

**MENSTRUAL HYGIENE PRACTICES AND
REPRODUCTIVE MORBIDITY : A COMMUNITY
BASED SURVEY IN RURAL
THIRUVANANTHAPURAM, KERALA**

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*Dissertation submitted in partial fulfilment of the requirements
for the award of the degree of
Master of Public Health*

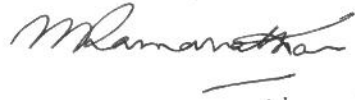


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CERTIFICATE

Certified that this dissertation entitled 'Menstrual Hygiene Practices and Reproductive Morbidity: A Community Based Survey in Rural Thiruvananthapuram, Kerala' is a record of bonafide original research work undertaken by Ms. Anuradha R. in partial fulfilment of the requirements for the Degree of Master of Public Health, under our guidance and supervision.

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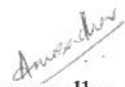
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DECLARATION

I hereby certify that the work embodied in this dissertation entitled 'Menstrual Hygiene Practices and Reproductive Morbidity: A Community Based Survey in Rural Thiruvananthapuram, Kerala' is the result of original research and has not been submitted for any degree in any other University or Institution.

Thiruvananthapuram
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ABBREVIATIONS

FPAI	Family planning association of India
KSSP	Kerala Sastra sahitya parishad
MC	Menstrual Cycle
NFHS	National Family Health Survey
RTI	Reproductive Tract Infection
SPSS	Statistical Package for Social Studies
SES	Socio Economic status
UTI	Urinary Tract Infection
WHO	World Health Organisation

ABSTRACT

Background of the study

Hygiene related practices of women during menstruation are of considerable importance as it has a health impact in terms of increased vulnerability to infection. Few studies done in the past have acknowledged the association between menstrual hygiene and RTIs. However, no studies have enquired especially into this aspect. Given this, it was decided to conduct a cross sectional study, to identify the menstrual hygiene practices, determine the factors associated with menstrual hygiene maintenance and the relation if any, between menstrual hygiene practices and reproductive morbidity.

Methodology

Multi stage cluster sampling method of 'thirty cluster of twelve' was used to identify the sample population. The sample comprised 360 married or unmarried, non-pregnant, non-lactating women in the reproductive age group (12-45). A house-to-house survey was conducted using a structured pretested questionnaire. Menstrual hygiene practices were assessed in terms of the type of protection used, frequency of changing, its disposal or recycling (if reusable) methods. Symptoms suggestive of reproductive morbidity condition RTI, UTI, Skin problems associated with sanitary protection and menstrual disorders were collected. Key informant interviews and group discussions were also undertaken.

Results

Majority (60.8 percent, 95%CI: 56.4 -65.2)) dealt with menstruation unhygienically. A statistically significant association was seen between menstrual hygiene maintenance and education, SES, knowledge prior to menarche, type of protection, accessibility to water, bathroom facilities and menstrual disorders. Multiple logistic regression identified a significant positive relation between hygiene maintenance and SES (OR=1.15 95%CI: 0.60-2.15 for middle, OR=3.65 95%CI: 1.35-9.85 for upper compared to lowest SES). Symptoms suggestive of RTI were reported by 36.1 percent (95%CI: 33.6-38.6) of the women. Skin problems related to sanitary protection were reported by 45.8 percent (95%CI: 43.2-48.4) of the women. Unhygienic management of menstruation was significantly associated with RTI (OR=1.86, 95%CI 1.18-2.94) and Skin problems associated with sanitary protection (OR= 3.95, 95%CI 2.49-6.27).

Discussion

The interplay of SES, menstrual hygiene practices and RTI are noticeable. In resource poor contexts, where women do not have access to basic facilities like water, bathroom and privacy, the standard of hygiene one can maintain is severely compromised. This in turn renders them vulnerable to reproductive tract infections. There is a need to improve the housing conditions with respect to basic facilities. There is also a need to make available sanitary napkins at affordable prices for women in these conditions. Health education campaigns targeting young girls in schools and elsewhere should focus on menstrual hygiene. Further study with lab investigation is required to confirm and generalise the findings of the present study.

Chapter - I

INTRODUCTION

1:1 Back Ground Information:

Reproductive health is affected by the economic, social, cultural, and educational environment, in which girls are born, grow to womanhood, marry and repeat the process in starting their own families (Fred, 1989). Menstruation is the first significant milestone in the reproductive history of a woman's life. Biologically, menstruation is the visible manifestation of cyclic physiologic uterine bleeding out of shedding of the endometrium. The first menstruation occurs between 11-15 years with a mean of 13 years (Dutta, 1994). It is the only tangible evidence that most women have of the continuous cycle of fertility going on within the reproductive system. Between one-seventh and one-fifth of a woman's adult life could be spent menstruating (Greer, 1971).

However, it is an area, which has got various cultural beliefs and practices linked to it. Menarche is viewed as a sign of sexual maturity. Women's perception about this physiological process is influenced by social rules, which vary between cultures or differ even between social groups within a single culture (Snowden and Christian 1983). The meaning menstruation has for a woman is dynamic and changes with the sexual and reproductive roles associated with each stage of life. Even though it has an impact on her overall health status, this area is considered as the "silent" domain and the silence is sustained through notions of impurity, privacy and normality (George, 1994).

Hygiene related practices of women during menstruation are of considerable importance as it has got a health impact in terms of increased vulnerability or exacerbation of an

existing infection. During menstruation, the vaginal pH (the concentration of hydrogen ions) becomes increased due to contaminated blood and fall of oestrogen. The protective cervical mucus disappears and the endometrium sheds. Therefore vaginal defence is lost and the infection occurs easily once introduced into the vagina. Unhygienic practices during this period can lead to colonisation or overgrowth of micro-organisms, thereby infections- mainly vulval and vaginal infections which have far reaching consequences on women's reproductive health (Dutta, 1994).

Insertions of tampons, close fitting clothing and perennial pads all have potential for bringing pathogenic organisms into contact with the meatus. Frequent changes of tampons and sanitary pads are important in preventing vaginal infections (Fogel, 1995). Many of the infections of vulva have shown an association with menses. Symptoms of trichomoniasis may increase during or after menses and it is often associated with intense itching of the vulva. Candida infections causes white curd like discharge and symptoms occur or increase before menses. Good personal hygiene is essential for preventing vaginal infections.

Factors that affect menstrual hygiene are 1) access to resources that determine the type of protection used 2) the kind of material used as protection 3) recycling practices, including methods for washing and drying and 4) access to privacy, including toilet facilities (Mukherjee, 1996). In addition, awareness about the protection materials, importance of hygiene maintenance and its implication for reproductive health are also essential.

In India there are numerous beliefs and practices regarding menstruation. Most of these beliefs concern the polluting nature of menstruation- both to the physical as well as sociocultural environment (Van Woerkens, 1990; George, 1994; Mukherjee, 1996).

Further, since a larger part of population is in the lower SES, the most common protection used is cloth that can be reused after washing. However, the lack of privacy and access to resources like water, soap, washing space, drying space and storage space can affect the practices related to maintenance of menstrual hygiene. Further the management of menstruation is rendered difficult because of the cultural restrictions and proscriptions in the life style including clothing, food and mobility. Notions of pollution associated with menstruation, these restrictions and the silence that surround it serve to embarrass the women and this complicates menstrual management (Van Woerkens, 1990; George, 1994).

Reproductive tract infections preferentially affect women over men, because women are more likely to be infected, less likely to seek care, are more difficult to diagnose and suffer more severe biological and social consequences (Faundes, 1994).

Menstrual problems constitute one of the major reproductive health problems among women. This includes dysmenorrhoea and abnormal menstrual bleeding, skin problems related to protection used and problems related to unhygienic management of this cyclic process. Endogenous infections, a category of reproductive tract infections arise from overgrowth of organisms, bacterial and fungal, that normally found in the genital tract. These infections are related to inadequate personal, menstrual and sexual hygiene practices. In fact it is believed that in resource-poor environments around the world, reproductive tract infections in particular are extremely common, with frequent and potentially devastating consequences for the health and social well being of the women and children (Wasserheit, 1992). Moreover rural women are typically the most vulnerable group in developing nations as the lack of access to basic resources like water

and privacy. This lack of access to resources coupled with traditional norms and practices lead to unhygienic management of menstrual cloth.

1:2 Need For The Study

In recent times reproductive tract infections (RTIs) have been increasingly recognised as a major health problem affecting women world over. Past few years have witnessed a growing concern amongst health and social science professionals for the social, cultural and psychological forces that act upon the reproductive health of women in the developing countries (Khattab, 1993). There is growing recognition that woman in poorer section carry a heavy burden of reproductive morbidity and experience a higher risk of infection. Several studies done in the last decade have documented high prevalence of gynaecological problems among rural women in India (Bang, 1989; Bhatia and Cleland, 1995; Koenig et. al, 1996; Garg et.al, 1999). Caused often by external irritation, bad hygiene, or factors that lead to rise in the natural microorganisms found in the vaginal tract, they are infections that can be easily cured, if identified in time and properly treated (Saran, 1998).

Girls arrive at menarche with conflicting attitudes, myths, and illogical beliefs having heard some information about its physical and social consequences (Rierdan et.al, 1986; Abraham et.al, 1985). Studies have confirmed that many young women are not receiving adequate or in some cases no information about menstruation prior to menarche (Divekar et.al, 1978; Korah, 1990; Hegde et.al, 1990) also it has been found that knowledge about menstruation is very poor among girls from lower Socio economic status.

Eventhough Presterilised pads and tampons are commercially available; women in the third world countries use a set of clothes to absorb menstrual blood (Williams et.al,

1990). In two studies done in Bangladesh, it was found that the use of rags to absorb menstrual blood was significantly associated with an increased risk of infection (Wasserheit, 1989; Ahmed 1992). This finding is also supported by another study in Egypt (Younis, 1993). The association between menstrual hygiene and reproductive morbidity has, however not studied in any detail.

In rural India, RTIs occur due to poor menstrual hygiene, and neglect of asepsis in gynaecological and obstetric interventions (Apte and Athwal, 1999). As stated above a large majority of women in India uses cloth that can be recycled, for protection during menstruation. Lack of privacy and access to resources can manipulate the extent of hygiene women can maintain. Also the shame attached to menses makes it difficult for the women to have proper menstrual hygiene. In India, not many studies are available, exploring this silent domain. The available literature is limited to few areas such as knowledge and attitudes related to menstruation (Chhabra, 1989; Chaturvedi and Chandra, 1991; Korah, 1990), pattern of menstruation in relation to growth (Vaidya, 1998; Hegde, 1990) and socio cultural factors influencing menstruation (Joshi, 1996). No studies are available which look into the factors associated with maintenance of menstrual hygiene and the consequences of poor menstrual hygiene.

