



Original Research Article

Intravaginal practices: A potential route to genital infection

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**Marie Chantal Ngonde-Essome^{1,2*},
Mohamadou Mansour¹,
Hortence Gonsu^{2,3},
Nehemie Donfagsiteli¹,
Angeline Boula⁴,
Seid Bondoro⁵,
and
Jean Louis Essama-Oyono¹.**

¹Institute of Medical Research and Medicinal Plants Studies, Yaoundé Cameroon.

² University Teaching Hospital Yaoundé, Cameroon.

³ Department of Microbiology, University of Yaoundé I, Yaoundé Cameroon.

⁴ Child and Mother Foundation, Central Hospital of Yaoundé, Cameroon.

⁵High Institute of Health Professions, Yaoundé Cameroon.

*Corresponding Author
Email: ngondechan@yahoo.fr

Tel: +237677655602

Cultural beliefs and educational factors strongly lead women to perform intravaginal practices in sub Saharan Africa. Previous research has suggested that vaginal douching modifies vaginal flora and was associated with genital infections. The aim of our study was to evaluate the contribution of intravaginal practices in the acquisition of genital infections in women. This was a cross-sectional study. For bacterial vaginosis diagnosis, vaginal smears were heat-fixed and gram-stained then examined by light microscopy the results were interpreted by using a standardized method for diagnosing bacterial vaginosis, as described by Nugent. The mycological examination consisted of culturing on the CHROM agar *Candida* medium and Sabouraud chloramphenicol agar the vaginal swabs. 169 women were enrolled in this study. The majority of respondents were in the age group of 29-39 years (44%). The students were represented with a prevalence rate of 42.60%. Our results showed that 71% of women performed intravaginal practices and the most used vaginal practice is scraping the vaginal walls with the fingers (69.2%). University level women were mostly using these practices (55%) than secondary level women (30.8%) and primary level women (14.2%) with significant difference ($P < 0.05$). The prevalence rate of vaginal candidiasis in female who did not perform intravaginal practices was higher (73.7%). Bacterial vaginosis was more common in women who performed intravaginal practices (76.6%). However, no significant association was found between intravaginal practices and the occurrence of vaginal candidiasis and bacterial vaginosis in the women ($P > 0.05$). Women who performed intravaginal practices were more co-infected with vaginal candidiasis and bacterial vaginosis (20.72%) than women who did not (10.34%); but the difference was not significant ($p > 0.05$). Intravaginal practices may expose women to genital infections. Health education must be provided to women who performed intravaginal practices in order to reduce genital infections

Keywords: Intravaginal practices, vaginal candidiasis, bacterial vaginosis, women, Cameroon

INTRODUCTION

Intravaginal practices (IVP) are procedures used by women to cleanse and dry their vaginal cavity. These practices include douching with water, commercial antiseptics, salt

water, lemon water, scraping the vaginal walls with the fingers to eliminate excess vaginal secretion and the intromission of traditional herbs, pieces of cloth or paper

into the vagina to dry and firm it in order to satisfy the sexual partner (Girod, 2013). A study conducted in China reported that 84% of women practiced douching (Liluo et al., 2016). Another study conducted in Kenya reported that 75% of IVP were done by scraping the vaginal walls with the fingers, while 23% of women reported douching with water and 71% used soapy water or antiseptics (McLelland et al., 2006). A study concerning vaginal practices in HIV negatives Zimbabweans women found that 84% of women reported cleansing inside the vagina and 40% of visited women reported drying the vagina using cloth or paper (Turner et al., 2010). A study carried out in Central Africa showed that 51% of women practiced intravaginal cleansing while 28% reported use of intravaginal herbs (Mbizvo et al., 2004). There is a lack of information regarding intravaginal practices in women in Cameroon. These vaginal practices aim to eliminate vaginal odor, excess vaginal secretions, to fight against sexually transmitted infections or pregnancy and to shrink and firm the vaginal cavity (UNESCO, 2016). The vaginal cavity is protected from infections by lactobacilli which provide it with an acid pH that is unfavorable to the installation of numerous bacteria (Bohbot, 2016).

