

A description of Surgical counting safety practices among operating room nurses and midwives in Rwanda

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Abstract

Background : The retained surgical item is a critical double burden to the patients and their families. One way of minimizing the risks of this critical burden is the surgical counting process which is costless, effective and preventive method. The present study aimed to determine the knowledge and practice towards surgical counting among operating room nurses and midwives at referral teaching hospitals in Rwanda.

Methods: A descriptive cross-sectional study was conducted at four referral teaching hospitals on 160 randomly selected nurses and midwives working in the operating rooms. Nurses and midwives working in OR reported their knowledge and practices in surgical counting exercise using a self-administered questionnaire. A checklist was used by the researchers to observe the compliance with surgical count policy in the OR. Data were entered in Statistical Package for Social Sciences (SPSS version 21.0) for analysis. A correlation between knowledge and practices and association between demographic characteristics with knowledge and practices were tested in this study. The ethical principles were valued.

Results: Out of 156 participants who responded to this study, the majority were females (62.8%), Married (70.5%), 30-39years old (53.8%), advanced diploma (82.1%) and with clinical experience below 6 years (52.5%). The majority (78.2%) had good knowledge of surgical count but the majority reported the poor practices (57.8%, n=89). Compared to self reported practices, the observation reports of 35 cases revealed very poor performance. Being female and 1-3 years experience in OR are factors for performing surgical counting practices (OR:3.030562;p≤0.027); and (OR; 9.215279;p ≤0.002) respectively).

Conclusion : The surgical count practices were self-reported and observed at low level. The experience and female gender was associated with the practices towards surgical count safety. Others barriers that may hinder the practices were not explored in this study and recommended for further research. Increasing a number of specialized perioperative nurses in OR and in service training and policy implementation follow up may improve Surgical count safety practices. Key words: Surgical count, Operating room, Practice and Referral hospital

Background

Globally, World health Organization(1) stated that one in ten patients are harmed when they are receiving healthcare services. In most cases of surgical interventions, retention of surgical objects in abdominal opening is accidental error but continues to happen over time; this may cause severe clinical mistake and patient harm that can raise the rate of mortality and morbidity in surgical domains(2).

Regionally, in one European Country such as Portugal, Maria and Paulo (2016) highlighted that the surgical counting process is considerably related to clinical organization and the existence of surgical counting technology as well as other methods of surgical counting(3). In Asia, the Turkish researchers worked on the surgical count implementation in the operating room and realized that standardized surgical count procedures are available and almost all incidents regarding the retention of surgical swab

or instrument occur in abdomen surgeries, moreover some unprepared surgical interventions, existence of many theatre team members in operating room, procedures periods and complicated procedures are also taken in action (4).

In Africa continent; recently in South Africa, the study put in consideration the ways the operating room members try doing their best to make sure that the patient safety during surgical counting is significant, however some interruptions might occur such as transfers during surgical interventions, and staff shifting(2). Surgical counting process is still the one way of minimizing the risks of retained surgical object. Therefore, Most of the times, 70% of unknown retained items were found in the abdominal opening due its big size and tiny dimensions of used objects(5). The international guidelines from World Health Organization, Association of periOperative Registered Nurses , American College of surgeons and The Joint Commission developed and recommended the use of standardized surgical counting protocol in order to decrease the hazard of retained surgical sponges or devices for surgical safety and saving patient's life(6). There is a considerable reduction of morbidity and mortality rate where the implementation of the standardized surgical counting procedure is applied(7).

In Rwanda, studies were conducted in operating rooms regarding surgical sites infections and others than the practice of surgical counting among nurses and midwives. The observation done by the perioperative student nurses during their clinical practices mentioned that there are many challenges regarding the retained surgical instruments (6). The burden of this issue elevates the idea of the study to assess the knowledge and practices of surgical counting and associated factors among the operating room nurses and midwives at Rwandan Referral hospitals.

