Original Article

2014 (10 COPY)

EFFECT OF EDUCATIONAL PROGRAM ON NURSES, KNOWLEDGE AND SKILLS ABOUT ORAL CARE FOR TRAUMATIZED PATIENTS

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ABSTRACT

Background: *Oral care is a basic nursing care procedure that improves patient comfort and prevents oral infection, although oral care is a common requirement of nursing practice, providing intubated patients. Continue education programs on oral care for improving the knowledge and skills of intensive care nurses.* **Objective:** *The aim of this research was to study effect of educational program on nurse's knowledge and skills about oral care for traumatized patients.* **Method**: *the presented study was conducted in trauma intensive care unit at Assuit university hospital. a convenience sample of all available nurses (about 52 nurse) 30 were nursing diploma and 22 bachelor degree during one year, subject two tools, the data were collected using tool I pre/post questionnaire sheet for assessment of nurses knowledge, too II pre/post observation checklist to assess nurse skills. The results of this study indicated that the nurses' knowledge about oral care was the majority of nurses had unsatisfactory total knowledge pre education program. It improved to 86.7% in diploma nurses and 100% in bachelor degree. Immediately post education program, also, the majority of nurse's skills were inadequate pre education; they improved to 93.3% in diploma nurses and 100% in bachelor degree, also there were significant difference between all studied nurses.* **Conclusion:***The study concluded that the education program lead to significant improvement in nurse's knowledge and skills about oral care procedure.*

Keyword: *oral care, knowledge, skills. Tooth brushing, ventilator-associated pneumonia.*

INTRODUCTION

Oral hygiene is an integral part of care in intensive care units (ICUs), the relationship between oral hygiene and the reduction of oropharyngeal colonization with pathogenic organisms is less recognized. Microbial colonization of the oropharynx and of dental plaque has been associated with systemic and respiratory diseases, most notably ventilator-associated pneumonia (VAP) in morbidity and mortality **(Cason, et al 2007).**

The Centers for Disease Control and Prevention (CDC) recommend development and implementation of a comprehensive oral hygiene program, potentially with the inclusion of an antiseptic agent, for settings where patients are at risk for hospital-acquired pneumonia (HAP). In

support of this recommendation, researchers have advocated oral hygiene (and a subsequent reduction in the colonization of dental plaque) as an important strategy in preventing VAP. Despite these recommendations, limited evidence exists to guide nurses' oral hygiene practice in the general ICU population **(Berry, et al 2007).**

Oral decontamination with antiseptics of adult patients receiving MV is associated with a lower risk of VAP. Many reports suggest a potential relationship between poor oral care and increased incidence of VAP. Using chlorhexidine for oral care is considered a low-cost, easy-application intervention with a low level of adverse effects **(Lorente, et al 2007).**

Chlorhexidine is recommended as the most effective antiplaque agent. Chlorhexidine, has a positively charged molecule, works by binding to negatively charged sites on tooth enamel and mucosal cells. This action results in a reduction of microbial adherence to the tooth and mucosal surfaces. **(Munro, et al 2009).** Chlorhexidine has an inhibitory effect against Gram-positive and Gram-negative organisms. Lastly, Chlorhexidine, by its slow release properties, maintains an antimicrobial activity up to 12 h **(Prendergast, 2011).**

Sodium bicarbonate 0.1% if diluted carefully effectively removes debris. Further research is needed to determine the most effective way to perform oral hygienic care in critically ill patients as well as deciding on the most appropriate frequency of oral care **(Abidia, 2007).**

Nurses may be hesitant to provide oral care to patients who are intubated because endotracheal tubes (ETT) may limit access to the oral cavity. The fear of dislodging or displacing the tube is also restriction. Provision of oral care may be affected by the perception that oral care contributes less to patients' health and well-being (or has lower priority) than

other nursing interventions for critically ill patients. **(Grap, et al 2003)**

From literature the recommended tools used for assessing the oral cavity are the modified Beck Oral Assessment Scale (BOAS) and the mucosal-plaque score (MPS). The modified BOAS consists of 5 subscales: assessment of lips, mucosa and gingiva, tongue, teeth, and saliva. BOAS scores range from 5 (no oral dysfunction) to 20 (severe dysfunction) **(Ames, et al 2011).** MPS includes only 2 scores that reflect an assessment of mucosal surfaces and plaque. MPS values range from 2 to 8; any score greater than 5 reflects marked lack of oral integrity **(Ames, et al 2011).**

Brushing in one continuous line starting at the left upper (LU) gingival surface of the teeth, then the right upper (RU), then to right lower (RL), then to left lower (LL) gingival area. Brushing should be done in circular motion to help remove debris and decreasing plaque **(Prendergast, et al 2012).**

Using water to moisten toothbrush. Using of toothpaste or any antiseptic solution depends on the condition of the patient and oral mucosa. Tooth brushing should be done no more than every 8 hours unless plaque is particularly heavy, suctioning excess fluid and remove debris to prevent aspiration. In between brushing, moisten oropharyngeal cavity (can be with water or lanoline **(Abidia.,2007).**

Toothbrush is the most commonly used tool for maintaining oral health of the intubated patients. Manual toothbrushes have been proposed as the ideal method of promoting the oral hygiene of orally intubated patients. **(Berry, & Davidson, 2006).** Daily has been seemed superior to a manual toothbrush for removing dental plaque and improving gingival health. Soft pediatric toothbrush remove dental plaque

than foam swabs .

Oral care is a basic nursing care activity that provides relief and comfort to patients who are seriously ill and cannot perform this simple activity themselves. **(Munro and Grap 2009)** . In ICUs providing oral cares to patients who are uncooperative have a high risk procedures and adequate evidence to support these processes are needed. **(Ames, et al 2011** for aspiration, or are intubated can be a challenge and at times an impossible task. However, if the benefit of oral care outweighs the risk of clear precise oral care).

Teaching and evaluating clinical knowledge, skills, and problem-solving abilities should include didactic and interactive activities with regular training sessions to prevent the decrease in perfonnance that may occur with time **(Schmalenberg, et al. 2008).** For example Comprehensive education about ventilator modes, function of dials, and various skills to prevent and manage various patient- and ventilator related a problem promotes optimal patient-centered care **(Kaynar, et al 2007).**

The implementation of a

AIM OF THE STUDY

The aim of this study is to evaluate effect of educational program on nurses Knowledge and skills about oral care for traumatized patients.

Hypothesis:

-There was significant difference between post test knowledge scores   to the pretest knowledge scores following implementation of education program.

SUBJECT AND METHOD

Research design: A quasi-experimental research design was used in the study.

