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# Vulvovaginal Hygiene Practices Among Pregnant Ladies in Rural West Bengal: A Cross sectional Observational Study

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**A B S T R A C T**

Vulvovaginitis is very common in pregnancy in our country. Lactobacilli are the normal vaginal microflora which maintains acidic vaginal pH. Lack of hygiene may lead to colonisation of coliforms resulting in vulvovaginitis which in turn may cause serious health problems for the mother and the new-born. A cross-sectional observational study was conducted on pregnant women attending antenatal OPD of BMCH on every Wednesday between 1st July to 31st December, 2022 with a preformed questionnaire which dealt with different parameters to observe whether present pregnancy was complicated by any vulvovaginal ailments. Although they had little knowledge about vulvovaginal microbiota, pathogenesis and morbidity of vulvovaginitis during pregnancy, most had a practice of vulvovaginal cleaning with plain water and not commercial douching. Protection against vulvovaginal infection is particularly important for pregnant women as it increases the risk serious maternal and neonatal morbidities. Routine washing of the vulva with plain water is beneficial to maintain cleanliness and prevent vulvovaginal infection. Vulvar cleansing products does not treat infections rather disrupts normal vaginal microbiota thus promotes colonization of uropathogens. Prevention of vulvovaginal infection by simple hygiene maintenance can be achieved by educating antenatal mothers during their visits.

## I. INTRODUCTION

Vulvovaginal disease is often caused by multiple factors, such as immune deficiency, hormonal changes, stress, or use of a vaginal douche or soap to clean the vagina which may upset the normal flora and cause infections. The vagina has no gland. It is lubricated by transudates from subepithelial capillary plexus across the epithelium which is permeable. The pH of vagina at reproductive age is 3.8–4.4 (F. Gary, 2018). The female genital tracts harbour a wide variety of microflora[2] which are commensals and mostly constituted by lactobacilli[3], without causing infection [4]. However, they may become pathogenic in case of disorder in the normal microflora[5]. Vulval microflora are lipophilic and non-lipophilic diphtheroids; coagulase negative staphylococci, micrococci, lactobacilli; streptococci; gram-negative rods; gram-negative bacilli; neisseria; gardnerella vaginalis; and/or yeasts. Vaginal microflora consists of lactobacillus spp., atopobium vaginae, megasphaera spp., leptotrichia spp., gardnella vaginalis, staphylococcus aureus, and/or candida albicans (F. Gary, 2018), the vulvovaginal vasculature develops varicosities during pregnancy from increased venous pressure by enlarged uterus. Due to increased vascularity vaginal secretions are notably increased. The pH becomes acidic due to more conversion of glycogen into lactic acid by lactobacillus acidophilus consequent to high estrogen level of pregnancy and subsequently this acidic pH prevents multiplication of pathogenic organisms. Vulvovaginitis and urinary tract infection are very common in pregnancy in our country, occurs when there is a shift in the normal flora dominated by lactobacilli to coliform uropathogens (Yazici S, 2009; Olsen BE et al, 2000; Mignini L et al, 2009), and can result in serious health problems for the mother and the new-born (Mignini L et al, 2009; Pete PMN et al 2019) such as pyelonephritis, early and mid-trimester pregnancy loss, low birth weight, preterm labor, preterm premature rupture of membrane, intra uterine growth restriction, and increased incidence of perinatal death (Schnarr J et al, 2008; Al-Badr A et al, 2013; Hillier SL et al, 1995; Fiscella K et al 1998).

