A RETROSPECTIVE EVALUATION OF VAGINAL INFECTIONS AMONGST WOMEN OF REPRODUCTIVE AGE GROUP ATTENDING GET-WELL WOMEN & CHILDREN HOSPITAL, KANO NIGERIA.

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ABSTRACT

BACKGROUND: Vaginal infection is one of the most common health challenges in health care delivery, and constitutes one of the main purpose that drive women for obstetrics and gynecological consultations in developing countries. The common ones include Vulvovaginal candidiasis, Bacterial vaginosis, and Trichomoniasis.

OBJECTIVE: To evaluate the prevalence of vaginal infections amongst women of reproductive age group attending Get-well Women & Children Hospital Kano

MATERIALS AND METHODS: A retrospective study was conducted from July 2018 to April 2019 on 200 women attending the Get-Well Specialist Hospital Kano, Nigeria. Vaginal swabs were collected through a sterile speculum using aseptic techniques from the participants and analyzed in the microscopically for the presence *Candidia albican, Gardnerella vaginalis and Trichomonas vaginalis* respectively. A structured questionnaire was used to collect participants` socio-demographic data. Data were analysed on SPSS version 25.0 and were considered significant at $p \leq 0.05$.

RESULTS: A total of 200 women participated in the study. The overall prevalence of vaginal infection was 30.0%. This includes; 19.0% for *Gardnerellavaginalis*, 10.0% for *Candida albicans,* and 1.0% for *Trichomonas vaginalis*. Pregnant women had high prevalence than non-pregnant women, but however there was no significance difference ($P < 0.05$). Women between 26-35 years had the highest prevalence of each pathogen, although this was not statistically significant. Prevalence was found to be significantly higher with increasing education although women with primary education were found to have high prevalence than those with, secondary& professional/university education ($P < 0.0001$). Infections were higher in the third trimester and many women admitted to practices that might increase the risk of these infections.

CONCLUSIONS: In conclusion, the overall prevalence of vaginal infection in our study population is 30% and highest among women aged between 26& 35 years, pregnant women, married women, & less educated women.

Keywords: Kano, Women of Reproductive age, Gardnerella vaginalis, Candida albicans, Trichomonas vaginalis, gynecology, socio-demographic data

INTRODUCTION

Vaginal infection is one of the most common problems in health care delivery, and constitutes one of the main purpose that drive women for obstetrics and gynecological consultations in developing countries [1]. The common ones include vulvovaginal candidiasis, bacterial vaginosis, and trichomoniasis [2]. Vaginal infection is characterized by vaginal discharge, itching, vagina irritation and vagina odour [3]. Bacterial vaginosis, candidiasis and trichomoniasis are responsible for about 90% of cases of infections origin [4] and have been linked to premature labour, preterm delivery, low birth weight, increase prenatal mortality as well as predisposing them to HIV/AIDs and cervical cancer [5-6].

Bacterial vaginosis is a synergistic polymicrobic infection caused by a complex alteration in the microbial flora of the vagina with an up to 1000 fold increase in *Gardnerella vaginalis* and a decrease in lactobacilli [7]. It usually presents with no symptoms but could be accompanied by vaginal irritation, vaginal discharges and fish-like odour [5]

Candida albicans is the most commonly implicated fungi infection of the vagina and vulva characterized by severe itching, burning sensation, soreness, irritation and whitish-grey cottage cheese-like discharge often with a curd-like appearance (Mackay, 1998). Approximately 75% of the female population suffers at least one episode during their lives [7]. *Candida albicans* is the causative agent in most cases [7]. Pregnancy, diabetes mellitus, and antibiotic treatment are the most common predisposing factors [7]

The protozoa *Trichomonas vaginalis*is is a sexually transmitted parasite causing vulvovaginitis characterized by intense frothy yellow-greenish vaginal discharges, irritation and pain in the vulva, perineum and thighs, and dyspareunia and dysuria [8], is the most prevalent non-viral sexually transmitted vaginal infection worldwide with an estimated 180 million infections acquired annually[8], there has been varying prevalence of these pathogens, grossly due to differences in participants characteristics and in sociodemographic/socioeconomic factors [1].

Globally, there has been varying prevalence of these pathogens, grossly due to differences in participants' characteristics and in sociodemographic/socioeconomic factors [1]. In Nigeria, there is scarce data on the prevalence of adverse pregnancy outcomes associated with vaginal infections [7]. However there have been a few reports about the prevalence of these infections. The prevalence of trichomoniasis has been reported to be 1.5% to 20% [7-8], *Gardnerella vaginalis* was also reported to be 26.0% - 38% [7-8] and Candidiasis between 36%- 42.0% [7-8]. However, most of these results were associated to a certain group of individuals such as sex workers, HIV/AIDS patients and did not take into consideration socio-demographic and socioeconomic characteristics on the prevalence.

