East African Medical Journal Vol. 102. 8 August 2025
NURSING PRACTICE IN PREVENTION OF SURGICAL SITE INFECTIONS AT MBAGATHI AND MAMA LUCY HOSPITALS IN NAIROBI, KENYA

Anthony Karanja Chege, MScN, RN, BScN, Clinical Nurse Specialist/ Student in medical surgical nursing, School of Nursing Sciences, Jomo Kenyatta University of Agriculture and Technology, P O Box 62000 - 00200, Nairobi, Kenya, Benard Mbithi, PhD, RN, MScN, BScN, Senior Lecturer, Department of Medical Surgical Nursing, School of Nursing Sciences, Jomo Kenyatta University of Agriculture and Technology, P O Box 62000 - 00200, Nairobi, Kenya, Sherry Oluchina, PhD, RN, MScN, BScN, Senior Lecturer – Department of Medical Surgical Nursing, School of Nursing Sciences, Jomo Kenyatta University of Agriculture and Technology, P O Box 62000 - 00200, Nairobi,Kenya, Julia Kimondo, PhD, Pharm, M Pharm, B Pharm, Senior Lecturer, Department of Pharmacy, School of Pharmacy, Jomo Kenyatta University of Agriculture and Technology, P O Box 62000 - 00200, Nairobi,Kenya

Corresponding author: Anthony Karanja Chege, Clinical Nurse Specialist/ Student in medical surgical nursing, School of Nursing Sciences, Jomo Kenyatta University of Agriculture and Technology, P O Box 62000 – 00200, Nairobi, Kenya, Email address: antkarazg@gmail.com

NURSING PRACTICE IN PREVENTION OF SURGICAL SITE INFECTIONS AT MBAGATHI AND MAMA LUCY HOSPITALS IN NAIROBI, KENYA

A. K. Chege, B. Mbithi, S. Oluchina and J. Kimondo

ABSTRACT

Background: **The burden of Surgical Site Infections (SSIs) remains high with an estimated incidence of between 10% to 30% across various health care settings globally. Nurses have an integral role in prevention of SSIs to ensure the quality of surgical care and patient safety standards. Nosocomial infections especially SSIs have increasingly affected the cost and safety of surgical care at Mbagathi and Mama Lucy hospitals in Kenya. The purpose of this study was to evaluate the standards of nursing practice in prevention of SSIs.**
Methods: **This was a descriptive cross-sectional study conducted in the two major public referral hospitals in Nairobi County. A total of 126 nurses (63 from each of the two hospitals) were recruited through simple random technique, data was collected through questionnaires and observation check lists. Data was analysed through univariate, chi square test and fisher's exact methods.**
Results: **There were unsatisfactory standards of practice among 36 (57%) and 31 (49%) of the 63 nurse participants each at Mbagathi and Mama Lucy hospitals respectively. Nursing practice in prevention of SSI was non-standardised compromising overall surgical care. A majority, 42 (87.5%) and 46 (92%) of the 48 and 50 nurses working at Mbagathi and Mama Lucy hospitals pre-operative departments respectively did not harness simple and achievable interventions like ensuring that the patients had taken a bath or shower before surgery for prevention of SSIs.**

Conclusion: **The standards of nursing practice in prevention of SSIs were inconsistent and unsatisfactory affecting the quality of surgical care. There is need for dissemination and utilization of evidence based guidelines to improve the standards of SSI preventive care and patient safety.**

INTRODUCTION

The incidence of hospital acquired infections including surgical site infections (SSIs) has increasingly affected the safety and quality of health care globally. In despite of the burden of SSIs, existing studies have demonstrated unsatisfactory standards of nursing practice in preventive care. According to a study in teaching and non-teaching public hospitals in Iraq, 58.3% of nurses had poor knowledge while 75.6% had inadequate skills in prevention of SSIs [1]. Similarly, in a study conducted within public hospitals in Ethiopia, only 46% of surgical nurses had adequate skills in prevention of SSIs [2]. In a different study conducted across 81 hospitals, despite nurses having good standards of knowledge in SSI prevention guidelines, the level of implementation varied highly among the participants ranging between 40.4% and 93.4% [3].

In Kenya, nursing care in prevention of SSIs has remained a major setback affecting patient safety and the quality of surgical care especially within public health care settings. The incidence of SSIs following emergency laparotomy procedures at Kenyatta national hospital was estimated at 30.8% [4]. According to a study conducted at Nyeri county hospital in Kenya, only 34% of nurses had adequate knowledge and skills in prevention of SSIs [5]. Similarly, a study exploring caesarean section SSIs at Thika Level V hospital in Kenya, the incidence was estimated at 24.4% with competence gaps in preventive care among nurses that affected the treatment care outcomes [6].

