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ORIGINAL ARTICLE

Prevalence, Pattern and Predictors of Abnormal Vaginal Discharge among Women attending Health Care Institutions in Imo State, Nigeria.

Uwakwe KA[1], Iwu AC[1], Obionu CN[2], Duru CB[1], Obiajuru IC[3], Madubueze UC[4]

[1]Department of Community Medicine, College of Medicine, Imo State University, Owerri, Imo State
[2]Department of Community Medicine College of Medicine, University of Nigeria Nsukka, Enugu State
[3]Department of Medical Microbiology, College of Medicine, Imo State University, Owerri, Imo State
[4]Department of Community Medicine, Federal Teaching Hospital, Abakaliki, Nigeria

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ABSTRACT

Background: Normal vaginal discharge is a normal physiological process that can become abnormal due mostly to sexually and non-sexually transmitted infections. This study determined the prevalence, pattern, sociodemographic and maternal predictors of abnormal vaginal discharge among women attending health care institutions in Imo State, Nigeria.

Methods: This cross-sectional descriptive design used stratified sampling technique to select 450 records of women of reproductive ages. Data was extracted using a proforma. Descriptive statistics was presented using frequencies and summary indices. Chi square statistics and binary logistic regression were done. P-value of < 0.05 was considered significant.

Results: The overall prevalence rate of abnormal vaginal discharge was 55.6% and among those pregnant, was 73.3%. Majority of the women had whitish virginal discharge (76.3%) and 49.6% had experienced foul and fish smelling discharges. *Candida albicans* was the pathogen most isolated (63.3%) followed by *Gardnerella vaginalis* (13.9%). Majority of the women (76.2%) also had coexisting gynaecological complaints, of which 41.3% and 38.8% experienced itching around the vulva and lower abdominal pain, respectively. The predictors of abnormal vaginal discharge were residing in an urban area, having a post-secondary level of education, having no child, currently pregnant, having no history of induced abortion, being sexually active and having other complaints associated with sexually transmitted infections, ($p<0.05$).

Conclusion: The socio-demographic and maternal predictors of abnormal vaginal discharge in the study area should be taken into account in order to improve early detection and identify the women at risk of abnormal vaginal discharge.

Correspondence to:
Dr Anthony C. Iwu
Department of Community Medicine,
College of Medicine, Imo State University, Owerri, Imo State
Email: iwuchinedu@yahoo.com
Telephone: +2348033483968

INTRODUCTION

Normal vaginal discharge in women of child bearing age, is the result of a physiological process involving secretions from the cervical and Bartholin's glands; and the desquamation of vaginal epithelial cells.[1] This discharge which is non-offensive, clear or white, flows out of the vagina everyday with the colour and thickness changing with the monthly menstrual cycle.[2] This normal discharge can

become abnormal, with about 40% of women that experience vaginal discharge having some type of vaginitis as a result of a distortion in the balance of micro-organisms that is exerted by Lactobacilli within the micro-environment of the vagina.[3, 4] This imbalance is commonly created by the dominance of sexually and non-sexually transmitted infectious organisms and less commonly by non-infectious causes within the micro-environment of the vagina, resulting in signs of increased discharge, change in colour or smell with or without associated irritation, itching and burning sensation in and around the vagina. This abnormal vaginal discharge is attributed mostly to vaginal infections such as Trichomoniasis, vulvovaginal candidiasis and bacterial vaginosis.[3]