Setting:

The study was conducted in Trauma Intensive Care Unit at Assiut university

comprehensive oral education program, may contribute to decreasing patient's risk of VAP information about the frequency and type of oral care provided to critically ill patients will guide the development of nursing intervention that may improve outcomes in these patients **(Grap, et al., 2003)**

The Mucosal-Plaque Scale (MPS)**.** It is used to **assesses** the oral mucosa and gingival for presence or absence of inflammation (e.g. normal gingival, presence of mild inflammation, moderate, severe) if the mucus membrane is normal it takes score (1) and if there is severe inflammation it takes score (4). The plaque is assessed by inspection if it is not visible it takes score (1) and if there is abundant amount of plaque it takes score (4). **(Ames et al, 2011)**

Significance of the study: It was observed that most of the oral care procedure gone failed because of the inappropriate methodological application by the nurses. So there is a need for a study to promote the nurses knowledge that could help them to contribute a successful patient care out come.

-There was significant difference between post test skills scores
to the pre test skills scores following implementation of education program.

-Positive relation was exit between knowledge and skills scores obtained by critical care nurses receiving education program.

hospital.

Subjects of the study:

A convenience sample of all available nurses (about 52 nurse) 30 were diploma degree and 22 were bachelor degree, working in trauma intensive care unit at

Assuit university hospital for one year.

Tools:

Data pertinent to the study were collected, utilizing the following two tools.

First tool: Pre/post questionnaire sheet for the nurses' knowledge.

It was developed by researcher based on current national and international an extensive review of literature **(Ames.et al 2011)**.

This tool was used to assess their knowledge regarding to oral care procedure and used to prior and immediately after the implementation of the educational program for nurses, It consists of 6 main parts:

• Socio demographic data as (name, age, sex, marital status. Qualifications, and years of experience. It includes 6 items.

• Oral care procedure for trauma intensive care patient, which includes:

• Nurses knowledge about respiratory tract infection and care of endotracheal tube patient.

• Assessment of oropharyngeal cavity by using an oral assessment scale (BOSA &MPS).

• Suction technique for trauma intensive care patient.

• Nurses' knowledge about frequency, different methods of oral care, which included 25 questions, covered the previous parts.

Scoring system:

Each right answer was given score according to answer the total scores were 50 degree those who obtained <60% were considered having unsatisfactory level of knowledge. While those who obtained > 60 was considered having satisfactory level of knowledge.

Tool two: *Pre/post an observational checklist sheet for the nurses skills:*

Observational check lists were adopted from **(Carlson 2009)**for assessment of nurses level of skills in providing oral care, which included frequency, different methods of solution: (oral care procedure by brushing technique 31 items checked), suction technique (21 items checked), cuff pressure monitoring (22 items checked) every step takes score 1 point, Also the educational program included how to assess the oropharyngeal cavity by using an oral assessment scales (BOAS & MPS) of the study, culture aspiration from the ETT and oropharyngeal swab drawing.

Scoring system of observation checklist sheet was 63 degree each item in check list was scored as: one degree for each step that done and zero for each step that not done. Scoring system translated in results into adequate and inadequate done, adequately done include steps that done and in adequately done include steps that not done scores > 60% was graded as adequate level of skills. Scores < 60 were graded as inadequate of level skills.

Construction of Education Program:

The education program was developed by the researcher based on the previous assessment of nurses' knowledge and skills. Available resources and review of relevant literature.

Methodology:

- Study was applied after an official approval for data collection was
obtained from ICU director and ethics committee in ICU of Assuit University Hospital.

-Tools were developed by the researcher after reviewing the related literature.

- Tools were tested for content clarity, and validity by a jury of (5)

experts in the field of the study (three nursing professional staff, two medical staff and one experts in statistics) and the necessary modifications were done.

- Permission for voluntary participation was obtained from nurses and the nature and purpose of the study was explained.

Pilot study:

- Pilot study was conducted on random sample of 6 nurses to test the feasibility and applicability of the tool and the necessary modifications that were done.

Study Procedure:

Preparatory phase:

- Review of current study and past, local and international related in the various aspects of the problems using books, articles, periodically, and magazines were done. The proposed study setting was assessed effect of oral care educational program on Knowledge and skills of critical care nurses.

- Educational program v/as conducted by the researcher for ICU nursing

(52) about oral care whom were working in trauma intensive care unit at Assuit university hospital.

- The total sample was divided into 10 subgroups include from 5 to 6 nurses for each session.

Implementing phase:

- All the nurses were completed the pretest, attended the educational session and finished the posttest questionnaire.

- Questionnaire sheet was developed by the researcher and used to assess nurses level of knowledge about frequency, different type solution of oral care, assessment of oropharyngeal cavity, respiratory tract infection and care of mechanically ventilated patients it consists of 25 items in addition to the socio demographic data as (name, age, sex, and years of experience).

- Observational checklists were developed by the researcher to assess nurses level of skills in providing oral care, which included two different of solutions: (oral care procedure by brushing technique (31

items checked), suction technique (21 items checked), 'cuff pressure monitoring (22 items checked) every step takes score lpoint.

-Also the educational program included how to assess the oropharyngeal cavity by using an oral assessment scales (BOAS & MPS) of the study, culture aspiration from the ETT and oropharyngea! swab drawing.

- The educational program has been implemented in seven sessions:

-Three theoretical sessions about the following:

1- Description the anatomy and physiology of the oral cavity.

2-Technique of oral care for mechanical ventilation care of endotracheal tube patients (60 minutes).

3-Importance and effectiveness of oral care by using frequency every 4 hours, different type of antiseptic agents (Alcohol-Free Chlorhexidine 0.2%,& Sodium Bicarbonate 0.1%) and its effect in preventing bacterial colonization, oral inflammation and respiratory infection (30 minutes).

4-How to use tools of the study during care of mechanically ventilated patients (Bacterial Colonization Indicators, Beck Oral Assessment Scale& Mucosal-Plaque Scale) (30 minutes).

Four clinical sessions:

1-Technique of oral care for mechanically ventilated patients was carried out by using soft pediatric toothbrush with the application of two different antiseptic agents according the study. Each solution was introduced to the student in its name, concentration and amount used (l0 minutes).

2-Suction technique from the oropharyngeal cavity and from the ETT (10 minutes).

3-ETT care and cuff pressure monitoring (10 minutes).

4- Technique culture aspiration from the ETT and oropharyngeal swab drawing**.**

Procedure:

- Each theoretical session were carried out in class to include all nurses.

All the topics were presented in the form of power point program.

-Theoretical sessions started with discussion (10 minutes) to assess nurse's feedback of knowledge about related topics then the researcher started the education time. After the session break time was given to them (10 minutes) followed with discussion to assess nurse's level of understanding (10 minutes).

-Clinical sessions were conducted first in the clinical lab by using doll.

-Every session was started first with discussion to assess nurse's feedback about the procedure (5 minutes) then training phase about definition, indication, frequency of oral care, and technique of the procedure (15 minutes).

