



The Association Between Information Literacy and Evidence-Based Practice in Nurses of the Critical Care Units of Public Hospitals, Tehran, Iran

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Abstract

Background: Considering the importance of information literacy in achieving well-documented and reliable information, it is evident that nurses must achieve a high level of information literacy through evidence-based performance. With regards to this, the present study was conducted to determine the association between information literacy and evidence-based practice.

Methods: The present research was a descriptive-correlation study. The subjects of the study were 244 nurses working at critical care units of Tehran University of Medical Sciences hospitals. The tool used comprised of three parts: demographic information, information literacy, and evidence-based practice. The questionnaires were completed through the self-report method, and the data obtained were analyzed using the SPSS software 16.

Results: The results of the study indicated that scores of information literacy and evidence-based practice were 78.72 ± 16.64 (of 170) and 102.17 ± 20.40 (of 130), respectively. Also, a significant and direct correlation was observed between the researched subjects' information literacy and evidence-based practice ($r = 0.596$, $P < 0.001$). Regression analysis showed that information literacy is a predictor for evidence-based practice in nurses ($R^2 = 0.4$, $P < 0.001$).

Conclusion: The findings showed that the subjects' level of information literacy and evidence-based practice is not desirable and can only be considered average. Thus, it can be concluded that through improvement of nurses' information literacy, who are working at hospitals' critical care units, one can improve the attitude towards and acceptance of evidence-based practice. This will improve nurses' clinical practice and will eventually lead to an improvement in community health.

Keywords: Nurses, information Literacy, Evidence-Based Practice

1. Background

Considering the increase in the utilization of research findings and updating of information in health care, nurses' information literacy has been raised as a serious and notable topic in this profession (1, 2). Information literacy is the basis for the formation of life-long learning and allows the learners to become self-reliant and capable in terms of the content of learning and research development (2). Nurses' urgent need to gain online searching skills has been pointed out in a great number of studies. Also, the necessity of their ability to utilize specialized articles to improve the results of clinical care has been proven (3). It is more evident that nurses and other health care providers must achieve a high level of information literacy based on scientific findings to improve their practice (1, 4).

Information literacy is the basis for critical thinking

and is a requirement for successful implementation of evidence-based practice (EBP) by nurses and other health care providers (4). The lack of information literacy prevents them from achieving reliable evidence. It can be claimed that information literacy is a framework for EBP. Smart et al. showed that nurses need a high level of information literacy to investigate information retrieved from databases and combine them with EBP (5). In fact, it is vital for nurses to be able to utilize new clinical evidence to develop and improve their professional life (1, 6).

It is believed that information literacy plays a key role in nursing, especially in EBP, and is a starting point for clinical practice based on research and evidence (7). The modification and improvement of the teaching method is the key to the betterment of students' information literacy (8). Hence, information literacy should be the main focus of nursing education (6). Nurses with a considerable level

of information literacy have shown greater understanding and utilization of research evidence in clinical decisions (9). The American association of medicine has predicted that in 2020, 90% of all health care decisions will be made based on evidence (10). Using evidence-based practice is on the basis of the idea that science is an ideal source of knowledge and can guide clinical decisions (11). Nowadays, skilled nurses agree that the best type of practice in nursing is evidence-based nursing (12). It is essential for the nurses to have updated as well as skill- and evidence-based knowledge (13, 14). Various studies showed that EBP improves the consequences for the patient, the quality of care, and the skills of care providers. It also reduces the cost of care (15).

Researchers found that nurses experience a poor level of EBP (14, 16, 17). The findings of researchers showed that as a result of lacking information literacy, nurses are not ready enough for EBP (18, 19). Also Pravikoff et al. found out that one important reason for nurses' lack of readiness for applying evidence in the clinic is their low level of information literacy (20). The study by Farokhzadian et al. demonstrated that due to weakness in information retrieval and searching, nurses face difficulties in the implementation of EBP (19). Based on the findings of researches, the widest gap between the technical skills of EBP and nurses' role, is the nurses' ability to identify information and research needs and to develop research questions, which are two important components of information literacy (21, 22). There is an evident association between information literacy and EBP in designing nursing education programs. Considering the importance of EBP in nursing and preparation for its implementation in practice, it is necessary to identify variables that contribute to this subject. As a result, a research was conducted to determine the association between nurses' information literacy and evidence-based performance.

