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Predictors of Abnormal Vaginal Discharge among Women of Reproductive Age in Southeast Nigeria

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Abstract

Background: An abnormal vaginal discharge is a common complaint among women of reproductive age, and it can indicate serious conditions like pelvic inflammatory disease and cervical cancer. This study aimed to assess the predictors of abnormal vaginal discharge in women of reproductive age group in Imo State, Southeast Nigeria. **Methods:** A cross-sectional study was conducted among 368 women of reproductive age group attending the clinic at Federal University Teaching Hospital Owerri, in Imo State, Nigeria. Respondents were recruited using a systematic sampling technique. Data were collected using a pre-tested interviewer-administered questionnaire. Multivariable analysis was performed to determine predictors of abnormal vaginal discharge. Statistical significance was set at $p < 0.05$. **Results:** The mean age of the respondents was 30 ± 4.5 years. Predictors of abnormal vaginal discharge were: age 36 - 45 years (OR: 4.5; 95% C.I: 1.023 - 8.967, p = 0.041), being a student (OR: 2.4: 95% C.I: 1.496 - 7.336, p = 0.003), use of oral contraceptives (OR: 3.4; 95% C.I: 1.068 - 6.932, p = 0.010), use of water cistern (OR: 4.7; C.I: 1.654 - 5.210, p = 0.028) anal hygiene practices (OR: 2.7; 95% C.I: 1.142 - 4.809, p < 0.001) sexual frequency of more than twice in a month (OR: 2.7; 95% CI: 1.032 - 5.309 p = 0.025), retroviral disease positive (OR: 2.7; 95%, C.I: 1.39 - 7.177, p = 0.010), and having dysfunctional family or relationship (OR: 2.7; CI: 1.39 - 7.177, p = 0.036). **Conclusion:** These findings suggest that targeted sexual and reproductive health interventions should be provided to re-

duce the risk of abnormal vaginal discharge in women of reproductive age group.

Keywords

Predictors, Abnormal, Vaginal, Discharge

1. Introduction

Among women of reproductive age, abnormal vaginal discharge is a common symptom of reproductive tract infections [1]. This issue frequently prompts women in this age group to seek medical care [2] [3]. Most often, infection of the vaginal mucosa is the cause of symptomatic vaginal discharge. However, disruptions in the vaginal flora can lead to vaginitis, which manifests as abnormal vaginal discharge [2]. Among these infections, three of the most prevalent causes are bacterial vaginosis, *Trichomonas vaginalis*, and *Candida albicans* infections [3] [4]. One critical component of the global health sector strategy on sexually transmitted infections (STI) is the emphasis on the effective management of STI symptoms, with abnormal vaginal discharge considered one of the symptoms associated with STI [5]. Studies have identified a number of risk factors for abnormal vaginal discharge in women of reproductive age.

These factors include multiple sexual partners [6] [7], use of oral contraceptives [8] [9], douching [10] [11], pregnancy [8] [12], hormone replacement, uncontrolled diabetes, immunosuppression, use of antibiotics, and intrauterine device [8]. Other reported risk factors were being single, partner infidelity [13], advanced age, childbearing history [14], past history of abortion [7] [15], lower educational level and economic status [14]-[17], history of sexually transmitted infection [7], smoking [18], and elevated level of sex hormones [8] [19]. Abnormal vaginal discharge carries significant implications for women's well-being. It extends beyond the physical discomfort it can cause, affecting aspects of their lives such as sexual activity and social interactions, often leading to social stigma [20]. Abnormal vaginal discharge can also serve as a warning sign, indicative of potentially severe medical conditions, including pelvic inflammatory disease (PID) [21], and cervical cancer [22]. Furthermore, the underlying infectious causes, STIs and bacterial vaginosis, in addition to causing genital symptoms, pregnancy complications, infertility, HIV transmission, and other psychosocial effects, affect sexual, reproductive, and maternal-child health [23] [24].

In light of this, it becomes evident that understanding the factors that predict abnormal vaginal discharge among women of reproductive age is paramount. Such understanding is vital for the development of targeted interventions aimed at the prevention and management of the condition. Also, this study tends to fill a gap in research by assessing the association between the role of family and relationship dysfunction as a potential risk factor for abnormal vaginal discharge.