A significant proportion of women with abnormal vaginal discharge appear not to seek medical advice or treatment on time, even though vaginal complaints are the most common reasons for gynaecological consultation.[4-7] The persistence of this abnormal vaginal discharge which is highly indicative of vaginal infection caused by *Neisseria gonorrhoea, Chlamydia trachomatis, Mycoplasma genitalium* or primary genital herpes simplex cervicitis, could have profound effects on the reproductive ability and healthy life of women, pregnancy and pregnancy outcomes; and can be a facilitator for the spread of sexually transmitted infections (STIs) which are of public health concern. [1, 8-10] This is depicted by the global estimates of the World Health Organization (WHO), where it is estimated that 357 million new cases of syphilis, gonorrhoea, chlamydia and trichomoniasis occur annually in people aged between 15–49 years and more importantly, its apparent relationship with Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome (HIV/AIDS).[11] In a study conducted in Kano, Nigeria, abnormal vaginal discharge was observed especially in young female adults with 70% of the genital swabs positive for microorganisms, mainly *Candida species* followed by *Gardnerella vaginalis*.[12] Consequently, there is a critical need to timely intervene in cases of abnormal vaginal discharge which cloaks the presence of highly probable STIs, with the aim of preventing and controlling the transmission of STIs through the syndromic management approach, as recommended by WHO for resource poor settings; due to their limitations in accessing simple and affordable diagnostic tests.[13] Despite the fact that the syndromic approach will fail to detect asymptomatic STI which represent a significant proportion of STIs, [14] it remains the best approach within the existing constraints prevailing in the environment of study.

Different socio-demographic and maternal factors have been reported to be associated with the occurrence of abnormal vaginal discharge, [1, 15, 16] thus the assessment of these factors gives an insight into the likely predictors for abnormal vaginal discharge herein and consequently, create a high index of suspicion for vaginal discharge in such clientele in view of resource constraint. Hence, determining the likely associated socio-demographic and maternal factors in the environment of study may enable the development of suitable local management protocol. This will provide some guidance to further strengthen the syndromic management approach and possibly help in identifying those at high risk for STI, so appropriate tests can be offered when absolutely needed. This study was therefore conducted to determine the prevalence, pattern, socio-demographic and maternal predictors of abnormal vaginal discharge among women attending health care institutions in Imo State, Nigeria.

METHODOLOGY

The study was conducted in Imo State University Teaching Hospital in Orlu Local Government Area (LGA) and in Holy Rosary Hospital Emekuku in Owerri North LGA of Imo State within the South Eastern part of Nigeria from January to December 2015. While Imo State covers an area of about 5100 square kilometre (sq. km) with a population density varying from 230-1400 persons per sq. km, Orlu LGA occupies an area of 132.9 sq. km with a population density of about 1,074 persons per sq. km and Owerri North LGA occupies an area of 200 sq. km with a population density of about 882 persons per sq. km. [17]

Imo State University Teaching Hospital, Orlu, is a government owned tertiary health care and training institution for both medical and paramedical care personnel that provides general and specialized care with an average annual obstetrics and gynaecological clinic attendance of 1,077 clients. Holy Rosary Hospital, Emekuku, is a Faith-based secondary care (general) private hospital with departments in medicine, general surgery, paediatrics, obstetrics and gynaecology and it is a training centre for General Nursing, Midwifery and Medical Laboratory Technology with an average annual obstetrics and gynaecological clinic attendance of 341 clients.

The study was a hospital record based, retrospective cross-sectional design that used a pre-tested proforma. The study population comprised, women of reproductive ages (15-49 years) attending the Obstetrics and Gynaecological clinics of Imo State University Teaching Hospital, Orlu and Holy Rosary Hospital, Emekuku. Inclusion criteria included clinical case records of women of reproductive ages that attended the study facilities from January to December of 2015. The exclusion criteria included any clinical case record indicating that the patient was deceased. The minimum sample size was calculated using the Cochrane formula: [18]

$$n = \frac{Z^2pq}{d^2}$$

When n= minimum sample size, Z= Standard normal deviate corresponding to 5% significant level, p = proportion of women with abnormal vaginal discharge in a study done in Lagos, Nigerian [19] was 21.8%, $q=1-p$, d= tolerable error of margin set at 0.05, Z=1.96, q=1-0.218. Applying the formula above, the calculated minimum sample size was 262 but a sample size of 450 clients' reports was used in this study taking into account missing and incomplete data. Selection of case files was done using stratified sampling technique with weighed proportionate allocation. The health facilities were stratified based on the level of care into primary, secondary and tertiary. Using simple random sampling technique, one of the two tertiary care hospitals in the State was selected by balloting. Then, out of 10 secondary health care facilities in the State, one functional secondary care hospital was purposively selected. No Primary Health Care facility was selected due to absence of adequate laboratory facility to aid diagnosis. Subsequently, a weighed proportionate random sampling technique was used to select the eligible clinical case files of female clients attending the Obstetrics and Gynaecological clinics of the study facilities. A ratio of 3.15:1 was established between Imo State University Teaching Hospital, Orlu and Holy Rosary Hospital, Emekuku with respect to the total number of female clients that attended the Obstetrics and Gynaecological clinics from January to December of 2015 in the Teaching Hospital (1077 clients) and Holy Rosary Hospital (341 clients). Using their respective clinic attendance records, numbers were assigned serially from the first eligible client in

