

Prevalence of *Trichomonas Vaginalis* Infection and Associated Risk Factors amongst Women of Childbearing Age Attending the Bamenda Regional Hospital

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ABSTRACT

Trichomonas vaginalis which colonizes the urogenital tract of humans, is a sexually transmitted parasite that causes the disease trichomoniasis, the most common non-viral sexually transmitted disease in the world. Infection with *Trichomonas vaginalis* can go undiagnosed and it is mostly transmitted by asymptomatic carriers. The public health importance of the problem is underlined by the fact that trichomoniasis is prevalent in women of reproductive age and is associated with serious adverse reproductive outcomes. This infection may lead to the risk of HIV transmission and other STDs. It may cause chronic inflammation of the urogenital tract which may lead to infertility.

Objectives

The aim of this study was to determine the prevalence and associated risk factors of *Trichomonas vaginalis* infection amongst women of childbearing age attending the Regional Hospital of Bamenda.

Method

In essence, we contacted 347 women for this study, but only 312 completed their questionnaires and gained admission into this study, giving a participation rate of 89.9%. This was a hospital based cross-sectional study which was carried out in the RHB from the 3rd December 2022 to the 19th of September, 2023 during which a total number of 312 participants were conveniently selected.

Data was collected using a well-structured questionnaire that was administered to participants who agreed to sign the informed consent form and laboratory investigations were used to ascertain the prevalence of the infection. Vaginal discharge of participants was collected with the help of a vaginal swabs. A wet mount was prepared from the collected samples and mounted on the microscope for the observation of motile trichomonads.

Results

The prevalence of *T. vaginalis* was 5.77% against 94.23% of the population that did not show positive for *T.*

vaginalis. Although the prevalence is relatively low, but it is significant, P-value <0.001 at 95% confidence interval when we compare the demographic characteristics in relation to the infected population. majority 85.9%, of the participant were sexually active and double to having multiple sex partners and this same group showed the highest prevalence of T. vaginalis with a prevalence of 5.45% while just 0.35% said they were not sexually active and tested positive for T. vaginalis. About 53.85% of the respondents used pit toilet closely followed by 21.15% who used the water system toilet and this study noted that the prevalence of T.vaginalis was unavoidably high among participants who used pit toilet and other unspecified toilet systems. 3.2% of respondents usually use oral contraceptives and showed occurrence of T. vaginalis while 2.56% did not use to use oral contraceptives regularly but were infected with T. vaginalis while majority of those who did not use condoms during sexual intercourse tested positive for T.vaginalis (figure 5) and these findings were however statistically significant ($p \leq 0.001$). the highest occurrence of Trichomonas vaginalis infection was seen among those who felt pain during Urination and those who had excess virgina discharge 6.3% and 6.7% respectively. A statistically significant (p -value ≤ 0.001) portion of study had virgina itches and tested for T.vaginalis

Conclusion and Recommendation

A relatively high prevalence of 5.77% was observed in this study. Factors such as having multiple sex partners, using dirty toilets and not using condoms during sexual intercourse were found to be statistically related with T. vaginalis infection. Single people had a higher prevalence than the married for the infection to T.vaginalis. The occurrence of the disease was found to be directly associated with having multiple sexual partners, no use of condoms during sexual intercourse and lack of hygiene.

Use other methods such as PCR, culture for the diagnosis of T. vaginalis in our hospital setting as the sole use of wet mount microscopy have low sensitivity.

