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A RETROSPECTIVE REVIEW OF PID AMONGST WOMEN SEEN IN GOPC AND THEIR IMMEDIATE OUTCOMES AT A HEALTH FACILITY IN NIGERIA BETWEEN 2007-2017
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ABSTRACT

***Background*: Women suffering from Pelvic Inflammatory Disease (PID) are at higher risk of infertility, regular/prolonged hospitalization making this disease a clinical and public health issue. This study aimed to investigate the reported cases of PID, associated factors and drug management of this condition by clinicians.**

***Design*: Patients records within the study period were obtained from the medical records unit of the central secondary health to extract relevant information of all the patients diagnosed with PID.**

***Results*: Results showed that 57 (41.6%) women were within the age range of 26 and 35 years. Also, 69 (50.4%) women were diagnosed with PID for the second time. The results showed that *Chlamydia trachomatis* was the most isolated organism while vaginal candidiasis (13.1%) was the most frequent co-infection. Metronidazole (68%), doxycycline (67%) and ciprofloxacin (54%) were the foremost prescribed.**

***Conclusions*: High recurrent cases of PID observed in this study calls for investigation into probable drug resistance development and patients' education. Finally, the observed high prevalence of PID the adolescent age group necessitates public health education in the inherent dangers of early sexual activities.**

INTRODUCTION

Pelvic inflammatory disease (PID) has been described as a disorder of the upper reproductive tract which includes conditions such as salpingitis, pelvic peritonitis, endometritis and tubo-ovarian abscesses. It is an infection affecting the genital tract, uterus, fallopian tubes as well as the ovaries (1). It is a condition mostly affecting women that are within reproductive age especially those in their twenties and thirties and rarely found in postmenopausal women as well as in women who had a tubal ligation (2, 3). This condition is characterized by pain, excessive vaginal discharge, lumbago, fever, vulva itching with burning sensations. Risk factors for the pelvic inflammatory disease include: exposure to sexual contact at a young age, having sexual intercourse at a higher rate, having more than one sexual partner and promiscuous partner. Women suffering from this infection are at higher risk of chronic pelvic pain, ectopic pregnancy, infertility, regular and prolonged hospitalization making this disease a clinical and public health issue (3).

The microbial aetiology is attributed to multiple microorganisms some of which are sexually transmitted and others are non-sexually transmitted infections; some of these organisms are associated with bacterial vaginosis; respiratory and enteric pathogens that have colonized the genitalia (4). Studies showed that *Chlamydia trachomatis* and *Neisseria gonorrhoea* are the most common sexually transmitted causal pathogens while others include *Peptostreptococcus* species, *Mycoplasma genitalium*, *Ureaplasma urealyticum* associated with tubal infertility and PID confirmed by laparoscopy, *Gardnerella vaginalis*, *Actinomyces Israeli*, *Prevotlla bivia*, *Campylobacter fetus, Escherichia coli,* group B to D *Streptococci* and *Bacteroides* species (1). International data revealed that the effect of PID among women in developing countries is significant; reports from sub-Saharan Africa showed that PID had 17% to 40% prevalence among gynaecologic admissions. Also, 80% of infertility cases are associated with previous exposure to PID, 30% to 50% of women in their reproductive ages are infertile (1).

The approach in the management of PID incorporated into the primary health care system of the developing countries such as Nigeria can only be effective when properly used and continuously evaluated. However, problems of poor policy formation, implementation and evaluation have been identified to often lead to the ineffectiveness of the healthcare system which undermines the success of the cheap method of management; other possibilities that may jeopardise effective management include poor detection rates of chlamydial and gonorrhoeal infections, overtreatment and low presentation degrees in asymptomatic situations (5). A documented study showed that although PID is a relatively common condition, there was a likelihood of missed diagnosis [6]. The sequelae of this include serious complications and failed therapy. Based on the foregoing, this study aimed to investigate the documented cases of PID, associated factors, isolated organisms and drug treatment of this condition.

METHODS

This study, clinical audit of case files, was carried out at the General Out-Patient Department (GOPD), Obstetrics and Gynecology unit of a Central Hospital Warri (secondary health facility), Delta State, South-south, Nigeria. Ethical clearance was obtained from the Ethical and Research Committee with the protocol number, CHW/ ECC VOL 1/ 161. Data was generated by extracting relevant information from medical records of all the patients diagnosed with PID from 2007-2017 in the health facility. Case files before 2007 were not included in the study. Also, case files of

patients who presented with cases other than PID within the study period or with incomplete documentations were excluded. The information extracted include demographic information, medical examinations conducted and factors related to PID. The patients were assigned a code (without names) to ensure confidentiality; the data then analysed using SPSS 15.0.

