

Prevalence of Neisseria gonorrhea by age group and sex among OPD patients at Arua Regional Referral Hospital aged 18-65 years. A cross-sectional study.

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ABSTRACT

Background:

The study aimed to determine the prevalence of Neisseria gonorrhea by age group and sex among OPD patients at Arua Regional Referral Hospital aged 18-65 years.

Methodology:

A cross-sectional study was conducted among 72 consenting OPD patients aged 18–65 years with symptoms suggestive of gonorrhea at Arua Regional Referral Hospital. Participants were purposively sampled. Data on demographic characteristics and predisposing factors were collected using English/Lugbara questionnaires. Urethral swabs from males and endocervical swabs from females were collected and examined using laboratory procedures, including microscopy and culture. Data were analyzed using SPSS and presented in tables, graphs, and charts. Ethical approval, informed consent, privacy, confidentiality, and quality-control procedures were maintained throughout the study.

Results:

Among 72 OPD patients examined, males constituted 55.6% (n=40) and females 44.4% (n=32). Regarding employment status, 44.44% (n=32) were self-employed, 30.56% (n=22) formally employed, and 25.0% (n=18) unemployed. Laboratory examination identified 17 positive cases, giving an overall gonorrhea prevalence of 23.6% (17/72), while 76.4% (n=55) tested negative. The highest age-specific prevalence occurred among participants aged 18-25 years at 31.6% (6/19), followed by those aged 26–35 years at 26.1% (6/23). Prevalence was 18.8% (3/16) among those aged 36-45 years, 11.1% (1/9) among 46-55 years, and 20.0% (1/5) among 56-65 years. Males had a higher prevalence than females, at 25.0% (10/40) and 21.9% (7/32), respectively.

Conclusion:

Gonorrhea prevalence among OPD patients at Arua Regional Referral Hospital is high, indicating a significant public health concern.

Recommendation:

The Ministry of Health should strengthen STI prevention programs targeting age groups with higher prevalence of Neisseria gonorrhoeae infection.

Keywords: *Neisseria gonorrhoeae, Gonorrhea, Prevalence, Sexually transmitted infections, Outpatients.*

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BACKGROUND OF THE STUDY

Gonorrhoea is a common sexually transmitted infection caused by *Neisseria gonorrhoeae* and remains an important global public health concern. In 2012, the World Health Organization estimated global gonorrhoea incidence rates of 19 per 1,000 women and 24 per 1,000 men aged 15–49 years, with subsequent evidence indicating a substantial global burden of infection (World Health Organization [WHO], 2016; Kirkcaldy et al., 2019). The infection disproportionately affects young adults, particularly those aged 15–35 years, who account for a substantial proportion of diagnosed cases. Frequent sexual activity, inconsistent condom use, multiple sexual partnerships, and inadequate

knowledge of STI prevention contribute to the increased vulnerability of this age group (WHO, 2021).

In sub-Saharan Africa, gonorrhoea continues to affect young adults disproportionately. Smith et al. (2020) reported that the highest prevalence occurred among individuals aged 18–30 years, a group characterized by increased sexual activity and exposure to sexual risk factors. This pattern highlights the importance of age-specific STI prevention strategies, particularly among young adults attending outpatient services.

In Uganda, evidence also demonstrates a substantial burden of sexually transmitted infections among younger populations. Masanja et al. (2021), in a study involving female youths, reported a high prevalence of self-reported

STIs among those aged 15–24 years. Similarly, Kato et al. (2019) found that individuals aged 20–30 years had the highest prevalence of gonorrhoea in urban outpatient settings, particularly in Kampala. Bukirwa et al. (2020) also reported that individuals aged 18–35 years accounted for a large proportion of gonorrhoea cases in Arua District.