January to the last eligible client in December in each of the respective hospitals. Then applying the established ratio and using the table of random numbers, 342 and 108 case files of clients were selected by simple random sampling method from the established sampling frames of the Imo State University Teaching Hospital Orlu and Holy Rosary Hospital Emekuku, respectively. No patient was duplicated on account of repeat visits, as all visits within the study period constituted a case. The clinical case files of the selected patients were subsequently retrieved and in the event of no records, the case file was replaced with the next randomly selected case file.

Data was collected without personal identifiers from the retrieved case files using a proforma that was pretested on a sample of 20 female case files from General hospital Umuguma, Owerri. It comprised three sections: Section one: socio-demographic characteristics; Section two: maternal factors and Section three: prevalence and patterns of abnormal vaginal discharge such as the colour, odour, consistency, viscosity, relationship with cyclical menstrual flow and type of pathogens isolated. Five research assistants were trained on data extraction to collect information from the clinical case files. Data was validated, imputed manually and analysed using IBM-SPSS version 22. Descriptive statistics (frequency tables and summary indices) were generated. Chi Square was used to test the associations between socio-demographic and maternal factors with abnormal vaginal discharge. Variables having significant associations with abnormal vaginal discharge were included in a binary logistic regression model to determine its predictors. P value was set at < 0.05 significance level. Ethical approval was obtained from the Ethics Committee of the Imo State University Teaching hospital. Permissions to assess the clinical case records were granted by Imo State University Teaching Hospital Orlu and Holy Rosary Hospital Emekuku respectively. All authors hereby declare that the study has therefore been performed in accordance with the ethical standards laid down in the 2013 amended declaration of Helsinki

RESULTS

Four hundred and fifty clinical case records were assessed but 432 case records contained complete information corresponding to a complete data record rate of 96.0%. The majority of the women in the study were within the ages of 21 to 40 years 328 (76.0%), married 313 (72.5%) and were traders 137 (31.7%). Also, majority of the women were within the middle level category of monthly household income 243 (56.3%) having a secondary or post-secondary level of education 372 (86.1%) and residing in a rural area 271 (62.7%). (Table 1)

More than one third of the women in the study had no child 156 (36.1%), with more than one quarter 130 (30.1%) having a history of abortion and the majority not using any form of contraceptives 330 (76.4%). Among those that use contraceptives, 66 (64.7%) used either condoms or intrauterine contraceptive devices (IUCD). A majority of the women in the study were not pregnant 301 (69.7%) but were sexually active 312 (72.2%) and complained of at least a gynaecological symptom other than vaginal discharge that is associated with sexually transmitted infections 274 (63.4%). (Table 2)

The overall prevalence rate of abnormal vaginal discharge among the women was 240 (55.6%) and 96 (73.3%) among those who were pregnant. (Figure 1).

