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Factors contributing to sepsis among adult patients in the surgical unit at China-Uganda Friendship Hospital, Naguru, Kampala district. A cross-sectional study.

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Abstract

Background

In Uganda, sepsis remains a significant cause of morbidity and mortality among hospitalized patients, particularly in surgical wards. The purpose of this study was to determine the factors contributing to sepsis among adult patients in the surgical unit at China-Uganda Friendship Hospital, Naguru, Kampala District.

Methods

A descriptive cross-sectional study design employing a quantitative research method was used to obtain data. In four days, 44 adult patients were sampled by a simple random sampling technique using a structured questionnaire, and data were analyzed using Microsoft Office (2013) version, and the results were presented in the form of tables, graphs, and pie charts.

Results

out of 44 study respondents sampled, more than half (52.3%) were aged between 26 and 32 years, and 36.4% had attained secondary school education. Regarding the individual-related factors, more than half (59.1%) reported that post-surgical care was expensive, more than half (54.5%) had long-term illness, (40.9%) frequently used traditional medicine, and most (70.5%) rated their post-surgical nutrition as poor. Pertaining to health facility-related factors, a significant (86.4%) reported that necessary medicines and supplies for wound care were rarely available, and more than half (54.5%) found healthcare workers to be rude during follow-up visits.

Conclusion

Sepsis in adult patients was influenced by both personal factors and healthcare facility-related issues. Many adults faced challenges such as unaffordable post-surgical care and pre-existing chronic conditions, which hindered wound healing and heightened their risk of infections.

Recommendation

There is a need to establish subsidized post-operative care packages, especially for patients with chronic illnesses like diabetes and hypertension, to reduce the financial burden and improve recovery outcomes.

Keywords: *Sepsis, Adult Patients, Surgical Unit, China-Uganda Friendship Hospital, Naguru, Kampala District.*
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Background of the study

Sepsis is a life-threatening condition that arises when the body's response to infection causes widespread inflammation, leading to tissue damage, organ failure, and death (Sygitowicz & Sitkiewicz, 2021). It can be caused by bacterial, viral, fungal, or parasitic infections, with common sources including pneumonia, urinary tract infections, abdominal infections, and surgical site infections (Aljamali et al., 2021). Sepsis is a major health concern worldwide, affecting an estimated 49 million people and causing 11 million deaths annually, making it one of the leading causes of mortality worldwide (Cassini et al., 2020). Early detection and prompt treatment are crucial in reducing complications and improving survival rates.

Globally, the prevalence of sepsis among hospitalized patients is estimated at 31.5% with mortality rates reaching up to 27% (La Via et al., 2024). Sepsis can be caused by bacterial, viral, or fungal infections, with common pathogens including Staphylococcus aureus,

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Escherichia coli, and Klebsiella pneumoniae (Minasyan, 2019). In developed countries such as the United States, sepsis accounts for approximately 11% of all hospital admissions with an estimated annual mortality rate of 23.1% despite advanced healthcare systems (Saxena et al., 2021).

In Sub-Saharan Africa, sepsis remains a major public health concern, contributing to approximately 50% of in-hospital mortality among surgical patients (Kotecha & Seni, n.d.). Factors such as poor infection control practices, delayed diagnosis, and limited access to critical care facilities exacerbate the burden of sepsis in the region (Limbani et al., 2022). Studies in West Africa report a sepsis prevalence of 26.7% with contributing factors including prolonged hospital stays, surgical site infections, and multidrug-resistant pathogens (Jolomba, 2024).

In East Africa, studies indicate that the prevalence of sepsis among surgical patients ranges between 35% and 60% with Kenya reporting an estimated 42% prevalence in major referral hospitals (Sheikh, 2022). In Tanzania, a study revealed that sepsis was responsible for 38% of post-surgical mortality (Dawer et al., 2024). According to the results done by Legese et al. (2022), the primary pathogens identified in sepsis cases include Escherichia coli, Klebsiella pneumoniae, and Staphylococcus aureus.

