

Prevalence of septic wound infections and common bacterial pathogens among patients attending the Mengo Hospital surgical ward. A cross-sectional study.

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ABSTRACT

Background:

The study aimed to determine the prevalence of septic wound infections and to identify common bacterial pathogens among septic wound patients attending the Mengo Hospital surgical ward.

Methodology:

A retrospective study was conducted at Mengo Hospital, Kampala, using laboratory and patient records from January 2023 to December 2025. The study included patients with clinically suspected wound sepsis whose samples underwent culture and sensitivity testing. A sample size of 227 was determined using the Kish and Leslie formula and selected through simple random sampling. Data were extracted using a structured form, analyzed descriptively, and presented in tables and charts. Quality control and ethical standards were strictly maintained throughout.

Results:

Among 227 participants, the largest proportion was aged 28–37 years (36.1%, n=82), followed by 38–47 years (32.6%, n=74), while those aged 1–17 years represented the smallest group (5.3%, n=12). Bacterial pathogens were isolated from 153 wound samples, yielding an overall prevalence of 67.4%, indicating that bacterial infection was present in more than two-thirds of septic wounds. The isolates comprised both Gram-positive and Gram-negative organisms. *Staphylococcus aureus* was the most prevalent pathogen, accounting for 31.4% (n=48) of all isolates, followed by *Pseudomonas aeruginosa* at 17.0% (n=26). *Escherichia coli* and *Klebsiella pneumoniae* each constituted 15.0% (n=23), while *Enterobacter* species accounted for 6.5% (n=10). Other Gram-negative isolates contributed 9.2% (n=14), whereas *Staphylococcus pseudointermedius* and *Staphylococcus haemolyticus* accounted for 3.9% (n=6) and 2.0% (n=3), respectively.

Conclusion:

Septic wounds showed high bacterial infection, mostly in adults 28–47 years, with Gram-negative bacteria dominating; *Staphylococcus aureus* and *Pseudomonas aeruginosa* were the leading pathogens.

Recommendation:

Healthcare workers at Mengo Hospital should strengthen infection prevention and control measures to reduce septic wound infections.

Keywords: Septic wound infections, Bacterial pathogens, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, Prevalence, Antimicrobial susceptibility testing.

Submitted: May 15, 2026 **Accepted:** June 18, 2026 **Published:** June 30, 2026

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BACKGROUND OF THE STUDY

Wound sepsis continues to be a major clinical challenge among hospitalized patients, especially in low- and middle-income countries, where it is frequently linked to prolonged hospitalization, poor wound care practices, and inadequate

infection control during dressing procedures. Globally, surgical site and wound infections have shown a rising trend over time. For instance, a large ecological study conducted in England reported a significant increase in wound sepsis rates from 27.9 to 210.4 cases between 1998 and 2023, a rise

largely associated with bacterial pathogens such as *Streptococcus pyogenes* and enterococci (Allen et al., 2025). Similarly, Akhter et al. (2016) reported an 11% incidence of surgical site infections among postoperative patients in India, with major contributing factors including advanced age, diabetes mellitus, immunosuppression, and poor glycemic control. In Africa, wound sepsis is reported to be more prevalent compared to high-income settings. Studies in Nigeria and Kenya documented prevalence rates as high as 82.8%, with *Staphylococcus aureus* and *Escherichia coli* being the most commonly isolated pathogens (Akobi et al., 2018).

In Uganda, different hospital-based studies have reported varying prevalence rates. For example, Mulago National Referral Hospital recorded a prevalence of about 75%, with postoperative sepsis contributing significantly to cases (Haruna, 2019). However, lower rates have been observed in other facilities such as Hoima Regional Referral Hospital (12.4%) (Nuwareza, 2023).

Regarding microbial patterns, *Staphylococcus aureus*, *Escherichia coli*, and *Klebsiella* species remain frequently reported pathogens in wound infections (Akhter et al., 2016). In Uganda, *Staphylococcus aureus* continues to be the most commonly isolated organism in surgical wound infections, as reported in studies from Lubaga Hospital and Mulago Hospital (Lubowa et al., 2021). Overall, *Staphylococcus aureus* remains a dominant pathogen in wound infections across different settings (Dawer et al., 2024).

The study aimed to determine the prevalence of septic wound infections and to identify common bacterial pathogens among septic wound patients attending the Mengo hospital surgical ward.