Mbagathi and Mama Lucy hospitals are the major public health care institutions within the southern and eastern parts of Nairobi county in Kenya. The hospitals encounter a high burden of SSIs affecting quality and efficacy of surgical care. According to a study on infection prevention and control (IPC) standards at Mbagathi hospital, only 17.8% (n=90) of the nurses had satisfactory knowledge on the basic components of IPC measures. There was unsatisfactory awareness of IPC standard precautions and for those who knew, their compliance was suboptimal [7]. Despite the existing burden of SSIs there are few studies on the gaps in preventive care within public hospitals in Kenya. This study was aimed at assessing nursing care in prevention of SSIs at Mbagathi and Mama Lucy hospitals.

METHODS

Study design

A descriptive cross sectional study conducted over a duration of three months to assess nursing practice in prevention of SSIs at Mbagathi and Mama Lucy hospitals.

Study setting

The study was conducted within surgical departments at Mbagathi and Mama Lucy hospitals in Nairobi county. The hospitals serve as major referral hospitals in the southern and eastern parts of Nairobi county.

Ethical considerations

Ethical approval for the study was sought from The Nairobi Hospital Bioethics and Research Committee; authorization reference number TNH/DCS/DMSR/ERC/SERC/26/04/24). A study permit was obtained from NACOSTI (National Commission for Science, Technology and Innovation); authorization reference number NACOSTI/P/24/35347. Authorization to conduct the study was sought from Nairobi county government. A written informed consent was ensured for all the study participants during the data collection process.

Inclusion Criteria

The study included all the qualified nurses with over 6 months of clinical experience working within surgical departments.

Data collection

Data collection was conducted through the use of structured researcher administered questionnaires and participant observation check lists. The tools collected primary data on the care implemented in prevention of SSIs as well as nurses' adherence to the standard precautions in prevention of SSIs. Collectively, the data described the elements of nursing care in prevention of SSIs aimed at assessing the overall standards of nursing practice in prevention of SSIs based on the existing standard guidelines.

Study size and sampling technique

Two independent means sample size formula was used to calculate the sample size which was 63 participants from each hospital. A total of 126 nurses participated in the study (63 participants from each of the two hospitals). Simple random sampling technique was used to obtain the study participants.

Data collection and analysis

Data was collected using a researcher administered questionnaire paired with a participant observation checklist. A default sample size of 30 participants was used to pre-test and ensure validity and reliabilty of the data collection tools at Kiambu county hospital [8]. A test retest reliability coefficient was calculated that yielded a Cronbach's Alpha of 0.995.

Data analysis was done using R version 4.1.2; univariate data analysis was used to calculate the descriptive statistics and determine nursing practice in prevention of SSIs while Chi-square and Fisher's exact test was used to compare nursing practice between the two hospitals. A p-value of < 0.05 at 95% confidence interval was considered to be significant in the study.

RESULTS

Nurses aged 25 to 34 years consisted of 28 (44.4%) and 39 (61.9%) while nurses aged 35 to 44 years were 13 (20.6%) each from Magathi and Mama Lucy hospitals respectively. Nurses with diploma training as the highest level of education were the majority consisting of 34 (54%) and 35 (55.6%) at the two hospitals respectively.

Nurses with a higher diploma in specialized training consisted of 14 (22.2%) and 16 (25.4%) in the two hospitals respectively. Among the participants, 2 (3.2%) nurses in one of the hospitals had a master's degree. The common nursing specialties in the two hospitals were nephrology, critical care and perioperative care. Nurses who had an experience of 0 to 5 years consisted of 22 (34.9%) and 29 (46%) from the two hospitals respectively while those who had an experience of above 21 years were 13 (20.6%) and 4 (6.4%) from Mbagathi and Mama Lucy hospitals respectively.

A majority of the participants, 41 (65.1%) from Mbagathi hospital had never attended any training on SSI preventive care while a majority from Mama Lucy hospital, 35 (55.6%) had attended some training on SSI preventive care. The rest of the information is shown in table 1.

Table 1. Demographic characteristics of the participants

		Mbagathi Hospital (n = 63)	**Mama Lucy Hospital (n = 63)**
Variables	**Categories**	**Frequency (%)**	**Frequency (%)**
Age in years	18-24	3 (4.8%)	6 (9.5%)
	25-34	28 (44.4%)	39 (61.9%)
	35-44	13 (20.6%)	13 (20.6%)
	45-54	16 (25.4%)	5 (7.9%)
	55-64	3 (4.8%)	0
Gender	Male	15 (23.8%)	19 (30.2%)
	Female	48 (76.2%)	44 (69.8%)
Level of education	Certificate	0	3 (4.8%)
	Diploma	34 (54%)	35 (55.6%)
	Higher National Diploma	14 (22.2%)	16 (25.4%)
	Critical care nursing	***5 (35.7%)***	***7 (43.8%)***
	Nephrology nursing	***7 50.0%)***	***5 (31.2%)***
	Perioperative	***1 (7.1%)***	***3 (18.7%)***
	Accident and Emergency	***0***	***1 (6.3%)***
	Psychiatry	***1 (7.1%)***	***0***
	Bachelor's degree	13 (56.5%)	9 (14.3%)
	Master's degree	2 (3.2%)	0
Experience in years	0-5 Yrs	22 (34.9%)	29 (46%)
	6-10	14 (22.2%)	19 (30.2%)
	11-15	4 (6.3%)	5 (7.9%)
	16-20	10 (15.9%)	6 (9.5%)
	21-25	6 (9.5%)	3 (4.8%)
	26-30	4 (6.3%)	1 (1.6%)
	>30	3 (4.8%)	0

