EAS Journal of Parasitology and Infectious Diseases
Abbreviated Key Title: EAS J Parasitol Infect Dis
ISSN: 2663-0982 (Print) & ISSN: 2663-6727 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-8 | Issue-4 | Oct-Dec- 2026 | DOI: https://doi.org/10.36349/easjpid.2026.v08i04.002

Original Research Article

Incidence and Antibiotic Susceptibility Profiles of Bacteria Causing Reproductive Tract Bacterial Infections Among Women of Reproductive Age Attending Homabay County Teaching and Referral Hospital, Homa Bay County, Kenya

Alice K. M[1]*, Menza N. C.[2], Muturi M. W.[3]

[1]Department of Medical Laboratory Sciences, School of Healthy Sciences, Kenyatta University, P.O BOX 43844-00100 Nairobi, Kenya
[2]Senior Lecturer, Medical Laboratory Science, Kenyatta University P.O Box 43844-00100 Nairobi
[3]Professor, Medical Laboratory Science, Kenyatta University P.O Box 43844-00100 Nairobi

Article History
Received: 09.09.2026
Accepted: 03.11.2026
Published: 05.11.2026

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Background*:** Bacterial infections of the reproductive tract are a leading cause of morbidity among women of child bearing age globally. These infections can affect either the upper reproductive tract, encompassing the fallopian tubes, ovaries and uterus, or the lower reproductive tract, featuring the vagina, cervix and vulva. ***Objectives*:** The study aimed to determine the incidence of bacteria causing reproductive tract bacterial infections among women of reproductive age attending Homabay County teaching and referral hospital in Kenya and their current antibiotic susceptibility profiles. ***Materials and Methods*:** A cross- sectional study design was adopted, employing a systematic sampling technique. The minimum sample size was determined using Fisher et al.'s formula and sample analysis done at the Homabay County Teaching and referral hospital laboratory. High vaginal swabs were examined for bacterial vaginosis and grading performed using Nugent's. All gonorrhoea isolates were tested for antibiotic sensitivity using the disc diffusion method with reference to CLSI 2024 guidelines. Data analysis employed Statistical package for social sciences version 28, with a significance level set at $P \leq 0.05$. Fisher's exact test was employed to assess the sensitivity of *Neisseria gonorrhoea* to various antibiotics commonly prescribed for treatment. Ethical approval was provided by the Kenyatta University Ethical Review Committee and research permit obtained from the National Commision for Science, Technology and Innovation. ***Results*:** Findings on reproductive tract infections among 360 women showed 20.3 % incidence. *Neisseria gonorrhoea* exhibited 100% resistance to tetracycline, 34% resistance to penicillin, and 100% sensitivity to ceftriaxone. ***Conclusions and Recommendations*:** Owing to the high incidence rate and poor sensitivity rates to most antibiotics, the study recommended regular screening of women of child bearing age for reproductive tract bacterial infections and prioritizing ceftriaxone for gonorrhea treatment while monitoring resistance.

Keywords: Reproductive Tract Infections, Bacterial Infections, Women of Reproductive Age, *Neisseria gonorrhoeae*, Antibiotic Susceptibility.

Copyright © 2026 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Reproductive tract bacterial infections (RTBIs), commonly regarded as infections in the female reproductive system pose a significant public health challenge among women of reproductive age. This is because they produce severe health results including infertility, pelvic inflammatory disease and a higher chance of contracting HIV[1]. In developing countries, the prevailing bacterial factors leading to reproductive tract bacterial infections encompass *Chlamydia trachomatis*, *Neisseria gonorrhoea*, bacterial vaginosis (BV), syphilis, lymphogranuloma venereum (LGV), and chancroid [1].