Further evidence from Kampala demonstrates the substantial burden among young adults. Nakku-Joloba et al. (2022) reported a gonorrhoea prevalence of 25% among individuals attending sexually transmitted disease clinics in Kampala. In addition, surveillance conducted among 1,013 males presenting with urethritis in Kampala between 2018 and 2019 found a mean age of 27.2 years, with 51.1% confirmed to have *Neisseria gonorrhoeae* through culture testing (Kakooza et al., 2021). These findings indicate that young adults consistently experience a greater burden of gonorrhoea and emphasize the need to assess age-specific prevalence among OPD patients aged 18–65 years at Arua Regional Referral Hospital.

The study aimed to determine the prevalence of *Neisseria gonorrhoeae* by age group and sex among OPD patients at Arua Regional Referral Hospital aged 18–65 years.

METHODOLOGY

Study area and rationale

The study was conducted at Arua Regional Referral Hospital located in Northern Uganda, in Arua City, Arua District. The hospital receives approximately 250–300 patients per day. The hospital was selected for the study due to its large patient intake, which is attributed to the wide range of services it offers, as well as its proximity to numerous educational institutions that contribute to a high number of students in the area.

Study design and rationale

A cross-sectional study design was used. This design involved a one-time study in which both the outcomes and exposures of the study participants were measured simultaneously. The design was selected because the study aimed to gather information from different participants to determine the prevalence of gonorrhea, its predisposing factors, the sex most affected, and the age group most affected among OPD patients aged 18–65 years. The cross-sectional design was considered appropriate due to the limited time available for conducting the research alongside other academic activities. Additionally, a quantitative research approach was used, whereby numerical data were collected and analyzed to determine the number of cases diagnosed with gonorrhea, which helped in determining its prevalence.

Study population.

The study enrolled consented participants aged between 18 and 65 years who attended the OPD at Arua Regional

Referral Hospital and presented with signs and symptoms suggestive of gonorrhea.

Inclusion criteria

The study included patients who willingly provided informed consent after being clearly informed about the purpose and procedures of the research. Only individuals aged between 18 and 65 years of age were considered because they are old enough and capable of making independent decisions to consent to participation in research. The study targeted patients who presented with signs and symptoms of gonorrhea, such as abnormal genital discharge, painful urination, or genital discomfort.

Exclusion criteria

The study excluded OPD patients below 18 years of age because minors may not have the legal capacity to independently provide consent for participation in research. Patients who did not provide informed consent were also excluded to ensure that participation remained voluntary and ethically acceptable. Patients who did not present with signs and symptoms of gonorrhea were excluded because they were not relevant to the study objectives.

Sample size determination

The minimum sample size was determined using the Kish and Leslie (2004) formula:

$$n = \frac{Z^2 P(1 - P)}{d^2}$$

Where:

- n = required sample size
- Z = standard normal deviation at 95% confidence interval (1.96)
- P = estimated prevalence of gonorrhea in the target population
- d = margin of error (usually 0.05)

The formula was used to calculate the minimum number of participants required for the study to produce reliable and valid findings. Since the prevalence of gonorrhea was unknown, an estimated prevalence of 25% ($P = 0.25$) was used.

Therefore:

$$n = \frac{(1.96)^2 \times 0.25 \times (1 - 0.25)}{(0.1)^2}$$
$$n = 72 \text{ respondents}$$

Thus, the study sample size consisted of 72 respondents.

Sampling technique and rationale

The study used a purposive sampling technique. A total of 72 participants were selected based on the researcher's judgment and their suitability for the study. This technique was considered cost-effective and helped minimize potential errors and biases.

Sampling procedure

Participants were selected based on characteristics considered appropriate for the research topic and their accessibility. Eligible participants were systematically enrolled until the required sample size of 72 respondents was achieved. Urethral swabs were collected from male participants, and endocervical swabs were collected from female participants to provide quantitative and qualitative data.

Data collection methods

Qualitative data such as predisposing factors were collected using questionnaires because they were easy to administer. Quantitative data were obtained through microscopic examination and culture to ensure accurate diagnosis of gonorrhea. Laboratory test results were recorded using a data collection tool and later analyzed. Relevant information, including participants' sex, age, and laboratory test results after sample analysis, was recorded. Urethral swabs were collected from male participants while endocervical swabs were collected from female participants for laboratory examination.

