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PREVALENCE OF SYPHILIS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE CLINIC AT JINJA REGIONAL REFERRAL HOSPITAL.A CROSS-SECTIONAL STUDY.

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ABSTRACT

Introduction

Syphilis infection among pregnant women has been and still is a threat in Uganda and the world at large. The objectives of the study aimed at assessing the prevalence of syphilis among pregnant women attending antenatal care clinics at Jinja Regional Referral Hospital.

Study method

A descriptive cross-sectional study of quantitative approaches was conducted among a simple random sample of 85 pregnant women from September to October 2023. A questionnaire was used to collect information about the demographic factors and various risk factors associated with syphilis infection. The blood samples collected were tested for syphilis using the Rapid Plasma Reagan (RPR) test and results were analyzed using Microsoft Excel, and presented in the forms of tables, graphs, and pie charts.

Results

Results from the study revealed that syphilis prevalence among pregnant women was 10.6%, with a history of sexually multiple sexual partners being the most significant risk factor. The age group that was mostly affected by syphilis infections among the participants was 25-29 years old.

Conclusions

Conclusively, according to the results of this study, syphilis prevalence among pregnant women still showed high percentages. History of multiple sexual partners was the most prevalent factor associated with syphilis infection, with the most positive cases being 25-29 years old.

Recommendations

Much emphasis should be put on point care Tests (POCTS) for all pregnant mothers at each of their antenatal care visits, awareness about prevention and control of syphilis and other STIs to the public, and effective health education programs to females at childbearing age about the health benefits of full antenatal care services.

Keywords: *Syphilis, Pregnant Women, Antenatal Care Clinic, Jinja Regional Referral Hospital.*
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Background of the study

Syphilis is a systemic disease caused by Treponema Palladium which can be spread by sexual contact, and blood transfusion it is a classic example of a disease that effective public health measures can successfully control due to the availability of a sound diagnostic test and effective public and economical treatment options

The signs and symptoms of syphilis vary depending on which of the four stages it presents (primary, secondary, latent, and tertiary stage). The primary presents with a single chancre (firm, painless, non-itchy skin ulceration between 1cm to 2cm in diameter) though there may be multiple sores. In secondary syphilis, a diffuse rash occurs, which frequently involves the palms of the hands and soles of the foot and there may also be sores in the mouth and vagina. In latent syphilis, which can for years there are few or no symptoms. In tertiary syphilis, there is soft, non-cancerous growth, and heart or neurological problems. Syphilis has been known to cause symptoms similar to any other disease.

According to the result findings from the United States in 2018, 114,048 cases of all stages of syphilis were reported including 35063 cases of primary and secondary syphilis which are the most infectious stages of the disease (Centre for Disease Control and Prevention, 2018).

Additionally, after the lowest possible prevalence achievement between 2000 and 2013, rates of primary and secondary syphilis among women and congenital syphilis rose by 172% and 185% between 2014 and 2018, respectively (Emily HMD, Adhikari *et al.*,2020).

Syphilis is curable at its early stages and so can be successfully controlled by effective public health measures, through sound diagnostic tests and economical treatment options (H Gere Mew, 2021). However, if left uncontrolled, syphilis among pregnant women is a serious health problem that is usually the main cause of constantly increasing cases of stillbirths, neonatal deaths, blindness, and deafness among newborns and spontaneous miscarriages among pregnant mothers (Simiyu, Andrew, 2021). Therefore, this makes it the number one cause of morbidity and mortality in

association with the increased risk of HIV contraction in developed and developing countries. In addition, congenital syphilis is an example of vertical transmission and is usually life-threatening to the fetus, if the maternal infection is not detected on time and treated early in the pregnancy. And congenital syphilis can lead to the following stillbirth and low birth weight and babies born with congenital syphilis experience deformed bones, anemia, skin rashes, and many others (Syphilis: women-Health, 2022). For instance, in the United States, since 2013, the rate of congenital syphilis has increased each year. In response to the alarming rates of syphilis, in 2016, the World Health Organization released a new strategy to combat sexually transmitted infection from 2016 to 2021, and the strategy prioritizes the elimination of congenital syphilis by implementing comprehensive syphilis screening and treatment among women, as well as in specific population with a goal of 90% reduction in syphilis incidence globally and so or fewer cases of congenital syphilis per 100,000 live birth in 80% of the countries by 2030 (Kojima N, Klaussner JD, *et al.*,2018). From 2015 to 2018, 11 countries and territories have been validated as having eliminated mother-to-child transmission of syphilis (MTCT). So far, each WHO region has developed plans to address the greatest STI control challenges and their regional strength. Report from STI regional advisors at the STI surveillance meeting held in February 2018 indicates the advancement of STI priorities with regional and country programming (A report on global sexually Transmitted Infection Surveillance, 2018).