Key words: Trichomonas vaginalis, risk factors, childbearing

BACKGROUND

Trichomonas vaginalis is an anaerobic, flagellated protozoan parasite and the causative agent of a sexually transmitted disease called trichomoniasis. It is the most common pathogenic protozoan that infects humans in industrialized countries. The flagellated protozoan parasite Trichomonas vaginalis, occurring in the human urogenital tract, is the etiological agent of trichomoniasis, the most common worldwide non-viral sexually transmitted infection (STI) [1]. Approximately 180 million women worldwide and 3 million women in the United States are infected every year by T. vaginalis. Who estimates that 173 million of new cases occur annually. Trichomonas vaginalis is a sexually transmitted pathogen with the highest annual incidence of all curable and non-viral STIs. By 2008, the prevalence of T. vaginalis was higher than Chlamydia trachomatis (100.4 million), Neisseria gonorrhoeae (36.4) and Treponema pallidum (36.4) infections combined. In addition, trichomoniasis is the most common parasitic infection in the US, affecting an estimated 3.7 million persons nationwide, including 2.3 million women and 1.4 million men [2]. The prevalence and incidence of vaginal trichomonas infection is high in Africa region and Americas than in other parts of the world with an incidence of 144/thousand and a prevalence of 28.1 million of women infected with T. vaginalis [3]. Vaginal T. vaginalis infections in the entire African region are estimated to be 42.8 million [4]. Cameron and Padian observed that T. vaginalis infection ranges from 5% to 10% in healthy women populations while it could be as high as 50% in prostitutes and female prisoners [5]. Despite the estimated large burden of T. vaginalis infection in the African region, data on clinical presentation, demographic and behavioral factors associated with infection, and microbiological factors are relatively limited. However, in other continents, multiple studies have been done in the context of T. vaginalis infections. T. vaginalis prevalence has been reported for a few African countries and ranges from 6.5% to 40%. One of the explanations for the often-high T. vaginalis prevalence is the lack of STI screening programs and limited control measurements. The estimated burden of disease is significant but available data on symptomatology, coinfections and pathogen load are limited. This study to determine the prevalence and associated risk factors of Trichomonas vaginalis infection amongst women of child bearing age attending the Bamenda Regional Hospital.

Problem Statement

Trichomoniasis is a parasitic infection that can go undiagnosed for years and is mainly transmitted by asymptomatic carriers. The public health importance of the problem is underlined by the fact that *T. vaginalis* infection is prevalent in women of reproductive age, and is associated with serious adverse reproductive outcomes. This infection may also increase the risk of human immunodeficiency virus (HIV) transmission and other STD infections which are observed significantly more frequently in women. Infection may cause chronic inflammation of the urogenital tract, which may lead to infertility. Several studies report that patients with *T. vaginalis* infection display deleterious outcomes in reproduction. The incidence and severity of cervical dysplasia is associated with trichomoniasis. Probably, the true prevalence of *T. vaginalis* is higher due to its frequent asymptomatic course. This parasite is not routinely screened in asymptomatic patients and the infection can persist for 3–12 months in the genital tract. This study helped to determine the prevalence of trichomoniasis amongst women of childbearing age attending the Regional Hospital Bamenda and improve knowledge on the role of the parasite in human infertility.

MATERIALS AND METHOD

Study Site

This study was carried out at the Bamenda Regional Hospital Laboratory Microbiology unit. The Regional Hospital Bamenda is located in the Azire Health Area, Bamenda 11, Mezam division, North West Region of Cameroon. The hospital is bounded to the North by the Ntamulung Health Area, to the South by the Atuakom Health Area, to the West by the Alakuma health area, and to the East by the Ntambang Health Area. Bamenda is the chief town of the North West Region which is a multicultural and metropolitan town whose inhabitants are engaged in various socio-economic activities. The town has both government and private hospitals taking care of over 650 360 inhabitants and other villages around its localities as of 2011 demographic data.

Study Design

This was a descriptive hospital based cross-sectional study. The study subjects were women of childbearing age from 15-45 years old attending the RHB and were conveniently selected. All participants who came for consultation and were directed to the laboratory for any urinary tract infection was contacted for the study immediately.

Study Duration

This study was conducted from the 3rd December 2022 to the 19th of September, 2023.

Inclusion/Exclusive Criteria

Women of childbearing age within the age range (15-45years) and that have willingly signed the inform consent form and answered the questions in the questionnaire form were included in this study.

Women of child bearing age who signed the consent form but were on their period were however excluded from the study.