## II. METHODS

A cross-sectional observational study was conducted on pregnant women attending antenatal out patients' department (OPD) of Burdwan Medical College and Hospital on every Wednesday between 1st July and 31st December, 2022. which is a tertiary care hospital located in Bardhaman, a suburban town in the district of Purba Bardhaman, West Bengal, where patients from both urban and rural areas regularly attend. Average number of patients attending OPD during our study on each Wednesdays of every week was 110 to 140. Every fifth antenatal mothers of at least six weeks of pregnancy were selected, counseled and requested for an interview. Those who volunteered were enrolled. Total number of 482 (out of 780 approached) patients were recruited. A clear and thorough explanation of the objectives and nature of the study was provided and the participant was invited to take part in the study. A semi-structured self-prepared preformed questionnaire was explained in their own language, which dealt with different parameters such as socio-demographic characteristics, awareness of importance of vulvo-vaginal-perineal hygiene and usual practices of vulvo-vaginal-perineal washing, medicated or indigenous douching, the use of antiseptic solution, dressing and underwear used, sexual habits and practices in antenatal period and hygiene practices after sexual act. History was taken about her past (if any) and present pregnancy like parity, previous pregnancy loss and duration of present pregnancy, whether the present pregnancy was complicated by any vulvovaginal or lower genitourinary ailments. The data collected was tabulated in prescribed format. Statistical analysis was done using microsoft excel chi-test.

## III. RESULT

In this study we have recruited 482 participants, most of them were teen age pregnancies, 361 out of 482, ie. 74.89% patients in 15 – 25 yrs age group, although 8.29% was in elderly

mothers' group also. Most of them have completed their primary school education i.e. 67.8%, a few are illiterate and 21.16% have completed their high school. As our hospital is located in a suburban area, we provide service to a wide range of urban and rural areasl. We found 65.9% of our candidates from rural, 20.9% from semi urban and 13% from urban areas including slums. Religion is almost equally distributed between Hindus and Muslims among the attendees. Excepting a few exceptions more than 97% were married, a bit over 50% were housewives, while the rest were economically independent by either service or daily labour activities. About 62.65% belong to lower socio-economic condition and a few in the upper or middle class society. The modern era revolution has brought the privilege of household sanitary latrine to more than 90% of our study population. 95.64% of our study subjects had no addiction, 3.94% had history of smoking (bidi or chutta) and 5.19% was addicted to alcoholic beverages. (Table-1)

**Table 1. Participants' demographic data (n=482)**

| | | | |
|---|---|---|---|
| **Age** | 15 – 25 yrs | 361 | 74.89% |
| | 26 – 35 yrs | 81 | 16.8% |
| | 36 – 45yrs | 40 | 8.29% |
| **Education** | No schooling | 53 | 10.9% |
| | Lower school | 327 | 67.8% |
| | Higher school | 102 | 21.16% |
| **Residence** | Rural | 318 | 65.9% |
| | Semi urban | 101 | 20.9% |
| | Urban | 63 | 13% |
| **Religion** | Hindu | 272 | 56.4% |
| | Muslim | 199 | 41.28% |
| | Other | 11 | 2.28% |
| **Marital status** | Married | 470 | 97.51% |
| | Cohabitation | 8 | 1.65% |
| | Single | 4 | 0.82% |
| **Occupation** | Housewife | 265 | 54.97% |
| | Service | 39 | 8.09% |
| | Labour | 178 | 36.92% |

| | | | |
|---|---|---|---|
| **Socio economic status** | Upper | 49 | 10.16% |
| | Middle | 131 | 27.17% |
| | Lower | 302 | 62.65% |
| **SanitaryLatrine/ Washroom** | No | 09 | 1.86% |
| | Yes | 434 | 90.04% |
| | Don't use | 39 | 8.09% |
| **Substance abuse** | No | 461 | 95.64% |
| | Smoking | 19 | 3.94% |
| | Alcohol | 25 | 5.19% |

Most of our study population was second gravida mothers and the majority was in their third trimester pregnancy. 40.66% had no history of spontaneous abortion, 40.87% had one and 18.46% had two or more spontaneous abortion in their past obstetric history (Table-2).

**Table 2. Participants' obstetric history and clinical symptoms (n=482)**

| | | | |
|---|---|---|---|
| **Parity** | Para 0 | 120 | 24.89% |
| | Para 1 to 3 | 297 | 61.61% |
| | Para >4 | 65 | 13.48% |
| **Duration of pregnancy** | 6 to 12 wks | 32 | 6.63% |
| | 12 to 24 wks | 119 | 24.68% |
| | 24 to 36 wks | 331 | 68.76% |
| **Previous history of SA** | No SA | 196 | 40.66% |
| | One SA | 197 | 40.87% |
| | SA >2 | 89 | 18.46% |

