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## NURSES' KNOWLEDGE, PRACTICE AND ASSOCIATED FACTORS REGARDING POSTOPERATIVE WOUND CARE OF HOSPITALIZED PEDIATRIC PATIENTS IN PUBLIC HOSPITALS OF MEKELLE CITY, NORTH ETHIOPIA, 2015

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### ABSTRACT

**Background:** Complications of surgical care have become a major causes of morbidity, mortality, disability and also leads to increases in length of hospital stay and health care costs world wide. Poor postoperative wound care affects up to two thirds of operated patients and newborns and pediatric populations are at higher risk in a limited resource settings than the developed countries. Surgical wound care can prevent upto a quarter of postoperative wound infections, which depended on nurses' evidence based knowledge and practice. Little is known about the current level of knowledge and practice of nurses and associated factors in the study area. **Objective:** To assess the nurses' knowledge, practice and associated factors regarding postoperative wound care of pediatrics patients in public hospitals of Mekelle City, North Ethiopia 2015. **Methods:** Institutional based cross sectional study design was conducted in public hospitals of Mekelle City, North Ethiopia from December 2014 to June 2015. Simple random sampling method was used to select the study participants. The data was collected using self administered questionnaire and it was entered, cleaned and analyzed using SPSS version 20. Data are described in terms of frequency, proportion and presented in text and tables. Binary logistic regression model was used to test association between independent and dependent variables. **Results:** A total of 158 out of 160 nurses had completed the self administered questionnaire. This study found the average of knowledge and practice among nurses was 64% and 84.3% respectively. Eighty seven (55.1%) of nurses had good knowledge. Nearly two thirds (58.2%) of nurses had reported that they had good nursing practice. Poor documentation [AOR=0.28; 95% CI (0.1, 0.74)], lack of familiarity with antiseptics [AOR=0.32; 95% CI (0.12, 0.88)] and position; head nurses [AOR=0.18; 95% CI (0.04, 0.86)] were identified as being influential to the nurses' level of practice towards postoperative wound care. The association between nurses level of knowledge and nurses level of practice, however, was not statistically significant. **Conclusion and recommendation:** The knowledge regarding postoperative wound care among nurses was low. However, the nurses' practice was good. Further improvement of nurses knowledge and practice on postoperative wound care is important by identifying solution for the factors associated with nursing practice.

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### INTRODUCTION

It is estimated that between 187 and 281 million surgical procedures are performed around the world each year, or approximately one operation annually for every 25 human beings alive. This is a large and previously unappreciated volume with significant implications for public health.

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It is almost double the annual volume of childbirths in 2006, there were approximately 136 million births and is at least an order of magnitude more dangerous (WHO, 2009). Surgery patients are responsible for approximately 6–12% of all paediatric admissions in sub-Saharan Africa, although the proportion may be higher in some urban areas (Bickler, 2002). Most wounds in surgical paediatric wards are acute wounds, healing without complication in an expected timeframe, which usually heal within 7–14 days depending on the type of surgery. Surgical wounds can be further classified into clean,

clean-contaminated, contaminated or dirty-infected, providing an indication of how the wound will heal (Heather, 2010). Despite best practice, some surgical wounds fail to heal primarily or are deliberately left open to heal by secondary intention. Unfortunately, especially in wounds healing by secondary intention, post-operative complications do occur such as, surgical site infections, postoperative blistering, wound dehiscence, haematomas. Poor management of wound exudate or the failure to adequately control moisture balance at the wound-dressing interface can result in excoriation, irritant dermatitis and/or maceration of peri-wound skin (Milne, 2012; Pukki, 2010; Yao, 2013 and Letouze, 2004). The effectiveness of healing depends on wound assessment and constant re-evaluation of the adopted management strategy. Management strategies should be holistic and take into account the wound bed and local and systemic barriers to healing, as well as patients' thoughts and concerns about their wound (Murphy, 2006). A multidisciplinary approach to postoperative care involving the surgical team is required to improve the overall management of surgical wounds (Milne, 2012). Optimal management of surgical wounds is an important part of post-operative care to prevent the potential complications and minimise physical trauma to the wound, prevent microbial invasion and ensure patient comfort. Fundamentals of wound care in the neonatal and pediatric population are similar to those applicable to adults. As compared to adults, however, there are important age-related and neurodevelopmental considerations that impact wound care in the neonatal and pediatric populations. The key elements of post-operative wound management include timely review of the wound, appropriate cleansing and dressing, and early recognition and intervention of wound complications (Pukki, 2010; Yao, 2013 and King, 2014). Nurses have a pivotal role in wound management and dressing selection, and should aim to keep up to date in this dynamic specialty. As such, nurses, who play an important part in the sub-acute management of post-operative wounds, should appreciate the physiology of wound healing and the principles of post-operative wound care. Nurses are also needed to ensure adequate nutrition and implement measures to prevent incisional infections (Murphy, 2006 and King, 2014).

### **Statement of the problem**

The appropriate postoperative wound management can significantly decrease patient's morbidity and mortality including early and late complications (Melanie Charalambous, 2013). The management of postoperative wounds has perhaps received less attention than is merited, with the greatest focus being upon the management of chronic wounds (Nigel Roberts, 2011). The infection rate in operated wounds ranges from less than 2% in clean wounds and can exceed 20% in dirty wounds (Singh, 2014). Postoperative wound infection is the leading infection in the general patient population in countries with limited resources, affecting up to two third of operated patients and with a frequency up to nine times higher than in developed countries. Postoperative wound infection accounts for about 15% of all health-care-associated infections and about 37% of the hospital-acquired infections of surgical patients. Two thirds of postoperative wound infections are incisional and one third confined to the organ space. In western countries, the frequency of such infections is 15–20% of all cases, with an incidence of 2–15% in general surgery. In Africa an incidence of surgical site infection ranging from 2.5% to 30.9% following various types of surgical procedures