In Uganda, sepsis remains a significant cause of morbidity and mortality at a rate of 5·5% among hospitalized patients, particularly in surgical wards (Atumanya et al., 2024). A study conducted at Mulago National Referral Hospital found that sepsis accounted for 45.6% of post-surgical complications (Naiga, 2023). Within Kampala District, research at China-Uganda Friendship Hospital, Naguru, has shown that surgical site infections and prolonged hospital stays are major contributors to sepsis among adult patients with an estimated prevalence of 40% (Nabawanuka et al., 2025).

Despite efforts to improve infection control practices, sepsis remains a critical challenge in surgical wards, necessitating further research to identify and mitigate the factors contributing to its high prevalence among adult patients. The purpose of this study was to determine the factors contributing to sepsis among adult patients in the surgical unit at China-Uganda Friendship Hospital, Naguru, Kampala District.

Methodology

Study Design and Rationale

This study employed a descriptive cross-sectional study design using quantitative methods of data collection. A cross-sectional approach was appropriate as data were collected at a single point in time from a defined group of respondents to describe their characteristics. The study was descriptive because it aimed to present findings without the manipulation of variables. This design was preferred because it allowed for the analysis of relationships between independent and dependent variables efficiently.

Study Setting and Rationale

The study was conducted at China-Uganda Friendship Hospital, Naguru, located in Kampala District, Central Uganda. The hospital is situated approximately 5 kilometers east of Kampala's central business district, along Naguru Road. As a government-owned national referral hospital, it operates under the Ministry of Health and provides specialized healthcare services to the population of Kampala and surrounding districts, including Wakiso to the west and Mukono to the east. China-Uganda Friendship Hospital, Naguru, has a bed capacity of 100 and serves as a key referral center for both urban and peri-urban communities. The hospital offers a wide range of healthcare services, including general surgery, maternal and child health services, emergency care, intensive care, and infectious disease management. The surgical unit at Naguru Hospital admits a significant number of adult patients undergoing various surgical procedures and management, making it an ideal setting for studying factors contributing to sepsis among this population. Geographically, the hospital is positioned at coordinates 0°19′26″N and 32°36′40″E (0.32389°N, 32.61111°E).

Study population

The study population consisted of adult patients admitted to the surgical unit at China-Uganda Friendship Hospital, Naguru in Kampala District. These patients came from diverse socioeconomic backgrounds and underwent various surgical procedures, including emergency and elective surgeries.

Sample size determination

The sample size determination followed the guidelines provided by Krejcie and Morgan's table of 1970. According to records from 2024 from the surgical unit at China-Uganda Friendship Hospital, Naguru, there were over 50 adult patients undergoing various surgical procedures. Given this population size and using Krejcie and Morgan's table, if the study population is known as 50, it gives an appropriate sampling size of 44. Therefore, the researcher considered N to be 50, which acted as a population of adult patients in China -Uganda Friendship Naguru.

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Sampling procedure

The researcher used a simple random sampling technique. This technique was chosen for this study because it ensured that the sample was a representative of the study population, as well as reducing bias in the population sample. For the researcher to get the required respondents from the surgical Ward, 50 papers were prepared, and of these, 44 papers were written on **YES,** and the other 6 papers were written on **NO** all these papers were combined and put in a box, and then respondents were requested to pick only one paper without replacing it. Those who picked paper 44 with a label of **YES** were selected to participate in the study, and adult patients who picked 6 papers with **NO** were promised participation in the next study if another chance was given to them. This process of sampling respondents continued for four days while sampling 11 respondents every day to get the required number of 44 respondents.

Selection criteria

Inclusion criteria

The study included all adult patients at the surgical unit at China-Uganda Friendship Hospital who, upon informed consent, agreed to participate in the study, those who were present in the ward at the time of data collection, and those who were in good condition and able to participate in the study were included.

Exclusion criteria

All adult patients at the surgical ward who were in critical ill conditions and not able to respond to questions were excluded.

Dependent Variables

Dependent variables were characteristics that could not be manipulated by the researcher, and in this case, it was sepsis among adult patients.

Independent variables

Independent variables were the characteristics that could be manipulated by the researcher, and in this case, these included;

Individual-related factors and health facility-related factors contributing to sepsis among adult patients in the surgical unit at China-Uganda Friendship Hospital, Naguru.

