

Factors contributing to postoperative sepsis among postoperative patients at Kayunga Regional Referral Hospital, Kayunga district. A cross-sectional study.

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ABSTRACT

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Background:

Post-operative infection is any infection that occurs within 30 days after a surgical procedure or within one year if an implant was placed. The purpose of the study was to determine the factors contributing to postoperative sepsis among postoperative patients at Kayunga Regional Referral Hospital, Kayunga district.

Methodology:

The study used cross section study design, 60 respondents were selected by a simple random method. The study employed structural questionnaires, which were administered by the researcher and assistants to collect data using a simple random technique.

Results:

35(58%) were aged above 40 years, and 10 (17%) were aged below 20 years. 40 (67%) were formally educated, and 20 (33%) had no formal education. According to patient-related factors, it was revealed that postoperative sepsis was highest among males aged 40years 58% and also it was reported to be high among patients with comorbidities 70% and those who smoke, 58%. According to health facility-related factors, it was also shown that postoperative sepsis was high among people who did not receive prophylactic antibiotics before surgery 53% and high among patients who were not reviewed after surgery, 53%. In regard to socioeconomic factors in the same study, it was revealed that the majority of the respondents 63% were unemployed, and 55% lacked caretakers.

Conclusion:

The highest pronounced factors contributing to postoperative sepsis among clients were male over 40years of age, underlying comorbidities such as diabetes mellitus, and smoking. Higher body weight, preoperative antibiotics, unemployment, and lack of caretaker.

Recommendations:

The government should formulate policies concerning POS, provision and lobbying of funds, training health workers, supporting supervision of surgical wards and theatres, and providing modern machines used during surgeries.

Keywords: Factors, Postoperative sepsis, Patients, Kayunga Regional Referral Hospital.

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Background

Post-operative infection is any infection that occurs within 30 days after a surgical procedure or within one year if an implant was placed. Sepsis is a severe and life-threatening complication characterised by organ dysfunction resulting from an exaggerated immune response to infection. Globally, postoperative sepsis affects an estimated 49million people and contributes to about 11million potentially preventable deaths each year. Mortality is commonly linked to poor quality healthcare, weak infection prevention systems, late diagnosis, and inappropriate clinical management.

Madrigal et al. (2020) observed that about 5.1% of surgical patients developed POS, with the highest rates seen in skin and soft tissue procedures (12.9%). A study on clinical and surgery-specific risk factors for postoperative sepsis, the patient-related risk factors were: male gender, preexisting heart failure, diabetes mellitus, and chronic renal disease.

The surgery-related risk factors identified were: emergency surgery, perioperative blood transfusion, inpatient hospital stay, and open surgery. The overall adjusted incidence of surgical sepsis was 1.84% (Plaeke *et al* 2020). Male patients and those with higher American Society of Anesthesiologists (ASA) scores were more likely to develop postoperative sepsis or septic shock, particularly after pancreatic or small intestine operations (Gabriel et al, 2019). Marital status and social support also affect recovery. Tang et al. (2023) found that married patients had fewer complications and deaths after kidney surgery compared with unmarried patients. Abdelhack et al. (2024) linked social vulnerability, including poverty and poor housing, to higher rates of surgical wound infections. Hidalgo et al. (2021) revealed that unemployment and neighbourhood poverty above 10% were associated with higher mortality among patients with septic shock. The study aims to assess

the factors contributing to postoperative sepsis among postoperative patients.

METHODOLOGY

Study design

A descriptive cross-sectional study was used, involving a quantitative way of data collection from respondents. This study design was used because it enabled the researcher to obtain data in the shortest time possible.

Area of study

The study was conducted at Kayunga Regional Referral Hospital, Kayunga. The area is located in Kayunga town, Kayunga district, Central Region, Uganda. It is a general hospital offering both inpatient and outpatient services. Having a surgical ward with many surgical patients. The hospital provides a variety of health services, including endocrinology, family medicine, surgery, orthopaedic medicine and surgery, among others.

Study population

The study population was postoperative patients attending postoperative care at Kayunga regional referral hospital, Kayunga District.