Kerala is one of the smaller states in India, supporting around 3 percent of its population (Kannan et.al, 1991). Compared with other Indian states, Kerala has got distinguishable health status (Thankappan and Valiathan, 1998). In a state like Kerala, with its outstanding literacy rate, cultural taboos and restrictions related to menstruation persist (Thomas, 1999). A hospital based study in Kerala confirmed the importance of genital hygiene in the fight against infections that have a role in the development of cervical

dysplasia and cancer (Cherian, 1999). The observed deficiencies in genital hygiene were associated with ignorance, socio economic status and certain aspects of sexual behaviour. The study identified a negligible percentage of sanitary napkin users (8 percent) as the sanitary pads were prohibitively expensive for poor women (Cherian, 1999).

However, there is no published literature available that explores menstrual hygiene practices, barriers associated with hygiene maintenance and its implications for reproductive health. Hence the present study.

1:3 The Objectives of this study are

- To study the menstrual hygiene practices among women of reproductive age group.
- To determine the factors associated with menstrual hygiene maintenance.
- To estimate the reported morbidity so as to find out the relation if any, between reported morbidity and menstrual hygiene practices
- To estimate the cost of sanitary protection for each cycle

1:4 Rationale For Study

Understanding the menstrual hygiene practices and barriers associated with its maintenance has implications for women's reproductive health. It helps the health planners and policy makers to decide upon interventions, which have far reaching effect on reproductive health of women.

Chapter II

REVIEW OF LITERATURE

Menstruation is a normal physiological cyclic function common to all females in the reproductive age group. It influences her quality of life at the individual, household and societal level. The socio cultural meanings attached to it have a far-reaching effect on her health status.

For the present study, various published and unpublished articles were reviewed and findings are highlighted in this chapter. The review of literature is arranged in five sections namely 2.1) Process of menstruation, 2.2) Knowledge, Beliefs, Attitudes associated with menstruation, 2.3) Menstrual problems, 2.4) Menstrual Hygiene and 2.5) Menstrual Hygiene and Reproductive Morbidity.

2:1 Process Of Menstruation

Biologically, menstruation is the visible manifestation of cyclic physiologic uterine bleeding out of shedding of the endometrium. It occurs due to invisible interplay of hormones mainly through hypothalamic- pituitary –ovarian axis. The menstrual cycle is usually one of 28 days, measured by the time between the first day of one period and the first day of next. The duration of bleeding is about 3-5 days and estimated blood loss is between 20 to 80 ml with an average of 50-ml (Padubidri & Shirish, 1999; Dutta, 1994).

2:2 Knowledge, Beliefs, Attitudes About Menstruation

2:2:1 Knowledge

Incomplete knowledge about menarche and menstruation among adolescents is a worldwide phenomenon. A number of studies have investigated the knowledge and

modern beliefs about menstruation, often in the spirit of an anthropological enquiry or in an endeavour to improve menstrual health education for the adolescents. Ignorance about the physiological and phenomenological reality of menstruation might be expected to be a significant feature of cultures in which menstruation is surrounded by secrecy and euphemism (Walker, 1993).

Abraham et. al, (1985) report a study of 1377 young Australian women aged 14-19 years and representative of the general population. Average score of these women on menstrual knowledge questionnaire was 10, from a possible maximum of 30. In particular these women were unsure about the timing of ovulation, when pregnancy is likely to occur, and the contents of menstrual blood. Only 15 percent could accurately estimate the average volume of menstruation.

Mbizvo et.al, (1997) studied the reproductive health knowledge and behaviour among adolescent pupils' chosen from East, Central, and Southern Africa and found that there were misconceptions on menstruation with 23 percent reporting that it was an illness.

In another study, secondary school nursing students enrolled in the main University Hospital of Alexandria were studied for knowledge and practices related to menstruation. Over 85 percent of the students could report on age at menarche, length of the menstrual cycle, and duration of menstrual bleeding. Only 71.54 percent gave correct answers about age of menstrual cessation. The main source of knowledge on the topic was the mother. The nursing school education was not mentioned except by minority of students in relation to menstrual hygiene (El-Shazly et. al, 1990).

Eighty college women were asked about their knowledge of three aspects of menstrual cycle (menstruation, ovulation, and menopause). Results indicated that basic knowledge

of menstrual cycle, even among well- educated women, is at times incorrect, generally incomplete, and negatively biased (Koff and Rierdan, 1990). Another study by the same group (Koff and Reirdan, 1995) considered 224 sixth grade girls about their preparation for and expectations about menarche. Although girls viewed themselves as prepared for menarche, their expectation about menstruation reflected incomplete knowledge and a variety of misconceptions. It was found that the girls had learned and internalised the cultural stereotypes and myths about menstrual symptomatology and associated variety of negative physical and psychological changes with menstruation.

Korah, (1990) conducted an explorative and descriptive study at Bombay on knowledge and perceptions regarding menstruation among adolescents. The findings of the study revealed that adolescents overall, had inadequate knowledge about menstruation. This study also showed that girls of the upper strata had more knowledge and positive perception when compared to the girls of lower strata.

A study conducted to explore the socio cultural and health relate problems of unmarried adolescent girls in a selected urban slum at Bombay, showed that 68.57 percent of the adolescent girls did not have any knowledge about menstruation. Also, the results showed that majority of the adolescent girls (94.29 percent) expressed fear of menarche (Joseph, 1994).

James, (1997) in her study of knowledge and practices among adolescent school girls of Punjab regarding menstrual hygiene revealed that adolescent school girls on the whole had an inadequate knowledge of menstrual hygiene. Also it has been found that knowledge about menstruation is very poor among girls from lower socio economic

status. Studies by (Divekar et.al, 1978) (Chhabra, 1989) also identified that majority of adolescent girls had no knowledge of menstruation.

One thousand pregnant teenagers who came for abortion in Wardha were interviewed for their knowledge about menstruation and its relationship to pregnancy. Four- fifth of this group had no knowledge about menstruation and its relationship to pregnancy (Chhabra, 1989). (Divekar et.al, 1978) interviewed 422 unmarried adolescent girls who came for terminating pregnancies in Bombay and found that most of them had misconceptions about menstruation and had no understanding of the relationship between menstruation and pregnancy.

Joshi et. al, (1996), in their study on socio cultural implications of menstruation and menstrual problems on rural women's lives conducted in Gujarat found that most of the women were unaware of the concept of reproduction prior to menarche. A few women who had some idea stated that their knowledge was limited to the awareness that "women bled from the vagina on certain days of the month". Apparently they knew nothing beyond this. Even women who had attained menarche at the age of 16 years or later stated that they were not fully aware of the implications of menstruation.

2:2:2 Attitudes

The idea of menstruation as 'dirty' is wide spread, and some versions of this view depict menstruation as a state of pollution (Walker, 1997). Historical literature contains many references in this regard. The *Bible* says,

" When a woman has her monthly period, she remains unclean for seven days. Any one who touches her is unclean until evening. Any thing on which she sits or lies during her monthly period is unclean"

(Levi. 15: 19-20).

The concern about cleanliness is also found in many cultures in the form of proscriptions about the activities in which women can engage during menstruation. Many societies forbid the preparation of food during these days, for fear that the food will be spoiled (Walker, 1997). Other beliefs include that a menstruating woman can make flowers to lose their scent; that should she walk through a farmer's fields growth of crops would be affected and if she tried to bake bread, the dough would not rise (Boback and Jenson, 1993).

Adolescent girls often view menstruation with attitudes of fear and hate. Often the age-old customs, myths and illogical beliefs influence these attitudes (Abraham et. al, 1985). Stoltzman, (1986) investigated the menstrual attitudes of adolescent girls (15-16 years), their mothers and friends, using a 32-item questionnaire. The adolescents in this study were more likely than their mothers to view menstruation as debilitating, bothersome, and unsanitary and less likely to view it as a positive event.

Martin, (1989) did a qualitative study among three age groups of women (puberty to childbearing, child bearing and child rearing age, menopause and post menopause) in all social groups. These women saw menstruation not as a private function, but as something that was part of their lives at school and work also. They describe menstruation as a 'hassle' and were concerned about its 'messiness' because they face a variety of practical difficulties in keeping it in secret while at work.

One of the largest studies of menstrual beliefs was the W.H.O funded study of patterns and perceptions of menstruation (Snowden and Christian, 1983). This study involved over 5000 women in 10 countries and collected information about their menstrual experiences, such as length, frequency, and amount of bleeding as well as their beliefs

about menstruation. Analysis of data on menstrual beliefs have shown 9 different grouping of beliefs, which demonstrate the diversity of views held by women about menstruation, with each belief pattern being held by relatively a small proportion of women, ranging from 4.68 percent to 19.17 percent of the total sample

Desai et. al, (1989) found that 34.6 percent adolescents had depression in response to menarche. Other forms of attitudes were indifference and revulsion. Nearly 80 percent of the respondents practised some form of taboo during menstruation such as avoiding holy places and not touching others. Other taboos include hair washing, bathing and mixing with other family members (Korah, 1990).

Menstrual attitudes were studied in a group of 48 Indian women using the Menstrual Attitude Questionnaire, modified and adapted for Indian background. The study has shown a clear relation ship between menstrual attitudes, physical distress and pre-menstrual change (Chathurvedi and Chandra, 1991).

Joshi et. al, (1996) identified that a menstruating woman had to maintain some form of isolation because she was considered 'impure' and 'polluted'. The restrictions to be practised during menstruation are more rigidly practised among Hindus than Muslims.

In her study, (Ginsburg, 1996) found that the social attitudes towards menstruation play a role in the treatment of women's hygiene items. Study of over 150 boxes of sanitary goods in United States- northern California reveals how the design of the objects and of their packaging can be read as encouraging private, discreet consumption. She identified that the packaging of sanitary napkins are relatively plain and that it avoids any reference to the physicality of the objects inside or to their use.

2:3 Menstrual Problems

The most common menstrual disorders found among adolescent girls are dysmenorrhoea, Pre-menstrual syndrome and dysfunctional uterine bleeding (Dutta, 1994).

James, (1997) in her study on menstrual knowledge and practices among adolescent girls in Punjab found that the common problems faced by adolescent girls a few days before or during the menstrual periods were abdominal pain, backache, tension and constipation.

Desai et. al, (1990) studied 600 adolescent girls of ages ranging from 13-19 years and identified that only 61 percent had regular cycles, 55 percent had painful menstruation and 21 percent had either excessive or scanty bleeding. The cycle ranged between 26-30 days for more than 65 percent of the respondents. Pre or inter menstrual complaints like abdominal pain, cramps and acne were reported by 40 percent of the respondents.

In a random study of 2000 girls between the age of 11 and 19 years at Ajmer, 56.48 percent had gynaecological problems. The major problem was menstrual in 43.3 percent cases and they were dysfunctional uterine bleeding in 7.6 percent cases and dysmenorrhoea in 24 percent cases. The menstrual problems were found more in lower socio economic status. Of the total cases 50 percent were practising some form of menstrual taboos and a definite relation is found with menstrual problems and taboos (Bhargava, 1980).

Joseph, (1994) found that 92 percent of the unmarried adolescent girls in a selected slum reported painful menstruation; 64 percent, heavy bleeding and 52 percent had irregular bleeding. These menstrual problems were more common among girls who were employed.

2:4 Menstrual Hygiene

One important set of behaviours related to menarche is the hygienic practices. Often the hygienic practices are related to culture and socio economic status.