Many of them gave history of vulvovaginal symptoms i.e. vaginal discharge (10.99%), pruritus vulvae (7.05%), burning sensation (18.87%) and rest asymptomatic (63.07%). Statistical test of significance for the clinical vulvo vaginal and urinary symptoms among the participants was done using microsoft excel chi-test software. The chi square p value of these clinico pathological symptoms is too high and we will not reject the null hypothesis (Chi square test p-value 1.8001E-83). As far as urinary symptoms are concerned there were no symptoms in 87.73%, asymptomatic

bacteriuria in 6.43% and symptomatic bacteriuria in 6.01% patients in the study group (Chi square test p-value 4.389E-195) (Table-3)

**Table 3. Participants' clinical symptoms (n=482)**

| | | | | |
|---|---|---|---|---|
| **Vulvo vaginal symptoms** | No Symptoms | 304 | 63.07% | Chi square test p-value 1.8001E-83 |
| | Vaginal discharge | 53 | 10.99% | |
| | Pruritus vulvae | 34 | 7.05% | |
| | Vulvovaginal burning sensation | 91 | 18.87% | |
| **Urinary symptoms** | Asymptomatic, no bacteriuria | 422 | 87.73% | Chi square test p-value 4.389E-195 |
| | Asymptomatic bacteriuria | 31 | 06.43% | |
| | Symptomatic bacteriuria | 29 | 06.01% | |

As far as vulvovaginal and urinary symptoms are concerned, in both cases **Chi square test p value is 4.389(>.05).** Chitest p-value is too high so that we are not going to reject the null hypothesis ie the observed symptoms in our study population is not statistically significant and we have found it merely by chance (p value for the chi square test less than or equal to .05 was regarded as evidence of a statistically significant result).

On questioning about their habits, we found most of them i.e.57-58% use simple water for washing vulvovaginal area instead of medicated douching, which was only 0.82% Majority of the pregnant mothers avoided wearing undergarments while only 1.64% had habit of unhygienic underwear use. 80.70% practiced household bathing in shower regularly while 12.03% in common water bodies. We also asked about pattern of sexual activity and practice after sexual exposure and found majority preferred infrequent and protected intercourse during pregnancy (72.40%). Here also 62.28% preferred only water for vulvovaginal wash after the act of physical contact (Table-4).

**Table 4. Vulvovaginal hygiene maintenance practices among the study population (n=482)**

| | | | |
|---|---|---|---|
| **Practice of hygiene at Vulva and Perineum** | Nil | 17 | 3.52% |
| | Water | 278 | 57.67% |
| | Soap and water | 183 | 37.96% |
| | Medicated douching | 04 | 0.82% |
| **Practice of hygiene at Vagina** | Nil | 17 | 3.52% |
| | Water | 282 | 58.5% |

| | | | |
|---|---|---|---|
| | Soap and water | 183 | 37.96% |
| | Medicated douching | 00 | 00% |
| **Use of undergarments** | No undergarments | 360 | 74.68% |
| | Tight undergarments | 23 | 4.77% |
| | Loose undergarments | 91 | 18.87% |
| | Unhygienic undergarments | 08 | 1.65% |
| **Bathing practices** | Avoids bathing | 06 | 1.24% |
| | Bath at common waterbodies | 58 | 12.03% |
| | Household bathing in shower | 389 | 80.70% |
| | Not soaking the whole body | 29 | 6.01% |
| **Sexual practices** | Avoids intercourse | 79 | 16.39% |
| | Frequent unprotected intercourse | 37 | 7.67% |
| | Infrequent & protected (>once/wk) | 349 | 72.40% |
| | Frequent & protected (<once/wk) | 17 | 3.52% |
| **Practice of hygiene after sexual activity N = 403** | Nil | 103 | 25.55% |
| | Water | 251 | 62.28% |
| | Soap and water | 45 | 11.91% |
| | Medicated douching | 04 | 0.995 |

In Table-5 we statistically analysed the data to find any correlation between vulvovaginal hygiene maintenance and vulvovaginal-urinary symptoms and found The p value too high (Chi square test p-value 1.41371E-94) to declare no significant correlation between practice of vulvovaginal hygiene and vulvovaginitis. Similarly we found statistically non significant association between vulvovaginal hygienic practice and incidence of UTI (Chi square test p-value 6.61609E-94) as obtained by interview in our study subjects of antenatal mothers.

