The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 8, 2025

EFFECTIVENESS OF EDUCATIONAL INTERVENTIONS ON NURSES' PRACTICES OF ORAL CARE IN CRITICALLY ILL PATIENTS AT TERTIARY CARE HOSPITALS, PESHAWAR.

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DOI: https://doi.org/10.5281/zenodo.16963061

Keywords
Oral Care Practice, Critical Patients, ICU Nurses

Article History
Received on 27 May 2025
Accepted on 06 August 2025
Published on 27 August 2025

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Abstract

Introduction:
Intensive Care Units (ICUs) are the most sensitive departments in all health care systems where critically ill and unconscious patients are served. Effective ICU care, especially oral or mouth care for ICU patients, is one of the major responsibilities of critical care nurses. But for unconscious and intubated patients oral care becomes a challenging issue for nurses. Effective and evidence-based nurses' practices can influence the provision of appropriate oral hygiene practices to these clients, but previous literature revealed that usually, nurses have lack of knowledge about evidence-based practice to provide appropriate oral care for critical patients.

Objective:
To evaluate the effectiveness of educational intervention on nurses' practices of oral care for critically ill patients at ICUS of Tertiary Care Hospital Peshawar

Methods:
A Quasi-experimental design was used to meet the objective of the study. A total of 108 nurses from ICUs of public sector teaching hospitals of Peshawar were selected. Pre-intervention Data were collected through a validated self-administered questionnaire followed by an educational session. Post-intervention Data were collected through the same questionnaire at a one-month interval. The pre and post-intervention data were entered and analyzed using the Statistical Package for Social Science (SPSS) version 24. An Independent T-Test was applied to find mean differences among control and experimental groups both in pre and post-intervention.

Results:
Among the 108 participating nurses (54 in the control and 54 in the experimental group), 66.67 % (n=72) were female, and 33.33%(n=36) were male. The average age of the research participants was 29.51 years, with a standard deviation of 5.80 years. Among the total participants, 48.10% (n=52)

had diploma in nursing, 46.30% (n=50) had a BSN, and 5.6% (n=6) had a BSN as a qualification. There was no significant relationship found between the pre-intervention practice score and the sleeted demographic variables. The pre-intervention practice mean score was 20.52±3.75, and the mean post-intervention practice score was 31.86±13.0. The pre-intervention Practice mean score for the control group was 12.81±3.18, and the pre-intervention Practice score for the experimental group was 33.63±1.56 but, there was no significant mean difference with a p-value of 0.061. The mean post-intervention Practice score for the control group was 12.81±3.18, and the mean post-intervention Practice score for the experimental group was 33.63±1.56, and there was a highly significant mean difference with a p-value of 0.001.

Conclusion:

According to the findings of this study, majority of the nurses were having poor pre intervention practices. The intervention was effective and had significantly improved the nurse's practices. Comprehensive assessment of nurse's practices followed by effective intervention to improve their practices of oral care for critically ill patients is crucial for nurses to enable them for effectively dealing with oral care at ICUs. This will lead to improve patient outcome and will decrease morbidity and mortality due poor oral hygiene.

INTRODUCTION

Oral care in critically ill patients is a fundamental nursing intervention aimed at maintaining oral hygiene, preventing infections, and improving patient comfort. Educational Interventions are structured programs or activities designed to improve knowledge and skills among nurses. [1, 2]. Oral Care refers to the cleaning and maintenance of the oral cavity to prevent dental plaque, infections, and ventilator-associated pneumonia (VAP). Critically Ill Patients are individuals admitted to intensive care units (ICUs) requiring continuous monitoring and advanced life support due to life-threatening conditions. Nurses' Practices are the clinical actions carried out by nurses to provide safe, evidence-based care in line with professional standards. [3, 4].

The prevalence of poor oral health in critically ill patients is high due to mechanical ventilation, reduced consciousness, and limited self-care ability. Studies report that up to 60–80% of ventilated patients develop colonization of pathogenic microorganisms in the oral cavity, increasing the risk of ventilator-associated pneumonia. [5].Globally, VAP accounts for 25–50% of infections in ICU patients, leading to prolonged hospital stay and increased mortality. The burden is higher in low- and middle-income countries where ICU protocols for oral care are inconsistently applied.[6, 7].