Ethical Consideration

An administrative authorization from the Regional Delegation of Public Health for North West Region and administrative authorization from the General supervisor of the Regional Hospital Bamenda was obtained and permission from the major of the regional hospital Bamenda laboratory. The ethical clearance to carry out this study was obtained from the Ethical Review Committee/Institutional Review Board of the University of Bamenda. Only participants who agreed to take part in the study after clear explanation about the research work were asked to sign the consent form and fill the questionnaire.

Laboratory Procedure

The method used to detect *T. vaginalis* in this study was direct wet mount microscopy. This method is the most commonly used method for *T. vaginalis* diagnostic in clinical settings all over the world including Cameroon, as it is easy to perform, inexpensive, and available in almost all the health care settings. Wet mount microscopy is a simple procedure, giving fast results, needing only the microscope and trained personnel. For these reasons it is the test of choice not only in resources poor settings but also worldwide.

Wet mount microscopy is reported to have low sensitivity as compared to the other diagnostic methods but it has a specificity of 100% as compared to the other methods. The specificity of wet mount remains high as it involved direct visualisation of the parasite.

The sensitivity is affected by delay in transporting or processing of the sample as organisms often die during transfer. To minimize lower sensitivity, the specimen was examined within 10 to 20 minutes of collection for better results as when delayed organism loses its motility.

Sample Collection

The study required the collection of vaginal discharge. The subjects were informed about the VS (vaginal swab) procedure. The subjects were identified and registered by allocating a code to each subject. All the activities in the laboratory were carried out while wearing the appropriate personal protective equipment (disposable protective hand gloves, closed shoes and a long sleeved laboratory coat). Vaginal swab was collected as follows;

1. Before collection, the participant's code was written on the sterile vaginal vagnet
2. The spread sheet was placed on the bed inside the collecting room.
3. The participant was asked to remove their under wear and lie in a lithotomy position on the bed.
4. The swab was held by placing the thumb and forefinger in the end of the sterile swab stick.
5. The sterile swab stick was carefully inserted in to the inside opening of the vagina about 2 inches and gently rotated for 10-20 seconds. Making sure that the swab touches the wall of vagina so that moisture is absorbed by the swab.
6. The swab was withdrawn without touches the skin and placed into the sterile vagnet, close and place into the transportation flask.
7. The participant was asked to dress up and the flask was immediately brought to the lab for immediate analysis.

Sample Analysis

In the lab, the sample was analyzed as soon as possible as follows;

1. 50ul (1drop) of normal saline was placed on a labeled microscope slide with the help of a syringe
2. The specimen obtained using sterile swab stick was mixed gently with the normal saline.
3. The preparation was covered with a coverslip
4. It was then immediately focused on the microscope using the 10X objective and observed using the 40X objective with the condenser iris closed sufficiently to give good magnification

Result

A Positive result was defined by the presence of one or more Trichomoads with its characteristic morphology (pear-shape,) and jerking motility.

Data Analysis

The data was analysed using the Statistical Package for Social Sciences (SPSS) version 20.0 and result was presented in graphs and tables while the p value was determined at a confidence interval of 95% as follows

RESULTS

Distribution of Demographic Characteristics of Respondents and Frequency of Trichomonas Vaginalis in Each Category.

In essence we contacted 347 women for this study , but only 312 completed their questionnaires and gained admission into this study, giving a participation rate of 89.9%. From table 1, the mean age of the participants was 30.6 and S.D \pm 11.8.

The age group 21 – 25 accounted for majority of infected cases of the total population with the highest prevalence of T. vaginalis most of those infected had attended only secondary school level. The table presents detailed findings from the 312 women who took part in this study.

Table 1: Distribution of respondents and frequency of Trichomonas vaginalis for respect to Demographic data.

Demographic Information	Category	Frequency (N=312)	Percent (%)	Frequency (n) of T. vaginalis infection
Age	Mean	30.6	-	-
	S.D.	11.8	-	-
	15 - 20 years	34	10.8	5
	21 - 25 years	117	37.5	7
	26 - 30 years	89	28.5	6
	31 - 45 years	72	23.07	0
Level of Education	Primary	103	33.01	5
	Secondary	147	47.11	11
	University	62	19.87	2
Occupation	Housewife	80	25.64	4
	Student	39	12.5	3
	Business	174	55.76	9
	Nurse	6	1.92	0
	Civil servant	13	4.16	2
Marital status	Married	80	20.83	4
	Single	232	79.16	14
Religion	Christian	272	87.17	13
	Muslim	40	12.82	5

Source: The researcher 2023.