Research instruments

This study employed a structured questionnaire, and it consisted of three sections: Section **A,** describing the Demographic characteristics of respondents, Section **B,** with questions on the individual-related factors, and Section **C,** containing questions on the health facility factors. Each section contained closed-ended questions in English to assess participants' responses in line with the study objectives. On the other hand, illiterate respondents were also put under consideration as the questions were verbally read to them, and the researcher filled in their views with the assistance of research assistants.

Data collection procedure

An introductory letter from the Principal of Mildmay Uganda School of Nursing and Midwifery was given to the researcher, which the researcher presented to the Director of China Uganda Friendship Hospital to carry out the study among adult patients in the surgical ward. The study involved the training of two research assistants who helped the researcher in translating English questions for the illiterate respondents who were not able to read or write. Data was collected by sampling 11 participants for four days to achieve a sample size of 44 respondents to ensure the success of this study.

Data management

On each day of the data collection, completed questionnaires were checked before leaving the study area to ensure that there were no mistakes and spaces left blank. The questionnaires were coded for easy reference, and the collected questionnaires were kept in a lockable box. A password for the computer was created for electronic data management and was only accessed by the researcher.

Data analysis

The data collected from the field was analyzed manually by the researcher, and then the findings were entered into the computer using Microsoft Excel (2013) version, where the data was presented in the form of tables, graphs, and pie charts to establish the accuracy of facts, and then the interpretation of the results was done.

Quality assurance

Validity

In this case, Validity was ensured by setting questions according to the research objectives and working hand in hand under the guidance of my research supervisor to ensure that the tool has both reliability and validity.

Reliability

The data collection tool was pre-tested at Mulago National Referral Hospital among 8 selected adult patients at the surgical unit. Then it was re-tested among 4 respondents to make final adjustments before the formal study and

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before leaving the study site, ensuring accuracy of the tool, and also all necessary corrections were made.

Ethical considerations

Consent was sought from each respondent before enrolling them to participate in the study, and only questions that did not encroach on the rights and privacy of respondents were asked. Research respondents were assured of the confidentiality of their information and the anonymity of their identities by not putting names on the questionnaire.

Informed consent

All the participants consented to this study.

Results

Demographic Characteristics of Respondents.

Table 1 shows respondents' biodata

Variable	Response	Frequency (n=44)	Percentage (%)
Age Bracket	18–25 years	7	15.9
	26–32 years	23	52.3
	33–40 years	10	22.7
	40 years and above	4	9.1
Level of Education	No formal education	10	22.7
	Primary school	13	29.5
	Secondary school	16	36.4
	Diploma	5	11.4
Place of Residence	Urban	6	13.6
	Semi-rural urban	30	68.2
	Rural	8	18.2

Table 1 showed that slightly more than half, 23 (52.3%), of the respondents were aged between 26–32 years, 10 (22.7%) were between 33–40 years, 7 (15.9%) were aged 18–25 years while the minority 4 (9.1%), were aged 40 years and above. Less than half, 16 (36.4%) of the respondents had attained secondary school education, 13 (29.5%) had reached primary level, 10 (22.7%) had no formal education, while the least 5 (11.4%) held diplomas. A majority of 30 (68.2%) of the respondents lived in semi-rural urban areas, 8 (18.2%) were from rural areas, while the least 6 (13.6%) resided in urban settings.

Individual-Related Factors Contributing to Sepsis among Adult Patients in the Surgical Unit.

Figure 1 Shows the knowledge about wound care after surgery.