2. Methodology

2.1. Study Area

This study was conducted at the General Outpatient Clinics (GOPC), of the Family Medicine Department, Federal University Teaching Hospital Owerri, in Imo State from May to September 2023. The Hospital is located in the heart of Owerri City and serves as the referral Centre for the secondary care centers in the State and its environs. The General Outpatient Clinics run the primary and secondary services and attend to patients with various complaints including sexual and reproductive health issues.

2.2. Study Design

The study was a cross-sectional hospital-based study.

2.3. Study Population

Women between the ages of 18 and 45 years who presented to the GOPC and gave consent to participate in the study.

2.4. Sample Size and Sampling Technique

The sample size was 368, determined using the formula for calculating single proportion population formula. Respondents who met the inclusion criteria were recruited using a systematic sampling method. Women between 18 years and 45 years who presented at the GOPC between 8 am and 4 pm from Mondays through Fridays were recruited by systematic random sampling method. Available hospital records showed that an average of 200 patients presented at the GOPC daily and about 110 of them were women within the reproductive age group. This translates to 550 patients in five working days of one week and 8800 in 16 weeks (4 months), which was the proposed duration of the study.

The sample frame was 8800. The sample interval (k) was 8800/368 = 24.

The first respondent was the number 10, who was chosen from the first 24 respondents by simple random sampling using balloting technique. All patients within the study population had their cards tagged with a paper tape and numbered serially. If any patient that was chosen did not meet the criteria or refused to participate, the person was dropped and the next person in the sequence was chosen as a replacement, and the sequence continued until the estimated sample size was reached. Structured interviewer-administered questionnaire and validated instruments were used to collect demographic and clinical data respectively.

2.5. Data Collection

Data were collected using a pre-tested interviewer-administered questionnaire developed after a review of kinds of literature on similar topics. The questionnaire included sections on the socio-demographic characteristics and risk factors of abnormal vaginal discharge such as sexual history, hygiene and history of

co-morbidities. Socio-economic class stratification into low/middle/high class is shown in Appendix IV attached. The questionnaire was pre-tested in a cohort of 20 women at the Imo State Specialist, Hospital, Owerri, and showed good validity.

2.6. Data Analysis

Data were entered and analysed using Statistical Package for Social Sciences (SPSS) version 25. Quantitative variables were summarized using means and standard deviation while categorical variables were summarized using frequencies and percentages. In bivariate analysis, associations between abnormal vaginal discharge and independent variables were determined using Chi-square tests. Multivariable regression analysis was performed to determine predictors of abnormal vaginal discharge at 5% level of significance.

2.7. Ethical Clearance

Ethical approval was obtained from the Health Research and Ethics Committee of the Federal University Teaching, Hospital, Owerri. Written informed consents were obtained from the respondents after the details of the study and its voluntariness were explained to them. Confidentiality was also ensured throughout the study.

3. Results

3.1. Socio-Demographic Characteristics of the Respondents

A total of 368 women of reproductive age participated in the study giving a response rate of 100%. The mean (± SD) age of participants was 30 ± 4.5 years. The greater proportion of the participants 154 (41.8%) were in the age group 26 - 35 years and almost all of them had at least primary education with the majority of them, 229 (62.2%), having had tertiary education. More than half of the participants, 201 (54.6%), were married. As regards occupation, most of the respondents, 185 (50.3%), were students while about one-quarter, 98 (26.6%), were civil servants. The majority of the respondents, 270 (73.3%), belonged to the middle socio-economic class as shown in Table 1.

Table 1. Socio-demographic characteristics of respondents.