and Up to 21% of operated patients develop wound infection in Ethiopia. Postoperative wound infections also lead to an average increase in the length of hospital stay of 4–7 days and increase in health-care costs. Infected patients are twice as likely to die, twice as likely to spend time in an intensive care unit and five times more likely to be readmitted after discharge (WHO, 2009; WHO, 2011; Nejad, 2011 and Messele, 2009). Newborns and pediatric populations are at higher risk, with surgical infection rates in developing countries 3-20 times higher than in high-income countries (WHO, 2011 and Nejad, 2011). Although a large number of reports on SSI are available in adult literature, reports for children are few, and most are from developed countries with an overall incidence of 2.5–20%. In most of Africa, incidence data are not available, but one hospital-based prospective report suggests an incidence of 23.6%. In a report on sub-Saharan African children undergoing operation, the SSI rate was 14.3% in clean incisions, 19.3% in cleancontaminated incisions, 27.3% in contaminated incisions, and 60% in dirty incisions (Francis, 2011). Postoperative wound infections in children are related more to perioperative factors than to the patients' overall physiologic status (Francis, 2011). Among several contributing factors to postoperative wound complications, nurse's responsible factor seems to be a significant importance, particularly nurses' lack of knowledge and skills. For example, a study showed that malnutrition rate was high in patients before undergoing gastrointestinal surgery due to nurses' lack of knowledge and inability to evaluate nutritional status of the patients (Aydin, 2008). Based on a literature review, approximately 25% of the infections could be prevented by nursing personnel by following proper precautions during nursing care of surgical patients (Parvez, 2005). Successful nursing care of surgical wounds depended on nurses' evidence based knowledge and practice in terms of understanding normal wound healing process, type of surgery, methods of wound closure, preventive technique, risk factors for surgical wound, and management of surgical wound care. Using these knowledge and practices, nurses can provide a systematic and holistic patient assessment and management to prevent Postoperative wound complications (Parvez, 2005). Surgical safety has therefore emerged as a significant global public health concern. Just as public health interventions and educational projects have dramatically improved maternal and neonatal survival, analogous efforts might improve surgical safety and quality of care. Appropriate postoperative management of the incision can reduce postoperative wound infection (WHO, 2009).

### **Significance of the study**

Postoperative wound care is the result of a complex interaction among the patient, wound related factors and nurses' evidence based knowledge and practice of postoperative wound care. The incidence of postoperative wound complications, specifically surgical site infection is high in Ethiopia (16). Nurses have a lot of roles to play in prevention of post operative wound complications, thus, there is a need to assess their state of knowledge and practice. The assessment of nurses' knowledge and practice regarding postoperative wound care in hospitalized pediatrics patients has not been conducted in the study area. Therefore, this study is proposed to assess the level of knowledge and practice towards postoperative wound care of hospitalized pediatric patients among nurses working in public hospitals of Mekelle City, North Ethiopia. The finding of this study can provide with relevant information for future planning and interventions of appropriate

postoperative wound care strategies to prevent the complications and restore the health of the individuals and will also help as a baseline data for those who are interested in carrying out further research in this regard.

### Literature Review

A paucity of pediatric wound care research is available upon which to guide practice; few wound care products have been studied in this population. Research findings suggest that nurses lack research-based knowledge regarding wound management. Other findings also suggest that there are other factors that influence nurses' practice.

**Nurses' knowledge and practice regarding post operative wound care:** Although they follow the same wound healing trajectory as adults, wounds in neonates and children typically exhibit faster rates of closure. In fact, rapid, uncomplicated wound healing requiring limited healthcare professional intervention is the "normative expectation" in pediatrics. This expectation of rapid, uneventful healing and innate age-related integumentary resiliency has, in part, resulted in the lack of wound care knowledge transfer to the pediatric population (King, 2014). For the prevention of postoperative wound complications, nurses should have proper knowledge and they should have skills on this matter during preoperative, intraoperative, and postoperative period. Postoperatively, nurses need to have knowledge and maintain good practice in the following scopes; surgical wound care with aseptic precaution, wound assessment and monitoring of surgical site infection, and nutritional support (Celik, 2007 and Mangram, 1999). Findings from the study in British showed that nurses applied unsterile and inappropriate technique of using glove in surgical wound care and surgical procedures (Hampton, 2003). And 85% of nurses used inappropriate dressing technique in caring for surgical patients (McFadden, 1994). A result of similar survey study in British (2008) also found that the nurses lacked of potential knowledge and practice in respect of wound care and also conducted poor management of wounds with inappropriate usage of dressing technique (Hollinworth, 2008). A study conducted in Queensland, Australia (2012) on wound care practices: A survey of acute care nurses showed that only 27% of the respondents nominated the recommended time period of wound dressing removal. And 50% of them reported being 'unaware' of the national standards pertaining to wound management, and only 34.7% respondents reported that their knowledge of wound products was 'good' or 'excellent' (Gillespie, 2014). Findings from a study in Baghdad, Iraqi on nurses' practices toward postoperative wound dressing in surgical wards showed that all nurses regardless of their gender had performed almost at the same level of practices relative to postoperative wound dressing. Older nurses demonstrated inadequate practices concerning postoperative wound infection precautions (Hussein, 2012). A study conducted (2010) in Bangladeshi on nurses knowledge and practice on prevention of post operative surgical site infection showed that the knowledge of the nurses were at the moderate level with the mean of 74.16% and the postoperative practice of surgical site infection prevention was at very high level with the mean score of 96% (Sickder, 2010). A study conducted in Benha specialized pediatric hospital, Egypt (2004) on nurse's knowledge and practice pre and postoperative care showed that nearly two thirds (66.1%) of nurses had poor level of knowledge regarding information about about disease, preoperative care, and immediate care

after surgery and general observation and caring in day following surgery. And (67.9%) of nurses had poor level of practice regarding to pre-operative care, post-operative care, wound care, IV infusion care, hand washing and psychological support for children and their families. nurses' age from 20 to less than 30 had the highest mean scores of knowledge and performance. nurses who hold bachelor degree in nursing had the highest, mean scores of knowledge and performance. nurses who were head nurses in nursing had the highest, mean scores of knowledge and performance (Nurses, 2015). A study conducted in Khartoum state showed that the majority of nurses (83.1%) had poor knowledge in the initial assessment of wound, compared with 64.8% in the low knowledge regarding type of dressing. Nurses' dressing skills were satisfactory in two steps; preparation and wound cleaning, but they were poor in the documentation. Seventy five percent (75%) of nurses were satisfactory in the preparation of dry dressing, and 58.3% in applying dry dressing (Moreljwab, 2015).