Desai, (1990) found 77.3 percent girls used household clothes for menstrual flow and only 22.6 percent used sanitary napkins. Use of sanitary napkins, though hygienic has still not become popular, and the reasons reported as responsible for this are lack of easy availability and cost. The mere fact that the person is shy to buy it from the shop shows the conservatism in the society.

James, (1997) identified that adolescent girls had inadequate knowledge of menstrual hygiene. Girls were not confident of their self-care concerning protection against staining clothes during periods, so much so that they imposed certain restrictions on themselves. During menstruation, most of the girls were using unsterilised cotton pads or old cloth pieces and reused old clothing after washing. Majority of the girls changed pads at fixed times of the day i.e., once or twice. They did not change the pad when it was soaked. Also she identified that a large number of girls disposed of their pads unhygienically. Girls were dissatisfied with the information they had received on menstrual hygiene.

(Drakshayani Devi, 1994) in her study among adolescent girls found that though most girls received advice regarding menstrual hygiene from different sources, only 15 percent were practising menstrual hygiene. The study showed that the mothers of these girls had inadequate knowledge and this was transferred to their daughters.

Even among nursing students the level of menstrual hygiene was found to be poor (El-Shazly et. al, 1990). One quarter of the subject revealed that they avoided bathing during their bleeding period. They also found that lower grade girls used fewer pads than higher grades. This was associated with the fear of menstrual bleeding and menstrual pain. (Czerwinski, 1996) in his exploratory descriptive study on adult feminine hygiene practices found that hand washing varied according to bodily involvement or specific feminine hygiene practices.

In India, the most common protection used is cloth that can be recycled. It needs to be washed with soap and water and dried in the sun for disinfecting. However, the notions of pollution, superstition and shame associated with menstruation, added with lack of access to resources like water, privacy and sun lead to unhygienic management of menstrual cloth (Mukherjee, 1996; George, 1994).

2:4 Menstrual Hygiene And Reproductive Morbidity

A microbiological survey of 400 sanitary dressings showed that a large number of bacteria were present on them including species indicative of faecal contamination (Lucas, 1980). A study on contraceptive choices and reproductive morbidity in Istanbul (Bulut et.al, 1997) noted that 37 percent of women reported morbidity including backache and 81 percent reported morbidity when a checklist with 3 months recall was administered. Reproductive tract infections were found to be more common in the age group 25-34 yrs, when menstrual hygiene was poor.

Wasserheit, (1989) in the study on reproductive tract infections in a family planning population in rural Bangladesh found significant association between use of rags to absorb menstrual blood with an increased risk of infection independent of birth control

method and duration of method use (with 1.74 odds ratio). The link between use of rags and the incidence of reproductive tract infection is supported by a study on the sanitary protection needs of poor women in Bangladesh (Ahmed et. al, 1992).

A community study of gynaecological and related morbidity in rural Egypt had identified unhygienic habits in relation to the menstrual protection used as a risk factor for reproductive tract infections (Younis et. al, 1993)

An explorative study on personal hygiene and self reported symptoms suggesting reproductive tract infection among 100 women in Pune City has clearly brought out the possibility of an association between genital hygiene and symptoms suggestive of RTI/UTI. About half of those women who did not use water after voiding (48 percent) and about one third (29 percent) of those who used homemade pads had some symptoms suggestive of UTI/RTI (Apte and Atwal, 1999).

The review has shown that affordability; accessibility and availability of the hygiene products have implications for menstrual hygiene maintenance. Also it is clear that unhygienic practices do increase the chance of reproductive morbidity.

Chapter III

METHODOLOGY

Introduction

This chapter explains the methodology adopted for the present study. This mainly includes description of the study design, study location, variables and definitions, sample size estimation and selection strategy, data collection tools, data collection strategy, plan for data processing and analysis, pretesting and ethical considerations. It also gives a brief description of the problems of data collection, limitations and strength of the study.

3:1 Study Design

A cross-sectional descriptive survey was undertaken to identify the menstrual hygiene practices among women of reproductive age group. Symptoms suggestive of gynaecological morbidity were also collected.

Menstrual hygiene practices were assessed in terms of the type of protection used, frequency of changing, its disposal or recycling (if reusable) methods, also menstrual history was taken in terms of age at menarche, length of menstrual cycle and frequency.

Reproductive morbidity conditions studied include RTIs- both lower and upper RTIs, menstrual problems, which include menstrual disorders, and skin problems associated with the protection used, and Urinary tract infections. For the married group, contraceptive history was collected.

Both quantitative and qualitative methods were used for data collection. Quantitative data was collected with the help of a structured, pretested questionnaire applied during

house to house survey qualitative data was collected using group discussion with college girls regarding their perception and practices related to menstruation. A checklist was used for this discussion. Also the widely used anthropological method of key informant interviews was also used for collecting information. The key informants included gynaecologists from the medical college, medical officer and counsellor from the adolescent clinic in the Family Planning Association of India (FPAI).

3:2 Study Location

The study was conducted in the rural population of Thiruvananthapuram district, the capital city of Kerala. Several factors were taken into consideration in selecting the rural population of Thiruvananthapuram. Among these, the most important were, the vulnerability of the women in this population comparing to urban population in terms of socio economic development, also it was preferable for the researcher to do the study in the district where her parent institution was situated, for timely consultation. Cost and feasibility was also taken into consideration.

3:3 Study Population

The study population consisted of women in the reproductive age group. A woman was eligible for the study if she was between 12 and 45 of age, married or not married, menstruating, non-pregnant, non-lactating, and residing in the selected clusters. The lower age limit was taken as 12, unlike the defined reproductive age group (15-45), owing to the fact that the age at menarche is declining in developing countries. Pregnant and lactating women were not included so as to avoid the anticipated effects these conditions would exert on the pattern of menstrual bleeding.

3:4 Sampling Method and Sample Size

Assuming that around 30 percent women in the rural population manage menstruation hygienically, the sample size was calculated with the precision factor '10'. The required sample size was 320. Multi stage cluster sampling, '30- cluster of 12' method was used to identify the population. Therefore, the total sample studied to assess the menstrual hygiene practices and reported morbidity comprised 360 women in the reproductive age group (12-45).

A cluster sample of village was selected from the 1991 census list of villages. According to 1991 census Thiruvananthapuram had a population of 29.46 lakhs. There are 84 panchayaths in the Thiruvananthapuram district and each panchayath is divided into 10-12 wards with a population between 2000 to 3000 each.

All the 84 panchayaths in the Thiruvananthapuram district had been listed and cumulative population computed. A random number was taken and the first cluster was identified. With the random number, the sampling interval was added and likewise subsequent 29 clusters were identified. The list was verified from the district Panchayath office for confirmation of the clusters. The central road or specific junction in each of the selected clusters was identified by the investigator and from this central location a road was randomly selected and households in that road visited until the required number was met (12 subjects/cluster).

Group discussions were conducted to seek more information pertaining to knowledge, perception and practices among School/ College going girls. The group consisted of adolescents, mainly school and college girls as the quantitative sample was lacking in an adequate number of them.

Key informant interviews among Gynaecologists and the Counsellor in an adolescent clinic were done to identify the providers' perspective about the studied problem and the health-seeking behaviour.

.3:5 Research Tools

A structured questionnaire with close and open-ended questions was used to interview the study subjects and data was obtained on the variables specified. The questionnaire was prepared on the basis of information collected from women and experts through various discussions related to practices and beliefs existing in the society in relation to menstruation. The questions were mainly concerning the variables under study. This included sections on informants' demographic characteristics, socio economic characteristics, educational level, menstrual history, menstrual hygiene practices and morbidity pattern and health care seeking. For married women, questions pertaining to contraceptive history and sexual hygiene were included.

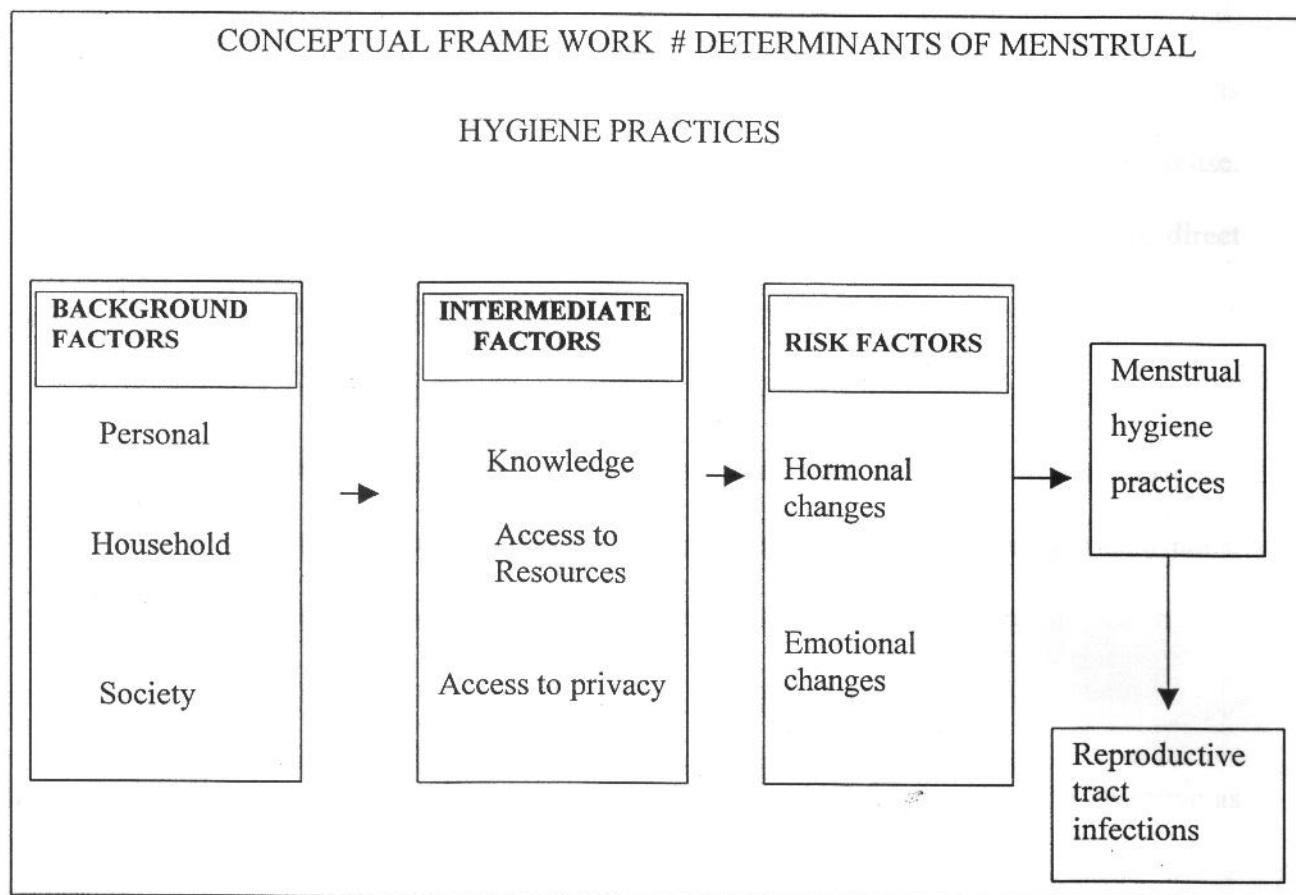
Topic guidelines were prepared for group discussions and key informant interviews. The guideline for group discussions included instructions for the researcher on how to initiate the discussion and the areas to be discussed. It included areas such as adolescents knowledge about menarche, their experience, beliefs, how it is dealt with in the school curriculum, information resources, hygienic practices and knowledge about various products, personal hygiene, problems associated with menstruation, health seeking behaviour and decision making.