-Researcher provided teaching material as videos about the procedure to help nurses during demonstrating it. Videos were presented before and after demonstration time.

-Each clinical session would be repeated more than once in the same day and in the other day to be sure that every nurse reached accurate skills of the procedure.

- All Nurses demonstrated for studied groups the procedure once or more under observation by researcher in the lab to ensure correct procedure and assess the

weak points.

- Each nurse of all studied groups obtained a copy of the educational program in Arabic and English language booklet included all theoretical and practical content.

-The topics included hand out, posters and clinical videos for demonstration of the care provided.

- An open channel communication was achieved between researcher and nurses to ensure understanding, answer any question and to verify information and practical skills given.

-Observation checklist was used during data collection to evaluate nursing level of skills in providing oral care and to ensure skills until competency. Each right action would have score 1 according to the importance of it and the false action had score zero.

-Each group takes two month training in ICU so that evaluation of the nurse's skills started from the second week of every group.

Evaluation phase:

- The evaluation of knowledge was done immediately after program implementation by using the same questionnaire sheet (the post-test).

The nurse whom paced 60% and more of the questionnaire sheet correctly was considered satisfactory but whom paced less than 60% was considered unsatisfactory.

STATISTICS ANALYSIS

Data analysis was done using SPSS 20.0 application (Statistical package for social science). Qualitative data described by number and percent, where quantitative data described using mean and standard deviation. Chi-square test

used to test relation between qualitative variables where independent samples T-test used to compare between two groups of quantitative data, paired T-test used to compare between pre-test and post-test and person

RESULTS

Table 1 shows the socio-demographic of the studied groups recruited at age <35, and standard division age of (26.4±4.8), where about 61.5% of them had married, about 57.7 of them had diploma qualified, in the case of years of experience 80.8% of them had from 1 to less than 5 years of experience.

Table 1: Frequency distribution of socio-demographic characteristics of the studied group

	No.	%
Age		
• Range	18 - 35 years	
• Mean ± SD	26.4 ± 4.8	
Sex		
• Female	52	100.0
Marital status		
• Single	20	38.5
• Married	32	61.5
• Total	52	100.0
Qualification		
• Diploma	30	57.7
• Bachelor	22	42.3
• Total	52	100.0
Years of experience		
• 0-<1 year	4	7.7
• 1-<5 years	42	80.8
• >=5 years	6	11.5

Table 2: Relationship between nurses diploma and bachelor degree related to knowledge for oral care procedure.

Shows, before program none (0.0%) of the diploma nurses had knowledge and (40.9% and 27.3%) in bachelor related to assessment used (BOAS) and (MPS) scales bachelor degree respectively .while around the half of the diploma degree and (81.8%) in bachelor degree had knowledge immediately after program also there were significant difference (P < 0.5) between studied nurses

As regard in different methods of solutions, cholerhexidine, and sodium bicarbonate .only 6 diploma nurses (20%) and around half of bachelor degree (54.5%) had knowledge this results increased to (53.3%, 46.7%) of diploma degree, (90.9%, 95.5%) of bachelor degree post education. there were High significant difference (P < 0.01) between diploma and bachelor degree post education

As regard tooth brushing pre test around half of diploma nurses (53.3%) and (77.3%) had knowledge in bachelor degree this results increased post education to majority of the diploma and all of bachelor had knowledge immediately post test (80% and 100%) respectively, also there were significant difference (P < 0.05) between diploma & bachelor degree.

As regard to frequency of oral care every 4/h. it was noticed before education was (40% and 64.6) in diploma nurses and bachelor degree respectively. This results

improved post education to (63.3% and 90.9%) in diploma nurses and bachelor degree respectively, also there were significant difference (P<0.05) between diploma & bachelor degree.

It was notice knowledge as regard precaution prevention of aspiration before program was (13.3% and 50%) between diploma & bachelor degree, respectively this result increased after program to (36.7% and 86.4%) in diploma & bachelor degree respectively also there was high significant difference (P< 0.01) post implementing.

The findings indicated nurse's knowledge as regard suction before oral care before

education was (43.3% and 68.2) respectively between diploma nurses, and bachelor degree this result improved after education to (73% and 100%) respectively.

As regard decrease bacterial colonization it was noticed that there was (40% and 63.6%) pretest in nursing diploma and bachelor degree respectively while posttests become (53.3% and 90.9%) in nursing diploma and bachelor degree respectively also there was significant difference (P < 0.01) post education program between nurses diploma and bachelor degree respectively.

Table 2: Relationship between diploma and bachelor degree related to level of knowledge Oral care procedure.

Oral care	Diploma=30				P. value	Bachelor=22				P. value	P1
	Pre		Post			Pre		Post			
	No.	%	No.	%		No.	%	No.	%		
Assess GCS Before	6	20.0	24	80.0	<0.01**	12	54.5	22	100.0	<0.01**	<0.05*
Prepare Equipment	14	46.7	26	86.7	<0.01**	15	68.2	22	100.0	0.055^{ns}	0.104^{ns}
Sodium bicarbonate	6	20.0	14	46.7	<0.05*	12	54.5	21	95.5	<0.05*	<0.01**
chlorhexdine Solutions	6	20.0	16	53.3	<0.01**	13	59.1	20	90.9	0.059^{ns}	<0.01**
Decreased Oral Bacterial Colonization	12	40.0	16	53.3	0.218^{ns}	14	63.6	20	90.9	0.096^{ns}	<0.01**
Breath sounds	18	60.0	26	86.7	<0.01**	17	77.3	22	100.0	0.139^{ns}	0.104^{ns}
Prevent Aspiration for the Intubated	4	13.3	11	36.7	<0.05*	11	50.0	19	86.4	<0.05*	<0.01**
Patient Position	9	30.0	20	66.7	<0.01**	13	59.1	20	90.9	0.059^{ns}	<0.05*
Assess used (BOAS)	0	0.0	15	50.0	<0.01**	9	40.9	18	81.8	<0.05*	<0.05*
Tooth brushing pattern.	16	53.3	24	80.0	<0.05*	17	77.3	22	100.0	0.139^{ns}	<0.05*

	Pre		Post		P. value	Pre		Post		P. value	P1
	No.	%	No.	%		No.	%	No.	%		
Frequency oral care	12	40.0	19	63.3	0.061^{ns}	14	63.6	20	90.9	0.096^{ns}	<0.05*
Suctioning before oral care	13	43.3	22	73.3	<0.05*	15	68.2	22	100.0	0.055^{ns}	<0.05*
Assess by MPS	0	0.0	14	46.7	<0.01**	6	27.3	18	81.8	<0.01**	<0.05*
Total Score (29)	11.2 ± 2.3		24.5 ± 3.4		<0.01**	16.7 ± 3.8		28.7 ± 1.2		<0.01**	<0.01**

^{ns} There is no significant difference   * Significant difference at p. value<0.05

** High Significant difference at p. value<0.01

P1: Comparison between diploma and Bachelor in the post test

Table 3 shows As regard decreased incidence of (VAP) it was noticed that there was significant difference (P < 0.05) posttest between nursing diploma & bachelor degree with percentage (80.0% and 100.0%) post education.