***Corresponding Author:** Alice K. M
Department of Medical Laboratory Sciences, School of Healthy Sciences, Kenyatta University, P.O BOX 43844-00100 Nairobi, Kenya

The incidence and frequency of infections affecting the reproductive tract may exhibit notable variations across different countries and regions due to differences in pathogen characteristics, duration of infectivity, transmissibility and various behavioral, biological, medical and socio-economic factors. Data indicates that RTBIs are widespread in nearly all developing countries, impacting diverse populations, including high-risk groups such as patients visiting sexually transmitted disease (STD) clinics and those involved in transactional sex, as well as low-risk groups [2].

With regards to treatment of RBTIs, the antimicrobial era began around 1930, with sulfonamides being the first effective antimicrobials for treating gonorrhoea. Initially, they achieved a cure rate of 80% to 90% for gonorrhoea. Unfortunately, clinical resistance emerged by 1944, leading to widespread resistance among gonococcal strains by the late 1940s [3]. These resistant strains have since emerged against sulfonamides, penicillin, earlier cephalosporins, tetracyclines, macrolides and fluoroquinolones worldwide. Due to increasing fluoroquinolone resistance, many Asian and European countries abandoned ciprofloxacin as a first-line treatment in the early to mid-2000s [3]. By 2007, fluoroquinolones were completely phased out of the CDC-recommended treatment regimens for gonorrhoea. Currently, the incidence of fluoroquinolone-resistant gonococcal strains remains high globally [4]. In Kenya, the treatment for *N. gonorrhoea* involves a combination of cefixime (400 mg) and azithromycin (2 g), administered as a single oral dose [5].

Research shows that Homabay County teaching and referral hospital experiences a substantial but underreported incidence of bacterial pathogen-induced RTBIs among its visiting female patients. The high number of RTBIs among women of childbearing age can be attributed mostly to poor hygiene habits and inconsistent contraceptive protocols combined with weak healthcare facilities in Homabay County [6]. This is as observed in areas characterized by restricted healthcare access together with socioeconomic challenges, where these infections endanger the reproductive and general health of women, thereby intensifying health-related risks. The present situation triggers continuous morbidity resistance in bacterial strains and raises disease transfer rates because RTBIs go untreated [7].

The absence of detailed information regarding infection rates and bacterial sources, together with antibiotic response patterns, leads healthcare facilities to create unsuccessful treatment plans. This necessitated research, where this study focused on determining the incidence of RTBIs in this population and the antibiotic susceptibility profiles of bacteria responsible for the reproductive tract bacterial infections.

MATERIALS AND METHODS

Study Area

The study was conducted in Homabay County teaching and referral hospital, the largest hospital in South Nyanza. The study area's suitability was propelled by the special health and demographic characteristics of the region. This is because the high load of sexually transmitted infections and poor healthcare accessibility in the area constantly lead to potentially higher rates of reproductive tract bacterial infections among women in this age group in the area [8].

Study Design

A cross-sectional study design was used to study women of child bearing age seeking care at Homabay County teaching and referral hospital from January 2022 to August 2022.

Study Population

The study included women aged 18 years to 49 years attending the hospital. The study participants were stratified into distinct age groups: 18-23, 24-29, 30-35, 36-41, 42-47 and over 47.

Inclusion an Exclusion Criteria

The study included consenting women of reproductive age, ranging from 18-49 years old who sought care at the gynecological, outpatient and antenatal clinics in Homabay County teaching and referral hospital.

The study excluded non-consenting women and those that did not fall within the age bracket of 18-49 years old.

Sample Size Determination: The minimum sample size was calculated using the Fisher's formula [9]. A reproductive tract bacterial infection incidence of 37.4% was used [10].

$$n = \left(\frac{z}{m}\right)^2 p(1-p)$$

Where;

N= Desired minimum sample size

Z = Standard normal deviation = 1.96 (from tailed normal table)

P = Prevalence of reproductive tract bacterial infection

M= Desired degree of accuracy at 95% confidence level =0.05 N = $(1.96/0.05)^2$ x 0.37(0.63)

N = 1536.64 x 0.2341=359 samples. Rounded off to 360. Therefore, a total of 360 participants were recruited for the study.