Key informants were interviewed to get their opinion on various practices existing in the society and its implication on health, the magnitude of the problem, and the health-seeking behaviour. The provider's perspective could be identified from this.

3:6 Conceptual Framework

A conceptual framework (see figure 3.1) was developed as a general model to explain the factors affecting menstrual hygiene practices, which may or may not have implications on women's reproductive health in terms of reproductive morbidity.

Figure 3.1



The factors were divided into 3 groups in terms of their mode of operation on the outcome variable. The three groups were background factors, intermediate factors and risk factors, which have an impact on the menstrual hygiene practices.

Background factors include; a) personal characteristics such as age of the woman, education of the woman, marital status, occupation, income, b) household characteristics

such as number of members in the household, economic status and housing conditions and c) social characteristics such as norms and values existing in the society which pave the way for guided/ misguided management of hygiene practices.

The next level consists of Intermediate factors that includes age at menarche, knowledge about menstruation, hygiene products; in other words the options available and consequences of poor hygiene. It also includes access to resources in terms of material, soap and water to clean the material (if cloth used), washing space to wash the cloth as well as to wash herself, drying space and facilities for recycling the material for reuse. These factors can also be called as proximate determinants as they have a more direct effect on menstrual hygiene practices. These are modifiable factors. Background factors influence the intermediate factors.

At the most proximate level are the Risk factors that directly affect the hygiene practices. These included menstrual disorders (bleeding characteristics) such as dysmenorrhoea, menorrhagia, polymenorrhoea and oligomenorrhoea.

3:7 Variables

Socio economic characteristics: The SES classification was done using both objective as well as subjective criteria for assessment. They included type of the house, house ownership, monthly household expenditure, number of rooms and presence of assets. Each information was scored with in a range of one to three, three being the maximum score and one being the minimum score. Based on the total score, three groups were formed. They were lower (SESI), Middle (SESII) and Upper (SESIII) (lower being the group with lowest score and vice versa). Information was also collected about availability of bathroom and toilet facilities (type and number).

Demographic characteristics: These include number of members in the household, number of menstruating women within the household, the respondent's age, marital status and occupation. If married contraceptive history and sexual history was also considered.

Educational level: The educational level was categorised in to groups based on the years of school education. These groups were, below primary, primary, middle school, secondary, under graduate, graduate and postgraduate level. For further analysis the group was re-categorised as women with less than 10 years of schooling and more than 10 years of schooling.

Menstrual History- Menstrual history was collected based on age at menarche, knowledge at the time of menarche, length of last menstrual period, regularity and frequency.

3.7.1 Menstrual hygiene practices-This part was assessed by asking questions on the type of protection used, its duration, any shift in the method, reason for not using a particular method, disposal practices if sanitary napkins used, recycling practices if cloth used, restrictions in the activities during this period.

Menstrual hygiene: Level of hygiene was assessed as hygienic and unhygienic. Menstrual hygiene included hygiene related to the sanitary material used and personal hygiene. A woman was considered, maintaining menstrual hygiene if she changed the protection material, irrespective of cloth or napkin, at least 2 times in a day, washing with soap and water (if non disposable), drying by exposing to sun or air, not reusing or reusing only for 2-3 cycle and storing it in a clean plastic cover for the next cycle.

Unhygienic: Not changing the material or changing less than 2 times a day, washing with water (may or may not use soap), drying it unexposed under other garments, reusing for more than 3 months, storing it in an unclean area.

3.7.2- Reproductive morbidity- This was identified by symptoms suggestive of the following conditions in the past two months. The conditions are RTI and UTI; Skin problems associated with sanitary protection material and menstrual problems. Each reproductive morbidity condition was assessed using the following clinical presentation of reproductive symptoms.

Categories of RTI

Upper RTI: Pain in the iliac fossa or lower abdominal pain with associated vaginal discharge and with or without associated fever

Lower RTI: Vaginal discharge with associated itching or irritation, white or coloured discharge with or without foul odour

Categories of UTI

Lower UTI: Dysuria (pain or burning sensation while passing urine) and frequent urination, with or without incontinence (leakage of urine when coughing or sneezing)

Upper UTI: recurrent Dysuria with fever, back pain and high coloured urine

Categories of skin problems associated with sanitary protection

Itching, Skin excoriation, Skin discoloration, and peeling of skin

Categories of menstrual problem

Dysmenorrhoea: Painful menstruation

Menorrhagia: Prolonged duration of bleeding of more than five days and excessive bleeding with history of passing clots

Polymenorrhoea: Frequent menses less than 21 days duration, either excessive or not

Oligomenorrhoea: Duration of bleeding less than 3 days with scanty periods or spotting

Delayed cycles: More than 45 days duration

3:8 Pre-testing Of the Questionnaire

Pretesting of the questionnaire was done in the 2nd week of December to check the clarity and practicality of the questions used. Accordingly, necessary modifications were made, to meet the study objectives. Translation to the native language, Malayalam was not done, as the investigator's mother tongue is Malayalam.

3:9 Data Collection Strategy

It was a house-to-house survey. Directions given from the Panchayath Office helped in identifying the clusters and enquire with the local leaders helped in identifying the particular wards. After identifying the ward, a road was randomly chosen and the left track was followed to identify households. Twelve individuals were interviewed per day. Information was collected from the study subjects, no other substitute for the informant was considered. Each interview was scheduled for 35-40 minutes and the data collection was done within a period of 7 weeks (December 20th 1999 to February 11th 2000). Confidentiality was ensured to each of the subject. Eligible cases were taken from each house, regardless of the number, after seeking their willingness. After identifying 11 women, if the next household had two women, then one person was interviewed.

Interviews were done even during holidays, as students and workingwomen were more likely to be available during these days.

3:10 Data Storage and Analysis

Data entry was done with the help of a structured code book in Microsoft excel version 4. After the data entry, cleaning of the data was done for any entry error. Descriptive analyses of all study variables were carried out using statistical package SPSS program (SPSS 6.1 Version for windows). Chi-square test for significance was used for testing association whenever necessary. Multiple logistic regression was used for multivariate analysis.

3:11 Limitations

- Since most part of the study was done during working days, a representative number of workingwomen and students could not be met.
- No clinical examination was under taken to confirm the reproductive morbidity. The relationship between self reported symptoms and clinically verifiable conditions in this study are uncertain.
- Adolescents' sexuality has not been looked in the context of reproductive morbidity.
- Since it is a cross sectional study, causal association between hygienic practices and reproductive morbidity cannot be established.

3.12 Strength of the study

- It is a community-based study done using multi stage cluster sampling, which provided a good coverage of the district under study.
- A single investigator conducted the study that helped in minimising the inter-observer variation.

Chapter IV

RESULTS

This chapter deals with the description of the analysis and interpretation of data collected from the study population. Results of the analysis have been organised according to the objectives of the study. The findings have been grouped into sections. The findings of the quantitative analysis are in the first section. The results of qualitative analysis (group discussion and key informant interviews) constitute the second section of this chapter. The study population consists of both married and unmarried women in the reproductive age group (12-45).

The first section is again classified in to 5 sub sections. The socio economic and demographic characteristics of the population is described in the first sub section, followed by findings of menstrual hygiene practices, factors affecting menstrual hygiene practices, Reproductive morbidity and reproductive morbidity among various hygiene groups.

Section: 1

4.1 Socio- Demographic Profile of the women

The study sample consisted of 360 women from 289 households. There were 206 unmarried women and 154 married women. On an average each household had 2.1 women in the reproductive age group.

Demographic and Socio Economic Characteristics: This part discusses the distribution of subjects on the basis of age, marital status, educational level, Socio economic status, occupation and religion (see table 4.1).

Table 4.1. Socio economic and demographic profile of the respondents

Characteristics (variables)	Number (n=360)	Percent
Age group		
<19	123	34.2
20-29	147	40.8
> 30	90	25
Marital status		
Married	154	42.8
Unmarried	206	57.2
Education status		
< 10 years	198	55
> 10 years	192	45
Socio economic status		
Low	137	38.1
Middle	186	51.7
High	37	10.3
Occupation		
Students	96	26.7
House wives	145	40.3
Employed	40	11.1
Unemployed	79	21.9
Religion		
Hindu	253	70.3
Muslim	85	23.6
Christian	22	6.1
Toilet facilities		
Yes	322	89.4
No	38	10.6
Bath room facilities		
Yes	255	70.8
No	105	29.2

1 Age distribution of the subjects

Average age of the sample population was 24.4 years. The sample population was categorised in to 3 groups (see Table 4.1) and majority, 40.8 percent belonged to the age group 20-29.

2 Marital status

The study sample constitutes 57.2 percent (206) unmarried women and 42.8 percent (154) married women. Of the married group, 37.2 percent were living with husband, 4.4percent had migrant husband, one person (0.3percent) was divorced and 3 (0.8percent) were deserted.

3 Educational level

The literacy rate of the study population was high, comparable to Kerala status. There were no illiterates and only 1.4 percent of the population had below primary education. The study group constituted 45 percent women with more than 10 years of schooling and 55 percent of the women with less than 10 years of schooling

4 Socio economic status

Socio economic status was assessed on the basis of a predefined criterion. As mentioned in the methodology part, based on the set criteria, the study population was classified into three categories. Among the study group, 137cases (38.1 percent) belonged to SES I category. SES II category consisted 186 cases (51.7 percent) and 37 cases (10.3 percent) belonged to SES III category. Most of them (95.8 percent) lived in houses owned by themselves or other family members. The KSSP survey of 1996 also showed the similar trend.

5 Occupation

Of the 360 respondents, 40.3 percent of the women were housewives, 26.7 percent were students, and 21.9 percent were in the unemployed category. 11.2 percent were working. The study group was recategorised on the basis of 'how often they were away from home'. In the sample, 37.8 percent were daily travellers by occupation, while 62.2 percent were non-travellers.

6 Religion

Majority of the sample group, 70.3 percent were Hindus. Muslims constituted 23.6 percent and Christians were 6.1 percent.

4.2 Menstrual Cycle

Majority of women in the study population (71.3 percent) attained menarche between 12- 14 years, while 4.7 percent of the study population attained menarche before the age 12. The mean age at menarche in this study group came to 13.5 years with a standard deviation of ± 1.4 . Of the study population, 256 (71.1 percent) cases had regular menstrual cycle, while 104 (28.9 percent) had irregular menstrual cycle.

