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Original Article

A study of the relationship between nurses' experience, structural empowerment, and attitudes toward computer use

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ABSTRACT

Objective: This study examined the relationship between structural empowerment and nurses' experience and attitudes toward computer use.

Methods: This study was conducted using a cross-sectional quantitative design. A total of 184 registered nurses from four hospitals in Jordan participated in the current study. Data were collected using a demographics questionnaire, the Conditions for Work Effectiveness Questionnaire-II (CWEQ-II), and the Pretest for Attitudes toward Computers in Healthcare (PATCH).

Results: The median of experience in years among nurses was 5.0, ranging from one to 26 years. The mean score for the attitudes toward computer use was 61.90 ± 11.38 . Almost half of the participants, 45.11%, were in the category of "feel comfortable using user-friendly computers." The participants' mean average of the total structural empowerment was 12.40 ± 2.43 , and the values for its four subscales were: opportunity 3.57 ± 0.87 , resources 2.83 ± 0.85 , information 3.06 ± 0.79 , and support 2.95 ± 0.86 . The frequencies analysis revealed that most participants had a moderate level of empowerment ($n = 127$, 69.02%). The bivariate correlation between nurses' experience and attitudes toward computer use was significant ($r = -0.17$, $P < 0.05$). The relationship between the total structural empowerment score and attitudes toward computer use was positive but weak ($r = 0.20$, $P < 0.01$).

Conclusion: The results indicated that more experienced nurses are more reluctant toward computer use. However, creating an empowering work environment can facilitate nurses' attitudes toward computer use.

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What is known?

- Nurses' attitudes toward computer use could hinder achieving the expected benefits of computerized systems.
- The literature regarding the relationship between nurses' experience and the attitude toward computer use provides mixed results.

What is new?

- Nurses' experience is negatively correlated with their attitudes toward computer use.

- The correlation between structural empowerment and the attitude toward computer use was positive but weak.
- Creating an empowering environment could help nurses acquire a more positive attitude toward using the computer.

1. Introduction

Technological advances in healthcare systems have radically expanded over the past few decades. One such advance has been the transformation toward using computerized systems, for example, electronic health records (EHR), in almost every aspect of healthcare. Healthcare providers, including nurses, use these

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systems daily. Therefore, proficiency in using computerized systems has become a necessity in healthcare settings. The benefits of utilizing computerized systems are well documented in the literature. Examples include the decrease in health care costs and improvement in the quality of care provided [1–5]. Besides, computerized systems facilitate communication and reduce the risk of committing medical errors [6]. However, the literature shows that nurses' attitudes toward computer use remain the main barrier that could limit using computerized systems and hinder achieving these potential benefits [7,8].

Nurses' attitudes toward computer use are pivotal in mastering the skills needed to use computerized systems [9,10]. Variations in nurses' demographic and individual characteristics are significant factors determining attitudes toward computer use [7]. Salameh and colleagues conducted an integrative literature review. They classified the factors that influence computer use into three main categories: a) characteristics of the nurses, b) characteristics of the technology used, and c) characteristics of the organizational environment [10]. A prominent finding of the works by Ifinedo [7] and Salameh et al. [10] is the existence of multiple factors that could affect nurses' attitudes toward computer use. Nurses' years of experience has been one of these factors. In addition, the authors of these studies [7,10] recommended an investigation of other factors that could affect the attitudes toward computer use. The following discussion will address the role of nurses' experience in determining attitudes toward computer use.

The literature regarding the relationship between nurses' experience and attitudes toward computer use is mixed. Some studies found no relationship [4,7,9]. It was reported in other studies that the more experienced nurses have more positive attitudes toward using technology than less experienced nurses [10–12]. However, the opposite was reported in the literature [13]. Such mixed results could be attributed to many factors, including the variations in the methodology and statistical analyses of the conducted studies. Variations in the theoretical and operational definitions of attitudes toward using technology play a key role in determining the relationship with nurses' experience. While in some studies, the purpose of the attitudes toward computer use was confined to merely using the EHR [12], others extended the definition to encompass using technology as a means for accessing online databases for information seeking [7].

Different statistical methods were used to explore the relationship between nurses' experience and attitudes toward using technology. Bivariate correlations analyses were performed to draw conclusions in many research studies [10]. On the other hand, regression and structural equation models were employed in other studies [7]. Using more complex models certainly adds more insights regarding this complex relationship. Ifinedo maintained that a thorough investigation of the attitudes toward using technology necessitates incorporating different factors that could have a crucial role in explaining such phenomenon [7]. The literature regarding the integration of other factors still lacks, though [7].

