Effect of an educational programme on the attitudes towards patient safety of operation room nurses

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ABSTRACT

Background: A culture of patient safety is one of the cornerstones of good-quality healthcare, and its provision is one of the significant challenges in healthcare environments. Aim: The purpose of this study was to evaluate the effect of a surgical safety educational programme on the attitudes of nurses to patient safety in operating rooms (OR). Design: An interventional one-group pre-/post-test design, which sought to measure changes in OR nurses' attitudes toward patient safety culture. Methods: A simple random sampling technique was used to recruit 66 OR nurses working at six Royal Medical Service hospitals in Amman, Jordan. All participants took part in a 4-hour educational workshop. Pre-tests and post-tests were done. Results: The results of this study showed that OR nurses' attitudes towards a culture of patient safety was originally negative; significant improvement after attending the programme was found (3.3 ± 0.20 versus 3.8 ± 0.30). There was a negative correlation between years of experience and nurses' attitudes towards patient safety. Conclusions: Incorporating courses about safety culture into continuing education programmes may improve nurses' attitudes towards patient safety. Nurses should be qualified to play an important role in creating a culture of patient safety.

Key words: Operating room nurses ■ Safety culture ■ Surgical safety education programme ■ Attitudes to patient safety

Patient safety is considered the cornerstone of good-quality health care, and its provision is one of the significant challenges in healthcare environments. Patient safety is a basic human right and providing a culture of patient safety is the responsibility of all healthcare personnel, regulatory agencies, and government bodies (Tingle, 2012).

Patient safety was defined by the Institute of Medicine as 'the prevention of harm to patients' (Aspden et al, 2004). The Agency for Healthcare Research and Quality (AHRQ) further defined patient safety as:

> **'A discipline in the healthcare sector that applies safety scientific methods towards the goal of achieving a trustworthy system of healthcare delivery. Patient safety is also an attribute of healthcare systems, it minimises the incidence and its impact, and maximises recovery from adverse events.'**
>
> ***Emanuel et al, 2008***

Making patient safety a top priority is dependent on having a strong and positive safety culture (Nieva and Sorra 2003). Patient safety culture refers to the prevailing attitudes of the members, units or teams of an organisation towards patient safety. It shapes nurses' attitudes about favourable behaviour related to patient safety in their work area; thus, culture influences staff attitudes (Morello et al, 2013). The term patient safety culture is a relatively new and potentially very valuable concept. With the increasing emphasis on safety issues in healthcare organisations worldwide, creating and maintaining a patient safety culture becomes extremely important (Feng et al, 2008). Liu et al (2009) investigated nurses' perceptions of safety culture in Chinese hospitals, indicating three core dimensions as components: management commitment to safety, the safety system and work pressure. Feng et al (2008) identified four subdomains of patient safety culture: system, personal, task-associated and interactive.

Domrose (2010) argued that the essential factors contributing to the advance of patient safety culture are human factors, such as leadership, communication, teamwork, and staff empowerment. Swift (2017) indicated that poor communication was a contributing factor in many medical malpractice claims. Eliminating poor communication could reduce medical errors and patient harm. A breakdown in communication, whether between individuals or teams of healthcare personnel, underlie most adverse patient outcomes in all healthcare settings (Scott et al, 2011). They may involve communicating too little or even too much, too early or too late; they may be the failure of either the person initiating the communication or the receiver, who may fail to understand or

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even hear the message (Katz, 2014). Lack of communication among healthcare providers may be attributed to ineffective closed-loop communication, information lost, or failure to establish clear lines of responsibility (Swift, 2017). To emphasise the importance of effective communication, Wachs et al (2014) reported that most surgical errors are not related to a single person but involve multiple personnel. The operation room (OR) is a potentially high-risk setting that is vulnerable to multiple communication errors. Poor communication is the most frequent cause of adverse events across all facets of health care, resulting in malpractice, such as delays in treatment, medication errors and wrong-site surgery (Zegers et al, 2011).

