

An Effective Menstrual Hygiene by using Kitchen Wastes (Fruits Peel)

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Abstract: Women around the world suffer from many Reproductive tract infection and reproductive organ diseases, Most commonly in Developing countries and Under developed countries due to unhygienic method that they use such as use of reused clothes during menses because of high prices of commercial pads and taboo associated with Menstruation. As the used clothes are contaminated with many fungi and bacteria which results in infection and vaginal discharge. On the other hand Vinegar possess a very good antimicrobial property and works as a very good disinfectant against clothes, other than antimicrobial property, vinegar can be produced very cheaply and at home with the use of kitchen wastes such as fruit peel scraps and banana peel, which can be easily found in every house and it can be produced by performing simple steps by women. Vinegar can also be produced from bamboo which can be found in many local areas, which can also be prepared by using simple methods by locals. Who can further store it and use it as disinfectant on clothes after washing it. Use of disinfectant property of vinegar to minimize RTI and vaginal discharge can lead to lesser infection and a healthy women, Which eventually lead to a healthy family and healthy living.

Keywords: Survey, Menstrual Hygiene, RTI, Clothes, Fruit Peel, bamboo, Vinegar, Disinfectant, Antimicrobial

1. Introduction

According to 2018 data as much as 82% of women in India still do not know what a sanitary napkin is and what is used for, only 18% women in India uses sanitary napkins [1] and according to 'National Family Health Survey 2015 - 2016' which estimates that among 336 million menstruating women in India only 121 million women uses sanitary napkins which is roughly 36% during their menses. [2] The main reasons behind this are 'THE TABOO ASSOCIATED WITH MENSURATION' and 'THE HIGH PRICES OF SANITARY NAPKINS.' [1]

Women are not allowed to touch pickles, not stepping in the temples, are not allowed to enter in the kitchen area, reusing the used clothes. Due to the misbeliefs and consideration of menses as something unreligious, women of India suffer from chronic reproductive tract infections not just in rural areas but also in urban areas. [1] Due to improper menstrual hygiene there is an increase in chances for women to get cervical cancer, Reproductive tract infections, Hepatitis B infection, various types of yeast infections and Urinary Tract infections. [2]

The sanitary pad cost in India "A typical large pad in India costs between Rs 8 - 10. Which is considerably high for a lower middle class and lower class family. [1]

Research carried out in orisha India by the group of scientists on 'Unhygienic menstrual practices' reveals that among 558 recruited women for the study 62.4% were diagnosed with at least one of the three tested infections and 52% were suffering from one or more RTI symptoms. Bacterial vaginosis was most prevalent infection (41%), followed by Candida Infection (34%) and Trichomonas vaginalis (5.6%). Candida infection was more likely by the of reusable absorbent material and by washing less frequently. [3]. Reproductive tract infection and vaginal

discharge were positively related to unhygienic method used during mensuration [4].

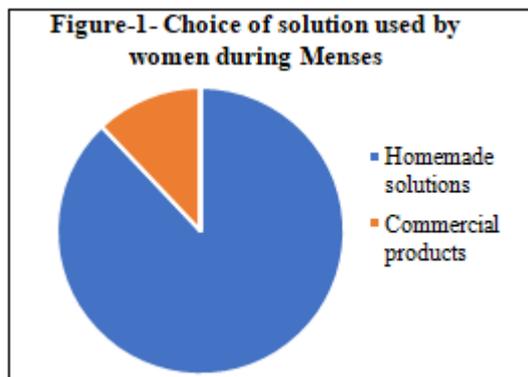
Unhygienic methods of menstrual practices leads to many problems in female. Mensuration is considered a taboo in most places in India due to which women are forced to do unhygienic practices like reusing old and used clothes which is a main causes of lower reproductive tract infections. By using proper method one can minimize the infections. Vinegar has characteristics of a good disinfectant for clothes which can minimize the colony of bacteria and fungus. Vinegar can be made by using by - products of fruits like banana peels and many other fruits peel scraps and by bamboo. [6, 7, 14] Method for proper sanitisation of used/ unused clothes. Clothes - - - Washing it with normal water— Washing it with boiling water - - - Applying vinegar as disinfectant - - - Drying it—Using it in days of menses.