**Factors contributing to Nurses' Knowledge and Nurses' Practice:** Several factors contributing to nurses' knowledge and their practice have been identified in nursing literature. Very few studies explored such factors in an area of post operative wound care. Thus, in this section, the researcher presents the literature demonstrating empirical evidence of contributing factors from various topics, not limited to only postoperative wound care. Literature has shown that nurses' age, gender, areas of practice, years of working experience, and education and training play roles in nurses' knowledge. Age difference- age is related to nurses' knowledge and their practice. In pain literature, it was found that nurses whose age were over 30 years old tend to overestimate burn pain. Whereas, nurses who were less than 25 years old tended to underestimate burn pain (Allcock, 1996). In nutrition literature, one study found that younger nurses were more knowledgeable than older ones (Endevelt, 2009). Gender-gender difference in nurses' knowledge and practice has also been addressed in the literature. A crosssectional survey was conducted with 650 European ICU nurses. Nurses' knowledge of evidence based guidelines for the prevention of surgical site infection. They evaluated ICU nurses' knowledge of the postoperative surgical site infection guideline. The researcher found that male nurses had better knowledge scores than female nurses. Another survey study was conducted with 216 Italian operating theater nurses regarding infection control. This study found that the level of knowledge was higher in males compared to female nurses (Angelillo, 1999). Areas of practice- areas of practice are influential factor on nurses' knowledge and practice. A comparative study was conducted with 45 qualified nurses at three hospitals in Ireland. It was found that nurses who had more practice experience in caring AIDS patients appeared to have more knowledge than those who did not practice in AIDS area (Steele, 1995). Another study found that nurses who practiced in nutritional area showed significantly higher nutritional knowledge than those with less clinical practices (Lindseth, 1997). Years of working experience- in a survey study found that nurses who had more years of working experience of nurses had the higher level of knowledge than those who had less years of working experiences. However, years of working experience did not influence clinical practice (Pancorbo-Hidalgom 2017). Another study found that nurses who had more than 10 years of working experience showed a decline of their knowledge and practice regarding infection control than novice recruited nurses (Vij, 2007). Once again, findings leads us to that

moderate practice level are prominent in term of nurses experience in surgical ward within (Yao, 2013; Letouze, 2004; Murphy, 2014; King, 2014 and Hahler, 2006) years of nurses' experience in surgical ward (Hussein, 2012). Education and training- the factor of education and training on nurses' knowledge and practice are inconclusive. Nurses who received higher education had high level of knowledge than those did not receive (Steele, 1995). A study revealed that the nurses who trained on infection control training had more likely to perform better practice than untrained nurses. However, a study revealed that training programme did not make any significant differences in the knowledge level between control and experimental groups (Benneth, 1997). The study results indicated that all the segment of nurses with bachelor degree (100.0%) showed high practice level comparing with other nurses' educational backgrounds. in addition the findings highlight that those nurses with  $\leq 26$  year of employment showed the highest percentage (93.0%) with in moderate practice level. Finally, it's clear that nurses who never attained training sessions in their entire carrier path in surgical care are the dominant which reflected by (83.0%) of them performed with in the category of moderate practice level (Hussein, 2012). Findings from the study in Malta on nurses' knowledge and practice on postoperative wound management revealed that the factors that seem to influence nurses' practice include hierarchical pressures, and a lack of assertiveness. Furthermore; a lack of opportunities to express their opinions about wound care issues; and the unavailability of a variety of wound cleansing solutions and dressing materials, have also been identified as being influential (Annabella Galea, 2015).

### Conceptual framework

Studies in different parts of the world reviewed that the level of nurses' knowledge and practice is affected by different factors. For this study, the main factors are sociodemographic factors, health care provider related factors and institutional factors. The next conceptual frame work which depicts the relationship of the variables of this study.

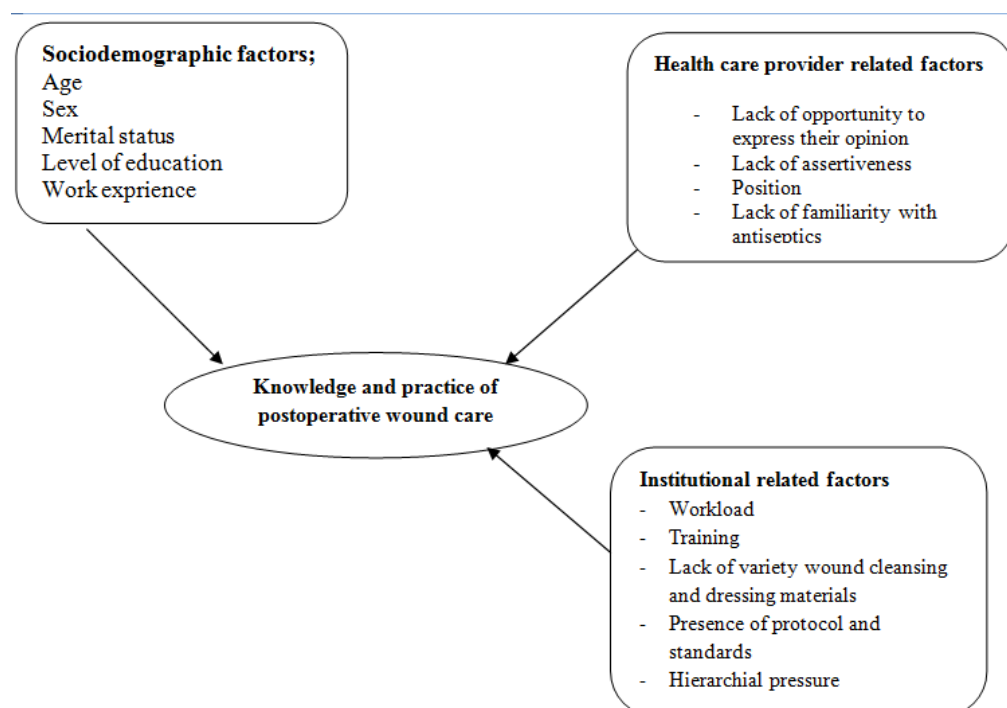


Figure 1. Conceptual framework for the study of knowledge and practice of nurses and associated factors towards postoperative wound care of hospitalized pediatrics patients adopted from literatures by the investigator

### Objectives

**General objective:** To assess nurses' knowledge, practice and associated factors regarding postoperative wound care of hospitalized pediatrics patients in public hospitals of Mekelle City, North Ethiopia, 2015.