The prevention of VAP is thought to depend heavily on comprehensive oral hygiene. Suction of the oropharyngeal secretions, which are "rich" in bacterial load, is the most often used procedure. For patients on ventilators, the following additional oral care techniques are frequently employed to avoid ventilator-associated pneumonia: Chlorhexidine can be used as an oral rinse, gel, or foam in various strengths of 0.12%, 0.2%, 1%, and 2%. It can also be used as a standalone treatment or in combination with mechanical debridement, such as manual or electric tooth brushing [1].

In ICUs, keeping good oral hygiene among critical patients is a critical part of the nurse's work that affects the patient's safety and comfort. Effective oral hygiene has consequences for identification, interventions, and treatment since it is crucial to a patient's health. Patients in critical condition lacked the capacity to take care of their own oral hygiene. The practice of oral hygiene is made more difficult by the fact that the majority of critically sick people have a gastric tube, an end tracheal tube, and a lot of other equipment necessary for evaluating and supervising a critically sick patient. For critically ill hospital patients, good oral hygiene is essential. Hence, for unconscious and intubated patients, oral care becomes a challenging issue for nurses. Centers for Disease Control and

Prevention defines oral care as "a practice that aims to stop disease by keeping the mouth cavity hygienic and healthy" [8]. According to the American Association of ICU Nurses, proficient practices of oral care consist of brushing the teeth, gum and tongue twice a day and using a soft and spineless toothbrush. Additionally, the application of moisturizing liquid on the oral mucosa and lips every 2 to 4 hours is compulsory for effective oral hygiene [9].

The aim of mouth care is to maintain the oral cavity of ICU patients, keeping it clean, wet, and infection-free [10]. In some cases, unconscious ICU patients may require oral intubation to sustain a patent airway. The endotracheal tube, which is frequently used for this reason, results in ventilator-associated pneumonia (VAP), which is one of the most frequent causes of hospital-acquired infections amongst mechanically-ventilated patients in the ICUs [11, 12].Ventilator-Associated Pneumonia (VAP) represents 47 % of all infections in the ICU patients, which increases the burden on intubated patients, as increased length of stay in the ICUs, financial costs, as well as rising morbidity and mortality rates [13]. Literature acknowledged that oral hygiene practices can decrease the occurrence of VAP by 60% [14].

Methodology

A quasi-experimental study design was adopted to evaluate the effectiveness of educational interventions on oral care practices of nurses in Intensive Care Units (ICUs). The research was conducted in three public sector tertiary care hospitals of Peshawar: Khyber Teaching Hospital (KTH), Hayatabad Medical Complex (HMC), and Lady Reading Hospital (LRH). Each of these hospitals has well-established ICUs where critically ill patients receive intensive care services.

The study population included all registered nurses working in the ICUs of KTH, HMC, and LRH. Nurses with less than one year of ICU experience and those unwilling to participate were excluded. The sample size was calculated using the G*Power calculator, yielding 108 participants at a 95% confidence level and 5% significance level. Participants were equally divided into two groups, with 54 nurses each in the intervention and control groups, using convenient sampling. The independent variable was the **educational intervention** (PowerPoint presentations and brochures), and the dependent variable was the **oral care practice score** of ICU nurses.

Educational Intervention and Data Collection

The intervention was developed in line with MOH Nursing Clinical Practice Guidelines (2004). A 50–60-minute session was conducted, including PowerPoint presentations translated into Pashto and brochures in Urdu for clarity. The intervention consisted of three stages:

- **Preparatory Stage**: preparation, expert review, rehearsal, and informed consent from participants.
- **Intervention Stage**: training through PowerPoint and demonstration on an adult dummy in the teaching halls.
- **Termination Stage**: assessment of participants' reactions and ensuring message clarity.