The prevalence of T. vaginalis was 5.77% against 94.23% of the population that did not show positive for T.

vaginalis. Although the prevalence is relatively low, but it is significant, P-value <0.001 at 95% confidence interval when we compare the demographic characteristics in relation to the infected population.

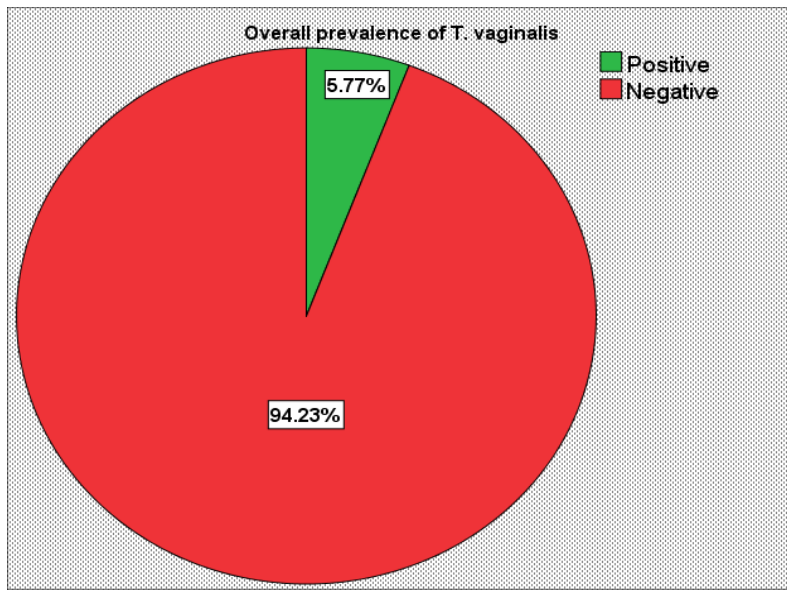


Figure 1: Overall prevalence of T. vaginalis amongst women of childbearing age consulting at the Regional Hospital Bamenda.

Distribution of Respondents Based on the Associated Risk Factors to T. Vaginalis and Prevalence.

Distribution of respondents based on whether they were sexually active/ have multiple sex partners and the occurrence of t. vaginalis.

From Figure 2, majority 85.9%, of the participant were sexually active and double to having multiple sex partners and this same group showed the highest prevalence of T. vaginalis with a prevalence of 5.45% while just 0.35% said they were not sexually active and tested positive for T. vaginalis.