Variables	Frequency	Percentage (%)
Age		
18 - 25	120	32.6
26 - 35	154	41.8
36 - 45	94	25.6
Level of Education		
No formal	3	0.8
Primary	16	4.3

Continued

Secondary	120	32.6
Tertiary	229	62.2
Marital status		
Single	160	43.5
Married	201	54.6
Divorced	3	0.8
Widowed	4	1.1
Occupation		
H/W	53	9.5
Student	185	50.3
Civil servant	98	26.6
Farmer	13	3.5
Business	19	5.2
Social class		
Low class	58	15.8
Middle class	270	73.3
High class	40	10.9

3.2. Association between Socio-Demographic Characteristics and Abnormal Vaginal Discharge

The age of the respondent (p = 0.02) and occupation (p = 0.012) were found to have significant associations with abnormal vaginal discharge. Other factors such as level of education, (p = 0.897), marital status (p = 0.143), and social class (0.161) were not found to be significantly associated with abnormal vaginal discharge as shown in Table 2 below.

Table 2. Association of vaginal discharge with socio-demographic characteristics.

Variables	Without VD (%)	With VD (%)	Total (%)	X^2	p-Value
Age in years					
18 - 25	89 (74.2)	31 (25.8)	120 (32.6)		
26 - 35	121 (78.6)	33 (21.4)	154 (41.9)	7.8627	0.020
36 - 45	84 (89.4)	10 (10.6)	94 (25.5)		
Level of Education					
No formal	2 (66.7)	1 (33.3)	3 (0.8)		
Primary	12 (75.0)	4 (25.0)	16 (4.3)	0.5957	0.897
Secondary	96 (80.0)	24 (20.0)	120 (32.6)		
Tertiary	184 (80.4)	45 (19.6)	229 (62.3)		

Continued

Marital Status					
Single	120 (75.0)	40 (25.0)	160 (43.5)	5.4205	0.143
Married	168 (83.6)	33 (16.4)	201 (54.6)		
Divorced	2 (66.7)	1 (33.3)	3 (0.8)		
Widowed	4 (100.0)	0	4 (1.1)		
Occupation					
Home maker	40 (75.5)	13 (24.5)	53 (14.4)	12.7657	0.012
Student	151 (81.6)	34 (18.4)	185 (50.3)		
Civil servant	84 (85.7)	14 (14.3)	98 (26.6)		
Farmer	9 (69.2)	4 (30.8)	13 (3.5)		
Business	10 (52.6)	9 (47.4)	19 (5.2)		
Social Class					
Low Class	41 (70.7)	17 (29.3)	58 (15.7)	3.6513	0.161
Middle Class	220 (81.5)	50 (18.5)	270 (73.4)		
High Class	33 (82.5)	7 (17.5)	40 (10.9)		

3.3. Association between Other Risk Factors and Abnormal Vaginal Discharge

Concerning the association of abnormal vaginal discharge and other risk factors, douching (p = < 0.001) and use of oral contraceptive methods (p = 0.05) were found to be associated with the complaint of abnormal vaginal discharge. Similarly, the hygienic practice after urinating (p = < 0.001) and after passing stool (p = < 0.001) were found to be significantly associated with abnormal vaginal discharge. Other significantly associated risk factors include past history of termination of pregnancy (p = < 0.001), recent antibiotic use (within one week) (p < 0.002), and being sexually active (p = 0.001). The type of menstrual hygienic practice was not found to be significantly associated with the complaint of abnormal vaginal discharge (p = 0.750). In addition, retro-viral disease status (p = 0.025) and family function (p = 0.015) were found to be associated with abnormal vaginal discharge, as shown in Table 3 and Table 4 below.

Table 3. Association of abnormal vaginal discharge with other factors.

Variables	Without VD	With VD	Total (%)	X^2	p-Value
Douching					
Yes	08 (36.4)	14 (63.6)	22 (6)	25.1836	< 0.001
No	286 (81.6)	60 (18.4)	326 (94)		
Smoking					
Yes	0	0	0 (0)		
No	294 (79.9)	74 (20.1)	368 (100)		

