Original Article

Safety Practices Employed By Perioperative Nurses In Selected Tertiary Health Institutions In South Western Nigeria

Boluwaji Reuben Fajemilehin, RN, PhD
Professor Department of Nursing Science, Obafemi Awolowo University, Ile-Ife, Nigeria

Oyebanji Olufemi Oyediran, RN, MSc
Chief Nursing Officer, Department of Nursing Services, LAUTECH Teaching Hospital, Osogbo, Osun State, Nigeria

Joel Olayiwola Faronbi, RN, PhD
Lecturer I, Department of Nursing Science, Obafemi Awolowo University, Ife, Nigeria

Bayo Lawal Ajibade, RN, PhD
Associate Professor, Department of Nursing, LAUTECH, Osogbo, Osun State, Nigeria

Correspondence: Oyediran Oyebanji Olufemi Department of Nursing Services, LAUTECH Teaching Hospital, P.M.B 5000, Osogbo, Osun State, Nigeria e-mail: phemyoyediran@gmail.com

Abstract

Background: Surgery plays an increasingly prominent role in healthcare around the world and growing attention is being focused on the safety and quality of such care. Half of all surgery related iatrogenic complications are avoidable and breakdown in communication, ineffective teamwork, and non- adherence of surgical team nurses inclusive to standard practice regarding sterilization, aseptic technique and prevention of wrong patient and site are contributing factors.
Aim: The aim of the study was to assess various safety practices employed by nurses to ensure patients safety in operating theatre.
Methods: Descriptive cross sectional design was adopted and the setting of the study were four selected tertiary health institutions in south western Nigeria. Multistage sampling technique was used to select 211 respondents from the setting. Yamane's formulae was used to determine the sample size. Twenty point scale was used for knowledge with yes/no option and the score was categorized into poor (10-11), fair (12-13) and good (14-20). Questionnaire and observation were used to collect data between January and April 2015. Descriptive and inferential statistics were used to analyze the data with the aid of Statistical Product and Service Solution (SPSS) version 20. The P values was considered significant at >0.05
Results: The results showed that (80.0%) of the respondents in both state and federal institutions had good knowledge about safety practices. Findings from questionnaire revealed that identification of patient at the red line as a measure to ensure patient safety in theatre had the highest mean (2.45 ± 1.42). Result from the observation revealed that use of operation schedule to send for patient from the ward had the highest means 6.91 ± 0.28 while only57% of the respondents were using WHO surgical safety checklist. Findings also showed that socio-demographic and professional characteristics are predictors of good safety practices ($F_{4,196} = 5.047$, $p < .001$) .
Conclusions: This study concluded that Perioperative nurses have good knowledge about safety practices and they engaged in standard safety practices in the operating theatres but WHO surgical safety have not been fully adopted in the selected theatres.

Key words: Safety Practices, Knowledge, Perioperative, Teaching Hospital, Western Nigeria .

Introduction

Patient safety is a new healthcare discipline that emphasizes reporting, analysis, and prevention of medical errors that often leads to adverse health care events and it has become a health policy priority around the world in recent time, and is a critical component of patient care (Emmanuel, *et al*., 2007). This is related to the fact that human errors in health care industry constitute a threat to the safety of the patients (Dousis et al., 2008). Preventable adverse outcomes that result in extended patient stays or costs for care can leads to litigation.

A significant proportion of these preventable adverse events are associated with surgical procedures in the operating theatre (Colopinto, 2010). Surgery plays an increasingly prominent role in healthcare around the world and growing attention is being focused on the safety and quality of such care. Almost all surgical procedures are carried out in the operating room. The operating theatre is a dynamic, complicated areas, where the safety of patients undergoing surgery and nursing care of high quality is issue of great priority (Dousis, et al., 2008).

An estimated 234 million major surgical operations are performed annually worldwide and as volume and importance of surgery in global healthcare increase, patient safety and quality in surgical care gain more attention (Martie et al. 2012). The National Reporting and Learning Service in England and Wales reported that out of 135,000 reports of patients' safety incidents relating to surgical specialties in a year, 40, 941 caused low, moderate or severe harm and 296 patients died respectively. For an average English hospital, this equates to approximately two deaths per year and 90 patients suffered severe harm (James 2013).

The Regulation and Quality Improvement Authority of Northern Ireland (2014) reported WHO's estimation that each year, worldwide, one million mortality and six million suffer disabilities as a result of surgical procedure. In addition, nearly one out of ten in-hospital patients experience iatrogenic events and more than half of them occur within perioperative care. (Martie van,et al., 2012). These iatrogenic events are related to non-adherence of perioperative nurses to standard practice regarding sterilization, aseptic technique and prevention of wrong patient and site. Also, results of study had shown that at least half of all surgical complications are avoidable and that breakdown in communication, ineffective teamwork, and lack of compliance with process measures all contribute to error (Norton & Rangel, 2010).

All these statistics are pointing to the essence of patient's safety practice that will reduce avoidable errors and injuries among surgical patients. It is therefore pertinent that perioperative nurses, who are patients advocate, develop a positive safety practices that will significantly improve surgical outcomes and Perioperative nursing care.

Patient safety is now recognized in many countries, with global awareness fostered by the World Health Organization's World Alliance for patient safety. Yet there continue to be significant challenges to implementing patient safety policies and practices. Components of patient safety have been expressed by thought leaders, and models have been presented. However, a single translation that can help a thorough adoption of patient safety culture throughout healthcare system has not been available. (Emmanuel, *et al.* 2007).

Preventing unnecessary harm to patient is a serious concern for practitioners in healthcare facilities and hospitals worldwide. In 2001, the institute of Medicine in United State of America published a report titled 'Crossing the Quality Chasm' to describe what must be accomplished within healthcare systems to achieve optimal patient safety, including improved communication and cooperation among clinicians, transparency, and shared knowledge. (Colopinto 2010).

Safety practices that is surgical patient centered should be the focus of perioperative nurses according to Association of Operating Room Nurses (AORN) statement that was issued in 2006.This statement also stressed the need for healthcare system to provide an atmosphere where all members of the perioperative family can openly discuss errors, process improvement or system issues without fear of reprisal (AORN 2006).