According to previous studies IVP increase the risk of vaginal infections because they cause an ecological imbalance of the vaginal flora and sometimes a disappearance of lactobacilli (Turner et al., 2010). In a study conducted in United States, 81% of women reported washing inside of their vagina, 21% of them suffered from bacterial vaginosis and 6% from vulvo vaginal candidiasis (Brown et al., 2013). Intravaginal use of oils was associated with candida colonization (44%) compared with (5%) in women who did not use it (Brown et al., 2013). Women reporting intravaginal use of petroleum jelly were 2.2 time more likely to test positive for bacterial vaginosis OR 2.2 IC (1.3-3.9) than women who did not use petroleum jelly (Brown et al., 2013). Some authors reported in their study that IVP increase the risk of developing bacterial vaginosis, the most common genital infection associated with transmission of sexually transmitted diseases and acquired immunodeficiency syndrome (AIDS) (Alcaide et al., 2017).

Another study reported that frequent douching with water or other fluids was significantly associated with higher odds for recurrent vulvo vaginal candidiasis (OR 2.41 IC (1.25-4.66); $p=0.000$) (Ekpenyong et al., 2012). The aim of our study was to evaluate the contribution of intravaginal practices in the acquisition of genital infections in women who came for consultation in the Gynecology Department of the University Teaching Hospital.

MATERIALS AND METHODS

Type and duration of the study

It was a cross-sectional study, spreading over a period of three months from June to August 2021, at the Yaoundé University Teaching Hospital in the Centre region of Cameroon.

Study population and size of the study

Our study population consisted of 169 women, aged of 18 to 49, coming to the Department of Gynaecology of the University Teaching Hospital to consult for vaginal discharge or vaginal itching and who gave informed consent to participate in the study. Menopausal women and women in menstruation or on vaginal ovules or under antibiotics were excluded. The size of the population was calculated with formula of Lorentz according the prevalence of 11% of vulvovaginal candidiasis reported in a study conducted in Nigeria (Ekpenyong et al., 2012).

Sample collection

Participants were asked to avoid vaginal cleansing before attending the visit. Collected samples were processed in the Human Biology Laboratory of Institute of Medical Research and Medicinal Plants Studies (IMPM).

After cleansing the vaginal margins with Dakin's solution, vaginal swabbing (at the cervix margins) was performed using specula and sterile swabs: a sterile cotton wool-tipped swab (Henso Medical, Hanghan, Co, Ltd) was used to collected secretion from the vagina walls and served to diagnose bacterial vaginal infections

Each sample collected was preceded by a questionnaire: participants were interviewed face to face by trained interviewers (researchers of IMPM). The informations were collected using the questionnaire included socio demographics informations (age, marital status, education level), intravaginal practices behavioral data (cleaning inside the vaginal cavity, vaginal toilet with finger, vaginal douching with water alone, water with soap, commercial antiseptic solution, vinegar, lemon juice, salty water, insertion of products to dry or tighten vagina as powder, cream, herbs, stones, leaves). The reason that motivate you to follow these practices (eliminate vaginal odor, eliminate excess vaginal secretion, fight against sexually transmitted diseases, avoid pregnancy, dry or tighten the vagina, by education), medical history (past and current sexual transmitted infection such as gonorrhoea, *chlamydia trachomatis* infection, acquired immunodeficiency syndrome, mycoplasma infections, syphilis), history of self-medication and recent treatments.

Diagnosis of bacterial vaginosis

For bacterial vaginosis, vaginal smears were heat-fixed and gram-stained then examined by light microscopy by a single reader and the results were interpreted by using a standardized method for diagnosing bacterial vaginosis (Nugent et al., 1991). Bacterial vaginosis was defined as a Nugent score of 7 to 10. Small gram negative or variable bacilli were assumed to be *Gardnerella vaginalis* morphotype. Sniff test was performed with potassium hydroxide solution (10%). It is positive in case of bacterial vaginosis.

Table 1. Distribution of vaginal infections according to age, marital status and level of education in the population study

Variables	Vaginal candidiasis (VC)			Bacterial vaginosis (BV)		
	No N(%)	Yes N(%)	P value	No N(%)	Yes N(%)	P value
âge (years)						
18-28	32 (27.1)	16(31.4)	0.9	26 (27.1)	22 (30.2)	0.3
29-39	49 (41.5)	26 (51.0)		43 (44.8)	32 (43.8)	
>40	37 (31.4)	09 (17.6)		27 (28.1)	19 (26)	
Total	118(100)	51(100)		96(100)	73(100)	
marital status	N(%)	N(%)		N(%)	N(%)	
Single	54 (45.8)	27 (52.9)	0.2	45 (46.8)	36 (49.3)	0.9
Married	51 (43.2)	20 (39.2)		40 (41.7)	31 (42.5)	
Concubinage	13 (11)	4 (7.9)		11(11.4)	06 (8.21)	
Total	118(100)	51(100)		96(100)	73(100)	
Educational level	N(%)	N(%)		N(%)	N(%)	
Primary	12(10.1)	07(13.7)	0.001	21(21.8)	14(19.1)	0.001
Secondary	17(14.4)	29(56.8)		36(37.5)	09(12.3)	
University	89 (75.4)	15(29.4)		39 (40.6)	50(68.5)	
Total	118(100)	51(100)		96(100)	73(100)	