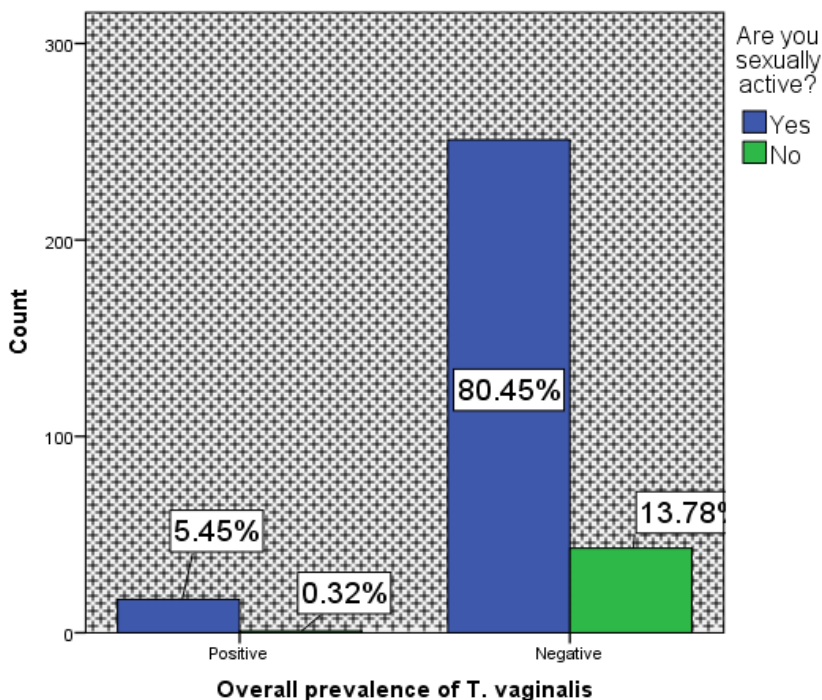


Figure 2: Distribution of respondents based on whether they were sexually active and the Occurrence of T. vaginalis.

Distribution of respondents based on the type of toilet used as well as weather they practice douching and the occurrence of t. vaginalis with respect to the type of toilet used.

From Figure 3, in majority, 53.85% of the respondents used pit toilet closely followed by 21.15% who used the water system toilet and this study noted that the prevalence of T.vaginalis was unavoidably high among participants who used pit toilet and other unspecified toilet systems. The occurrence of T. vaginalis was highest (3%) among those who used the Pit toilet and lower (1%) among those who used the water system toilets. equal douching was mentioned by most infected individuals.

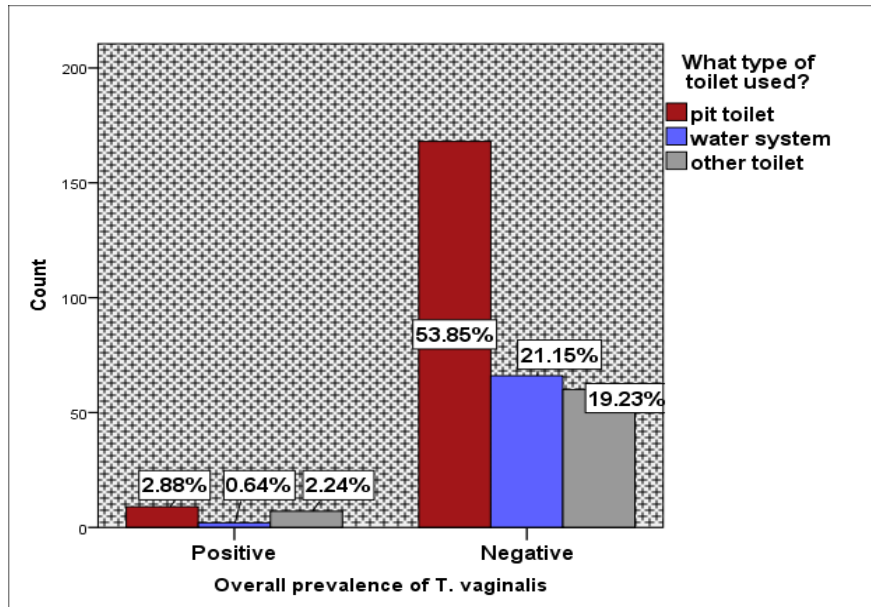


Figure 3: Distribution of respondents based on the type of toilet used and the Occurrence of T. vaginalis with respect to the type of toilet used.

Distribution of respondents based whether they use Oral contraceptives/condoms and the Occurrence of T. vaginalis with respect to such practice.

From Figure 4, 3.2% of respondents usually use oral contraceptives and showed occurrence of T. vaginalis while 2.56% did not use to use oral contraceptives regularly but were infected with T. vaginalis while majority of those who did not use condoms during sexual intercourse tested positive for T.vaginalis (figure 5) and these findings were however statistically significant ($p \leq 0.001$).