There are paucity of study done on the assessment of healthcare safety practices in Africa and Nigeria specifically as there was no substantive literature

on it. In terms of progress, research shows that patient safety and quality of care information from this region (Africa) is still infrequent and limited in scope (Carpenter, et al., 2010). There is also scanty evidence of local initiatives put in place in our healthcare institutions to ensure that patient care is effective, appropriate, and safe (WHO, 2011). Therefore, an information gap in practice exist and this is associated with lack of implementation of best practice, safety culture, quality improvement, and patient safety and quality of care measures in this region.

This was also supported by Society for Quality in Health Care in Nigeria in 2013 when they submitted that the biggest threat to patient safety is lack of accurate data to inform improvement priorities among health professionals' perioperative nurses inclusive. This will adversely affect the outcome of surgical procedure. It will not be an over statement to say that little is known and documented about the safety practices employed by perioperative nurses in this part of the developing world. It is against this background that this study intends to assess the safety practices employed or adopted by Perioperative nurses in tertiary health institutions in South West, Nigeria. Hence, this research study therefore assessed the patient safety practices employed by perioperative nurses working in tertiary health institutions in South West, Nigeria.

The objectives of the study are to:

(i) assess the perioperative Nurses knowledge about patient safety practices in operating room,

(ii) evaluate the safety measures employed by perioperative Nurses to ensure patients safety in operating theatre,

(iii) identify various types of patients' safety policies used in selected operating rooms and

(iv) find out whether socio-demographic and professional variables will jointly predict safety practices.

Methodology

Descriptive cross sectional design was adopted using quantitative method of data collection. The study was conducted in the operating theatres of four selected tertiary health institutions in South West Nigeria namely: University College Hospital, Ibadan, Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, LAUTECH Teaching Hospital, Osogbo and LAUTECH Teaching Hospital, Ogbomoso). A sample of 201 perioperative nurses was selected using a multi stage sampling technique and the sampling frame was nurses' duty's roaster. The sample size was determined using Yamane's formula ($n=N/ 1+N (e)^2$) from a target population of 401.Thus, using proportional allocation, the sample sizes from the four selected institutions are: UCH Ibadan- 117, OAUTHC Ile-Ife-61, LTH Osogbo-19 and LTH Ogbomoso- 14.

The instruments used for the study were a self-administered structured questionnaire and a checklist. The self-administered questionnaire comprises of four sections namely: section A, B, C&D Section A contains information on the respondents' demographics. Section B contains items that address perioperative nurses knowledge about patient safety and the option was scored from 1 to 0 (Yes to No) categorize score into 10-11, 12-13 and 14-20 translating into poor, fair and good knowledge respectively. In addition, it also identified the facilities policy and compliance with safety regulations in operating rooms. Then questionnaire contains test items and likert scale was used to score the respondent's responses, the scale ranges from strongly agree, Agree, I don't know, strongly disagree to disagree. Also a rated checklist that was adapted from the Imperial College Assessment of Technical Skills for Nurses, Comprehensive surgical checklist by AORN, sterile processing checklist, standard for creating sterile field and Standards of Practice for Patient Identification, Correct Surgery Site and Correct Surgical Procedure. The checklist had five segments; section A had six items to elicit safety practices to prevent wrong patient, site and wrong procedure, section B had ten items to elicit safety practices to control infections through standard surgical hand scrubbing, gowning and gloving, section C. also had ten items to elicit safety practices to control infections through standard method for creating sterile field, section D had six items to elicit safety practices to control infections through standard practice of surgical instruments decontamination and section E had five items to elicit safety practices to ensure standard sterilization methods.

The observed practices were score from not applicable, not done at all, several major mistakes, major mistakes, moderate mistakes, minor mistakes and done very well. Not applicable score is 1 while done very well score 7. Mean and SD values of each variable was calculated.

The reliability of the research instruments was established through a test retest which yielded a Chronbach alpha of 0.923. Preliminary visits were made to the institution and permission obtained. The selected perioperative nurses were approached and those who agreed to participate in the study were administered the questionnaire. In addition, visit were made to each of the operating room theatre and assessments were made using the checklist. Data collection took place between January and April, 2015 The study received ethical clearance from all the participating institutions with the ethical approval numbers as follows:

EKSUTH/A67/2014/09/004,

LTH/OGBO/EC/2014/051,

LTH/EC/2014/11/0186,

OAUTHC /ERC/2014/09/23 &UI/EC/14/0300.

Similarly, permissions were obtained from all the administrative heads of the institutions. In addition, informed consent was also obtained from respondents before participation in the study.

Data generated from the study were analyzed using Statistical Product and Service Solution (SPSS) version 20.The data were analyzed using descriptive and inferential Descriptive statistics included frequency table, pie chart, bar chart and percentage while multiple regression was also used to test the hypotheses and value of 0.05 was considered significant for the hypotheses.

Results

The socio demographic characteristics of the respondents is presented in Table 1, findings revealed that 46.1% of the respondents were within the age ranges of 41-50 years with the mean of 36.24(±7.02). 66.2% of the respondents were females and more than half (63.7%) of the perioperative have RN/RPON as educational qualification. Also, more than half (68.6%) of the respondents are in general surgery practice and 42.2% have between 1-5 years of experience as perioperative nurses. In addition, 32.8% of the respondents were NOI by professional rank. Majority of the respondents were Christians (88.7%) and lastly, 93.1% were Yoruba.

Findings on knowledge about safety practices showed that majority of respondents in both federal and state teaching hospitals had good knowledge about safety practices 80.8% & 81.3% respectively, 11.6% & 12.5% have fair knowledge while 7.6% & 6.2% were reported to have poor knowledge about safety practices.

The distribution of respondents based on types of safety checklist showed that 55.8% of the respondents have WHO surgical safety checklist in their theatre, 22.1 % had locally developed checklist while 22.1% did not have any checklist.

The respondents distribution based on regularity of WHO safety checklist usage **(**table 2) showed that 44.6% (91) respondents are using WHO surgical safety checklist regularly while the same number 3.4% (7) uses it occasionally, 3% (6) on special occasion while 5% (10) uses it sometimes.