As regard clinical picture of nosocomial infection, it was noticed that there were (53.3%, 81.8%) pretest in nursing diploma & bachelor degree respectively this results increased posttest become (93.3% and 100%) in diploma & bachelor degree respectively also there were significant difference (p. value < 0.05) as regard color and mucus membrane, Tracheal Secretion Consistency, Medication as regard Bachelor. Where there were significant difference (p. value < 0.05) between diploma and bachelor as regard post-test in Skin color and mucus membrane, Tracheal Secretion Amount to Assess Presence of Infection, Tracheal Secretion Color, tracheal Secretion Consistency.

Table 3: Relationship between diploma and bachelor degree related to level of knowledge nosocomial infection.

Nosocomial infection	Diploma=30				P. value	Bachelor=22				P. value	P1
	Pre		Post			Pre		Post			
	No.	%	No.	%		No.	%	No.	%		
Risk factors nosocomial infection	14	46.7	26	86.7	<0.01**	15	68.2	21	95.5	0.093^{ns}	0.278^{ns}
Clinical picture that reveals presence of nosocomial respiratory infection	16	53.3	28	93.3	<0.05*	18	81.8	22	100.0	0.057^{ns}	0.306^{ns}
Skin color and mucus membrane	14	46.7	22	73.3	<0.05*	15	68.2	21	95.5	<0.05*	<0.05*
Procedure confirm presence of (VAP)	15	50.0	21	70.0	0.094^{ns}	18	81.8	20	90.9	0.331^{ns}	0.069^{ns}
Percussion of the Chest Assess Presence of	20	66.7	28	93.3	<0.05*	18	81.8	22	100.0	0.057^{ns}	0.306^{ns}

Infection											
Tracheal Secretion Amount to Assess Presence of Infection	16	53.3	22	73.3	0.091^{ns}	17	77.3	21	95.5	0.094^{ns}	<0.05*
Tracheal Secretion Color	10	33.3	18	60.0	<0.05*	14	63.6	19	86.4	0.082^{ns}	<0.05*
Tracheal Secretion Consistency	8	26.7	14	46.7	0.091^{ns}	10	45.5	17	77.3	<0.05*	<0.05*
Decreases Incidence of (VAP)	10	33.3	24	80.0	<0.01**	12	54.5	22	100.0	<0.01**	<0.05*
Medication	12	40.0	24	80.0	<0.01**	15	68.2	21	95.5	<0.05*	0.114^{ns}
Total score(16)	4.7±1.4		12.3±1.2		<0.01**	8.9±2.4		14.1±0.7		<0.01**	<0.01**

^{ns} There is no significant difference   * Significant difference at p. value<0.05

** High Significant difference at p. value<0.01

P1: Comparison between diploma and Bachelor in the pos

Table (4) shows relationship total level nurse's skills and their qualification.

Related to oral care skills which revealed in the pre education program (0.0%) none of the diploma had total skills related to prepare equipment, assess oropharyingeal (BOAS) and (MPS) scale, and technique use toothbrush in one line continuous starting (LU) to (RU) and (RL) to (LL), were (36.4%, 31.8%, 50%,54.5%, and 50%) in bachelor degree, there were this results increased post education becomes (50%, 50%, 46.7%, 43.3% and 40%) in nursing diploma and (90.9%, 77.3%, 90.9%, 90.9%, 86.4%) in bachelor also there were significant difference (P < 0.01) between pre/ post education in nursing diploma & bachelor degree.

As regard to clean the endotracheal tube and change site daily, this findings of the present study before the program only (16.7%) in diploma nurses and (63.6% and 54.5%) in bachelor degree had demonstrated skills in clean ETT change site daily. This percent increased in diploma nurses to (76.7% and 66.7%) respectively and (90.9% and 95.5%) respectively in bachelor degree also there were significant difference (P < 0.05) between studied groups.

As regard Hand washing and wear glove pre education there were (53.3%, 50%) in diploma and (77.3, 86.4) in bachelor degree while improved post education become nursing diploma (90%, 83.3) and (86.4 and 100%) in bachelor degree respectively there were statistically significant difference (P< 0.01) in nurses skills pre education compared post education program.

Related to Assess of conscious, suctioning, hold tooth brush 45 degree, there were found that (63.3%, 60%, 63.3%) respectively in nursing diploma had skills, while the majority of bachelor had adequate skills pre education, this results increased to (93.3%, 83.3%, 90%) in diploma degree and all bachelor degree. After education

Table 4: Relationship between level nurse's skills and their qualification related to oral care.

Nurses skills	Diploma=30					P. value	Bachelor=22					P. value	P1
	Pre		Post				Pre		Post				
	No.	%	No.	%			No.	%	No.	%			
Assessment of conscious	19	63.3	28	93.3		$<0.05^*$	21	95.5	22	100.0		0.501^{ns}	0.306^{ns}
Assessment APACHE Score II	0	0.0	14	46.7		$<0.01^{**}$	10	45.5	19	86.4		$<0.01^{**}$	$<0.01^{**}$
Hand washing	16	53.3	27	90.0		$<0.05^*$	17	77.3	22	100.0		$<0.05^*$	0.177^{ns}
Prepare equipment	0	0.0	15	50.0		$<0.01^{**}$	8	36.4	20	90.9		$<0.01^{**}$	$<0.01^{**}$
Assess oral cavity used(BOAS) scale	0	0.0	15	50.0		$<0.01^{**}$	7	31.8	17	77.3		$<0.01^{**}$	$<0.05^*$
Assess used (MPS) Scale	0	0.0	14	46.7		$<0.01^{**}$	11	50.0	20	90.9		$<0.01^{**}$	$<0.01^{**}$
Suction oropharyngeal secretions	18	60.0	25	83.3		$<0.05^*$	19	86.4	22	100.0		0.115^{ns}	0.062^{ns}
Change ETT site daily	5	16.7	20	66.7		$<0.01^{**}$	12	54.5	21	95.5		$<0.01^{**}$	$<0.05^*$
Insert oral airway gently	14	46.7	28	93.3		$<0.01^{**}$	16	72.7	22	100.0		$<0.05^*$	0.306^{ns}
Hold the tooth brush with 45 degree	19	63.3	27	90.0		$<0.01^{**}$	20	90.9	22	100.0		0.234^{ns}	0.177^{ns}
Technique brush in one continuous line starting (LU) to (RU)	0	0.0	13	43.3		$<0.01^{**}$	12	54.5	20	90.9		$<0.01^{**}$	$<0.01^{**}$
Brush (RL), to (LL)	0	0.0	12	40.0		$<0.01^{**}$	11	50.0	19	86.4		$<0.05^*$	$<0.01^{**}$
Apply lubricant to pt.'s lips.	11	36.7	20	66.7		$<0.05^*$	18	81.8	21	95.5		0.171^{ns}	$<0.05^*$
Clean the endotracheal tube	5	16.7	23	76.7		$<0.01^{**}$	14	63.6	20	90.9		$<0.05^*$	0.165^{ns}
Wear gloves	15	50.0	25	83.3		$<0.01^{**}$	19	86.4	22	100.0		0.115^{ns}	0.062^{ns}
Total (15)	5.3+1.4		11.8+1.2			$<0.01^{**}$	8.7+2.1					$<0.01^{**}$	$<0.01^{**}$