Kanter defines structural empowerment as “the extent to which employees feel they have access to the structures in their work settings” [14]. Laschinger and colleagues argued that access to four types of structures enhances structural empowerment [15]. These structures are access to opportunity, resources, access to information, and access to support [16]. Laschinger et al. maintained that employees within empowering settings (i.e., where these four structures are supported) demonstrate improved attitudes and are more successful in accomplishing work [15]. Empirical evidence in the relevant literature supports that claim. Structural empowerment has been associated with job satisfaction [17], decreased stress [18], burnout [19], organizational commitment and trust [20], and interprofessional collaboration [21]. Overall, the four

structures empower nurses and allow them to utilize the available resources effectively. Consequently, nurses could overcome certain obstacles to contemporary healthcare issues, such as negative attitudes toward computer use. However, up to the authors' knowledge, the relationship between structural empowerment and nurses' attitudes toward computer use is not thoroughly studied.

Recent and ongoing advancements in healthcare systems and relying heavily on technology require nurses to facilitate the use of electronic resources. However, one of the main challenges to effectively using technology in healthcare is nurses' attitudes toward computers [7,8]. Thus, it is essential to get further insights into the factors affecting nurses' attitudes toward computer use. In this study, the authors intended to investigate whether nurses' experience facilitates the attitudes toward computer use or not. Meanwhile, the authors examined the relationship between structural empowerment and nurses' attitudes toward computer use. Theoretical and empirical evidence support the claim that structural empowerment is considered a cornerstone factor in facilitating nurses' work. However, the literature regarding the association between structural empowerment and nurses' attitudes toward computer use is limited. Thus, this study examined the relationship between structural empowerment and nurses' experience and attitudes toward computer use.

2. Methods

2.1. Design and setting

This study was conducted using a cross-sectional quantitative design in four hospitals in Jordan.

2.2. Participants

The study participants were recruited using purposive sampling. The following inclusion criteria were applied: a) being employed at the hospital as a registered nurse for at least one year, and b) being employed full-time. Data were collected from 184 registered nurses. This sample size is deemed sufficient to achieve a power of 0.8 with an α of 0.05 and an effect size of 0.2 using G*Power analysis [22].

2.3. Data collection

After obtaining the IRB approval from the host organization and the university hospital, registered nurses were contacted and asked to participate in the current study. Informed consent was obtained from eligible participants who agreed to participate in the study. Data collection took place between January and March 2020. Data were collected using a demographics questionnaire, the Conditions for Work Effectiveness Questionnaire-II (CWEQ-II) [15], and the Pretest for Attitudes toward Computers in Healthcare (PATCH) [23]. The permissions to use the data collection tools were obtained from the original developers. During the data collection, a research assistant was available to answer any questions by the participants. Upon submission of the questionnaires by the participants, the research assistant checked the forms for completeness.

2.3.1. The Conditions for Work Effectiveness Questionnaire-II

The four-subscale version of the CWEQ-II is a 12-item tool used to measure structural empowerment among nurses [15]. The four subscales of this version of the CWEQ-II are opportunity, resources, information, and support. The subscales involve three items each, measured using a 5-response Likert scale ranging from 1 (none) to 5 (A lot). Summing up the scores of the four subscales is used to calculate the overall structural empowerment. The four-subscale

version's total structural empowerment scores range from 4 to 20, with higher scores indicating higher perceived empowerment. Scores from 4 to 9, 10 to 14, and 15 to 20 represent low, moderate, and high structural empowerment [16].

Previous research regarding the psychometric properties of the original CWEQ-II supported the factor structure of this tool [24]. In addition, the Cronbach's α coefficient values of the four subscales were acceptable with a range of 0.80–0.89 [24]. A recent study showed that the factor structure and internal consistency of the Arabic version of the CWEQ-II are also supported [25]. In the current study, the Cronbach's α coefficient of the total structural empowerment was 0.83, and the four subscales had 0.70, 0.82, 0.75, 0.74 for opportunity, resources, information, and support, respectively.