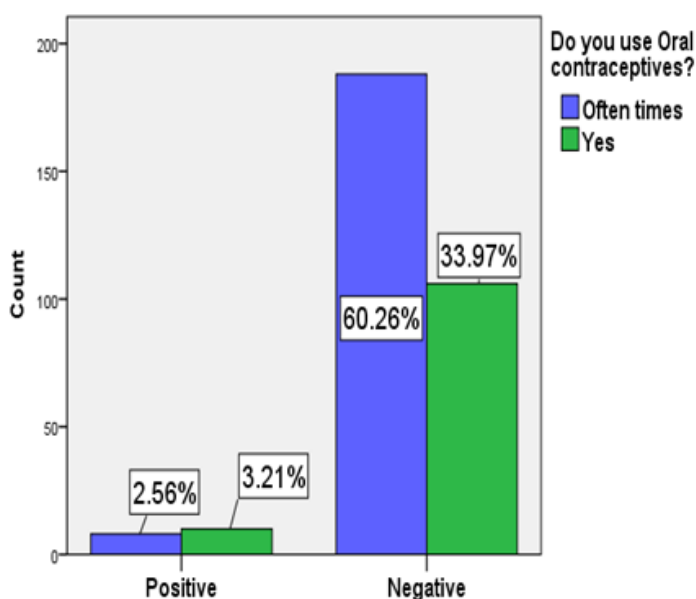


Figure 4: prevalence of T. Vaginalis/oral contraception

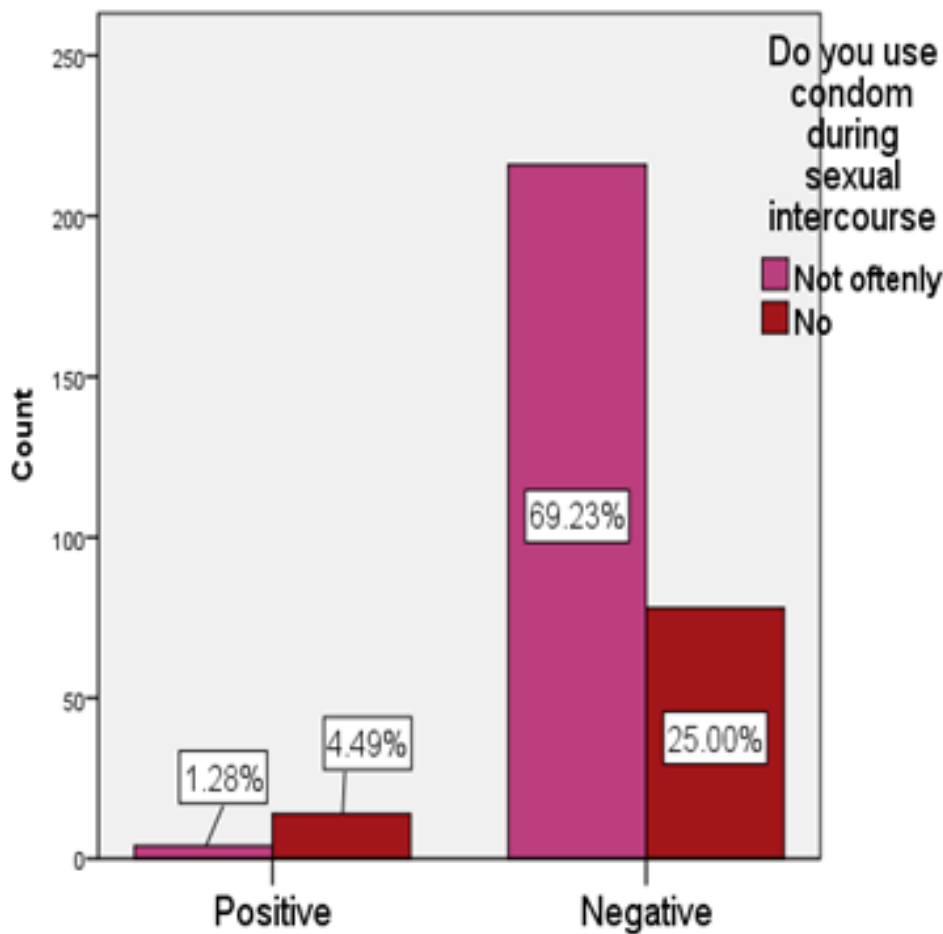


Figure 5: prevalence of T. Vaginalis/use of condom

Figure 4&5: Distribution of respondents based whether they use Oral contraceptives/ Condoms and the Occurrence of T.vaginalis with respect to such practice.