Continued

Contraception					
None	198 (80.8)	47 (19.2)	245 (66.6)	14.7582	0.005
Oral	37 (63.8)	21 (36.2)	58 (15.7)		
Condom	51 (89.5)	6 (10.5)	57 (15.5)		
Injection	3 (100.0)	0 (0.0)	3 (0.8)		
IUCD	5 (100.0)	0 (0.0)	5 (1.4)		
Toilet structure					
Pit toilet	10 (66.7)	3 (33.3)	15 (4.1)	8.5336	0.036
VIP	28 (66.7)	14 (33.3)	42 (11.4)		
WC	250 (82.2)	55 (18.0)	305 (82.9)		
Others	6 (100.0)	0 (0.0)	6 (1.6)		
After urinating					
FTB	242 (82.9)	50 (17.1)	292 (79.3)	15.7115	< 0.001
BTF	34 (60.7)	22 (39.3)	56 (15.2)		
Dabbing	18 (90.0)	2 (10.0)	20 (5.5)		
After stool					
FTB	270 (86.5)	42 (13.5)	312 (89.1)	71.9653	< 0.001
BTF	14 (31.8)	30 (68.2)	44 (9.5)		
Washing	10 (83.3)	2 (16.7)	12 (1.4)		
During menses					
Pads	280 (79.8)	71 (20.2)	351 (95.4)	0.5758	0.750
Tampons	0	0	0 (0)		
Tissue	8 (88.9)	1 (11.1)	9 (2.4)		
Cloth	6 (75.0)	2 (25.0)	8 (2.2)		
T.O.P					
Yes	90 (67.2)	44 (32.8)	134 (37.5)	21.2478	< 0.001
No	204 (87.2)	30 (12.8)	244 (62.5)		
Antibiotics					
None	182 (85.0)	32 (15.0)	214 (58.2)	12.8159	0.002
1 - 3	72 (78.3)	20 (21.7)	92 (25)		
> 3	40 (64.5)	22 (35.5)	62 (16.8)		
Intercourse					
None	81 (91.0)	8 (9.0)	89 (24.2)	29.1381	< 0.001
1 - 2	134 (85.9)	22 (14.1)	156 (42.4)		
> 2	79 (79.9)	44 (35.8)	123 (33.4)		

Table 4. Association of abnormal vaginal discharge with other co-morbidities.

Variables	Without VD	With VD	Total	X^2	P-Value
BMI					
Normal	180 (61.2)	49 (66.2)	229	0.7069	0.702
Overweight	72 (24.5)	15 (20.3)	87		
Obesity	42 (14.3)	10 (13.5)	52		
Blood glucose					
Normal	272 (92.5)	69 (93.2)	341	0.5070	0.776
Impaired	20 (6.8)	4 (5.4)	24		
Diabetes	2 (0.7)	1 (1.4)	3		
RVD screening					
Reactive	2 (0.7)	3 (4.1)	5	5.0209	0.025
Non-reactive	292 (99.3)	71 (95.6)	363		
Family Function					
Functional	192 (65.3)	35 (47.3)	227 (61.7)	8.3713	0.015
Mod functional	82 (27.9)	30 (40.5)	112 (30.4)		
Dysfunctional	20 (6.8)	9 (12.2)	29 (7.9)		

3.4. Predictors of Abnormal Vaginal Discharge

Compared to respondents between 18 and 25 years, those between 26 and 35 years had twice the risk of having abnormal discharge (OR = 2.3 CI = 1.534 - 5.233), while those between 36 and 45 years had more than fourfold increased risk (OR = 4.5, CI = 1.023 - 8.967). Students were twice more likely to have abnormal vaginal discharge when compared to businesswomen/ traders. (OR = 2.4, CI = 1.496 - 7.336). Similarly, women who used any form of oral contraceptives were three times more likely to have abnormal vaginal discharge (adjusted OR 3.4 CI 1.068 - 6.932, p = 0.001), and women who used water cistern toilets were more than four times more likely to have abnormal vaginal discharge (adjusted OR 4.7 CI 1.654 - 5.210, p = 0.028). Women who cleaned their anus back to front after passing stool were more than twice as likely to have abnormal vaginal discharge compared to women who practised washing (adjusted OR 2.7 CI 1.142 - 4.809, p = 0.042). Similarly, women who had more than two sexual intercourse in a month were more than twice as likely to have abnormal vaginal discharge compared to those who had less than 1 or none (adjusted OR 2.7 CI 1.032 - 5.309, p = 0.028). Women who were retroviral disease positive were more than two times more likely to have abnormal vaginal discharge. Women who were classified as having dysfunctional families or relationships were nearly three times more likely to have a complaint of abnormal vaginal discharge compared to women who had functional families or relationships (adjusted OR 2.7 CI 1.39 - 7.177, p = 0.036) as shown in Table 5 below.