Nevertheless, in high-income countries, syphilis remains high among selected populations such as homosexuals, female sex workers, and many others, while in low and middle income it is still endemic (Syphilis: Women Health,2022).

In Africa, the overall syphilis prevalence in pregnant women ranges from 4% to 15% and untreated early syphilis will result in stillbirth in 25% of pregnancies and 14% of newborns. a study across 43 Sub-Saharan African counties has shown that adverse outcomes such as stillbirth, neonatal death, low birth weight, and congenital syphilis occur in 20,6000 pregnancies each year (Tareke K,2019).

Conclusively, Uganda is inclusive of the endemic areas infected by syphilis, and also one of the African countries with high existing cases of syphilis among women and congenital syphilis among newborns of which not all information has been acquired due to the relatively low percentage of pregnant women attend all the four antenatal care visits (59.9%), and also due to low coverage of screening in ANC clinic (WHO, 2018). Therefore, there is an alarming need to conduct a study on the prevalence of syphilis among pregnant women attending the Antenatal Care Clinic at Jinja Regional Referral Hospital in Jinja district, to meet the World Health Organization strategy upon elimination of congenital by the year 2030.

Specific objectives

- To evaluate the prevalence of syphilis among pregnant women attending antenatal care clinics at Jinja Regional Referral Hospital.
- To evaluate the various risk factors associated with syphilis infection among pregnant women attending the antenatal care clinic of Jinja Regional Referral Hospital.
- To assess the age group that is mostly affected by syphilis infection among pregnant women attending the antenatal care clinic at Jinja Regional Referral Hospital.

METHODOLOGY

Study design

A cross-sectional study design was used because it was easy and cheap to use

Study area

The study was carried out at the Antenatal clinic of Jinja Regional Referral Hospital, located in Jinja district. Jinja is located in the eastern region of Uganda, 70km from Kampala's capital city; located on a longitude of 33.2 and latitude of 0.45. Jinja Regional Referral Hospital is at latitude: 0025'51" N and longitude:330 12'17" E. starting from September 2023 to October 2023.

Study population

The research study will focus on pregnant women attending antenatal care clinics at Jinja Regional Referral Hospital, Jinja district.

Target population

The target population of the study was pregnant women who turned up for antenatal care services from September to October 2023 at Jinja Regional Referral Hospital, Jinja district.

Sample size determination

The sample was calculated using the formulan=z2pq according to
d2
(Kish andLeslie1965**),** where
N: is the desired size
z: is the standard deviation taken as 1.96 at a confidence interval of 95%
p: the estimated prevalence of syphilis among pregnant women who attend antenatal care, as stated in the previous findings by (Simiyu, Andrew,2021), is 5.9%
Q: the difference between1 and p (1-p) D: is the degree of accuracy=0.05
N= (1.96)2*(0.059) *(1-0.059) (0.05)2
N = (3.8416) *(0.059) *(0.941) (0.0025)
N = (0.2132)
(0.0025)

N=85 respondents
Therefore, the sample size is 85 respondents

Sampling technique
A simple random sampling technique was used to select the desired participants. The method was preferred because it was easy to administer and there was an equal chance for every individual to be selected into the study.

Sampling procedure
The required sample of participants was selected using the lottery method of sampling; each member of the total population was assigned a unique number which was written on similar pieces of paper, folded, placed in a bowl, and thoroughly mixed. Then the blindfolded researcher selected one piece of paper at a time randomly from the bowl without replacement until the required number of participants according to the sample size attained

Data collection method
Data on the various risk factors associated with syphilis infection and the age group at most risk of acquiring the syphilis infection among pregnant women was collected from particular participants who consented using a questionnaire method of data collection. Additional information regarding the prevalence of syphilis was obtained from the syphilis test results.

Data collection tools
A close-ended questionnaire was used as the data collection tool.

Data collection procedure
After confirmed consent from selected participants, a study questionnaire was given to each of them and they were required to fill them accordingly as stated per question. The filled questionnaire was picked from the participants and organized in a file to be used in data analysis.
Results about the syphilis serostatus of the pregnant women were obtained by performing the syphilis RPR test that was done on the participant's venous blood collected in an EDTA vacutainer. It was from these tests that the prevalence was determined.