2. Methods

The present study was a descriptive-correlative research. The samples of the research were nurses, who had been working for at least 6 months at hospitals' critical care units (including ICU, cardiac care, and dialysis wards) and had been familiar with EBP. In order to determine the sample size, the limited population formula was used. According to this formula ($N = 670$, $Z = 1.96$, $P = Q = 0.5$, $d = 0.05$), 244 nurses participated in the study. Samples were randomly (regardless of the shift of work) selected from seven public central hospitals of Tehran University of Medical Sciences, Iran. Hospitals were selected if they had a critical care unit.

The goals of health care at critical care units are patient safety and quality patient outcomes, which are more vital than other units. The EBP is viewed as a tool to achieve these goals. Therefore, nurses from these units were selected to participate in the current study.

The tool used was a questionnaire with three parts: demographics (age, gender, work experience, and educational level), information literacy, and evidence-based practice. The information literacy questionnaire was based on information literacy standards of the Association of College and Research Libraries. The tool consisted of 26 phrases in 5 sub scales: determining the nature and amount of information required; accessing required information; critically evaluating information and resources; effectively using information in order to accomplish a specific purpose; and understanding the ethical, legal, social, and economic issues of information and technology. The face and content validity of the tool was confirmed by seven academic faculty members of the department of Information Science and Knowledge Studies at Tehran University of Medical Sciences. The reliability of the tool was calculated at 0.70 to 0.90, using Cronbach's alpha. The answering of the questionnaire was done using a 5-point Likert. The range of the scores was from never = 1 to always = 5; as a result, the sum of the scores was between 26 and 130.

The EBP questionnaire was a standard tool used by Pashaeypoor et al. in her study titled "Factors affecting nurses' adoption of evidence-based practice based on Rogers' Diffusion of Innovations Model: A path analysis approach." The mentioned questionnaire had 34 phrases in three sub scales: knowledge, attitude, and acceptance. The answering of the questionnaire was done using a 5-point Likert scale. The scores ranged from disagree = 1 to totally agree = 5. The sum of scores of the evidence-based questionnaire was between 34 and 170. Cronbach's alpha was used for the reliability of the questionnaire. Cronbach's alphas for the three sub scales of awareness, attitude, and acceptance were $\alpha = 0.78$, $\alpha = 0.82$, and $\alpha = 75\%$, respectively (14).

Nurses completed the instruments through a self-report. After data collection, the SPSS software version 16 was used to analyze the data. Descriptive statistics for categorical data were reported as frequencies and percentages; continuous data were reported as means and standard deviation. To determine whether health literacy scores were associated with EBP scores, Pearson linear correlation test and multivariable linear regression analyses were used. A significant level of 0.05 was considered. The researcher informed all the participants of the objectives of the study. Further permission and written consents were obtained from all participants.

3. Results

The results showed that the average age of the nurses was 30.83 ± 7.08 and the majority of the nurses were female (69.7%); the nurses' average grade point average (GPA) was 15.69 ± 1.11 (of 20); The findings demonstrated that research subjects had about 6 years of experience at critical care units (6.80 ± 6.12); the degree of education in 184 (75.4%) nurses was Bachelor of Science (BS) and 60 (24.6%) nurses had Master of Science (MS) in nursing. Other demographic characteristics are presented in [Table 1](#).

Table 1. Nurses' Demographic Characteristics at Critical Care Wards

Critical Care	Gender		Age, y	Experience, y
	Male	Female		
CCU	36	83	30.1 ± 5.2	5.7 ± 2.1
ICU	30	65	30.6 ± 4.6	7.03 ± 3.3
Dialysis	8	22	34.3 ± 7.2	10.3 ± 2.7

The present study demonstrated that the mean score of the subjects' information literacy was 78.72 ± 16.64 (of 130). The mean scores for five components of information literacy are shown in [Table 2](#). The findings showed that the subjects' mean score for EBP was 102.17 ± 20.40 (of 170), their mean score for EBP knowledge was 27.35 ± 7.27 (of 50), attitude towards EBP was 44.33 ± 8.93 (of 70), and the mean score for the acceptance of EBP was 30.90 ± 7.59 (of 50) ([Table 2](#)).

Table 2. Means \pm SD Information Literacy and Evidence-Based Practice in Nurses

Variables	Total Score
Information literacy	
Nature and amount of required information	13.11 ± 3.17 (20)
Access to required information	20.81 ± 5.45 (35)
Critical evaluation of information and resources	23.56 ± 5.98 (40)
Application of information to accomplish a specific goal	9.22 ± 2.56 (15)
Understanding the ethical, legal, social and economic issues of information & information technology	11.83 ± 2.90 (20)
Information literacy	78.72 ± 16.64 (130)
Evidence Based Practice	
Knowledge	27.35 ± 7.27 (50)
Attitude	44.33 ± 8.93 (70)
Acceptance	30.90 ± 7.59 (50)
Evidence Based Practice	102.17 ± 20.40 (170)

The results showed that the studied subjects' information literacy had a direct, positive, and significant correlation

with EBP ($r = 0.596, P < 0.001$) and its three components, namely knowledge ($r = 0.68, P < 0.001$), attitude ($r = 0.381, P < 0.001$), and acceptance ($r = 0.442, P < 0.001$). Also, EBP had a direct, positive, and significant correlation with the studied subjects' information literacy and its five components ($P < 0.001$); each of the five fields of information literacy showed a significant correlation with other fields ([Table 3](#)). Correlation between knowledge, attitude, and acceptance of EBP is presented in [Table 4](#).