Correlation of the Occurrence of T. Vaginalis with Respect to the Signs and Symptoms.

From table 2 below, the highest occurrence of Trichomonas vaginalis infection was seen among those who feel pain during Urination and those who had excess virgina discharge 6.3% and 6.7% respectively. A statistically significant (p-value ≤0.001) portion of study had virgina itches and tested for T.vaginalis.

To determine the occurrence of T. vaginalis based on the mentioned symptoms is relatively not significant, P-value 0.1 for the feeling of pain during urination, P-value 0.2 the feeling of pain during sexual intercourse, P-value 0.05 and whether there was discharge.

Table 2: Correlation of the Occurrence of T. vaginalis with respect to the Signs and symptoms.d

Factors determining the signs and symptoms of T. vaginalis infection	Overall prevalence of T. vaginalis	
	Positive	Negative
Do You feel pain during Sexual intercourse?		
Yes	17 (6.3%)	251 (93.7%)
No	1 (2.3%)	43 (97.7%)

Do You suffer from vaginal itches?		
Most times	18 (12.5%)	126 (87.5%)
No	0 (0.0%)	43 (100.0%)
Yes	0 (0.0%)	125 (100.0%)
Have vaginal discharges?		
Most times	18 (6.7%)	251 (93.3%)
Only normal	0 (0.0%)	43 (100.0%)
Do you feel pain during Urination?		
Yes	13 (4.9%)	251 (95.1%)
No	5 (10.4%)	43 (89.6%)
4o		

DISCUSSION

Trichomonas vaginalis is one of the most common curable sexually transmitted infection in the World. It is a parasitic infection that can go undiagnosed for years and is mainly transmitted by asymptomatic carriers. The prevalence of trichomoniasis is mostly high in women of reproductive age and is associated with increased risks of Human Immunodeficiency Virus (HIV) transmission, chronic inflammation disease of the urogenital tract of humans and cervical dysplasia. The incidence of trichomoniasis rate depends on many factors including age, sexual activity, number of sexual partners, the presence of other STDs, sexual customs, phase of the menstrual cycle, techniques of examination, specimen collection and laboratory technique. This parasite is not routinely screened in asymptomatic patient's and the infection can persist for 3-12 months in the urogenital tract.

In this study conducted in the urban Regional Hospital of Bamenda, the prevalence of T. vaginalis infection and some of the associated risk factors was determined amongst women of child bearing age attending the Regional Hospital Bamenda. Analyzing the demographic characteristics, it was noted that most women at child bearing age were of age and that alone explain why the mean value is unexpectedly high. Equally in this study, majority of the participants were unmarried women who do mostly hugging business in the town of bamenda which is fully rocked with warlike conditions since October 2016 till date and the situation keep running out of hand as killings and arm attacks continue hence killing men and leaving most women unmarried. We had an overall prevalence which was relatively high compared to other works and the crises condition which has caused raping , unwanted sex and also pushed families to separate could be blamed although other factors could be fueling this infection rate. This prevalence was lower than the 10.6% reported by Mbu et al [6] among HIV positive pregnant women in Cameroon. It was equally lower than the 13.2% reported by Daniel S. et al [7] among urban women in Southern Ghana. The lower prevalence gotten in this study could be due to the fact that this study was a hospital base study and risk to miss some potentially infected women, and again other studies that recorded higher prevalence recruited more participants such as Daniel S. et al who recruited over 492 participants in a study carried out in Southern Ghana. This could also be due to the difference in sensitivity of the type of method used in the diagnosis of T. vaginalis infection. In this study, only wet mount microscopy technique was used for the diagnosis of T. vaginalis meanwhile in the above mentioned studies, they make use of both wet mount microscopy and Polymerase Chain Reaction (PCR) thus increaSING the chance of T. vaginalis detection. The difference in the study population and the differences in hygiene practice among the study population could also be a reason for the lower prevalence in this study.