[ns] There is no significant difference   * Significant difference at p. value<0.05

** High Significant difference at p. value<0.01

P1: Comparison between diploma and Bachelor in the post test

Table 5 shows that there were significant difference (p. value <0.05) between pre and post education in all oral care procedure except Auscultate bilateral chest sound IN Diploma also there were significant difference (p.value<0.01) between pre and post education as regard check EIT cuff pressure 8/h ,change ETT

tube and Hyper oxygenate before, after suctioning in nurses diploma.

Table 5: Relationship between level nurse's skills and their qualification related to oral care

Nurses skills	Diploma=30				P. value	Bachelor=22				P. value	P1
	Pre		Post			Pre		Post			
	No.	%	No.	%		No.	%	No.	%		
Place the patient position at (35-45 degree)	17	56.7	25	83.3	<0.05*	19	86.4	21	95.5	0.299[ns]	0.181[ns]
Place mackintosh and towel	19	63.3	27	90.0	<0.05*	20	90.9	22	100.0	0.312[ns]	0.177[ns]
Wear gloves	14	46.7	25	83.3	<0.05*	17	77.3	21	95.5	0.094[ns]	0.181[ns]
Measure cuff pressure	15	50.0	26	86.7	<0.01**	16	72.7	22	100.0	<0.05*	0.104[ns]
Hyper oxygenate before and after suctioning	18	60.0	27	90.0	<0.01**	19	86.4	22	100.0	0.115[ns]	0.177[ns]
Change ETT tape daily	16	53.3	26	86.7	<0.01**	17	77.3	22	100.0	<0.05*	0.104[ns]
Check ETT cuff pressure q 8 hours	19	63.3	28	93.3	<0.01**	19	86.4	20	90.9	0.501[ns]	0.419[ns]
Auscultate bilateral chest sound	16	53.3	23	76.7	0.052ns	17	77.3	21	95.5	0.094[ns]	0.71[ns]
Documentation	12	40.0	24	80.0	<0.01**	16	72.7	20	90.9	0.120[ns]	0.245[ns]
Total (9)	4.8±0.9		7.4±0.4		<0.01**	6.7±0.6		8.1±0.3		<0.01**	<0.01**

[ns] There is no significant difference   * Significant difference at p. value<0.05

** High Significant difference at p. value<0.01

P1: Comparison between diploma and Bachelor in the post test

Table 6 shows that as regard to Suctioning and end tracheal tube procedure scale there were high significant statistically (p. value 0.01). between nurses diploma and bachelor according to pre and post education respectively.

Table 6: Relationship between level nurse's skills and their qualification related to Suctioning and end tracheal tube procedure scale

	(Mean ± SD)				P1
	Diploma=30		Bachelor=22		
	Pre	Post	Pre	Post	
Suctioning procedure (total=20)	**5.3±1.1**	**15.7±2.2**	**12.7±1.3**	**19.2±0.5**	**0.001**
P. value	**0.001**		**0.001**		
Endotracheal tube (total=20)	**4.8±1.7**	**14.9±2.7**	**12.9±2.4**	**18.8±0.9**	**0.001**
P. value	**0.001**		**0.001**		

** High Significant difference at p. value<0.01

P1: Comparison between diploma and Bachelor in the post test
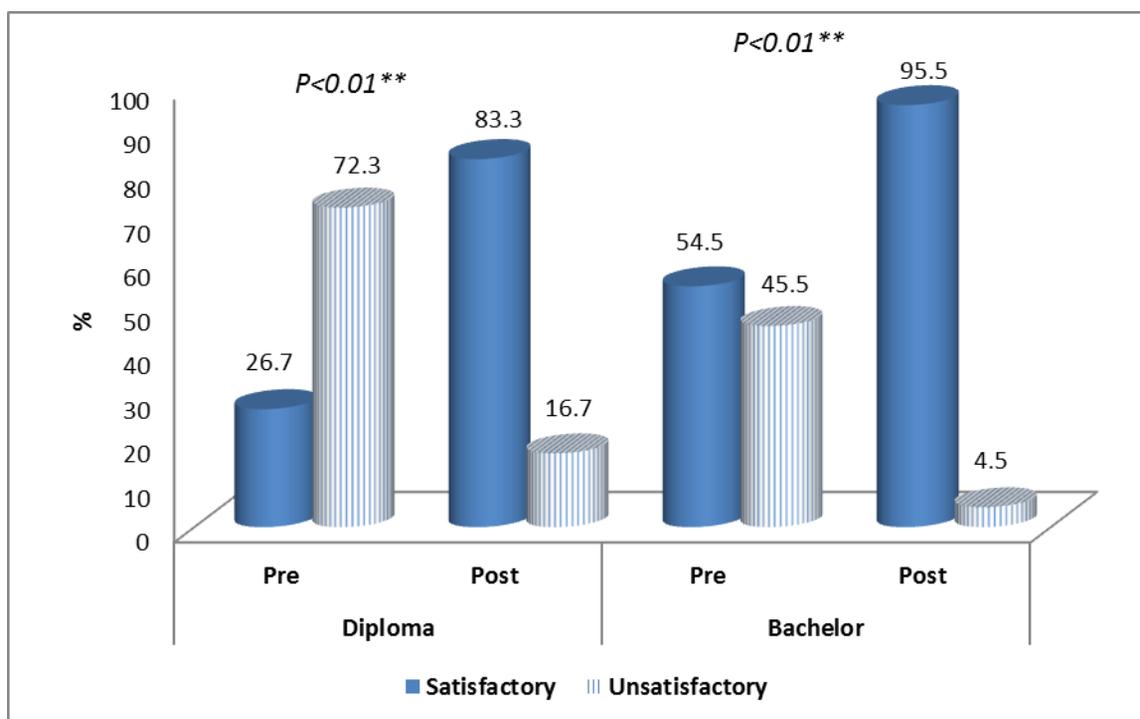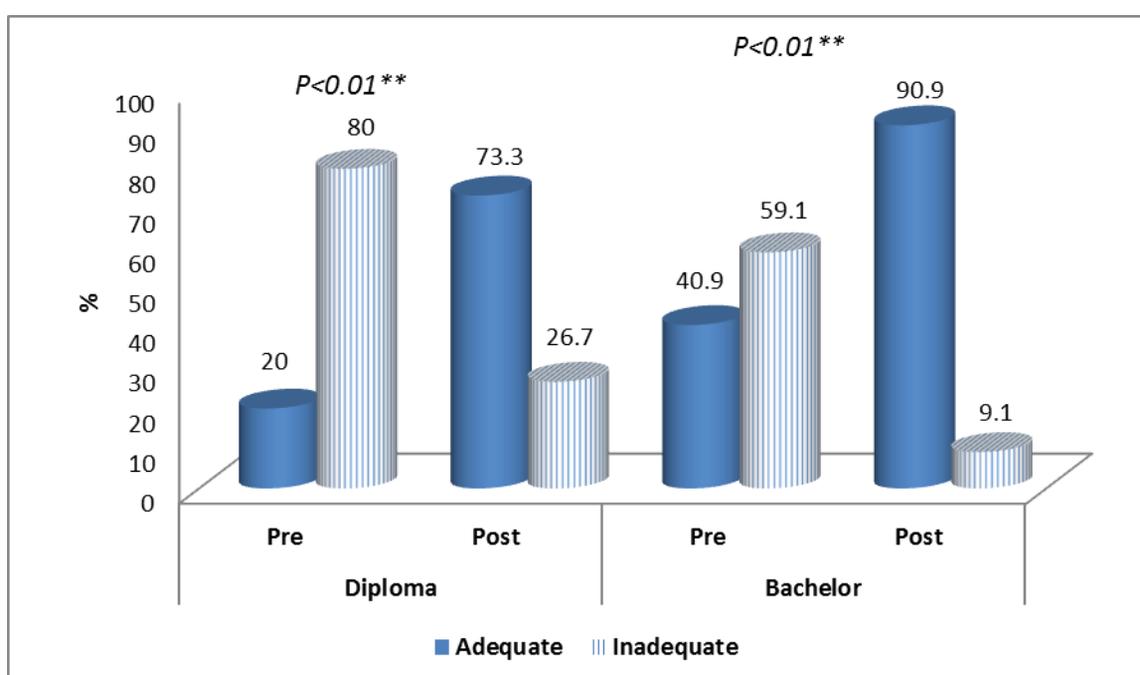
Fig1: Relationship between nurse's level knowledge and their qualification
** High Significant difference at p. value<0.01