From the distribution of respondents based on the use of WHO safety checklist (figure 2) it can be deduced that more than half (57%) of the respondents were using WHO surgical safety checklist while 43% are not using it.

Table 3 revealed measures most commonly employed methods to ensure patients safety in operating theatre. Identification of patient using case note at the red line was ranked highest with mean and standard deviation of 2.45 ± 1.42, use of sterile equipment was next to it with mean value of 2.41 ± 1.64 while site marking as an important measure to prevent wrong site was the least ranked with mean value of 2.26 ± 1.74

Table 4 shows the standard actions expected to be taken by perioperative nurses to prevent wrong patients, surgery and sites in the theatre. Use of operation schedule/list to send for patient from the ward was ranked highest with the mean and SD value of 6.91 ± 0.28 while checking of site of the surgery for marking was ranked lowest with these value of mean and SD 2.32±1.43.

The results of checklist on Infection Control and Prevention **(**table 5) revealed procedures performed by perioperative nurses on standard

actions on surgical hand scrubbing, gowning and gloving. The tying of gown by unscrubbed person without touching the sterile area was ranked high with mean and SD of 6.89±0.39 while inspection of hands and arms for cuts and abrasions has the lowest rank with these value of mean and SD:2.24±0.95.

Table 1: Socio demographic characteristics of the perioperative nurses (n=204)

Variables	Frequency	%
Age in years		
21-30	27	13.3
31-40	44	21.5
41-50	94	46.1
51-60	39	19.1
Sex		
Male	69	33.8
Female	135	66.2
Educational qualification		
RN/RPON	137	67.1
RN/RPON and BNSC	55	27.0
M.sc (others)	11	5.9
Area of surgical specialty		
Orthopaedics	5	2.5
Obstetrics/Gynaecology	25	12.3
Opthalmic	12	5.9
General	140	68.6
Others	22	10.7
Years of experience		
1-5	86	42.2
6-10	43	21.1
11-15	59	28.9
20-25	11	5.4
26 and above	5	2.5
Present rank		
NO II	34	16.7
NO I	67	32.8
SNO	24	11.8
PNO	38	18.6
CNO	16	7.8
ADNS	25	12.3
Religion		
Christian	181	88.7
Islam	23	11.3
Ethnicity		
Yoruba	190	93.1
Igbo	8	3.9
Hausa	6	2.9

Table 2: Knowledge of perioperative nurses about safety practices.

	Federal teaching hospitals		State teaching hospitals	
Variables	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Good knowledge	139	80.8	26	81.3
Fair knowledge	20	11.6	4	12.5
Poor knowledge	13	7.6	2	6.2
Total	172	100.0	32	100.0

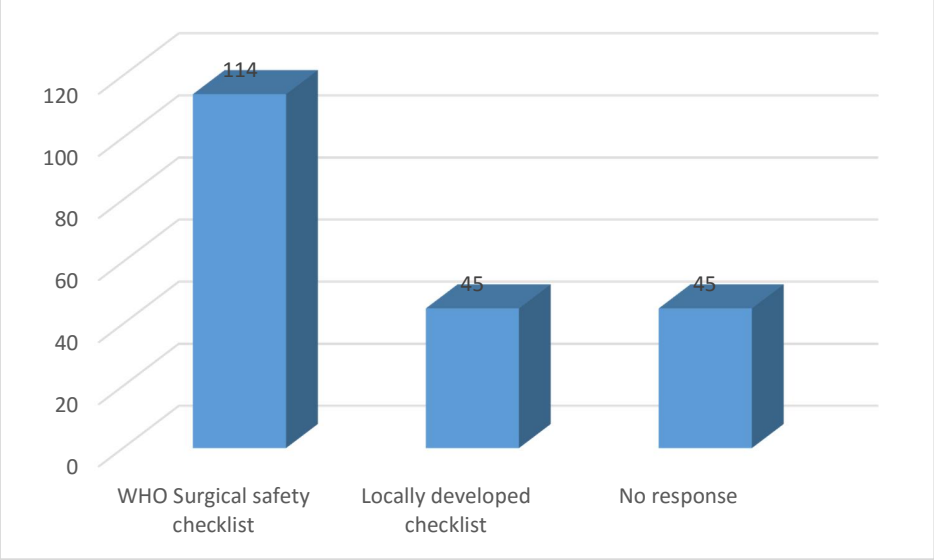

Figure 1: Distribution of respondents based on types of safety checklist

.