In this investigation, the prevalence of T. vaginalis among single women was higher as compared to few married women. The high prevalence of T. vaginalis in this study could be because, unmarried women turn to keep many sex partners although they are believed to have no sex parner or husband and hence the fact of keeping many sex

partners turn to prone them to *T. vaginalis* infection and others STI by the virtue of their unstable life style with many sex partners. However, higher prevalence among them could be but not exclusively attributable to the sexual promiscuity of their sex partners who might save as the carrier of the infection. The prevalence of *T. vaginalis* was higher among secondary school graduate than primary and university graduate. This still concord with the study carried out by Dickson S. et al [8] at the Yaoundé teaching hospital among women of reproductive age. The higher prevalence among secondary graduate could be because they have limited knowledge on safe sexual hygiene practice. Although it can also be other factors such as poverty, and multiple sex partners.

The prevalence of *T. vaginalis* with respect to type of toilet used, multiple sex partners, oral contraceptives, and being sexually active was statistically significant in this study as p-value is less than 0.05 at 95% confident interval. This disagree with the study conducted by Daniel S. et al that reported some evidence of association between the type of toilet used, the practice of douching and the prevalence of *T. vaginalis* which was significant.

The prevalence of *T. vaginalis* with respect to signs and symptoms; painful or burning urination, painful sexual intercourse, vaginal itching, and vaginal discharges in this study was not significant as p-value is greater than 0.05 at 95% confidence interval.

Looking at the level of education, those who were had educational standared below secondary education had the highest prevalence of *T. vaginalis*of , while those in the primary level had the lowest prevalence of . This finding is in the same direction with that of Watson et al. (9), who in a study of rural men in Tanzania observed that illiterates had a prevalence of 15.8% as compared to those in the secondary level of education with 7.4%, and university level with 8.7%. Also, the finding falls in line with those of Al-Majidii and Alsaady (10) who recorded that, illiterates had a prevalence of 77.67% greater than those at the secondary level with the lowest prevalence of 50%, in a study amongst women in Iraq. The findings of this study disagree with the findings of Taher and Shaker (11), which had the highest prevalence of 45% in those of the primary level and lowest in those of the secondary level with 20.5%, studied amongst women in the Najaf Province of India. In addition, the results of the present study also disagree with the findings of Mazigo et al. (12) who recorded a prevalence of 23.2% in literates and 21.2% in illiterates in a study from Nwara City, North-Western Tanzania. Prevalence being higher in those who are illiterate maybe because of the low level of understanding of the availability and transmission of the disease. Singles had higher prevalence as compared to the married respondents. The findings disagree with those of Onyido (13), who recorded 20.9% for married people and 8.82% for singles. Singles were more infected in the study maybe because they are more excited about life and could be more promiscuous than the married persons. Single women had a higher prevalence than married women. This result disagrees with Al-Majidii and Alsaady (10), who had an incident rate of 80.92% for married women and 40.62% for single women. Single women had a higher prevalence than the married women maybe because most of them were promiscuous.

LIMITATION OF THIS STUDY

Only participants who presented in the hospital to consult were contacted for the study and thus not giving chance for potentially infected individuals who did not show up in the hospital within the study period.

CONCLUSION

A relatively high prevalence of 5.77% was observed in this study. Factors such as having multiple sex partners, using dirty toilet and not using condoms during sexual intercourse were found to be statistically related with *T. vaginalis* infection. Single people had a higher prevalence than the married for the infection with *T.vaginalis*. The occurrence of the disease was found to be directly associated with having multiple sexual partners, no use of condoms during sexual intercourse and lack of hygiene.

RECOMMENDATION

1. Use other methods such as PCR, culture for the diagnosis of *T. vaginalis* in our hospital setting as the sole use of wet mount microscopy have low sensitive.

2. Health care providers should educate the population more and more the use of contraceptives which we believe will go a long way to curb the transmission of sexually transmissible infections.
3. The population should avoid multiple sex partners
4. Future studies should employ more reliable methods of diagnosis and explore more factors like co-infection with HIV, HSV and other STIs.

SUGGESTION FOR FURTHER STUDY

A similar study could be conducted using a larger population to confirm these results and also make it community base and not hospital base so that the ugly face of *T.vaginalis* among the inhabitants of the north west region can be unveiled in the proper.

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