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EFFECTIVENESS OF EDUCATIONAL INTERVENTIONS ON KNOWLEDGE, ATTITUDE, AND PRACTICE REGARDING SURGICAL SITE INFECTION PREVENTION AMONG NURSES & MIDWIVES

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Abstract

Background: *Caesarean section (CS) rates have increased by 20% globally in the past three decades. Surgical site infection (SSI) following CS remains a significant contributor to maternal morbidity and mortality. Infection control practice techniques are the backbone of nursing practice. Knowledge, attitude and practices of healthcare providers play an important role in the prevention of hospital-acquired infections.*

Objective: *The study aimed to evaluate the effectiveness of educational interventions on knowledge, attitudes, and practices regarding the cesarean section- surgical site infection (CS-SSI) prevention among nurses and midwives.*

Methodology: *A quasi-experimental study with a control group was conducted in the three public hospitals in Karachi from February to May 2024. A total of 86 nurses and midwives were recruited through a convenient sampling method. A valid questionnaire was used. The tool has four components' Socio demographic data, knowledge questions, attitude assessment, and an observational checklist for practice. The participants received a 4 weeks educational interventions. The post test data was conducted twice, once after 1 week and after 1 month of the intervention. SPSS Version 22.0 was used for data entry and analysis.*

Result: *There was a significant difference found in pre and post-test scores of knowledges, attitude, and practice. In the pre-test, the intervention group 23.3%participants had a high level of knowledge, 2.3% had a positive attitude and 18.6% had a high level of practice level. After the intervention, it increased to 83.7% high-level knowledge, 63% positive attitude, 86.0% participants had a high level of practice, at p-value of <0.001.*

Conclusions: *Educational interventions had significantly improved nurses' and midwives' knowledge, attitudes, and practice about cesarean section surgical site infection and this will help in prevention of the surgical site infection and improved the quality of care in the health care setting.*

INTRODUCTION

Cesarean section (CS) rates have increased globally during the last three decades, with an estimated 22.9 million cesarean births(1) . The major cause of morbidity after the cesarean section is the surgical site infection(2). Globally, the cesarean

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section surgical site infection ratio was 2.7% in China, 5.9% in Thailand, and 48% in Tanzania (3). A study conducted in Pakistan reported that cesarean-section surgical site infection rates have risen from 9.1% to 24.3% in two years (4). Post-CS-SSI increased maternal morbidity and mortality and also 3.4% of surgical wound infections proceeded to sepsis, necessitating intensive care unit hospitalization (5).

Infection prevention and control practice is a fundamental aspect of modern health care(6). The World Health Organization (WHO) reports that SSIs are the second-most common form of hospital-acquired infections and they affect between 4.5 and 5.7 billion people annually as a result of hospitals' lack of aseptic procedures (7). The prevalence ratio of SSI varies in different countries, developed countries such as the UK, the USA, and Sweden have lower SSI ratios ranging from 2% to 6.4%(8).In developing countries such as India, Bangladesh, and Nepal have higher incidence ratios ranging from 5.5% to 25% (9). Surgical site infection is potentially the most serious complication associated with cesarean section(10)

Infection control techniques are the backbone of nursing practice(11). Healthcare providers have unique abilities to prevent the hospital-acquired infections (12). They can also speed up a patient's recovery and reduce infection-related problems by using their skills and knowledge while providing the care(13). Implementing structured education is deemed a crucial component in improving the competencies of nurses and enhance the quality of care, which in turn will help to prevent the occurrence of SSI, reduce the cost of related complications and improves outcomes(14). Adequate knowledge and good practices by the nurses can facilitate patient care and may contribute to decreasing the rate of infection in the hospitals(15). Therefore, the objective of this study was to update the knowledge, attitude, and practice of nurses and midwives through the educational interventions so that the quality of care is improved, prevent complications, and improve outcomes(16).