2.3.2. The Pretest for Attitudes toward computers in healthcare

The participants in the current study completed the third version of the PATCH. This self-report tool was used to measure nurses' attitudes toward computers in healthcare settings [23]. PATCH is a 50-item scale with responses rated on a five-point Likert scale ranging from "Agree Strongly = 1" to "Disagree Strongly = 5". There are 25 positively worded items and 25 negatively worded ones. To calculate the cumulative PATCH score, the item scores for positively worded items are converted as follows: 1 = 2, 2 = 1.5, 3 = 1, 4 = 0.5, and 5 = 0. For negatively worded items, the following conversion is applied: 1 = 0, 2 = 0.5, 3 = 1, 4 = 1.5, and 5 = 2. The total score is then calculated as the sum of the converted scores. Possible total scores on PATCH range from 0 to 100, and the interpretation are classified into six distinct categories: a) 0–17: positive indication of cyberphobia, b) 18–34: indicates some uneasiness about using computers, c) 35–52: moderate comfort in using computers, d) 53–69: feel comfortable using user-friendly computers, e) 70–86: confident of ability to use a variety of computer program, and f) 87–100: very confident that they can learn to use a computer to boost creativity, and perform routine functions [23].

The PATCH scale is a well-established tool that has been used in various healthcare settings and countries. The results of such studies are supportive of the PATCH psychometrics among nurses and nursing students [23]. In the current study, the Cronbach's α coefficient of the PATCH was 0.92, supportive of the internal consistency.

2.4. Data analysis

The analyses in this study were performed using SPSS (version 23). SPSS was used to conduct descriptive statistics and bivariate correlations. Descriptive statistics, including the frequencies, mean average, and standard deviation, were all used to describe the participants' sociodemographic characteristics. In addition, the mean average of the participants' experience, attitudes toward computer use, and structural empowerment and its four subscales were calculated. Pearson's correlation coefficient was used to examine the bivariate correlations between nurses' experience, attitudes toward computer use, and structural empowerment. Statistical significance was determined based on the conventional P value of <0.05 .

2.5. Ethical considerations

The Institutional Review Board committee at the host university reviewed and approved the study before recruiting the first participant (IRB reference ID 4612019). Each participant signed written informed consent after fully explaining the study and before collecting the data. The participants were assured that their confidentiality would be maintained, and they had the right to

withdraw from the study at any time.

3. Results

Regarding the participants' characteristics, 52.72% were female, and the mean average age was 28.60 ± 4.61 . The median of experience in years among nurses was 5.0, ranging from one to 26 years. Most of the participants had a bachelor's degree in nursing (97.83%). Table 1 summarizes the demographic characteristics of the participants.

Regarding the participants' attitudes toward computer use, the mean average of the scores on the PATCH scale was 61.90 ± 11.38 . The frequencies analysis of the PATCH scores showed that the distributions within the six categories were as follows: a) positive indication of cyberphobia = 0 (0%), b) indicates some uneasiness about using computers = 2 (1.09%), c) moderate comfort in using computers = 44 (23.91%), d) feel comfortable using user-friendly computers = 83 (45.11%), e) confident of ability to use a variety of computer program = 55 (29.89%), and f) very confident that they can learn to use a computer to boost creativity, and perform routine functions = 0 (0%).

The total structural empowerment scores had a mean average of 12.40 ± 2.43 . The mean average values for the four subscales of structural empowerment were 3.57 ± 0.87 , 2.83 ± 0.85 , 3.06 ± 0.79 , and 2.95 ± 0.86 for the opportunity, resources, information, and support, respectively. The frequencies analysis revealed that most participants had a moderate level of empowerment ($n = 127$, 69.02%).

The results showed that nurses' experience had a weak, negative correlation with the attitude toward computer use ($r = -0.17$, $P < 0.05$). A moderate, negative correlation was found between nurses' experience and overall structural empowerment ($r = -0.42$, $P < 0.001$). Pearson's correlation revealed a positive, weak relationship between structural empowerment and attitudes toward computer use ($r = 0.20$, $P < 0.01$).

4. Discussion

Using computerized systems has become a central feature of healthcare systems. Nurses must properly utilize such systems to enhance communication and optimize the quality of care provided [1–6]. However, nurses' attitude toward computer use has been reported as the main barrier to implementing computerized systems in healthcare settings [7,8]. Different characteristics of the nurses, the technology used, and the organizational environment influence the attitude toward computer use [7,10]. This study investigated the relationship between nurses' experience,

Table 1
Demographics of the nurses in the study ($n = 184$).

Variables	N	%
Gender		
Male	87	47.28
Female	97	52.72
Marital status		
Single	98	53.26
Married	85	46.20
Separated	1	0.54
Education		
Bachelor's	180	97.83
Master's	4	2.17
Work experience (years)		
1–5	103	55.98
6–10	63	34.24
11–26	18	9.78

structural empowerment, and attitudes toward computer use. Structural empowerment encompasses different structures that were derived from the Expanded Workplace Empowerment Model [15]. The authors conducted this study to help expand the literature regarding the potential factors that could affect nurses' attitudes toward computer use, which has recently been addressed as one of the gaps in the literature [7].

