Likert-type scale from 0 to 5, whereas 0 = never practiced, 1 = seldom practiced, 2 = sometimes practiced, 3 = often practiced, and 5 = routinely practiced. This sub-domain focused on assessing nurses’ perception of leadership styles at the time of EHRs implementation.

The second sub-domain covered the teaching and training methods that were used during the EHRs implementation process, specifically their perceived frequency and effectiveness. Frequency of use was measured on a 4-point Likert-type scale ranging from 0 (never used) to 3 (very frequently used). The response format for effectiveness of methodology was measured on a 5-point scale ranging where 0 = never used, 1 = extremely ineffective, 2 = somewhat ineffective, 3 = somewhat effective, and 4 = extremely effective.

The third sub-domain evaluated the levels of EHRs use adopted by nurses during their daily clinical practice. The eight levels of use were non-use, orientation, preparation, mechanical use, routine, refinement, integration, and renewal level. This domain was measured using the concern-based adoption model designed by Hord and Hall (2014). Each level was defined based on the behavior that allows each user to acquire new skills and make use of innovation. Discussing these levels in detail is beyond the scope of this paper; for more detail, see Hord and Hall (2014).

Cronbach’s alpha was calculated to measure the reliability and internal consistency of the data collected through the survey instrument: for the first sub-domain, it was 0.90 (Leithwood et al., 2010), for frequency of use in the second sub-domain, it was 0.56, and for the effectiveness of the methodology, it was 0.65 (McMillan & Schumacher, 1997), and for the level of use sub-domain, it was 0.93, indicating consistency within the data throughout the survey instrument (Huck et al., 1974). In the current study, for the first sub-domain of leadership, the Cronbach’s alpha was .89, for the second domain of teaching methodology, it was .74, and for the level of use, it was .94.

**Statistical Analysis**

Data were analyzed using Statistical Package for Social Sciences (IBM SPSS Corp., Armonk, NY, USA) version 25. Descriptive analysis including frequency, percentage (%), mean, and standard deviation used to describe participant’s characteristic and their responses to the sub-domains of tool. Besides, correlations were used to define the relationship between the most commonly practiced item, leadership style, and appropriate teaching method that used for effective application of electronic health records.

**Ethical Considerations**

Ethical approval to conduct the study was granted from the Ethics Committees of Scientific Research and Ethics of Research at Faculty of Nursing/AL al-Bayt University number 04/2019/2020 of the researchers’ universities and the selected hospitals. There were no known risks from participating in the study. The anonymity and confidentiality were maintained. An information sheet was provided to each participant describing the purpose of the study, confirming the privacy, anonymity, and confidentiality of participants, the voluntary nature of their participation, and providing instructions on how to rate the level of use of EHRs. Informed consent was implied by completing and returning the survey. Permission was obtained from the copyright holder to use the questionnaire developed by Janssen (2011).

**Results**

**Participants’ Demographics**

A total of 213 participants from five hospitals completed the questionnaire. The majority (n = 154, 72.3%) were female, with a mean age of 34 (standard deviation (SD) = 6.2) years, ranging from 23 to 51. Approximately two-thirds of the sample had a bachelor’s degree in nursing. Table 1 provides a detailed description of the participants’ demographics.

**Styles of Nursing Leadership**

Nursing leadership styles were divided into three sub-domains: setting directions, developing people, and redesigning the organization. Nurses were asked to report the frequency of nursing administration’s use of each style within their setting during the implementation process of EHRs. For the purpose of analysis, the never practiced and seldom practiced categories were merged

| Characteristic          | Mean (SD) | Frequency (%) |
|-------------------------|-----------|---------------|
| Age                     | 34.0 (6.2)|               |
| Nursing experience in years | 11.2 (6.7)|               |
| Gender                  |           |               |
| Male                    |           | 59 (27.7)     |
| Female                  |           | 154 (72.3)    |
| Education level         |           |               |
| Diploma                 | 36 (16.9) |               |
| Bachelors               | 157 (73.7)|               |
| Postgraduate studies    | 20 (9.4)  |               |
| Previous experience with EHRs |       |               |
| Yes                     | 61 (28.6) |               |
| No                      | 152 (71.4)|               |

Note: EHRs = electronic health records; SD = standard deviation.
as not practiced, while often practiced and routinely practiced were merged as practiced, and sometimes practiced remained unchanged. One hundred nine participants (51.2%) revealed that their leaders helped them by clarifying the reason for using the EHRs in their institutions. Similarly, 114 participants (53.5%) suggested that their leaders demonstrated high expectations of their work with the EHRs system. In regard to developing the people sub-scale, 96 (45%) participants recognized the leadership role in modeling a high level of professional practice in using the EHRs. Also, 45% of participants reported receiving full support from their leaders in using the EHRs. In redesigning the organization, 92 (43.2%) and 93 (43.7%) participants pointed