Methods

The study aimed to determine the knowledge and practice towards surgical counting among operating room nurses and midwives at referral teaching hospitals in Rwanda. A non-experimental, cross-sectional descriptive study was conducted at four referral teaching hospitals from 4th February to May 22nd 2019. These hospitals are Kigali University Teaching Hospital (CHUK), Rwanda Military Hospital (RMH), King Faisal Hospital (KFH) and Butare University Teaching Hospital (CHUB). All referral hospitals are located in Kigali city except CHUB which is located in Southern province. They admitted all patients transferred from all district and provincial hospitals in Rwanda and private clinics. Their operating theatres employ 240 registered nurses (112) and midwives (128) who made the target population of this study. They are holder of advanced diploma or bachelor degree in Nursing and midwifery with a minority number of registered perioperative nurses (masters' degree).

A proportional sample of 150 Nurses and Midwives participated in this study. It was calculated from the target population using Taro Yamane formula in order to get the sample size(8) and selected using stratified random sampling strategy. Each working hospital constituted a stratum. This means that 32 nurses and 13 midwives from RMH, 35nurses and 65midwives from CHUK, 19 nurses and 50 midwives

working at CHUB, and 26 nurses at KFH. A proportional number representing the midwives and nurses was randomly selected at each hospital.

A questionnaire developed and pre-tested by Beukes and Cohen at Stellenbosch University in 2016 and was used with slight modification to adapt it to both the study objectives and the clinical practice reality with the permission. Validation of the researcher's modified questionnaire and observation checklist was done by the Perioperative nurse expert to ensure that is readable and easily understandable. It was valid to cover the study objectives. It was made of three sections, the first section was to assess the demographic characteristics, the 2nd section assessed the Knowledge using 15 statements and the third section assessed practices 15 statements. The section two and three were in Likert scale formats where respondents had to demonstrate their level of agreement with the statements. We also used a checklist to observe the compliance with surgical count practices. I had 15 statements that the research had to tick whether the skill is preformed or not.

Approval and consent to conduct the study were required and guaranteed from University of Rwanda Review board and the hospitals administration involved in the research. The researcher approached the unit managers of operating rooms in their morning staff meeting for explaining the purpose and process of the study. They all had time to ask questions for clarification before signing an informed consent to participate into the study. The participation was voluntary and they had permission to withdraw from the study at any step.

A self-administered questionnaire was given to everyone after providing their permission to participate into the study and submit them back to the researchers after completion. The researchers were participating in the surgery to observe how they were complying with surgical counts practices. The investigators conducted the observation using the checklist on the surgical count safety practices in operating theatres among nurses and midwives attending different surgical procedures including caesarian sections, orthopedic surgeries, neurosurgeries and general surgeries where opening cavities were practiced and Ear, nose & throat (ENT) to make sure that count was complete. At least ten surgical operations were observed at each hospital.

Data were entered in Statistical Package for Social Sciences (SPSS version 21.0) and analyzed. The descriptive statistics helped to present data in terms of frequency and percentages. The bivariate analysis & multivariate logistic regression were used to establish the independent factors for surgical count knowledge and practices. A correlation between Knowledge and practices was tested in this study.

Results

Around 156 participants responded to this study. Starting with the demographic characteristics of respondents, the majority were females (62.8%), Married (70.5%), 30–39 years old (53.8%), advanced diploma (82.1%) and with clinical experience of 6 years and above (47.5%) (*table 1*).

Regarding the knowledge in surgical count standards, the respondents provided their level of agreement with the knowledge related statements (*Table 2*). The majority strongly agree that surgical counts are conducted by two persons (31.4%, n = 49), Swabs can be kept to minimum (43.5%, n = 68), Surgical counts should be done aloud (51.2%, n = 80). The majority strongly disagree that If any count discrepancy, closure of the cavity continues as usual (53.8%, n = 84), items included in the count can be removed from the theatre before the final count (46.1%, n = 72). After totaling the abstained marks and averaged over 100, the level of knowledge was considered poor if it is less than 60% and good if it is above 61%. The findings revealed that the majority of the respondents (78.2%) had good knowledge versus 21, 8% who had poor knowledge on surgical counting practices.