Study variable
The independent variable for this study was various risk factors associated with syphilis infection and the age group at most risk of acquiring syphilis
The dependent was the prevalence of syphilis

Inclusion criteria
All the pregnant women who agreed to fill out the consent form participated in the study and also all women who attended antenatal care in September and October were included in the study.

Exclusion criteria
All pregnant women who had conditions like severe anemia, and severe malaria, and those who were ill did not participate in the study.

Quality control
The test strips to be used were quality controlled by performing a prior test procedure on known positive and negative samples before the participant's samples. Standard Operating Procedures were also emphasized while performing the tests.

Ethical consideration
After the approval of the research proposal by the institute researcher's supervisor and the committee, an introductory letter (appendix iv) was submitted from the school to the Medical Director/supretendants Jinja Regional Referral Hospital, who in turn introduced the researcher laboratory manager in-charge antenatal care unit, with whom an official consent (appendix v) was made to ensure that all patient's information is kept confidential and not manipulated in any way.

Data analysis and presentation
The data collected was cross-checked for consistency and accuracy. The results were fed into the computer software and data was analyzed using Microsoft Excel which helped in tallying and converting frequencies to percentages. The final information was presented in the form of pie charts, tables, and graphs.

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RESULTS

Table 1: Demographic factors associated with syphilis infection among pregnant women attending antenatal care clinic

Variants	Frequency(N=85)	Percentage%
Marital status		
Married	62	72.94
Single	13	15.29
Divorced	10	11.76
Residence		
Rural	56	65.88
Urban	29	34.12
HIV Sero status		
Positive	5	5.88
Negative	80	94.12
Age clusters		
15-19	4	4.71
20-24	14	16.47
25-29	35	41.18
30-34	19	22.35
35-39	9	10.59
>39	4	4.47

Table 1

According to the results in Table 1, demographic factors considered for this study were marital status, residence HIV Sero status, and age. Information on marital status showed the highest number of participants being married and these presented with the highest percentage 72.94%, 13 were single accounting for 15.29%, and 10 were divorced with a percentage of 11.76%. On residence, the participants recruited were from both rural and urban areas. However, 56 of them were rural dwellers (65.88%) while 29 were urban dwellers (34.12%). Concerning HIV Sero status, 5 of the participants were positive (5.88) while 80 participants were HIV negative (94.12%) Information on age indicates that most of the participants were in the age group (25-29) years accounting for 41.18%

Prevalence of syphilis among pregnant women attending antenatal care clinic
Figure 1: syphilis prevalence (N=85)

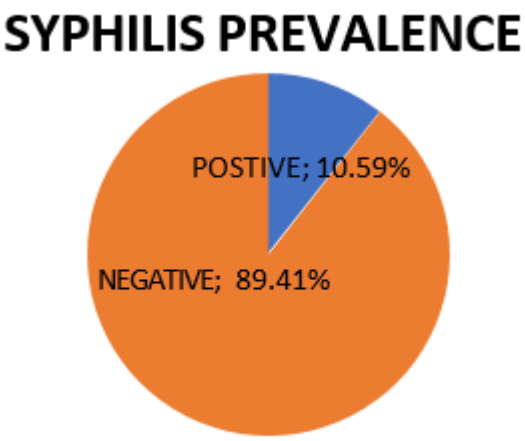

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Figure 1
Figure 1 shows results obtained from a two-month study where a total of 85 pregnant mothers consented to participate. Among these, 9 participants tested positive for syphilis accounting for 10.6%. The syphilis negative cases were 76 also accounting for 89.4%.
various risk factors associated with syphilis infection among pregnant women attending antenatal care clinics.

Table 2: relationship of various risk factors with syphilis prevalence among the participants.

According to information collected from the participants through questionnaire filling, various risk factors associated with syphilis infection and these are all presented in Table 2.

RISK FACTOR	POSITIVE(N= 9)	NEGATIVE(N=7 6)	TOTA L	PERCENT GE OF POSITIVES	PERCENT GE OF NEGATIVES
History of STIs					
Yes	6	2	8	66.67	2.63
No	3	74	77	33.33	97.37
History of multiple sexual partners					
Yes	7	0	7	77.78	0
No	2	76	78	22.22	100
HIV Sero-status					
Positive	5	0	5	55.56	0
Negative	4	76	80	44.44	100
Marital status					
Married	3	58	61	33.33	76.31
Divorced	6	5	11	66.67	6.58
Single	0	13	13	0	17.11
Residence					
Rural	6	50	56	66.67	65.79
Urban	3	26	29	33.33	34.21
Marriage below 18years	0	0	0	0	0
History of	2	14	16	22.22	18.42

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Table 2

According to the information conveyed in Table 2, various risk factors were associated, however the most prevalent of them was a history of multiple sexual partners whose percentage of syphilis positivity was 77.78% followed by a history of sexually transmitted infections with a percentage of 66.67% about syphilis positivity.