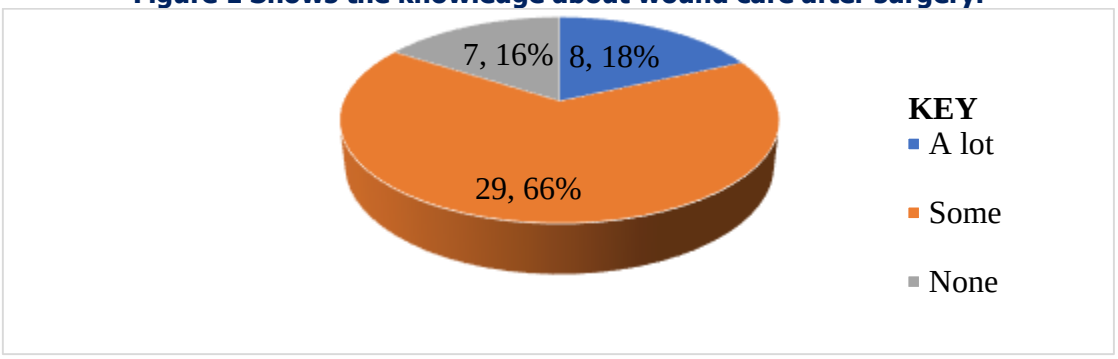

Figure 1, 29 (65.9%) of the respondents reported having some knowledge about wound care after surgery, 8 (18.2%) had a lot of knowledge, while the least 7 (15.9%) did not know at all.

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Table 2 Shows the affordability of post-surgical care, the presence of long-term illness, hand and wound hygiene, the number of surgeries, use of traditional medicine, and adherence to prescribed antibiotics.

Variable	Response	Frequency (n=44)	Percentage (%)
Affordability of post-surgical care	Very affordable	10	22.7
	Somehow affordable	13	29.5
	Expensive	26	59.1
Presence of long-term illness	Yes	24	54.5
	No	20	45.5
Hand and wound cleaning frequency	Always	5	11.4
	Sometimes	36	81.8
	Rarely	3	6.8
History of more than one surgery	Yes	12	27.3
	No	32	72.7
Total		**44**	**100**
Use of traditional medicine	Frequently	18	40.9
	Sometimes	15	34.1
	Never	11	25.0
Completion of prescribed antibiotics	Always	29	65.9
	Sometimes	7	15.9
	Never	8	18.2

More than half 26, 59.1%) of the respondents reported that post-surgical care was expensive, 13 (29.5%) said it was somewhat affordable, while the least 10 (22.7%) found it very affordable. More than half, 24 (54.5%) of the respondents reported having a long-term illness, while the remaining 20 (45.5%) did not have any. A bigger portion, 36 (81.8%) of the respondents cleaned their hands and wounds only sometimes as instructed, 5 (11.4%) always followed hygiene instructions, while the least 3 (6.8%) rarely cleaned as required. Most 32 (72.7%) of the respondents had not undergone more than one surgery before, while a minority of 12 (27.3%) had experienced multiple surgeries. Nearly half 18, 40.9%) of the respondents frequently used traditional medicine for infections instead of hospital treatment, 15 (34.1%) used it sometimes, while the least 11 (25%) never used it. A majority of 29 (65.9%) of the respondents reported that they always completed their prescribed antibiotics, 8 (18.2%) never finished their doses, while the least 7 (15.9%) only did so sometimes.