Table 1: Socio-demographic Characteristics of women attending Obstetrics and Gynaecological Clinics in Hospitals in Imo State in Jan-Dec 2015

Variable	Frequency (n=432)	Percent
Age (Years)		
≤20	36	8.3
21-30	205	47.5
31-40	123	28.5
>40	68	15.7
Marital Status		
Single	119	27.5
Married	313	72.5
Occupation		
Traders	137	31.7
Students	127	29.4
Public/Civil Servant	108	25.0
Others*	60	13.9
Residence		
Rural	271	62.7
Urban	161	37.3
Monthly household income (Naira)	162	37.5
Low (<75,000)	243	56.3
Middle (75,000-100,00)	27	6.3
High (>100,000)		
Educational level		
None/Primary	60	13.9
Secondary	188	43.5
Post-secondary	184	42.6

*Others: farmers and housewives**

Table 2: Maternal factors of women attending Obstetrics and Gynaecological Clinics in Hospitals in Imo State in Jan-Dec 2015

Variable	Frequency (n=432)	Percent
Parity		
0	156	36.1
1	81	18.8
2-4	124	28.7
>5	71	16.4
History of Abortion		
Yes	130	30.1
No	302	69.9
Pregnancy Status		
Pregnant	131	30.3
Not pregnant	301	69.7
Sexual Activity		
Active	312	72.2
Inactive	120	27.8
Contraceptive use		
Yes	102	23.6
No	330	76.4
Type of contraceptives used (n=102)		
Condoms	43	42.2
IUCD	23	22.5
Oral contraceptives	17	16.7
Injection/Implant	19	18.6

More than one third of the women with abnormal vaginal discharge had a laboratory diagnosis 92 (38.3%), with most of the samples isolating one pathogen or another 79 (85.9%), of which *Candida albicans* was the most common pathogen isolated 50 (63.3%). Most of the abnormal vaginal discharge experienced were either white or creamy in colour 208 (86.7%), with close to half having either a foul or fishy smell 119 (49.6%) and more than half with a curdy consistency 126 (52.5%) and high viscosity 124 (51.7%). The majority of the women with abnormal vaginal discharge noticed a relationship with their cyclical menstrual flow 160 (66.7%).

Furthermore, about three quarters of the women with abnormal vaginal discharge had a coexisting gynaecological complaint 183 (76.3%) with more than one third experiencing either itching around the vulva 99 (41.3%) or lower abdominal pain 93 (38.8%). (Table 3)

The following socio-demographic factors were significantly associated with abnormal vaginal discharge: educational level ($p=0.018$) and place of residence ($p<0.001$). On the other hand, the associations of age, marital status, occupation and monthly household income were not statistically significant with abnormal vaginal discharge ($p>0.05$).

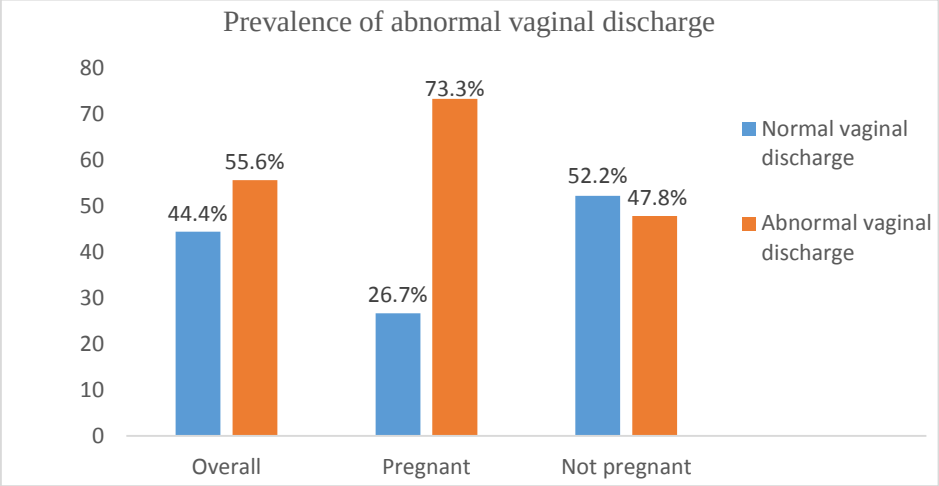

Figure 1: Prevalence of Abnormal Vaginal Discharge among women attending Obstetrics and Gynaecological clinics in Hospitals in Imo State in Jan-Dec 2015