Sample size determination

The sample size was determined using the Burton formula of sample size determination, $\text{sample size} = QR/O$, where Q = total number of days that were spent on data collection (15 days)

R = maximum number of respondents to be interviewed per day (5 respondents), O = maximum time that was spent on each respondent (1 hour)

Sample size = QR/O Sample size = $15 \times 5 \times 1$

Sample size = 60 respondents

Therefore, the researcher used 60 postoperative patients in the study.

Sampling technique

A simple random technique was used where the subjects were chosen from the sample population at random, each having an equal opportunity of selection, and avoiding bias in data collection.

Sampling procedure

A random sampling method was used to obtain 60 respondents at Kayunga regional referral hospital at the surgical ward, whereby the researcher used papers of similar characteristics, including size, shape, texture, weight, and folding style. The folded papers were put in six boxes; each box will be labelled with a particular letter. Altogether, those who will pick papers with numbers 1 to 10 were picked for an interview, and those who picked papers with numbers beyond 10 will be eliminated from the study. This method helped to avoid biases in choosing principal respondents.

Study variables

Dependent variables

The postoperative sepsis among postoperative patients

Independent variables

These include: socioeconomic factors, health facility-related factors, and patient-related factors contributing to postoperative sepsis among postoperative patients.

Data collection tool(s)

This study used self-administered structured questionnaires to gather the relevant data among postoperative patients; this was because a questionnaire was easier to collect data from a wide population within a short period.

Data collection procedure

A letter of introduction was obtained from the research committee of Kampala Institute of Health Professionals, then was taken to the hospital medical Superintendent and then to the surgical ward in charge for approval. A research assistant was trained, and consent was obtained from study participants who met the inclusion criteria. Then, questionnaires were given out, and an explanation on how to fill them out was provided.

For the respondent who consents, a consent was given to him/her to be filled out and signed. In case the respondent cannot read or write, the researcher will guide him/her.

The above procedure is repeated on each respondent until the end of the data collection process.

Data collection method

A researcher used a questionnaire guided with closed-ended questions, which helped the researcher to get quantitative data from the respondents; this helped to collect data in the shortest time possible.

Data analysis and presentation

The data obtained was tallied manually using pens, paper, and tally sheets, and the information obtained after tallying was presented in the form of tables, bar graphs, and pie charts. A narrative follows

Quality control

Pretesting of the research tools

The questionnaire was pretested at Kayunga Regional Referral Hospital among post-operative patients to check whether the questions were specific to the study, measurable, accurate, relevant, and time-bound.

Ethical consideration

After getting the permission from the school administration through the research committee, I headed and presented the letter to the hospital administrator who later referred me to the surgical wards in charges, I sought consent from the respondents and request them to participate in the interview to collect data from them at the same time and ensured

confidentiality of the information provided by the respondents which portrayed a good image.

RESULTS

Patient-related factors contributing to postoperative sepsis among respondents.

Table 1: Showing distribution of respondents according to the patient-related factors contributing to the postoperative sepsis (n=60)

Variable	Response	Frequency(f)	Percentage (%)
Age	Less than 20	10	17
	30-40 years	15	25
	Above 40 years	35	58
	Total	60	100
Gender	Female	12	20
	Male	48	80
	Total	60	100
Level of education	Formal education	40	67
	No formal education	20	33
	Total	60	100

Table 1 shows that most of the respondents, 35(58%), were aged above 40 years, while the least, 10 (17%), were aged below 20 years. It was revealed that males 48 (80%) were more affected than females 12 (20%). Regarding the level of education, 40 (67%) were formally educated, and 20 (33%) had no formal education.

Table 2: Showing distribution of respondents' responses on whether they often have any comorbidity like HIV, Diabetes mellitus (n=60)

Do you have comorbidity?	Frequency (f)	Percentage (%)
YES	42	70
NO	18	30
Total	60	100
If yes specify		
HIV	12	29
Diabetes mellitus	30	71
Total	42	100

Table 2, the majority of the respondents, 42(70%), had comorbidities, while those without 18(30%). Out of the 42 respondents, 30(71%) had diabetes mellitus and 12(29%) had HIV.

