Original Research Article

Effect of hormonal and copper IUDs on genital microbial colonisation and clinical outcomes in North-Western Nigeria

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ABSTRACT

Background: Intrauterine devices are one of the popular long term reversible contraceptive methods. Earlier forms were associated with genital infections, however more recent types such copper IUDs and hormonal types have been shown to have better safety profile. However, there is no conclusive evidence to demonstrate that hormonal IUD is less associated with genital infection when compared with copper IUDs. The objectives include determination of prevalence of genital tract infections among IUD users, to determine the type of IUD that is less associated with genital infection, and also determine clinical features seen among IUD users.
Methods: We conducted a descriptive, cross sectional study of clients who were at 6 months following IUD insertion. Endocervical and high vaginal samples were taken to isolate microbes.
Results: The prevalence of genital tract infection was 20% in Copper IUD users and 8.6% among LNG-IUS users. Genital infection was significantly higher among copper IUD users compared to hormonal IUD users (p=0.038, OR= 2.88). Abnormal vaginal discharge was the commonest symptoms among IUD users and formal education was associated with less risk of genital infections (p=0.048).
Conclusions: Hormonal IUDs are less associated with genital tract infection compared to copper IUDs and women with formal education are less likely to have genital infection among IUD users.

Keywords: Copper IUD, Genital infection, LNG-IUS

INTRODUCTION

The suspicion that intrauterine devices (IUDs) could cause genital infections has a long history from 1940s.[1] The introduction of newer IUDs including the hormonal type with the aim of improving its safety profile and efficacy has increased its popularity.[2] So many studies have been conducted to identify IUD related infections. It is likely that the hormone in LNG-IUS could limit the ascent of microbes in the genital tract. The most acceptable conclusion is that IUD related infection is generally low but appears to be highest in the first month post insertion, suggesting that insertion procedure may be responsible.[3] This study assessed genital infection in copper containing IUD and LNG-IUS users in the North-Western part of Nigeria. The study set out to determine the prevalence of genital tract infections among IUD users; to determine common symptoms of genital infection among IUD users and to identify the type of IUD associated with genital infection.

METHODS

Study area

The study was conducted at the Family Planning clinics of the Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto.

Design of the study was a cross-sectional study.

Study population

The study involved 70 clients who used IUD for six months, 35 used Cu-T 380A and 35 used LNG-IUS.

Sampling method

Eligible clients were recruited by convenience sampling method. A semi-structured questionnaire was used to obtain relevant information and all clients were recruited from September 2015 to June 2016.

Sample collection

An endocervical specimen was collected for culture using a sterile cotton swab during vaginal examination to detect *Neisseria gonorrhea* after inoculation into Thayer Martin and 5% blood agar. The endocervical swab was also smeared onto a glass slide for Giemsa staining to detect Chlamydia trachomatis inclusion bodies. High vaginal swabs were taken to isolate for *Trichomonas vaginalis, Candida species, Gardnerella vaginalis* and *anaerobes*. One of the high vaginal swabs was used to make wet mount and Gram Staining, while the second swab was used for culture.

The swab sticks had Amies medium which served as transport medium used for the transport of samples to the laboratory.

The high vaginal swab was utilized to make the preparation for detection of *Trichomonas vaginalis* trophozoites, motile bacteria, Candida species, epithelial cells and pus cells.

Gram staining was used to identify gram negative diplococci denote *Neisseria gonorrhea.* Large Gram positive yeast cells and pseudohyphae seen could be Candida species. In bacterial vaginosis, epithelial cells with adhering gram negative organisms.

Giemsa staining was used to identify Chlamydial infection when blue-mauve coloured inclusion bodies were seen in epithelial cells.

Oxidase and Sugar fermentation test was performed on suspected *Neisseria gonorrhea* colonies. *Neisseria gonorrhea* colonies are Oxidase positive and ferment glucose but not lactose, maltose or sucrose. Catalase and coagulase test was employed to differentiate between the Gram positive cocci. Staphylococcus aureus is catalase and coagulase positive while *Streptococcus agalactiae* is catalase negative. Candida species was further confirmed to their specie level by the use of Germ tube test and sugar assimilation test. *Candida albicans* is germ tube positive, while other species are negative.