Data collection tools

Questionnaires developed in both English and Lugbara were used to collect data on predisposing factors, the most affected sex, and the age group most affected by gonorrhea. For each participant, the patient number, age, sex, and laboratory results were recorded. Participants who were unable to read or write in English or Lugbara were assisted by the researcher, who interpreted the questions and recorded their responses. Confidential laboratory request forms were also used for quantitative data collection. The collected data were later presented using tables, bar graphs, and pie charts with the assistance of SPSS.

Data collection procedures

Questionnaires were administered to participants based on the researcher's judgment. Each consented participant was given approximately 30 minutes to complete both closed-ended and open-ended questions independently. Participants who were unable to read or write were assisted by the researcher. Data obtained were recorded in a study-specific record book. Urethral swabs from male participants and endocervical swabs from female participants were collected and examined in the laboratory.

Sample collection

Urethral swabs from male participants and endocervical swabs from female participants were collected by first cleaning the area of collection. A sterile swab was then inserted into the appropriate site and gently rotated for approximately 10–30 seconds to obtain an adequate sample. The swab was then withdrawn and placed into a transport

tube. The tip of the swab remained visible below the tube label, which contained the participant's identification details.

Laboratory examinations

The collected samples were examined following standard operating procedures.

Piloting of the study

The study tools, including structured questionnaires and direct wet preparation urine examination methods, were first piloted on patients attending the OPD at Arua Regional Referral Hospital between 10th and 20th December 2025. The piloting exercise helped to validate and improve the data collection tools.

Quality control

Standard operating procedures were followed during sample collection and laboratory testing. Sample containers were clearly labeled with the participant's laboratory number to ensure proper identification and correlation with the respective patient. A parallel check by different laboratory technicians was conducted to verify the results obtained. Quality control was also maintained through regular consultation with the researcher's supervisor to make necessary corrections where required.

Data analysis and presentation

The collected data were entered into a computer and analyzed using the SPSS program. The results were presented using graphs, pie charts, and tables with the help of Microsoft Excel.

Ethical considerations

Before conducting the study, a letter of introduction together with a copy of the research proposal was presented to the administration of Arua Regional Referral Hospital for approval. Informed consent was obtained from all participants after explaining the purpose and objectives of the study. Collection of swabs: endocervical and urethral swabs were collected by trained medical personnel of the same sex as the participants to ensure comfort and professionalism. Participants' privacy was ensured by conducting all specimen collection in a private screened examination room where confidentiality was strictly maintained.

RESULTS

Demographic data of respondents

Laboratory examination of urethral swabs from male participants and endocervical swabs from female participants was conducted to determine the presence of *Neisseria gonorrhea*.

Table 1: A table showing social demographic characteristics of respondents. (n=72)

Demographic	Frequency	Percentage (%)
Gender		
Males	40	55.6%
Females	32	44.4%
Total	72	100%
Age groups		
18 - 25 years	19	26.39%
26 - 35 years	23	31.94%
36 - 45 years	16	22.22%
46 - 55 years	9	12.50%
56 - 65 years	5	6.94%
Total	72	100%
Employment status		
Unemployed	18	25%
Self-employed	32	44.44%
Formally employed	22	30.56%
Total	72	100%

Source: primary data (2026)

From the results above, males formed the majority of respondents at 62.50% (n=45), while females accounted for 37.50% (n=27). The most affected age group represented was those between 26 and 35 years (31.94%, n=23), followed by participants aged 18–25 years (26.39%, n=19). Employment analysis showed that nearly half (44.44%, n=32) were self-employed, suggesting that small-scale and informal work is common among participants in the study area. This was followed by formal employment (30.56%, n=22), and the smallest group was unemployed individuals (25%, n=18).

General prevalence of gonorrhea infection among OPD patients aged 18-65 years at Arua regional referral hospital.

Laboratory examination of urethral swabs from male participants and endocervical swabs from female participants was conducted to determine the presence of *Neisseria gonorrhea*.