Mycological examination and identification

The mycological examination consisted of culturing on the CHROM agar *Candida* medium (Media Mage, Johannesburg, South Africa) and on Sabouraud Chloramphenicol agar (Media Mage, Johannesburg, South Africa), the swabs. This permitted us to isolate and identify (depending on the color) *Candida* colonies after 24 to 48 hours of incubation. A number of colonies greater than or equal to 10 of a vaginal sample culture was considered to be a pathogenic character of the isolated yeast

Ethical considerations

We obtain administrative authorization of the Director of Yaoundé University Teaching Hospital to carry out our research. The study was submitted to the National Research Ethics Committee for Human Health (CNERSH) to obtain their approval and an ethical clearance was issued under the reference N° 2021/01/615/CE/CNERSH/SP. In addition, informed consent was obtained from patients who agreed to participate in the study.

Statistical analysis of the data

We entered the data in Excel software. The data collected was analysed statistically using SPSS software version 21.0. The chi square test was used to compare the difference in proportion between the variables. A P value <0.05 was significant.

RESULTS

The majority of respondents were in the age group of 29-39 years (44%) with an average age of 30.92±8.16 years. Students were represented with a prevalence rate of 42.60%. In our study we had 32.5% of civil servants, 12.4%

of housewives and 12.5% of traders and farmers. Single and women with university level were represented with a prevalence rate of 47.90% and 62.20% respectively. Our results showed that 71% of women performed intravaginal practices (IVP) and the most used vaginal practice is scraping the vaginal walls with the fingers (69.2%), followed by douching with simple water or other products (30.8%). Of the women who performed IVP, 60% (72 women) answered that they did it to eliminate vaginal secretions and 11.6% to dry out the vaginal cavity.

The prevalence of vaginal candidiasis in the population study was 30.20% and that of bacterial vaginosis due to *Gardnerella vaginalis* (GV) was 43.20%. The 29-39 age group was more affected by vaginal candidiasis and bacterial vaginosis due to *Gardnerella vaginalis*; 51% and 43.8% respectively and the same result was observed among single people with regard to these two infections (52.9% for vaginal candidiasis and 49.3% for bacterial vaginosis due to *Gardnerella vaginalis*). University level women were more exposed to bacterial vaginosis (68.5%) than secondary level women (12.3%) and primary level women (19.1%) and the difference was statistically significant P=0.001 (Table 1).

The prevalence rate of bacterial vaginosis flora (score 7-10) according to the Nugent classification was 40.20%. The prevalence rate of co infection; vaginal candidiasis and bacterial vaginosis due to *Gardnerella vaginalis* was 23.2%.

The distribution of IVP according to socio-demographic characteristics showed that, the age group of 29-39 years performed more IVP (42.5%), followed by 18-28 years (39.2%). Married women practiced more IVP (47.5%) than single women; but the difference was not significant (P>0.05). University level women followed more these practices (55.0%) than secondary level women (30.8%) and primary level women (14.2%) and the difference was significant (P=0.01) (Table 2).

The prevalence rate of vaginal candidiasis in female who did not performed IVP was higher (73.7%) than in those

Table 2. Distribution of intravaginal practices according to socio-demographic characteristics

Variables	Intravaginales Practices		P value
	No N(%)	Yes N(%)	
age (years)			
18-28	26 (53.1)	47 (39.2)	0.13
29-39	19 (38.8)	51 (42.5)	
>40	04 (8.1)	22 (18.3)	
Total	49 (100)	120 (100)	
Marital status	N(%)	N (%)	0.08
Single	29 (59.1)	52 (43.3)	
Married	14 (28.7)	57 (47.5)	
Concubinage	06 (12.2)	11 (9.2)	
Total	49 (100)	120 (100)	
Educational level	N(%)	N(%)	0.01
Primary	02 (4.1)	17 (14.2)	
Secondary	08 (16.3)	37 (30.8)	
University	39 (79.6)	66 (55)	
Total	49 (100)	120 (100)	