Table 5. Multivariate logistic regression analysis of independent risk factors of Vaginal Discharge.

Variable	Adjusted OR	95% Confidence Interval Lower	Upper	p-Value
Age				
18 - 25	1			
26 - 35	2.3	1.534	5.233	0.041*
36 - 45	4.5	1.023	8.967	0.023*
Occupation				
Business/trader	1			
Farmer	1.4	0.234	3.437	0.121
Civil servant	0.9	0.743	3.649	0.095
Housewife	2.1	0.312	4.550	0.598
Student	2.4	1.496	7.336	0.003*
Douching				
No	1			
Yes	2.2	0.967	5.211	0.083
Contraception				
None	1			
Condom	0.8	0.421	1.455	0.976
Oral	3.4	1.068	6.932	0.010*
Toilet structure				
VIP	1			
Pit toilet	2.3	0.753	4.321	0.654
WC	4.7	1.654	5.210	0.028*
After urinating				
Dabbing	1			
FTB	1.2	0.870	1.863	0.542
BTF	3.7	0.542	7.432	0.074
After stooling				
Washing	1			
FTB	0.9	0.433	1.567	0.071
BTF	2.7	1.142	4.809	0.042*
T.O.P				
No	1			
Yes	1.6	0.395	5.002	0.201
Frequency of Intercourse				
None	1			
1 - 2	1.2	0.769	2.964	0.571
> 2	2.7	1.032	5.309	0.028*
RVD				
No	1			
Yes	3.8	1.392	6.642	0.010

Continued

Family function				
Functional	1			
Mod. Functional	1.6	0.415	4.381	0.420
Dysfunctional	2.7	1.039	7.177	0.036*

* = statistically significant.

4. Discussion

It is noteworthy that this study assessed the association between family dysfunction and abnormal vaginal discharge which is an area of gap in most previous studies. It is interesting to note that family dysfunction was found to be a predictor of abnormal vaginal discharge. The reason could be that dysfunctional family or relationships can lead to stress, which can weaken the immune system and upset the normal flora, thus, rendering women more susceptible to STIs and, consequently, vaginal discharge [25]. This finding aligns with a study that identified a significant relationship between psychosocial stress and vaginal discharge [26]. It has been documented that persistent exposure to psychosocial stress can lead to disruption of the vaginal microbiota leading to vaginal dysbiosis which can allow opportunistic organisms to overgrow causing vaginal infections [27] [28]. Another possible explanation could also be that those who experience family dysfunction may develop unhealthy coping mechanisms, such as substance abuse or sexual risk-taking behaviour. These behaviours can increase the risk of sexually transmitted infections (STIs), which can cause vaginal discharge.

In this study, respondents between 26 and 45 years old were more likely to have an abnormal discharge than their counterparts. This finding is somewhat consistent with a study that reported a higher prevalence of abnormal vaginal discharge in women within a similar age range (19 - 42 years) [29]. It is possible that the result is due to a change in the pH of the vaginal cavity, since the vaginal pH value is age-dependent and may be slightly higher than 4.5 for women in the perimenopausal stage [30] [31]. This increased vaginal pH has been shown to increase susceptibility to sexually transmitted infections [31]. Also, hormonal changes could account for the age-related difference because as women progress through their reproductive years, hormonal fluctuations can impact the vaginal microbiota, potentially leading to an increased susceptibility to infections and abnormal discharge [32]. Respondents who were students were found to be more likely to have an abnormal vaginal discharge than those in other occupations. This finding could be attributed to their increased likelihood of engaging in sexual activity, and having multiple sexual partners. This finding may also reflect disparities in lifestyle and daily routines between these groups. In addition, students are frequently faced with academic pressures, irregular sleep patterns, and higher levels of stress, which can affect their general health, including their vaginal health. In this study, use of oral contraceptives was also found as a pre-

dictor of abnormal vaginal discharge, and this is similar to findings from other studies [8] [9]. One possible explanation for this might be that oral contraceptives can alter the vaginal flora and increase the risk of developing vaginal candidiasis, a common cause of abnormal vaginal discharge [33] [34]. It was also noted that respondents who used water cisterns were more likely to have an abnormal vaginal discharge than respondents who used other types of sanitary facilities. In a study done in Cameroon use of water cistern was reported as a risk factor for vulvovaginal candidiasis [35].