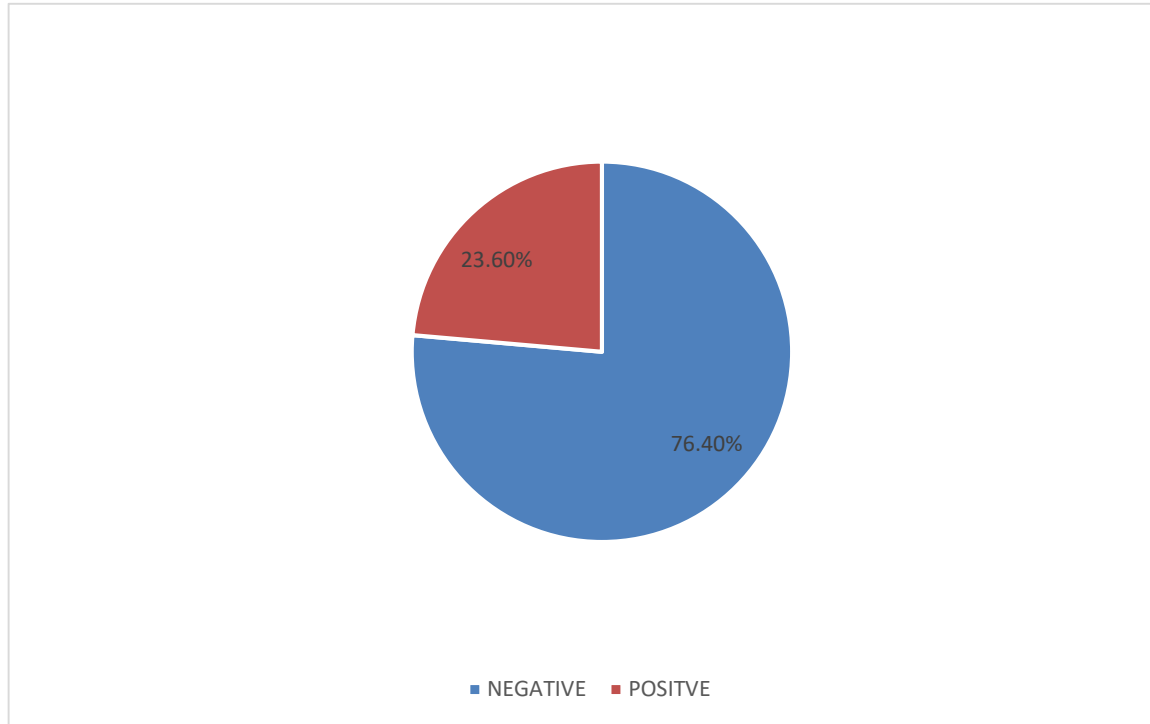
Table 2: A table showing the general prevalence of *Neisseria gonorrhea* infection among outpatients.

Prevalence status	Frequency	Percentage (%)
Positive	17	23.6%
Negative	55	76.4%
Total	72	100%

Source: primary data (2026)

The results in Table 2 show that 17 respondents tested positive for gonorrhea, while 55 respondents tested negative. Therefore, the prevalence of gonorrhea among OPD patients was 23.6%.

Figure 1: A pie chart showing the prevalence of gonorrhea infection among OPD Patients aged 18-65 years at Arua Regional Referral Hospital.



Age group most affected by gonorrhea.

The study also analyzed gonorrhea infection according to age groups.

Table 3: Age Group most affected by Gonorrhea

Age group	Positive	Prevalence (%)
18 – 25	6	31.6
26 – 35	6	26.1
36 – 45	3	18.8
46 – 55	1	11.1
56 - 65	1	20.0
Total	17	

Source: primary data (2026)

The age group 18-25 had the highest prevalence of 31.6%, followed by the age group of 26-35 with a prevalence of 26.1%. Lower prevalence was observed in older age groups (above 35 years).

Sex most affected by gonorrhea.

The study also determined the distribution of gonorrhea infection according to sex.