RESULTS

A key challenge encountered in the course of this study was proper documentation of patients' record. To this end, some of the patients could not be included in the study due to incomplete record. This became a limitation to obtaining the accurate number of PID cases reported in the facility over the period studied.

Results of women diagnosed with PID (from the case file) showed that 57 (41.6%) women were within the age range of 26 and 35 years while 10 (7.3%) women were above 45 years of age (Table 1). The results also showed that 62 (45.3%) women were diagnosed with PID for the first time, 69 (50.4%) for the second time and 6 (4.4%) for the third time (Table 1). The patients' demographic results showed that 90 (65.7%) women with PID were married, 42 (30.7%) were single, 3 (2.2%) were divorced while 2 (1.5%) were widowed. Furthermore, 101 (73.7%) lived in a nuclear family setting while 36 (26.3%) lived in an extended family setting. Results of education status showed that 14 (10.2%) women had no formal education, 29 (21.2%) had primary education, 32 (23.4%) had secondary education while 62 (45.3%) had tertiary education (Table 1).

Table 1

Socio-demographic and clinical characteristics of the patients with PID beween 2007-2017

N=137

Status/Parameter	Category	Frequency (%)
Age	15 – 25	43 (31.4)
	26 – 35	57 (41.6)
	36 – 45	27 (19.7)
	> 45	10 (7.3)
Number of PID diagnosis:	First time	62 (45.3)
	Second time	69 (50.4)
	Third time	6 (4.4)
Marital	Married	90 (65.7)
	Single	42 (30.7)
	Divorced	3 (2.2)
	Widowed	2 (1.5)
Type of Family	Nuclear	101 (73.7)
	Extended	36 (26.3)
Educational	No formal education	14 (10.2)
	Primary	29 (21.2)
	Secondary	32 (23.4)
	Tertiary	62 (45.3)

Occupation	Full house-wife	12 (8.8)
	Unskilled worker	34 (24.8)
	Skilled worker	23 (16.8)
	Health professional	1 (0.7)
	Other professional	67 (48.9)

The results (Table 2) showed that *Chlamydia trachomatis* was the most isolated organism (91.9%) while *Haemophilus influenza* was observed to be the least isolated organism (0.7%). It was observed (Table 3) that vaginal candidiasis (13.1%) was the most frequent co-infection followed by urinary tract infection (2.9%); bacterial vaginosis, endometritis and bilateral ovarian cyst (1.4% each). The results of antimicrobials prescribed/administered to patients are presented in table 4. Metronidazole (68%), doxycycline (67%) and ciprofloxacin (54%) were the foremost prescribed.

Table 2

Microorganisms Isolated from Women with PID

N=137	
Isolated Organisms	**Frequency n (%)**
Chlamydia trachomatis	126 (91.9)
Neisseria gonorrhoea	75 (54.7)
Gardnerella vaginalis	25 (18.2)
Escherichia coli	5 (3.6)
Haemophilus influenza	1 (0.7)
Candida albicans	22 (16.0)

Table 3

Co-morbidities in Women with PID

Co-infection/condition	**Frequency n (%)**
Vaginal candidiasis	18 (13.1)
Urinary Tract Infection	4 (2.9)
Bacterial vaginosis	2 (1.4)
Endometritis	2 (1.4)
Bilateral Ovarian Cyst	2 (1.4)
Dysmenorrhea	1 (0.7)
Endometriosis	1 (0.7)