For those who having regular cycle, the mean frequency was 28.9 ± 2.7 SD and for irregular group it was 42.7 ± 19.5 SD days. Mean length of menstrual cycle among the study group was 4.5 days with a standard Deviation of ± 1.96 . When asked about the source of information, more than half (55.8 percent) reported mothers as the main source of information followed by relatives (22.8 percent) and friends (17.2 percent). Majority (73.6 percent) of the study group reported that they did not have any prior knowledge about menstruation. Only 26.4 percent had some form of information about menstruation prior to menarche attainment.

Table 4.2. Menstrual Characteristics of the study population (n=360)

Characteristics	Mean $\pm$ SD
Age of women(years)	24.4 $\pm$ 7.9
Age at menarche(years)	13.5 $\pm$ 1.4
Menstrual cycle	
Regular	28.9 $\pm$ 2.7
Irregular	42.7 $\pm$ 9.5
Length of menstrual cycle(days)	4.5 $\pm$ 1.96

4.3 Menstrual Hygiene Practices

Menstrual hygiene practices included hygiene of the sanitary protection material used and personal hygiene.

4.3.1 Hygiene of the sanitary protection material

1. Types of protection

Table 4.3. Distribution of sample on the basis of type of protection used (n=360)

Type of protection	Percent
Cloth only	74.7
Sanitary napkin only	13.9
Using both	8.6
Panties only	2.5
Under skirt only	.3

During menstruation, 74.7 percent of the women used cloth as protection. Among them 2.2 percent had used napkin earlier, but shifted to cloth for various reasons. Women commonly use pieces of cloth torn from old lungis, saris, and mundu. Only 13.9 percent were using sanitary napkin exclusively, of them 3.3 percent were in the group 'shifted from cloth to sanitary napkin'. In the studied population, 8.6 percent were using both cloth and sanitary napkin and 2.5 percent were using only panties. One person reported using 'pavaadai' (under skirt) as protection during menstruation.

2. Hygiene Practices among clothes users:

In the study population as has been mentioned earlier, 74.7 percent were cloth users. Most of them reported to be using cotton cloth pieces (as reported above, taken from old saris, lungis or mundu) while 20.3 percent said that they use cotton or polyester or synthetic material depending on the availability.

Majority of the cloth users (97.8 percent) reported changing the cloth at least once, during menstrual days while 2.2 percent did not have the habit of changing used cloth pieces. The frequency of 'changing cloth material' varied from once a day to 5 times a day (See table 4.4).

Table 4.4. Frequency of changing cloth pieces (n=269)

Frequency	Percent
< 2 times a day	13.4
2 times a day	55.8
> 2 times a day	30.9

Washing practice: Most of the women (83.6 percent) used soap and water for cleaning the cloth, 7.8 percent cleaned it by dipping in the antiseptic lotion and then cleaning with soap and water and 5.2 percent cleaned with hot water. Only 3.7 percent (10 cases) reported disposing the cloth as it is. Among the cloth users, 44.4 percent said that they wash the menstrual cloth inside the bathroom, while 32 percent washed it inside the toilet. Ten percent reported to wash it in the backyard, while 13.5 percent washed it in the pond or river.

Table4.5. Distribution of the cloth users on the basis of source of water for washing
(n=259)

Source of water	percent
Well water	59.5
Pipe water	27
Surface water	13.5

Less than one tenth of the women (8.3 percent) in the study population stated that the cloth after washing was dried outside exposed to sun, and this can be considered as relatively more hygienic practice, as the presence of ultraviolet rays in the sunlight acts as bactericide (Chakraborty, 1995). Also, 17 percent dried it outside on a cloth line attached to the roof and 9.3 percent dried it inside the house. Some of them took precaution in drying cloth by covering the cloth with any other garments (3.5 percent inside and 13.1 percent outside) to prevent others from noticing it, which is unhygienic. A few (8.9 percent) dried it inside the bathroom. Many of them maintained a separate clothesline for this purpose. During rainy season, more than half of them (56.8 percent) dried the cloth inside the house. Among those who dried it inside the house, 18.9 percent followed this unhygienic method of drying it unexposed under other garments.

The practice of reusing the cloth was common in the study population. Of the cloth users (259 cases), 95.4 percent stated that they reuse the cloth for consecutive cycles.

Table 4.6. Distributions of the sample on the basis of number of times cloth reused
(n=247)

Number of times cloth reused	Percent
<= 3	46.2
4-6	40.1
>6	13.7

Of the cloth users, 46.2 percent (114 cases) reused the cloth for less than / for 3 months which is considered hygienic. Remaining 53.8 percent reused the cloth for more than 3 months, which is unhygienic.

Among those who reuse the cloth for next cycle, storage method varied. More than half (60.7 percent) of them followed the hygienic method i.e. storing in a clean plastic cover. Almost a third of them (33.2 percent) kept the cloth in an area not to be seen by others, irrespective of the cleanliness. This included places such as on a cloth line covered by other garments, under the bed, behind the wooden rack, on the thatch or in the attic, inside the bathroom etc. Fifteen women (6.1 percent) said that they keep it inside the cupboard.

Majority of them (95.1 percent) stated that they did not wash the cloth before next use, reasons being hesitation and inconvenience. Among the cloth users majority stated that, when the cloth pieces cannot be reused any longer, they bury or burn it. When asked about the use of sanitary napkin, majority (79.9 percent) of the cloth users stated that they had never used sanitary napkin. The reasons stated are shown in the table 4.7.

Table 4.7 Reason for not using sanitary napkin (n=215)

Reason	Percent
Not affordable	84.2
Not safe	12.1
Others	3.7

The category 'others' included responses such as 'not required' and 'do not feel like using' etc Among cloth users, 19.4 percent reported to have used napkin at one time or the other. The reason for current non-usage was given as not affordable (33.3 percent), not safe (59.3 percent) and the others category consisted of 7.4 percent.

3. Hygiene Practices among Napkin Users:

Only 13.9 percent were using sanitary napkin exclusively, of them 3.3 percent were in the group 'shifted from cloth to sanitary napkin'. These women had switched from cloth to sanitary napkin for various reasons. Safety and comfort was the major reasons (83.3 percent). Some reported (8.3 percent) reported that they were not aware of commercial products earlier, while rest of them reported economic reason (affordability).

Majority of the napkin users reported to be changing their napkins at least once, during menstrual days. The frequency of changing napkins varied from once a day to 4 times a day. Among the sanitary napkin users, 98 percent changed napkins either 2 times a day (36 percent) or more than 2 times (62 percent) which is accepted as a hygienic practice (see table 4.8).

Table 4.8 Distribution of subjects according to frequency of changing napkins (n=50)

Frequency	Percent
<2 times a day	2
2 times a day	36
>2 times a day	62

When asked about facilities for changing napkins, all the subjects agreed that they had facilities at home, while 38.5 percent pointed out that there is no facility for changing a napkin at the work place (school/ college/ office). Many school/ college students have pointed out that the maintenance of school bathrooms were poor and that the water supply to the school/ college toilet was inadequate.

The participants said that they dispose their sanitary protection material in various ways. Majorities of the napkin users dispose it by flushing in the closet (61.3 percent). Slightly

more than one fifth (27.5 percent) disposed it by burying (7.5 percent) or burning (20 percent). 6.3 percent of the napkin users reported throwing it out as it was. While the remaining 5 percent used to wrap the used pad in a paper or cover and throw it out.

3.1 Types of products used and amount spent per cycle

The brand of the product depended on the availability. The most frequently used brand was Stayfree (37.5 percent), followed by Whisper (28.8 percent), Carefree (26.3 percent), Shapers (6.3percent) and Kotex (1.3 percent).

Expenditure per pad has been calculated. On an average, women spend Rs. 3.72 per pad. Among the sanitary napkin users the average expenditure per cycle was Rs. 37 $\pm$ Rs. 24.

4 Using both (sanitary napkin and cloth)

In the study population, 31 women (8.6 percent) were using both cloth and sanitary napkins. Among them, 25 (80.6 percent) reported using cloth at home and sanitary napkin while travelling or going out as it was more comfortable, while 4 (12.9 percent) reported using cloth during initial days of menstruation, as there was increased flow and sanitary napkins for the remaining days (decreased flow). The remaining 2 (6.5 percent) women stated that they use cloth when there is decreased flow. Among this category, the average expenditure on sanitary napkins per cycle had been calculated as Rs. 10.

5 Others

Of the 360 women studied, 9 (2.5 percent) reported using panties alone as sanitary protection. One woman said that she uses two panties at a time for more protection. Another woman said that she uses only underskirt as sanitary protection. According to her, from the time of menarche, she started using underskirt and she felt it as a sufficient protection.

4.3.2 Personal hygiene

1 Bath during menstrual days

Among the study population, majority of the women (91.7 percent) took a daily bath. During menstrual days, 96.1 percent took bath daily. Among them, 18.8 percent took bath twice a day, while rest (81.2 percent) took bath at least once a day. However, 3.9 percent stated that they do not take bath during menstrual days. Women gave various reasons for this practice. More than half of them (61.5 percent) stated that, in 'Quran' it is specified to take bath only on 3rd, 5th and 7th days. However, this practice was prevalent in a specific region where there is scarcity of water, bathroom and space. Scarcity of water and non-availability of bathing space was the factor for some of them (7.7 percent), while 30.8 percent pointed out physical discomfort as the reason for this unhygienic behaviour.

2 Urination during menstrual days

Frequency of urination was another area of concern. Of the study subjects, 162 (45 percent) women reported less frequency of urination during menstrual days when compared to other days. Majority of them (96.1 percent) stated hesitation as the main reason for this. Various responses included "do not want to change the cloth in between", 'do not want to use the same cloth after urination', do not want to get noticed' and 'feels dirty to wear same material after urination'. Severn women (1.9 percent) reported physical discomfort as the reason for decreased urination, while another 7 (1.9 percent) reported non-availability of bathroom as a factor for decreased frequency.

3 Sexual behaviour

Among the married participants, all most all (95.4 percent) maintained sexual abstinence during menstrual days. All most all believed that it is improper to have intercourse

during these days. The notion of pollution or impurity kept women from having sex with their husbands. Less than five percent reported sexual relations with their husbands during menstruation.

4.3.3 Menstrual Postponement

Around one fifth (16.7 percent) of the women interviewed, admitted to using medication for postponing menstruation. Most of them took progesterone pills (primolut-N) or some other contraceptive pills. Postponement was mainly done for religious ceremonies such as going to temple (63.3 percent), or for attending social functions and festivals (36.7 percent).

Based on criteria mentioned earlier, 39.2 percent (95%CI: 34.2 - 44.2) of the study population was maintaining hygienic management of menstruation, while it was identified that 60.8 percent (95%CI: 56.4 - 65.2) of the population managed menstruation unhygienically.

Table 4.9. Distribution of subjects according to the menstrual hygiene maintenance (n=360)

Hygiene maintenance	percent
Hygienic	39.2
Unhygienic	60.8

4.4. Factors Responsible for Hygiene Maintenance: An analysis of factors responsible for maintenance of menstrual hygiene based on the conceptual framework has been undertaken and the results are given below.

Background Factors

Education and menstrual hygiene: The bivariate analysis indicates a statistically significant association between education and menstrual hygiene practices. The relation is in the expected direction. The result shows that as the educational status increases, the level of hygiene also increases.