METHODOLOGY

Study design

A retrospective study design was used because the data were collected from the records of the hospital, and provides reliable results in the shortest time with minimal resources.

Study area

This study was carried out at Mengo hospital, a private not-for-profit health facility located in Kampala district, Uganda's capital city, in central Uganda, on a series of hills just North of Lake Victoria, with coordinates around 0019 North latitude and 32035 East longitude. Kampala district is bordered by Wakiso district to the south, west, and North, and Kira municipality to the east. The city occupies a series of hills, with an elevation of about 3,900 feet (1,190 meters). Mengo Hospital provides inpatient and outpatient services, including specialized clinical care and diagnostic laboratory services. It serves a wide catchment area that includes

patients in Kampala districts and surrounding districts such as Mpigi, Wakiso, Mukono district, and other parts of central Uganda. The hospital receives referrals from public and private facilities, and walk-in patients from both urban and rural areas. Mengo Hospital has a high patient turnover, quality laboratory capacity, and routinely manages wound infections. The availability of laboratory records and consistent processing of wound samples ensures the feasibility of conducting the above study.

Study population

The study population comprised patients with clinically suspected wound sepsis whose wound samples were received and processed at Mengo hospital laboratory between January 2023 and December 2025, both inpatients and outpatients of all age groups and sexes.

Sample size determination;

The sample size was determined using the Kish and Leslie (1965) formulae;

where n =sample size

Z-score (standard deviation) corresponding to the confidence interval of 95%; $Z=1.96$

P-Estimated prevalence e of bacterial pathogens in septic wounds; $P=18\% = 0.18$

$Q=1-p$

D-Acceptance error/required precision of the estimate; $D=0.05$

$$n = \frac{z^2 pq}{d^2}$$

$$n = \frac{1.96^2 \times 0.18 \times 0.82}{0.05^2}$$

$$n = 227 \text{ participants}$$

Therefore, the sample size was 227 participants.

Sampling technique

Simple random sampling was used because it made the study easy, fast, inexpensive, and unbiased (Noor S 2022)

Sampling procedure

Wrote each number on a piece of paper, folded them, and placed them in a container. Mixed them thoroughly and drew out the number of slips required for the sample size. (Noor 2022)

Collection method.

The data was collected using secondary methods of data collection. The data was obtained using a data collection sheet that was designed by the researcher. (Syeda et al. 2021)

Data collection tools.

A data extraction sheet was used to capture socio-demographic and other data from the patients' records. Results were extracted from the microbiology record file and were entered into the data extraction form. (Syeda et al. 2021)

Data Collection Procedure

The researcher used a data extraction sheet to obtain socio-demographic information and relevant information concerning the study. This was from patient records whose samples were analyzed from January 2023 to December 2025

Quality control.

This was ensured by training of research assistants, pretesting of the research tool, giving ample time for data collection, cross-checking the data obtained, and having clear inclusion and exclusion criteria.

Study variables

Independent variable

The independent variables included age, sex, and education

Dependent variable

The dependent variables were the prevalence and characterization of bacterial pathogens.

Inclusion Criteria

Patients were admitted to the surgical ward between January 2023 and December 2025.

Patients with a documented diagnosis of septic wound infection.

Patients whose laboratory records show bacterial culture and sensitivity results.

Exclusion Criteria

Patients with Incomplete medical records.

Patients with wound infections without microbiological testing.

Patients with non-bacterial infections.

Data analysis and presentation

Data was cross-checked to ensure completeness, consistency, and accuracy, and then was entered and analyzed. The findings were presented in tables and charts. During the interpretation of data, the researcher explained and discussed the results thoroughly, depending on the information presented (Creswell, 2018)

Ethical consideration

Permission to carry out the study and to access patient records was sought from the school by the Mengo Hospital Research and Ethics Committee MHREC. After the approval of the research proposal by the Mengo Hospital research committee, an introductory letter was given to the researcher, which was used to obtain permission from the D.H.O., Kamapala district, to start conducting research in the study area. Using the same letter from the D.H.O, permission to conduct the study was sought from the Medical Superintendent of Mengo Hospital, who then gave permission to collect data in the study area. For the purposes of confidentiality, the researcher did not include the names of the participants but instead used codes. The study will comply with Uganda National Health Research Standards (NHREC, 2023) and guidelines outlined by Kothari (2014).

