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Identification of the Gap between Research and Practice in Surgical Care

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Abstract

The process of applying Evidence-Based Practice (EBP) in the clinic has been slow in various departments and disciplines. In particular, according to the results of studies, EBP use is much less common in the operating room than in medical wards. This study aimed to evaluate the use of EBP in surgical care and identify barriers to its application among operating room and anesthesia nurses.

This cross-sectional descriptive study was conducted using online survey tools on 251 operating room and anesthesia nurses from Mazandaran teaching hospitals, Iran, January 2021. The EBP Implementation (EBPI) Scale and EBP BARRIERS Scale were used to assess the extent of EBP and barriers, respectively. The mean use of EBP was 27.73 ± 8.73 (range: 0-72). The results showed that about 50% of the participants had never used EBP in the past 8 weeks. The EBP application showed an inverse relationship with age ($P < 0.01$, $r = -0.30$) and work experience ($P < 0.01$, $r = -0.20$). Education had a significant effect on the process of EBP ($P < 0.01$). There was a positive correlation between the EBP BARRIER scale and EBPI Scale ($r = 0.34$, $P < 0.01$). The major barrier for the use of EBP was "The lack of authority to change patient care procedures".

The results of this study can be used along with evidence-based information to plan the organization's strategy to increase the use of EBP in daily practice.

Keywords: Anesthesia nurse, EBP, Operating room nurse, Surgery

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Introduction

Evidence-Based Practice (EBP) is a problem-solving model that has been recognized as a way to raise care standards and achieve excellence in health care. This model facilitates clinical decision-making by integrating existing scientific evidence, clinical expertise, and patient preferences (1).

The implementation of EBP requires going through five well-known steps, namely clinical question design using appropriate population, intervention, comparison, and outcomes (PICO) structure; search for the best evidence and critical evaluation of evidence obtained in terms of quality; importance and clinical application; combining the evaluation result with clinical experiences and unique characteristics of each patient; and finally, the evaluation that seeks to use the evidence (2).

The results of studies indicate that nurses who base their practice on scientific evidence have managed to make better decisions, provide better quality care, reduce hospitalization time and patient costs, and lead to better cost-effectiveness for both the patient and the organization (3).

At the international level, EBP has been emphasized by the World Health Organization and the European Commission to provide health services based on the best research evidence. In today's world, we are witnessing rapid innovations and developments in the field of health care (4). Operating room and anesthesia nurses, like other medical professions, are challenged with the short half-life of their scientific information that quickly becomes obsolete. Given that care cannot be guided by the tradition or preference of the provider, relying on tradition or experience and using outdated customs "because this is the practice that we have always done it" to rationalize clinical practice is unacceptable (5).

Evidence-based practice enables operating room and anesthesia nurses to explain to patients the scientific value of interventions and the implications of treatment options for quality service, which helps patients participate in their care (6). Moreover, they can justify what they do; for example, if a surgeon does not want to cover his/her hair with a surgical cap and asks the nurse why he or she should do it, the nurse can answer "because that's what our policy says". They can also explain that several research papers are reporting that hair can carry bacteria capable of dispersion in the air during shedding, and that covering completely the hair on the scalp and face protects the patient from exposure to potentially pathogenic microorganisms, which in turn protects the surgical site from infection (6).

Evidence-based practice has existed as a problem-solving model for decades; however, the process of applying it in the clinic has been slow in various departments and disciplines (7, 8). In particular, according to the findings of studies, EBP application is much less common in the operating room than in medical wards, while nursing care in operating room suit requires more problem-solving techniques and skills than that in other wards demanding more communication and emotions skills (9).

The strategy that is generally recommended to cover the gap between research and practice is to identify barriers to the change of performance, and subsequently, implement appropriate strategies in order to deal with these barriers that are typically context-dependent (10). Therefore, this study aimed to investigate the current situation and help identify the gap between research and practice to facilitate the development of quality surgical care in the operating room.

Methods

Setting and participants

This cross-sectional descriptive study was conducted in January 2021. It aimed to investigate the use of EBP in surgical care and barriers to its application among operating room and anesthesia nurses working in the educational and medical centers of Mazandaran University of Medical Sciences, Sari, Iran.

The study population included all operating room and anesthesia nurses with an associate diploma and higher degrees with at least 1 year of work experience. A questionnaire was randomly emailed to 320 subjects. The ethics code was obtained from the Biomedical Research Ethics Committee of Mazandaran University of Medical Sciences before collecting the questionnaires, and the completion of the participants' survey was considered their informed consent.