Figure 2 shows post-surgical nutrition, n=44

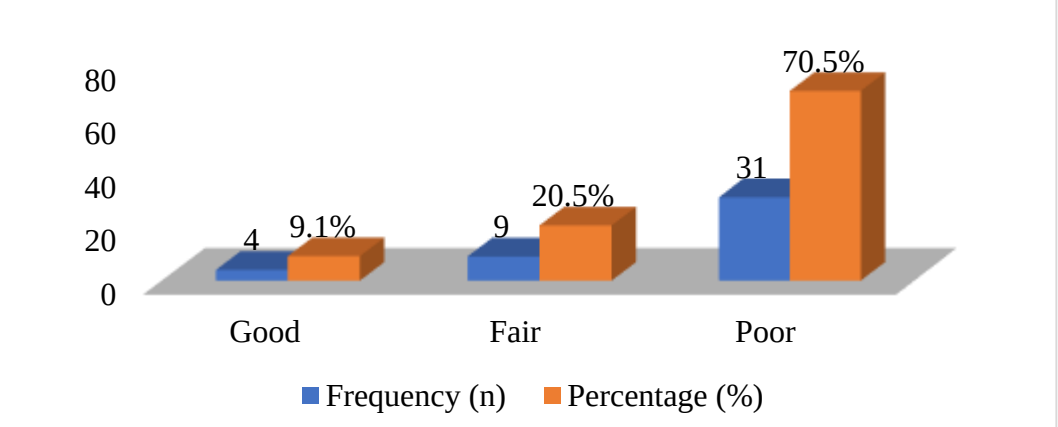

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Figure 2 indicates that 31 (70.5%) of the respondents rated their post-surgical nutrition as poor, 9 (20.5%) described it as fair, while the least 4 (9.1%) had good nutrition after surgery.

Figure 3 shows the availability of necessary wound care supplies

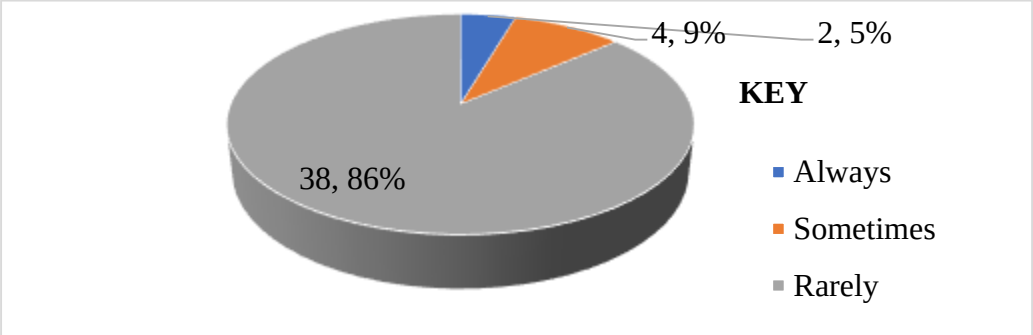

Figure 3 demonstrates that a significant 38 (86.4%) of the respondents reported that necessary medicines and supplies for wound care were rarely available, 4 (9.1%) said they were sometimes available, while the least 2 (4.5%) said they were always available.

Table 3 shows healthcare worker attitude, clarity of wound care instructions, cleanliness of hospital environment, and sterilization of medical equipment, n=44

Variable	Response	Frequency (n)	Percentage (%)
Treatment by healthcare workers	Friendly and supportive	8	18.2
	Neutral	12	27.3
	Rude and unhelpful	24	54.5
Clarity of wound care instructions	Yes, very clear	26	59.1
	Somewhat clear	13	29.5
	Not clear at all	5	11.4
Cleanliness of the hospital environment	Very clean	6	13.6
	Fairly clean	30	68.2
	Poorly maintained	8	18.2
Sterilization of medical equipment	Always	30	68.2
	Sometimes	9	20.5
	Rarely	5	11.4

Table 3 shows that more than half, 24 (54.5%) of the respondents found healthcare workers to be rude and unhelpful during follow-up visits, 12 (27.3%) described them as neutral, while the least 8 (18.2%) found them friendly and supportive. More than half, 26 (59.1%) of the respondents indicated that healthcare workers gave very clear wound care instructions, 13 (29.5%) found the instructions somewhat clear, while the least 5 (11.4%) said the instructions were not clear at all. Most 30 (68.2%) of the respondents described the hospital environment as fairly clean, 8 (18.2%) said it was poorly maintained, while the least 6 (13.6%) rated it as very clean. A majority of 30 (68.2%) of the respondents reported that medical equipment was always properly sterilized, 9 (20.5%) said it was sterilized sometimes, while the least 5 (11.4%) noted that it was rarely sterilized.

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Discussion

Demographic characteristics of the respondents

Most participants fell within the 26–32-year age group (52.3%). This might be because this age group is more likely to be active and exposed to trauma, accidents, or surgeries due to their productivity in the workforce. This is contrary to a study conducted by Ismael (2019), which indicated that elderly patients (above 60 years) were 50% more likely to develop sepsis due to weakened immune systems, slower wound healing, and increased susceptibility to infections.