**Co-morbidities- other conditions diagnosed along with PID*

Table 4

Pattern of Antimicrobials dispensed and treatment Regimen for Women with PID

Antibiotic	Class	Dosage /Type	Duration	Frequency n (%)
Ceftriaxone	Cephalosporin 3rd generation	i.v 1g Stat		42
Ceftriaxone	Cephalosporin 3rd generation	i.v 1g	2 days	7
Ceftriaxone	Cephalosporin 3rd generation	i.v 1g	3 days	23
Ceftriaxone	Cephalosporin 3rd generation	i.v 1g	4 days	4
Ceftriaxone	Cephalosporin 3rd generation	i.v 1g	5 days	31
Ciprofloxacin	Fluoroquinolone	Tab 500mg b.d	5 days	15
Ciprofloxacin	Fluoroquinolone	Tab 500mg b.d	7 days	54
Ciprofloxacin	Fluoroquinolone	Tab 500mg b.d	14 days	4
Metronidazole	Nitroimidazole	Tab 400mg t.d.s	5 days	18
Metronidazole	Nitroimidazole	Tab 400mg t.d.s	7 days	68
Metronidazole	Nitroimidazole	Tab 400mg t.d.s	14 days	3
Metronidazole	Nitroimidazole	i.v 500mg b.d	5 days	2
Metronidazole	Nitroimidazole	i.v 500mg Stat		1
Metronidazole	Nitroimidazole	i.v 7.5mg o.d	5 days	1
Doxycycline	Tetracyclines	Tab 200mg Stat		21
Doxycycline	Tetracyclines	Tab 100mg b.d	7 days	67
Doxycycline	Tetracyclines	Tab 100mg b.d	5 days	12
Doxycycline	Tetracyclines	Tab 100mg b.d	14 days	3
Doxycycline	Tetracyclines	Cap. 150 stat		1
Cefixime	Cephalosporin 3rd Class	i.v 785mg o.d	6 days	1
Cefixime	Cephalosporin 3rd Class	i.v 1g stat		1
Cefixime	Cephalosporin 3rd Class	Tab 200mg stat		1
Amoxycillin/Clavulanate	Beta-lactam	Tab 625mg b.d	7 days	7
Amoxycillin/Clavulanate	Beta-lactam	Tab 625mg b.d	5 days	2
Amoxycillin/Clavulanate	Beta-lactam	i.v 1.2g o.d	5 days	1
Amoxycillin/Clavulanate	Beta-lactam	Tab 625mg b.d	14 days	1
Nystatin	Antifungal	Pessary nocte	3 days	6
Ofloxacin	Fluoroquinolone	Tab 400mg b.d	7 days	6
Gentamycin	Aminoglycoside	i.v 26mg b.d	5 days	1
Gentamycin	Aminoglycoside	i.v 80mg b.d	2 days	2
Clotrimazole	Imidazole (Antifungal)	Pessary nocte	5 days	14
Clotrimazole	Imidazole (Antifungal)	Pessary nocte	7 days	3
Clotrimazole	Imidazole (Antifungal)	Cream b.d	7 days	1
Azithromycin	Macrolide	Tab 1g b.d	5 days	3
Levofloxacin	Fluoroquinolone	Tab 500mg t.d.s	7 days	1
Fluconazole	Azole (Antifungal)	Tab 200mg o.d	3 days	1
Nalidixic acid	Quinolones	Tab 500mg t.d.s	7 days	1

i.v: - intravenous; tab: - tablet; cap: - capsule; Pessary: - vaginal insertion (during pregnancy); t.d.s: - three times daily; b.d: - twice daily; o.d: - everyday; nocte: - at night; stat: - immediately

DISCUSSION

The population of women in the study area is about 1,500,000. At a confidence level of 95% and confidence interval set at 10%, the number of case files (137) obtained and studied are representative of the study group; the limitation of accurate case filing notwithstanding. However, a better filing system especially complementary electronic filing system would enhance documentation.

The total of 137 extracted data over the period, though, statistically representative of the studied population is a little bit low given that PID is a common genealogical condition. This could be as a result of improper documentation at the health facility as observed during the study. Furthermore, the issue of patient related factor(s) cannot be ruled out. Of importance is that the facility is located in a low-income-economy nation with little access to National Health Insurance policy to allow for easy access to health care. Hence, a number of the populace resort to self-medication and use of medications which are readily available at local drug retail outlets. Also, the relationship between PID and sexually transmitted infections may have led to self-diagnosis by the patients. This becomes more important since self-medication especially with antimicrobials may give some temporary 'succour' and false impression of cure. The limitations are huge and may increase morbidity, infertility, mortality and antimicrobial resistance.