Trained on SSI preventive care	Yes	22 (34.9%)	35 (55.6%)
	No	41 (65.1%)	28 (44.4%)

Nursing practice in prevention of Surgical Site Infections

The level of awareness of any existing guidelines in prevention of SSIs was among 30 (47.6%) and 42 (66.7%) of participants from the two hospitals respectively (p = 0.048). The commonest reported guideline was utilization of infection prevention and control measures among 17 (56.6%) and 37 (88.1%) of nurses from Mbagathi and Mama Lucy hospitals respectively.

The specific interventions commonly utilized in prevention of SSIs in the two hospitals respectively included: postoperative wound dressing (38.1%, 42.9%), administration of antibiotic prophylaxis (63.5%, 66.7%), patient education (39.7%, 42.9%), aseptic technique (57.2%, 55.5%), avoiding pre-operative shaving of the surgical site and the use of a hair clipper for shaving where necessary (3.2%, 0%).

A majority of nurses, 46 (73%) and 45 (71.4%) [p = 1.0] from the two hospitals respectively assessed for SSI risk factors among surgical patients whereby 22 (34.9%) and 16 (25.4%) nurses from Mbagathi and Mama Lucy hospitals respectively considered immunocompromising conditions and co-morbidities among surgical patients as the major risk factors for developing SSIs. Poor patient hygiene was considered as a risk factor for SSIs by 7 (11.1%) and 15 (23.8%) of nurses from the two hospitals respectively. Patient knowledge deficit was also considered as a risk factor for SSIs by 2 (3.2%) and 7 (11.1%) of nurses from the two hospitals respectively. There was a significant difference in nurses' assessment for SSI risk factors between the two hospitals respectively [p = 0.001] as shown in table 2.

Table 2. Nursing practice in prevention of SSIs

		Mbagathi Hospital	**Mama Lucy Hospital**	**P-value**
Variables	**Categories**	**n (%)**	**n (%)**	
Perceived role of nursing care in prevention of SSIs	Very important	59 (93.7%)	57 (90.5%)	0.742
	Important	4 (6.3%)	6 (9.5%)	
Awareness of SSI prevention guidelines	Yes	30 (47.6%)	42 (66.7%)	0.048
	No	33 (52.4%)	21 (33.3%)	
If yes in above which guidelines?	Antibiotic prophylaxis	1 (3.3%)	1 (2.4%)	0.004
	Standard operating procedures	4 (13.3%)	0	
	IPC guidelines	17 (56.6%)	37 (88.1%)	
	Can't remember	8 (26.7%)	4 (9.5%)	
	Avoid preoperative shaving	2 (3.2%)	0	0.693

Nursing interventions in prevention of SSIs	Wound dressing, Antibiotic prophylaxis, patient education	24 (38.1%)	27 (42.9%)	
	Aseptic technique	19 (30.2%)	20 (31.7%)	
	Aseptic technique and antibiotic prophylaxis	16 (25.4%)	15 (23.8%)	
	Aseptic technique, antibiotic prophylaxis, patient education and good nutrition	1 (1.6%)	0	
	No intervention	1 (1.6%)	1 (1.6%)	
Do you apply the above interventions?	Yes	62 (98.4%)	62 (98.4%)	1.0
	No	1 (1.6%)	1 (1.6%)	
How often do you apply the above interventions?	Always	41 (65%)	51 (81%)	0.078
	Sometimes	19 (30.2%)	12 (19%)	
	Rarely	2 (3.2%)	0	
Do you conduct patient education in prevention of SSIs?	Yes	39 (61.9%)	36 (57.1%)	0.717
	No	24 (38.1%)	27 (42.9%)	
If yes above, how often? (**n = 39**) Mbagathi (**n = 36**) Mama Lucy	Always	25 (64.1%)	20 (55.6%)	0.550
	Sometimes	13 (33.3%)	13 (36.1%)	
	Rarely	1 (2.6%)	3 (8.3%)	
Do you assess patients for SSI risk factors?	Yes	46 (73%)	45 (71.4%)	1.0
	No	17 (27%)	18 (28.6%)	
If yes above, which patient risk factors for developing SSIs do you assess for?	Comorbidities	12 (19%)	16 (25.4%)	0.001
	Immunocompromised patients	22 (34.9%)	4 (6.3%)	
	Poor hygiene	7 (11.1%)	15 (23.8%)	
	Inadequate knowledge	2 (3.2%)	7 (11.1%)	
	Non-adherence to antibiotics	3 (4.8%)	3 (4.8%)	
	Do not assess	17 (27%)	18 (28.6%)	
If yes in above, how often? (**n = 46**) Mbagathi (**n = 45**) Mama Lucy	Always	29 (63%)	30 (66.7%)	0.628
	Sometimes	15 (32.6%)	15 (33.3%)	
	Rarely	2 (4.3%)	0	