Sampling Technique

A systematic sampling method was adopted where the average total population of women attending the referral hospital annually (which was 1800) was divided by the minimum sample size of 360 hence the sampling interval was determined by k = 5, ensuring that each participant had an equal chance of being included.

Sample Collection

High vaginal swabs were collected following the Nugent *et al*., method while blood samples were collected following Kenyon *et al*., method for bacterial analysis [11].

Blood Analysis

This was conducted for the analysis of *Treponema pallidum* using treponemal serological test. All samples that turned positive for VDRL were analyzed by TPHA to confirm positivity [2].

High Vaginal Swab Analysis

Amsel testing Bacterial vaginosis by Amsel testing involved checking the vaginal fluid for a thin white to yellow, homogenous discharge. Wet mounts were made on a slide from the HVS and checked on the microscope for clue cells. Also, the vaginal fluid was checked for pH and those that were 4.5 and above suspected for bacterial vaginosis (BV) organisms. In addition, potassium hydroxide (KOH) solution was added on the slides and the production of a fishy odor was suggestive of BV. Samples that were positive for BV using Amsel testing were not repeated using the Nugent's test.

Nugent's Test

Bacterial vaginosis scoring using Nugent's criteria involved fixing vaginal smear slides with methanol, followed by Gram staining and examination under oil immersion at 100x magnification [10]. Nugent's grading process, which evaluated various bacterial morphotypes was observed keenly. These included large Gram-positive rods (stained with Crystal Violet, indicating *Lactobacillus* spp.), small Gram-negative or variable rods (stained pink or with Neutral Red, indicative of *Gardnerella* or *Bacteroides*) and curved Gram-variable rods (suggestive of *Mobiluncus* spp). Scores ranging from 0 to 3 denoted "normal vaginal flora," scores from 4 to 6 indicated" intermediate vaginal flora," and scores from 7 to 10 were considered diagnostic for "Bacterial Vaginosis (BV)." *Neisseria gonorrhoea* was also detected using the Nugent's staining procedure. The strong suspicion of *Neisseria gonorrhoea* arose when Gram-negative intracellular diplococci were observed during a Gram stain, particularly in the presence of mucopurulent cervical discharge.

Gram Stain

The test was conducted following the procedure outlined by King and Martin (2020). Smears prepared from suspected colonies were stained using the Gram staining technique. This differential staining method provided preliminary information for identifying the suspected colony. The smears were examined under an oil immersion objective, and the presence of Gram-negative diplococci indicated that the organism might be *N. gonorrhoea*, necessitating further testing for definitive identification.

Biochemical Tests

The isolates were done various biochemical tests for identification. Patterns of acid production from carbohydrates, along with oxidase and catalase tests, helped distinguish *Neisseria gonorrhoea* from other Neisseria species (Appendix III). The oxidase test used the tetramethyl-p-phenylenediamine reagent (King and Martin, 2020). This test involved applying a drop of the reagent onto filter paper, followed by the addition of a culture colony using a wooden applicator stick. The oxidase test detects the presence of a cytochrome oxidase system in bacteria. A positive result is indicated by a dark purple color change within ten seconds. To verify the reagent's effectiveness, quality control involves using Pseudomonas aeruginosa ATCC 27853 as the positive control and Escherichia coli ATCC 25922 as the negative control.

The catalase test was conducted with 3% hydrogen peroxide. A drop of the reagent was placed on a clean glass slide, and a loopful of the suspected colony was emulsified in the reagent (King and Martin, 2020). A positive reaction was indicated by the production of bubbles within one to two seconds. *Neisseria gonorrhoea* yielded a positive result. Quality control for the catalase reagent included using *Staphylococcus aureus* ATCC 25923 as the positive control and *Streptococcus pyogenes* ATCC 19615 as the negative control.