Education and training in patient safety, with a focus on human factors and systems safety, is important, as one of the most significant responsibilities of nurses is to guarantee safe patient care. No time should be lost in obtaining the resources needed to provide sufficient and relevant training for all healthcare personnel to improve their patient safety culture practices (Rall et al, 2011). Training has been shown to reduce errors and increase the ability of staff to solve problems, particularly for inexperienced professionals, whereas lack of training is often found to be a major cause of incidents (Rogers et al, 2006; Straight, 2008).

AbuAlRub and Abu Alhijaa (2014) examined the impact of educational interventions in patient safety among senior nurses in Jordan, investigating their perceptions of safety culture. They found that the initial overall perception of safety was 51.5%, which is considered a negative attitude (Sexton et al, 2006); after the intervention the figure was 60.6%, showing the impact of education on improving safety. According to Sexton et al (2006), the authors of the research instrument, perception of safety includes the following: teamwork climate, safety climate, perceptions of management, job satisfaction, working conditions, and stress recognition. They also noted that surveys are not always capable of measuring all other aspects of culture, such as behaviour, values, and competencies.

The present research is the first interventional study using an educational programme to evaluate the attitudes of Jordanian OR nurses towards a patient safety culture, although a few similar studies were found that did not specifically examine OR nurses (Hayajneh et al, 2010; AbuAlRub et al, 2012; AbuAlRub and Abu Alhijaa, 2014).

Aim

The main purpose of this interventional study was to evaluate the effect of a surgical safety educational programme on OR nurses' attitude towards a culture of patient safety.

Research questions

This study aimed to answer the following research questions:

- What are the attitudes of OR nurses towards a patient safety culture?
- What differences are there in OR nurses' attitudes after receiving an educational programme on patient safety culture?
- What differences are there in OR nurses' attitudes towards patient safety in terms of selected demographic variables (years of experience, gender and level of education)?

Methods

Design

An interventional one-group pre-/post-test design was used, which sought to measure changes in OR nurses' attitudes toward patient safety culture immediately after attending an educational workshop utilising the Surgical Safety Educational Programme (SSEP). This programme was devised by the authors based on World Health Organization (WHO) (2009) guidelines for safe surgery and the main items of the Safety Attitudes Questionnaire (SAQ), developed by Sexton et al (2006).

Settings and sample

This study was conducted in six Jordanian Royal Medical Service hospitals in Amman. These military hospitals provide various surgical services including: general, paediatric, orthopaedic, ENT, cardiac, ophthalmic, neurological, obstetrics, urology and vascular surgeries to the military and general public. A random sampling technique was used to recruit participants from among eligible nurses working in OR in the six hospitals. The sample size was calculated using the Power Primer to perform a two-tailed paired *t* test assuming a power of 0.80, medium effect size (d=0.50) and (α=0.05). Sixty participants were needed, and the sample size was increased by 10 to manage expected attrition bias. Therefore, 70 nurses were recruited to participate in this study. A systematic sampling method was used to select the study sample; the accessible population were listed and the researcher (the first author) selected every fourth person as a participant, based on dividing the entire accessible population size (310) by the desired sample size (70). The starting point for this sample was selected blindly. Owing to limited resources, it was practically and financially difficult to recruit a control group. Nurses who had a BSc degree or a diploma in nursing, had been working in OR within these hospitals for at least 1 year and who could read and understand English were included in this study.

Instrument

The SAQ (Sexton et al, 2006) was composed of 30 items divided into six domains: safety climate, job satisfaction, teamwork climate, stress recognition, perceptions of management, and working conditions. Each item is scored on a five-point Likert scale (1=disagree strongly, 2=disagree slightly, 3=neutral, 4=agree slightly, 5=agree strongly). A Likert scale is frequently involved in research used to signify participants' attitudes to a particular issue. The advantages of this type of instrument are that it is easy to create, it not time- or cost-consuming, and it gathers large amounts of significant data, while the most common disadvantages are that it may sometimes lead to inaccurate or subjective results (Kothari et al, 2013). The scores of the individuals were then ranked from 0 to 100 (1=0, 2=25, 3=50, 4=75, and 5=100). According to Azimi and Bahadori (2012) and Richardson (2010), scores of 60% or above (mean=3.4) are considered to represent a positive attitude towards a given safety culture subscale, while a score below 60% (mean=3.4) is considered to represent negative attitudes and areas needing improvement. The SAQ total scale reliability is 0.9, with subscales' reliability ranging from 0.78 to 0.91 (Lee et al, 2010).