The majority (36.4%) had attained secondary education. This was because most people in urban and semi-urban Uganda stop at the secondary level due to economic and accessibility constraints. This implies that health education interventions on sepsis and post-surgical wound care should be tailored to suit individuals with moderate literacy levels for maximum comprehension.

Most respondents (68.2%) were from semi-rural urban areas. This could be attributed to the fact that the hospital's catchment area includes both urban and peri-urban populations, with semi-rural zones being predominant. This implies that residence in such areas may influence health-seeking behaviors and accessibility to proper wound care, thereby affecting sepsis outcomes.

Individual Related Factors Contributing to Sepsis among Adult Patients in the Surgical Unit at China-Uganda Friendship Hospital, Naguru

A greater number of respondents (65.9%) had some knowledge about post-operative wound care. This might be because basic health information is often shared during discharge, though not in depth. This implies that partial knowledge may contribute to improper wound care practices, elevating the risk of sepsis, hence the need for thorough discharge education. This is in contrast to a study done by Peralta & Fenkl (2023), which showed that limited knowledge about infection control measures significantly contributed to sepsis cases.

The majority (59.1%) reported that post-operative care was expensive. This can be because wound care often requires regular dressing, antibiotics, and hygiene supplies, which may be unaffordable for many. This is in line with a study carried out by Bayih et al. (2020), which indicated that a lack of financial resources resulted in a 50% increase in sepsis cases due to improper wound management.

More than half (54.5%) of the participants had chronic illnesses like diabetes or hypertension. This might be because non-communicable diseases are increasingly common in adult populations in Uganda. These study findings are in agreement with a study conducted by Yagmur et al. (2019), which revealed that patients with chronic illnesses such as diabetes and hypertension had a significantly higher risk of post-surgical infections.

The majority (81.8%) of patients reported adhering to hygiene practices only sometimes. This could be because of limited access to clean water, wound care supplies, or poor adherence to medical advice. These study results agree with a study carried out by Shakir et al. (2021), which showed that patients who did not follow proper hand hygiene and wound care instructions had a 55% increased risk of developing infections.

Most participants had not undergone multiple surgeries (72.7%). This might be because elective surgeries are still limited to one-time interventions in low-income settings unless complications arise. This is similar to the study carried out by Brakenridge et al. (2019), which showed that patients with a history of multiple surgical procedures had a 40% higher likelihood of developing sepsis.

Traditional medicine was frequently used by a significant number of respondents (40.9%). This could be because cultural beliefs and affordability issues make traditional remedies more accessible than hospital treatment. This study is in disagreement with a study conducted by Steinhorst et al. (2021), which showed that 30% of patients sought traditional remedies instead of hospital-based care due to distrust in the healthcare system.

Most (65.9%) patients reported completing their antibiotics. This may be because health professionals often emphasize adherence, and patients may fear complications. This contradicts a study done by Ankrah et al. (2021), which indicated that 45% of patients discontinued antibiotics prematurely due to a lack of understanding about their importance.

A large number (70.5%) of respondents had poor nutrition after surgery. This could be because many cannot afford nutritious diets, especially during recovery when appetite and income are reduced. This is in agreement with a study conducted by Jiang et al. (2023), which indicated that malnourished patients experienced delayed recovery and a 45% higher incidence of infections.

Health Facility-Related Factors Contributing to Sepsis among Adult Patients in the Surgical Unit at China-Uganda Friendship Hospital, Naguru

Research findings showed that supplies were reportedly rarely available (86.4%). This might be because of stockouts, limited funding, or supply chain delays common in public hospitals. This is contrary to a study done by Taj et al. (2024), which demonstrated that 55% of

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hospitals lacked essential supplies such as sterile gloves, antiseptics, and antibiotics.

More than half (54.5%) of patients found healthcare workers rude and unhelpful during follow-up. This might be because of staff burnout, high patient loads, and poor communication. This is in disagreement with a study carried out by Obembe & Fonn (2020), which indicated that 35% of surgical patients who experienced negative attitudes from healthcare providers were reluctant to return for follow-up care.