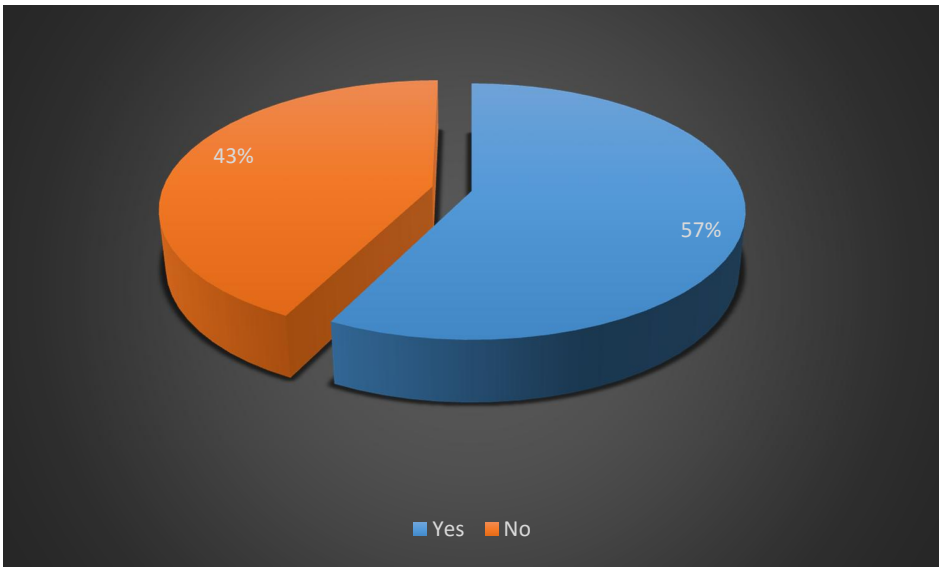

Figure 2: Distribution of respondents based on the use of WHO safety checklist

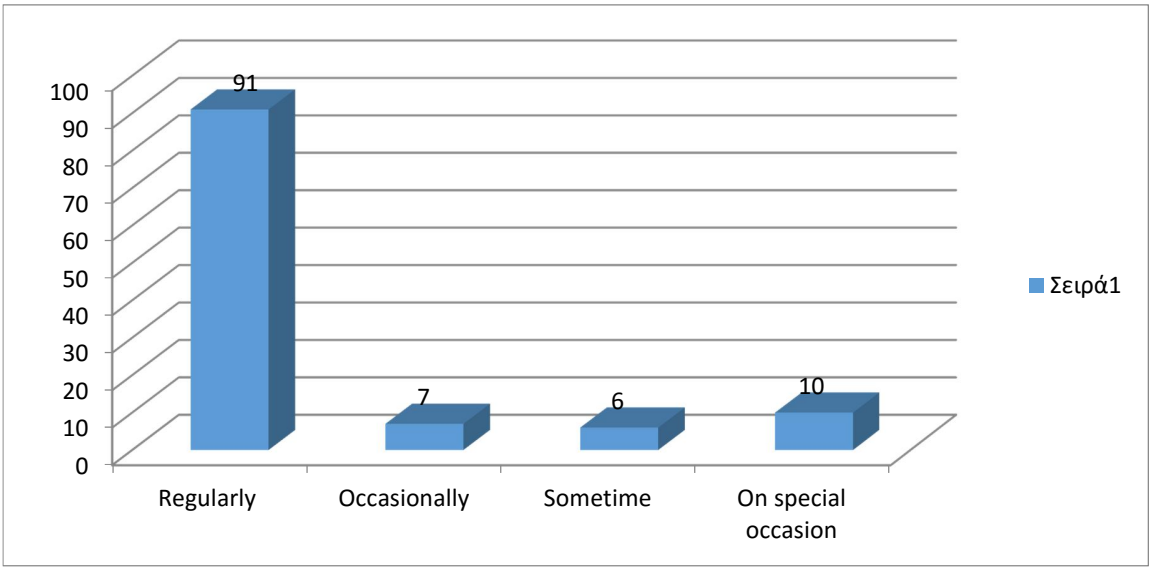

Figure 3: Respondents distribution based on regularity of WHO safety checklist usage.

Table 3: In ranking order, most commonly employed patient safety measures by perioperative nurses in Operating Theatre.

Measures	Mean ± SD	Median	Rank
Identification of patient using case note at the red line	2.45±1.42	2	1
Recording of correct procedure.	2.41±1.64	2	2
Use of sterile equipment.	2.40±1.70	1	3
Standard practice in maintaining sterile field intraoperatively	2.40±1.80	1	3
Accurate information on operation list can prevent wrong site surgery.	2.36±1.65	2	4
Standard practice for creating sterile field.	2.36±1.65	2	4
Implementing checklist for scheduling will reduce wrong site surgery.	2.34±1.59	2	5
Getting involve in pre surgical briefing.	2.34±1.89	2	5
Checking of patient vital signs at the red line	2.34±1.57	2	5
Prevention of burns from devices like diathermy	2.33±1.75	1	6
Counting of surgical swab, sutures instruments and needles before and after surgery	2.31±1.73	1	7
Standard practice during surgical hand scrubbing, gloving and gowning.	2.29±1.60	2	8
Ensuring standard and excellent cleaning and sterilization process of surgical bundles and instruments.	2.28±1.71	1	9
Teamwork spirit and effective communication among the team members.	2.28±1.70	1	10
Prevention of specimen loss through adequate management	2.28±1.73	1	10
Participating in surgical team debriefing after running a day list.	2.27±1.63	1	11
. Site marking is important to prevent wrong site.	2.26±1.74	1	12

Table 4: Results of checklist on prevention of wrong patient/surgery/site.

Variable	Mean± SD	Median	Rank
Perioperative nurse uses operation schedule to send for the patient from the ward.	6.91 ± 0.28	7	1
Perioperative nurse identify the patient by name at the reception area.	6.82 ± 0.38	7	2
Perioperative nurse verify all necessary documents at the red line.	6.51±0.55	7	3
Perioperative nurse uses standard surgical checklist at the reception area.	5.46±2.02	7	4
Perioperative nurse participates in time-out activities before skin incision.	2.38±1.30	2	5
Perioperative nurse check the site of the surgery for marking.	2.32±1.43	2	6

Table 5: Standard actions on Surgical Hand Scrubbing, Gowning and Gloving.

Variable	Mean± SD	Median	Rank
The gown was tied by unscrubbed person without touching the sterile area.	6.89±0.39	7	1
Hands are hold higher than elbow and away from surgical attire	6.50±0.61	7	2
Scrub nurse holds the hands at the shoulder level and slip both arm into the sleeves of thee gown without contaminating it.	6.40±0.55	6	3
Perioperative Nurse removes jewellery, put on surgical mask and cap before surgical hand scrubbing.	6.25±0.84	6	4
Scrubbing was performed for 3-5 minutes and all four sides were washed thoroughly with the hand elevated.	6.08±0.61	6	5
Perioperative nurse put on the surgical gloves using either closed or open methods without contaminating the gloves.	6.07±0.85	6	6
Perioperative nurse dry hands by using one end of the towel to dry one hand and arm.	6.05±0.60	6	7
The scrub nurse don gown by grasping the gown at the neckline lift it and move a step back from the table.	6.02±1.24	6	8
The gloves were inspected for integrity before putting on second pairs	2.46±1.35	2	9
Perioperative Nurse inspect his hands and arms for cuts and abrasions	2.24±0.95	2	10