**Table 5. Correlation between vulvovaginal hygiene maintenance and vulvovaginal-urinary symptoms**

| | S/S of Vulvovaginitis N=304 | No S/S of Vulvovaginitis N=178 |
|---|---|---|

| | | | |
|---|---|---|---|
| **Vulvovaginal hygiene maintenance practice N=461** | 284 | 177 | Chi square test p-value 1.41371E-94 |
| **No Vulvovaginal hygiene maintenance practice N=21** | 20 | 01 | |
| | UTI and ASB N=60 | Asymtomaic & no UTI N=422 | |
| **Vulvovaginal perineal hygiene maintenance practice N=461** | 39 | 422 | Chi square test p-value 6.61609E-94 |
| **No Vulvovaginal hygiene maintenance practice N=21** | 18 | 03 | |

The p value in both the cases are more than .05 which means we have found no significant correlation between practice of vulvovaginal hygiene as obtained by interview, has got no significant statistical correlation with vulvovaginitis and UTI in our study subjects of antenatal mothers.

## IV. DISCUSSION

The vulva is the first line of defense against genital tract infection. Collection of moisture, sweating & menstrual blood in the vulvar folds and hormonal fluctuations influence vulvar microbial growth, potentially resulting in foul smell as well as vulvovaginal infection. Vulvar skin differs from other body parts in respect of hydration, friction, permeability, irritability and is more susceptible to topical agents (Holst E, Goffeng AR, Andersch B, 1994 ; Hay PE et al, 1994 ; Chen Y, Bruning E, Rubino J, Eder SE, 2017). The non-keratinized vulvar vestibule is likely to be more permeable than keratinized skin (Holst E, Goffeng AR, Andersch B, 1994). Genital skin is unique in that it is covered by a thin stratum corneum containing large hair follicles, making it easier for microbial and other substances to permeate the skin (Farage MA and Maibach HI, 2016). The vagina is a fibro muscular canal extending from its external opening in the vulva to the cervix and is composed mainly of smooth muscle covered with a non-keratinized epithelial lining which is kept moist by fluid secreted through the vaginal wall and mucus from cervical & vestibular glands until the menopause. The tight junctions of vaginal mucosa along with thick cervical mucus act as a physiological barrier against microorganisms during pregnancy. Abundance of Lactobacillus in pregnancy reduce vaginal pH and increase vaginal secretions which act as a barrier against pathogenic microbes too (Farage MA, 2005). The major changes in the vaginal microbiome occur during early pregnancy, it gets back to baseline i.e., decrease in Lactobacilli and enrichment of bacterial associates during later stages of pregnancy and puerperium (Wakashin K, 2007). Several studies have reported that there is alteration and physiological changes during pregnancy which decreases the ability of the lower genitourinary tract to resist invading bacteria (Farage MA, 2005). Since long time it has been believed absence of lactobacilli leave vagina susceptible to infections leading to vulvovaginal and lower genitourinary tract infection followed by upper genitourinary tract infection resulting in preterm birth and pregnancy complications.