Table 1. Sample's characteristics (*n*=66)

Variables	Frequency (%)
Gender	
Male	32 (48.5)
Female	34 (51.5)
Education level	
Bachelor's degree in nursing	23 (35)
Diploma degree in nursing	43 (65)
Had attended previous safety education	
Yes	7 (11)
No	59 (89)

Table 2. Safety Attitudes Questionnaire scale and subscale pre-test descriptive statistics (*n*=66)

Subscale	Mean (SD)
Total teamwork climate mean score	3.3 (±0.31)
Total safety climate mean score	3.3 (±0.30)
Total stress recognition mean score	3.3 (±0.39)
Total job satisfaction mean score	3.5 (±0.34)
Total perception of management mean score	3.2 (±0.46)
Total working conditions mean score	3.3 (±0.32)
Total attitudes mean score pre-test	3.3 (±0.20)

Intervention

The 4-hour educational workshop utilising SSEP was conducted from 8:00 to 12:00 in an auditorium at one Royal Medical Service hospital; it comprised three sessions. Attending the educational workshop also provided continuing education points for the participants, as further encouragement for participation. The researchers developed the SSEP based on WHO (2009) guidelines for safe surgery and the main items of the SAQ. The SSEP includes general safety culture information, methods known to minimise the risk of surgical site infection, general criteria for counting for counting surgical instruments and sponges after an operation and the main items of the SAQ for operating rooms, which includes six specific patient safety domains.

Two experts in patient safety measures assessed the content validity of the SSEP. The experts suggested some modification to SSEP to suit specific safety measures in the OR, after which it was approved.

Data collection procedure

All participants were invited to participate in the study through phone calls one week before the workshop and reminder calls one day before. The confirmation calls included the time and place of the workshop. After registration the participants were asked to complete the questionnaire. The SSEP was delivered through a 4-hour workshop in three sessions. After the workshop, the participants were asked to complete the questionnaire again.

Ethical considerations

Ethical approval was obtained from the scientific committee of the Jordanian Royal Medical Services. All participants were assured that participation in the study was voluntary and that they could withdraw from the study without any consequences. All completed questionnaires were secured in a locked cabinet in the researchers' office, to which only the researchers had access. The questionnaire was distributed individually to each participant, accompanied by a covering letter to clarify the purpose of study and the rights of participants. All participants were assured that participation in the study was voluntary and that they could withdraw from the study without any consequences. However, the covering letter stated that completing the questionnaire was considered to be an agreement to participate in the study.

Results

Sample characteristics

Seventy nurses working in ORs who met the inclusion criteria were recruited. Four were not included because of a failure to contact them at the time of the intervention. Therefore a total of 66 OR nurses were included in the study (a response rate of 94%). Males and females were almost equally represented (52% females and 48% males) and their ages ranged from 21 to 37 years, with a mean of 28±5; see *Table 1*. The majority of participants held a diploma (65%) with an average of 5.3 (SD: 4.3) years of clinical experience. The majority (89%, *n*=59) had not previously attended an educational or training course on patient safety in the OR.

OR nurses' attitudes towards a patient safety culture

The mean score for attitude pre-test was 3.3 (SD: 0.20); the total score was below 60%, indicating relatively negative attitudes. The highest total mean score on the safety scale was on the job satisfaction subscale at 3.5 (SD: 0.34), which is slightly above the cut-off point. The lowest subscale total mean score was for perception of management, at 3.2 (SD: 0.46), and for the remaining subscales was 3.3. *Table 2* presents the mean scores and SD for each subscale.

After attending the SSEP, the results revealed that the highest total mean score was for the stress recognition subscale at 3.9 (SD: 0.44), this is slightly above the cut-off point. The lowest subscale score was for working conditions, at 3.6 (SD: 0.43). The scores and SD for all the subscales are presented in *Table 3*.