Instructions were clear to most respondents (59.1%). This could be because some healthcare workers made efforts to communicate post-op guidance effectively. These study findings are contrary to the findings of a study done by Woldegioris et al. (2019), which showed that 65% of healthcare workers lacked updated knowledge on infection control protocols.

The hospital environment was described as fairly clean (68.2%). This can be because cleaning services were available, though possibly not consistently or thoroughly. This is in line with a study done by Hutton et al. (2024), which recommended upgrading hospital sanitation facilities.

Study results showed that (68.2%) of the respondents reported that medical equipment was often properly sterilized. This could be because standard sterilization protocols exist and are followed in many operating theatres. These findings are in disagreement with a study done by Hutton et al. (2024), which showed that inadequate sterilization of medical equipment is a key factor contributing to increased sepsis cases.

Limitations of the study

Some adult patients withdrew from the study before it was fully completed.

Some respondents were reluctant to give information due to personal reservations and expectations of financial rewards for their participation in the study.

Conclusion

Regarding individual-related factors, the study showed that the majority of patients had only partial knowledge about post-surgical wound care, found post-surgical care unaffordable, and had chronic conditions that significantly impaired wound healing and increased susceptibility to infections. Inconsistent hygiene practices and poor post-operative nutrition were also common, further heightening the risk of sepsis among the participants.

In terms of health facility-related factors, the study revealed that wound care supplies were rarely available, and healthcare workers were often perceived as rude and unhelpful during follow-up. Although most patients reported that instructions for wound care were clear and that medical equipment was well sterilized, the hospital environment was only fairly clean, suggesting lapses in infection prevention and control.

Recommendations

To the Ministry of Health (MOH)

The MoH should develop and support community-based awareness programs to educate the public on post-surgical wound care, the dangers of traditional medicine use after surgery, and the importance of completing antibiotic treatments.

Establish subsidized post-operative care packages, especially for patients with chronic illnesses like diabetes and hypertension, to reduce the financial burden and improve recovery outcomes.

Regularly inspect and supervise health facilities to ensure that infection prevention and control standards, including sterilization of equipment and cleanliness of surgical environments, are consistently maintained.

To the Management of China-Uganda Friendship Hospital, Naguru

The hospital should prioritize the consistent availability of essential medicines and wound care materials in the surgical unit to reduce infection risks.

Continuous in-service training should be provided to healthcare workers on professional conduct, patient-centered communication, and updated wound care protocols to improve follow-up experiences.

To the Participants and General Patients

Patients should be encouraged to complete the full course of antibiotics, maintain proper hygiene, and avoid the use of prescribed traditional remedies after surgery.

Participants with chronic conditions should seek timely medical reviews and ensure they fully understand post-operative care guidelines.

Patients should aim to improve their post-surgical nutrition by consuming balanced diets to support immune function and healing.

Acknowledgement

I wholeheartedly thank Almighty God from the bottom of my heart for His endless grace in enabling me to accomplish this research and this course.

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and direction during the development of this research work.
I also want to thank the management of Mildmay Uganda School of Nursing and Midwifery, tutors, and non-teaching staff, and also appreciate the management of China Uganda Friendship Hospital, Naguru, Kampala District, for allowing me to conduct my study at the facility.
May God richly bless them all.

List of Abbreviations

IRC: Institution Research Committee
MOH: Ministry of Health
UHPAB: Uganda Health Professions Assessment Board
WHO: World Health Organization

Source of funding

The study was not funded.

Conflict of interest

The author declares no conflict of interest.

Author contributions

Mariam Nabbuga was the principal investigator.
Hasifa Nansereko supervised the research project.
Jane Frank Nalubega, Edith Akankwasa, Elizabeth Okello, and David Kavuma, manuscript writing; Immaculate Naggulu Posperia cleaned the data and analysis.

Data availability

Data is available upon request.

Author biography

Mariam Nabbuga holds a Diploma in Nursing Extension from Mildmay Uganda School of Nursing and Midwifery.
Hasifa Nansereko, Jane Frank Nalubega, Immaculate Naggulu Posperia, Edith Akankwasa, Elizabeth Okello, and David Kavuma are tutors at Mildmay Uganda School of Nursing and Midwifery.

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