HIV status of the participants was less significantly associated with syphilis infection only 5(55.56%) of the pregnant women who tested syphilis positive had HIV, while 4(44.44%) of the syphilis positive were HIV negative and all who tested syphilis negative were HIV negative

Information based on marital status revealed that most of the participants were married. However, divorced women were at high risk of acquiring syphilis (66.67%), compared to married women (33.33%) and single (0%).

According to residence as a factor, most of the participants were rural dwellers (56), where 6 tested positive for syphilis out of the 9-syphilis positive pregnant women with a percentage of 66.67%, and only 3 of urban dwellers were syphilis negative with a percentage of 33.33%

There was no significant relationship between syphilis infection and marriage below 18 years, only 16 participants had a history of abortion and miscarriage. However, this factor was to a very small extent associated with syphilis Sero positivity among the participants (only 2 participants which accounted for about 22.22% of the syphilis-positive women.

Figure 2: Relationship of various risk factors with syphilis infection among syphilis-positive participants.

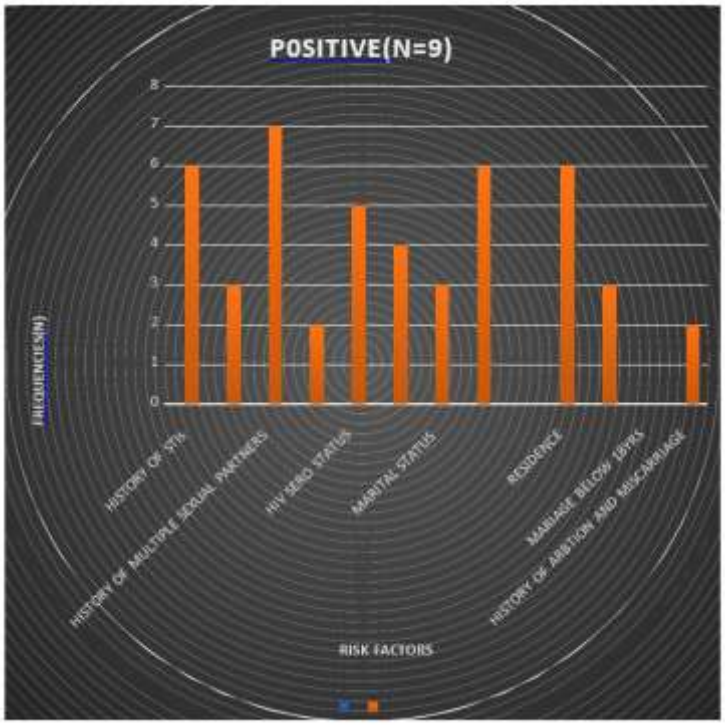

Figure 2

In regards to the syphilis-positive cases, the column graph above conveys all the information regarding the extent of the impact of the various risk factors on the syphilis prevalence among the participants

The age group mostly affected by syphilis infection Table 3: Age distributions among the participant

Age cluster (years)	Positive	Negative	Percentage (%) of positives	Percentage (%) of negatives
15-19	0	4	0	5.26
20-24	2	12	22.2	15.8
25-29	5	30	55.6	39.47
30-34	1	18	11.1	23.68ss
35-39	1	8	11.1	10.53
>39	0	4	0	5.26
Total	9	76	100	100

Table 3

The mean age of the participants was 28 years, ranging from 17 to 41 years. The age group of (25-29) years possessed the highest number of participants (35) with 5 positive cases, rendering it the age group with the highest number of syphilis-positive cases. The other positive cases were (2,1,1 participants) in the age group of (20-24), (30-34), and (35-39) years respectively. All participants who were between the age of (15-19)years and above 39 years were syphilis negative.