Socio economic status and menstrual hygiene: A statistically significant association was found between SES and hygiene level. Women from the upper class were found to be maintaining higher level of hygiene when compared to lower classes. A hierarchical relation was seen in the bivariate analysis.

Marital status and Hygiene: A statistically significant association was seen between marital status and hygiene maintenance. Married women tend to maintain more hygiene than unmarried women do.

The bivariate analysis did not show significant association between age group and hygiene maintenance. However, the trend is that, women tend to maintain hygiene as the age increases. Occupation and hygiene maintenance was not found to be significantly related.

Intermediate factors

Prior knowledge about menstruation had a significant relation with menstrual hygiene practices. More than half of the women who knew about menstruation in advance maintained good hygiene compared to those who had not. Bivariate analysis has shown a consistent relation between hygienic practices and the products used for its maintenance. Among the sanitary napkin users 98 percent were maintaining good hygiene while only 28.3 percent of cloth users followed hygienic practices. Among those who uses both

products, 51.6 percent maintained good hygiene. Access to privacy in terms of availability of bathroom and toilet facilities has shown a statistically significant association with hygiene maintenance.

Access to water and hygiene A statistically significant association was seen between source of water used for bathing and washing in relation to hygiene maintenance. Poor menstrual hygiene was seen among those who use surface water for washing and bathing compared to well water and pipe water users. Among the well water users, those with storage facilities were maintaining higher-level hygiene when compared to those who do not. Among the pipe water users, those with private pipe facilities seem to be hygienic compared to households depending on public pipe water.

Risk Factors

Menstrual disorders – The bivariate analysis has revealed a statistically significant association between menstrual disorders and hygiene maintenance. Among the women, who reported having menstrual problems, more than half (66.5 percent) were not maintaining menstrual hygiene.

Table 4.10. Relation of menstrual hygiene with specified determinants

Variables	Chi square	Degree of freedom	P value
Back ground :			
Age	2.12	2	0.3
Education	14.50	1	<. 001
Marital status	6.5	1	<. 05
Socio economic status	26.62	2	<. 001
Intermediate:			
Knowledge	9.82	1	<. 001
Type of protection	94.54	3	<. 001
Access to			
Bathroom	11.26	1	<. 001
Water	29.59	2	<. 001
Risk : Menstrual disorders	6.7	1	<. 01

4.4.1 Results of multivariate logistic regression of menstrual hygiene maintenance with selected determinants

Multivariate logistic regression was done using hygiene as a dependent variable. The variables identified as having a significant association were included as independent variables. These were SES, marital status, access to resources including water and bathroom facilities and menstrual disorders. The high level of interaction between education and SES lead to its elimination from list of variables considered for logistic regression.

Table 4.11. Results of multivariate logistic regression: Menstrual hygiene with specified determinants

Characteristics	Reference category	Odds ratios	Characteristics	Reference category	Odds ratio
Socio economic	Lower	1	Water source	Surface/ Public water	
			Well water		2.04
			Pipewater (private)		3.45**
Marital status	Unmarried		Bath room	No	
			Yes		0.99
Knowledge	yes		Menstrual problems	Yes	
			No		1.51

** p value < 0.01

SES and the source of water used for washing and bathing had a significant association with maintenance of menstrual hygiene, after controlling for other variables.

Women from the higher SES were engaged in hygienic management of menstruation when compared to lower SES (OR=3.65, 95%CI: 1.35-9.85 for SES III when compared

to SES I). The significant association of source of water and menstrual hygiene management may be explained by the socio economic status itself. Women from the higher SES have more access to private water sources when compared to women from the lower SES.

4.5 Reproductive Morbidity as Perceived by the Women

Among the women who participated in the study, the reported morbidity was high. At least one form of reproductive morbidity was experienced by 86.1 percent of the women. i.e. any one of the given morbidity was present (RTI, UTI, menstrual disorders, or skin problems associated with sanitary protection). When the skin problems associated with sanitary protection material were segregated, 77.8 percent reported one or the other form of reproductive morbidity (See table 4.9).

Table 4.12. Frequency of Different Reproductive Morbidity (n=360)

Reproductive morbidity	Percent
Reproductive tract infection (RTI)	36.1
Upper	15.3
Lower	26.1
Menstrual problems	58.1
Urinary tract infections (UTI)	33.6
Upper	3.3
Lower	32.2
Skin problems associated with Sanitary protection	45.8

As seen in the table, many women (45.8 percent) reported skin problems related to sanitary protection. The individual problems included skin excoriation (63.9 percent), itching (50 percent), discoloration of the skin (58.9 percent) and peeling of the skin (15

percent). Disorders pertaining to menstruation compose a significant segment of all the morbidity reported by the women in the rural areas (58.1 percent), which included dysmenorrhoea (47.2 percent), delayed cycle (14.7 percent), Menorrhagia (4.7 percent) intermenstrual irregular bleeding (1.9 percent), Oligomenorrhoea (3.6 percent) and polymenorrhea (5percent). Slightly over a third (35.6 percent) of the women reported RTIs, which consisted of upper (15.3 percent), and lower (26.1 percent) RTIs.

4.6 Reproductive morbidity and menstrual hygiene maintenance

A statistically significant association was noticed between total reproductive morbidity and menstrual hygiene maintenance ($P < .001$). Among the unhygienic group 83.6 percent reported any one of the above said morbidity conditions, while 56 percent of the hygienic group reported any one of the morbidity conditions.

When compared with individual morbidity, a statistically significant association was found between reproductive tract infection and hygienic practices ($P < .01$). RTI was reported by 41.6 percent of the unhygienic group and 27.7 percent of the hygienic group.

Table 4.13. RTI in relation to menstrual hygiene

Menstrual hygiene	RTI(%)	
	YES	NO
Unhygienic	41.6	58.4
Hygienic	27.7	72.3
p value	< 0. 01	
Odds ratio (95%CI)	1.86 (1.18 - 2.94)	

In the study population a statistically significant association was seen between lower RTIs and menstrual hygiene status ($P < .001$). However, this did not hold true for upper RTIs.

Skin problems related to sanitary protection material were reported by 45.8 percent of the women. Among those who were reported to have skin problems related to sanitary protection, 58.4 percent belonged to unhygienic group and 26.2 percent to hygienic group (p value $< .001$, $OR=3.95$ with $95\%CI: 2.49-6.27$).

Table 4.14. Comparison of prevalence of reproductive morbidity among women with menstrual hygiene

Menstrual hygiene	RTI (n=128)	UTI (n=121)	Skin problems associated with sanitary protection (n=165)	Any one of the Problem (n=308)
Unhygienic(n= 219)	41.6	36.5	58.4	83.6
Hygienic(n=141)	27.7	29.1	26.2	56
p- value	$<.01$	0.1	$<.001$	$<.001$

4.7 Type of protection and RTI

When analysed, there was no significant difference between cloth users and sanitary napkin users in terms of RTI. However sanitary protection problems have shown significant association (p value $< .01$).

4.8 Marital status and RTI

Relationship between marital status and RTI was examined. No statistically significant association was seen between RTI and marital status. However, when individual conditions were examined (upper and lower RTI) a statistically significant association was seen for Upper RTI (p value $< .01$). To examine the pattern in depth, Contraceptive

Use and reproductive morbidity was assessed. In the study sample, among the married women, 65.6 percent reported to be using contraceptives. Among the users 87.1 percent were sterilised, while 12.9 percent were using temporary methods. When contraceptive use was assessed in terms of reproductive morbidity, upper RTI had shown a significant relationship (p value $< .01$). However, when lower RTI among contraceptive users as well as those who did not practice contraception was examined, no distinct pattern emerged.

Among the unmarried group, a statistically significant association was found between menstrual hygiene and RTI (p value $< .01$). When grouped into different categories, association was consistent for lower RTI (p value $< .01$). However, significance was lost for upper RTI.

4.9 SES and RTI

There was a significant association between SES and RTI ($P < .05$). Woman in the lower SES group reported more morbidity compared to the middle and upper SES group. Of the women who reported having RTI (36.1 percent), 44.5 percent belonged to SES I category, 31.7 percent from SES II and 27 percent belonged to SES III category. When assessed for total morbidity, the trend was similar. Women from the lower SES group reported higher level of morbidity compared to the higher group.

4.10 Frequency of urination and UTI

A statistically significant association was seen between frequency of urination and UTI. Among the study population 45 percent said to have lesser frequency of urination during menstrual days compared to other days. Of this 45 percent, 37.7 percent reported to have Lower UTI.

4.11 Multivariate logistic regression of RTI with selected characteristics of women

The logistic regression results of dependent variable RTI with selected characteristics of women is given below (Table4.15).

Table 4.15. Results of multivariate regression: RTI with specified determinants

Characteristics	Reference category	Odds ratios	
		RTI	Lower RTI
Socio economic	Lower	1	1
	Middle	0.62	0.60
	Upper	0.59	0.86
Hygiene	No	1	1
	Yes	0.58	0.55
Occupation	No employment	1	1
	Employment involving travel	1.61	1.23

P value <. 05

Independent variable included were Hygiene, SES, and Occupation. RTI was statistically significantly associated with menstrual hygiene, after controlling for other variables. Lower RTI had shown the same trend.

Section II

I -Group discussion/ in depth interviews

Group discussion and in depth interviews with college and school students indicated that for most of them the knowledge of menarche before the event was restricted to ' something happening to women during which she has to follow many restrictions'. In other words, the knowledge was limited to restrictions and proscriptions. This served to develop negative attitudes towards menstruation. Ninety percent of the discussants showed a negative attitude towards menstruation. It seems that the actual experience of first menstrual period is sudden, embarrassing, rather shocking or frightening. All most all of them had their menarche at about 12 years. The girls reported a long list of rules and restrictions that has to be followed during menstruation. It included both food restrictions and activity restrictions. Also it has been reported that the restrictions are strictly practised among Hindus, followed by Muslims while Christians do not have any restrictions. Most of the participants reported to be using cloth pads, however all of them knew about commercial napkins. Sharing cloth among siblings was a reported phenomenon among girls.

Almost all were concerned about personal hygiene. According to the discussants, postponing menstruation for religious activities and social functions is a routine practice among college girls. The complaints frequently experienced were abdominal pain, cramps and mood swings were the most reported problems. Itching and burning sensation between the thighs due to friction was also among the reported problems. However none of them said that they had approached any health providers for the same.

II- Key Informant Interviews

Most of the key informants said that the imparted knowledge about menstruation among adolescents through households and schools are inadequate. According to them, hygiene maintenance normally and especially during menstruation is very important, as the chances of acquiring infections during this time are profound. Along with inadequate knowledge the cultural norms and values attached to it make the hygienic management difficult. According to one gynaecologist, unhygienic management of menstruation paves way for RTIs. Staff from the adolescent clinic also reported that unhygienic management of menstruation is more common among low socio economic strata, where they do not have enough facilities. They also found that fungal infections are more common among teenagers, especially among dropouts. Inadequate toilet facilities in schools and colleges for proper hygiene maintenance were an area of concern. Most of them emphasised the need for imparting school health education programs, where education about menarche and menstrual hygiene should be a major component among upper primary classes.