Figure 1: Showing the distribution of respondents' responses on the type of surgery undergone (n=60)

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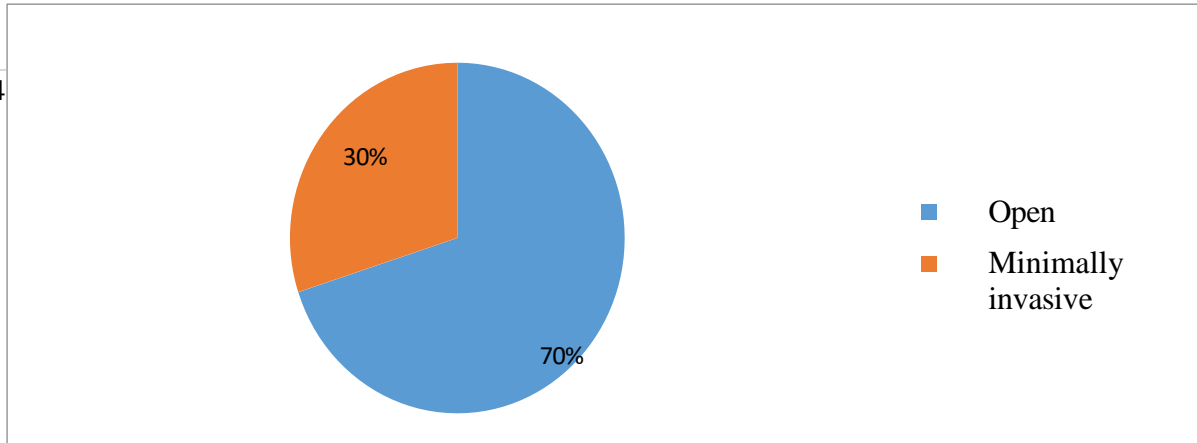


Figure 1 indicates that half of the respondents, 42(70%), reported having open surgery, while 18(30%) had minimally invasive surgery.

Figure 2: Showing the distribution of respondents' responses who smoke. (n=60)

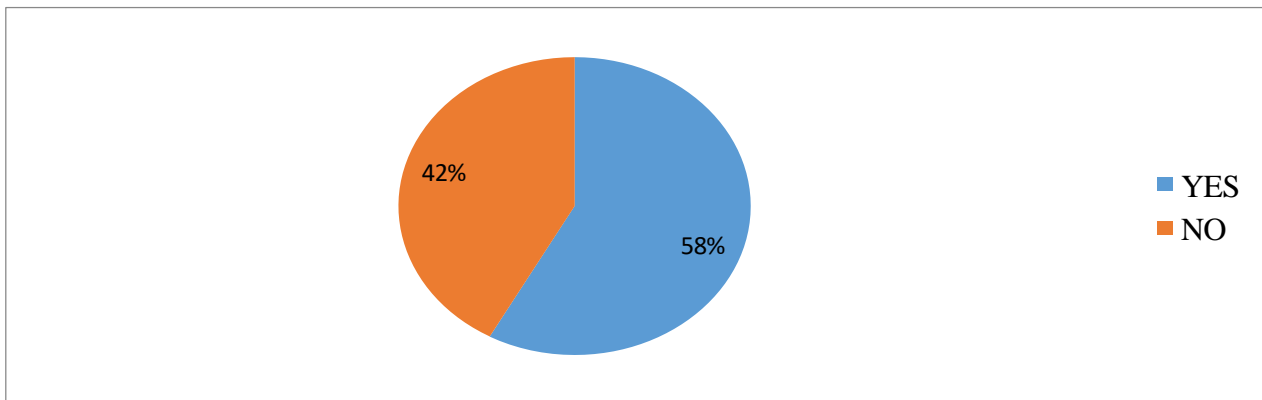
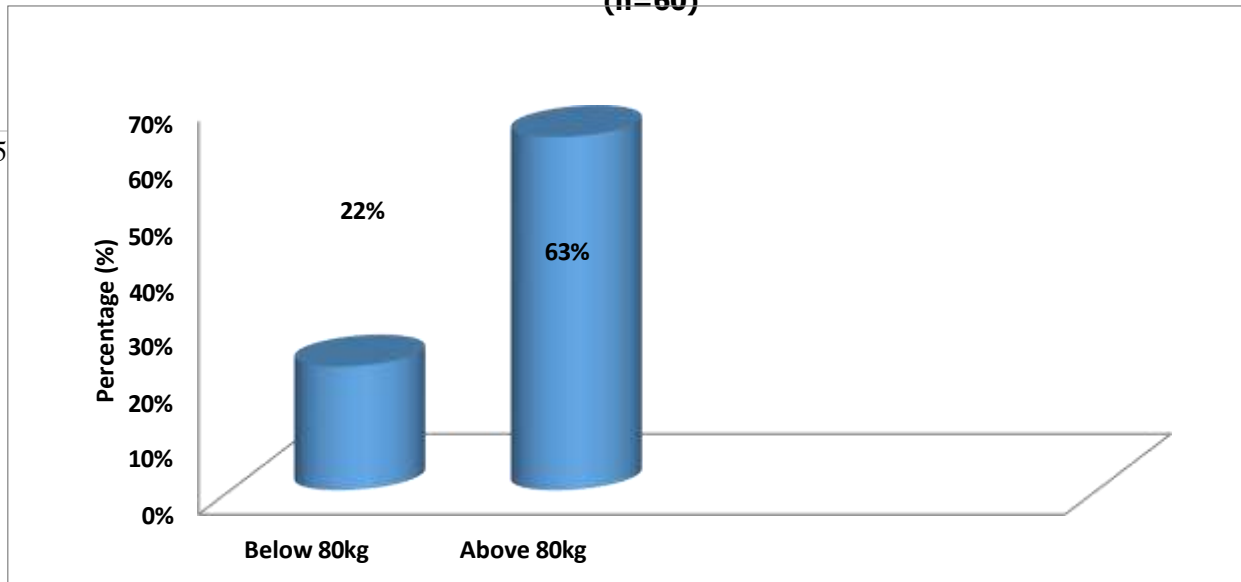