### Specific objectives

- To describe nurses' knowledge regarding postoperative wound care of hospitalized pediatrics patients in public hospitals of Mekelle City, North Ethiopia, 2015
- To describe nurses' practice regarding postoperative wound care of hospitalized pediatrics patients in public hospitals of Mekelle City, North Ethiopia, 2015
- To identify factors associated with nurses' knowledge regarding postoperative wound care of hospitalized pediatrics patients
- To identify factors associated with nurses' practice regarding postoperative wound care of hospitalized pediatrics patients

## MATERIALS AND METHODS

### Study Areas

The study was carried out in Mekelle City, Tigray region, North Ethiopia, which is located at 783km from the capital city, Addis Ababa. There are 7 sub cities. The total population of Mekelle city is estimated to be 262,622 according to the 2007 EFY population estimation. There are private and governmental health facilities in the City. There are 8 health centers, one referral hospital and two general hospitals owned by government and 4 general hospitals, 38 clinics owned by the private organizations. The number of nurses working in the public hospitals include 138 nurses in Mekelle hospital, 472 nurses in Ayder Referral hospital and 43 nurses in Quiha hospital with a total of 653 nurses both diploma and degree.

**Study period:** The study was conducted from December 2014 to June, 2015.

**Study design:** An institution based cross-sectional study design was used.

### Source population and study population

**Source population:** All nurses who were working in pediatric units of all public hospitals of Mekelle city.

**Study population:** All sampled nurses who were working in pediatric units of the public hospitals of Mekelle city.

$d$  = the margin error between the sample and the population.  
 $Z_{\alpha/2}$  = critical value at 95% confidence level of certainty (1.96)

- Since the source population is less than 10,000, we will use the correction formula i.e .
- $nf = \frac{no}{1+no/N} = \frac{384}{1+384/232} = 145$
- By adding 10% non response rate the estimated sample size was 160 nurses.

**Sampling technique and procedure:** There are 3 public hospitals in Mekelle City, North Ethiopia. All the 3 public hospitals were included in the study.

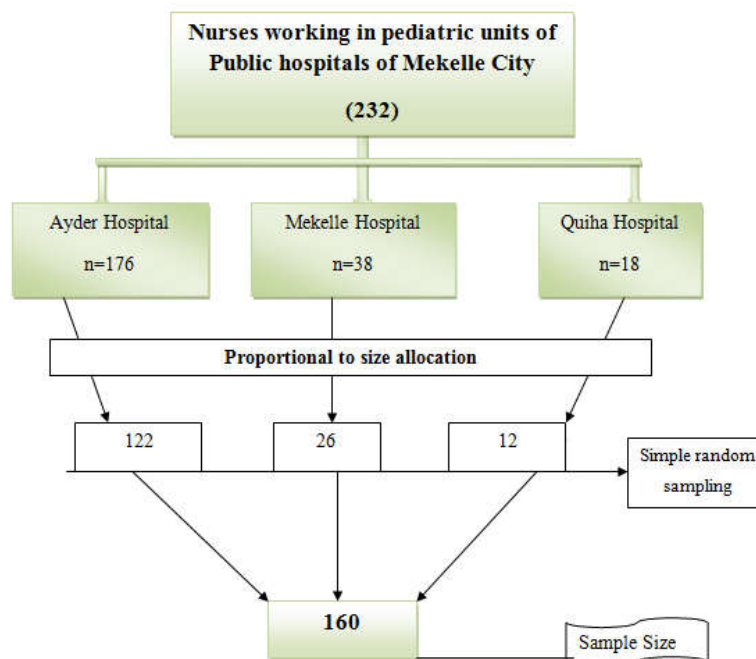


Figure 2. Schematic Representation of Sampling Procedure of the study

### Eligibility criteria

**Inclusion criteria:** All nurses who were working in Ayder Referral, Mekelle, and Quiha hospitals of pediatric wards, Pediatrics emergency departments, pediatric and neonatal ICUs were included.

**Exclusion criteria:** Nurses who were new employees of 6 months duration and below for that particular facility were excluded.

### Sample size and sampling procedure

**Sample size determination:** The sample size was estimated based on an assumption that the proportion of nurses who have sufficient knowledge on post operative wound management is to be 50.0%, with 5% margin of error and 95% confidence level of certainty. The actual sample size is calculated using single population proportion formula.

$$n = \frac{z^2 \left(\frac{\alpha}{2}\right)^2 * P(1-p)}{d^2}$$

$$n = \frac{(1.96)^2 * 0.5(0.5)}{(0.05)^2}$$

$$n = 384$$

Where: P= 50.0%, estimated proportion of nurses who had sufficient knowledge on postoperative wound care.

The number of study units to be sampled from each facility was determined using proportional allocation to sample size. Sampling frame was prepared. Simple random sampling technique (lottery method) was employed to select the study subjects.

### Data collection tool and procedure

A set of structured questionnaires by reviewing different literatures and modified by the researcher was used in this study. It was developed in English and was translated in to Tigrigna and then the data was collected using self-administered questionnaire from the study subjects. It was designed to include part I: socioeconomic variables such as age, gender, marital status, educational level, position, years of experience in pediatric surgical wards, length of services, inservice training and name of current duty ward. Part II: will have questions that examine the level of nurses' knowledge regarding postoperative wound care, it was designed to measure three cognitive levels; remembering, comprehension and cognitive application. it includes postoperative wound assessment, wound care with antiseptic solution precautions, appropriate cleaning and dressings, and early recognition and intervention of wound complications knowledge needed for postoperative wound care in hospitalized pediatric patients. There are 15 multiple choice questions. The correct response for each item receives a score of "1" and "0" for incorrect



response. The score ranged from 0-15 and was transformed into percentage. part III: contains questions that can examine the level of nurses' practice. It includes surgical wound care with aseptic precaution, wound assessment and nutritional support. There are 15 items. A 4-point rating scale was used. Each item score ranged from "no practice", "seldom practice", sometimes practice, and "always practice". The total score ranged from 0-75 was transformed into percentage and finally part IV: was designed to identify the associated institutional factors to manage postoperative wound care in hospitalized pediatric patients. Three diploma nurses and one degree supervisor was participated through out the data collection period.

### Study variables

#### Dependent variables

- Knowledge related to postoperative wound care.
- Practices related to postoperative wound care.

#### Independent variables

**Socio demographic characteristics;** age, sex, marital status, religion, level of education, working experience,

**Health care provider factors;** position, experience in pediatric units, lack of assertiveness, lack of familiarity with antiseptics, lack of opportunity to express their opinion.

**Institutional factors;** workload, inservice training, hierarchical pressure, lack of variety wound cleaning and dressing materials, presence of postoperative wound care protocols and setups.