Chapter V

DISCUSSION

This study aimed at learning about menstrual hygiene practices existing in a rural community and its implication for women's reproductive health. The types of practices existing in the selected rural community have been studied. The factors responsible for menstrual hygiene maintenance have been identified. The reported morbidity was collected and its relation with existing hygienic practices had been looked into. The findings of the study are discussed here.

The mean age of menarche in the present sample of women was 13.5 years. Studies from different part of the country (Hegde, 1989) have reported an age at menarche comparable to the present study. However, it is disturbing to note that over 10 years no decline is seen in age at menarche and this could imply that there has been no rise in the nutritional level of the women. This trend in the present study may be because the study group did not contain girls below 12 years. Another reason could be that the study group contained women of two generations.

Prior knowledge about the scientific aspect and maintenance of menstruation helps to develop positive reaction to menarche. The survey and the group discussions reveal that knowledge of menstruation prior to menarche was almost non-existent as has been noted elsewhere (Chaabra, 1989; Hegde, 1990; Koff and Reirdan, 1995; James, 1997). Due to inadequate prior knowledge, the first reaction at the onset of menarche was embarrassment and fear. For more than half of study population, the mother was the primary source of information. The schools do not seem to play a vital role in imparting this information.

Almost all of the women who participated in the study (93.3 percent) reported practising some form of restrictions during menstruation with respect to routine activities. These restrictions pertained to participation in religious activities. This indicates that even now the belief system associating menstruation with pollution continues to be reinforced.

The study has found that the most common protection used by rural women during menstruation was old cloth (74.7 percent). Use of sanitary napkins, though hygienic has still not become popular with women. Among the study population 13.9 percent used sanitary napkins. The level of socio economic stability of the woman can explain this. Among the cloth users 84.2 percent pointed out non-affordability as the vital factor. This has been supported by another study (Cherian, 1999).

In the study population 8.6 percent were using both sanitary napkin and cloth, the former when the women have to travel and the latter at home. Compared to the readily available household piece of cloth, sanitary napkins are costlier. Thus, women, even those who can afford sanitary napkins tend to prefer both for the management of menstruation economically. The present study had shown the economic non-viability of the existing commercial sanitary napkins for women.

On an average a woman had to spend Rs. 37 for every cycle. This seems to be prohibitively expensive for the women, especially those in the lower socio economic status.

In a country like India, where two third of the population belong to lower Socio economic status, advising sanitary napkin as the only hygienic method seems to be too expensive. The cloth they use, if managed hygienically, is acceptable. However, the notions of pollution, superstition and shame associated with menstruation in addition to

lack of privacy and access to resources like water, soap, sun and storage place can lead to unhygienic management of menstrual cloth. In the study population, according to the predefined criteria, only 39.2 percent of the population managed menstruation hygienically.

Based on the conceptual framework factors responsible for menstrual hygiene maintenance had been identified. While considering the background factors responsible for menstrual hygiene maintenance, a statistically significant association was seen with education, marital status and socio economic status. Women from higher socio economic status were found to maintain a higher level of hygiene when compared to lower socio economic status groups. This may be because of their greater affordability and accessibility of hygienic material and better surroundings. Previous studies have explained that woman from low socio economic status tend to maintain less hygiene, owing to the lack of awareness and inaccessibility and non-affordability (Wasserheit, 1989).

The present study had shown that married women tend to maintain more hygiene than unmarried women do. Two explanations can be given for this. Women may become conscious about sexual hygiene after marriage, which in turn let them maintain menstrual hygiene indirectly or it may be that married women tend to be less embarrassed about the bodily processes when compared to unmarried women.

The study has revealed that, intermediate factors such as prior knowledge about menstruation, type of menstrual protection products and accessibility to basic resources such as water and bathroom facilities has a significant impact on menstrual hygiene practices.

Among the study population it was found that 98 percent of the sanitary napkin users were maintaining good hygiene while only 28.3 percent of the cloth users followed hygienic practices. This may be explained by the fact that the workload of women using cloth is higher than that of sanitary napkin users (in terms of recycling). This finding has considerable implication in terms of making available disposable napkins at affordable cost.

The study also found a significant association of hygienic practices with access to privacy. In other words, accesses to water, toilet and bathroom facilities have shown a significant association with menstrual hygiene maintenance. This may be because, in a resource poor context, the standard of hygiene that women can maintain will be highly compromised. This finding highlights the importance of access to basic facilities for better health.

In the study, disorders' pertaining to menstruation was identified as a significant risk factor for menstrual hygiene maintenance. Among the study population 58.1 percent reported to be having menstrual problems. Dysmenorrhea (painful bleeding) was reported by 47.2 percent of the cases. About two thirds of the women (63.5 percent) who reported having menstrual problems were following unhygienic management of menstruation. This could be explained by the fact that in a resource poor setting with lack of access to basic resources like privacy and water, the problems associated with menstrual bleeding act as a catalyst for the negative attitude in dealing menstruation hygienically.

Reproductive morbidity was assessed as perceived by the women themselves. In many of the studies self-reporting of the symptoms was a major tool (Bhatia and Clenland, 1995;

Sowmini, 1999; Jaswal, 2000). Even though its diagnostic accuracy and relation with clinically validated conditions are yet to be proved, in a developing country context, self reported morbidity has its own importance as a cost effective measure. Among study population 36.1 percent reported symptoms suggestive of RTIs and of that, lower RTI was reported by 26.1 percent of the study group. Many community-based studies done in the past have brought out the high prevalence of gynaecological morbidity in the developing world. (Bang et.al, 1990; Wasserheit et.al, 1990; Younis et.al, 1992; Bhatia and Clenland, 1995; Sowmini, 1999; Jaswal, 2000). An earlier study (Shenoy, 1996) done in Thiruvananthapuram district has shown higher prevalence of reported gynaecological symptoms such as vaginal discharge (26.8 percent) and vaginal itching (11 percent). However, the purpose of the present study was not to arrive at a precise estimate of prevalence rates, but to explore the relation between practices related to maintaining menstrual hygiene and reproductive tract infections.

The study has shown a statistically significant association between unhygienic management of menstruation and reproductive tract infections (OR= 1.86, 95 % CI: 1.2 - 2.94). When individual categories were assessed, lower reproductive tract infections and skin problems related to sanitary protection material had a significant relation with menstrual hygiene practices. The possible explanations can be- a) close fitting under garments or tying the cloth too tightly to prevent staining and less frequency in changing material that can augment the fungal growth. In other words, since the vaginal defence is lost during and around menstrual period, unhygienic conditions associated with even minor injury (due to scratching or friction of under garments or sanitary towels) can pave the way for fungal infections. b) Trichomoniasis can be acquired by inadequate hygiene

or it is favoured when the pH is raised as during menstrual period (Padubidri and Daftary, 1999).

To eliminate the confounding of other causal factors for RTIs with menstrual hygiene, socio- economic status, marital status and contraceptive use were examined. A statistically significant association was seen between socio economic status and reproductive morbidity. This can be supported by the fact that in developing countries biomedical, behavioural and societal factors determine the incidence of reproductive morbidity (Wasserheit, 1989). Lower morbidity among higher socio economic strata may be due to the educational level and the hygienic practices. Here again, the interrelation between socio-economic status and hygienic practices related to menstruation is emphasised. Marital status did not show a statistically significant association with RTI. Among the unmarried group, association between menstrual hygiene practices and Lower RTI was significant (p value $< .01$). In recent studies on RTIs, the association between use of contraceptives and reported or clinically diagnosed morbidity has been well-documented (Bhatia and Cleland, 1995; Sowmini, 1999). In the present study, the association was significant for Upper RTI. However, when lower RTI was examined, no distinct pattern emerged.

Skin problems related to sanitary protection material were more common among the unhygienic group. An explanation could be the type of material used, frequency of changing, washing, drying and storing practices. Skin problems associated with sanitary protection materials were more common among cloth users. This could be attributed to the inadequate and unhygienic recycling practices (i.e. inadequate removal of bloodstain, restrictions in drying, and storing the cloth in unclean areas) of the menstrual cloth. The

association found between menstrual hygiene practices and reproductive morbidity is supported by earlier studies (Wasserheit, 1989; Ahmed, 1993; Younis, 1993).

Conclusions

The findings of the study revealed that majority of the women deal menstruation unhygienically. Socio economic status is significantly associated with menstrual hygiene maintenance. Women from higher socio economic status are more likely to follow hygienic management of menstruation when compared to lower socio economic groups. In resource poor contexts, where women do not have access to basic facilities like water, bathroom and privacy, the standard of hygiene one can maintain is severely compromised.

Few studies have examined the relationship of hygienic practices with respect to menstruation and reproductive tract infections. The present study has clearly brought out the association between menstrual hygiene and reproductive morbidity. Since the causal factors for reproductive tract infections are many, this can be considered as one of the enhancing factors. The interplay of socio economic status, menstrual hygiene practices and reproductive tract infections are apparent. Clearly socio economic factors have a major role in determining the women's ability to maintain hygiene and this in turn renders them vulnerable to reproductive tract infections.

Recommendations

- School health education programmes has to be strengthened and education with respect to menstruation should be a major component of health education for girls in the upper primary classes.

- Hygienic management of the menstruation should be added as a part of health sciences in schools. In addition, a comprehensive information, communication and education programme has to be developed targeting the adolescent girls.
- Hygiene of menstruation should be included in the teachers training programmes so that they are equipped with adequate knowledge to guide their students.
- Organisations have to be promoted to produce sanitary napkins at affordable cost.
- Improvement in the housing conditions, with respect to water, bathroom /toilet would facilitate hygienic management of menstruation.
- A study that incorporates clinical examination and laboratory investigations will have to be undertaken to establish the causal relationship between menstrual hygiene and RTIs beyond reasonable doubt.

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Schedule no.

PERCENTAGE OF
RURAL POPULATION

APPENDICES

APPENDIX I

Questionnaire

APPENDIX II

Cluster Information Form

APPENDIX III

Map of Thiruvananthapuram District

APPENDIX I

Schedule no:

MENSTRUAL HYGIENE PRACTICES AND PERCEIVED GYNAECOLOGICAL MORBIDITY IN THE RURAL POPULATION OF TVM, KERALA.

Investigator: Anuradha.R

Date:

Panchayat:

Ward No/ Name:

Address:

House Number

1. Number of members in the household: Adults: M...F...Total...

Children (<12 Yr.): M...F...Total...