2. Data and Methodology

Table 1: Surveys

Survey	% of women using Clothes during menses
2015 - 2016 National family Survey	~64% (2)
NFHS IV	~62% (8)
MHAI	~16% due to covid restriction (9)
Bill and Melinda gates (FSG - menstrual India)	~70% (5)

88% women in India uses clothes/homemade solutions and 12% uses commercial products. (5)



Contamination on reused clothes

Research was carried out to identify and isolate the types of contamination of bacteria and fungi present on clothes. Culture and biochemical methods were used to identify. Samples were washed using two types of detergents (soap, granulated detergent) to investigate the efficiency of these detergents in reducing bacterial contamination in such clothes. The results showed that the dominant isolate bacteria in adult clothes were *Staphylococcus* sp. and *Enterobacteriace* sp. while *Enterobacteriace* sp., *Bacillus* sp. in baby clothes and *Bacillus* sp. in fabric toys. Results showed that the isolated fungi were *Aspergillus flavus*, *Aspergillus niger*, *Rhizopus*. After washing with detergents including soap it's recommended to wash second hand clothes using other methods to remove both bacterial and fungal contamination such as disinfectants then ironing. (10)

Diseases caused due to unhygienic menstrual practices

Unhygienic menstrual practices leads many infections and diseases among women. A total of 558 women were recruited for the study of whom 62.4% were diagnosed with at least one of the three tested infections and 52% presented with one or more RTI symptoms. BV (Bacterial vaginosis) was the most prevailing infection (41%), *Candida* infection (34%) and TV (*Trichomonas vaginalis*) infection (5.6%). Women diagnosed with *Candida* infection were more likely to use reusable absorbent material and practice lower frequency of personal washing. Women with BV were more likely to practice personal washing less frequently, change absorbent material outside a toilet facility. No studied factors were found to be associated with TV infection. In addition, among women reusing absorbent material, *Candida* but not BV or TV - infection was more frequent who dried their pads inside their houses and who stored the cloth hidden in the toilet compartment. (3) RTI (Reproductive tract infection) and Vaginal discharge were the outcome of not using proper hygienic method during menstruation. The women who used unhygienic method during menstruation were more likely to have any symptom of RTI (reproductive tract infection) and vaginal discharge. (4)

Antimicrobial property of vinegar

A laboratory based assay was carried out to investigate inhibitory effect of bamboo vinegar against bacteria and fungi. The result shown that bamboo vinegar has the inhibitory effect on growth of bacteria and fungi. The determination of inhibitory effect was carried by the inhibition zone diameter and the minimum inhibitory concentration. The microorganisms for test was such as *Micrococcus Luteus*, *Bacillus Subtilis*, *Saccharomyces*

Cerevisiae, *Aspergillus Niger*, *Mucor Racemosus*, *Cryptococcus neoformans*, *Candida albicans*, *Trichophyton mentagrophytes*, *Saccharomyces* and *Rhizopus* SP. The result show that bamboo vinegar has inhibitory growth effect on bacteria and fungi. (11, 12) A study was also done to evaluate the antimicrobial activity of three vinegar created from sweet lime peel, sweet lime fruit peel and sweet lime fruit combo. The anti - microbial activity the three vinegar was assessed for *e. coli*, *salmonella typhi* and *Klebsiella* species using Agar well diffusion method. The result came out to be the vinegar showed inhibition on growth of *E. coli*, *Salmonella typhi* and *klebsiella* species. (13)

Procedures to prepare vinegar

Besides possessing anti - microbial and anti - fungal property, vinegar can also be cheaply produced using biowastes like fruit peels scrap, banana peels, also can be prepared from bamboo.

1) Fruit Scrap Vinegar

Fruit scrap vinegar takes minutes to prepare and last for years. It can be prepared by using following method roughly chop the fruit scraps and put them into non - metallic container, add some sugar and honey, cover it with clothe, keep it at room temperature and avoid direct sunlight. Once the mixture start bubbling and fermenting after a week, strain the liquid and compost the scrap continue it fermenting for another two to four week. Then after that vinegar will get ready. (7)

2) Bamboo vinegar

Bamboo vinegar is prepared by using bamboo material as a raw material, wherein it makes the bamboo lower, and so on bamboo pin referring to crushing raw materials, stacking to ferment for 10 - 12 hours to make it reach the temperature of 40 - 50 °C; Adding dry distillation kettle for 4.5 - 5 hours, collecting rough mixed solution Taking rough mixed liquid naturally depositing 40 - 60 days, absorbing light tar, heavy tar so as to obtain the bamboo vinegar original liquid by filtering, then removing tar decolouring by distillation to obtain high purity refined bamboo vinegar. The invention not only shortens the production time of bamboo vinegar, and the yield of the bamboo vinegar, effective ingredients and quality is higher. (6) The bamboo vinegar can be prepared at rural areas where this naturally occurs and women who cannot afford sanitary pads can use it to disinfect the clothes they use.