Descriptive analysis of the nurses' overall scores revealed that the highest mean score was 4.00 (SD: 0.76), reported for item six on the safety climate subscale: 'I would feel safe being treated here as a patient'. The second highest mean was for item number 1 in the stress recognition subscale: 'When my workload becomes excessive, my performance is impaired', with an item mean score of 3.96 (SD: 0.59). The third highest was for item number 2 in the same subscale: 'I am more likely to make errors in tense or hostile situations', at 3.95 (SD: 0.90). The lowest item mean score was 3.3 (SD: 0.75) for item number 7 in the safety climate subscale: 'In this clinical area, it is difficult to discuss errors'. The next lowest mean score was for item number 3 in the working conditions subscale: 'Trainees in my discipline are adequately supervised', at 3.4 (SD: 0.72), and the third lowest

Table 3. The total mean score for each item and subscale before and after intervention (*n*=66)

	Pre-test		Post-test	
Teamwork	**Mean**	**SD**	**Mean**	**SD**
It is easy for personnel in the ORs here to ask questions when there is something that they don't understand	3.5	0.63	3.9	0.63
I have the support I need from other personnel to care for patients	3.6	0.58	3.8	0.70
Nurse input is well received in this clinical area	3.3	0.70	3.8	0.80
In the ORs here, it is difficult to speak up if I perceive a problem with patient care	3.1	0.74	3.5	0.73
Disagreements in the ORs here are resolved appropriately (ie not who is right but what is best for the patient)	3.51	0.79	3.85	0.80
The physicians and nurses here work together as a well-coordinated team	3.2	0.52	3.7	0.80
Total teamwork climate	**3.3**	**0.32**	**3.7**	**0.35**
Safety climate	**Mean**	**SD**	**Mean**	**SD**
The culture in this clinical area makes it easy to learn from the errors of others	3.3	0.77	3.7	0.82
Medical errors are handled appropriately in this clinical area	3.31	0.61	3.84	0.67
I know the proper channels to direct the questions regarding patient safety in the ORs here	3.36	0.77	3.6	0.76
I am encouraged by my colleagues to report any patient safety concerns I may have	3.2	0.68	3.8	0.79
I receive appropriate feedback about my performance	3.0	0.67	3.6	0.79
I would feel safe being treated here as a patient	3.31	0.66	4.0	0.76
In this clinical area, it is difficult to discuss errors	3.0	0.56	3.3	0.75
Total safety climate score	**3.3**	**0.30**	**3.7**	**0.38**
Stress recognition	**Mean**	**SD**	**Mean**	**SD**
When my workload becomes excessive, my performance is impaired	2.9	0.60	3.96	0.59
I am more likely to make errors in tense or hostile situations	3.3	0.59	3.95	0.90
Fatigue impairs my performance during emergency situations	3.0	0.82	3.7	0.66
I am less effective at work when fatigued	3.8	0.78	3.92	0.71
Total stress recognition score	**3.3**	**0.39**	**3.9**	**0.44**
Job satisfaction	**Mean**	**SD**	**Mean**	**SD**
This hospital is a good place to work at	3.2	0.76	3.74	0.73
I am proud to work at this hospital	3.6	0.67	3.7	0.70
Working here is like being part of a large family	3.4	0.55	3.6	0.74
Morale is high in the ORs here	3.6	0.63	3.72	0.74
I like my job	3.5	0.66	3.8	0.78
Total job satisfaction score	**3.5**	**0.34**	**3.7**	**0.41**
Perception of management	**Mean**	**SD**	**Mean**	**SD**
Management does not knowingly compromise patient safety	3.3	0.73	3.75	0.66
Management supports my daily efforts	3.0	0.80	3.6	0.70
I am provided with adequate, timely information about events in the hospital that might affect my work	3.1	0.76	3.6	0.71
The levels of staffing in this clinical area are sufficient to handle the number of patients	3.3	0.66	3.8	0.76
Total perception of management score	**3.2**	**0.46**	**3.8**	**0.45**
Working condition	**Mean**	**SD**	**Mean**	**SD**
All the necessary information for diagnostic and therapeutic decisions is routinely available to me	3.5	0.50	3.8	0.74
This hospital deals constructively with the problems of physicians and employees	3.1	0.85	3.6	0.72
Trainees in my discipline are adequately supervised	3.5	0.72	3.4	0.72
This hospital does a good job of training new personnel	3.3	0.56	3.8	0.65
Total working conditions score	**3.3**	**0.32**	**3.6**	**0.43**
TOTAL ATTITUDES MEAN SCORE	**3.3**	**0.20**	**3.8**	**0.30**