Evaluation tools

To evaluate the utilization of EBP, the Evidence-Based Practice Implementation (EBPI) Scale, developed by Melnyk et al., was used (11). This 18-item scale is scored on a five-point Likert scale (0=zero times, 1=1-3 times, 2=4-5 times, 3=6-7 times, and 4=8 or more times), and the options are based on how frequently the respondents perform each of the items over the past 8 weeks. The total score of the scale is

obtained in the range of 0-72. The Persian version was prepared based on the standard translation and equivalence process steps and its validity was assessed by the use of several experts that reviewed the questionnaire. Afterward, item number 18, "Accessed the National Guidelines Clearinghouse" was modified to "I have read the national guidelines in my career" because no comparable database exists in Iran. The reliability of the tool was evaluated with Cronbach's alpha coefficient method at 0.90, which was similar to the original tool with a Cronbach's alpha coefficient of 0.96.

To evaluate barriers to research utilization questionnaire, the BARRIERS Scale developed by Funk et al. was used (12). Cronbach's alpha coefficient of the whole questionnaire is 0.92, which was examined by Bayek et al (13). This 29-item questionnaire is rated on a five-point Likert scale from 1=strongly disagree to 4=strongly agree, and there is one option as "I have no idea". This tool includes characteristics related to four subscales, namely recipient, organization, innovation, and communication (presentation). This questionnaire was used in a research by Nouhi et al. in Iran and its validity and reliability were confirmed ($r=0.79$) (2). In addition, the data related to personal and occupational features of research units, such as gender, age, place of service, specialty, educational background, and employment status, were collected.

Data analysis

Frequency distribution tables and relative percentage distribution tables were used for statistical analysis and description of qualitative variables. Mean and standard deviation was used for quantitative variables, and the relationship between variables was examined using Kolmogorov–Smirnov method to assess the normal distribution of data. Chi-square and Mann-Whitney tests at $p<0.05$ were used by SPSS software version 22.

Results

A total of 251 operating room and anesthesia nurses participated in this study, and the proportion of respondents was 78%. The mean age of participants was 29.26 ± 6.13 years, 57.8% of subjects were female, and 75.7% of the cases held a bachelor's degree. Other demographic information about the participants is presented in Table 1.

The use of EBP score in the last 8 weeks ranged from 0-72 and was 27.73 ± 8.73 mean score. About 50% of the participants never used EBP in the past 8 weeks. The frequency distribution of EBP over the past 8 weeks is depicted in Figure 1. The score of each item on the EBPI Scale was at the range of 0-4, with the lowest score for constructing a PICO-structured question on clinical issues equal to 1.32 ± 0.61 and the highest score for accessing and reading the national guidelines in one's career being 2.40 ± 1.12 .

Table 1. Relationship between variables and evidence-based performance

Variable	Mean (SD)/n (%)	Implementation of EBP score (0-72)	95% confidence interval	P-value	
Age	29.26±6.13	-	-	$r=-0.3$ $P<0.01$	
Work experience	5.94±5.48	-	-	$r=-0.2$ $P<0.01$	
Gender	Male	106 (42.2%)	26.85±8.40	25.39-28.55	$P>0.08$
	Female	145 (57.8%)	28.36±8.93	26.90-29.86	
Specialty	OR nurse	136 (54.2%)	26.75±7.37	25.51-28.13	$P>0.19$
	Anesthesia nurse	115 (45.8%)	28.88±10.02	27.21-30.62	
Education	Associate	16 (6.4%)	25.75±11.89	20.56-31.81	$P<0.01$
	Bachelor	190 (75.7%)	26.92±8.66	25.73-28.09	
	MSc	44 (17.5%)	31.93±6.33	30.25-33.86	
Employment status	Temporary	99 (39.4%)	28.64±8.57	27.02-30.53	$P<0.05$
	Contract	65 (25.9%)	27.73±8.28	25.81-29.70	
	Permanent	87 (34.7%)	26.67±9.20	24.72-28.58	