Data was collected using a pre-validated questionnaire (Cronbach's alpha = 0.80). The tool had two sections: demographic information and assessment of oral care practices. Baseline assessment was conducted before the intervention, followed by reassessment one week after the intervention using the same tool.

Data Analysis

Data was analyzed using SPSS version 25. Each questionnaire was coded to maintain confidentiality and anonymity. Continuous data were analyzed using means and standard deviations, while categorical data were analyzed using frequencies and percentages. Graphical presentation was used where appropriate. Inferential statistics included paired t-tests to evaluate the effectiveness of the intervention on pre- and post-practice scores within groups, independent t-tests to compare mean scores between intervention and control groups, and ANOVA for comparisons across multiple groups.

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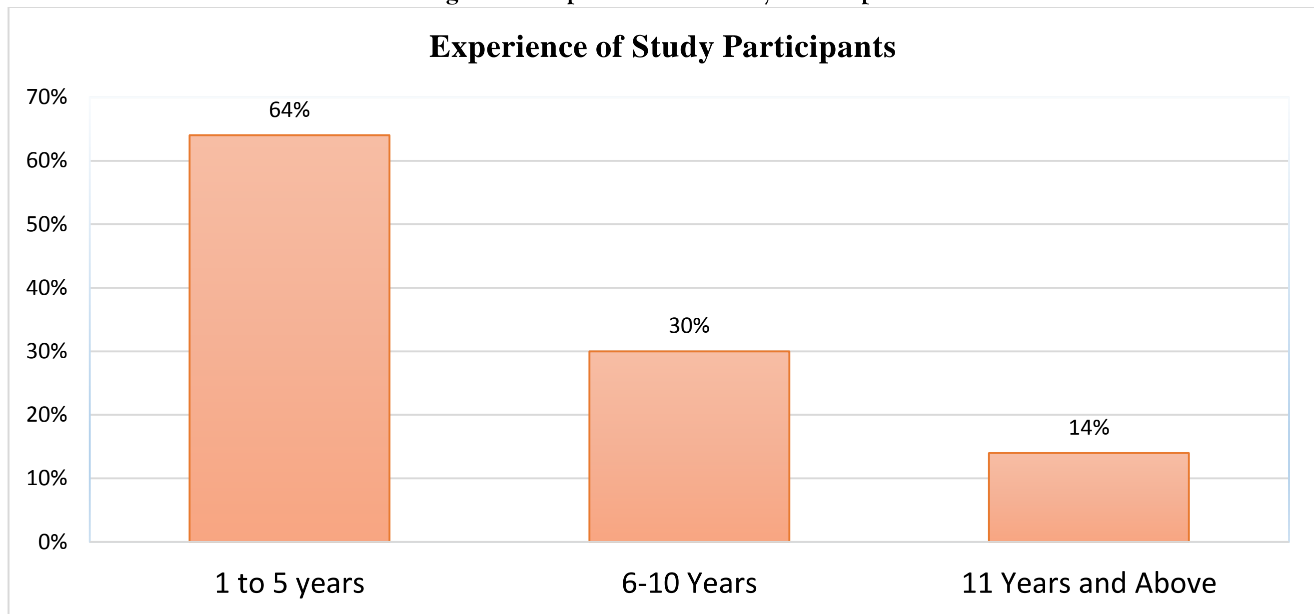
Results and Analysis

Table 1: Demographic Characteristics of Study Participants (N = 108)

Variable	Details
Age (years)	Mean = 29.51 ± 5.80 (Range: 22–50)
Gender (Male/Female)	36 (33.3%) / 72 (66.7%)
Qualification (Diploma/BSN/Generic BSN)	52 (48.1%) / 50 (46.3%) / 6 (5.6%)
Workplace (LRH/KTH/HMC)	58 (53.7%) / 24 (22.2%) / 26 (24.1%)
Total Nursing Experience (years)	Mean = 5.82 ± 3.92 (Range: 1–22)
ICU Experience (years)	Mean = 3.38 ± 2.54 (Range: 1–15)
Training in Oral Care (Yes/No)	24 (22.2%) / 84 (77.8%)