Fig1 shows that there is high significant statistically difference in nurse's level knowledge in comparison between pre-test and post- test regarding to diploma and bachelor respectively at p. value less than 0.01 .it was notice before program, the majority of nurses had unsatisfactory total knowledge related to oral care procedure, (72.3%) in diploma and (45.5%) in bachelor , while the majority of them had satisfactory in total knowledge immediately after program (83.3% and 95.5%) in diploma and bachelor degree respectively. this table that nurses knowledge was improved after education.

Fig2: Relationship between nurse's level skill and their qualification
** High Significant difference at p. value<0.01

Fig 2 shows that there is high significant statistically difference (P. value <0.01) in nurse's level skills between pre and post education nurses diploma and bachelor, before program, the majority of nurses had inadequate total skills related to oral care procedure, (80% and 59.1%) in diploma and bachelor respectively, while the majority of them had adequate in total knowledge immediately after program (73.3% and 90.9%) in diploma and bachelor degree respectively. There were high significant statistically difference (P< 0.01) in nurse's level knowledge, this table that nurses knowledge was improved after education.
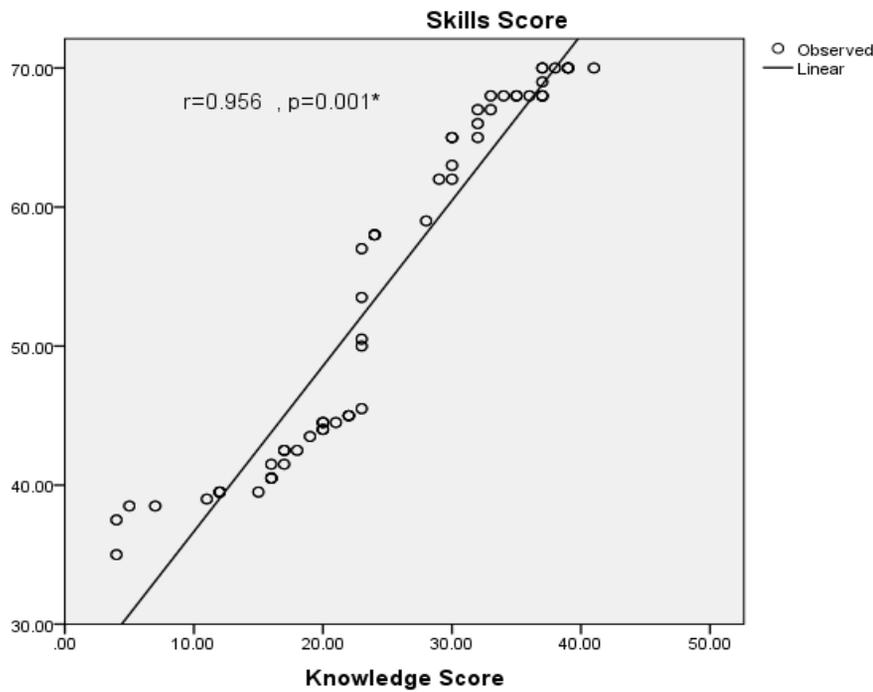
Fig 3: Correlation between nurse's level skills and their Knowledge qualification post education.

Fig 3 shows that there was a significant positive correlation between score of knowledge and score of skills r=0.956.

Table 8 shows that Relationship between nurse's years of experience and their level knowledge of post education was 95.0% nursing diploma from 1 to 5 years and 75.0% more than 5 years of experience were satisfactory of level knowledge with significant statistical difference at p. value < 0.05. In other hand 100.0% of bachelor more than 5 years and 90.0% of bachelor from 1 to 5 years of experience were satisfactory respectively of their level knowledge with more significant statistical difference at p. value < 0.01

Table 8: Relationship between nurse's years of experience and their level knowledge of post implementation.