Table 6: Results of checklist on creation of sterile field

Variable	Mean± SD	Median	Rank
Sterile items are placed on clean, dry surfaces.	6.74 ±0.89	7.00	1
Equipments like electrosurgical unit, suction system, tourniquet machine, power drill and microscope are tested for functionality before the commencement of the surgery.	6.46±0.71	7.00	2
Sterile supplies are opened as close to the time of surgery as possible.	6.44±0.80	7.00	3
The necessary instruments, supplies and equipment needed to prepare sterile field are available in the operating room.	6.43±0.91	7.00	4
Sterile items should be placed where they will be easily accessible to the circulator.	6.34±1.11	7.00	5
The Scrub nurse did not touch the working end of the instruments.	6.24±0.49	6.00	6
All the operating room furniture and equipment are grouped and positioned prior to opening of sterile items.	5.85±1.43	6.00	7
The nurse controlled and monitored the traffic in and out when she is opening sterile items.	3.13±1.76	2.00	8
The nurse verifies the external chemical indicator changes colour to indicate that the item has been exposed to sterilization process.	3.56±2.24	2.00	9
The integrity of the packaging materials is checked for intactness, no perforation.	2.75±1.63	2.0	10

Table 7: Results of checklist for decontamination of surgical instruments

Variable	**Mean± SD**	**Median**	Rank
The nurse dried the instruments before packing them for sterilization.	6.89±0.39	7.00	1
The cleaning agent selected is not corrosive to the equipment's.	6.68±1.10	7.00	2
The nurse cleans the instrument in a separate room other operating and preparatory rooms.	6.19±1.59	7.00	3
Cleaning of instruments begin during surgical procedure by removing blood, and debris from the instruments	5.19±1.91	6.00	4
The scrub nurse separate sharp instruments from blunt ones before washing them.	4.49±2.23	6.00	5
The nurse visually inspect the instruments for damage, debris and detergent residue	4.45±2.09	5.50	6

Table 8: **Results of checklist on sterilization method**

Standard practice on sterilization method	**Mean± SD**	**Median**	Rank
Steam sterilization is used for all heat resistant surgical instruments	7.00±0.00	7.00	1
Sterilization's Indicators are placed on the instrument cover to ascertain their sterility.	6.83±0.86	7.00	2
Chemical sterilant (Gluterdehyde) was used to sterilize instrument that can be destroy by heat according to manufacturer's instructions	6.77±0.423	7.00	3
Sterilization load record consists of date and name of the machine operator.	5.58±1.25	6.00	4
Sterilized items are arranged and stored in first in first out process.	5.27±2.00	6.00	5

Table 9: Multiple regression analysis showing the joint prediction of age, educational qualification, years of experiences and present rank on safety practices.

Variables	coefficient	Beta	t-cal	Sig.t
Age	7.329	0.397	3.450	0.001
Educational qualification	2.661	0.063	0.876	0.382
Years of experiences	5.075	0.207	1.926	0.045
Present rank	1.100	0.068	0.792	0.024
Constant	24.002	7.473	3.212	0.002
R^2 = 0.930				
R_2 (adj) = 0.750				
F- ratio = 5.047, Sig^{-val}= 0.01				

Table 6 shows the observed practices on creation of sterile field. Placement of sterile items on clean, dry surfaces has the highest rank with the mean and SD of 6.74 ±0.89 while checking the integrity of the packaging materials for intactness, no perforation has the lowest rank with these value of mean and SD: 2.75±1.63

Table 7 shows the observed practices on decontamination of surgical instruments. Drying of instruments by the nurses before packing them for sterilization has the highest rank with mean and SD of 6.89±0.39 while inspection of instruments visually for damage, debris and detergent residue had the lowest rank with 4.45±2.09 as value for mean and SD respectively.

In table 8 the observed practices on sterilization methods for surgical instruments are presented The use steam sterilization for all heat resistant surgical instruments was ranked high with mean and SD of 7.00±0.00 while arrangement of sterilized items in first in first out process has the lowest rank with 5.27±2.00 as the mean and SD value.

Table revealed that the multiple regression analysis run to predict the four independents variables on the dependent variable. From the result, the R (coefficient of the multiple regression) was 93.0% to have a good level of prediction while the R_2 (0.750) is the proportion of variation accounted for by the regression model.

Furthermore, the result show the significant model emerged ($F_{4,196}$ = 5.047, p< .001).Thus, this result showed that age, years of experience, present rank and education will jointly predict the safety practices of the Perioperative nurses.

Discussion

This study contributes to the existing knowledge on issues of patient safety practices in the theatre. It also explored various measures employed by perioperative nurses to ensure patient safety in the operating theatres of the selected hospitals as well as the most commonly used safety checklist in the selected theatres. The findings from this study were discussed below;

Less than half of the respondents were between 41-50 years old and is in disagreement with Adejumo & Olatunji (2013) where they reported that majority of nurses were between 21 and 30 years old and more than half of them were female, this is in agreement with a study by Flin et al 2006& Bamishaye & Hinmikanye (2012) which reported that 87% & 70% of the operating room nurses were females and it is also supported by Danjuma et al., (2015) in their study when they reported that more than half of the Perioperative nurses were female.

More than sixty percent have diploma certificates (RN/RPON) as minimum qualification and this is supported by Adejumo & Olatunji (2013) when they reported that above sixty percent of nurses had Diploma certificates, majority are general perioperative nurses and this agreed with findings of Flin et al 2006 as they reported that majority of theatre nurses partake in general surgery. Less than half had 1-5 years of experience, this is in consonant with the report of Adejumo & Olatunji (2013) when they reported that less than half of nurses had 1-5 years working experience and also agreed with Denise& Joyce 2008, as well as Labrague et al 2012 when they also reported that less than half of operating room nurses had 1-5 years of working experience.

Larger percentage of the respondents from the two categories of the institutions have good knowledge about patient safety practices and this agreed with the findings of Labrague et al. (2012) that majority of operating room nurses possess excellent knowledge about the subject matter. The implication of this is that during their training, they were exposed to both theoretical terms and clinical aspect of activities and issues relating to patient safety.

This is also supported by Steelman & Graling (2013) when they stated that Registered Perioperative Nurses are in unique position to understand and prevent adverse events and unrepeated patient safety issues that occur every day in the theatre by virtue of their training. This statement made them to conduct a study titled Perioperative nurses perceptions of near-miss patient safety events from where ten top safety issues in operating theatre were identified.