Methodology

A quasi experimental study was conducted in the three public hospital of Karachi, Pakistan. The sample size was calculated by online software "open epi" version 3.0. Total of 86 participants including nurses and midwives were recruited. Nurses and midwives were working in obstetrical and gynecological wards of three public hospitals of Karachi. Permission was taken from medical superinidient of the three hospitals. After taking the permission from MS, participants were selected through non probability connivance sampling methods, purpose, risk benefits and objective of study were explained to participants. Consent form was obtained from the study participants. Pre- test data was collected through the knowledge, attitude and partice questionnaire. Knowledge was assess through 25 multiple mcqs regarding cesarean section surgical site infection prevention, attitude assessment was done through five point Likert-scale from strongly disagree to strongly agree and practice assessment was done through the surgical site dressing observational checklist(17). Practice assessment was done mannequin. The CVI of tool was 0.95. Pretest data was collection was done through valid questionnaire. After the collection of pre -test participants was divided into intervention and control groups. The intervention group participants received the educational session given by the primary researcher. Participants were divided into small groups, with each group comprising 4 to 5 members. Educational session was delivered using PowerPoint presentations, interactive lectures, and group discussions on CS-SSI prevention, following CDC guidelines(18). The content include cesarean section site infection, classification of surgical site infection, factors influence on surgical site infection, criteria to diagnose surgical site infections and pre, intra and post-operative guidelines to reduce the cesarean section surgical site infection. Practical training included demonstrations on a manikin, followed by participants practice and re-demonstration .The time and date of the session was developed according to the availability of the participants. Each educational session lasted 120 minutes. Total 8 sessions were conducted. The

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theory sessions were conducted in seminar hall and practice sessions were conducted in the skill lab. The control group participants received education through pamphlet about general information on infection prevention and control (IPC). The content of the pamphlet was description about infection prevention and control, mode of infection transmission, chain of infection, contact, air bone, and droplets precautions, essential infection prevention and control measures. Pamphlet was explained to the each participant. Hardcopy of pamphlet was also given to the participants. Post-test assessments were conducted twice one post-test was done once after the 1 week and 2nd after the one month of the intervention**.** The same questionnaire was used to collect post-test data from both the intervention and control group participants. The data was inputted and processed using SPSS version 26. Descriptive statistics such as frequencies, percentages, mean, and standard deviations were employed for analysis. Statistical tests, such as the Friedman test, Cochran's Q test and Mann-Whitney U test, were used to evaluate pre- and post-observations. The level of statistical significance was considered at $p < 0.05$.

Ethical consideration

Approval was obtained from GNRC, the Ethical Review Committee (ERC), and the Board of Advanced Studies and Research (BASR) at Ziauddine University. Additionally, permission for data collection was granted by the medical superintendent of Dr. Ruth K.M Pfau Civil Hospital and Sobhraj Maternity Hospital Abbasi Shaheed Hospital in Karachi, Pakistan. Written informed consent was obtained from each participant and subjects were assured that their data would be securely stored. Confidentiality and anonymity of information were strictly maintained, and participants were informed about the study's risks and benefits

Results

Table No:1 Demographic Data

Age	**Frequency** (%)
18-30 yrs.	13(15.1)
31-40 yrs.	21(24.4)
41-50 yrs.	52(60.5)
Qualification	
Diploma in Nursing	41(47.7)
Post RN BSN	11(12.8)
Diploma in Midwifery	34(39.5)
Experience	
1-5 years	10(11.6)
6-10 years	24(27.9)
11-15 years	52(60.5)

The demographic findings revealed that most participants (60.5%) were aged 41–50 years, reflecting a mature and experienced workforce. Nearly half (47.7%) held a diploma in nursing, while 39.5% had a midwifery diploma and 12.8% a Post RN BSN. In terms of experience, 60.5% had worked for 11–15 years, 27.9% for 6–10 years, and 11.6% for 1–5 years.

Table # 2 Analysis of knowledge, attitude, and practice level of the control group in pre and post, phases.

n=43	**Frequency**		
	PRE	**POST**	**p-value**
KNOWLEDGE			
Low knowledge	31(72)	30(69.7)	

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Moderate knowledge	8(18.6)	8(18.6)	0.944 [a]
High knowledge	4(9.3)	5(11.6)	
ATTITUDE			
Negative	35(81)	36(83.7)	0.472 [b]
Positive	8(18.6)	7(16.2)	
PRACTICE			
Poor practice	35(81)	32(74.4)	
Moderate Practice	5(11.6)	8(18.6)	0.729 [a]
High level practice	3(6.9)	3(6.9)	

In the control group, no significant changes were noted between the pre- and post-assessments. Knowledge levels slightly declined from 72% to 69.7%, while negative attitudes increased marginally from 81% to 83.7%. Poor practice remained dominant, improving only from 81% to 74.4%.