#### Operational definitions

- **Good knowledge** - those who scored above the mean on knowledge items and
- **Poor knowledge** - those who scored below mean to knowledge items.
- **Good practice** - those who scored above the mean on practice items and
- **Poor practice** - those who scored below the mean on practice items

**Data quality assurance:** Structured questionnaires was translated in to Tigrigna to have a consistent final version of the questionnaire. Data collectors and supervisor was trained for two days on the aim of the study, confidentiality issue, informed consent study instrument and data collection procedures by the principal investigator. Ten percent of the collected data was checked by the supervisor daily for completeness and finally the principal investigator will monitor the overall quality of data collection. The questionnaire was pre-tested on 5% of the calculated sample size in a hospital which was not selected in the study (Wukro hospital) preceding the actual data collection period.

**Data analysis procedure:** The collected data was checked for completeness and inconsistencies. And it was entered, cleaned and analyzed using SPSS version 20 statistical software. In the first step the descriptive analysis, such as frequency distribution, percentages, and measures of central tendency was also computed. Then the assumptions of multinearity, interaction effects was checked and no significant interaction

and multicollinearity was found. Bivariate analysis was used to see the association between independent versus out-come variables and multivariable logistic regression models was used to identify the associated factors to nurses' knowledge and practice towards postoperative wound care. statistical significance was declared at p value <0.05. Finally, the result are presented with text, Graphs and Tables.

### Ethical Consideration

Ethical clearance was obtained from Institutional Review Boards of University of Mekelle College of Health Sciences and then official letter was gained from the regional health bureau. Letter of permission was secured from administrative bodies of the area to communicate with relevant bodies in the health institutions. All of the study participants was informed about the purpose of the study, about their right to participate or to terminate at any time if they want and respondents was ensured about the confidentiality of information obtained. Beneficence of the participants was maintained throughout the study.

### Dissemination of the result

Finally the findings of the study will be submitted to the Department of nursing, college of health sciences, Mekelle University. It will be also communicated to the respective hospitals. It will also be presented in seminars and workshops as well as it will be published the findings at national or international peer reviewed journals.

## RESULTS

This study was aimed to assess nurses' knowledge and practice regarding postoperative wound care in pediatric patients. 158 out of 160 nurses who had been working in pediatric areas for more than six months were completed the self administered questionnaires yielding a response rate of 98.8%.

### Socio demographic characteristics of the study subjects

The median ( $\pm$ IQ range) age of the nurses was 28  $\pm$ 13 years ranges from 20 to 56 years. Eighty six (54.4%) of the nurses were in the age range 20 to 29 years. The three fourth quarter, 115(72.8%) of the study subjects were females. Regarding to their educational status, majority 138(87.3%) of the nurses were Bsc degree holders. The average years of working experience of the study subjects in pediatric units was 2 years (IQ range $\pm$ 2) and majority of them, 151(95.6%) had experience of less than five years in the pediatric units (Table 1).

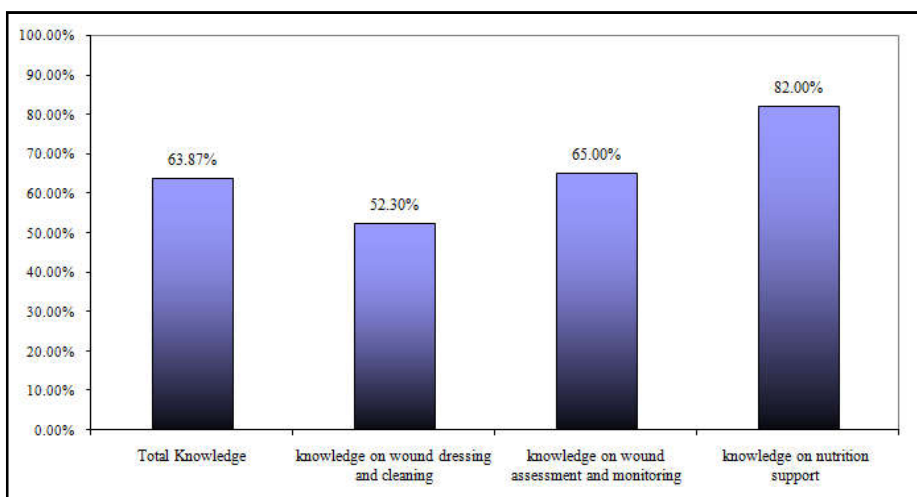
### Knowledge regarding Post operative wound care

This study shows that the mean of total score of knowledge regarding post operative wound care of the study subjects was 63.97% (SD $\pm$ 13.1%). Eighty seven (55.1%) of the nurses had good knowledge regarding postoperative wound care (Figure 3 & table 2). Two thirds, 95(60.1%) of the study participants had good knowledge regarding cleaning and dressing of the post operative wound. However, 89(56.3%) and 90(57.0%) of the nurses has scored below the mean of knowledge score on wound assessment, monitoring and nutrition support respectively (Table 2).

**Table 1. Distribution on socio demographic characteristics of nurses working in public hospitals of Mekelle city, Tigray region, North Ethiopia**

Variable	Category	Frequency	Percent (%)
Age of nurse	20 – 29 years	86	54.4
	30 -39	36	22.8
	40 - 49	24	15.2
	50-59	12	7.6
	Total	158	100.0
Sex	Male	43	27.2
	Female	115	72.8
	Total	158	100.0
Marital status	Married	91	57.6
	Single	59	37.3
	Divorced/widowed	8	5.1
	Total	158	100.0
Religion	Orthodox	144	91.14
	Muslim	13	8.23
	Protestant	1	0.63
	Total	158	100.0
Educational level	Bsc	138	87.3
	Diploma	17	10.8
	MSc	3	1.9
	Total	158	100.0
Current ward	Pediatric ward	72	45.6
	Pediatric ICU	23	14.6
	Neonatal ICU	9	5.7
	Others*	27	17.1
	Total	27	17.1
Experience in pediatric units	6 months to 5 years	151	95.6
	>5 years	7	4.4
	Total	158	100.0
Total work experience in years	6 month to 5 years	88	55.7
	6 – 10	22	13.9
	11 -15	10	6.3
	16 – 20	16	10.1
	>20	22	13.9
	Total	158	100.0
Position	Staff	144	91.1
	Head nurse	14	8.9
	Total	158	100.0

\*pediatric OPD, Recovery Room, Eye clinic



**Figure 3. Average (mean) knowledge score of study subjects on total and sub categories of knowledge of postoperative wound care**