Antibiotic Susceptibility Testing

Antibiotic susceptibility testing was performed on *Neisseria gonorrhoea* isolates using Penicillin 10ug, Tetracycline 10ug, and Ceftriaxone 10ug. These antibiotics are commonly prescribed for treating gonorrhoea in women attending HBCTRH. The testing followed Clinical and Laboratory Standards Institute (CLSI) guidelines and employed the disk diffusion to determine the zones of inhibition or minimum inhibitory concentration (MIC). *Neisseria gonorrhoea* ATCC 49229 served as the quality control strain and the assays were conducted on 100mm and 150mm plates using Gonococcal (GC) agar base and a 1% defined growth supplement.

In this study, bacterial colonies were directly suspended in Mueller-Hinton broth adjusted to a 0.5 McFarland standard. These colonies were derived from overnight growth on TMM 27 agar. Incubation occurred at 36°C ± 1°C with 5% CO2 for 20–24 hours.

Data Analysis

The study utilized the Statistical Package for Social Sciences version 28 (SPSS 28) for analysis. Data was visually presented through tables and figures. The incidence of reproductive tract bacterial infections was determined as follows:

$$1995\ (\frac{0}{P} \times 100\ \%)$$

People with the disease, P = the population susceptible to contracting the infection during the study period.

The study calculated 95% confidence intervals (CI) for incidence using a proportion test.

Associations of bacterial vaginosis agents with antibiotic susceptibility tests were assessed using Fisher's exact test conducted with two-sided P values, and significance was established at $P \leq 0.05$.

Ethical Consideration

For this study, ethical approval was obtained from the Kenyatta University ethics review committee (PKU6361718) and a research permit obtained from the national commission for science, technology and innovation (NACOSTI/P/25/4172801). Prior to enrollment, informed consent was sought from all participants. Confidentiality was strictly maintained and any information obtained from participants was used exclusively for study purposes. Numeric codes were assigned to ensure confidentiality. Participants were informed of potential risks during sample collection and reassured.

RESULTS

Incidence of Reproductive Tract Bacterial Infections among Women of Reproductive Age Attending Homabay County Teaching and Referral Hospital

The incidence of reproductive tract bacterial infections among the study population was as shown in Table 1.

Table 1: Incidence of reproductive tract bacterial infections among women of reproductive age who are attending Homabay County teaching and referral hospital

Incidence of infection	Negative (n, %)		Positive (n, %)	
Plasma testing for *T.pallidum*	321	89.2%	39	10.8%
Hvs Amsel testing (*Lactobacillus, Mobilluncus Gardnerella* & *Bacteroides*)	350	97.3%	10	2.7%
Hvs Nugent scoring (*Lactobacillus, Mobilluncus Gardnerella* & *Bacteroides*)	349	96.9%	11	3.1%
Culture for *N. gonorrhoea*	347	96.4%	13	3.6%

The overall Incidence of reproductive tract bacterial infections among women of reproductive attending Homabay County teaching and referral hospital is given as follows:

Summing up all the positive: Incidence of RTBIs= $\frac{(Amsel + Nugent+Plasma+Culture)}{(Total\ Sample\ size)}$

$= \frac{(10 + 11+39+13)}{360} \times 100\%$

$= \frac{73}{360} \times 100\%$

Thus, the incidence of RTBIs among women of reproductive age attending Homabay County teaching and referral hospital is 20.3%.

Age Distribution Incidence of *Neisseria Gonorrhoea*

A total of 347 (96.4%) of patients were negative for *N. gonorrhoea* and 13 (3.6%) positive for gonorrhoea. The distribution per age group was as shown in figure 1 below.

Antibiotic Susceptibility Testing of Isolated *Neisseria Gonorrhoea*

Out of all a total 360 cultures done 13 (3.6%) cultures were positive for *N. gonorrhoea*. These were tested for antibiotic sensitivity using the disk diffusion method against penicillin 10ug, tetracycline 10ug and ceftriaxone 10ug. *N. gonorrhoea* showed 100% resistance to penicillin, 100% resistance to tetracycline while it showed 100% sensitivity to ceftriaxone.