SD: Standard deviation; EBP: Evidence-based practice; OR: Operating room

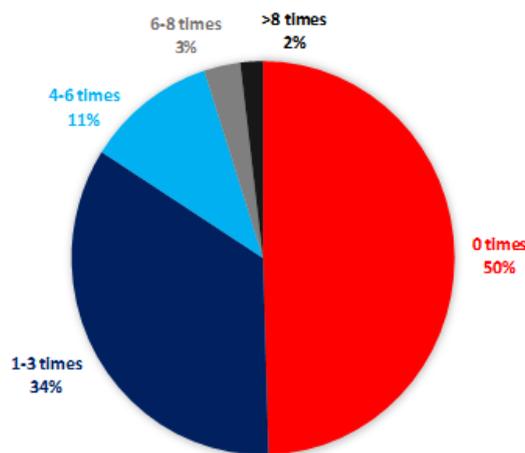


Figure 1. The implementation of evidence-based practice in surgical care from patients in the last 8 weeks

The results showed that the application rate of EBP had a significant and inverse relationship with age ($r=-0.30$, $P<0.01$) and that with aging, the rate of EBP utilization decreased by a ratio of -0.3 . In this regard, an increase in work experience reduced the use of EBP ($r=-0.20$, $P<0.01$). Education had a significant effect on the process of EBP ($P<0.01$). The results of the Mann-Whitney test and comparison of subgroups revealed that the application rate of EBP was significantly higher in individuals holding a master's degree than in those with bachelor's ($P<0.01$) and associate diploma ($P<0.01$) degrees. Although a higher rate of EBP implementation was observed in those with a BSc degree, it was not statistically significant compared to associate degree holders ($P<0.100$). There was a significant relationship between employment status and EBP usage ($P<0.05$). In a comparison of subgroups, there was only a significant relationship between temporary and permanent employment status ($P<0.05$). Nevertheless, the use of EBP had no significant relationship with gender and specialty (Table 1). There was a positive correlation among EBP, the BARRIER Scale, and the EBPI Scale ($r=0.34$, $P<0.01$). The three major barriers to the use of EBP were found to be "the lack of authority to change patient care procedures" (80%), "managers will not allow implementation" (70.9%), and "the nurse does not have time to read research" (70%). The results of the barrier study are summarized in Table 2.

Table 2. Barriers to the use of the evidence-based practice in surgical care (agree and strongly agree)

	Items	Subscale	n	Percentage
1	The nurse does not feel he/she has enough authority to change patient care procedures	S	201	80
2	Managers will not allow implementation	S	178	70.9
3	The nurse lacks time to read the research	S	177	70.5
4	Facilities are insufficient to conduct research	S	169	67.3
5	Physicians will not cooperate with the implementation	S	163	64.9
6	The nurse does not see the value of research for practice	N	160	63.7
7	There is insufficient time on the job to implement new ideas	S	156	62.1
8	The nurse sees little benefits for himself/herself	N	149	59.3
9	The nurse is not involved in research	N	126	52.2
10	The nurse feels that the results are not generalizable to own setting	S	125	49.8
11	The nurse is uncertain whether to believe the results of the research	R	121	48.3
12	Research reports/articles are published in English, and therefore, difficult to understand	N	121	48.2
13	The nurse is unaware of the research	N	118	47
14	The nurse feels that the benefits of changing practice will be minimal	N	118	47
15	Other staff are not supportive of the implementation	S	118	47
16	The nurse is unwilling to try new ideas	N	109	43.9
17	There is not a documented need to change practice	N	104	41.5

Table 2. Continued

18	The conclusions drawn from the research are not justified	R	104	41.4
19	The relevant literature is not compiled in one place	P	93	37.1
20	The research has methodological inadequacies	R	86	34.3
21	Research reports/articles are not published fast enough	R	82	32.7
22	The research has not been replicated	R	78	31.1
23	There are no clear working instructions for conducting research	P	76	30.3
24	Statistical analyses are not understandable	P	75	29.9
25	The nurse does not feel capable of evaluating the quality of the research	N	74	29.5
26	The literature reports conflicting results	R	72	28.7
27	The research is not reported clearly and readably	R	66	26.3
28	The nurse is isolated from knowledgeable colleagues with whom he/she can discuss the research	N	65	25.9
29	Research reports/articles are not readily available	P	58	23.1
30	The research is not relevant to nurses' practice	P	58	23.1
31	The amount of research information is overwhelming	R	55	21.9

S: Setting, N: Nurse, P: Presentation, R: Research

Discussion

The results of this study showed that the use of EBP in surgical care by operating room and anesthesia nurses was in an unfavorable situation so that 50% of staff had never used EBP in their care of patients in the last 8 weeks. This issue is a huge gap in the application of research and scientific evidence to the surgical care of patients. Despite the efforts of researchers in finding appropriate scientific solutions to the problems of patient care and attempts to improve the quality of surgical care in the operating room, the findings of our study showed the lack of application of the results derived from this research in the clinical environment.