Another predictor of abnormal vaginal discharge was anal hygiene practices of cleaning from back to front. This practice can transfer bacteria from the anus to the vulva and into the vagina, potentially leading to faecal contamination, which is a known endogenous factor that may affect vulvar pH and thus lead to abnormal vaginal discharge [25]. Sexual frequency of more than twice a month was also noted as a predictor of abnormal vaginal discharge. This is in tandem with other reported studies that being sexually active increases the chances of abnormal vaginal discharge [12]. Sexual activity has been linked to disruptions in the vaginal microbiota possibly due to the transmission of infections [27]. The reason might be because bacterial vaginosis which is the most common cause of vaginal discharge among women of reproductive age can spread through sexual contact [36]. In this study, those who are retroviral disease positive were more likely to have abnormal vaginal discharge. HIV infection can increase the risk of developing various vaginal infections, such as bacterial vaginosis, candidiasis, and trichomoniasis [37]. Factors, such as immune deficiency, can disturb the normal vaginal flora and lead to recurrent vaginal infections and discharge [25] [30]. A diminished response to Candida albicans in lymphocytes from HIV-positive women has also been documented, highlighting their heightened susceptibility to candidiasis and underscoring the importance of compromised immunity [30].

5. Conclusion

The findings from the study underscore the importance of age, occupation, contraceptive use, sanitation practices, sexual behaviour, HIV status, and family dynamics in understanding and addressing this prevalent gynaecological concern. Therefore, to improve women's reproductive health, targeted interventions should be developed based on these identified predictors. These may include comprehensive sexual and reproductive health education on improved genital hygiene and contraceptive choices. Also, counselling and mental health support for dysfunctional families and relationships.

6. Limitation

This study was cross-sectional, which means that it cannot establish causality.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix I: Questionnaire

Participant Serial Number

SECTION A: SOCIO-DEMOGRAPHIC DATA.

1. Age as at last birthday

☐ 18 - 25yrs ☐ 26 -35yrs. ☐ 36 - 45yrs

2. Level of Education

☐ No formal education ☐ Primary ☐ Secondary ☐ Tertiary

3. Marital Status

☐ Single ☐ Married ☐ Widowed ☐ Separated/Divorced

4. Occupation

☐ Student ☐ Home Maker ☐ Civil Servant

☐ Civil Servant Farmer ☐ Civil Servant Business Executive

5. Socio-economic class

☐ I ☐ II ☐ III ☐ IV ☐ V

SECTION B: FEATURES OF VAGINAL DISCHARGE

6a. Have you ever had vaginal discharge?

☐ Yes ☐ No

6b. Do you have vaginal discharge now?

☐ Yes ☐ No

6c. How old do you have the first episode? Less than

☐ 1 yr ☐ 1 - 5 yrs ☐ more than 5yrs

7. Within the past year, how many times have you had episodes of vaginal discharge?

☐ once ☐ two to three times ☐ four times or more ☐ continuous

8. How will you quantify the disharge?

☐ mild ☐ moderate ☐ severe

9. When is the discharge noticed to be present or become worse?

☐ Just before menses ☐ after menses ☐ during sexual intercourse

☐ at all times

10a. Whats your perception of vaginal discharge?

☐ **Normal for women** ☐ **abnormal**

10b. What do you think is the cause of vaginal discharge?