This study was therefore undertaken to evaluate the prevalence of vaginal infections amongst women of reproductive age group attending Get-well Women & Children Hospital Kano State, Nigeria

MATERIALS AND METHODS

Ethics Statement/Administrative Clearance

The study was approved by the Institutional Review Board of Saint Monica University Buea, Cameroon while administrative authorization to collect clinical samples was obtained from the Chief Medical Director of Get-well Women & Children Hospital Kano, where the study was conducted. Written informed assent was obtained from the patients and data was treated with confidentiality.

Study Population

The study population was drawn from the population of women attending the Get-well Women & Children Hospital Kano from July 2018 to April 2019. A total of 200 women of reproductive age group from 15 years and above, who met the inclusion criteria were recruited in this study. After detailed explanation of the study objectives and protocols by the researcher, the women gave their consent to participate in the study by signing informed consent forms while those who refused to give their consent or who were menstruating at the time of recruitment were excluded from the study.

Socio-demographic Data

A structured questionnaire was used to collect participants' socio-demographic data includes; participant's age, marital status, pregnancy status, level of education, and other variables.

Samples

The samples analyzed were vaginal swabs and were collected using aseptic techniques from the women with the use of sterile swab sticks. The participant was instructed to lie on the collection bed in a supine position. With both legs flexed, the labial majora was held apart by the participant. A labeled sterile swab was carefully inserted into the vagina and discharge was collected by gently rolling the inserted swab. The swab sticks were recapped and refrigerated (at 4ºC) for further processing at the

Macroscopic examination

The odor, consistency and color of each specimen discharge were observed and recorded.

Laboratory Identification of *Trichomonas vaginalis*

Trichomonas vaginalis was identified by making wet mounts of vagina swaps and viewing for viable organism under x10 and x40 objectives of the light microscope.

Laboratory Identification of *Gardnerella vaginalis*

Gardnerella vaginalis was identified using two different methods; Whiff-amine test and Gram staining. Whiff-amine test was used to test for the production of a fishy ammonia smell and Gram staining was used for identification of bacterial vaginosis through vaginal flora typing. The vaginal flora were divided and labeled into four different types: Type I for slides which had only Gram positive bacilli indicating normal vaginal flora; Type II for slides which had Gram positive bacilli and few other bacteria; Type III for slides which had few Gram positive bacilli and many other bacteria indicating bacterial vaginosis and Type IV for slides which had no Gram positive indicating bacterial vaginosis [9-10].

Laboratory Identification of *Candida albicans*

Candida albican was identified through a step-wise process. Wet mounted slides were examined for budding yeast cells and pseudohyphae using the germ tube test. Gram staining was use to examined for the presence of yeast cells. For the positive slides, their corresponding swab sticks were cultured on Chrome Agar for further confirmation. Culture plates with white to cream colored, smooth, glabrous yeast-like in appearance were isolated and a confirmatory test was performed by transferring a few of the colonies into human sera which were subsequently viewed under the microscope for the identification of tube-like yeast cells [10].

Data Analysis

Data obtained from this study was entered into Microsoft Excel and analyzed using SPSS version 20.0. The Chi square test was used to determine the differences in the distribution of vaginal infections. Statistical significance was considered at $p \leq 0.05$.

RESULTS

Socio-demographic Data

Participants' socio-demographic data are presented in Table 1. Of the 200 participants, the age ranged 15-25 years was the most represented 130 (65%) while only a few fell in the age ranges of ≥46 years 10(5.0%). More married women participated in the study 167 (83.5%) as well as pregnant women 112(56%). With regards to educational level, 110(55%) of the participants had attained only primary qualification and only 5(2.5%) had never been to school.