	Diploma		Bachelor	
	Satisfactory	**Unsatisfactory**	**Satisfactory**	**Unsatisfactory**
0-<1 year	3(75.0%)	1(25.0%)	0(0.0%)	0(0.0%)
1-<5 years	19(95.0%)	1(5.0%)	18(90.0%)	2(10.0%)
>=5 years	3(75.0%)	1(25.0%)	2(100.0%)	0(0.0%)
P. value	<0.05*		<0.01**	

* Significant difference at p. value<0.05   ** High Significant difference at p. value<0.01

Table 9: Relationship between nurse's years of experience and their level practice of post education

	Diploma		Bachelor	
	Adequate	In Adequate	Adequate	In Adequate
0-<1 year	1(25.0%)	3(75.0%)	0(0.0%)	0(0.0%)
1-<5 years	18(81.8%)	4(18.2%)	18(90.0%)	2(10.0%)
>=5 years	3(75.0%)	1(25%)	2(100.0%)	0(0.0%)
P. value	0.003**		0.001**	

** High Significant difference at p. value<0.01

Table 9 shows that 100.0% and 90.9% of diploma with more than 5 years and from 1 to 5 years of experience were satisfactory respectively where about 25.0% of less than 1 year of experience is satisfactory of their level practice with more significant statistical difference at p. value<0.01. In other hand 100.0% and 95.0% of bachelor with more than 5 years and from 1 to 5 years of experience were satisfactory respectively of their level practice with more significant statistical difference at p. value < 0.01.

DISCUSSION

Oral care is a standard part of the daily nursing care provided by health professionals and is one method of lowering the incidence of VAP (Augustyn 2007). Oral care is generally included in the fundamental nursing curriculum; though, not many schools stress the importance of oral care for patients on ventilators (**Sole** *et al.* **2003)**.

Oral care is a simple and effective strategy to reduce ventilator-associated pneumonia (VAP) in patients requiring mechanical ventilation. Colonization of the aspiration of contaminated secretions into the lower airway **(Kaynar 2007).**

Provided useful insights on the oral hygiene knowledge and practices of nurses caring for critically ill patients nurses lacked adequate knowledge related to oral health and generally were ill equipped to care for their patients oral hygiene needs it is crucial that training updates are conducted for qualified nurses to educate them on maintaining proper oral hygiene for the critically ill. **(Grap et al 2003)** Assess their knowledge of the risk of VAP because of micro-aspiration of oropharyngeal secretions of the possible VAP risk factors present in their study, the nurses felt that main cause of VAP was aspiration of oropharyngeal secretions, **Laheau et al. (2008)**.

Mechanical tooth cleaning, such *as* tooth brushing and vigorous suctioning. are also important approaches to reduce oral bacteria and thereby reduce bacterial colonization of the aero-digestive tract. **(SHaron 2008)**

Implementing education program on the role of oral cave in VAP prevention was associated with improved and more frequent oral care and a significant reduction in the incidence of VAP. **(Furr,2004)**

Therefore The aim of this study to effect of educational program on nurses Knowledge and skills about oral care for traumatized patients.

Concerning the effect of the present education program that there were significant differences between nurses' knowledge before and after the program The majority of nurses before education were not knowledge related lo the all items in oral care procedure. The

improvement due to the present education program using information, adequate sessions and increased motivation.

In the present study was presented that the majority of the studied nurses were in years experience of nurse from 1 to 5 years of experience and the mean of age (26.4 ± 4.8), in trauma patients. These findings wore- in line with studies of **(Ayer, et al 2007)**

The present study revealed that, nurse knowledge related to, precaution prevent aspiration for the intubated patients was 36.7% in nursing diploma and 86.4% bachelor's degree after education program also there were significant difference between studied nurses, this finding supported by **(Ross, 2007)** reinforcing proper oral care in educational programs on the role of oral care in VAP prevention was associated with improved, and more frequent oral care.

(Cason, 2007) Reported by Nurses documented that ,half nurses had an oral care protocol in their hospital for the prevention of VAP reported improved compliance with hand washing and maintenance of bed elevation.

The results of this survey show that nurses are generally aware that aspiration of contaminated secretions is a probable mechanism for the development of VAP. Considering oral care every high nursing priority for ventilated patients mouth and oropharynx may harbor pathogens' can cause pneumonia. . Having an oral care assessment tool readily available at the bedside provides an objective method, for monitoring the effectiveness of interventions, and may help to prevent this problem.

(Labeau et al. 2008) found that the more knowledge related, to prevention of VAP increased. Training should be given before their usage to ensure that they are used safely and effectively.

The presented study shows before program, around half of nurses had.

satisfactory level of knowledge in prepare equipment, and used tooth-brushing in nursing diploma this results less than bachelor degree. They improved in studied nurses immediately post education. .These results are in agreement with **(pearson and hutton 2002)** stated that nearly two-thirds of the nurses used Manual Toothbrushes, have been shown to be superior for plaque removal, toothbrush on admission could help to prevent complications associated with poor oral care and could effect a cost saving in the 1CU. Nurses are now more aware of the value of brushing ventilated patients teeth.

(Pear son and Hutton 2002) reported was brushing to be more efficacious in removing dental plaque. 61.3% nurses interesting they would choose tooth brushes to clean their patients' mouths.

The current study findings revealed that nurses' knowledge as regard different methods of solution such as chlorhexidine and sodium carbonate were 50% in diploma nurses also less than bachelor's degree after education and there were significant difference between nurses studied of knowledge. These findings were in line with studies of **(Berry et al., 2007)** stated that 37% of nurses chose chlorhexidine as their main oral cleaning solution for ventilated patients, measures should be taken to heighten awareness on the efficacy of chlorhexidine as oral cleaning agent to encourage wide spread usage.

(Houston 2002) reported cholexidine was effective in reducing the incidence and associated mortality of VAP and nosocomial infection.

(Wise, et al 2008) stated that cholexidine (CHD) having better antibacterial properties, , less than half the nurses used the recommends that the use of CHD should be considered as this intervention is feasible, safe and cost-

effective reported with CHD use, but the potential reduction in nosocomial infections outweighs these risks."

(**Kite and Pearson 2011**) said that the study less than half of nurses emphasize that certain solutions chlorhexidine abroad spectrum antibacterial agent for oral hygiene.

(**Chan 2007**) reported that more than 80% of nurses the respondents assessed their patients oral status within 24 hours, reassessed it every shift. Nurses reported were more likely to document assessments on the oral cavity based on patient's oral condition.

Formal oral assessment Guide by standardized assessment tool to improve oral care practices were found 43.4% to have good oral care knowledge. The respondents knowledge corresponded with their educational (**Andersson, et al., 2012).**

The current study revealed that none of nurse had satisfactory knowledge about assess oropharyngeal by BOAS and MPS seals also the majority of bachelor degree had unsatisfactory before education, this results better after education in all studied nurses according to (**jones,2004**) stated that 98%nurses nurses routinely performed an oral needs assessment only 26%used written assessment tool.

(**Berry et al., 2007**) reported that 52% of nurses the oral care procedures were performed the strength of study two oral assessment measures, the BOAS and MPS, these measures, are easy to use and teach to critical care nurses, the BOAS cores and MPS values improved after nurses implemented program.