The findings of this study showed that the implementation of EBP among operating room and anesthesia nurses was generally low (27.73 ± 8.73 out of 72). However, compared to the findings of other studies carried out in different specialties and used the EBPI Scale tool to evaluate the use of EBP, a relatively better situation was observed in our study (Table 3). The reason for this difference can probably be attributed to the increasing attention to research and scientific work in recent years in Iran; however, the usage rate of EBP in clinical care was not acceptable. Based on the results of studies conducted in Iran, a high percentage of nurses do not use research reports in clinical decisions (14, 15).

In this study, there was not a high level of heterogeneity between participants' responses to EBP use, and almost all participants were on the same level (27.73 ± 8.73). Age and work experience showed a significant relationship with EBP score, which was consistent with the results of a study conducted by Pashaeypoor et al. (16). In Iran, probably the inclusion of research and computer courses and the improvement of research status in recent years have resulted in the training of

Table 3. Status of evidence-based practice in various specialties with EBPI Scale

Country	Date	Mean (SD)	n	Specialist	Rang score	Author (ref)*
Iran	2021	27.73±8.73	251	Operating room and anesthesia nurses	0-72	Rafiei et al.
Switzerland	2020	8.38±9.62	121	Nurse	0-68	Kerwien et al. (36)
USA	2020	14.5	428	Occupational therapists	0-72	Krueger et al. (25)
Norway	2018	30.4±0.9	316	Healthcare providers	0-72	Moore et al. (37)
Switzerland	2018	13.03±11.4	86	Community health nurses	0-68	Pereira et al. (38)
Ethiopia	2017	21.2±11.4	405	Healthcare providers	0-72	Dessie et al. (39)
USA	2017	34.5±15.3	355	Nurse	0-72	Bovino et al. (24)
Switzerland	2017	12.43±12.0	329	Nurse	0-68	Verloo et al. (20)
Switzerland	2017	16.39±15.4	62	Allied healthcare providers	0-68	Verloo et al. (20)
USA	2016	13.06±13.16	1,093	Nurse	0-72	Warren et al. (40)
Norway	2014	7.8±7.9	185	Nurse	0-72	Stokke et al. (4)
USA	2011	10.44	24	Nurse	0-72	Levin et al. (35)

EBPI: Evidence-based practice implementation

*The numbers refer to the reference's numbers cited at the end of the article

younger graduates who have much better knowledge and practice in applying EBP. However, in developed countries, such as the United States, the findings of studies showed no significant difference between age and work experience with the use of EBP (17). The results of some studies have also indicated that the use of EBP increases with age and work experience, and it has been shown that the ability to use research evidence enhances with an increase in the age and years of practice of nurses (18, 19).

The results of this study were in line with those of other pieces of research indicating that a higher level of education was associated with higher implementation rates of EBP (20, 21). However, according to the findings of some studies, a high level of education does not necessarily indicate an increase in the use of EBP (22).

The examination of EBP implementation showed that the lowest score was related to constructing questions with PICO structure related to clinical issues and examining the systematic review database. Other studies also developed clinical questions with PICO structure and access to systematic review databases obtained the lowest scores in EBP performance among the participants (23-25). In a study conducted by Robert, only 7% of occupational therapists in the last 2 months had a PICO question in their clinical work, and in another research performed by Bovino, nurses creating a PICO question had the lowest use among other items with a score of 1.59 (1.0) out of 4 (24). The first step in starting the EBP deployment process is PICO, and this result indicated that participants were not involved in the very first phase of the EBP deployment cycle. In this regard, Bovino suggested mentorship programs for training and systematic use of reviews and the creation of PICO questions for new employees and graduates.