RESULTS

Social Demographic Characteristics of the Respondents

Table 1: Age Distribution of Respondents

Of the 227 participants recruited, 36.1% (82) belonged to the age group of 28-37, and the majority were females, 54% (123).
n=227

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AGE	Group	Frequency	Percentage (%)
	1-17	12	5.3
	18-27	38	16.7
	28-37	82	36.1
	38-47	74	32.6
	48-57	21	9.3
	Total	227	100
GENDER	Males	104	46
	Female	123	54
	Total	227	100

Prevalence of Bacterial Pathogens Among Patients with Septic Wounds at Mengo Hospital

Of the 227 participants recruited, 153 participants had pathogens in their wounds, giving the overall prevalence of 67.4%.

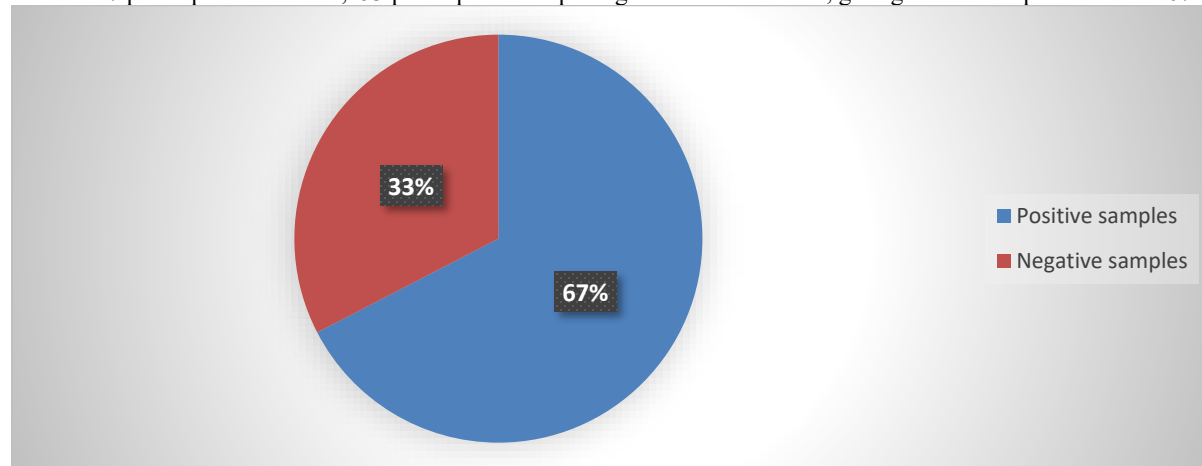


Figure 1 shows the Prevalence of Bacterial Pathogens.

Common Bacterial Pathogens Isolated from Septic Wounds at Mengo Hospital

Of the 153 patients with bacterial wound infections, *Staphylococcus aureus* was the most common gram-positive organism, accounting for 31.4%, and for the Gram-negative bacterial isolates, *Pseudomonas aeruginosa* was the most prevalent organism, accounting for 17.0% of all isolates, followed by *Escherichia coli* and *Klebsiella pneumoniae*, accounting for 15.0%

Table 2 shows the distribution of bacterial isolates of patients with septic wounds attending Mengo Hospital, n=153.

Category	Organism	Frequency	Percentage (%)
Gram positives	Staphylococcus aureus	48	31.4
	Staphylococcus pseudointermedius	6	3.9
	Staphylococcus haemolyticus	3	2.0
Gram negatives	Pseudomonas aeruginosa	26	17.0
	Escherichia coli	23	15.0
	Klebsiella pneumoniae	23	15.0
	Enterobacter species	10	6.5
	Other gram-negative isolates	14	9.2
Total		153	100

DISCUSSION

This study found a high prevalence (67.4%) of bacterial pathogens among patients with septic wounds at Mengo Hospital. This finding is consistent with results from Mulago National Referral Hospital, which reported a prevalence of 75% (Haruna, 2019), and a study in Nigeria that documented an even higher rate of 82.2% (Akobi et al., 2018). The high burden may be linked to prolonged hospitalization, frequent wound manipulation, and exposure to hospital-acquired infections.