Nurses' adherence to the WHO guidelines in prevention of SSIs

Using the World Health Organization (WHO) SSI prevention guidelines as the standard global evidence based guidelines in prevention of SSIs, nurses were directly observed while providing pre-operative, intra-operative and post-operative care. An observation checklist comprising of the WHO SSI care bundle elements was used to conduct the observations.

Preoperatively, a majority of the nurses, 42 (87.5%) and 46 (92%) in the two hospitals respectively did not ensure that the patients had taken a bath or shower before surgery with either plain or antimicrobial soap and water as indicated in the SSI prevention guidelines [p = 0.50]. A majority of the nurses: 45 (93.8%) and 47 (94%) at Mbagathi and Mama Lucy hospitals respectively avoided pre-operative shaving and where necessary used a clipper as recommended in the SSI care bundle guidelines [p = 1.0]. Nurses' role and practice in ensuring a clean surgical environment varied significantly between the hospitals' surgical departments whereby 42 (87.5%) and 28 (56%) of nurses from the two hospitals' respectively ensured a clean surgical environment [p = 0.001].

Intraoperatively, 14 (93.3%) and 13 (100%) of nurses from the two hospitals respectively prepared their hands adequately before surgery by scrubbing using the aseptic technique using a suitable antimicrobial soap and water (before donning sterile gloves) [p = 1.0]. Theatre traffic control and discipline in the operating room was ensured by 8 (53.3%) of nurses in Mbagathi hospital and 8 (61.5%) of nurses from Mama Lucy hospital [p = 0.684].

Postoperatively, a majority of nurses (93.8% and 96%) from the two hospitals respectively conducted appropriate wound care after surgery [p = 0.674]. Similarly, a majority (91.6% and 86%) of nurses from the two hospitals respectively avoided the use of advanced wound dressing materials for postoperative wound care [p = 0.567]. Most of the nurses, 44 (91.6%) and 43 (86%) in the two hospitals respectively did not conduct SSI surveillance within the hospitals' surgical departments [p = 1.0] as shown in table 3.

Table 3. Nurses adherence to the WHO SSI preventive care guidelines

		Mbagathi Hospital	Mama Lucy Hospital	P-value
Variables	**Categories**	**n (%)**	**n (%)**	
PRE-OPERATIVE PHASE (n = 48 and 50 respectively)				
Ensure the patient takes a bath or shower before surgery with either plain or antimicrobial soap.	Yes	6 (12.5%)	4 (8%)	0.520
	No	42 (87.5%)	46 (92%%)	
Avoid pre-operative shaving around the incision site or if necessary, use a clipper.	Yes	45 (93.8%)	47 (94%)	1.0
	No	3 (6.2%%)	3 (6%)	
	Yes	26 (54.2%)	40 (80%)	0.012

Conduct mechanical bowel preparation for adult patients undergoing elective colorectal surgery.	No	22 (45.8%)	10 (20%)	
Conduct enteral or parenteral nutrition/fluids as indicated before surgery.	Yes	27 (56.3%)	37 (74%)	0.102
	No	21 (43.7%)	13 (26%)	
Ensure a clean surgical environment.	Yes	42 (87.5%)	28 (56%)	**0.001**
	No	6 (12.5%%)	22 (44%)	
INTRA-OPERATIVE PHASE (n = 15 and 13 respectively)				
Hand preparation by scrubbing using aseptic technique.	Yes	14 (93.3%)	13 (100%)	1.0
	No	1 (6.7%)	0	
Clean, decontaminate and sterilize surgical instruments and other equipment.	Yes	15 (100%)	13 (100%)	
Administer antibiotic prophylaxis.	Yes	14 (93.3%)	13 (100%)	1.0
	No	1 (6.7%)	0	
Maintain asepsis, theatre traffic and discipline in the operating room.	Yes	8 (53.3%)	5 (38.5%)	0.684
	No	7 (46.7%)	8 (61.5%)	
Use of either sterile disposable non-woven or reusable woven drapes and surgical gowns.	Yes	15 (100%)	12 (19%)	0.464
	No	0	1 (1.6%)	
Skin preparation using an alcohol-based solution containing chlorhexidine gluconate.	Yes	10 (66.7%)	13 (100%)	**0.044**
	No	5 (33.3 %)	0	
Avoid the use antimicrobial sealants	Yes	11 (73.3%)	11 (84.6%)	0.655
	No	4 (26.7%)	2 (15.4%)	
Warm the patient immediately before surgery to reduce the risk of hypothermia.	No	15 (100%)	13 (100%)	
Ensure blood glucose control (diabetic and non-diabetic adult patients).	Yes	4 (26.7%)	4 (30.8%)	1.0
	No	11 (73.3%)	9 (69.2%)	
Irrigate the incisional wound with aqueous povidone-iodine.	Yes	9 (60%)	12 (92.3%)	1.0
	No	6 (40%)	1 (7.7%)	
Use of triclosan-coated sutures and prophylactic negative wound pressure therapy.	No	15 (100%)	13 (100%)	