Participants were categorized into three groups on the basis of their experience, i.e. experience of 1 to 5 years, 6 to 10 years and 11 years & above. The percentage of participants in each group is shown in the figure 1

Figure 1: Experience of Study Participants



The practice of the participants was assessed through a checklist consisting of different aspects of oral care, having a total of 15 items in the questionnaire. The response was never scored as 1, the response for some time was 2, and the response for always was scored as 3. The total pre & post-practice score was computed for each participant, and the mean score was calculated along with the standard deviation. The mean pre-intervention practice score was 20.52±3.75, and the mean post-intervention practice score was 31.86±13.0, as shown in table 2

Table 2: Pre & Post Intervention Practice Score

	Mean	Std. Deviation	Minimum	Maximum
Pre Intervention Practice Score	20.52	3.75	15	37
Post Intervention Practice Score	31.86	13.00	15	45

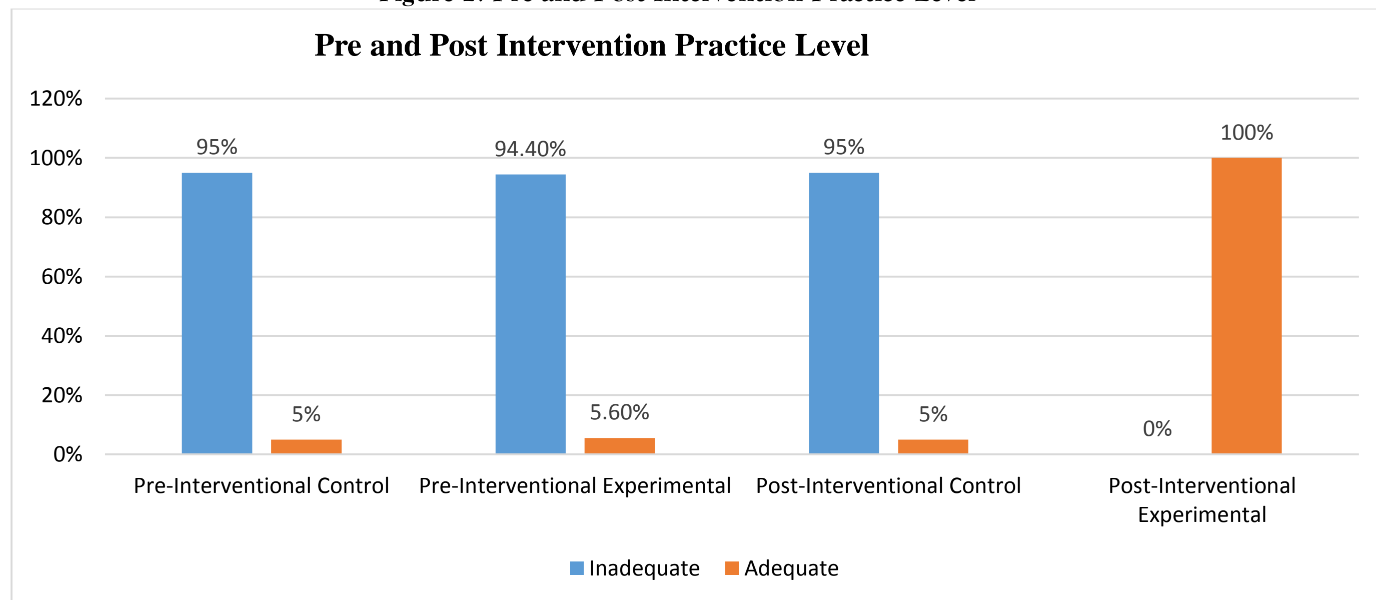
Likewise, pre-intervention and post intervention mean scores were calculated for both experimental and control groups separately to compare with each other. The details are given in the table 3 below. The mean practice score was increased from 21.93 to 44.65 in the experimental group, while the mean practice score was not changed in the control group.