The highest diagnosis of PID in married women is a reflection of the documented relationship between PID and sexual activities (3). Although no direct reason could be adduced for a higher frequency of the clients living in a nuclear family setting, it could be inferred that nuclear family setting gives room for more sexual intimacy between partners as against what obtains in an extended family setting. The reported highest number of educated clients diagnosed with PID may be attributed to willingness to seek medical advice as a result of formal education. This may be a reflection of priority placed on health by this group of individuals. The observed higher number of clients presenting with PID more than once could be attributed to re-exposure to the risk factors. In their studies, Marks *et al.*, (7) concluded that a previous presentation with PID could be a risk marker for the diagnosis of PID. The observed prevalence of PID in the age range 26-35 (41.6%) and 15-25 (31.4%) are similar to the findings of Nkwabong *et al.*, (8). This connotes early sexual activities in adolescents from 15 years of age. In their study, Oseni & Odewale (9) attributed sexual activities at an early age in adolescents in a low-income-nation to the unfavourable economy. They opined that this encourages multiple sexual partners. Khan *et al*. (3) demonstrated a strong association between PID and multiple sexual partners. This predisposes them to PID attendant health issues like HIV infection, ectopic pregnancy, spontaneous abortion and infertility. Roy *et al.*, (10) and Joda & Masha, (11) reported a strong association between PID and infertility.

The more frequent isolation of 'exogenous' microorganism (*C. trachomatis* and *N. gonorrhoea*) as against those that are also microbiota/microflora (*H. influenza* and *C. albicans*) suggested that the PID cases were due to contracted pathogenic microorganism possibly as sexually transmitted infections (STI). However, the relatively lower but noteworthy isolation of vaginal microbiome (*G. vaginalis* and *C. albicans*) suggests a trend of a paradigm shift in the likely risk factors of PID in our clime. This was also reported in the document published by the CDC (12). The high prevalence of *Neisseria gonorrhoea* and *Chlamydia trachomatis* agree with the submissions of Trent (1) and Price *et al.* (13) respectively which identified these

organisms as the dominant culprits of PID. A previous study (14) reported that there was a high risk of hospitalisation for ectopic pregnancy and PID recurrence by chlamydial infection. Also, the 18.2% isolation rate for *Gardnerella vaginalis* is comparable to 14.1% reported by Nkwabong *et al.* [8]; the 16.0% isolation rate of *Candida albicans* is comparable to the 13.5% reported by Goel and Kumar (15).

The observed fewer co-morbid conditions with PID in the present study could be an indication of the accuracy of diagnosis of PID by the clinicians. Also, the record of vaginal candidiasis as the leading co-morbidity coupled with the isolation of *C. albicans* further buttress the likely involvement of vaginal microbiome as a key risk factor in the cases of PID. A Study has documented STIs and endometriosis as risk markers of PID (7).

The drugs administered in the cases of PID in this study are in line with the CDC guidelines (16). The administration of third generation cephalosporin and beta lactam cum beta lactamase inhibitor (ceftriaxone and amoxiclav) suggests the development of resistance, by organisms implicated in PID to beta-lactams, probably by secreting beta-lactamases. These two antimicrobials possess the ability to withstand hydrolysis by beta-lactamases. Doxycycline is notable in its use for treating bacterial infections and parasites. Of the tetracyclines, it attains peak serum concentration faster; a desired property in treating PID. Furthermore, it has a longer half-life (necessitating less dosing frequency) and comparatively more renal excretion. These properties enhance patient compliance for patients treated on out-patient-basis and eradication of risk factors (microorganisms). Also, when administered orally, doxycycline is better absorbed with fewer tendencies to alter the microbiome. Alteration of microbiome can lead to super-infection which may further complicate the situation. The addition of an anti-anaerobe (metronidazole) is a pointer to the anaerobic property of some of the microorganisms implicated in PID.

CONCLUSION

This study showed that the clinicians followed CDC recommended guidelines in the management of PID. It was also discovered that although exogenous pathogenic microorganisms were the main risk factor, there was a paradigm shift to vaginal microbiome as the risk factor. There is need to include other screening tests such as HIV and abnormal glucose tolerance in the treatment of PID in the study area. Improper documentation and low reported cases call for more diligence record keeping and health care education of the populace at risk, women. High recurrent cases of PID observed in this study calls for investigation into probable drug resistance development, contact tracing/treatment of partners and patient's education especially with regards to compliance to treatment. Finally, the observed high prevalence of PID the adolescent age group necessitates public health education in the inherent dangers in early sexual activities.

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