Figure 2, more than half of the respondents, 35(58%), were smoking, while 25(42%) were not.

Figure 3: Showing the distribution of the respondents' responses on weight.
 (n=60)



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Figure 3 indicated that most of the respondents, 38(63%) were above 80kg, while 22(37%) were below 80kg.

Health facility-related factors contributing to postoperative sepsis.

Table 3: Showing distribution of respondents according to the health facility-related factors contributing to postoperative sepsis (n=60)

Variable	Response	Frequency(f)	Percentage (%)
Were you given medicines before the surgery?	YES	28	47
	NO	32	53
	Total	60	100
Were you given any treatment after the surgery operation?	YES	60	100
	NO	0	0
	Total	60	100
For how long did you receive the treatment after surgery?	< 5 days	50	83
	>5 days	10	17
	Total	60	100
Was the hospital environment clean?	YES	58	97
	NO	2	3
	Total	60	100
Where were you reviewed after the surgery?	YES	28	47
	NO	32	53
	TOTAL	60	100
How long was your stay at the hospital after surgery?	<5 days	30	50
	5-10 days	22	37
	>10 day	8	13
	Total	60	100
Were you given nutritional supplements before the surgery?	YES	4	7
	NO	56	93
	TOTAL	60	100

Table 3 shows that most of the respondents, 32(53%), did not receive medicine before surgery, while 28(47%) received medicine. Most of the respondents, 60(100%), received medicine after surgery. 50(83%) of respondents received medicine after surgery for <5 days and > 5 days were 10(17%). Most of the respondents, 32(53%), were not

reviewed, while 28(47%) were reviewed after the surgery. 30(50%) stayed at hospital for <5 days and > 10 days were 8(13%). Most of the respondents, 56(93%), were not given nutritional supplements, while 4(7%) were given nutritional supplements before surgery.

Socio-economic factors contributing to the postoperative sepsis.

Figure 4: Showing the distribution of respondents' responses on occupation status (n=60)