Table 3 Comparison of Pre and Post Intervention Mean Practice Score

		Pre-Intervention Practice Score	Post-Intervention Practice Score
Experimental Group	Mean	21.9259	44.6481
	Std. Deviation	4.07872	0.51970
	Minimum	17.00	43.00
	Maximum	37.00	45.00
Control Group	Mean	19.1111	19.0741
	Std. Deviation	2.78586	2.81406
	Minimum	15.00	15.00
	Maximum	30.00	30.00

The computed practice score was categorized into two levels, i.e. Adequate Practices (≤ 66.67% Score) and Inadequate Practices (score of below 66.67%). Frequencies and percentages for each level in both pre and post-intervention groups were calculated. Among the pre-intervention experimental group, 94.80% of participants had inadequate practices, and 5.20% had adequate practices. Likewise, in pre-intervention control, 95% had inadequate practices, while only 5% had adequate practices. Among the post-intervention control group, the percentage of inadequate practices remained the same at 95%, while the adequate practices in the post-intervention experimental group were increased to 100% after intervention, as shown in Figure 2

Figure 2: Pre and Post Intervention Practice Level



To find out mean differences of pre intervention practice score among various groups made on the basis of demographic characteristics, Independent T- Test (Gender) and One-way ANOVA (Qualification, Workplace) were

applied. Similarly, to find out the correlation between ICU Experience and pre-intervention practice score, a Pearson correlation test was applied. Lastly, the Chi-Square test was applied to find out the association between experience level and training with the pre-intervention level of practice, but it was found that there was no significant relationship between the selected demographic variables with pre-intervention Practice Score. The details are given in table 4

Table 4: Pre-Intervention Practice Score Versus Demographic Variables

S. No	Demographic Variable	Statistical Test	Test Value	P Value	Significance
1	Gender	Independent T-Test	t=-1.24	0.22	Not Significant
2	Qualification	One way ANOVA	F=1.68	0.19	Not Significant
3	Workplace	One way ANOVA	F=1.11	0.33	Not Significant
4	Level of Experience	Chi Square (X^2)	X^2= 1.37	0.50	Not Significant
5	ICU Experience in Years	Correlation (r)	r=-0.093	0.34	Not Significant
6	Training	Chi Square (X^2)	X^2= 0.908	0.34	Not Significant

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Discussion

One of the most fundamental nursing tasks is oral care. Keeping the mouth and teeth clean will protect the patient's oral health and expedite recovery by avoiding infections. An unconscious patient or patient in intensive care needs appropriate oral care, and the nurse is crucial in promoting good oral hygiene [(2)]. Hence, this study was conducted to investigate the impact of an educational program on nurses' practices of oral care for ICU patients. The educational intervention given to the study participants in this study had significantly improved their practices regarding oral care for critically ill patients.

In this study, a total of 108 nurses, i.e. 54 in the control group and 54 in the experimental group from ICUs of tertiary care hospitals Peshawar, participated in which 66.7% were female, and only 33.33% were male, and the mean age was 29.51±5.80. This finding is congruent with the finding of a study conducted in Baghdad in which the mean age of the study participants was 27.59 ±3.342, although the percentage of females in that study was 48.1% and males was 51.9%, which is not in line with the gender statistics of current study [(8)]. Similarly, another study (conducted to evaluate Nurses' Intervention toward Oral Hygiene in Critical Care Unit Patients) had contrary gender statistics, i.e. 36.7% of nurses in the study were female, and 63.3% of nurses were male [(15)]. In this study, the participants' mean total nursing experience was 5.82 years with a standard deviation of 3.92, while mean ICU experience was 3.38 years with a standard deviation of 0.92. These findings are supported by the result of another study conducted at Lahore, which reported that 38.7% nurses had experience of 1 – 5 years in ICUs [(16)]. Likewise, a study conducted in Saudi Arabia stated that the mean years of experience in the ICU was 7.49 with an SD of 5.58, and minimum experience of 1 year, and a maximum of 26 years [(24)]. In the present study 48.10% (n=52) were having diploma in nursing, 46.3 0 % (n=50) were having BSN and 5.6% (n=6) were having BSN (Generic). This is also supported by another Pakistani study, which reported that 69.8% (n= 115) of the participants had a diploma in Nursing [(17)].