Discussion

Prevalence of syphilis infection among pregnant women attending antenatal care clinic

About Figure 1, the data analysis interpretation of results revealed the following findings; it was stated that the prevalence of syphilis among the pregnant women who attended antenatal care throughout the entire study period who tested positive for syphilis and consented to participate in the study was 10.6%. This prevalence was far higher than that stated in the previous study findings carried out by (Simiyu Andrew *et al*.,2021) at Kawaala Health Center 1V, whose prevalence was 5.9%. This could be because the sample size used in this study was relatively low (85 participants) compared to that used in the previous study which was 1169 respondents. This high shoot of syphilis prevalence could be attributed to the high rate of unsafe multiple-sex practices among the participants, which was most rampant among the divorced women. These could not also take the initiative to use protective measures like condoms. For instance, among the 9 syphilis-positive cases,6 participants were divorced and were also attributed to multiple partner sex practices. These findings are in agreement with (Korenromp I E L *et al*.,2018) whose findings clarified that high rates of syphilis seropositivity have consistently been at antenatal in Africa over the past years (3%-18%), which is also relatively similar to findings stated by (Hussein S et al.,2019) whose findings state that the prevalence of syphilis among pregnant women in most parts of sub-Saharan region seemed to have decreased over the past 20 years except for the East African region.

This consistent increase in the prevalence over the years is an indication of poor utilization of antenatal care services by pregnant mothers, and could also be attributed to unsafe sex practices; mostly among middle-aged pregnant women who are sexually active. However, these study findings also contradict the findings by (M A Dahir,2019), in a research study to determine the prevalence of syphilis among pregnant women in Kiryandongo General Hospital whose prevalence was (0.03%) with only 2 positive cases out of 2453 participants

Various associated risk factors of syphilis infection among pregnant women attending antenatal care

According to findings presented in Table 1, a history of multiple sexual partners and a history of sexually transmitted infections were most significantly associated with syphilis infection among the participants with (77.78%) and (66.67%) respectively. This could be probably due to the high sexual activity among pregnant women since findings from the study also clarify that most of these participants were in the age group of (25-29) years. Also, the history of STIs among the participants as a significant factor is attributed to practicing multiple partner sex, probably without the use of condoms. Findings from this study revealed that among the syphilis-positive cases, 7 of them had a history of multiple partner practices, and only 2 of them practiced safe sex. Additionally, among those who practiced multiple partner sex, 6 of them had a history of Sexually Transmitted Infections. These findings are in agreement with those of another study by (the CDC, S Trivedi *et al*., 2020) which concluded that the most significant risk factors associated with syphilis were a history of more than one sexual partner in the past year (30%) and history of Sexually Transmitted Infections (43%). Therefore, these findings imply that there is still limited awareness about the use of condoms during sexual practices and the impacts of multiple-partner sex practices among people in the general population.

Another factor associated with syphilis infection among the participants was the HIV sero- status where 5 (55.56%) of the participants had syphilis-HIV co-infection. This could be due to low immunity imposed by HIV, and these patients could easily acquire syphilis. This finding is in agreement with study findings by (Tadesse A., Geda A., et al., 2022) which made it clear that participants who were HIV positive had a higher risk of syphilis infection. Information about marital status showed that most of the participants were married (61), summing to a percentage of 76.31% of all the participants. However, divorced pregnant women were at a higher risk of acquiring syphilis infection. Findings from the results showed that among the syphilis-positive cases, 6 (66.67%) of them were divorced while 3 were married (33.33%), whereas all the divorced pregnant women had a history of multiple sex partners. This implies that these divorced women were always engaged in practicing multiple partner sex, as a natural desire for the body's sexual satisfaction. And probably, this practice was done without the use of condoms as a protective 23 gear. These findings contradict those by (K Tareke *et al*.,2019), stating that marital status had no significant association with the disease, all the syphilis-positive cases (4) were found to be married cases (2.0%). With the factor of residence, most of the participants were rural dwellers (56), and 6 of them tested syphilis positive (66.67%). This could be due to the low level of awareness about STIs among the rural residents due to low level of education, and also the struggle to acquire basic needs due to poverty and unemployment pushed many into practicing multiple partner sex. This is also in agreement with findings by(Kiros et al., 2019) which state that the likelihood of syphilis was almost 3 times higher among rural residents compared to urban residents. However, in contrast to the above, according to (C A. Opone et al., 2019), women from urban areas had a 3.22% increased

risk of acquiring syphilis compared to rural dwellers. This difference could be simply because this study was carried out in a state that is an urban area (Akwa Ibom state) with high populations compared to rural areas. Marriage below 18 years was not associated with syphilis infection among the participants. This is because most of the girls below the age of 18 years are still schooling, and these are closely in schools and by parents not to engage in sexual affairs. History of abortion and miscarriage among the participants was less significantly associated with syphilis infection; where findings show that only 16 participants had a history of an abortion or miscarriage; and among these only 2 were syphilis positive (22.22%).