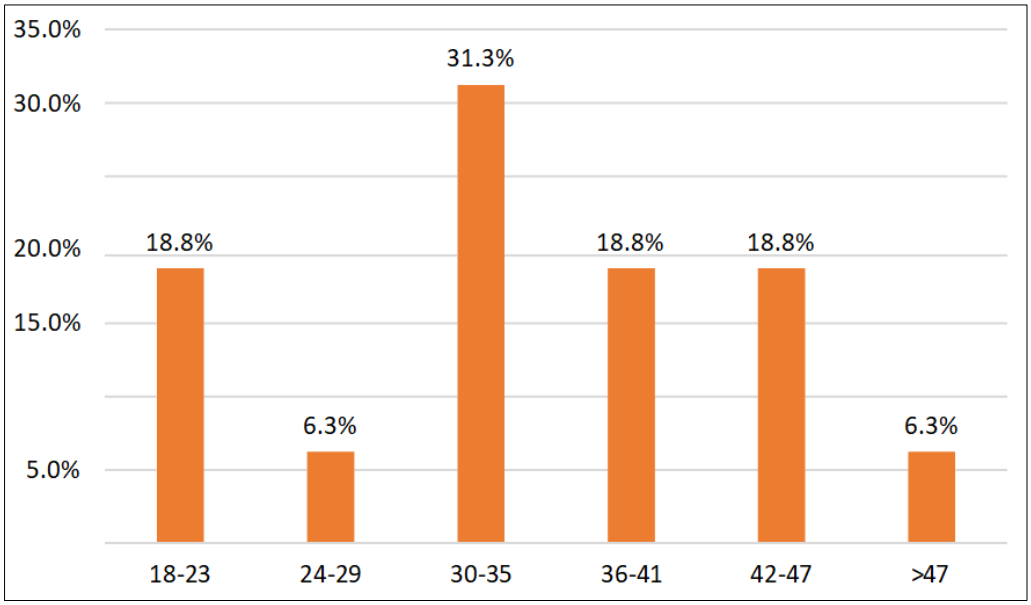


Figure 1: Age distribution incidence of *Neiserria gonorrhoea* among women of reproductive age attending Homabay County teaching and referral hospital

Table 2: Antibiotic sensitivity of Neisseria gonorrhoea to penicillin, tetracycline and ceftriaxone

Antibiotic Sensitivity	Positive Isolates (n)	Resistance	Sensitivity
Penicillin 10ug	13	100%	0%
Tetracycline 10ug	13	100%	0%
Ceftriaxone	13	0%	100%

DISCUSSION

The examined population shows a 20.3% total incidence of bacterial reproductive tract infections. The study's findings also demonstrate a significant presence of syphilis among this patient group because of their elevated *T. pallidum* infection rates. Research on STI incidence in resource-constrained environments presents similar findings because these settings have restricted screening, prevention and treatment access [12]. Earlier findings confirm that populations who face healthcare system limitations tend to carry higher syphilis infection rates while being exposed to social-economic risks [2].

In contrast to the high *T.pallidum* incidence, the lower incidence rates of RTBI - 5.3% via Amsel testing and 3.1% via Nugent scoring - indicate a less dominant but still meaningful presence of endogenous infections. The differences between results obtained from Amsel testing and Nugent scoring demonstrate how diagnostic test sensitivity and specificity affects data reporting [13]. The wide-ranging detection capabilities of Amsel testing which monitors clinical signs including pH and clue cells, show higher incidence for RTBI; however, Nugent scoring provides microscopic microbiological assessment through Gram staining that may skip minimal or unusual manifestations of RTBIs [10].