Data analysis

The results obtained were analysed using Statistical Package for Social Sciences (SPSS) version 21. A p-value of <0.05 was considered significant. Chi square was used to determine association and significant parameters were subjected to logistic regression.

RESULTS

A total of 70 women were enrolled for this study. The mean age of the respondents with copper IUD was 28.94±7.1 years and that of the hormonal IUD group was 27.90±6.7 years. Most of the respondents were between 25-34 years of age. The majority of the respondents were unemployed, 45(64.3%) and mostly in monogamous setting. Majority of the respondents were formally educated and only 9(25.5%) had no formal education. Most (78.6%) of the women had 1-5 previous deliveries (Table 1).

Table 1: Socio-demographic characteristics of respondents.

Characteristic	Frequency (%)	
	Copper IUD	LNG-IUS
Age (years)		
<20	9 (25.7)	12 (34.3)
20-30	20 (57.1)	17 (48.6)
>30	6 (17.1)	6 (17.1)
Occupation		
Unemployed	20 (57.1)	25 (71.4)
Employed	15 (42.9)	10 (11.4)
Type of family		
Monogamous setting	19 (54.3)	18 (51.4)
Polygamous setting	16 (45.7)	17 (48.6)
Educational status		
No formal education	5 (14.3)	4 (11.2)
Formal Education	30 (85.7)	31(88.8)
Parity		
1-5	27 (77.1)	28 (80.0)
6-10	8 (22.9)	7 (20.0)

Table 2: Common symptoms of genital infection among IUCD users.

Symptom	Number	Percentage
Lower abdominal pain	4	5.7
Dyspareunia	0	
Abnormal vaginal discharge	8	11.4
Abnormal vaginal bleeding	2	2.9
Urethral discharge	0	
Cervical excitation tenderness	0	
Adnexal tenderness	0	

Abnormal vaginal discharge was the commonest symptom at 6 month, it was identified in 8 (11.4%) of the respondents (Table 2).

At 6 months, 7 (20%) women who used copper IUCD and 3 (8.6%) women who used LNG-IUS had genital infection. The observed difference was statistically significant (χ^2= 6.066, p= 0.022) (Table 3). Women with copper IUD are more than two times more likely to have genital infections (OR= 2.88) (Table 4).

Table 3: Association of IUD types and infection.

IUD	Infection (%)		Test of significance
	No	**Yes**	
Copper T	28 (80)	7 (20)	χ^2=6.066
LNG-IUS	32 (91.4)	3 (8.6)	p=0.022*

*significant association

Table 4: Logistic regression model.

B	WALD	P value	OR	95% CI
2.064	5.274	0.038	2.88	1.35-45.83

Socio-demographic characteristics were analysed for association with genital infection among IUD users. Only educational status had statistically significant association with genital infection (χ^2= 0.315, p= 0.048). This implies that women who were not formally educated and had IUD were more likely to have genital infection after six month of insertion (Table 5).

Table 5: Risk factors associated with genital infections in IUD users.

Factors	Infection Test of significance		
	No	**Yes**	
Age			
<20	16 (76.2)	5 (23.8)	χ^2=4.993
20-30	28 (75.7)	9 (24.3)	p=0.141
>30	9 (75.0)	3 (25.0)	
Occupation			
Employed	33 (73.3)	12 (26.7)	χ^2=0.215
Unemployed	17 (68.0)	8 (32.0)	p=0.728
Edu. Status			
Informal	10 (52.6)	9 (47.4)	χ^2=5.315
Formal	40 (67.7)	11(21.3)	p=0.048*
Family setting			
Monogamy	28(75.3)	9 (24.3)	χ^2=1.39
Polygamy	22 (66.7)	11 (33.3)	p=0.29
Parity			
Para 1-5	40 (72.3)	15(27.3)	χ^2=1.893
Para 6-10	10 (66.7)	5 (33.3)	p=0.625