(Table 4) The following maternal factors were found to be significantly associated with abnormal vaginal discharge; parity (p<0.001), history of induced abortion (p<0.001), types of contraceptive use (p=0.009), pregnancy status (p<0.001), sexual activity (p<0.001) and having other gynaecological complaints associated with sexually transmitted infections (p<0.001). On the other hand, the association of contraceptive use was not statistically significant with abnormal vaginal discharge (p=0.287). (Table 5)

Women who had a secondary level of education were significantly less likely to have abnormal vaginal discharge when compared to those who had a post-secondary level of education (OR: 0.56; 0.373-0.852, p=0.006). Women with at least one or more children when compared with women with no children were less likely to have abnormal vaginal discharge, though this was only significant with women who had one child (OR: 0.45; 0.263-0.787, p=0.004) or more than five children (OR: 0.26; 0.145-0.475, p=0.000). Women with a history of induced abortion were significantly less likely to have abnormal vaginal discharge when compared to those without a history of induced abortion (OR: 0.22; 0.138-0.336, p<0.001). Women that use condoms, oral contraceptives and intrauterine devices when compared to injection implants were significantly more likely to have abnormal vaginal discharge (OR: 7.41; 1.875-29.265, p=0.002), (OR: 7.62; 1.591-36.489, p=0.007) and (OR: 8.30; 1.868-36.832, p=0.003) respectively. Pregnant women in the study compared to those not pregnant were significantly more likely to have abnormal vaginal discharge (OR: 2.99; 1.910-4.682, p< 0.001). Women who are sexually active compared to those not sexually active were significantly more likely to have abnormal vaginal discharge (OR: 2.64; 1.715-4.079, p<0.001). Also women who had other gynaecological complaints associated with sexually transmitted infections compared to those that did not, were significantly more likely to have abnormal vaginal discharge (OR: 3.56; 2.363-5.373, p<0.001).

DISCUSSION

The study determined the prevalence, pattern and predictors of abnormal vaginal discharge among women attending Obstetrics and Gynaecological clinics in Imo State. The high prevalence of abnormal vaginal discharge among women and especially among pregnant women was not consistent with other studies.

Table 3: Pattern of abnormal vaginal discharge among women attending Obstetrics and Gynaecological clinics in Hospitals in Imo State in Jan-Dec 2015

Variable	Frequency	Percent
Colour (n=240)		
White	183	76.3
Creamy	25	10.4
Red/Brown	18	7.5
Yellow	9	3.8
Grey	5	2.1
Odour (n=240)		
No odour	121	50.4
Foul smelling	99	41.3
Fish smelling	20	8.3
Consistency (n=240)		
Curdy	126	52.5
Homogenous	23	9.6
Watery	91	37.9
Viscosity (n=240)		
High	124	51.7
Low	116	48.3
Relationship with cyclical menstrual flow (n=240)		
Yes	160	66.7
No	80	33.3
Coexisting Gynaecological complaint* (n=240)		
Itching	99	41.3
Lower abdominal pain	93	38.8
Vaginal bleeding	16	6.7
Dysuria	11	4.6
Genital swelling	9	3.8
Dyspareunia	6	2.5
Dysmenorrhea	1	0.4
None	57	23.8
Mode of diagnosis n=240)		
Clinical	148	61.7
Laboratory	92	38.3
Pathogens isolated (n=92)	79	85.9
Yes	13	14.1
No		
Type of pathogens isolated (n=79)		
Candida Albicans	50	63.3
Gardnerella Vaginalis	11	13.9
Trichomonas Vaginalis	9	11.4
Streptococcus Pyogenes	9	11.4

*Multiple responses

The prevalence rates reported ranged from 21-26% in studies done in Nigeria, India and Egypt. [5, 6, 15.19, 20] Also, in Brazil, a prevalence rate of 43% among pregnant women was reported as against 73% observed in the present study.[1] This could be due to the fact that the present study was a hospital and record based study. Also, the data extracted included not only abnormal vaginal discharge as a presenting complaint, but also abnormal vaginal discharge elicited from the patients during the course of history taking and examination. According to Li et al, [21] women with abnormal vaginal discharge usually will not present it as a complaint, unless it is very uncomfortable to the extent of preventing performance of their routine activities. The subjective self-assessment by women of what constitutes an abnormal vaginal discharge with respect to their level of distress and well-being, reflects the challenges that exist in distinguishing between abnormal and normal vaginal discharge; while some women are easily irritated by the slightest amount of discharge, others are more accommodating and therefore, see no reason to complain even when the discharge appears to be significant.[6, 22] So it is probable, that in the course of taking history, a skilful physician is able to elicit a response regarding the presence of abnormal vaginal discharge in women that ordinarily would not have been presented as a complaint and therefore, resulting in the record of more cases of abnormal vaginal discharge.