Based on the literature review of EBP barriers, it appears that in all countries, time periods and different organizations, the barriers are mainly ranked in a similar manner (26-28). The most common barrier identified in this study was that nurses lacked the authority to use EBP. "Lack of authority to change patient care practices", "managers will not allow implementation", and "physicians will not cooperate with the implementation" were also among the first barriers found in the studies performed by Abrahamson and Jordan (27, 29). "The nurse does not have time to read research" and "there is insufficient time on the job to implement new ideas" were ranked third and seventh, respectively, which was among the first obstacles in other studies (26, 28, 30). The two barriers, namely "nurses do not appreciate the value of research for practice" and "nurses regard little benefit for themselves" were among the most common barriers (i.e., 6th and 8th) that were considered in the top ten obstacles in the studies carried out by Jordan and Chang (26, 27).

These barriers can be examined from several aspects as follows:

1) "Lack of authority to change patient care practices", "managers will not allow implementation", and "physicians will not cooperate with the implementation".

These three barriers can hinder the implementation of EBP in surgical care for several reasons. Firstly, managers and physicians directly prevent changes in the patient care process to improve the process based on scientific findings by nurses, which can also be due to the lack of belief in EBP and a sign of traditional thinking and reliance on the knowledge of their education period (31).

Secondly, this obstacle can be due to the physicians' and managers' self-centeredness, reliance on their knowledge, and disregard for nurses' knowledge. Moreover, it can be attributed to their opinion about nurses as considering them only executors of instructions to patient care. This is consistent with other findings and may be related to the low status and independence of nurses in all surveyed countries (32). The lack of general power and authority of nurses may be due to a tradition that nurses only have the duty to obey the orders of managers and physicians.

Thirdly, nurses erroneously think that even if they talk to physicians and managers with scientific evidence, the latter will prevent a change in the patient care process. However, perhaps if managers and physicians become aware that the change of the care process is based on scientific findings, they will welcome this change.

2) "The nurses do not have time to read research" and "There is insufficient time on the job to implement new ideas"

Nurses need times free of their care responsibilities at the patient's bedside and greater independence in performance, and they should search, evaluate, and access evidence and strengthen their educational background (28). Dedicating time outside patient care for nurses to attend scheduled on-the-job training programs seems to be necessary. At the same time, creating regular training

opportunities based on the findings identified in this study on the lowest scores obtained in performance appraisal with EBP Scale can be helpful. Harding in his study entitled "Lack of time or lack of priority?" raises the question of whether the use of EBP hinders "Not Enough Time" or "Low Priority options", and concludes that achieving a higher use of EBP among the treatment staff requires a cultural shift and placing higher value on these activities despite the challenging context of constant pressures to increase patient flow (33).

3) "Nurse does not see the value of research for practice" and "The nurse sees little benefits for himself or herself".

Nurses do not pay attention to EBP for various reasons and are reluctant to use it, which can be due to their inadequate job situation, such as nurses' poor economic situation, job dissatisfaction, and lack of differentiation between a person trying to improve the quality of care and an indifferent person.

Limitations

Although the standard EBP questionnaire used in several studies is an advantage for this study, it seems that it is difficult to obtain high scores in this questionnaire, so that despite interventions for the improvement of the use of EBP, for example, in Levin's study, a score of 41.4 out of 72 points was attained, and a score of 25.4 was obtained following the intervention in the study performed by Lynn (34, 35). Another limitation of our study was the self-reporting nature of this research, which might have led to unreliable findings. Another limitation of this study was the impact of the coronavirus disease 2019 pandemic on the number of surgeries.

Implications for Practice

To address patient safety and improve the quality of care, it is necessary to create an EBP culture. For this purpose, the barriers mentioned in this study should be examined and removed. First, in order for nurses to practice EBP, managers and physicians should be familiar with EBP culture. Nurses should be given more confidence and maneuverability by managers and physicians in their performance. Second, the lack of time in surgical care does not seem to be something that can be solved without increasing the number of employees; in this respect, each organization should hire enough employees (which is not a rational suggestion). Otherwise, it is recommended to recruit two or three interdisciplinary colleagues in the department to facilitate the work in the operating room by constantly monitoring and evaluating the healthcare providers using EBP. It is also suggested to find the best available scientific methods to be transferred to the operating room and anesthesia nurses. To address EBP through small group projects rather than taking individual responsibility may also be more acceptable to both treatment staff and managers.

Finally, it should be noted that unless the basic needs of nurses, including financial status, sense of worth and effectiveness in the profession, and the need for encouragement and respect, are met, we should not hope that the nurses are motivated to use EBP and improve the quality of surgical care of patients.

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Conflicts of Interest

The authors declare that there is no conflict of interest to report.

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