Along with endocrinological, immunological and metabolic changes during pregnancy, change in environment, weight, diet pattern, hormonal milieu and mostly kmowledge, attitude and practices towards vulvovginal-perineal hygiene during pregnancy can cause significant alterations in the microbiome (Wakashin K, 2007). The hormonal changes during pregnancy, rising progesterone and estrogen levels often lead to numerous physiological effects which may affect the microbiome composition. Microbiota is also influenced by changes in metabolism, as noted in obesity, metabolic syndrome, and diabetes. Thus, the metabolic changes in pregnancy are expected to influence the composition of microbiota. Health and hygiene practice during pregnancy is an important factor of perinatal and long term maternal and child health (Wakashin K, 2007). Our research aimed at highlighting knowledge of genital hygiene including personal hygiene behaviors and practices among pregnant women who were recruited in the study. Apart from antenatal care, diet and therapies, vulvovaginal hygiene are key components that need to be followed up and monitored during pregnancy. Vaginal douching practices may vary according to cultural factors and can be transmitted from one generation to the other. This was observed in the current study where the majority of participants declared that they received information on genital hygiene from a family member. In Africa, black women believed the vagina contains germs, which is the reason for the widespread practice of douching (MacIntyre DA et al, 2015). Other studies reported vaginal douching and use of antiseptic agents as a major factor in the outcome of reproductive and gynecologic health problems (Ramos BA et al, 2015; Hull T, 2011; Cottrell BH, 2010), this study we found most of the antenatal mothers, 57.67% of the total used plain water for washing vulvovaginal area and perineum and 37.96% used non-irritating agents like simple soap-water for vulva cleaning. Antiseptic solutions with water were preferred in only 0.82% for only vulval & perineal area but none used antiseptic for vaginal cleaning, it was found that apart from a few 3.52%, who never cared for genital hygiene, most women perceived their genital region as most susceptible for pathogenic organism growth and paid more attention. But it was also found that indigenous or unformulated antiseptic intra vaginal douching and cleaning in apprehension of vaginal hygiene might be a risky practice for the vaginal microflora as reported by other authors (Klebanoff MA et al, 2010; Fashemi B et al, 2013, Rothman KJ et al, 2003). Vaginal douching had no known confirmed health benefits, might undermine the innate immune defenses by altering the normal vaginal flora and thus predisposed women to infections like pelvic inflammatory diseases (PID), sexually transmitted infection (STI) and also endometriosis (Rosenberg MJ, Phillips RS, Holmes MD, 1991; Rosenberg MJ, Phillips RS, 1992; Sutton MY et al, 2006; Hutchinson KB, Kip KE, Ness RB, 2007; Ness RB et al, 2002; Scholes D et al, 1998).

Scholes and collaborators (2000), in their study on the risk factors for recurrent urinary tract infection in young women cited wearing tight undergarments among factors predisposing women to recurrent UTIs (Scholes D et al, 1993). In this study, 4.77% of participants declared wearing tight undergarments, 74.68% used none and 1.65% are most vulnerable for vulvovaginal urinary infection as they are too reluctant or casual to change their undergarments at frequent interval which indicates lack of good integration and practice of health promotion advice provided to women during antenatal visits (Scholes D et al, 1993).

Taking a bath by soaking the whole body in water could have potential genital adverse effects if the water used is of poor quality, and it was important to know the extent of this practice. Overall, three different bathing habits were found among participants: shower, soaking the whole body in water either in common ponds or tube well or municipal supply. It is well documented

from different studies that pelvic inflammatory disease, vulvovaginitis, UTI, etc. are often associated with bathing in common water bodies, and patients were always counseled to avoid such practices in rural area. Further studies should be conducted to identify risky types of bathing and their course.

Patterns of sexual exposure, habits and practice of hygiene after sexual activity during pregnancy are very important factors and data were collected by interview. Routine washing of the vulva after sexual activity is desirable to prevent accumulation of vaginal discharge, body fluids, sweat, urine, and fecal contamination. Although vulvar cleansing may be a useful adjunct to medical treatment, commercial or indigenous vulvar cleansing products for cleanliness and odor control may upset vulvovaginal pH and vulvovaginal microflora needed for protection against infection (Cottrell BH, 2010). In 2011, the Royal College of Obstetricians and Gynaecologists (RCOG) published evidence-based guidelines for care of vulvar skin disorders (Box 1) (Holst E, Goffeng AR, Andersch B, 1994; Wølner-Hanssen P, 1990).