This may have contributed to the marked difference in prevalence observed between the present study and the other reported studies. The presence of a high level of abnormal vaginal discharge observed in the present study especially among pregnant women is of significant public health concern.

Table 4: Socio-demographic factors associated with abnormal vaginal discharge among women Attending Obstetrics and Gynaecological clinics in Hospitals in Imo State in Jan-Dec 2015

Variable	Abnormal Vaginal discharge Present (%)	Abnormal Vaginal discharge Absent (%)	χ^2	p-value
Age (years)				
≤20	27 (75.0)	9 (25.0)	7.05	0.070
21-30	114 (55.6)	91 (44.4)		
31-40	66 (53.7)	57 (46.3)		
>40	33 (48.5)	35 (51.5)		
Marital Status				
Single	74 (62.2)	45 (37.8)	2.92	0.087
Married	166 (53.0)	147 (47.0)		
Educational level				
None/Primary	36 (60.0)	24 (40.0)		
Secondary	90 (47.9)	98 (52.1)	8.03	**0.018***
Post-secondary	114 (62.0)	70 (38.0)		
Occupation				
Traders	69 (50.4)	68 (49.6)	2.47	0.481
Students	75 (59.1)	52 (40.9)		
Public/Civil Servant	63 (58.3)	45 (41.7)		
Others	33 (55.0)	27 (45.0)		
Place of residence				
Rural	129 (47.6)	142 (52.4)	18.63	**< 0.001***
Urban	111 (68.9)	50 (31.1)		
Monthly Household Income				
Low	86 (53.1)	76 (46.9)	1.60	0.449
Middle	141 (58.0)	102 (42.0)		
High	13 (48.1)	14 (51.9)		
Total	**240 (55.6)**	**192 (44.4)**		

*significant

This is due to the increased risk of disease transmission to the child during vaginal delivery and also, the consequences of the child being delivered prematurely due to the association of preterm labour with abnormal vaginal discharge.[9]

There was a marked difference between the occurrence of abnormal and normal vaginal discharge among pregnant women observed in the present study. This appears not to be unusual, as the genital mucosa during pregnancy becomes more susceptible to infections, therefore results in an increased likelihood of the occurrence of abnormal vaginal discharge.[16, 23] Furthermore, it has been reported especially in developing countries that most cases of abnormal vaginal discharge are caused by infections.[3, 9] This was exemplified in the present study where pregnant women compared to those not pregnant were three times significantly more likely to have abnormal vaginal discharge.

In the present study, it was observed that only about 38% of the women with abnormal vaginal discharge underwent a laboratory diagnosis and this is most likely due to the patients' inability to afford laboratory investigations for STI. This has therefore, necessitated the use of the syndromic approach in the management of STI in our environment.

Table 5: Maternal factors associated with abnormal vaginal discharge among women attending Obstetrics and Gynaecological clinics in Hospitals in Imo State in Jan-Dec 2015