From the results of the questionnaire, identification of patient using case note at the red line was ranked high among other safety measures with the mean and SD values of: 2.45±1.42, followed by used of sterile equipment and standard practice in

maintaining sterile field intra-operatively while site marking as an important practice to prevent wrong site was ranked lowest having mean and SD values of: 2.26±1.74. But from the observation made, used of operation schedule to send for the patient from the ward by nurses was ranked highest with the mean and SD of.:6.91±0.28, followed by identification of patients by name at the reception area that was ranked second with mean and SD values of 2.82±0.38.Checking of the site of surgery for marking had the lowest mean value 2.32±1.43.

The result from the questionnaire showed that site marking was the least ranked by the respondents as a standard measure to prevent wrong site surgery and from the observation made, checking of site for marking had the lowest rank among all the action. The perioperative nurses from this region may not recognize site marking as a method of preventing wrong surgery and that might be reason for not checking the surgical site for marking. This finding was different from the recommendations of AORN (Steelman & Graling, 2013), Kathryn et al. (2010) and that of Association of Surgical Technology in 2006 when they submitted that surgical site must be marked with marker to prevent wrong site surgery.

Findings from the questionnaire showed that use of sterile equipment as a form of safety practices among the perioperative nurses in the theatre was also ranked high and by implication, nurses in the theatre ensure that all equipment used for surgery are always sterile. This practice is in line with the recommendation of Steelman &Graling (2013). Standard practice during surgical hand scrubbing gloving and gowning as an important measure to ensure patient safety in the operating room had higher rank with mean of 2.36±1.65 and from the observation made, almost all the standard actions had high mean (above 6) with only inspection of gloves for integrity and hands for cuts and abrasions having the low and lowest mean values respectively. The findings were supported by AORN's accepted standard practice for surgical hand scrubbing but not practicing inspection of surgical gloves for integrity and that of hands and arms for cuts and abrasions was against this standard practice on surgical hand scrubbing.

Standard practice for creating sterile field and Standard practice in maintaining sterile field intra-operatively as a measures to promote patient safety in the theatre were also ranked high from the questionnaire and the observation made also revealed that all standard actions for creating and maintaining sterile field were observed conscientiously with placing of sterile items having the highest mean value of 6.74 ±0.89 but in the aspect of controlling and monitoring of traffic, verification of external indicator for colour change and checking the integrity of parking materials for intactness and no perforation there were low mean value. Placing sterile items on clean and dry surfaces, testing all equipment for functionality before commencing surgery and opening of sterile supplies as close to surgery as possible are supported by the research conducted in 2008 by Association of Surgical Technologist Education and Professional Standard Committee.

This findings showed that perioperative nurses are not practicing the actions with low mean values as part of safety measures in the theatre and this finding was contrary to recommendations of Association of Surgical Technologist Education and Professional Standard Committee that was issued in 2008. This means that contaminated or unsterilized items may be used for surgical patients unknowingly by perioperative nurses.

Ensuring standard and excellent cleaning and sterilization process of surgical bundles and instruments as a measure to employ if patient safety in the theatre is to be ensured had low mean value from the questionnaire but from the observation, almost all standard actions for decontaminating surgical instruments had high value except separation of sharp instruments from blunt ones before washing them and inspection of instruments for damage, debris and detergent residue with drying of instruments before parking them for sterilization having the highest mean and SD (6.89±0.39). This supported the recommendations of Association of Surgical Technologist Education and Professional Standard Committee that was issued in 2008 but in contrary to this statement were non separation of sharp instruments from blunt ones before washing them and not inspecting them after washing for damage, debris and detergent residue.

Observational checklist for standard sterilization practices revealed that use of steam sterilization for

all heat resistant surgical instruments was ranked high with mean and SD values of 7.00±0.00, followed by placement of sterilization indicators on instrument cover to ascertain their sterility while arrangement and storage of sterilized items in first in first out process had the lowest mean value of 5.27±2.00. These findings were similar to that of an infection prevention and control nurse in England who submitted in his policy paper on prevention and control of infections in the theatre that the importance of infection prevention and control in the theatre cannot be overestimated and that if standard measures to prevent and control surgical site and post-operative infections are not adhered to, it will constitute a threat to patient safety (Davies 2013).

These standard practices were also supported by AORN (2011), Buchler (2013) stated that excellence in sterile processing can have a dramatic effect on patient safety and clinical outcomes and Association of Surgical Technologist Education and Professional Standard Committee (2008).The finding from this study that deviated from the above standard were in the aspect of not arranging and storing the surgical bundles in first in first out process and it is an important aspect that must not be ignored. This might be attributed to workload, insufficient instruments and bundles as most of these items are usually consumed before the expiration date of two weeks for sterility.

Counting of surgical swab, sutures, instruments and needles before and after surgery had low mean value. The finding showed that the respondents are not practicing counting of surgical items as expected and was not identify as a safety issue and this was contrary to Steelman &Graling (2013) when they stated that preventing retained surgical items was a safety issue of high priority and that distraction, time pressure multitasking and non-adherence to the institution's counting policy must be avoided.

Findings showed that little above half of respondents have WHO surgical safety checklist in their theatres while less than half had locally developed checklist but less than half of are using WHO checklist regularly and this in contrary to Richard (2013) when he submitted that implementation and regular use of WHO surgical checklist is a policy to improve surgical patient safety and mitigate risk in the operating room. This finding also against the WHO (2008) recommendations when concluded that regular use of this checklist was designed to reduce complications and death associated with surgery.

This findings may be attributed to the fact that most of selected hospitals have adopted the use WHO surgical safety checklist and that may be reason for enforcing its regular use among the respondents in the selected theatres because perioperative nurses alone cannot implement its usage.