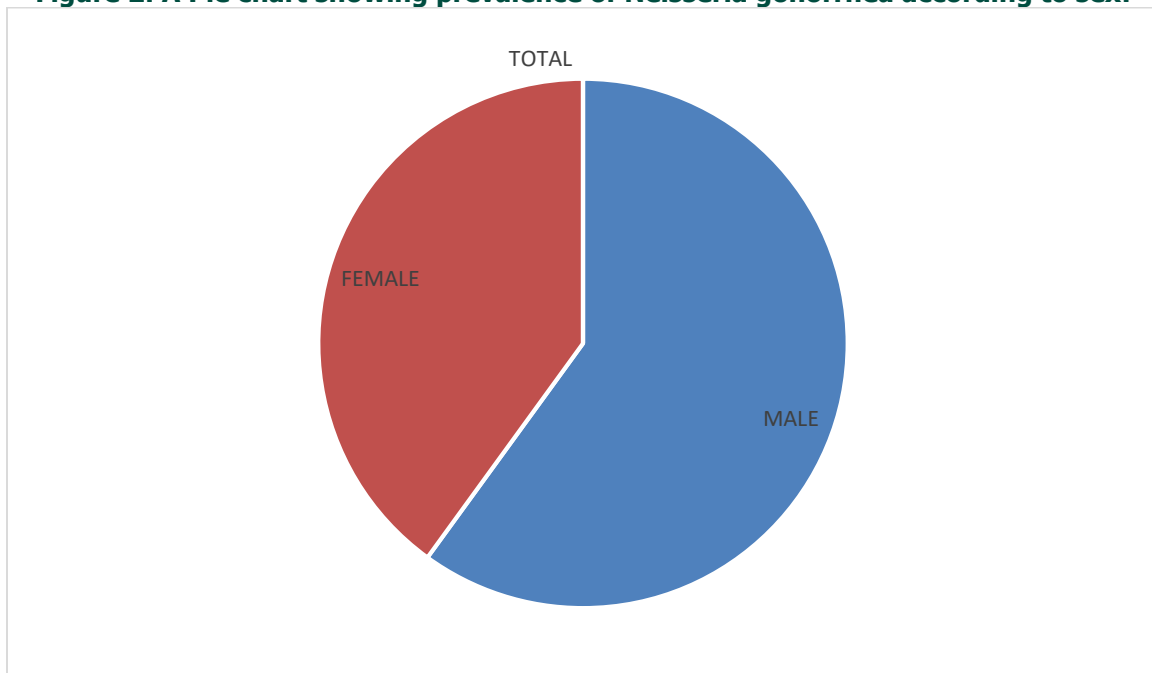
Table 4: Distribution and prevalence of gonorrhea cases by sex among outpatients at Arua Regional Referral Hospital.

Gender	Positive	Negative	Total	Percentage positive (%)
Male	10	30	40	58.8
Female	7	25	32	41.2
Total	17	55	72	100

Source: primary data (2026)

The results show that males accounted for the majority of gonorrhea cases (58.8%), while females accounted for 42.2% of the cases.

Figure 2: A Pie chart showing prevalence of Neisseria gonorrhea according to sex.



The figure illustrates that males were more affected by gonorrhea infection than females among the study participants.