The observed variability matches earlier studies which demonstrated that the complex vaginal microbiome generates detection results that change according to assessment methods [13]. The observed low RTBIS might be due to Lactobacillus-dominated bacteria protecting the vaginal area of some women in this population as reported by prior studies about lactobacilli symbiotic functions [14].

This 3.6% incidence data for *N. gonorrhoea* through culture identification strengthens this pattern by elucidating the role that sexually transmitted pathogens play in general disease transmission. The observed infection rate of *N. gonorrhoea* remains substantial, although it shows lower incidence compared to syphilis incidence. Culture-based testing limits accurate incidence detection for *N. gonorrhoea* because such specific organisms require optimized specimen processing techniques and incubation environments, which may fail in practice, according to earlier reports [15].

The combined incidence rate of 20.3% shows diverse infection patterns due to co-existing STIs with endogenous infections which have their specific biological and environmental risk factors. The combined incidence rate surpasses certain industrialized nations yet corresponds to developing country patterns because

population changes together with medical service inequalities and urban expansion increase exposure susceptibility [16]. A public health examination of the 20.3% incidence rate requires immediate action which should include screening programs and health education campaigns and broad antimicrobial availability for effective treatment of both immediate conditions and preventing long-term effects such as infertility and ectopic pregnancy [17]. Earlier researchers found analogous combined epidemiological risks in sub-Saharan Africa with their analysis establishing the relationship between female urethra length and behavioral exposures [18].

A susceptibility pattern exists that shows *N. gonorrhoea* outcome rates with penicillin, tetracycline and ceftriaxone as distinct entities. The susceptibility results for ceftriaxone show complete effectiveness whereas tetracycline and penicilin resistance remains high among bacterial isolates. The antibiotic- adapted gonococcus displays adaptive changes reflecting pharmaceutical use from both past and present drug eras which has preserved new-generation antibiotic effectiveness alongside retaining older medicine sensitivities. Global antimicrobial resistance observations of gonococci show the bacterium's adaptive qualities have reduced available treatment choices [3].

Ceftriaxone maintains its position as a dependable treatment option because the isolate demonstrates complete susceptibility to this drug. The results support the use of ceftriaxone as first- line therapy in many regions as WHO guidelines recommend [19]. Ceftriaxone shows high effectiveness across various populations, even though occasional reports have shown lower susceptibility in specific regions [20]. Current Homabay treatment regimens using ceftriaxone can maintain their effectiveness against gonorrhoea since the tested strains remain susceptible, which provides a protective barrier against additional resistance development. Total resistance to tetracycline has officially rendered this antibiotic unsuitable for managing gonorrhoea infection. This result matches documented worldwide trends because tetracycline became extensively used in the past when it allowed the adaptation of resistant bacterial strains through efflux pumps and ribosomal protection mechanisms [21].

Prior research also confirms that tetracycline has lost its effectiveness in STI treatment because of extensive resistance among gonococcal strains. Tetracycline resistance patterns in this area reflect past widespread clinical use of this antibiotic thus confirming the necessity for discontinuing tetracycline treatment of gonorrhea [19].

The outcome of penicillin treatment leads to a resistant and partially susceptible combination creating an intricate susceptibility situation. The lack of full-sensitive isolates combined with a majority demonstrating resistant penicillin zones of inhibition makes this antibiotic almost not fit for use in treatment of these infections [22]. Earlier confirm these findings by showing that penicillin resistance which started through plasmid-based mechanisms has spread throughout the world in as much as some areas still report reduced resistance [22].

The observed susceptibility patterns create various effects which extend beyond direct medical care. Clinically, the complete sensitivity to ceftriaxone provides peace of mind to healthcare staff by offering a direct treatment option. However, the patterns also create substantial stress on preserving the treatment's effectiveness because excessive treatment dependence may accelerate resistance development for multidrug-resistant gonorrhea [16]. The disappearance of tetracycline drug along with declining usefulness of penicillin emphasizes the decreasing number of effective treatments targeting *N. gonorrhoea*, requiring heightened antibiotic use vigillance and research into new therapeutic options. The public health analysis emphasizes the need for surveillance tracking resistance trends because it ensures treatment guidelines keep pace with local data [20].