The findings from multiple regression analysis showed that socio-demographic and professional characteristics are predictors of good safety practices ($F_{4,196}$ = 5.047, p< .001) but educational qualification was not a significant predictor of safety practice among perioperative nurses *($sig^{-val}=(0.382), P^{-val}>(0.05)$)* and this supported the findings of McHugh & Lake, (2010) but Blegen et al., (2001) concluded that adverse occurrence rates among baccalaureate-prepared nurses were not significantly better than those with diploma education. Findings by Blignaut et al., (2014) also showed that qualifications had no correlation with perceptions and practice of patient safety and quality of care It is may be due to the fact that majority of nurses with diploma certificate in Nigeria seeking degree education are doing so for the purpose of promotion and did not allow the content of the education to pass through them. Therefore, there may be no different in their clinical practice when they acquired higher qualification from university.

Acknowledgement

I express my appreciation to all the staff of the Department of Nursing Science especially all the academic staff for all their inputs in this project. To Dr. B.L. Ajibade, for being there always for me and for his contributions toward the completion of this course of study, I appreciate you sir.

My great appreciation goes to members of my family; my wife-Adekunbi Oyediran, my children, my father and my siblings for their understanding and encouragement in cash and kind before and during the course of this programme.

I also thank all my course mates especially late Mrs Essien Oluwatosin who was very supportive during my data collection stage in University College Hospital, Ibadan.

I also appreciate the effort of my analyst for ensuring that the data were well analyzed to time.

To all the Perioperative nurses in Ladoke Akintola Unversity of Technology (LAUTECH) Teaching Hospital, Osogbo, I register my appreciation to you for your supports throughout the period of the study.

Finally I thank all my respondents for creating time to fill the questionnaires

References

Adejumo P.O & Olatunji B.T. (2013) Exposure to work-related sharp injuries among nurses in Nigeria. *Journal of Nursing Education and Practice, 4(1)* 229.

Aliyu D., Adeleke I.T, Omoniyi S.O, Silas K, Odofin O.M &EssienEkaete P (2015) Knowledge, attitude and practice of preoperative visit: A survey of Nigerian perioperative nurses. *American Journal of Health Research 2015*, 3(1-1),

Association of perioperative Registered Nurses (2011) *Hand Hygiene, Gowning, and Gloving Practices in the Perioperative Setting*. Viewed on 10 August 2014, www.aorn. org.

Association of Surgical Technologists (2006). *Standards of Practice for Patient Identification, Correct Surgery Site and Correct Surgical Procedure* viewed on September 2014, http://www.ast.org/uploadedFiles/Main_Site/Content/About_Us/Standard%20Surgical%20Positioning.pdf.

Association of Surgical Technologists (2011).*Standards of Practice for Creating the Sterile Field,* viewed on 28 August 2014, http://www.ast.org/uploadedFiles/Main_Site/Content/About_Us/Standard_Creating_Sterile_Field.pdf

Association of Surgical Technologists (2009). *Standards of Practice for the Decontamination of Surgical Instruments.* Viewed on May 2014, http://www.ast.org/uploadedFiles/Main_Site/Content/About_Us/Standard_Decontamination_%20Surgical_Instruments_.pdf.

Beuzekom M, Boer F, Akerboom S, Hudson P. (2012). Evidence appraisal of Patient safety in the operating room: an intervention study on latent risk factors. *Association of Operating Room Nurses Journal, 97(4)*, 274-279

Blegen, M. A., Vaughn, T. E., & Goode, C. J. (2001). Nurse experience and education: effect on quality of care. *Journal of Nursing Administration*, *31*(1), 33-39.

Blignaut, A. J., Coetzee, S. K., & Klopper, H. C. (2014). Nurse qualifications and perceptions of patient safety and quality of care in South Africa. *Nursing & health sciences*, *16*(2), 224-231.

Bobay, K., Gentile, D. L., & Hagle, M. E. (2009). The relationship of nurses' professional characteristics to levels of clinical nursing expertise. *Applied Nursing Research*, *22*(1), 48-53.

Carmen G.L, Joanne P., Denise P, Cheryl T.B (2011): *Canadian Essential of Nursing Research*.3rd edition. Wolters Kluwer/Lippincott Williams & Wilkins, Philadeiphia.

Carpenter K B , Duevel M A, Lee P W , Wu A W , Bates D W , Runciman W B, Baker G.R, Larizgoitia I, Weeks W B (2010). Measures of patient safety in developing and emerging countries: a review of the literature. *Journal of Quality Safety Health Care,* 2010; 19(1), 48-54

Carthey J. and Clarke J. (2010): *Implementing human factors in healthcare.* Viewed on 4 August 2014, Retrieved from http:// www.patientsafetyfirst.nhs.uk.

Catalano K. (2008) Knowledge is Power: Averting safety compromising events in the Operating Room. *Association of Operating Room Nurses Journal,* 88(6), 487

Chappy S. (2006). Perioperative Patient Safety: A multisite Qualitative Analysis. *Association of Operating Room Nurses Journal, 84(4),* 871-4, 877-88, 891-7.

Clarke J. (2013): *Patient safety in Operating Room: Irish Nurses and Midwives Organization.* www.inmo.ie/attachment.aspx?doc=2957

Colopinto K. (2010). Comparison of the Cultural values of Sweden to Patient Safety culture *Association of Operating Room Nurses Journal,*92(2), 224-227

Davies E. (2013). *Prevention and Control of Infection in Theatre.* Viewed on 14 September 2014, http://www.documbase.com/Scrub-Tees.pdf

Dousis E.,Viaxioti E., Kyritsi E., ... Polikandrioti M.,(2008). Practice Guidelines in Greek. *Operating Theatre Health Science Journal,* 2 (4), 226-233.