Variable	Abnormal Vaginal discharge Present (%)	Abnormal Vaginal discharge Absent (%)	χ^2	p-value
Parity				
0	103 (66.0)	53 (34.0)	24.20	**< 0.001***
1	38 (46.9)	43 (53.1)		
2-4	75 (60.5)	49 (39.5)		
>5	24 (33.8)	47 (66.2)		
History of induced Abortion				
Yes	39 (30.0)	91 (70.0)	49.19	**< 0.001***
No	201 (66.6)	101 (33.4)		
Contraceptive use				
Yes	52 (51.0)	50 (49.0)	1.13	0.287
No	188 (57.0)	142 (43.0)		
Types of contraceptive use				
Condoms	25 (58.1)	18 (41.9)	11.62	**0.009***
Oral contraceptives	10 (58.8)	7 (41.2)		
IUCD	14 (60.9)	9 (39.1)		
Injection/implant	3 (15.8)	16 (84.2)		
None	188 (57.0)	142 (43.0)		
Pregnancy Status				
Pregnant	96 (73.3)	35 (26.7)	23.93	**<0.001***
Not pregnant	144 (47.8)	157 (52.2)		
Sexual Activity				
Active	194 (62.2)	118 (37.8)	19.96	**<0.001***
Inactive	46 (38.3)	74 (61.7)		
Other complaints associated with STI				
Present	183 (66.8)	91 (33.2)	38.28	**<0.001***
Absent	57 (36.1)	101 (63.9)		
Total	**240 (55.6)**	**192 (44.4)**		

*significant

However, among those that had a laboratory test, it was observed that *Candida albicans* was the most commonly isolated pathogen followed by *Gardnerella vaginalis*, the pathogen classically associated with bacterial vaginosis. This pattern was consistently seen in previous studies done in Bangladesh, Nigeria, Kenya and Israel [12, 16, 24-26] where *Candida albicans* was the most prevalent; but on the contrary, studies done in India[4, 27, 28] reported a dominance of bacterial vaginosis over candidiasis.

In keeping with the present study, Rahman et al, [16] reported that Candidiasis and bacterial vaginosis are the most common infections among women who complain of abnormal vaginal discharge.

It was observed in the present study, that the women who had other gynaecological complaints associated with sexually transmitted infections were four times significantly more likely, compared to those without, to have abnormal vaginal discharge.

Table 6: Predictors of Abnormal Vaginal discharge among women attending Obstetrics and Gynaecological clinics in Hospitals in Imo State in Jan-Dec 2015

Variable	OR (estimate)	5%(CI)	p-value
Educational level			
Post-secondary	1.00	-	-
Secondary	0.56	0.373-0.852	**0.006***
None/Primary	0.92	0.508-1.672	0.791
Place of residence			
Rural	1.00	-	-
Urban	2.44	1.621-3.683	**< 0.001***
Parity			
0	1.00	-	-
1	0.45	0.263-0.787	**0.004***
2-4	0.79	0.483-1.285	0.337
>5	0.26	0.145-0.475	**< 0.001***
History of induced Abortion			
No	1.00	-	-
Yes	0.22	0.138-0.336	**< 0.001***
Type of contraceptives used			
Injection/implant Condoms	1.00	-	-
Oral contraceptives IUCD	7.41	1.875-29.265	**0.002***
	7.62	1.591-36.489	**0.007***
	8.30	1.868-36.832	**0.003***
Pregnancy status			
Not pregnant	1.00	-	-
Pregnant	2.99	1.910-4.682	**< 0.001***
Sexual activity			
Inactive	1.00	-	-
Active	2.64	1.715-4.079	**< 0.001***
Other complaints associated with STI			
Absent	1.00	-	
Present	3.56	2.363-5.373	**< 0.001***

*significant

Following this, the most common coexisting gynaecological complaint was vulva itching, then lower abdominal pain. This pattern was not observed in some other studies that reported lower abdominal pain as the most common complaint. [4, 6] The predominance of vulva itching in the present study, could be related to the level of personal hygiene, in particular the menstrual hygiene being practiced by the women; as it was observed that the occurrence of abnormal vaginal discharge amongst a majority of the women was associated with their cyclical menstrual flow. According to Amanda et al, [29] abnormal vaginal discharge was significantly associated with unhygienic menstrual practices. These unhygienic practices could result in infections and increased local skin irritations around the vulva and pubic area, thereby explaining the increased relative occurrence of vulva itching in the present study.