(**Cason. et al., 2007**) stated that most 82% of nurses. reported compliance with hand washing guidelines, 75% reported wearing gloves, and half of nurses reported having elevating head of the bed. Third nurses reported performing suctioning all nurses with an oral care reported better compliance with

hand washing and maintaining nurses were more likely to provide oral care and were more to reduce rates of ventilator - associated pneumonia and organisms involved than were nurses without attending education program. The nurses had good skills related to hand washing and used gloves the end of training program better than before training.

Many studies there oral practice discovered that nurses washed their hands more frequently if they head participated in programs for improving infection control. They also found that the heads of patient beds were raised to 30-45 degree for long time if nurses ICUs had standardized oral care procedure.(**Pear S., 2007**)

The frequency of oral care was determined by the BOAS score but was at least every 12 hours. Nurses were instructed to assess the level of consciousness and use suctioning before the level of consciousness and use suctioning before providing oral care. An oral examination was performed, and the data required in the BOAS and MPS were obtained. After assessment for bleeding, toot-brushing was preformed in a systematic way to prevent missing any areas.

The present results revealed that increased satisfactory Knowledge education in studied nurses a related to frequency of oral care 4/h.

As regards nurses' skills in the present study revealed that was the majority of studied nurses were inadequate in ail procedures , also less than bachelor degree before the program. This result improved after education above, half of nurses' diploma this present result was congruent with (**Prendergast et al., 2009**) stated that the frequency of oral care documentation post education improved with an increase in every 2-4 hours compliance with the oral care protocol. With the improvement in the

quality of oral care provided by the nursing staff following the EBP 50%. Educational program that reinforces the role of oral educational program.

The frequency of oral care for intubated patient's record in nursing documents 4 times per 24 hours while *5%* used tooth brush once every 4 hours of their oral care practice **(ganz et al 2009)** found that 50% of the nurses performed oral suctioning for their patients every 2 hours.

(Ross and Crumpler 2007) fount that the frequency of oral care increased once education had been introduced, which them improved oral health in patients and reduced the incidence of VAP.

The best performance frequency of oral care for intubated patients among the nurses in study was removing oral secretions once every 2-4 hours, or more often **(koeman et al 2006).**

The present study revealed a significant difference in studied nurses after education about suctioning before oral care.

The ICUs of the nurses in this study have a suctioning and giving chest care every two hours Nurses will remove oral secretions from patients at the same time that they suctioning sputum, depending on the patient's condition which explains why the frequency of performing this particular from of oral care tended to higher.

(Cason, 2007) found that 50% of the nurses performed oral suctioning for their patients every 2 hours.

(Sole et al., 2003) found that the main influence on nurse performing suction and clean the respiratory tract was knowledge gained from their nursing education.

(Suzanna 2010) only 56% of the nurses reported performed oral care, 36% reported performing subglottic suctioning and 34% maintained patients had of bed

elevated above 30º, less than 40% respondents reported knowing VAP rates or causative organisms.

Cason et al., (2007) found that 50% of nurses they studied performed oral suctioning for their patients every two hours.

The current study emphasized that there was significant difference between nursing diploma and bachelor about check cuff pressure every 8 hours

(Pear 2007) said that ICU nurses reported still needing oral care education about over pressure of the ET tube cuff can damage (necrosis) that tracheal wall and causing bacterial growth and migration, increase oropharyngeal colonization and develops pneumonia.

Only five nurses diploma had adequate skills before education, this results improved to around two-third of nurses diploma after education related to clean of end tracheal tube.

The observation in the present study shows that there was a statistically significant difference between nurses' knowledge and their skills; also knowledge did the better than skills.

According to southern (2007) reported that oral care knowledge varies educated nurses having better oral health knowledge compared with nurses with only general nursing education.

(Turner and lawler 2011) said that the majority of nurses had received adequate training in providing oral care the intubated patient requires a different knowledge and skills base to that required for patient. Less than a quarter of the nurses had received oral care training during postgraduate ICU training providing oral care to ventilated patients during continuing education activities and in-service training.

In the present study, the findings related to assessment of oral cavity technique brush in one continuous line show none diploma nurses adequate skills

before education, also there were significant difference between all studied nurses after education.

Concerning the relation ships between nurses knowledge and skills and their years experience in nurses, they findings statistical significant between diploma &. bachelor degree arid older nurses with more years experience and increase of years experience showed increased of knowledge and practice.

The finding 95% had satisfactory knowledge of diploma nurses related to years experience from one to five years and 100%in bachelor degree post education the finding of the majority of studied nurses had adequate skills related to years experience from one to five years post education.

(Cason et al 2007). This study found that nurses with more years of experience in the ICU performed oral care practices more frequently for intubated **(Labeau et al). (2008)** found that nurses with more years of experience in the JCU had more knowledge about how to prevent VAP. The results of this study suggest that this is attributable to the accumulation of clinical experience and knowledge as nurses' age.

The present study shows, that high education nurses (bachelor degree) more knowledge and skills than nurses diploma in all items of oral care procedure pre and post education program.

Knowledge corresponded with there education levels, with more highly educated nurses having better oral care knowledge more than 80% of the respondents good oral care has a significant impact on patients, clinical out conies, almost a!! of the nurses strongly agreed that oral hygiene was high priority for mechanical ventilated, more than 65% of nurses was essential to attend training on proper oral care they indicated that more information on research proven oral care standards was required (Isabel 2010). We also assessed nurses ability to recognize the signs of oral problems.

The results of the study revealed significant positive correlation between knowledge and practice.(Ross and Grumpier (2007) indicated that providing oral care education increases the frequency of performing oral care for practices and consequently improves the quality of oral care for patients with oral endotracheal intubation. The implications of these findings should be assessed with caution. The present study shows, that high education nurses (bachelor degree) more knowledge and skills than nurses diploma in all items of oral care procedure pre and post education.

Before the program, the majority of nurses unsatisfactory and less of total score knowledge then nurses bachelor related to oral care procedure while the majority of them had satisfactory of total knowledge immediately after education program. This may be explained by the fact that all of studied nurses did not attend any training courses in oral care procedure, was found between pre and post education in the study the impact of an evidence based practice education program on the role of oral care in the prevention of ventilator associated pneumonia.

CONCLUSION AND RECOMMENDATION

It can be concluded that Continue education program on oral care for improving the knowledge and skills of intensive care unit **Recommendation**
Providing evidence-based education on the oral care skills for improving patient outcomes.

Development of standardized oral assessment technique and tools for nurses to improve quality of care.

Assessment of nurses' attitudes and

beliefs about the importance and benefits of oral hygiene in the 1CU.

Evidence based project to develop oral care protocol.

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