Table 3: Link between intravaginal practices and genital infections, type of flora, coinfection

Variables	Intravaginal practices		P value
	No N (%)	Yes N (%)	
Vaginal candidiasis			0.23
No	31 (26.3)	18 (35.3)	
Yes	87 (73.7)	33 (64.7)	
Total	118 (100)	51 (100)	
Bacterial vaginosis	N(%)	N(%)	0.15
No	32 (33.3)	17 (23.3)	
yes	64 (66.7)	56 (76.7)	
Total	96 (100)	73 (100)	
Type of flora	N(%)	N(%)	0.13
Score (0-6)	29 (59.2)	56 (46.7)	
Score (7-10)	20 (40.8)	64 (53.3)	
Total	49 (100)	120 (100)	
Coinfection(BV+VC)	N(%)	N(%)	0.19
No	52 (89.65)	88 (79.27)	
yes	06 (10.34)	23 (20.72)	
Total	58 (100)	111(100)	

who performed IVP (64.7%). However, no significant association was found between intravaginal practices and the occurrence of vaginal candidiasis in women ($P=0.23$). Regarding bacterial vaginosis, it was more common in women who performed intravaginal practices (76.6%) than in women who did not (23.3%). No significant association was found between IVP and the occurrence of bacterial vaginosis ($P= 0.15$). Finally, no significant association was found between IVP and the type of flora ($P=0.13$), but the pathological flora Nugent score (7-10) was found with a greater frequency (53.3%) in women who performed IVP. Women who performed IVP were more coinfecting with vaginal candidiasis and bacterial vaginosis (20.72%) than women who did not (10.34%) but the difference was not significant ($P= 0.19$) (Table 3).

DISCUSSION

Intravaginal practices are a reality in our context. The main reasons that motivate these women to follow these practices were to eliminate vaginal odor, to remove excess vaginal secretion, to clean before and after sex, to fight against sexually transmitted infections and tighten the vagina to please partner (Annang et al., 2006, Yildirim et al., 2020, Funkhouser et al., 2002, Crosby et al., 2000, Ness et al., 2003). Previous research has suggested that vaginal douching modifies vaginal flora and was associated with bacterial vaginosis, chlamydial infections (Yildirim et al., 2020). In past study, the rate of genital infections were 53.5% and 33.8% in women who did and did not douche, respectively (Ege et al., 2007).

Socio-demographic characteristics of the study population

The majority of the women in our study were aged 29-39; 44.4%. This can be justified by the fact that one gynecological consultation out of two is done by young women of childbearing age (Direction de la recherche, 2002). The majority of women surveyed had a university level (62.02%), which suggests that they should have correct knowledge of the risks incurred by performing IVP. Most of the women were single with a prevalence rate of 47.9%. A study conducted in Senegal had enrolled a majority of married women (Dieye, 2002). This result of our study can be justified by the fact that the majority of our participants are students (42%), so they are single and the Yaoundé University teaching hospital being surrounded by many higher education institutions.

Distribution of women according to intravaginal practices

Our study reported that 71% of women performed IVP; 120/169. The IVP most used by women was scraping the vaginal walls with the fingers (69.2%). According to a study conducted in China among prostitutes, 84% performed IVP (Liluo et al., 2016). Their higher prevalence than ours can be justified by their employment as sex workers; following their encounter with many sexual partners, they try to keep their vaginal cavity clean. On the other hand, another study reported that 64% of women practiced douching (Clark et al., 2007). Our higher prevalence rate of performing IVP can be justified by the fact that the black race is more adept at douching than Caucasian women. This is corroborated by Hassam et al., (2007) in their study: African women performed more intravaginal practices (33%) compared to women of European origin (14%) and Latinos (8%). The distribution of IVP according to socio-demographic characteristics showed that, the age group of 29-39 years performed more IVP, which can be justified by the fact that it is a very sexually active age group (Vallor et al., 2001), wanting to keep their vaginal cavity clean after multiple sexual intercourse. Married women practiced the most IVP (47.5%) which can be justified by the regular washing of their vaginal cavity because of the regular sexual relations maintained with their husband. University level women were statistically more adept at these practices (55.0%), than women with secondary level (30.8%) and primary level (14.2%) of education; $P=0.01$. However, Ghadar et al., (2019) reported that women with a low socio-economic level and a low intellectual level are more followers of these practices due to their low level of knowledge (27). Clark et al., (2007) in their study confirmed that women with less than high school education were most likely to shower.