Table 4. Paired sample *t*: test results of total and subscales of safety culture mean scores (*n*=66)

	Mean differences	Standard deviation	95% confidence interval difference		*t*
			Lower	Upper	
Pair 1: pre-test teamwork/post-test teamwork	-10.35	13.22	-13.60	-7.10	-6.36
Pair 2: pre-test safety climate/post-test safety climate	-10.76	12.5	-13.84	-7.69	-6.99
Pair 3: pre-test stress recognition/post-test stress recognition	-16.41	14.80	-20.05	-12.77	-9.00
Pair 4: pre-test job satisfaction/post-test job satisfaction	-6.89	15.00	-10.58	-3.20	-3.73
Pair 5: pre-test perception of management/post-test perception of management	-14.29	17.73	-18.65	-9.93	-6.54
Pair 6: pre-test working condition/post-test working condition	-7.67	13.14	-10.90	-4.43	-4.74
Pair 7: pre-test total attitudes/post-test total attitudes	-11.04	10.43	-13.70	-8.47	-8.59

DF (degrees of freedom)=65 for each pair of pre-/post-test of the subscale. Significance (2-tailed <0.001) for each pair of pre-/post-test of the subscale

mean score for item number 4 in the teamwork subscale: 'In the ORs here, it is difficult to speak up if I perceive a problem with patient care', at 3.5 (SD: 0.73). *Table 3* presents the total mean score for each item before and after the intervention.

After the programme, the results indicated improvement in all post-test means. The descriptive results revealed that the total attitudes mean score before attending the programme was 3.3 (SD: 20) and afterwards 3.8 (SD: 30). *Table 4* identifies the total mean score of each subscale pre-test and post-test and the total attitudes mean score pre-test and post-test. Paired sample tests showed significant statistical differences in attitudes after SSEP with t (65) = 8.59, P<0.001. See *Table 4*.

To examine the relationships between nurses' gender and level of education with their attitudes, Spearman's test was used. The result shows that there was no correlation between level of education, gender and attitudes towards the patient safety culture (P>0.05).

Pearson's correlation test was used to examine the relationship between years of experience and attitudes. The result shows a negative weak correlation between years of experience and attitudes towards patient safety—as years of experience increase the attitudes towards patient safety decrease. There were no correlations between gender, level of education, and attitudes.

Discussion

In the current intervention study, the overall attitudes of OR nurses towards patient safety after SSEP significantly improved from a total mean attitudes score of 3.3±0.20 to 3.8±0.30. The mean difference before and after the SSEP was statistically significant, t=8.59, P=<0.001. This indicates that the SSEP succeeded in improving the percentage of positive responses of OR nurses on all six patient safety culture subscales.

These results show the positive effect of an educational workshop on OR nurses' attitudes. Given that the nurses in OR work in a highly dynamic and complex clinical setting, working with health professionals with different backgrounds (surgeons, anaesthetists, technicians), they are in need of such workshops to highlight patient safety issues. These results are congruent with the findings of Arora et al (2011), who found significant improvement after safety training programmes. Similarly, Azimi and Bahadori (2012) found that education programmes have a positive impact on nurses' attitudes towards patient safety. AbuAlRub and Abu Alhijaa (2014) found that an educational programme succeeded in improving participants' perception of the safety culture. van Beuzekom et al (2012) studied the effect of education programmes on OR staff, focusing on selected latent risk factors (material resources, communication, teamwork) that influence the patient safety culture, and found a positive effect of the intervention on seven out of 12 subscales. Several other studies support the results of the current research, reporting that safety training programmes have a significant impact on improving nurses' attitudes (Sexton et al, 2006; Paige et al, 2009; Weaver et al, 2010; Hull et al, 2012; Lapoint, 2012)..