Table # 3 Analysis of knowledge, attitude, and practice level of the intervention group in pre-and post-phases

	Frequency		
N=43	**PRE**	**POST**	**p-value**
KNOWLEDGE			
Low knowledge	28(65.1)	0(0)	
Moderate knowledge	5(11.6)	7(16.3)	<0.001 [a]
High knowledge	10(23.3)	36(83.7)	
ATTITUDE			
Negative	42(97.7)	16(37.2)	<0.001 [b]
Positive	1(2.3)	27(62.8)	
PRACTICE			
Poor practice	30(69.8)	5(11.6)	
Moderate Practice	5(11.6)	0(0)	<0.001 [a]
High-level practice	8(18.6)	38(88.4)	

The intervention group showed a significant improvement in knowledge, attitude, and practice following the educational program. High knowledge levels increased from 23.3% to 83.7%, while negative attitudes declined from 97.7% to 37.2%. Similarly, good practice rose from 18.6% to 88.4% ($p < 0.001$). These results confirm the effectiveness of the educational intervention in enhancing participants' knowledge, attitudes, and practices.

Discussions

The present study result shows that 60.0% of the participants were between 41 and 50 years old. Similarly, another study (19)showed that more than half of the participants were between 40 and 50 years old. In contrast, in a study conducted in Lahore on nurses' KAP, The study finding showed that 57% were between 30 years -40-years old(20). The current finding revealed that majority of the participants had more than 10 years of experience. The present study's findings align with the study conducted on the assessment of knowledge of staff nurses regarding aseptic techniques at selected hospitals in which the results showed that more than 50% of participants were aged between 40 to 50 years, 48.2 % of the participant had a diploma in nursing and 52% participants had experienced between 10-15 years(21).

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The study further revealed that the participants in the control group had no significant KAP level(22). It was observed that a high level of knowledge increased from 9.3% to 11.6, a positive attitude level from 16.2% to 18.7 %, and a high level of practice from 6.9 % to 11.3%(23)
. These findings indicate that no significant levels of difference were found in the control group. These findings aligned with the study conducted by (Aktaş and Damar, 2022)which shows that control group participants remained unchanged in the level of KAP.(24)

Moreover, the study found that there was a significant difference in KAP levels in the intervention group, the high level of knowledge increased from 23.3% to 83.7% of the participants, and positive attitude levels increased from 37.2 % to 97.7 (18.6%), and high level of practice has increased from 18.6% to 88.4%(25). these findings were consistent with the study conducted by (26)in Iran, The study findings revealed that high levels of knowledge increased from 38.8 % to 75.6%, and practice increased from 42.2 % to 87.4% of the participants(27). Moreover .This result supports findings by Patel and Singh (2020), they highlighted that educational interventions emphasizing real-world relevance and motivational content can foster a proactive mindset(28) .The group discussions and scenario-based learning likely helped participants internalize the importance of infection prevention(29).

Furthermore, the study examined the association between socio-demographic characteristics and pre- and post-knowledge levels in the intervention group. The result revealed no significant association in the subjects' pre- and post-knowledge levels concerning age, qualification, and experience. These findings align with previous studies those nurses' experiences and qualifications were not strongly associated with surgical site infection prevention. In contrast, in a study conducted by (18), a significant correlation was found between post-knowledge level and education levels

The findings of the present study revealed that nurses had significantly higher knowledge, attitude, and practice (KAP) scores regarding cesarean section surgical site infection (SSI) prevention compared to midwives. This may be attributed to the fact that nurses often have greater exposure to surgical wards, perioperative care, and infection control protocols than midwives, whose primary focus is maternal and newborn care. The results align with previous studies conducted in Saudi Arabia, which have also reported insufficient knowledge and suboptimal practices among nurses in this area. This highlights the urgent need for targeted educational interventions and ongoing training for both nurses and midwives. Enhancing their understanding and practices in surgical site infection prevention is critical to improving maternal surgical outcomes and ensuring safe obstetric care.

Limitations

This study was limited to public sector hospitals in Karachi, Pakistan therefore, results could not be generalized for private sector organizations or overall populations.

Recommendations

- Continuing in-service educational programs, seminars, and continued nursing education should be conducted by public and private hospital management to update the evidence-based knowledge and practice of nurses and midwives.
- A similar type of study can be conducted on a larger sample size, including nurses midwives, and LHVs of different private organizations to achieve a generalization of the results.

Conclusions

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Conflicts of Interest

The author declares that there are no conflicts of interest regarding this research.

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Authors' Contributions

The author solely contributed to the conception, design, data collection, analysis, interpretation, and writing of this thesis under the supervision of the faculty of Ziauddine University.

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