Distribution of vaginal candidiasis and bacterial vaginosis at *Gardnerella vaginalis* in the population study

125/169 or 78% of women had a vaginal infection. The

prevalence rate of vaginal candidiasis in the population study was 30.20% and that of bacterial vaginosis due to *Gardnerella vaginalis* was 43.20%. The rate of vaginal candidiasis (51%) and bacterial vaginosis (43.8%) was higher in women aged 29-39 and unmarried for vaginal candidiasis (52.9%) and for bacterial vaginosis (49.3%). This can be justified that at this age, sexual activity is maximum and the number of sexual partners in single people is sometimes high. Previous researches reported that the high frequency of sexual intercourse damages the flora of Doderlein, the protective flora of the vaginal cavity. A study conducted in Vietnam support our findings; they reported the same prevalence rate of vaginal candidiasis as ours (51.3%) (Anh et al., 2021). A study conducted by Mulu et al., (2015) in Ethiopia reported a prevalence of bacterial vaginosis of 15.2%. Our high prevalence of bacterial vaginosis (43.20%) can be justified by the fact that our study population was a follower of IVP (71%), moreover in our study 55% of university level women (students often single) performed IVP often linked to bacterial vaginosis. Our results showed that women with university level were statistically more exposed to bacterial vaginosis (68.5%) than women with secondary level (30.8%) and primary level (14.2%) of education ($p=0.001$). This can be justified in our study by the fact that university-level women performed more IVP (55%). Mbizvo et al. (2004) reported that an education level of less than 13 years was associated with Bacterial vaginosis.

Relationship between intravaginal practices and vaginal candidiasis, bacterial vaginosis, co-infection, type of flora

The prevalence of bacterial vaginosis (76.6%) in women who performed intravaginal practices were higher than in women who did not performe IVP (66.7%). However, no significant association was found between intravaginal practices and the occurrence of vaginal candidiasis and bacterial vaginosis in women ($P=0.23$, $P=0.15$ respectively). Ours results were (high prevalence of bacterial vaginosis in women who performed IVP) confirmed by a study conducted in Kenya who reported that bacterial vaginosis was associated with intravaginal petroleum use because the alkaline pH of petroleum could promote the growth of bacteria of bacterial vaginosis (Hassam et al., 2007). Brown et al., (2013) reported that among women who performed IVP, 21% had bacterial vaginosis and vulvovaginal candidiasis. Our study found the same prevalence of co-infections (20.72%) and moreover women who performed IVP were more coinfectd (20.72%) with vaginal candidiasis and bacterial vaginosis than women who did not (10.34%). This high prevalence of coinfection in our study can be justified by the fact that african women performed more IVP. Gaddhar et al., (2019) found that 57.7% of pregnant women were co-infected with vaginal candidiasis and bacterial vaginosis. Their high prevalence compared to ours (20.72%) can be explained by the fact that pregnant women are often immunocompromised and

are more prone to infections, particularly vaginal candidiasis. Finally, no significant association was found between IVP and the type of flora ($P=0.13$), but the pathological flora; Nugent score (7-10) was found with a greater frequency (53.3%) in women who performed IVP. Our result corroborates that of Alcaide et al., (2017) who reported that IVP increase the risk of developing bacterial vaginosis; (Nugent flora score 7-10), the most common genital infection associated with the transmission of sexually transmitted infections and acquired immunodeficiency syndrome (AIDS).

CONCLUSION

Intravaginal practices may expose women to genital infections. The rate of women who performed intravaginal practices was high and women with university level of education in our study performed more these practices which are discouraged by health professionals since they are harmful to genital health. Women must be educated about the hygiene of their vaginal cavity in order to avoid genital infections.

Study limitations

This study had some limitations. Many women have cleaned the inside of their vagina and did not return the next day for the sample. Certain species of *Candida* in some samples grew on Sabouraud agar and did not grow on Chrom agar candida Medium. This did not allow us to describe the different species of *Candida* in our results

Recommendations

These findings showed that intravaginal practices expose women to bacterial vaginosis and to coinfection of bacterial vaginosis and vaginal candidiasis. Women should be educated on caring for their vaginal cavity to avoid genital infections.

Further research

There is a need to conduct a prospective study on a larger sample to better evaluate the association between intravaginal practices and genital infections. It would be beneficial to do biochemical tests to identify the different species of *Candida* involved in genital infections.

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