3) Using Banana peel

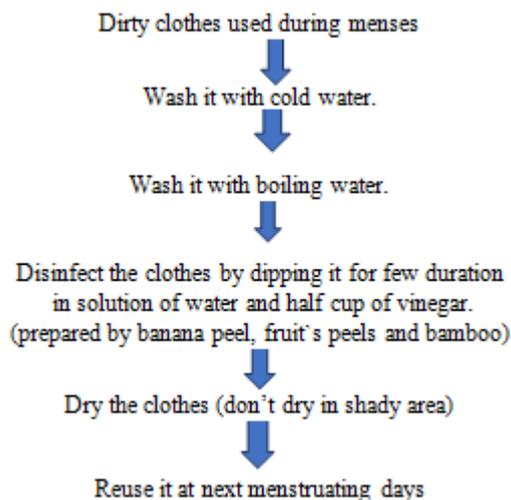
Vinegar can be prepare using banana peel using following steps - combine banana peel and water and bring the water to boil and then allow it to cool down for 30 minutes. Drain the liquid using cloth. Add sugar in the water and again boil it for 15 minutes. Pour the liquid into non - metallic container add some yeast and keep it at cool place for three weeks, after three weeks drain the liquid again by using cloth then lave it for 4 weeks and after 4 weeks put it in to pot and boil it for 10 minutes, after cooling down put it back into container and store the banana peel vinegar in the dark. (14)

Vinegar shows disinfectant properties for clothes, Which can be produced very cheaply and with the use of biowastes such

as fruit's peels which are commonly found in everyone's house. It can be a very effective solution for the proper hygiene method for women who use clothes during the days of menses. As vinegar act as a good disinfectant.

3. Methodology

Procedure to proper menstrual hygiene while using clothes. Use of clothes as menstruating pads leads to many diseases in women like reproductive tract infection with bacteria and many fungus. Vinegar possess a good disinfectant property for clothes and can be produced using biowastes and is cheaper to produce. With the use of vinegar a proper hygienic way of disinfecting used clothes can be done in the following ways;



The following methods are useful in disinfecting clothes as vinegar works against commonly found bacteria and fungus. Using the followings steps and lead to less infections in menstruating women and can lead to a healthy life.

4. Discussion

Women around the globe suffer from reproductive organ diseases due to not using proper hygienic method during menses specially in developing countries and under developed countries. Main reason of diseases is usage of clothes as absorbant during menses. Women use clothes due to high cost of commercial pads and because of habit of using it. Survey conducted by "Bill and Melinda Gates foundation" reveals that 88% of women use homemade solution during menses in India. Common infection and diseases that women get are, Reproductive tract infections, Hepatitis B infection, various types of yeast infections and Urinary Tract infections. . Bacterial vaginosis was most prevalent infection, followed by Candida Infection and Trichomonas vaginalis. The infections are due to usage of old and reused clothes which gets commonly contaminated with bacteria and fungus. Vinegar shows disinfectant properties against bacteria and fungus which are common cause in women for reproductive tract infection and on the other hand vinegar can be produce cheaply and may be free of cost with the help of biowastes found in everyone's house like fruit's peel and vinegar produced by banana peel and by bamboo. Women can produce this vinegar at home very

easily can use it to disinfect the clothes they use. It is an easy an affordable way to proper hygiene while using clothes and by using such method the problem of not affording pads could be eradicated and they can safely use the clothes disinfected by vinegar, which has antimicrobial and antifungal property. The simple and cheap method and awareness about menstrual hygiene could lead to healthy women, a healthy life and healthy family.

5. Conclusion

Women of developing countries and under developed countries suffer from reproductive tract infection and many reproductive organ diseases due to preference of using clothes as absorbent during menses, as the old and reused clothes are more likely to carry bacteria and fungus on them, which are responsible for infection. Studies and survey reveals that most women in India nearly 88% prefer using homemade solution during menses rather than using commercial pads because of the high cost of pads and due to they have habit of using clothes during menses. An effective and affordable solution was needed to overcome this problem. Vinegar possess a good disinfectant property for clothes as it possess antibacterial and antifungal properties and it can be produced very cheaply at home with the help of biowastes such as banana peels and other fruit's peel scrap, it can also be produced by using bamboo's raw material. Women from poor background who cannot afford commercial pads or who are having a habit of using clothes can use vinegar and water solution to disinfect clothes. A use of disinfectant on clothes can reduce the contamination on clothes of many bacteria and fungus and will make women less vulnerable to reproductive tract infections and diseases. Which will lead to a healthy women and a healthy life.

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