Table 2.
Descriptive Analysis and Frequency of Leadership Style Domain

| Leadership Style Items                                      | Not Practiced | Sometimes Practiced | Practiced | Mean (SD) |
|------------------------------------------------------------|---------------|---------------------|-----------|-----------|
| Setting directions                                         |               |                     |           |           |
| Nursing leadership helped clarify the reasons for using the EHR | 52 (24.4)     | 52 (24.4)           | 109 (51.2)| 3.5 (1.2) |
| Nursing leadership provided useful assistance to me in setting short-term goals for learning how to use the EHR | 41 (19.2)     | 68 (31.9)           | 104 (48.9)| 3.4 (1.1) |
| Nursing leadership demonstrated high expectations of my work with the EHR | 52 (24.4)     | 47 (22.1)           | 11 (53.5) | 3.4 (1.2) |
| Developing people                                          |               |                     |           |           |
| Nursing leadership gave me individual support to help me use the EHR | 61 (28.6)     | 56 (26.3)           | 96 (45.0) | 3.2 (1.3) |
| Nursing leadership encouraged me to consider new ideas on how to use the EHR | 79 (37.1)     | 50 (23.5)           | 84 (39.4) | 3.0 (1.3) |
| Nursing leadership modeled a high level of professional practice in relation to the use of EHR | 60 (28.2)     | 57 (26.8)           | 96 (45.1) | 3.3 (1.2) |
| Redesigning the organization                               |               |                     |           |           |
| Nursing leadership encouraged collaborative work among nurses. | 53 (24.9)     | 52 (24.4)           | 108 (50.7)| 3.3 (1.2) |
| Nursing leadership created conditions in the organization which allowed for wide participation in making decisions about the use of the EHR | 65 (30.5)     | 56 (26.3)           | 92 (43.2) | 3.15 (1.2) |
| Nursing leadership helped develop good relationships with patients as part of the organization’s efforts to respond productively to the EHR | 56 (26.3)     | 64 (30.0)           | 93 (43.7) | 3.25 (1.2) |
| Total                                                      |               |                     |           | 29.6 (8.4) |

Note: EHRs = electronic health records; SD = standard deviation.

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Table 3.
Frequency of the Level of Use of EHRs in Daily Clinical Practice

| Task                                      | Non-Users Frequency (%) | Beginner Users Frequency (%) | Professional Users Frequency (%) | M (SD) |
|-------------------------------------------|-------------------------|------------------------------|---------------------------------|--------|
| Chart measurements and results             | 18 (8.5)                | 42 (19.7)                    | 153 (71.8)                      | 5.26 (2.11) |
| Chart medications using CPRS              | 19 (8.9)                | 44 (20.6)                    | 150 (70.4)                      | 5.20 (2.11) |
| Nursing documentation: electronic plan of care | 25 (11.7)            | 40 (18.8)                    | 148 (69.5)                      | 5.16 (2.30) |
| Nursing documentation: assessments        | 26 (12.2)               | 42 (19.7)                    | 145 (68.1)                      | 5.18 (2.29) |
| Nursing documentation: discharge planning  | 22 (10.3)               | 43 (20.1)                    | 148 (69.5)                      | 5.30 (2.29) |
| Enter/review/approve orders and review results | 19 (8.9)               | 43 (20.1)                    | 151 (70.8)                      | 5.29 (2.23) |
| Use of ICU, CCU (flow sheets)             | 28 (13.1)               | 39 (18.2)                    | 146 (68.6)                      | 5.11 (2.36) |
| Bar code scanning for medications at point of care | 29 (13.6)             | 49 (23)                      | 135 (63.4)                      | 4.90 (2.32) |
| Patient identification at point of care   | 29 (13.6)               | 42 (19.7)                    | 142 (66.7)                      | 5.23 (2.40) |
| Total                                     |                         |                              |                                 | 46.6 (17.1) |

Note: CPRS = computerized patient record system; CCU = critical care unit; M = mean; ICU = intensive care unit; SD = standard deviation.
out that their leaders created conditions within hospitals that allowed them to participate widely in decisions for using EHRs and in developing good relationships with patients, respectively, as part of the organization’s effort to respond productively to the EHRs. Finally, most of the styles were practiced for less than 50% of the time, except for three items (Table 2).

Regarding the teaching methods that were used during the EHRs implementation period, the results show that classroom-based training was the most frequently used method (59.6%), followed by web-based training courseware (24.9%). Most of the participants reported that they did not use CD-ROM courseware (15.5%) or webinar methods (13.2%). Furthermore, 63.3% of the participants considered that classroom-based training was the most effective method, followed by web-based training courseware (23%). Most of the participants reported that both CD-ROM courseware and webinar methods were not as effective as the classroom method.

**Level of Electronic Health Records Use in Nurses’ Daily Practice**

The eight levels of use of EHRs were merged into three categories for the purpose of analysis: non-user, beginner user (orientation, preparation, and mechanical levels), and professional user (routine, refinement, integration, and renewal levels).