**Table 2. Distribution of nurses level of knowledge towards postoperative wound care working in public hospitals of Mekelle city, North Ethiopia**

Variables	Category	Frequency	Percent
Total knowledge on postoperative wound care	Poor	71	44.9%
	Good	87	55.1%
	Total	158	100.0%
Knowledge on postoperative wound cleaning and dressing	Poor	95	60.1%
	Good	63	39.9%
	Total	158	100.0%
Knowledge on wound assessment and monitoring	Poor	89	56.3%
	Good	69	43.7%
	Total	158	100.0%
Knowledge on nutrition support	Poor	90	57.0%
	Good	68	43.0%
	Total	158	100.0%

According to the result in this study, there were items that were correctly answered by higher percentages of nurses. Having less immune response for the malnourished surgical patients was the item answered correctly by highest (89.2%) number of nurses followed by kind of diet should be provided for the postoperative patients, which was correctly answered by 85.4% of nurses. To the reverse, when to change the surgical dressing was the item which was answered correctly by lowest (13.3%) percentage of respondents. Eating well cooked food to reduce infection of surgical patients with immunodeficiency disorders was also the second item which was correctly answered by low number of nurses (25.3%). Correct steps of hand washing was correctly answered by less than half, 77(48.7%), of nurses participated in this study (Table 7).

**Nurses' practice on postoperative wound care:** This study indicating that the mean of nurse's practice on postoperative wound care was 84.3% ranging from 25% to 100%. Around two third (58.2%) of nurses reported that their practice towards postoperative wound care was good. Accordingly, this study showed that two thirds, 96(60.7%) and, nearly three fourth, 115(72.8%) of nurses reported that their practice on cleaning and dressing, and assessment and monitoring was good respectively (Figure 4 & Table 3). Specifically, this study showed that majority, 135(85.4%) of nurses reported that they clean surgical site from clean to less clean area always in their practice. Around 83% of nurses were also reported as they were used sterilized dressing materials always in their practice. In addition, 123(77.8%) nurses were reported that they always advice their immune deficient patients to maintain their

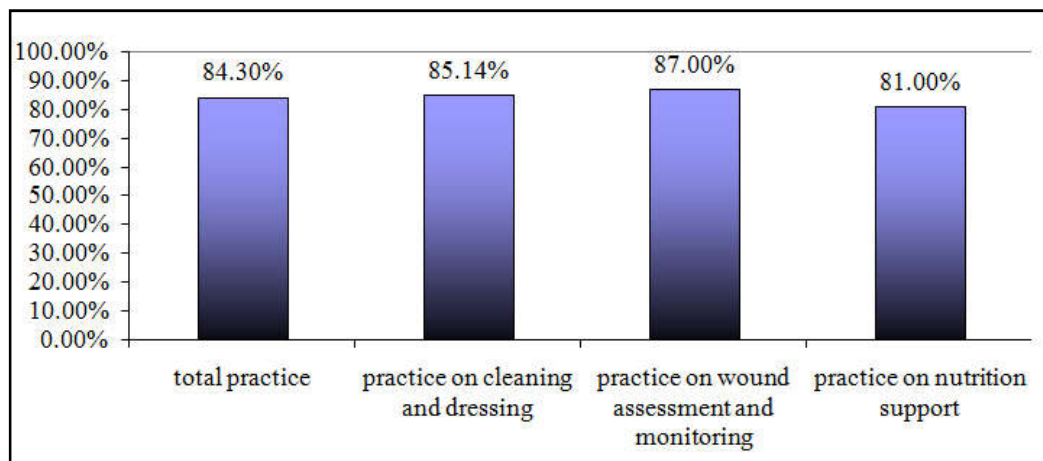


Figure 4. Average practice score of study participants on total and subdimentsions of practice on postoperative wound care

Table 3. Distribution of nurses based on their level of practice towards postoperative wound care

Variables	Category	Frequency	Percent
Total practice	Poor	66	41.8%
	Good	96	58.2%
	Total	158	100%
Practice on cleaning and dressing	Poor	62	39.2%
	Good	96	60.8%
	Total	158	100%
Practice on wound assessment and monitoring	Poor	43	27.2%
	Good	115	72.8%
	Total	158	100.0%
Practice on nutrition support	Poor	52	32.9%
	Good	106	67.1%
	Total	158	100.0%

Table 4. Percentage distribution of nurses according to level of their practice on postoperative wound care practices

No.	Item	Either of sometimes or rarely practice n(%)	Always practice n(%)
1	Hand washing before and after wound dressing	62(39.2%)	96(60.8%)
2	Hand washing before wearing sterile glove	97(61.4%)	61(38.6%)
3	I perform glucose test regularly in a diabetic Patient	35(22.2%)	123(77.8%)
4	I assess my patients body mass index (BMI)	107(67.7%)	51(32.3%)
5	Advice my patient to take vegetables and fruits	54(34.2%)	104(65.8%)
6	Advice malnourished patient to take nutritious protein diet	49(31.0%)	109(69.0%)
7	I inspect first for witness of gauze and color of Discharge	43(27.2%)	115(72.8%)
8	I clean surgical site from clean to less clean area	23(14.6%)	135(85.4%)
9	Used sterilized dressing materials for cleaning and dressing surgical wound	27(17.1%)	131(82.9%)
10	I use povidine-iodine or normal saline for cleaning surgical wound	67(42.4%)	91(57.6%)
11	Used aseptic technique for surgical wound Dressing	36(22.8%)	122(77.2%)
12	Used aseptic technique to obtain specimen for swab culture	45(28.5%)	113(71.5%)
13	Advice for immune deficient patients to maintain personal hygiene	35(22.2%)	123(77.8%)
14	I assess and monitor surgical site condition	59(37.3%)	99(62.7%)
15	Used facemask during cleaning and dressing surgical wound	93(58.9%)	65(41.1%)



**Table 5. Bivariate and multivariable logistic regression analysis result of sociodemographic, health care provider and institutional variables with level of nurses' knowledge working at public hospitals of Mekelle City, 2015**