The bacterial adaptations which lead to various resistance mechanisms, including enzymatic inactivation and enhanced efflux systems represent the reason for susceptibility differences among antibiotics[16]. Similar settings demonstrate that Homabay isolates participate in a worldwide continuous evolution of antibiotic resistance shaped by the uncontrolled access of antibiotics, poor medical practices and compromised patient treatment compliance. The established pattern functions as a small-scale illustration of a growing global healthcare problem because historical therapeutic advancement remains vulnerable to microbial adaptation and thus needs an evidence-based solution [21].

Study Limitations

A limited duration of study, limited sample size and non-random sampling may affect the generalizability of the results to the general population.

CONCLUSIONS AND RECOMMENDATIONS

The study concluded that the incidence of reproductive tract bacterial infections among women of reproductive age attending Homabay County teaching and referral hospital was 20.3%. The study also found 100% resistance rates of *Neisseria gonorrhoea* to penicillin and tetracycline, while ceftriaxone was found to be 100% effective in treating the reproductive tract bacterial infections. The study recommends regular

screening of at-risk groups and the general population for earlier detection and treatment of asymptomatic RTBI cases that would help reduce the high incidence of reproductive tract bacterial infections. Further, the study recommends that healthcare providers should follow new guidelines that recommend third-generation cephalosporins while avoiding tetracycline and penicillin for the treatment of *Neiserria gonorrhoea* among women of reproductive age.

Author Contribution

Mwendwa A, led the study, including conceptual development, funding acquisition, project management and preparation of the initial manuscript draft. Menza N, provided critical review and substantive editing of the manuscript while Muturi M. contributed to the conceptualization of the study.

Conflict of Interest: The authors declare that there are no conflicts of interest associated with this manuscript.