Table 1: participant's Socio Demographic Data

Parameters	No. Enrolled(N=200)	Percentage enrolled (%)
Age group		
15-25	25	12.5
26-35	130	65.0
36-45	35	17.5
≥46	10	5.0
Marital status		
Married	167	83.5
Single	33	16.5
Pregnancy status		
Pregnant	112	56.0
Not pregnant	88	44.0
Level of Education		
Never been to school	5	2.5
Primary	110	55.0
Secondary	50	25.0
University/Professional school	35	17.5

DISTRIBUTION OF THE VARIOUS ORGANISMS ACCORDING TO THEIR PREVALENCE

Out of the 200 women of reproductive age group enrolled, 38(19.0%) were infected with *Gardnerella vaginalis*, 20(10.0%) were infected with *Candida albican*, while two (1.0%) were infected with *Trichomonas vaginalis* giving us a total prevalence of 60(30.0 %) (**Table 2**)

Table 2: Distribution of the various organisms according to their prevalence

Organisms	Positivity(H)	Prevalence (N= 200) (H/N %)
Gardnerella vaginalis	38	19.0
Candida albican	20	10.0
Trichomonas vaginalis	2	1.0
Total	60	30.0

PREVALENCE OF VAGINAL INFECTIONS AMONG PREGNANT & NON-PREGNANT WOMEN

One hundred & twelve (56.0%) of the participants were pregnant while, 88(44.0) were non-pregnant. Among the pregnant women, 23(11.5%) were positive for *Gardnerella vaginalis,* 13(6.5%) for *Candida albican* & 2(1.0%) for *Trichomonas vaginalis* while among 88(44.0) non-pregnant women participants 15(7.5) were positive for *Gardnerella vaginalis*, 7(3.5%) for *Candida albican* & Trichomonas was negative **(Table 3)**.
However the prevalence of vaginal infection was insignificantly associated with pregnancy status (P > 0.05).

Table 3: Prevalence of Vaginal Infections Among pregnant & non-Pregnant Women

Parameter	No. Enrolled (%)	*Gardnerella vaginalis* (%)	*Candida albican* (%)	*Trichomonas vaginalis*(%)	P-Value
Pregnant	112(56.0)	23(11.5)	13(6.5)	2	
Non-Pregnant	88(44.0)	15(7.5)	7(3.5)	-	0.313
Total	200(100.0)	38(19.0)	20(10.0)	2(1.0)	

PREVALENCE'S OF VAGINAL INFECTION WITH RESPECT TO VARIOUS SOCIO-DEMOGRAPHIC CHARACTERISTICS

Prevalence's of Vaginal Infection with respect to various socio-demographic characteristics is presented in Table 4. Although the prevalence of the various infections was higher in some groups than others, no statistically significant differences were found (P-values ≥ 0.05).

Table 4: Prevalence of Vaginal Infection with respect to various socio-demographic characteristics

Parameters	Proportion N=200 (%)	Prevalence (%)			P-value
		GV	CA	TV	
Age (years)					0.521
15-25	25(12.5)	5(2.5)	2(1.0)	-	
26-35	130(65.0)	23(11.5)	13(6.5)	2(1.0)	
36-45	35(17.5)	6(3.0)	5(2.5)	-	
≥46	10(5.0)	-	-	-	
Total	**200(100.0)**	**38(19.0)**	**20(10.0)**	2(1.0)	
Marital status					0.058
Married	167(83.5)	23(11.5)	16(8.0)	2(1.0)	
Single	33(16.5)	11(5.5)	4(2.0)	-	
Total	**200(100.0)**	**34(17.0)**	**20(10.0)**	**2(1.0)**	
Pregnancy status					
Pregnant	112(56.0)	23(11.5)	13(6.5)	2(1.0)	0.313
Not pregnant	88(44.0)	15(7.5)	7(3.5)	-	
Total	**200(100.0)**	**38(19.0)**	**20(10.0)**	**2(1.0)**	
Education					0.0001***
Uneducated	5(2.5)	-	**-**	-	
Primary	110(55.0)	19(9.5)	12(6.0)	2(1.0)	
Secondary	50(25.0)	10(5.0)	6(3.0)	-	
University	35(17.5)	5(2.5)	2(1.0)	-	
Total	**200(100.0)**	**34(17.0)**	**20(10.0)**	**2(1.0)**	

GV= *Gardnerella vaginalis*, CA= *Candida albican*, & TV= *Trichomonas vaginalis*

PREVALENCE OF VAGINAL INFECTIONS WITH RESPECT TO GESTATIONAL AGE

The Prevalence of vaginal infections with respect to gestational age is summarized in Table 5. About 24(12.0%) of the participants in their third trimester were infected with *Gardnerella vaginalis*, *Candida albican* 10(5.0%) and *Trichomonas vaginalis* 2(1.0%). The prevalence of *Gardnerella vaginalis* appeared to increase with higher gestational age from about 2.0% in the first trimester to 12.0% in the third. Ten (5.0%) of the participants in their 2nd trimesters were infected with *Gardnerella vaginalis*, *Candida albican* 5(2.5%) and *Trichomonas vaginalis* negative respectively. The prevalence of *Candida albican* and *Gardnerella vaginalis* amongst the study participants in their 1st trimester were 3(1.5%) and 4(2.0%) respectively, while *Trichomonas vaginalis* recorded the least prevalence of 1(0.5%).