However, lower prevalence rates such as 12.4% reported in Hoima Regional Referral Hospital (Nuwareza, 2023) may be explained by differences in infection control practices, sample sizes, and patient awareness regarding wound care. The study also showed that both Gram-positive and Gram-negative bacteria were responsible for wound infections, with Gram-negative organisms being more predominant. *Staphylococcus aureus* was the leading Gram-positive isolate, consistent with findings from Lubaga Hospital (Lubowa et al., 2021). This organism is widely known for its ability to colonize the skin and enter wounds during injury or dressing procedures, and its persistence in hospital environments contributes to its transmission (Smith et al., 2020).

Among Gram-negative organisms, *Pseudomonas aeruginosa* was the most frequently isolated pathogen, followed by *Escherichia coli* and *Klebsiella pneumoniae*. Similar findings have been reported in other studies where Gram-negative organisms dominate wound infections due to

their environmental resilience and resistance to commonly used antibiotics (Delibe et al., 2024). In particular, *Pseudomonas aeruginosa* is known for its ability to survive in moist environments and develop antimicrobial resistance, making it a persistent cause of wound infection (Johnson & Lee, 2019).

Conclusion

The study found a high prevalence of bacterial pathogens among patients with septic wounds attending the surgical ward at Mengo Hospital. Adults aged 28–47 years were the most affected age group. Both Gram-positive and Gram-negative bacteria were isolated, with Gram-negative organisms being more predominant. *Staphylococcus aureus* was the most isolated Gram-positive bacterium, while *Pseudomonas aeruginosa*, *Escherichia coli*, and *Klebsiella pneumoniae* were the most common Gram-negative isolates.

Recommendation

Healthcare workers at Mengo Hospital should strengthen infection prevention and control measures to reduce septic wound infections.

Performing routine culture and antimicrobial susceptibility testing before administration of antibiotics to ensure appropriate treatment.

Sensitization of the public about improved wound care practices and the effects of self-medication with antibiotics.

Acknowledgement

I extend my gratitude to my supervisor, Mr Salaamu Geoffrey, for his support and guidance throughout the research process, the lab manager, Mr Kakeeto, and all the Mengo laboratory staff for providing the necessary resources, environment, and guidance for this research completion, and I also appreciate my family, friends, and tutors for their guidance, love, and support. Lastly, I appreciate everyone who contributed directly or indirectly to the successful completion of this research.

List of abbreviations

D.H.O – District Health Officer

MHREC – Mengo Hospital Research and Ethics Committee

NHREC – National Health Research Ethics Committee

Source of funding

The study received no external funding.

Conflict of interest

The authors declare no conflict of interest.

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

Namukimba, P., conceptualized the study, developed the research proposal, collected and analyzed the data, interpreted the findings, and drafted the manuscript.

Salamu, G. supervised the research project, provided technical guidance throughout the study, reviewed the research methodology, and critically revised the manuscript for intellectual content.

Oromcan, B. W., contributed to study design, data interpretation, manuscript review, and provided academic guidance during the research process.

Lugwana, R. S., Lubowa, T., Mudolo, T., and Kaketto, P. provided laboratory support, facilitated access to laboratory facilities and materials, assisted with laboratory procedures, quality control, and interpretation of laboratory findings.

Akullo, M., contributed to data analysis, manuscript review, and provided academic support during the preparation of the final report.

Mabonga, H., provided technical oversight, methodological guidance, mentorship in research writing, data interpretation, manuscript review, and overall coordination of the research process.

Data availability

Data is available upon request from the author.

Author biography

Patricia Namukimba: a student pursuing a diploma in medical laboratory technology.

Salaamu Geoffrey, Oromcan, B. W., Lugwana, R. S., Lubowa, T., Mudolo, T., and Kaketto, Akullo, M. P., Mabonga, H.: research supervisor at Mengo Hospital Training Institute

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Student's Journal of Health Research Africa

e-ISSN: 2709-9997, p-ISSN: 3006-1059

Vol.7 No. 2 (2026): June 2026 Issue

<https://doi.org/10.51168/en1x6016>

Original Article

- Student's Journal of Health Research Africa*, 2(6), 11. <https://doi.org/10.51168/sjhrafrica.v2i6.44>
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PUBLISHER DETAILS

Student's Journal of Health Research (SJHR)

(ISSN 2709-9997) Online

(ISSN 3006-1059) Print

Category: Non-Governmental & Non-profit Organization

Email: studentsjournal2020@gmail.com

WhatsApp: +256 775 434 261

**Location: Scholar's Summit Nakigalala, P. O. Box 701432,
Entebbe Uganda, East Africa**