POST-OPERATIVE PHASE (n = 48 and 50 respectively)				
Evaluate and manage wounds appropriately.	Yes	45 (93.8%)	48 (96%)	0.674
	No	3 (6.2%)	2 (4%)	
Remove the drain when indicated.	Yes	27 (56.2%)	28 (56%)	0.797
	No	21 (43.8%)	22 (44%)	
Avoid the use of advanced dressings and instead use standard dressings.	Yes	44 (91.6%)	43 (86%)	0.567
	No	4 (8.4%)	7 (14%)	
Patient education on SSI prevention.	Yes	23 (48%)	41 (82%)	**<0.001**
	No	25 (52%)	9 (18%)	
Active surveillance for SSIs and appropriate documentation.	Yes	1 (2.1%)	2 (4%)	1.0
	No	47 (97.9%)	48 (96%)	

Overall nursing practice in prevention of SSIs at Mbagathi and Mama Lucy hospitals

The overall SSI prevention practice was computed by summing the scores of individual components of SSI prevention practice. The scores' categories were created using Bloom cut-off points where ≥80% was good practice 60-79% was fair practice and <60% was poor practice [9]. Due to the need for high fidelity in prevention of SSIs, fair and poor nursing practice was considered unsatisfactory practice while good practice was considered satisfactory practice.

The overall nursing practice in prevention of SSIs in the two hospitals is as shown in figures 1 and 2.