El-Jardali F., Dimassi H., Jamal D.….Hemadeh N. (2011). Predictors and Outcome of Patient Safety Culture in Hospitals. *BMC Health Services Research, 11*(45) 11-45

Emmanuel L., Berwick D., Conway J..,…….Walton M.(2007). *What is exactly Patient Safety*. Viewed on 24 March 2014, retrieved from http:// www.ahrq.gov/download/pub/.../advances-emmanuel-berwick

Haugen A.S.,Softeland E., Eide N.,….Harthug S. (2013). Impact of World Health Organization's Surgical safety Checklist in Operating Room: controlled intervention study. *British Journal of*

Anaesthesia, 1-9, 807-815

Haynes A.B., Wieser T.G., Berry W.R.Lipsitz S.R., Breizat A.S., et al (2009). A surgical safety checklist to reduce Morbidity and Mortality in Global population. *The New England Journal of Medicine, 491-499.*

Hill, K. (2010). Improving quality and patient safety by retaining nursing expertise. *Online Journal of Issues in Nursing*, *15*(3)

Hinmikaiye C. D. &Bamishaiye E. I. (2012). The Incidence of Low Back Pain among Theatre Nurses: A Case Study of University of Ilorin and Obafemi Awolowo University Teaching Hospital. *International Journal of Nursing Science,* 2012;2(3), 23- 28.

Jeongeun K, Kyungeh A, Minah K. K, Sook H. Y (2007). Nurses' Perception of Error Reporting and Patient Safety Culture in Korea, Western. *Journal of Nursing Research,* 29(7), *827-844*

Kothari C.R (2004). *Research Methodology; Methods and Techniques*. 2nd Revised Edition, New Age International (P) Limited, Publishers 4835/24, Ansari Road, Daryaganj, New Delhi – 110002. www.newagepublishers.com

Kovner, C. T., & Schore, J. (1998). Differentiated levels of nursing work force demand. *Journal of Professional Nursing*, *14*(4), 242-253.

Labrague L.J, Arteche D.L, Yboa B.C, Pacolor N.F (2012). Operating Room Nurses' Knowledge and Practice of Sterile Technique. *Journal of Nursing Care, 2012*, 1(4)

McDonald,R., Waring J., Harrison S. Boaden R., Walshe K. and Parker D. (2007). *An ethnographic study of threats to patient safety in the operating theatre.* Viewed on 31 August 2014 www.birmingham.ac.uk/Documents/.../PS008FinalReportHarrison.pdf

McHugh, M. D., & Lake, E. T. (2010). Understanding clinical expertise: nurse education, experience, and the hospital context. *Research in nursing & health*, *33*(4), 276-287.

McNarama S. (2011). Instrument readiness: an important link to patient to Patient Safety. *Association of Operating Room Nurses Journal*, *93(1), 160-164*

Mitchell P.H and Soule E.S. (2008). *Defining Patient Safety and Quality Care*. Viewed on 20 July 2014, http://www.ncbi.nlm.nih.gov/books/NBK2681/

Norton E.K. & Rangel S.J. (2010). Implementing a Paediatric Surgical Safety Checklist in the OR and beyond. *Association of Operating Room Nurses Journal,*92(1), viewed on 31 July 2014, doi: 10.10 16/j.aorn.2009.11.069

Nygren M, Roback K, Öhrn A, Rutberg H, Rahmqvist M, Nilsen P.. (2013). *Factors influencing patient safety in Sweden: perceptions of patient safety officers in the country councils*. BMC Health Serv Res. 2013 Feb 8;13:52. doi: 10.1186/1472-6963-13-52.

Pelczarski K.M., Braun P. A., Young E. (2010). *Preventing Wrong-Site Surgery: Patient Safety & Quality Healthcar, v*iewed on 18 May 2014,www. p s q h . c o m

Regulation and Quality Improvement Authority (2014). *Review of Theatre Practice in Health and Social Care Trusts in Northern Ireland.* Viewed on 16 September 2014, Retrieved from http://www.rqia.org.uk/cms_resources/RQIA_Theatre_Overview_Report_Final_Web_12062014.pdf

Ridley, R. T. (2008). The relationship between nurse education level and patient safety: An integrative review. *Journal of Nursing Education*, *47*(4), 149.

Scherer S. & Fitzpatrick J.J. (2008). Perception of Patient Safety Culture among Physicians and RNs in the Perioperative Area. *Association of Operating Room Nurses Journal, 87(1),* 163-175.

Sexton J.B Eric J.T & Robert L.H (2006). Error, Stress, and Teamwork in Medicine and Aviation: Cross Sectional Surveys. *BMJ Clinical Research,* 320(7237), *745-9. DOI: 10.7771/2327-2937.1019*

Society for Quality Healthcare in Nigeria (2013). *Patient Safety in Africa: A culture shift.* Viewed on 25 May 2014,Retrieved from http:// www.sqhn org/patient-safety in Africa.

Spratt D., Charles E., Berguer Cowles R.B.,….Groah L. (2012). Workplace safety equals Patient safety .*Association of Operating Room Nurses Journal, 96(3),* 235-244

Steelman V. M. and Graling P. R. (2013). Top 10 Patient Safety Issues: What More Can We Do? *Association of Operating Room Nurses Journal*,*97(6),* 679-701.

Swanson J.& Tidwell C. (2011). 'Improving the culture of patient safety through the Magnet R Journey' *Online Journal of Issues in Nursing,* 16(3)

Teen Wei L. &Yazdanifard R. (2014). The impact of Positive Reinforcement on Employees' Performance in Organizations. *American Journal of Industrial and Business Management*, 2014, 4, 9-12.

Wakefield J.G., McLaws M.L., Whitby M. & Patton L. (2010). Patient Safety: Factors that influence clinician involvement in patient safety behaviours. Q*ualit and Safety in Health Care* 19, 585–591

Watson D.S. (2006). Counting for Patient Safety. *Association of Operating Room Nurses Journal 84(2),* 273-275.

Weaver S. J., Rosen M.A., DiazGranados D., Lazzara, E. H., Lyons R. Salas E.,… King H. B. (2010). Does Teamwork Improve Performance in the Operating Room? A Multilevel Evaluation. *The Joint Commission Journal on Quality and Patient*

Safety March 2010, 36(3)

World Health Organization (2008). *Implementation Manual WHO Surgical Safety Checklist* (First Edition), viewed on 8 April 2014, http:// www.who.int/patientsafety/challenge/safe.surgery/en/index.html

World Health Organization (2011). Patient safety in Africa: A Culture shift. *Journal of Patient Safety and Quality Healthcare*,2(52), viewed on 1 May 2014, http//psqh.com/patient-safety.in. Africa-a-culture-shift.