Regarding the practices (*Table 3*), the majority reported to often and always perform surgical counts according to the hospital policy (81.4%), ensure the circulating nurse documents the initial surgical count on the dry erase board (96.2%), often report surgical count status to the surgeon at different stages of closure of the surgical cavity (75.6%), check of all items used before and after use for completeness (62.2%). After totaling the score, the researchers realized that the majority of the respondents (57.8%, n = 89) had poor practice and (42.2%, n = 65) had good practice on surgical counting practices. Compared to self-reported practices, the observation reports of 35 cases revealed very poor performance. For example, perform surgical counts according to the hospital policy was performed in 15 cases (42.9%) versus 81.4% reported. Being female and 1–3 years experience in OR are factors for performing surgical counting practices (OR:3.030562; $p \leq 0.027$); and (OR; 9.215279; $p \leq 0.002$) respectively) (*Table 4*).

Documentation of the initial surgical count on the dry erase board was done in 11 cases only (31.4%) versus (96.2%) self-reported, report surgical count status to the surgeon at different stages of closure of the surgical cavity was performed in 17 cases (48.6%) versus (75.6%) reported (*Table 5*).

Discussion

The findings from this study are in tandem with the general Rwandan nurses and midwives characteristics. Females with advanced diploma nurses and midwives are dominant with a limited number of specialized perioperative nurses (2). In contrast to study (3), the working experience of Nurses and midwives working in Rwandan OR is low.

The more the staff is experienced the more they perform safety (3). The findings identified experience and being female are strong factors of safe surgical count practices. Being well skilled in operating room has good impact on surgical counting practices. This is supported 81.9% nurses & midwives strongly but wrongly agreed that surgical counts practice is done for certain procedures only. This statement is supported by the study (2) where the majority of respondents reported negative responses regarding knowledge to surgical item count.

Although World Health organization (WHO) and the Association of periOperative Registered Nurses (AORN) recommended that counting of surgical items would be performed for every surgical procedure (3) (11), similarly to the study (4), the respondents affirmed that surgical item count was performed in

certain procedures such the abdomen surgeries as the abdominal size can lead to surgical objects cases' retention(4). Therefore, the observation that was done in different types of surgical procedures as the study done in the Iran on "Three years evaluation of retained foreign bodies after surgery" showed that unknown items retained in everybody hollows were included peritoneal hollow, thoracic cavity, gastrointestinal zone, urogenital tract, facial region, abdominal-pelvic area with the majority of abdominal and peritoneal cavities(55,26%) and chest cavities(18.42%)(12).

Surgical count must be done before each procedure to establish the baseline as the responsibility of Circulating and scrub nurses/midwives(14). However, its practice and documentation were rare in this study and others(13)(4). Lack of knowledge in relation to surgical counting safety practices for procedures in the operating room may lead to poor practices of surgical counting and increase rate of retained foreign bodies. As complications, there are unplanned patients' outcomes like delay in hospitalization stay, repetition of open surgical procedure, high financial bill rate even sometimes the morbidity and the mortality rate associated with the retained surgical object increased in the patients who underwent surgery(9). We can't ignore that the hospital's satisfaction is also reduced due to lack of meeting patients' healthcare outcomes (10).

In this study, the self report identified good knowledge and poor practices and worse practices on observation. In standards, knowledge influence attitudes and practices(2). Therefore the factors influencing surgical count practices should be explored in further studies.

Limitations

Lack of updated studies regarding surgical counts practices in Rwandan context with accurate information.

Conclusion and recommendation

The nurses and midwives working in operating room of Rwandan referral hospitals had reported an improved knowledge in surgical count. However, the reported and observed practices were still poor. Working experience in the OR and being female were found to be the factors for practicing surgical counting safety. Others barriers that may hinder the practices were not explored in this study and recommended for further research. Increasing a number of specialized perioperative nurses in OR and in service training and policy implementation follow up may improve Surgical count safety practices.

Declarations

Ethics approval and consent to participate

This study established ethical clearance from Institutional Review Board/ College of Medicine and Health Sciences/ University of Rwanda. Permission was also obtained from the authorities of four referral teaching hospitals through their respective research committees to conduct the study. Obtaining written consent from the respondents was respected then information that was obtained was kept confidential.

The study respondents were assured of no harm and they were allowed to withdraw at any time without consequences.

Consent for publication: attached in supporting documents.