☐ Don't know ☐ "toilet infection" ☐ sexually transmitted infection

☐ mental stress

SECTION C: ASSOCIATED FEATURES

11. Does the discharge have an odour?

☐ Yes ☐ No

12. What is the colour of the discharge?

☐ milky/white ☐ yellow ☐ brownish ☐ green

13. How would you describe the nature of the discharge?

☐ watery ☐ curd-like ☐ frothy

14. What other symptoms are associated with the discharge?

☐ itching ☐ burning sensation ☐ Pain during urination

☐ pain during intercourse ☐ lower abdominal pain

SECTION D: RISK ASSESSMENT

15a. Do you practice Douching?

☐ Yes ☐ No

15b. If yes, what do you use?

☐ Salt in water ☐ antiseptic in water ☐ herbal preparation
☐ lime ☐ others specify

16a. Do you smoke?

☐ Yes ☐ No

16b. If yes, on the average how many sticks do you smoke per day?

☐ 1 - 10 sticks ☐ 11 - 20 sticks ☐ 20 sticks and above

16c. For how long have you been smoking?

☐ Less than one year ☐ 1 - 5 years ☐ more than 5 years

17. Which of the following contraceptive methods do you use?

☐ Oral hormonal ☐ Injection ☐ Condoms ☐ IUCD
☐ Tubal ligation ☐ None

18. What type of toilet facility do you use most of the time?

☐ pit latrine ☐ ventilation improved pit (VIP) ☐ water cistern (WC)
☐ others specify

19. After urinating, how do you clean the vulva?

☐ back to front ☐ front to back ☐ dabbing

20. After passing stool, how do you clean?

☐ back to front ☐ front to back ☐ washing

21. During menses what do you use?

☐ Sanitary pads ☐ Tampoons ☐ Tissue paper
☐ Clothing material

22. Have you had a miscarriage or termination of pregnancy in the past?

☐ Yes ☐ No

23. In the past 6 months how many courses of antibiotics have you used?

☐ None ☐ 1 - 3 times ☐ more than three times

24. In the past year how many sexual partners have you had?

☐ None ☐ 1 ☐ 2 ☐ > 2

25. In the past month how many sexual exposures have you had?

☐ None ☐ 1 - 2 ☐ > 2

Section E: Other Co-Morbidities:

26. Body Mass Index (BMI):

☐ Underweight ☐ Normal ☐ Overweight ☐ Obesity

27. Random Blood Glucose:

☐ Normal ☐ Impaired ☐ Diabetes

28. Classification based on Retroviral screening:

☐ Yes ☐ No

29. The vaginal fluid pH:

☐ Less than 4.5 ☐ 4.5 and above

30. The microscopy and/or culture result:

☐ *Candida* ☐ *B. vaginosis* ☐ *T vaginalis*

31. Others:

☐ None

Appendix II: Socio-Economic Classification Scheme by Oyedeji

FOR OCCUPATION

CLASS—OCCUPATION

I—Senior public servants, professionals, managers, large scale traders, business men, contractors

II—Intermediate grade public servants and senior school teachers

III—Junior school teachers, professional drivers, artisans

IV—Petty traders, laborers, messengers

V—Unemployed, full time house wife, students and subsistence farmers

FOR EDUCATION.

CLASS—EDUCATION.

I—University graduates or equivalent

II—School certificate holders ordinary level (GCE) who also had teaching or other professional training

III—School certificate or grade II teachers certificates holders or equivalent

IV—Modern three and primary six certificate holders

V—Those who could either just read and write or were illiterate

The exact class was gotten by calculating the average of the two classes.

Appendix III: Screening for Family Function Using Family Apgar Score

	Almost always	Some of the time	Hardly ever
A-ADAPTABILITY I am satisfied that I can turn to my family for help when something is troubling me.			
P-PARNERSHIP I am satisfied with the way my family talks things over with me and shares problems with me.			
G-GROWTH I am satisfied that my family accepts and supports my wishes to take on new activities or directions.			
A-AFFECTION I am satisfied with the way my family expresses affection and responds to my emotions such as anger, sorrow, love.			
R-RESOLVE I am satisfied with the way my family and I share time together.			

Hardly ever = 0, Some of the time = 1, Almost always = 2. Scores of 0 - 3 = dysfunctional, 4 - 7 = moderately dysfunctional, 8 - 10 = functional.