The findings of this study stated that only 22.2%(n=24) participants had attained formal training in Oral Care Practices and 78.8% (n=84) had not attained any training on oral care practices for ICUs' Patients which is congruent which another study which revealed that only 14.5% of the nurses had attended training on oral care and the majority (58%) had requested to have training arrangement for them [18]. In contrast to this study, a Sudanese study found that 64.5% of nurses had training in oral care services [15].

The current study found no association between chosen demographic variables and pre-intervention knowledge and practice scores, indicating that there is no significant relationship between total pre-intervention practices and level of education (at p-value of 0.19). This finding is supported by research done in Iraq [17] and in Egypt [19], where they discovered that there was no significant relationship between nurses' educational level and their practices.

The current study also found no statistically significant relationship between nurses' years of ICU experience and their pre-intervention oral care practices score (p-value= 0.34). This finding has been confirmed by research done in several countries, which discovered that there was no statistically significant association between nurses' years of experience and their pre-intervention practice score of oral care for critical patients [8, 15, 19].

Regarding the association of gender with pre-intervention practice score, the study disclosed that there is no significant association between nurses' Pre-intervention practice score and gender, where p-value = 0.22, which is consistent with the findings of other research that found no correlation between nurses' pre-intervention practice score and gender[20].

In the present study, the overall pre-intervention practice score of both groups, i.e. experimental and control group, is low, i.e. the mean pre-intervention Practice score for the control group was 12.81±3.18, and the mean pre-intervention Practice score for the experimental group was 33.63±1.56 and having no significant difference between two groups as p-value is 0.061. This result, supported by another study, revealed that the majority of nurses (80.46%) had a low level of practice prior to the study [22]. Likewise, another study also showed that (78.7%) of nurses have a low practice level regarding oral care for critically ill patients [53]. Another study found that (76%) of nurses had bad practices, (24% had moderate practices), and no one had good practices for oral care of ICU patients [21]. Lastly, a study conducted in 2016 stated that all ICU nurses practiced inadequate oral care practices [22].

Poor oral care practices of ICU nurses in the current research can be related to the fact that the majority of the nursing staff lacked appropriate knowledge of oral care for critically ill patients, particularly intubated patients. Furthermore, the presence of the ETT may impede the oral care procedure due to nurses' fear of displacing the ETT. This reasons are also reported by many researchers in the literature [23,24].

In the current study, the post-intervention mean Practice score for the control group was 12.81±3.18, and the mean post-intervention Practice score for the experimental group was 33.63±1.56. An independent T-Test was applied, and it was found that the mean difference was highly significant with a p-value of 0.001. This shows that the educational intervention has a positive outcome on the ICU nurses' practices of oral care for Critically Ill Patients. Many studies have found significant differences in the mean scores of nurses' practices regarding oral care before and after the educational program, with the mean score in the post-test experimental group being higher than the mean score in the pre-test experimental group [25, 26].

Conclusion

According to the findings of this study, the majority of the nurses had poor pre-intervention practices. The intervention was effective and had significantly improved the nurse's practices. Comprehensive assessment of nurse's practices followed by effective intervention to improve their practices of oral care for critically ill patients is crucial for nurses to enable them to effectively deal with oral care in ICUs. This will lead to improved patient outcomes and will decrease morbidity and mortality due to poor oral hygiene.

Recommendations

Keeping the present study findings in mind, the following are some of the recommendations suggested:

- Continuous in-service training programs and lectures should be provided to

nursing staff to keep their knowledge and skills updated.

- Manual guidelines should be distributed among nurses to enable them to correctly provide oral care to critically ill patients.
- A continuous nurse's performance evaluation and accreditation program should be developed.
- Contents and guidelines for oral care practices should be included within the curriculums of Nursing Education Programs.
- Replication of the same nature studies should be conducted at a larger scale.

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