Availability of data and materials:

The datasets generated and analyzed during the current study are available from the corresponding authors on reasonable request.

Competing interests

We declare that we have no competing interest in this current study.

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Author's contributions:

N.E conceived the idea, written the proposal, collected and analyzed data reported the findings and drafted the manuscript.

M. J. participated in manuscript drafting and writing.

N.C and L. A. O. supervised the work through all steps and participated in the manuscript writing.

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Tables

Table 1. Demographic characteristics of the respondents

Demographic characteristics		PARTICIPANTS RESPONSES (n=156)	
		Frequency	Percentage %
GENDER	Male	58	37.2
	Female	98	62.8
AGE	21-29 years	20	12.8
	30-39 years	84	53.8
	40-49years	36	23.1
	Above 50years	16	10.3
MARITAL STATUS	Single	27	17.3
	Married	110	70.5
	Divorced	6	3.8
	Widower	13	8.3
PROFESSIONAL CATEGORY	Diploma nurse	128	82.1
	Bachelor	20	12.8
	Master	8	5.1
WORKING EXPERIENCE	1 year	14	9.0
	1-3 year	36	23.1
	3-6years	32	20.5
	6-9years	58	37.2
	Above10years	16	10.3
	Total	156	100

Table2: Level of agreement with Knowledge statements

KNOWLEDGE STATEMENTS	Levels of agreement				
	<i>S.D*</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>S.A*</i>
Surgical counts are conducted by two persons	11(7.0)	19(12.1)	29(18.5)	48(31.0)	49(31.4)
Surgical counts are conducted for certain surgical procedures only.	8(5.1)	12(7.7)	8(5.1)	53(34.0)	75(48.0)
All swabs in use are kept to a minimum during surgery	8(5.1)	7(4.5)	39(25.0)	34(22.0)	68(43.5)
If a change in team members performing initial count, counting can be omitted.	53(33.9)	76(48.7)	138.3)	6(3.8)	8(5.1)
Due to interruption, the count can be continued without restarting	75(48.1)	63(40.4)	6(3.8)	7(4.5)	5(3.2)
Recording of all items and instruments done as the hospital policy.	11(7.0)	17(11)	15(9.6)	72(46.1)	41(26.2)
Surgical counts should be done aloud.	7(4.5)	12(7.7)	8(5.1)	49(31.4)	80(51.2)
Swabs use holding X-ray detectable strip.	8(5.1)	11(7.0)	13(8.3)	76(48.7)	48(30.7)
Surgical counts are conducted to control swabs, needles, blades and instruments.	3(1.9)	4(2.6)	3(1.9)	114(73.1)	32(20.5)
If any count discrepancy, closure of the cavity continues as usual.	84(53.8)	48(30.7)	10(6.4)	8(5.1)	6(3.8)
Surgical counts are recorded and controlled on a white board.	5(3.2)	11(7.0)	13(8.3)	53(33.9)	74(47.4)
Surgical counts recorded as correct or incorrect on the patient s' file	3(1.9)	5(3.2)	19(12.1)	78(50)	51(32.6)
Items intentionally left in a wound are not documented in patient's records.	52(33.)	53(33.9)	25(16.0)	17(11)	9(5.8)
Surgical counts are conducted in standardized multiples of fives.	54(34.6)	44(28.2)	21(13.4)	25(16.0)	12(7.7)
Items included in the count can be removed from the theatre before the final count.	72(46.1)	36(23.0)	22(14.1)	17(11)	9(5.8)

1. A*: strongly agree; S.D*: strongly disagree

Table 3. Frequency of surgical count practices (N=156).