Table 3. Correlation Between Evidence-Based Practice (EBP) with Each of the Five fields of Information Literacy in Nurses (n = 244)

Information Literacy	EBP
Nature and amount of required information	
r	0.508
P Value	< 0.001
Access to required information	
r	0.546
P Value	< 0.001
Critical evaluation of information and resources	
r	0.536
P Value	< 0.001
Application of information to accomplish a specific goal	
r	0.266
P Value	0.001
Understanding the ethical, legal, social and economic issues of information and information technology	
r	0.465
P Value	< 0.001

Table 4. Correlation Between Knowledge, Attitude and Acceptance of Evidence-Based Practice (EBP) (n = 244)

EBP	Knowledge of EBP	Attitude to EBP	Acceptance of EBP
Knowledge of EBP			
Attitude to EBP	$r = 0.615$		
	$P < 0.001$		
Acceptance of EBP	$r = 0.693$	$r = 0.572$	
	$P < 0.001$	$P < 0.001$	
EBP	$r = 0.872$	$r = 0.854$	$r = 0.861$
	$P < 0.001$	$P < 0.001$	$P < 0.001$

Based on the calculated regression analysis in [Table 4](#), the results showed that application of information to accomplish a specific goal can be a predictor for EBP ($P = 0.001$). Also, the predictor variables (information literacy) explained 0.40 of the variance of EBP ($P = 0.001$) ([Table 5](#)).

Frequency and percentage of health literacy questions are shown in Table 6.

Table 5. Regression Analysis Evidence-Based Practice and Information Literacy in Nurses^a

Dependent Variable/Predictors	B	SD	β	t	P Value
Evidence Based Practice					
Nature and amount of required information	0.266	0.615	0.041	0.433	0.665
Access to required information	-0.395	0.530	-0.106	-0.745	0.457
Critical evaluation of information and resources	-0.705	0.551	-0.207	-1.280	0.202
Application of information to accomplish a specific goal	-2.237	0.693	-0.282	-3.228	0.001*
Understanding the ethical, legal, social and economic issues of information	0.498	0.526	0.071	0.947	0.345

^aR square = 0.4, R = 0.6, P < 0.001.

4. Discussion

This study examined the association between information literacy and evidence-based practice in Iranian nurses, who worked at critical care units. The results showed that information literacy (each of the 5 components) and EBP had a direct, positive, and significant association with each other.

However, according to the findings of the study, the subjects' level of information literacy was not desirable with regards to the mean of the mentioned score (78.72 ± 16.64). The overall results did not point to a desirable level of information literacy in any of its components. Previous studies showed that information literacy of the students of University of Medical Sciences was not desirable (23, 24).

Considering that the total score of the EBP questionnaire was 170, the total score of EBP for the studied subjects was desirable (with a mean of 102.17 ± 20.40). However, from the results, it can be suggested that the score obtained by the subjects in the components of knowledge and acceptance of EBP was not desirable (with a mean of 27.35 and 30.90). However, the subjects' score in the attitude towards EBP component was higher than those of the knowledge and acceptance components. This led to a relative increase in the overall score of their evidence-based practice.

The results of Stichler et al. (2011), similar to that of the present study, demonstrated that the subjects' attitude towards EBP was more positive than their knowledge and practice (25). Several studies from Iran indicated that EBP is still new in healthcare settings, and healthcare professionals (including nurses and nursing students) need to learn EBP and how to implement it into their practice (14, 17). In a similar study, there was a direct relationship between knowledge and adoption of EBP. Attitude towards EBP also had a direct and significant relationship with adoption of EBP (14). Thus, nursing faculties need to integrate concepts in EBP into their curricula to prepare graduates in practice of EBP in their patient care (26).