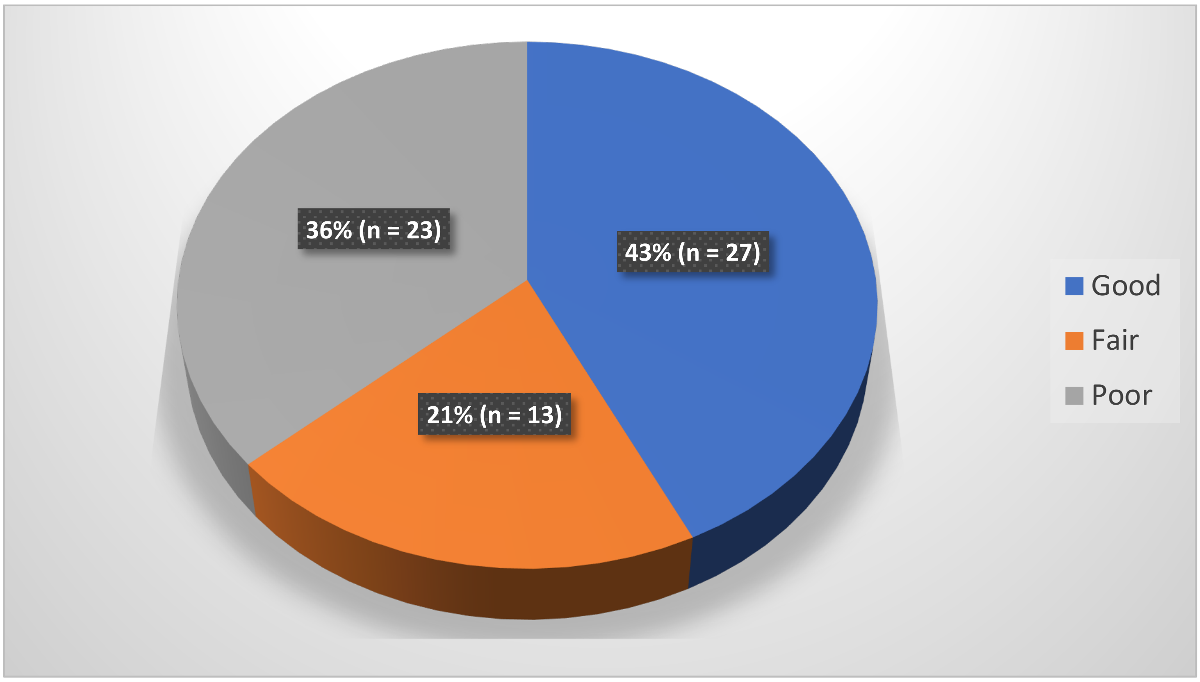

Figure 1. The overall nursing practice in SSI prevention at Mbagathi hospital

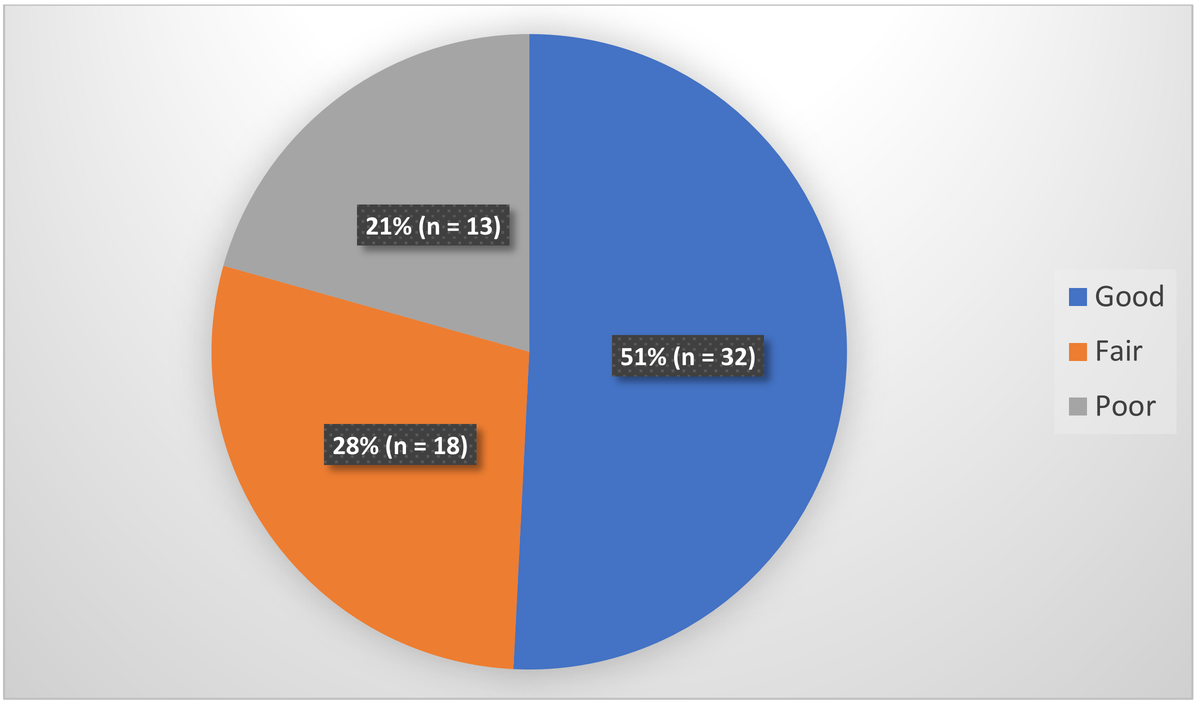

Figure 2. The overall nursing practice in SSI prevention at Mama Lucy hospital

DISCUSSION

The perceived role of nursing care in prevention of SSIs was regarded as very important by 93.7% and 90.5% of nurses from the two hospitals respectively. Nurses have important clinical, educational and leadership roles in implementing SSI prevention guidelines [10]. Despite the perceived role of nursing care in prevention of SSIs, there was non-commensurate inadequate awareness of evidence based guidelines.

Nurses' awareness of SSI prevention guidelines is pre-requisite to safe and effective standards of surgical care [11]. The findings revealed unsatisfactory standards of nursing practice in prevention of SSIs among 57% and 49% of participants from the two hospitals respectively. The hospitals did not utilize the existing standard guidelines on SSI preventive care. Unavailability of SSI prevention guidelines has been attributed to poor standards of surgical care [12]. In this study, lack of guidelines brought about varying standards of nursing practice in prevention of SSIs. There is need therefore for adoption of institutional evidence based guidelines for standardised surgical care in prevention of SSIs.

There were notable quality assurance gaps in prevention of SSIs since 65.1% and 44.4% of nurses from the two hospitals respectively had not attended any training on preventive care. In a similar study, SSI prevention training was reported to be poor among 81.5% of nurses having not attended any training on SSI preventive care [13]. Inadequate coverage of SSI prevention training was associated with skewed implementation of selective procedures such as the aseptic technique among 30.2% and 31.7% as the only intervention in prevention of SSIs. This was replicated in similar studies that demonstrated poor nursing knowledge and limited implementation of SSI prevention interventions [14,15].

Patient education on self-care in prevention SSIs was conducted by 61.9% and 57.1% of nurses from the two hospitals respectively. Health messaging was not tailored to the individual patients' SSI risk factors. Lack of individualized patient education approach while considering the prevailing risk factors does not adequately empower patients in prevention of SSIs. Emphasis on appropriate patient education in the care bundle has demonstrated significant benefits for patients who are undergoing colorectal surgeries [16].

Pre-operatively, only 12.5% and 8% on nurses in the two hospitals respectively ensured that patients had taken a bath or shower before surgery. Nurses did not consider simple interventions for prevention of SSIs. Simple and achievable interventions have been attributed to significant reduction in the incidence of SSIs within surgical settings [17]. There were good standards of hand preparation, administration of prophylactic antibiotics, preparation of surgical instruments and post-operative wound care.