**Box 1. RCOG Guidance on Care of Vulvar Skin**

| Box 1. RCOG guidance on care of vulvar skin. | |
|---|---|
| 1 | Most women with a vulvar disorder (e.g. contact dermatitis, vulvovaginitis) need advice about vulvar skin care and how to avoid contact irritants. |
| 2 | Washing with water can cause dry skin and make itching worse. Use a small amount of soap substitute and water to clean the vulva. |
| 3 | Shower rather than bathe and clean the vulva only once a day. Overcleaning can aggravate vulvar symptoms (e.g. symptoms of contact dermatitis). An emollient may be helpful. |
| 4 | Avoid using sponges or flannels. Just use your hand. Gently pat dry with a soft towel. |
| 5 | Wear loose-fitting silk or cotton underwear. Avoid close-fitting clothes. Wear loose-fitting trousers or skirts and replace tights with stockings. You may prefer to wear long skirts without underwear. |
| 6 | Sleep without underwear. |
| 7 | Avoid fabric conditioners and biological washing powders. Consider washing underwear separately in a non-biological laundry detergent. |
| 8 | Avoid using soap, shower gel, scrubs, bubble bath, deodorant, baby wipes, or douches on the vulva. |
| 9 | Some over-the-counter creams, including baby or nappy creams, herbal creams (e.g. tea tree oil, aloe vera), and “thrush” treatments, may include irritants. |
| 10 | Avoid antiseptic (as a cream or added to bath water) in the vulvar area. |
| 11 | Avoid using panty liners or sanitary towels on a regular basis. • Avoid antiseptic (as a cream or added to bath water) in the vulvar area. |
| 12 | Wear white or light colored underwear. Dark textile dyes (black, navy) may cause an allergy, but if new underwear is laundered before use, it will be less likely to cause a problem. |
| 13 | Avoid using colored toilet paper. |
| 14 | Avoid wearing nail varnish on fingernails if you tend to scratch your skin |

Middle East and Central Asia (MECA) recommended on female genital hygiene (Box 2) (Holst E, Goffeng AR, Andersch B, 1994; Scholes D, H.M.Thomas, Roberts L. Pacita, Stapleton E Ann, 2000). Both guidelines suggest daily vulva cleansing with a gentle hypoallergenic liquid wash avoiding soap, shower gel, scrubs, bubble bath, deodorant, baby wipe or douches on the vulva and recommend postpartum care should include frequent cleansing, drying, using pads as necessary to maintain dryness over any sutures without any creams.

**Box 2. MECA Guidelines on Female Genital Hygiene**

| Box 2. MECA guidelines on female genital hygiene. | |
|---|---|
| 1 | Women of all ages require daily intimate hygiene to keep their genital area clean |
| 2 | The vulva is susceptible to contact dermatitis. Take care to avoid contact with irritants |
| 3 | Use a hypoallergenic liquid wash with mild detergency and pH 4.2 to 5.6 |
| 4 | Avoid bar soaps and bubble baths, which are abrasive and have a more alkaline pH. |
| 5 | Lactic acid–based liquids with an acidic pH may augment skin homeostasis and have been shown to be helpful in vaginal infections as an adjuvant therapy but not as a treatment |
| 6 | Vaginal douching is not recommended. |
| 7 | Wear loose-fitting cotton underwear and minimize wearing tight clothes. |
| 8 | Change underwear frequently. |
| 9 | Do not use talcum powder. |
| 10 | Use any perfumes and deodorants sparingly (after allergy testing). |
| 11 | Change tampons and sanitary pads frequently. |
| 12 | Before and after intercourse, cleanse the vulva from front to back, especially the clitoris and vulval folds |
| 13 | Do not cleanse the vulva vigorously or irrigate the vagina. |
| 14 | Use a safe method of pubic hair removal and take care to avoid sensitivity and scarring |
| 15 | Postpartum care should include frequent cleansing, drying, and using pads as necessary. Maintain dryness over any sutures. Do not use any creams. |
| 16 | Wash hands prior to children’s genital care. Use separate towels. |

## V. CONCLUSION

The innate defense mechanisms namely normal vaginal flora and acidic vaginal pH protect against vulvovaginal infections. Resident bacteria like Lactobacillus etc. help to maintain an acidic pH and compete with exogenous pathogens to adhere to the vaginal mucosa. Protection against infection is particularly important for pregnant women as it increases the risk of preterm delivery, neonatal meningitis, and even fetal death as well as asymptomatic bacteriuria and urinary tract infections, upper and lower genital tract infections, and postpartum endometritis. Routine washing of the vulva with plain water is beneficial to maintain cleanliness, to prevent offensive body odor and may be a useful adjunct to medical treatment. Vulvar cleansing products are not designed to treat infections rather often promote genitourinary infection by disrupting normal vaginal microbiota.

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