* Significant association

DISCUSSION

The prevalence of genital infection among IUD users was 20% and 8.6% among copper IUD and LNG-IUS users respectively. However higher rates were observed in Benin, Nigeria where 53.07% of IUD users who presented with complain had laboratory confirmation of genital infection.[4] Alawad et al, in Sudan had prevalence of genital infection to be 65% among IUD users, but only clients with complain or ready for removal were recruited for the study.[5] In West Bank, 91% of women using IUD complain of symptoms which may be related to genital infections.[6] A lot of non-specific symptoms including fever and abdominal pain were considered in the study which was responsible for the high prevalence. These studies were cross sectional and there were gross variations in duration of IUD use. While some clients had, it inserted for few days, some had used it for more than 7 years. This may be responsible for the difference in prevalence rate. Additionally, the observed differences in these studies may also be due to differences in the types of IUCDs used by the clients. These could also be due to high prevalence of genital infection in the general population although, the infection status of the clients was not known prior to insertion of IUD. In Mumbai Shingade et al, reviewed women with clinical diagnosis of genital infection and 27.81% had IUD.[7] This contrast our study where IUD use is the basis for inclusion not genital infection. In study from Bangladesh, 64.7% of the IUD users had genital tract infection the study was carried out among women with gynaecological complaints.[8] Ruyer et al found 55.9% of women with IUD and vaginal discharge had laboratory evidence of genital infection. Since vaginal symptom is a symptom of genital infection, it's not surprising that microbes were isolated from many of the women.[9] Sangita et al found 22.3% of IUD users had pelvic inflammatory disease.[10] Patients were recruited at the gynaecological outpatient clinic which could have caused selection bias and more so, only upper genital tract infection was also studied.

The common clinical features recognized among IUCD users in this study were vaginal discharge and lower abdominal pain. At 6 months 12.2% and 6.1% of the women had abnormal vaginal discharge and lower abdominal pain respectively. Similarly in studies conducted in Sudan and Turkey, abnormal vaginal discharge was the commonest symptom among IUCD users.[5,11] In Palaestine, lower abdominal pain was the commonest symptom.[6] Menorrhagia was the main complaint of IUCD users in an Iranian study while backache and abnormal vaginal discharge were the major symptoms of the clients with IUCD in an Indian study.[12,13] In the non-IUCD group, abnormal vaginal bleeding was the commonest symptom in this study and this may have been contributed by relative high number women who used implants in this group.

It was observed in this study that copper IUCD was significantly associated with genital infection when compared with hormonal IUCD at six months (χ^2=6.066, p=0.022). Interestingly, when this association was subjected to logistic regression analysis it was found to be significant, women with copper IUCD were 2.8 times more likely to have genital infection at third contact (OR= 2.88, p value= 0.038, CI= 1.35-45.83). Serap et al found that copper IUD to be associated with an alteration on vaginal flora and higher frequency of nonspecific

inflammatory changes affecting cervical cytology but this was not seen with LNG-IUS.[14] The women used the IUDs for 12 months before tests were done and hence the patterns of infection in the first few weeks to months were not determined. Toivonen also found levonorgestrel IUD to have protective effect against pelvic inflammatory diseases compared to NOVA-T after 36 months of use (p<0.013).[15] Infection of the lower genital tract was not determined in the study. The incidence of pelvic inflammatory disease was low among LNG-IUS users regardless of the age. In NOVA-T, pelvic inflammatory disease was increased among the youngest women which makes the difference significant (p<0.01).[16] In contrast, Sivin et al observed no difference in the cumulative rate of infection between levonorgestrel IUD and copper IUD users. Infection rates appear to be lowest in the sixth and seventh years of the study.[17]

Age, occupation, marital status, husband's number of partners, educational status, religion and parity were analysed for association with genital infection among users of IUCD. Only educational status had statistically significant association with genital infection (χ^2=5.315, p=0.048). Women who used IUCD and had formal education were less likely to have genital infection compared to those without formal education. Formally educated women are more likely to observe good personal hygiene because they have more access to health information. Studies from Sweden[16] and Basra, Iraq showed that age was significantly associated with genital infection among IUCD users. Infection was higher among younger women.[18]

The prevalence of genital infection among IUD users was relatively high. Abnormal vaginal discharge was the most common symptom among IUD users. Genital infection was higher among copper containing IUD users compared to LNG-IUS. Formal education was associated with lower rate of genital infection among IUD users.

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