The results showed that nurses' overall level of structural empowerment ($Mean = 12.40, SD = 2.43$) falls within the moderate levels of empowerment category. The access to opportunity structure had the highest mean average, whereas the access to resources had the lowest. These results are comparable to other studies conducted among nurses [20,21,26]. The participants in the current study had a 61.90 mean average of the PATCH total score. According to the scoring interpretation, this average reflects the classification of "being comfortable using user-friendly computers" [23]. A closer look at the total PATCH scores revealed that none of the current study participants had cyberphobia. Similarly, none of the participants had a total PATCH score of 87–100, indicative of being "very confident that they can learn to use a computer to boost creativity and perform routine functions" [23].

The bivariate correlation between nurses' experience and attitudes toward computer use in this study was weak but statistically significant. The correlation was negative, indicating that the more experienced nurses are more reluctant toward computer use. This bivariate correlation is consistent with the study results conducted by Kivuti & Chepchirchir [13]. However, it is inconsistent with the results of other studies [10–12]. Such contradicting results impose the need for thoroughly integrating and investigating the role of other intervening factors. Therefore, the authors recommend conducting future research that expands beyond examining the linear relationship between nurses' experience and attitudes toward computer use. It could be more helpful to utilize more complex theoretical models and statistical analyses.

The correlation between nurses' structural empowerment and attitudes toward computer use was positive but weak. According to the Expanded Workplace Empowerment Model [15], structural empowerment is described as the extent to which employees feel they have access to different structures in their work settings. Structural empowerment, in turn, has been linked to critical organizational and job-related outcomes [15]. Based on the findings of this study, it could be inferred that nurses who believe that healthcare settings are suitable for professional growth have positive attitudes toward computer use. This finding provides further evidence that empowering nurses within healthcare settings facilitates the effective utilization of resources and yields positive work attitudes and behaviors [15,16,24].

The findings of this study support the evidence that nurses' attitudes toward computer use is a complex phenomenon. The interplay of different individual and organizational factors should be addressed when studying the attitudes toward computer use. However, the results reported here showed weak relationships between nurses' experience, structural empowerment, and attitudes toward computer use. Thus, caution is required when interpreting the results of this study.

4.1. Implications

Nurses' attitudes toward computer use play a key role in improving computerized systems in healthcare settings. Consequently, the quality of the provided healthcare and communication among the healthcare providers could be improved [6]. In this study, the authors found that nurses' attitudes toward computer use is negatively correlated with the experience and positively correlated with structural empowerment. The results highlight the

importance of recognizing staff nurses, nurse administrators, and healthcare organizations' shared responsibility in optimizing nurses' attitudes toward computer use [27]. Working nurses are encouraged to conquer the opportunity to advance their knowledge and skills in using computerized systems. Meanwhile, nurse administrators are encouraged to facilitate nurses' learning by ensuring that regular training is readily available to nurses and that access to resources and information is facilitated [28]. Empowering organizational environments, in turn, establish sustainable venues that nurture nurses' learning and access to the available resources.

4.2. Limitations

This study was conducted using a cross-sectional design and non-probability sampling. Consequently, the generalizability of the study results could be limited. As noted earlier, the use of computerized systems has expanded to different healthcare settings. This study was conducted in four hospitals among nurses providing healthcare to acutely ill patients. Generalizing the results to other nurses providing healthcare in the community or those employed at extended care facilities might be questionable. Furthermore, this study was conducted in a developing country, Jordan, where resources could be limited compared to the better-equipped healthcare settings in developed countries. Considering these limitations, conducting a more extensive study in different healthcare settings and, if possible, in other countries could enhance the findings' generalizability and help get a better understanding of the reported results.

5. Conclusion

This study showed that structural empowerment has a positive yet weak relationship with nurses' attitudes toward computer use. On the other hand, the relationship between nurses' attitudes toward computer use and the experience was negative. The results could benefit nurse researchers as they provide a more comprehensive understanding of this complex relationship. In addition, working nurses and nurse administrators are recommended to recognize the role of structural empowerment in adjusting the attitudes toward computer use in healthcare settings. Positive change in nurses' attitudes toward computer use can facilitate computerized systems and lay the foundations for providing quality healthcare.

CRedit authorship contribution statement

Jehad A. Rababah: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing. **Mohammed M. Al-Hammouri:** Conceptualization, Data curation, Writing – original draft, Writing – review & editing, Validation. **Wafa'a F. Ta'an:** Conceptualization, Project administration, Methodology, Writing – original draft, Writing – review & editing.

Declaration of competing interest

All other authors declare that they have no conflicts of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2021.09.007>.

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