The results of the current study indicate that there is no statistically significant relationship between gender, level of education and attitudes to patient safety, agreeing with the work of McCaffrey (2012). Aboul-Fotouh et al (2012) also indicated that there were no significant differences in perceptions of the safety culture on the basis of nurses' gender or education. However, Carney et al (2010), who surveyed gender differences

in OR care on perceptions of patient safety, reported that female nurses were significantly more likely to report less favourable perceptions of job satisfaction and working conditions.

El-Jardali et al (2014) found that level of education was negatively associated with a patient safety culture—that is, higher educational levels were associated with lower patient safety culture scores. On the other hand, a statistically significant negative relationship was identified between years of experience and nurses' attitudes. This might be related to the fact that safety culture is a new concept, which means that the more recently qualified and less experienced nurses had been exposed to it in their education and training, whereas the more experienced nurses who qualified some years ago were not educated on the topic. However, the exact reason remains unknown.

The findings of the current study are consistent with those of El-Jardali et al (2014), who reported that more years of experience (6 to 20 years) were associated with lower overall attitude scores to patient safety culture. Previous studies that examined the relationship between years of experience and nurses' attitude towards patient safety reported conflicting findings. Like El-Jardali et al's 2014 study, Al-Ateeq (2008) also reported that the longer the experience of a nurse, the poorer the attitude towards patient safety. However, other studies reported that positive attitudes towards patient safety were linked to more years of experience (Aboul-Fotouh, et al, 2012; AbuAlRub et al, 2012). One study reported no relationship between attitudes towards patient safety and years of experience (Ahmed, et al, 2011). These conflicting findings might be explained by the differences in the sample characteristics and the settings where the studies were conducted, because nurses in some settings were exposed to training programmes on safety culture.

Strengths and limitations

Despite the significant results, the lack of a control group was this study's main limitation, which may affect the validity of the results. Another limitation was asking the nurses to complete the post-test questionnaire immediately after the intervention. Spurlock (2018) stated that one-group pre-post-test design provides limited evidence to support claims of an intervention's effectiveness. The current study used a random sample, and its selection from a single healthcare sector in Jordan may limit the generalisability of the findings. Nevertheless, this study has several strengths. It is the first in Jordan to assess OR nurses' attitudes towards patient safety culture using the intervention of an education programme. The findings can provide a basis for comparison with those from other healthcare sectors. The study used a research design that is suitable to achieve the study purposes and to answer the study questions.

Conclusion

This study demonstrated that OR nurses had negative attitudes towards patient safety before attending the educational workshop using SSEP. This might be related to the fact that the culture is a new and complex concept, participants had never attended a patient safety workshop, they have a heavy workload and long working hours and there is a shortage of OR nurses despite the increasing number of emergency cases. The results of the current study can be used to develop strategies and action plans that focus on improving the areas of weakness in the culture that contribute to patient safety incidents, to evaluate the impact of different patient safety interventions and to identify barriers to improvement. The findings of this study provide baseline data about the factors contributing to a negative attitude towards a patient safety culture. Nurses working in this clinical setting can promote appropriate measures to improve the working environment. **BJN**

KEY POINTS

- Patient safety is considered to be the cornerstone of good quality health care, and its provision is one of the significant challenges in healthcare environments
- With the increasing emphasis on safety issues in healthcare organisations worldwide, creating and maintaining a patient safety culture becomes extremely important
- This study showed that operating room nurses' attitudes towards a culture of patient safety were originally negative; a significant improvement was achieved after the nurses attended a patient safety programme
- Educational courses about safety culture have strong potential to improve nurses' attitudes towards a patient safety culture

Declaration on interest: none

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CPD questions

- Think about the factors associated with patient safety in the operating room (OR)
- What are the OR nurses' attitudes towards a patient safety culture in your setting?
- Consider the nurse's role in assessment of patient safety in operating rooms
- What changes could you make to improve the safety of your patients?

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