REFERENCES

1. World Health Organization (2019) *Reproductive tract infections: global incidence and health implications*. Geneva: World Health Organization.
2. Rowley, J.T., Park, S. and Burke, R. (2019) Global incidence and treatment challenges of bacterial reproductive tract infections in women, *The Lancet Infectious Diseases*, 19(6), pp. 683–693. doi:10.1016/S1473-3099(19)30001-4.
3. Unemo, M., Seifert, H.S. and Hook, E.W. (2018) Gonococcal infections: current challenges and treatment strategies, *The Lancet Infectious Diseases*, 18(7), pp. 834–841. doi:10.1016/S1473-3099(18)30092-2.
4. Unemo, M. (2014) Current and future antimicrobial treatment of gonorrhoea—the rapidly evolving problem of antibiotic resistance, *Journal of Antimicrobial Chemotherapy*, 69(9), pp. 1739–1748. doi:10.1093/jac/dku161.
5. National AIDS and STI Control Programme (NASCOP) (2016) *Guidelines on management of sexually transmitted infections*. Nairobi: Kenya Ministry of Health.
6. Odongo, F. and Ochieng, R. (2021) Access to healthcare and reproductive health in rural Kenya, *International Journal of Healthcare*, 18(4), pp. 250–260.
7. Adams, R. and McDonald, B. (2018) The impact of reproductive tract infections on reproductive health: a global perspective, *The Lancet Global Health*, 7(5), pp. 743–755. doi:10.1016/S2214-109X(18)30120-5.
8. Muthoni, G., Ochieng, M. and Mbuthia, J. (2020) Incidence of reproductive tract infections in Kenyan women: a study of Homabay County, *Kenyan Journal of Public Health*, 22(3), pp. 134–145.
9. Fisher, L., Davis, M., Strauss, M., Yahil, A. and Huchra, J. (1998) Self-designing clinical trials', *Statistics in Medicine*, 17(14), pp. 1551–1562. doi:10.1002/(SICI)1097-0258(19980730)17:14<1551::AID-SIM882>3.0.CO;2-E.
10. Nugent, R.P., Krohn, M.A. and Hillier, S.L. (1991) Reliability of diagnosing bacterial vaginosis is improved by a standardized method of Gram stain interpretation, *Journal of Clinical Microbiology*, 29(2), pp. 297–301. doi:10.1128/jcm.29.2.297-301.1991.
11. Kenyon, C., Osbak, K. and Crucitti, T. (2018) The epidemiology of syphilis reinfections: a review, *Sexually Transmitted Infections*, 94(6), pp. 372–378. doi:10.1136/sextrans-2017-053503.
12. World Health Organization (2020) *Reproductive tract infections: global epidemiology and challenges*. Geneva: World Health Organization.
13. David, A. and Michael, P. (2015)The role of *Lactobacillus* in maintaining vaginal health: a microbiological perspective, *Microbial Ecology I n Health and Disease*, 26(1), pp. 150–167. doi:10.3402/mehd.v26.27936.
14. Lin, X., Wang, Y. and Li, H. (2018) The role of *Lactobacillus* in vaginal health and its relationship with bacterial vaginosis', *Frontiers in Microbiology*, 9, 1942. doi:10.3389/fmicb.2018.01942
15. King, C. and Martin, D.H. (2020) 'The pathogenesis and clinical manifestations of *Neisseria gonorrhoeae* infections', *Clinical Microbiology Reviews*, 33(2), e00165-19. doi:10.1128/CMR.00165-19.
16. Unemo, M., Bradshaw, C.S., Hocking, J.S., de Vries, H.J.C., Francis, S.C., Mabey, D. and Fairley, C.K. (2017) 'Sexually transmitted infections: challenges ahead', *The Lancet Infectious Diseases*, 17(8), pp. e235–e279. doi:10.1016/S1473-3099(17)30310-9.
17. Radolf, J.D., Bavoil, P.M. and Johnson, R.C. (2020) 'Reproductive tract infections and their impact on human health', *The Lancet Infectious Diseases*, 20(4), pp. 521–529. doi:10.1016/S1473-3099(19)30611-4.
18. Rowley, J., Unemo, M. and Low, N. (2020) 'Asymptomatic infections in sexually transmitted infections: the hidden burden', *The Lancet Infectious Diseases*, 20(4), pp. 425–435. doi:10.1016/S1473-3099(19)30663-1.
19. World Health Organization (2016) *Global health sector strategy on sexually transmitted infections 2016–2021*. Geneva: World Health Organization.
20. Golparian, D., Shafer, W.M. and Unemo, M. (2020) 'Challenges of untreatable gonorrhoea: recent advances and future treatment strategies', *Expert*

Review of Anti-infective Therapy, 18(10), pp. 977–991. doi:10.1080/14787210.2020.1797484.

21. Unemo, M. (2014) 'Current and future antimicrobial treatment of gonorrhoea—the rapidly evolving problem of antibiotic resistance', *Journal of Antimicrobial Chemotherapy*, 69(9), pp. 1739–1748. doi:10.1093/jac/dku161.
22. Beale, M.A., Marks, M., Sahi, S.K., Tantalo, L.C., Nori, A.V., French, P. and Lukehart, S.A. (2019) 'Genomic epidemiology of syphilis reveals independent emergence of macrolide resistance across multiple circulating lineages', *Nature Communications*, 10(1), pp. 1–10. doi:10.1038/s41467-019-11230-0.

Cite This Article: Alice, K. M., Menza, N. C., & Muturi, M. W. (2026). Incidence and Antibiotic Susceptibility Profiles of Bacteria Causing Reproductive Tract Bacterial Infections Among Women of Reproductive Age Attending Homabay County Teaching and Referral Hospital, Homa Bay County, Kenya. *EAS J Parasitol Infect Dis, 8*(4), 118-125. https://doi.org/10.36349/easjpid.2026.v08i04.002