Maintenance of theatre traffic and discipline was observed by 53.3% and 38.5% of nurses from the two hospitals respectively. The standards of theatre traffic and discipline is a multidisciplinary process whose outcome is determined by teamwork and availability of resources among other factors [18]. Nursing practice in ensuring a clean surgical environment varied significantly between the two hospitals. Nurses have a role in ensuring integrated surgical care including ensuring clean surgical environment standards [19].

Nurses have a significant role in early identification of SSIs through active surveillance [20]. There were only 1% and 2% of participants respectively who conducted SSI surveillance activities in surgical departments within the two hospitals. The findings differ to a similar study in which 93.3% of the nurses in Akash Doshi university hospital in Kentucky conducted surveillance for SSIs within the respective surgical departments [21]. There is need for enhanced surveillance of SSIs to help in early diagnosis, evaluation of the overall quality of surgical care and the standards of patient safety.

CONCLUSION

There were unsatisfactory standards of nursing practice in prevention of SSIs. Nurses seldom considered simple interventions such as encouraging patients to take a pre-operative shower and maintenance of theatre traffic and discipline as relevant SSI preventive measures. Implementation of prevention interventions varied among nurses; there were no existing guidelines to standardize SSI preventive care.

RECOMMENDATIONS

In order to strengthen the role of nursing care in prevention of SSIs, there is need for dissemination and implementation of the standard evidence based guidelines as a way of enhancing nursing practice and patient safety standards.

STUDY LIMITATION

The risk of hawthorne effect during data collection by observations was mitigated through participant observation.

DECLARATION OF GENERATIVE AI AND AI ASSISTED TECHNOLOGIES

The authors declare that no artificial intelligence or assisted technologies were used in the writing process.

CONFLICT OF INTEREST

The authors declare that they have no conflicting interests.

FUNDING

The study did not receive any external funding.

ACCESS TO DATA

The data to support the findings in the study are available from the corresponding author upon request.

CREDIT STATEMENT

A.C conceptualized the study, conducted administration, data collection and wrote the original draft. B.M performed data analysis and interpretation. S.O and J.K conceived the study and supervised the whole process.

REFERENCES:

1. Hassan AH, Roudsary DM. Nurses' Knowledge and Practice Regarding Prevention of Surgical Site Infection at Governmental Hospitals in Wasit City, Iraq 2022. Pak J Med Health Sci. 2023 Jan 31;17(1):581–4. DOI https://doi.org/10.53350/pjmhs2023171581

2. Tesfaye T, Dheresa M, Worku T, Dechasa DB, Asfaw H, Bune AJ. Surgical site infection prevention practice and associated factors among nurses working at public hospitals of the western part of southern nation, nationalities, and peoples' region, Ethiopia: A cross-sectional study. Front Surg [Internet]. 2022 Nov 14 [cited 2024 Oct 10];9:1013726. Available from: https://www.frontiersin.org/articles/10.3389/fsurg.2022.1013726/full

3. Ogce Aktaş F, Turhan Damar H. Determining Operating Room Nurses' Knowledge and Use of Evidence-Based Recommendations on Preventing Surgical Site Infections. J Perianesth Nurs [Internet]. 2022 Jun [cited 2024 Oct 17];37(3):404–10. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1089947221003208

4. Miima SE, Oliech JS, Ndaguatha PLW, Opot En. Incidence and Risk Factors for Surgical Site Infection Following Emergency Laparotomy at Kenyatta National Hospital. East Afr Med J. 2016 [cited 2024 Aug 1] Available from: https://www.ajol.info/index.php/eamj/article/view/147734

5.Gakuanyi RM, Mutunga CS, Njuguna J. Facility-linked factors and adherence to WHO blueprints on prevention of Surgical Site Infections in Kenya. Int J Sci Res Publ IJSRP [Internet]. 2022 Mar 24 [cited 2024 Oct 11];12(3):191. Available from: http://www.ijsrp.org/research-paper-0322.php?rp=P12312064

6. Ndege JW. Labor Related Factors That Contribute to Surgical Site Infections among Post Caesarean Section Mothers in Thika Level 5 Hospital. J Med Nurs Public Health [Internet]. 2022 Dec 15 [cited 2025 Apr 11];5(4):39–51. Available from: https://stratfordjournals.org/journals/index.php/Journal-of-Medicine-Nursing-P/article/view/1391

7. Moyo GM. Factors influencing compliance with infection prevention standard precautions among nurses working at Mbagathi district hospital, Nairobi, Kenya. In 2013 [cited 2025 Jun 8];41:100818 Available from: https://api.semanticscholar.org/CorpusID:74533190

8. Perneger TV, Courvoisier DS, Hudelson PM, Gayet-Ageron A. Sample size for pre-tests of questionnaires. Qual Life Res [Internet]. 2015 Jan [cited 2024 Aug 1];24(1):147–51. Available from: http://link.springer.com/10.1007/s11136-014-0752-2