The results showed that the majority of participants (≥60%) were in the professional user category for all clinical activities. For example, 71.8% of participants were at the professional level for implementing EHRs in charting measurement tasks such as taking intake and output and vital signs, 70.4% for charting medication using computerized patient record system, and 69.5% in nursing documentation (electronic plan of care). About 70.8% of participants used the system at the professional level to enter/review/approve orders and review results, and 68.6% used EHRs for the intensive care unit/critical care unit flow sheet. Further details on participants’ use of EHRs in daily practice are presented in Table 3.

**Discussion**

This study demonstrated that diverse nursing leadership styles were practiced during the implementation process of the EHRs: setting directions, developing people, and redesigning their organizations. The most commonly practiced item was clarifying the reasons for using the EHRs. Of the developing people items, in particular, leaders worked hard to encourage the staff to consider new ideas through the meaningful use of electronic innovation. This result is consistent with the findings of Magbity et al. (2020), who reported that most of the leadership styles were practiced by nursing leaders except for creating conditions in the hospital. Janssen’s findings opened the way for effective participation in decision-making about the meaningful use of EHRs. Similarly, a study conducted by Giddens (2018) revealed that the transformational leadership style is crucial for the effective implementation of EHRs since it inspires and motivates followers. Also, it can build relationships with staff members and create an innovative change by emphasizing values. Using this leadership style also encourages the high level of concern and motivation that are needed in healthcare organizations (Rooijackers et al., 2021). It is necessary for leaders to open these doors for nurses, suggesting new ideas that change direction for the better, since nurses are the primary users of the system and are familiar with the workflow process, enabling them to provide effective inputs to the positive change in the system (Almusawi et al., 2019).

Nursing leaders play a vital role in their healthcare institutions by improving staff performance as well as developing their greatest potential. Nursing leadership motivates followers to adopt the innovative EHRs system effectively and to achieve the shared vision of healthcare organizations collaboratively. Nurses and their leaders were the heaviest users of technology in guiding the effective adoption of the electronic system (Banihani et al., 2021), through indicating the appropriate training methodology and integrating the development of an informatics system to introduce high-quality patient care.

Regarding training methods, the results of this study showed that nurses preferred classroom-based training (59.6%) rather than web-based training courseware (24.9%), CD-ROM courseware (15.5%), and webinars (13.2%). This result is consistent with the findings of Janssen’s study (2011), which showed that nurses preferred the classroom-based training method with face-to-face interaction. Similarly, nurses perceived classroom-based training as the most effective method, improving information retention and allowing them to maximize the benefits of training through face-to-face interaction with trainers and their colleagues in the classroom. On the other hand, a systematic review by Wiebe et al. (2019) found that the combination of classroom and computer-based training was the most effective method for meaningful use of EHRs.

However, regarding the advanced technology, nurses preferred a combination (hybridization) of both classroom-based training and web-based training courseware that was available and easy to use, in accordance with the nurses’ needs and abilities. In this study, nurses were at the advanced professional level of use of the electronic system, which merged the routine, refinement, integration, and renewal levels of use. This level of use was seen in items of nursing documentation at the assessment stage, discharge planning, and documentation of electronic plans of care. This result is consistent with Janssen (2011), who found that most of the nurses reported that they were at the routine level of use, indicating smooth use of the system with minimal problems. Furthermore, most of the nurses perceived good transformational leadership practices in their leaders, which in turn encouraged them to use EHRs. They reported that their leaders inspired them to develop new ideas to reach a high level of professional practice in using the system and to establish a good relationship with patients as a critical part of organizational efforts to respond effectively to the EHRs.

**Study Limitations**

The results of the current study need to be read in light of the following limitations. First, the data were collected from a convenience sample, limiting the generalization of the results to similar settings. Second, the study was conducted only in government hospitals and did not cover private, university-affiliated, or Royal Medical Service hospitals that already implemented EHRs, which may have different leadership styles.
Future researchers are recommended to take these limitations into consideration and to include correlational studies that test the relationship hypothesis between nursing leadership style, the educational method, and the level of using EHRs.

Conclusion and Recommendations

The EHRs will lead to improving safety and a high quality of patient care. The current study provides baseline data about nursing leadership styles, training preferences, and the level of use of EHRs. Using this information could identify areas of improvement in leadership skills to enhance the effective adoption of EHRs by nurses. Furthermore, recognizing the training methods preferred by nurses can help in modifying educational plans accordingly. This would increase patients’ safety and improve the quality of care provided. In summary, the results of this study described the perception of nurses that transformative leadership skills promote the level of using the EHRs and thus contribute to enhancing the quality of the patients’ healthcare.

Ethics Committee Approval: This study was approved by the Committee of Scientific Research at Faculty of Nursing/Al al-Bayt University (Approval No.: 04/2019/2020).

Informed Consent: Verbal informed consent was obtained from the patients who agreed to take part in the study.

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