The results of the study showed that there is a significant association between nurses' information literacy and EBP. In line with this, the results of the study done by Pravikoff et al. showed that one important reason for nurses' lack of readiness for applying evidence in the practice, is their low level of information literacy (20). Also, Ross found that anesthesia nurses are not ready enough for the evidence-based practice approach as a result of their lack of information literacy (18). Furthermore, the study by Farokhzadian et al. demonstrated that due to weakness in information retrieval and searching, nurses face difficulties in the implementation of EBP (19). Modern nurses are made very aware that nursing practice should be evidence-based, yet their education rarely includes effective information literacy education (6).

The limitations of the current study were the degree of representativeness of the setting and the sample, and its generalizability. In addition, the data were self-reported by the participants, thus, there may be some inaccuracies in reporting the variables. It is recommended for similar research be done in other practical settings.

4.1. Conclusions

Considering the findings of the research, it can be concluded that nurses' knowledge, attitude, and acceptance of EBP can be improved through improving their information literacy. This will improve nurses' clinical practice and eventually lead to the improvement of community health.

This can be achieved only through improving the level of information literacy, utilizing EBP, and optimizing human resources, to improve the quality of health services and professional development.

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Table 6. Frequency and Percentage of Health Literacy Questions in Nurses

Health Literacy	Never	Seldom	Sometimes	Usually	Always
Nature and amount of required information					
Identify information needs	28 (11.5)	45 (20)	67 (27.5)	79 (32.4)	25 (8.6)
Identification of potential sources of information	31(13)	51(21)	61 (25)	69 (28.3)	32 (12.7)
Diagnosis of information to improve clinical practice	19 (7.8)	31 (13)	70 (29)	76 (31)	48 (19.2)
Use information to solve the problem	13 (5.3)	21 (9)	83 (34)	81 (33)	46 (18.7)
Access to required information					
Identify the appropriate ways to access information	35 (14.3)	55 (22.5)	56 (23)	69 (28.2)	29 (12)
Identify Keywords	5 (2)	12 (5)	70 (29)	93 (38)	64 (26)
Ability to search advanced in databases	48 (19.2)	73 (30)	51 (21)	42 (17.2)	30 (12.6)
Ability to use proximity operators (AND, OR, ...)	25 (10.2)	62 (25.4)	68 (28)	51 (21)	38 (15.4)
Ability to use new strategies	60 (24.5)	81 (33.2)	62 (25.4)	30 (12.3)	11 (4.6)
Lack of access to information in the initial search	27 (11)	38 (15.6)	56 (23)	80 (33)	43 (17.4)
Ability to find nursing information using databases	44 (18)	82 (33.6)	78 (32)	24 (10)	16 (6.4)
Critical evaluation of information and resources					
Ability to determine the main ideas of the document found	41 (17)	65 (26.6)	57 (23.3)	53 (22)	28 (11.1)
Ability to express ideas and new concepts	35 (14.3)	64 (26.2)	53 (22)	66 (27)	26 (10.5)
Evaluation of accuracy, up-to-date resources	19 (7.8)	67 (27.4)	62 (25.4)	55 (22.5)	41 (16.9)
Identification of documents that do not have a scientific reputation	20 (8.2)	70 (28.7)	67 (27.4)	52 (21.3)	35 (14.4)
Ability to determine the fulfillment of information needs	26 (10.6)	39 (16)	60 (24.6)	78 (32)	41 (16.8)
Ability to detect confirmation or contradiction of information	70 (28.7)	76 (31)	66 (27)	22 (9)	10 (4.3)
Ability to conclude based on information collected	28 (11.5)	38 (15.6)	55 (22.5)	82 (33.6)	41 (16.8)
Detecting a document with due regard to the limitations, tools and ...	46 (19)	75 (31)	49 (20)	45 (18.4)	29 (11.6)
Application of information to accomplish a specific goal					
Identify the goals of the proposed research	14 (5.8)	31 (13)	62 (25.4)	86 (35.2)	51 (20.6)
Ability to use information obtained in practice	41 (17)	71 (29)	52 (21.3)	46 (19)	34 (13.7)
Integrate new information with old for new understanding	45 (18.4)	64 (26.2)	49 (20)	55 (22.5)	31 (12.9)
Understanding the ethical, legal, social and economic issues of information and information technology					
The ability to use legal passwords	27 (11)	40 (16.4)	61 (25)	63 (26)	53 (21.6)
Illegal and immorality of unnamed references, content,...	33 (13.5)	45 (18.4)	49 (20)	69 (28.3)	48 (19.8)
Observe legal issues in keeping and publishing texts, data and ...	52 (21.3)	60 (24.6)	61 (25)	41 (17)	30 (12.1)
The correct understanding of plagiarism	62 (25.4)	73 (30)	51 (21)	41 (17)	17 (6.6)

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