Table: 5 Prevalence of vaginal infections with respect to gestational age

Gestational age	Proportion N= 200 (%)	GV Positive (%)	CA Positive (%)	TV Positive (%)
1st Trimester	96(48)	4(2.0)	3(1.5)	1(0.5)
2nd Trimester	48(24.0)	10(5.0)	5(2.5)	-
3rd Trimester	56(28.0)	24(12.0)	12(6.0)	1(0.5)
Total	200(100)	38(19.0)	20(10.0)	2(1.0)

GV= *Gardnerella vaginalis*, CV= *Candida albican*, & TV= *Trichomonas vaginalis*

DISCUSSION

This study reported a prevalence of 30% for vaginal infection among women of reproductive age group especially vulvovaginal Candidiasis and Bacteria Vaginosis in the study area. This has been described in other regions, but our study is one of the few in Kano State of Nigeria that investigate these three related infections concurrently amongst women of reproductive age group. This finding is comparable to that of Assobet et al. [11] who reported a 50.90% prevalence of vaginal infection among women in Buea. Although there is paucity of information on co-infection of vaginal infection in Nigeria, this condition remains a major public-health problem among women of reproductive age group in Nigeria based on our findings. This problem is made worst in pregnant women due to its adverse effects on pregnancy and its outcome. The impact of vaginal infections in pregnancy for the causation of premature rupture of membranes, preterm delivery and low birth weight is well established [12]. Failure to detect these infections in their early stage constitutes a major risk factor for the acquisition of other sexually transmitted infections as previously reported [13-14].

Gardnerella vaginalis was common among the study participants with a prevalence of 19.0% which is comparable with that of Mbu et al. [15] & Assob et al. [11] who both reported a prevalence of 15.2% & 17.6% respectively. The prevalence of *Candida albicans* was 10.0% which is in conformity with the results of Njunda et al. [16] and Assob et al. [11] in the same study country. However, Mbu and colleagues [15] have reported a higher prevalence (35.4%) of *Candida albicans* in Cameroon. A low prevalence of 1.0% was observe for *Trichomonas vaginalis* which is lower than the 10.6% reported by Mbu et al. [15] and the 20% reported amongst sex workers(2001). These variations in prevalence are related to the differences in the type of techniques used in the isolation of the pathogens, differences in patients' characteristics, and the presence or absence of symptoms in the study participants.

The prevalence of vaginal infections was not statistically significant (19.0% versus 11.0%) in non-pregnant women & pregnant women. This could be an indication of an effective health education during ANC where the implications of these infections especially relating to preterm labour or birth and low birth weight were probably highlighted to the pregnant women. Participant's age was not significantly associated with genital infections although high prevalences were found amongst women aged between 26-35 years; an age range involved with a lot of procreation. This is in conformity with the results of Ojiye et al and Adinma et al. [3, 17] A few cases were also observed in women who were between 36-45 years. This might be because women of such ages are thought to be at end of their reproductive life and this is in agreement with results from Ojiye et al. [3]

Married women had a high prevalence of infections than single women and although the association was not significant (P > 0.05). This is not in concordance with the work of Ojiye et al. [3] who reported that married women were less prone to vaginal infections by virtue of their stable life style with one sexual partner Ojiye et al. [3]. However, the higher prevalence among married women could be but not exclusively attributable to sexual promiscuity of their husbands whom might serve as carriers of the infection.

The prevalence of vaginal infections was associated with the level of education (P < 0.0001). Prevalence was high in educated women compared to those without education. Among the educated women, those with primary education had high prevalence when compared with those who attend secondary or tertiary education. Educated women are usually richer and have more affluence in the society than their uneducated pales.

Guzel et al. also found that the prevalence increased with gestational week, and this is related to our finding of increasing prevalence with trimester [18]. We found the prevalence to be highest in the third trimester as virtually all of these women had candidiasis compared with 7.5% of those in their second trimester and 2.0% of first trimester pregnancies which was also reported by an earlier study [8].

CONCLUSION

We therefore, conclude that the prevalence of vaginal infection in our study population is 30% and higher among women aged between 26 and 35 years, pregnant women, married women, less educated women and women who practiced poor vaginal hygiene

RECOMMENDATION

We suggest that all married women should be screened at least annually for vaginal infection so that positive cases can be detected and treated early enough to reduce subsequent or recurrent infections.

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Declaration of Competing Interests

The author(s) declare that they have no competing interests, no financial relationships with any organizations that might have an interest in the submitted work

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