Variables	Nurses level of knowledge			
	Poor	Good	COR	AOR
Age			1	1
20-29	42(48.8%)	44(51.2%)		
30-39	12(33.3%)	24(66.7%)	1.91[0.85-4.3]	2.28[0.7-7.53]
40-49	11(45.8%)	13(54.2%)	1.13[0.46-2.8]	1.02[0.20-5.1]
50-59	6(50.0%)	6(50.0%)	0.29[0.29-3.2]	0.77[0.1-5.52]
Sex				
Male	22(51.2%)	21(48.8%)	0.71[0.35-1.4]	0.75[0.35-1.6]
Female	49(42.6%)	66(57.4%)	1	1
Marital status				
Never married	29(49.2%)	30(50.8%)	1	1
Married	42(42.4%)	57(57.6%)	1.3[0.69-2.51]	0.97[0.4-2.34]
Educational level				
Diploma	7(41.2%)	10(58.8%)	1	1
Bsc and above	64(45.4%)	77(54.6%)	0.84[0.3-2.34]	0.79[0.26-2.35]
Experience in pediatric units				
0.5 to 2 years	54(47.8%)	59(52.2%)	1	1
Above 2 years	17(37.8%)	28(62.2%)	1.51[0.74-3.1]	1.92[0.81-4.6]
Total experience				
0.5 to 5 years	38(43.2%)	50(56.8%)	1	1
6 to 10 years	14(63.6%)	8(36.4%)	0.43[0.2-1.14]	0.28[0.1-0.92]
≥11 years	19(39.6%)	29(60.4%)	1.16[0.6-2.37]	1.1[0.24-4.5]
Position				
Head nurse	8(57.1%)	6(42.9%)	0.58[0.2-1.77]	0.83[0.2-2.83]
Staff	63(43.8%)	81(56.3%)	1	1
IP training				
No	22(39.3%)	34(60.7%)	1	1
Yes	49(48.0%)	53(52.0%)	0.7[0.36-1.36]	0.57[0.27-1.2]
Practice				
Poor	34(51.5%)	32(48.5%)	1	1
Good	37(40.2%)	55(59.8%)	1.58[0.84-2.9]	1.73[0.9-3.47]

**Table 6. Bivariate and multivariable logistic regression analysis result of independent variables with the level of nurses' practice working in public hospitals of Mekelle City, 2015**

Variables	Category	Nurses level of practice			
		Poor	Good	COR	AOR
Age	20-29	38(44.2%)	48(55.8%)	1	1
	30-39	15(41.7%)	21(58.3%)	1.12[0.5-2.44]	1.14[0.3-4.34]
	40-49	11(45.8%)	13(54.2%)	0.94[0.38-2.3]	1.37[0.23-8.21]
	50-59	2(16.7%)	10(83.3%)	3.96[0.8-19.2]	9.4[0.68-130.7]
Sex	Male	22(51.2%)	21(48.8%)	0.99[0.49-2.0]	1.22[0.48-3.13]
	Female	49(42.6%)	66(57.4%)	1	1
Marital status	Never married	29(49.2%)	30(50.8%)	1	1
	Married	42(42.4%)	57(57.6%)	1.04[0.54-2.0]	0.65[0.23-1.84]
Educational level	Diploma	7(41.2%)	10(58.8%)	1	1
	Bsc & above	64(45.4%)	77(54.6%)	0.74[0.26-2.1]	0.82[0.19-3.58]
Experience in pediatric unit	0.5 - 2 year	54(47.8%)	59(52.2%)	1	1
	2 & above	17(37.8%)	28(62.2%)	1.26[0.62-2.6]	1.7[0.63-4.6]
Total experience	0.5 to 5 years	38(43.2%)	50(56.8%)	1	1
	6 to 10 years	14(63.6%)	8(36.4%)	1.27[0.48-3.3]	1.07[0.27-4.26]
	≥11 years	19(39.6%)	29(60.4%)	0.93[0.46-1.9]	0.4[0.08-2.08]
Position	Staff	63(43.8%)	81(56.3%)	1	1
	Head nurse	8(57.1%)	6(42.9%)	0.36[0.1-1.14]	0.18[0.04-0.86]**
IP training	No	22(39.3%)	34(60.7%)	1	1
	Yes	49(48.0%)	53(52.0%)	1.34[0.7-2.6]	1.74[0.75-4.03]
Knowledge	Poor	34(47.9%)	37(52.1%)	1	1
	Good	32(36.8%)	55(63.2%)	1.58[0.84-3.0]	1.38[0.62-3.1]
Work load	No	22(40.0%)	33(60.0%)	1	1
	Yes	44(42.7%)	59(57.3%)	0.89[0.5-1.74]	1.65[0.65-4.21]
Lack of basic assessment tool	No	24(32.4%)	50(67.6%)	1	1
	Yes	42(50.0%)	42(50.0%)	0.48[0.25-0.9]*	0.62[0.25-1.56]
Lack of training	No	27(43.5%)	35(56.5%)	1	1
	Yes	39(40.6%)	57(59.4%)	1.13[0.59-2.2]	2.23[0.89-5.55]
Lack of familiarity with antiseptics	No	39(33.6%)	77(66.4%)	1	1
	Yes	27(64.3%)	15(35.7%)	0.28[0.13-0.6]*	0.32[0.12-0.88]**
Lack of Protocol	No	36(36.7%)	62(63.3%)	1.72[0.9-3.31]	1
	Yes	30(50.0%)	30(50.0%)	1	1.37[0.52-3.6]
Lack of equipments	No	37(38.5%)	59(61.5%)	1	1
	Yes	29(46.8%)	33(53.2%)	0.71[0.37-1.36]	2.13[0.8-5.71]
Lack of assertiveness	No	24(31.6%)	52(68.4%)	1	1
	Yes	42(51.2%)	40(48.8%)	0.44[0.23-0.8]*	0.45[0.17-1.18]
Absence of hierarchical pressure	No	40(33.9%)	78(66.1%)	1	1
	Yes	26(65.0%)	14(35.0%)	0.28[0.13-0.6]*	0.36[0.15-1.0]**
Lack of opportunity to express opinion	No	34(34.7%)	64(65.3%)	1	1
	Yes	32(53.3%)	28(46.7%)	0.47[0.24-0.9]*	0.92[0.33-2.53]
Poor documentation	No	26(28.0%)	67(72.0%)	1	1
	Yes	40(61.5%)	25(38.5%)	0.24[0.1-0.48]*	0.28[0.1-0.74]**

\*variables which were significant in the bivariate analysis and\*\* in multivariable analysis.

personal hygiene and similarly 123(77.8%) of nurses performed glucose test regularly for their diabetic patients. To the reverse, two thirds, 97(61.4%) of nurses reported that they wash their hands before wearing sterile glove only sometimes or rarely in their practice. Only 65(41.1%) of nurses used facemask always during cleaning surgical wound in their practice (Table 4).