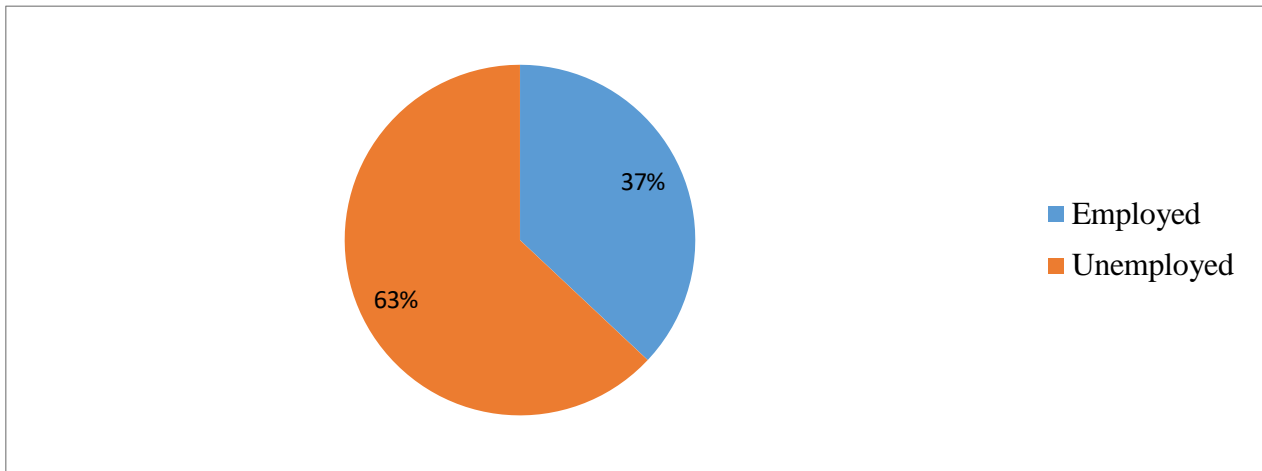


Figure 4, more than half of the respondents, 38(63%), were unemployed, while 22(37%) were not.

Figure 5: Showing the distribution of respondents' responses who attended all the schedule follow up visits (n=60)

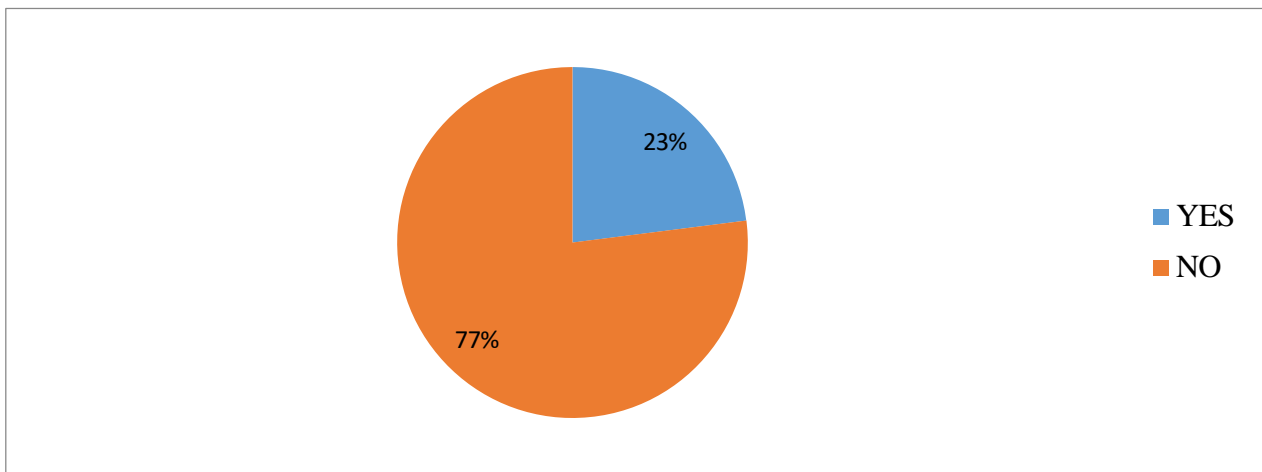


Figure 5, more than half of the respondents, 46(77%), did not attend all scheduled postoperative follow-up, while 14(23%) did not.

Table 4: Showing some distribution of respondents according to the socioeconomic factors contributing to the postoperative sepsis (n=60)

Variable	Response	Frequency(f)	Percentage (%)
Do you have any health insurance?	YES	10	17
	NO	50	83
	Total	60	100
Do you have a care plan after the surgery?	YES	27	45
	NO	33	55
	Total	60	100
What type of house do you live in?	PERMANENT	50	83
	SEM PERMANENT	10	17
	Total	60	100

Table 4, more than half of the respondents, 50(83%), did not have any health insurance, while 10(17%) had. 33(55%) did not have care taker and 27(45%) had care taker. Many, 50(83%) live in permanent house while 10(17%) had semipermanent.

Discussion.

Patient-related factors contributing to postoperative sepsis among respondents.