Concerning demographic factors in the findings from Table 2, the highest percentage of the participants were of the age group of (25-29) years, were married, were rural dwellers, and as well HIV negative. This could simply mean that most of the participants in the age group of (25- 29) years were sexually active and therefore also got engaged in marriage at such an early age. Most of these participants were rural dwellers because most of them would prefer residing in rural areas where their paternal and maternal homes were located, and also due to the relatively affordable costs of living in rural areas that were in favor of them. Additionally, most of the participants were HIV-negative since the majority of them practiced safe sex except a few participants. Among the demographic factors, age, marital status, residence, and HIV Status are significantly associated with syphilis infection. This is in agreement with findings from a study 24 carried out by (K Tareke *et al*., 2019), whose results indicate that syphilis infection was 10 times higher in divorced women, and 3 times higher among rural residents compared to urban residents.

The age group mostly affected by syphilis infection

The biggest number of participants were of the age group of (25-29) years. Among these, 5 tested positive for syphilis, rendering it the age group with the highest number of syphilis-positive cases. This could be because these participants of the age group (25-29) years are sexually active.

This could also be due to the high birth rate among people of this age group, which in turn led to their high percentage attendance at antenatal care clinics; which was not the case with those in the age groups of (15-19) and greater than 39 years. To some extent, this finding is in agreement with findings from another study carried out by (Lamedeen et al., 2022) which revealed that 23–29-year-olds had the highest syphilis positivity than the other age groups.

However, these findings contradict those from a study by (K Tareke *et al*., 2019) which stated that most of the cases were of 40 years and above age group (28.5%).

The age group of (15-19) and greater than 39 years had the least number of participants (4 and 4 respectively).

Conclusions

The objectives of the study specifically sought to assess the prevalence of syphilis, evaluate the various risk factors associated with syphilis infection, and determine the age group mostly affected by syphilis infection among pregnant women attending antenatal care clinics at Jinja Regional Referral Hospital.

Regarding the above objectives, the study findings revealed that; The prevalence of syphilis among pregnant women was 10.6%.

The risk factors significantly associated with syphilis infection were a history of multiple sexual partners (77.78%) and a history of sexually transmitted infections (66.67%). The age group mostly affected by syphilis infection was found to be (25-29) years, with the age ranges of the participants being 17-41 years, and the average being 28 years. Given these findings, it is therefore concluded that syphilis among pregnant women is still a health threat in Jinja and Uganda at large since the prevalence stated in this study is just a 25 synopsis of the national syphilis prevalence. This therefore calls for attention to the Ugandan health agencies and the Ministry of Health to look forward to laying corrective strategies to reduce the high shooting syphilis prevalence to at least as low as 0.5%.

Recommendations

Based on the conclusions made above, the following recommendations were suggested;

The high syphilis prevalence among the participants could be minimized by ensuring that at all government health facilities, Point of Care Tests are introduced and managed efficiently by hospital medical supretendants and managers in charge of antenatal care units. This could be done to all pregnant mothers at each of their antenatal care visits to aid first and efficient treatment of the positive cases.

Awareness about the control and prevention of syphilis infection and other sexually transmitted infections should be made clear among populations in the public both in urban and rural areas by the low-level facility personnel and village health teams. This will help improve the sexual behaviors of people in societies and would also help bring to light the values of practicing safe sex.

More sensitization and effective health education programs should be organized by the Ministry of Health to target females of childbearing age, conveying to them the health benefits of receiving full antenatal care services particularly, their partners, and their unborn babies

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LIST OF ABBREVIATIONS

ANC: Antenatal Care Clinic
AOR: AdjustableOdds Ratio
CDC: Center for Disease Control and Prevention
CI: Confidence Interval
ET AL: And Many Others
FT-ABS: Fluorescent Treponema Antibody-Absorption
HIV: human immune-deficiency Virus
JRRH: Jinja Regional Referral Hospital
MTCT: Mother to Child Transmission
RPR: Rapid Plasma Reagin
SDG3: Sustainable Development Goal 3
STD: Sexually Transmitted Disease
STI: Sexually Transmitted Infections
TPHA: Treponema Palladium Hem Agglutination Assay
VDRL: VenerealDisease Research Laboratory
WHO: World Health Organization

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Conflict of interest

No Conflict of interest

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