Educational level of the women in the present study, appeared to be associated with abnormal vaginal discharge, as those having a secondary, primary or no education compared to those with a post-secondary education were less likely to have abnormal vaginal discharge; even though, the association was only

significant in those with a secondary education. This relationship was not consistently observed in other studies that either reported no association with education or a significant association in women with little or no education.[1, 15, 16, 30] This observation in the present study, where the women with post-secondary education were more likely to have abnormal vaginal discharge, could be explained by the fact that, close to one third and half of the women respectively were students and within the ages of 21-30 years, suggesting that a reasonable proportion of the women were students in tertiary institutions. Though in the present study, the women who were students, had a higher prevalence of abnormal vaginal discharge, but this was not significantly different from the prevalence in the other occupations. It has been reported in several studies, that there is a high prevalence of risky sexual practices among undergraduates in tertiary institutions who are highly sexually active; and as such, are most vulnerable to infections with the increased likelihood of having abnormal vaginal discharge. [31-33] This was further highlighted in the present study, where sexually active women compared to those sexually inactive were three times significantly more likely to have abnormal vaginal discharge.

Similarly, the present study also observed that women residing in an urban area were significantly more likely to have abnormal vaginal discharge. This may be explained by the increased social interactive environment that operates in urban areas which are usually associated with risky sexual behavioural tendencies. According to a study in Uganda, [34] urban women, when compared to their rural counterparts were more likely to have multiple sexual partners and this was further highlighted in another study within an urban area in Nigeria, [35] where it was observed that, there was a very high rate of premarital sexual activities among married women. Although, other socio-demographic factors in the present study were not significantly associated with abnormal vaginal discharge, it has been reported in other studies that maternal age, socioeconomic status, household assets and marital status are significantly associated with abnormal vaginal discharge. [1, 15, 16, 30]

Women in the present study with one or more children compared to those without a child, appear to be less likely to have abnormal vaginal discharge even though, this relationship was not significant for women with two to four children. Nevertheless, this trend was similarly observed in a population based study among pregnant women that observed a relationship of decreasing parity with abnormal vaginal discharge.[1] But on the contrary, this relationship was not observed in a hospital based study among women of reproductive age, where there was a significant increase in prevalence of vaginal discharge as the number of children increased.[15] The relationship of parity observed in the present study, could be due to the relatively increased contact with the health care system through antenatal and paediatric care visits which provide the opportunities for treatment and personal hygiene education. This similar reason of interaction with health care system may also apply to the women in the present study with a history of induced abortion, as it was observed that, they were significantly less likely to have abnormal vaginal discharge when compared to those without a history of induced abortion. This was not consistently observed in some other studies, where there was no association with abnormal vaginal discharge [30] or where the past history of induced abortions was significantly more likely to have abnormal vaginal discharge. [1, 15]

In the present study, the usage or not of contraceptive was not significantly associated with abnormal vaginal discharge. However among the users, the women who use condoms, oral contraceptives and intrauterine contraceptive devices when compared to injection and implant users, (though interpreted with caution), were significantly more likely to have abnormal vaginal discharge. This relationship, nonetheless, was not similarly observed in some other studies, where no significant association with the types of contraceptives or in particular oral contraceptives was established with abnormal vaginal discharge.[1, 30] Though, a study by Rahman et al, [16] reported a significant association of candidiasis associated vaginal discharge with the use of intrauterine contraceptive device.

In conclusion, abnormal vaginal discharge that is mainly whitish in colour appear to be more prevalent than usually self- reported voluntarily especially among those pregnant, with *Candida albicans* being the most common isolated pathogen. The occurrence of this abnormal vaginal discharge appears to be determined by the level of education, place of residence, parity, history of induced abortion, types of contraceptive used, pregnancy status, sexual activity and other gynaecological symptoms associated with sexually transmitted infections. This is of public health concern because of its increased risk of facilitating sexually transmitted infections. There is an important need to educate women on vaginal discharge, good personal hygiene and the reportage of any unusual change in vaginal discharge. Similarly, the health care professionals should take advantage of the opportunities of contact to elicit the presence of abnormal vaginal discharge, improve its early detection and identify the women at risk by taking into cognisance the socio-demographic and maternal determinants of abnormal vaginal discharge in our environment.

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