9. Khaled A, Siddiqua A, Makki S. <p>The Knowledge and Attitude of the Community from the Aseer Region, Saudi Arabia, Toward COVID-19 and Their Precautionary Measures Against the Disease</p>. Risk Manag Healthc Policy. 2020 Sep 30;13:1825–34. DOI: 10.2147/RMHP.S271899

10. Ellsworth M, Peneza D, Ostrosky-Zeichner L. Perioperative Nurses: Key to Surgical Site Infection Prevention. AORN J [Internet]. 2023 May [cited 2025 Jun 9];117(5):267–9. Available from: https://aornjournal.onlinelibrary.wiley.com/doi/10.1002/aorn.13920

11. Guerrero MA, Anderson B, Carr G, Snyder KL, Boyle P, Ugwu SA, et al. Adherence to a standardized infection reduction bundle decreases surgical site infections after colon surgery: a retrospective cohort study on 526 patients. Patient Saf Surg. 2021 Dec;15(1):15. DOI: 10.1186/s13037-021-00285-7.

12. Lin F, Gillespie BM, Chaboyer W, Li Y, Whitelock K, Morley N, et al. Preventing surgical site infections: Facilitators and barriers to nurses' adherence to clinical practice guidelines—A qualitative study. J Clin Nurs [Internet]. 2019 May [cited 2025 Jun 8];28(9–10):1643–52. Available from: https://onlinelibrary.wiley.com/doi/10.1111/jocn.14766

13. Mohsen MM, Riad NA, Badawy AI. Compliance and Barriers Facing Nurses with Surgical Site Infection Prevention Guidelines. Open J Nurs [Internet]. 2020 [cited 2024 Oct 12];10(01):15–33. Available from: https://www.scirp.org/journal/doi.aspx?doi=10.4236/ojn.2020.101002

14. Desalew G, Geda B, Mengistie B, Demis A, Demis S. Surgical Site Infection Prevention Practices and Associated Factors among Nurses Working in Government Hospitals of Harari Regional State and Dire Dawa City Administration, Eastern Ethiopia. Nurs Commun [Internet]. 2019 [cited 2025 Jun 8];3(6):214. Available from: https://www.tmrjournals.com/article.html?J_num=18&a_id=1054

15. Horgan S, Drennan J, Andrews E, Saab MM, Hegarty J. Healthcare professionals' knowledge and attitudes

towards surgical site infection and surveillance: A quasi-experimental study. Nurs Open [Internet]. 2024 Jan [cited 2024 Oct 14];11(1):e2048. Available from: https://onlinelibrary.wiley.com/doi/10.1002/nop2.2048

16. Nikolic V, Markovic-Denic L, Kmezic S, Radovanovic A, Nektarijevic D, Djokic-Kovac J, et al. Empowering patients through a perioperative prevention bundle to reduce surgical site infections in colorectal surgery. Am J Infect Control [Internet]. 2025 Apr [cited 2025 May 10];S019665532500286X. Available from: https://linkinghub.elsevier.com/retrieve/pii/S019665532500286X

17. Bagga R, Suri V, Thami M, Nehra R, Dhaliwal N, Biswal M, et al. A Simple Infection Prevention 'Bundle' Including Preoperative Bath With Hair-Wash to Reduce Surgical Site Infection (SSI) Following Elective Caesarean and Gynaecological Surgery in India. J Fam Med Prim Care [Internet]. 2022 May [cited 2025 Jun 9];11(5):1970–9. Available from: https://journals.lww.com/10.4103/jfmpc.jfmpc_1838_21

18. Tanner J, Brierley Jones L, Westwood N, Rochon M, Wloch C, Vaja R, et al. A comprehensive qualitative investigation of the factors that affect surgical site infection prevention in cardiac surgery in England using observations and interviews. J Hosp Infect [Internet]. 2024 Jul [cited 2025 May 10];149:119–25. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0195670124001592

19. Almatrafi AS, Husayban Al-Mutairi RM, Alotaibi AM. Integrating nursing and emergency strategies for managing post-operative infections: Enhancing prevention and patient outcomes. Tenn Res Int Soc Sci [Internet]. 2019 Jan 15 [cited 2025 Jun 9];1(1):63–85. Available from: https://triss.org/index.php/journal/article/view/82

20. Copanitsanou P, Santy-Tomlinson J. The nurses' role in the diagnosis and surveillance of orthopaedic surgical site infections. Int J Orthop Trauma Nurs [Internet]. 2021 Apr [cited 2025 Jun 8];41:100818. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1878124120301246

21. Oliveira A. Operating Room Nurses' Knowledge of Surgical Site Infection Prevention Measures. Infect Control Hosp Epidemiol [Internet]. 2020 Oct [cited 2024 Oct 17];41(S1):s336–s336. Available from: https://www.cambridge.org/core/product/identifier/S0899823X20009447/type/journal_article