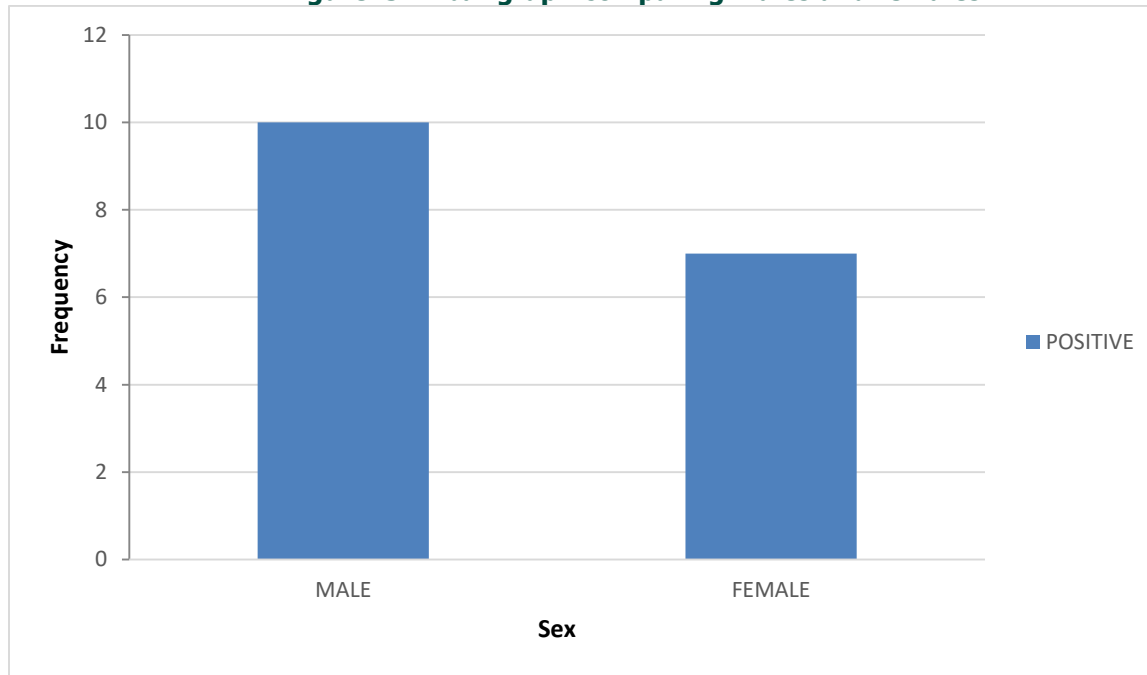
Prevalence of gonorrhea by sex

Table 5: A table showing the prevalence of Neisseria by sex.

Sex	Positive	Frequency	Prevalence (%)
Male	10	40	25
Female	7	32	21.9
Total	17	72	46.9

The prevalence of Neisseria gonorrhea was higher among males (25%, n=10) compared to females (21.9%, n=7). This suggests that male patients may be more prone to Neisseria gonorrhea infections, possibly due to having unprotected sexual intercourse with multiple partners, alcoholism, and delayed health care-seeking behavior.

Figure 3: A bar graph comparing males and females



DISCUSSION

Prevalence of gonorrhea

The study found an overall gonorrhea prevalence of 23.6% among OPD patients aged 18–65 years. This prevalence is relatively high and aligns with findings from other studies conducted in Uganda. For instance, a study conducted in Kampala reported a prevalence of 25% among individuals attending STD clinics (Nakku-Joloba et al., 2022).

The high prevalence observed in this study may be attributed to the fact that participants were selected based on the presence of signs and symptoms suggestive of gonorrhea, which increases the likelihood of detecting positive cases. Additionally, limited access to early diagnosis and treatment services in some regions may contribute to continued transmission within the community.

This finding is consistent with the literature indicating that gonorrhea remains a significant public health problem in sub-Saharan Africa, particularly in resource-limited settings (Kirkcaldy et al., 2019).

Age group most affected

The study revealed that the 18–25 years age group had the highest prevalence (31.6%), followed by the 26–35 years age group (26.1%).

This finding is in agreement with global and regional studies, which show that gonorrhea predominantly affects young adults, especially those aged between 18–35 years (Kirkcaldy et al., 2019). This age group is typically more sexually active and more likely to engage in high-risk sexual

behaviors such as having multiple sexual partners and inconsistent condom use.

The lower prevalence observed in older age groups may be due to reduced sexual activity, increased awareness, and more stable sexual relationships.

Sex most affected

The results showed that males (58.8%) were more affected by gonorrhea compared to females (42.2%). Similarly, the prevalence among males (26.3%) was higher than that among females (20.6%).

This finding is consistent with previous studies, which suggest that men are more frequently diagnosed with gonorrhea due to the presence of more noticeable symptoms such as urethral discharge and painful urination.