Regarding their age, findings revealed that most of the respondents, 58% who reported postoperative sepsis, were aged above 40 years. This indicates that postoperative sepsis was more prevalent in the age group above 40 years. The findings are in line with results obtained in a study carried out about the epidemiological characteristics of post-operative sepsis. The incidence of postoperative sepsis increased annually, with a crude mean of 0.06% for patients aged 45-64 years of age and 0.34% over 65 years. Patients with postoperative sepsis indicated a high risk associated with the characteristics male sex, Aged 45-64 years or <65years (P. Y Chen *et al* 2019).

Furthermore, regarding gender, findings revealed that most of the respondents 80% who reported postoperative sepsis were male. The findings are in line with the retrospective study carried out on the risk factors for postoperative sepsis and septic shock in patients undergoing emergency surgery (Viktor Gabriel *et al* 2019). Out of the 122281 patients who met the inclusion criteria, 2399(2%) developed sepsis or septic shock S/SS. Risk factors for S/SS included American Society of anesthesiologist physician status (ASA PS) class 2 or higher, totally and male gender. Compared with colorectal procedures, patients undergoing pancreatic and small intestine surgery were more likely to develop sepsis or

septic shock. Patients undergoing biliary surgery were less likely to develop sepsis or septic shock.

Regarding the findings, respondents with comorbidity were 70%, and this is in line with the study on clinical and surgery-specific risk factors for postoperative sepsis (Philip Plaeke *et al* 2020). The patient-related risk factors included male gender, preexisting heart failure, diabetes, and chronic kidney disease. The surgery-related risk factors identified included emergency surgery, perioperative blood transfusion, inpatient hospital stay, and open surgery. The overall adjusted incidence of surgical sepsis was 1.84%.

According to the findings, 70% of patients who underwent open surgery developed postoperative sepsis, and this was in line with the study about postoperative infection trends in distribution, risk factors, clinical and economic burden (Zaid Quraysh *et al* 2018). The POIs were common in procedures involving the digestive tract (46.5%), cardiovascular system (16.3%), or musculoskeletal system (11.2%).

Health facility-related factors contributing to postoperative sepsis among clients.

Regarding the factor of medicine before surgery, findings revealed that 53% of the respondents who were not given medicine before surgery developed post operative sepsis and it is corresponding with the study of the prevalence, bacterial profiles and factors associated with surgical site infections among post operative mothers at Kawempe national referral hospital, Uganda where the prevalence of surgical site infections was 30.7% due to failure to administer antibiotics before surgery (Muhumuza, *et al* 2020).

Based on nutritional supplements, 93% did not receive any, and they developed postoperative sepsis, it is corresponding

with a cohort study on the association between early postoperative nutritional supplement utilisation and length of stay in malnourished hip fracture patients (DG Williams et al, 2021). Overall, 160151 hip/femur fracture surgeries were identified with a coded malnutrition prevalence of 8.7%. Propensity score matching demonstrated that early nutritional supplements were associated with significantly shorter length of stay (6.6 days) vs (7.6 days), without increasing hospital costs. No association was observed between early nutritional supplementation and secondary outcomes.

Regarding patients' review after surgery, findings revealed that 53% of the respondents did not receive follow-up visits after surgery, and they developed sepsis, which is in line with a study about the rate of sepsis after surgery, where sepsis rates were significantly lower when nurses cared for fewer patients (JM Flanagan et al 2020). Linear regression for physician staffing revealed that higher rates of catheter-associated urinary tract infections and wound dehiscence after surgery, greater hospitalist hours, and

Based on the long hospital stay, findings showed that 50% of the respondents who stayed for < 5 days developed postoperative sepsis, and this finding did not correspond with the study a study about factors associated with the rate of sepsis after surgery, where sepsis rates were significantly lower when nurses cared for fewer patients (JM Flanagan et al 2020). Linear regression for nurse staffing revealed higher rates of catheter-associated urinary tract infections. Linear regression for physician staffing revealed that higher rates of catheter-associated urinary tract infections and wound dehiscence after surgery, greater hospitalist hours, and greater physician hours were associated with significantly higher sepsis rates, while greater intensivist hours were associated with a lower rate of sepsis.

Socio-economic factors contributing to postoperative sepsis among clients.