**Factors associated with level of nurses' knowledge:** Level of nurses' knowledge was assessed for its association with socio demographic and institutional related variables. None of them was shown significant statistical association unfortunately (Table 5).

**Factors associated with level of nurses' practice:** Level of nurses' practice was assessed for its association with socio demographic and institutional related variables. In bivariate analysis, lack of basic assessment tool, lack of familiarity with antiseptic solutions, lack of assertiveness, absence of hierarchical pressure, lack of opportunity to express their opinion and poor documentation was significantly associated with level of nurses' practice at  $p \leq 0.05$ . In the multivariate analysis, position was statistically associated with nurses level of practice ( $p=0.032$ ) which showed that head nurses were 82% less likely to have good practice compared to staff nurses [AOR=0.18; 95% CI (0.04, 0.86)]. Lack of familiarity with antiseptics was also identified as an influential to nurses level of practice (0.027) which indicated that those nurses who reported lack of familiarity with antiseptics as influential were 68% less likely to have good practice than those nurses who did not report lack of familiarity with antiseptics as influential factor [AOR=0.32; 95% CI (0.12, 0.88)]. In addition, poor documentation was also identified as influential factor ( $p=0.001$ ). The odds of having good practice among those nurses reported poor documentation as a factor was 72% less likely compared to those nurses who did not report poor documentation as influential [AOR=0.28; 95% CI (0.1, 0.74)]. On the other hand, lack of basic assessment tool, lack of assertiveness and lack of opportunity to express their opinion were not retained as a significant factor in the multivariate analysis. This study observed that the association between nurses' knowledge and nurses' level of practice was insignificant (Table 6).

## DISCUSSION

The purpose of this study was to assess nurses' level of knowledge, practice and associated factors regarding postoperative wound care of hospitalized pediatric patients in public hospitals of Mekelle City. In this study, the mean score of nurses' knowledge on postoperative wound care was 63.97% with 55.1% of the nurses had good knowledge. This finding is lower than the study conducted in Bangladesh 2010 (29), in which the mean score was 74.2% and 50.0% of nurses had above mean of knowledge score. But it is higher as compared to the study conducted in Egypt (2004) where majority (66.1%) of nurses had poor knowledge (30). This might be due to the reason that the difference in educational level of the study subjects where majority (87.3%), of the study subjects were Bsc degree holders. This study found that majority (60.1%, and 56.3%) of nurses had poor knowledge on cleaning, dressing as well as on assessment and monitoring of postoperative wound respectively. This is more or less comparable with result found in Khartoum, Sudan which

indicated that majority of the nurses had poor knowledge on wound cleaning, dressing as well as on assessment and monitoring (31). The findings of this study showed that the average knowledge score of the study participants on nutrition support towards postoperative wounded patients was 82% which is higher than the nurses' knowledge score on cleaning and dressing, and wound assessment and monitoring. No previous report was found on nurses' knowledge of nutrition support for postoperative wounded patients. This study observed that nurses aged 30 to 39 had better knowledge compared to those nurses aged 20-29 years. This is not consistent with the findings in the study conducted in Egypt (2004) which indicated that young nurses (aged 20-30 years) had good knowledge (30). This difference might be due to those nurses aged 30 -39 had higher education level and work experience, in which 94.4% of them were Bsc degree holders. concerning to experience in pediatric units, two thirds of nurses who had more than two years of experience had good knowledge than those who had two years or less years of experience in the unit. This is in agreement with the findings of the study conducted in Spain (2007) which indicated that nurses who had more years of working experience had higher level of knowledge (37). Other studies conducted in Egypt (2004) and Ireland (1999) showed that nurses with higher educational level had higher level of knowledge (30, 35). This study, however, not consistent with those findings. This might be due to three fourth of nurses who had Bsc and above participated in this study had less than two years of experience in pediatric units. Regarding to nurses' level of practice, this study indicated that majority (58.2%) of the nurses had good nursing practice on postoperative wound care. This is in agreement with the finding in Bangladesh in which the level of their practice was high and majority (51.7%) nurses had good practice (29). Majority (60.8%) of the nurses in this study had good practice in cleaning and dressing of postoperative wound care which is consistent with result found in Khartoum, Sudan where 58.3% of nurses had satisfactory practice in dressing (31). A study conducted in Malta identified that absence of hierarchal pressure was as influential (40). This finding is not consistent with the result found in this study. This might be due to the smaller sample size. This study revealed that those nurses reported lack of familiarity with antiseptics as an influential had 68% less likely to have a good practice. This is consistent with findings of the study conducted in Malta which identified that lack of familiarity with antiseptics as influential (40). In addition, poor documentation was also reported as a factor and those who said poor documentation as a factor had 72% less likely to have good practice compared to those who said poor documentation is not a factor. This is also in agreement with the result found in the study conducted in Malta (40). This study showed that majority (63.2%) of those nurses who had good knowledge had good practice even though not significantly associated. Smillar result was found in the study conducted in Bangladesh (2010) which observed that there was weak association between nurse's level of knowledge and nurses practice (29). However, this insignificant association might be due the smaller sample size.

**Strength:** As a baseline for further researches that will be done.

**Limitations:** This study used self administered questionnaire to examine nurse's knowledge and practice on postoperative wound care that may differ the understanding of the questionnaire among subjects.

## Conclusion and Recommendations

**Conclusion:** In conclusion, this study showed that more than half of nurses had good knowledge. However, the average knowledge score of all nurses was low (64%). Regarding to nurses practice, this study showed that nearly two thirds of nurses had good nursing practice on postoperative wound care with and average practice score was high (84.3%). Lacking of hand washing practice was also observed on majority of nurses participated in this study. Lack of familiarity with antiseptics, poor documentation and position were significantly associated with nurses' level of practice. Even though majority of those nurses who had good knowledge had good nursing practice, this study found the association between nurse's level of knowledge and nurses practice was not statistically significant.

## Recommendations

- The hospital administrators and professionals need to conduct continuous nursing education and training programs to enhance nurses knowledge regarding postoperative wound care.
- It is also important if hospital administrators Strengthen evidence based practices that would help in improving the nurses knowledge and practice.
- Hospitals also needed to offer more resources to manage postoperative wound care.
- Further study using observation method and on factors associated with: individual, organizational factors related to nurses' knowledge and practice on postoperative wound care are needed on the future.

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