In contrast, many women experience asymptomatic infections, which may lead to underdiagnosis and underreporting. This suggests that the actual burden of gonorrhea among females may be higher than reported. However, literature suggests that females are often asymptomatic or underreport symptoms, potentially underestimating the true burden among women (WHO, 2021). This underlines the importance of encouraging regular STI screening for females, even in the absence of symptoms.

CONCLUSION

Gonorrhea prevalence among OPD patients at Arua Regional Referral Hospital is high (23.6%), indicating a significant public health concern. Young adults aged 18–25

years are the most affected group. Males are more affected than females, although female cases may be underreported due to asymptomatic infections.

RECOMMENDATION

The Ministry of Health should strengthen STI prevention programs targeting age groups with higher prevalence of *Neisseria gonorrhoeae* infection.

Arua Regional Referral Hospital should prioritize routine STI screening among age groups identified with higher infection prevalence.

Communities should encourage individuals of all age groups to seek timely STI testing and treatment.

The Ministry of Health should promote gender-responsive STI prevention and control interventions.

Arua Regional Referral Hospital should ensure equitable access to STI screening and treatment services for both males and females.

Community members should adopt safer sexual practices and seek medical attention promptly when STI symptoms develop.

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List of abbreviations

ARRH - Arua Regional Referral Hospital
DMT - Diploma in Medical Laboratory Technology
OPD - Outpatient Department
SPSS - Statistical Package for the Social Sciences
STI - Sexually Transmitted Infection
STD - Sexually Transmitted Disease
WHO - World Health Organization

Source of funding

The study had no funding.

Conflict of interest

The authors declare no conflict of interest.

Data availability

Data are available upon request from the author.

Author contributions

PM: collected the data.

JB: supervised the study.

HN: supervised the study.

FS: supervised the study.

Informed consent

Written informed consent was obtained from all participants prior to 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.

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References

1. Kakooza, F., Musinguzi, P., Workneh, M., Walwema, R., Kyambadde, P., Mande, E., Lubega, C., Nakasi, J. M., Kiggundu, R., Hamill, M. M., Bagaya, B. S., Lamorde, M., Unemo, M., & Manabe, Y. C. (2021). Implementation of a standardised and quality-assured enhanced gonococcal antimicrobial surveillance programme in accordance with WHO protocols in Kampala, Uganda. *Sexually Transmitted Infections*, 97(4), 312–316. <https://doi.org/10.1136/sextrans-2020-054581>
2. Kirkcaldy, R. D., Weston, E., Segurado, A. C., & Hughes, G. (2019). Epidemiology of gonorrhoea: A global perspective. *Sexual Health*, 16(5), 401–411. <https://doi.org/10.1071/SH19061>
3. Masanja, V., Wafula, S. T., Ssekamatte, T., Isunju, J. B., Mugambe, R. K., & Van Hal, G. (2021). Trends and correlates of sexually transmitted infections among sexually active Ugandan female youths: Evidence from three demographic and health surveys, 2006–2016. *BMC Infectious Diseases*, 21, 59. <https://doi.org/10.1186/s12879-020-05732-x>

4. Nakku-Joloba, E., Mboowa, G., Ssengooba, W., Kiyimba, A., Kigozi, E., Baluku, H., Alinaitwe, L., Nyote, R., Kabahita, J. M., Mutumba, P., Katabazi, F. A., Kiwanuka, N., Sewankambo, N., & Kateete, D. P. (2022). Prevalence and antimicrobial resistance profiles of *Neisseria gonorrhoeae* and *Chlamydia trachomatis* isolated from individuals attending STD clinics in Kampala, Uganda. *African Health Sciences*, 22(3), 62–71. <https://doi.org/10.4314/ahs.v22i3.8>
5. World Health Organization. (2016). *WHO guidelines for the treatment of Neisseria gonorrhoeae*. World Health Organization. <https://www.who.int/publications/i/item/9789241549691>
6. World Health Organization. (2021). *Gonorrhoea*. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/gonorrhoea>

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