In regards to the occupation status, 63% of the unemployed developed postoperative sepsis, and these findings were in line with a study about how Lower socioeconomic factors are associated with higher mortality in patients with septic shock, where it was found out that a thirty-day mortality rate was higher in unemployed patients and neighbourhood poverty >10% (Hidalgo, et al 2021).

Based on the type of housing, findings revealed that 83% of the respondents with permanent houses developed sepsis, and the high increase in the rate of postoperative sepsis may be due to their poor cleanliness and poor maintenance of the wound. Patients with Medicaid as the primary source of payer were at a great risk of developing periprosthetic joint infection, and there was no difference in risk between the groups associated with education level or median household income.

Conclusion.

Regarding patient-related factors contributing to the postoperative sepsis among respondents attending Kayunga

Regional Referral hospital in Kayunga district, research study findings showed age and comorbidities were the major causes of postoperative sepsis.

Regarding health facility-related factors contributing to the postoperative sepsis, it was revealed that failure to give medicine before surgery and long stay at the hospital were the major factors associated with sepsis.

In regard to the socio-economic factors contributing to the postoperative sepsis, the study findings revealed that occupation status and housing were the major factors that contributed to sepsis.

Study limitations and solution

I was limited with inadequate funds to facilitate the activity of the study, this affected the smooth running of the research process and I solicited funds from my parents and I used available resources, I might also be affected by language barrier since most of the patients do not know how to speak English and I employed an interpreter, also a problem of limited time to carry out my research and this shall be solved by following the work plan effectively.

Recommendations

The patients should have good nutrition and hydration after surgery by having a balanced diet rich in proteins, vitamins, and zinc, as this can help in wound healing.

The patients should embrace all the post-operative instructions given to them after surgery, such as good hygiene practices and attending follow-up visits after surgery.

The administration of Kayunga regional referral hospital should emphasise continuous medical assessment for the healthcare workers to equip them with more advanced and latest techniques on reducing the risks of postoperative sepsis.

Educating patients about the consequences of postoperative sepsis and how to overcome them.

The surgeons should create more appointment visits for the postoperative patients to ensure clear follow-up and progress of the incision sites.

Provision of timely requisition notice to the government through the Ministry of Health for equipment and funds intended to mitigate sepsis by the administration of Kayunga regional referral hospital, such as buying more medicines, and so on.

Inventory of surgical equipment by the administration, such as equipment sterilisers, to ensure the use of sterilised surgical equipment.

Advocate and lobby for funds to expand the facilities, such as expanding the surgical ward so that it can accommodate a bigger number of surgical patients without becoming over-congested, as well as increasing the number of patient beds in the ward for a better environment for patients to recover.

The government should formulate policies that help to curb postoperative sepsis in the hospital by strengthening standard operating procedures, such as hand washing, so as to eliminate postoperative sepsis.

Provision of funds for programmes that support the

elimination of POS, for example, the creation of awareness on POS to the general public.

Training of health workers about procedures for reducing or eliminating postoperative sepsis through continuous medical education and continuous professional development.

The government, through the Ministry of Health, should make inventories of instruments used in operations in Kayunga regional referral hospital, plus other hospitals, so as to curb postoperative sepsis.

Support supervision from the Ministry of Health so as to make sure health workers are doing the right things in the hospitals, and also train them in areas where they are less efficient.

The government of Uganda should provide modern technological equipment to fight postoperative sepsis, such as machines for sterilising surgical instruments.

Acknowledgment

With gratitude, I thank the Almighty God for protecting me throughout the entire period in which I carried out my research and for giving me the wisdom to complete this program successfully.

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Abbreviations

ASAPS: American Society of Anesthesiologists Physician Status

POI: Postoperative Infections

POS: Postoperative Sepsis

S/SS: Sepsis or Septic Shock

Source of funding

The study was not funded.

Conflict of interest

The author did not declare any conflict of interest.

Data availability

Data is available upon request.

Informed Consent

Written informed consent was obtained from all participants

before their inclusion in the study. Participants were informed about the purpose of the study, procedures involved, potential risks and benefits, and their right to withdraw at any time without penalty.

Author contributions

Kolebu Wamume collected data and drafted the manuscript of the study

Alexander Ssekibaamu supervised the study

Author biography

Kolebu Wamume is a student at Kampala Institute of Health Professionals.

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