PRACTICES	Frequency surgical count practices				
	<i>Never</i>	<i>Seldom</i>	<i>Sometimes</i>	<i>Often</i>	<i>Always</i>
Perform surgical counts according hospital policy	2(1.3)	2(1.3)	25(15)	69(44.2)	58(37.2)
Do count continuously throughout the surgical procedure	13(8.3)	31(19.9)	21(13.5)	45(28.8)	46(29.5)
Check all items used before and after use.	2(1.3)	11(7.0)	46(29.5)	44(28.2)	53(34.0)
Use of swabs holding X -ray detectable strip	40(25.6)	39(25.0)	27(17.3)	32(20.5)	18(11.5)
Maintain an organized and tidy sterile field during and after the surgery.	11(7.0)	21(13.5)	31(19.9)	46(29.5)	47(30.1)
Documentation of the initial count/ additional /removal of items to the field on the board	2(1.3)	4(2.6)	13(8.3)	94(60.2)	43(27.6)
Report the count status to the surgeon at all stages of closure for acknowledgement	3(1.9)	14(9.0)	21(13.5)	54(34.6)	64(41.0)
Perform surgical counts: before the procedure	11(7.0)	3(1.9)	24(15.4)	43(27.5)	75(48.1)
Perform counting: Before closing of a cavity	1(0.6)	1(0.6)	7(4.5)	96(61.5)	51(32.7)
Perform surgical counts: before wound closure	70(44.9)	31(19.9)	13(8.3)	24(15.4)	189(11.5)
Perform surgical counts: At skin closure or end of a procedure.	0(0.0)	5(3.2)	24(15.4)	85(54.5)	42(26.9)
Perform surgical count: at permanent relief of either the scrub person or circulating nurse	5(3.2)	4(2.6)	9(5.8)	112(71.8)	26(16.7)
Perform counts & record of additional items	1(0.6)	1(0.6)	3(1.9)	70(44.9)	81(51.9)
Inform the surgeon and nurse manager in case of a count discrepancy.	1(0.6)	1(0.6)	18(11.5)	54(34.6)	82(52.6)
Recording of the surgical counts results as correct or incorrect in the patient's records.	13(8.3)	16(10.2)	36(23.0)	48(30.7)	43(27.5)

Table4: Association of demographic characteristics and levels of practice of surgical counting

Level of Practice	Odd ratio	p-value	95% Confidence Interval	
			Lower	upper
GENDER				
Female	3.030562	0.027	0.336388	5.724736
AGE				
30-39 years	-33.5557	0.994	-8192.81	8125.702
40-49years	-32.3619	0.994	-8191.62	8126.896
super 50years	0.077442	1	-9644.12	9644.273
MARITAL STATUS				
Married	28.42623	0.995	-8130.83	8187.685
Divorced	13.6154	0.997	-6672.6	6699.828
Widower	-2.08911	1	-9646.29	9642.107
WORKING EXPERIENCE				
1-3 years	9.215279	0.002	3.393264	15.03729
3-6years	5.6875	0.034	0.430089	10.94491
6-9years	3.194439	0.098	-0.58987	6.978751
10years and above	7.503446	0.022	1.091063	13.91583

Table 5: Report of observed practices

SURGICAL COUNTS PRACTICE	Opportunities (n=35)		observed
	Yes	No	Total
Recording hospital policy	15(42.9)	20(57.1)	35(100)
Continuously throughout the surgical procedure	13(37.1)	22(62.9)	35(100)
Check all items used before and after use for completeness.	21(60.0)	14(40.0)	35(100)
Use of swabs containing the X-ray detectable strip	15(42.9)	20(57.1)	35(100)
Maintain an organized and tidy sterile field to ensure an accurate count	20(57.1)	15(42.9)	35(100)
Ensure the circulating nurse documents the initial surgical count and addition	11(31.4)	24(68.6)	35(100)
Report count status to the surgeon at different stages of closure	17(48.6)	18(51.4)	35(100)
Before the procedure to establish a baseline	19(54.3)	16(45.7)	35(100)
Before closing of a cavity within a cavity,	21(60.0)	14(40.0)	35(100)
Before wound closure begins,	8(22.9)	27(77.1)	35(100)
At skin closure or end of a procedure,	29(82.9)	6(17.1)	35(100)
At the time of permanent relief of scrub or circulating nurse	22(62.9)	13(37.1)	35(100)
Perform counts if the items are added to the surgical field.	27(77.1)	8(22.9)	35(100)
Inform the surgeon/nurse manager in case of discrepancy	24(68.6)	11(31.4)	35(100)
Ensure the results of the surgical counts are recorded as correct or incorrect	17(48.6)	18(51.4)	35(100)
in the patient's records			