2. Information about respondent: Religion:

Name(Woman)	Age	Mens. status	Education	Occupation	Income

3. What is your normal monthly (household)expenditure: ...Rs

Household Condition

4. Interviewer's assessment: SES.I 1 SES.II 2 SES.III 3

5. Type of the house

Floor: mud 1 cement 2 tiled 3 mosaic 4 other 5

Wall: mud 1 stone 2 brick 3 plastering 4 other 5

Roof: tiles 1 asbestos 2 concrete 3 thatch 4 other 5

6. Number of rooms:

7. You have at home: Radio 1 colour TV 2 Newspaper 3 Gas 4 stove 5

Bicycle 6 fridge 7 telephone 8

8. Main source of water used for bathing and washing: piped water 1 Well water 2

Well water with over tank 3 Surface water 4

Toilet Facilities

9. Does your house have

Toilets: Common (shared between 1 or 2 families) 1 Private (with in the house, with water facilities) 2 Private (water carried) 3 Others(specify) 4

10. Bath room: Common (shared between 1 or 2 families) 1 Private(withwater facilities) 2 Private (with no water facilities) 3 Others(specify) 4

Menstrual Information

11. Age at menarche (in completed years): ...
12. When did you get the first information about menses? Before starting menses
☐ At the time of menses ☐
13. Where did you get the first information about menses? Mother ☐ Teacher ☐
 Friends ☐ Relatives ☐ T.V ☐ Magazines ☐ Any other ☐ No information ☐
14. Length of last menstrual period ... days
15. Regularity of menstrual cycle- regular ☐ irregular ☐
16. If regular, what is the frequency of your menstrual cycle: once in ... days
17. If irregular, what was the frequency of your last menstrual cycle ... days.

Practices

18. Type of protection used during the last menstrual cycle: Cloth only ☐ Sanitary napkin only ☐ Have used cloth, but shifted to sanitary napkin ☐ Have used sanitary napkin, but shifted to cloth ☐ Using both ☐ Others(specify) ☐

If cloth used

19. Material of cloth...
20. During menstrual days do you change the cloth in between? Yes ☐ No ☐
21. If yes, How often do you change the cloth

Days	once(1)	twice(2)	thrice(3)	more(4)
1 st				
2 nd				
3 rd				
4 th				
subsequent days				

22. If no, what is the reason for not changing
23. How is it taken care of? Clean with water ☐ Clean with soap and water ☐ Clean with hot water ☐ Clean with soap & wateraked in antiseptic lotion ☐ others(specify) ☐
24. where do you wash the menstrual cloth? Inside the bathroom ☐ Others(specify) ☐
25. Source of water for washing...
26. Where/ how do you dry the cloth? Inside the house on clothesline exposed to air ☐
 Inside the house but unexposed under garments ☐ outside on a cloth line exposed to sun ☐ outside on a cloth line unexposed under the garments ☐ Inside the bathroom ☐ any other ☐

27. Where / How do you dry the cloth when there is rain? Inside the house on clothesline exposed ☐1 Inside, but unexposed under other garments ☐2 In the bathroom ☐3 other ☐4

28. Do you reuse the cloth for next cycle? Yes ☐1 No ☐2

29. If yes, for how many cycle?

30. Storage method for next cycle: Fold and keep in a corner of the bathroom ☐1

Fold and keep in an area not to be seen by others ☐2 Fold and keep in a plastic cover ☐3

Inside the cupboard ☐4 others ☐5

31. Do you wash the cloth before the next cycle Yes ☐1 No ☐2

32. Have you ever used sanitary napkin: Yes ☐1 No ☐2

If sanitary napkin used regularly,

33. For a menstrual cycle how many pads /napkin do you use...

Days	Number of napkins
1 st	
2 nd	
3 rd	
4 th	
subsequent days	

34. Are there enough facilities to change your napkin -

a) at home: yes ☐1 no ☐2

b) at work place/school/college yes ☐1 no ☐2

35. How do you dispose the used sanitary pad? Bury ☐1 Burn ☐2 Throw out as it is ☐3

Flush in the closet ☐4 wrap in something and throw ☐5 others(specify) ☐6

36. Which brand do you use? Whisper ☐1 Stayfree ☐2 Carefree ☐3 Kotex ☐4

Shapers ☐5 Comfit ☐6 other ☐7

37. Amount spent on sanitary pads per cycle: ...

If shifted from cloth to sanitary napkin

38. How many months back ...

(Go to question number; 35 - 39)

39. What is the reason for discontinuing cloth?.....

If shifted from sanitary napkin to cloth

40. How many month back.....

(Go to question number; 23-33)

41. Reason for discontinuing napkin?

If cloth and sanitary napkin used

42. Are you using these products together? Yes ☐1 no ☐2
43. If yes, when do you use cloth?
44. When do you use sanitary napkin?.....

Activities:

45. How many times do you take bath daily (normally):
46. Do you take bath during menstrual days? Yes ☐1 no ☐2
47. If yes, how many times:
48. If no, What is the reason?.....
49. Frequency of urination
- a) Normal----
- b) During menstrual days...
50. Do you restrict any food during menses? Yes ☐1 no ☐2
51. If yes, what type of food?
-
52. Do you restrict any activities? Yes ☐1 no ☐2
53. If yes, what type of activities: Religious activities ☐1 attending social Occasions ☐2
- Cooking ☐3 filling water ☐4 touching anyone ☐5 Any other ☐6
54. Have you ever postponed menstruation by taking pills? Yes ☐1 no ☐2

If married,

55. When did you attain menarche? Before marriage ☐1 after marriage ☐2
56. Sexual contact during menstruation: Yes ☐1 no ☐2
57. Contraceptive method (Ever use)... Condom ☐1 oral pills ☐2 IUD ☐3 PPS ☐4
58. Current use yes ☐1 no ☐2
59. If yes, which method? Condom ☐1 oral pills ☐2 IUD ☐3 PPS ☐4

Reproductive Morbidity History

62. Problems faced during last two months (related to menstruation)
-
-
-

RTI (reproductive tract infection)	yes	no	Rx	place
Upper RTI				
a) pain in iliac fossa				
b) lower abdominal pain				
vaginal discharge with or without fever				
Lower RTI				
a) vaginal discharge with itching or irritation				
b) white/coloured(yellowish green, curdy white)				
c) foul odour discharge				
Menstrual Problems				
Delayed cycle				
Painful bleeding				
Freq.: menses < 21 days duration, excessive or not				
Bleeding <3 days with scanty periods or spotting				
Prolonged bleeding >5 days and excessive bleeding & passing clots				
Inter menstrual irregular bleeding				
Lower UTI				
pain or burning sensation while passing urine				
Frequent urination with above symptoms				
Incontinence				
High coloured urine with above symptoms				
Upper UTI				
Back pain, fever, dysuria				
Problems associated with sanitary protection				
Itching				
Skin Excoriation				
Peeling				
Discoloration of the skin				

63. Does your husband have any of the following problems?

a) Genital discharge: Yes ☐ 1 No ☐ 2

b) Ulceration in the external genitalia: Yes ☐ 1 No ☐ 2

64. Are you currently undergoing treatment for any other (non-gynaecological) illness?

65. If yes, for which disease? ...

APPENDIX II

Identification of Rural Clusters (Cluster Information Form)

Total rural population = 2268443

Random Number = 34604

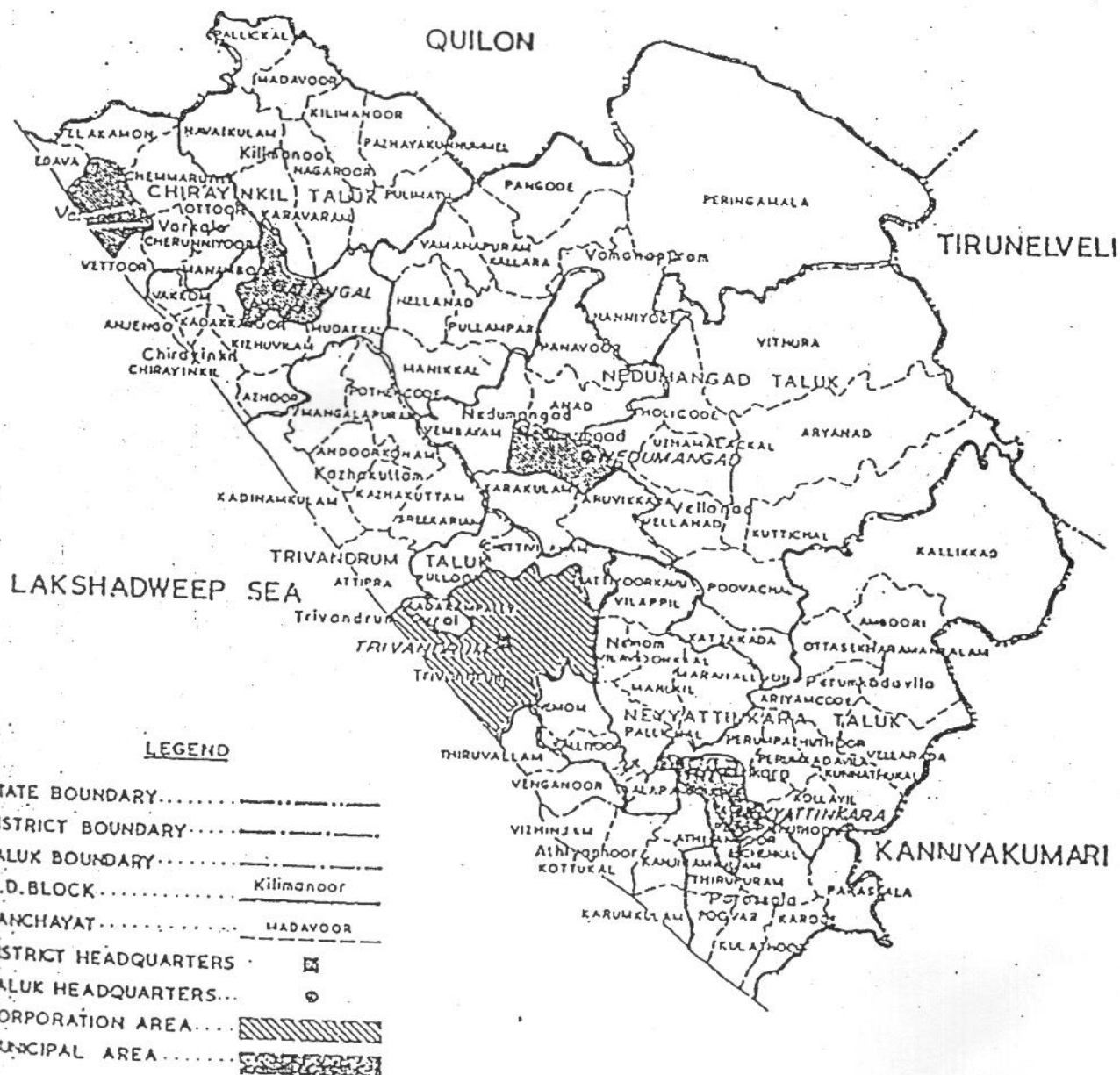
Sampling Interval = $2268443/30 = 75615$

	Panchayath	Selected Panchayath population	Panchayath cumulative population	Cluster Number
1	Chemmaruthy		27093	
2	Edava	26537	53630	C1
3	Elakamon		75153	
4	Manamboor		95728	
5	Ottoor		108870	
6	Cherunniyoor	16325	125195	C2
7	Vettoor		143985	
8	Kilimanoor		161824	
9	Pazhayakunnummel		185177	
10	Karavaram	25655	210832	C3
11	Madavoor		229373	
12	Pallickal		244082	
13	Nagaroor	24088	268170	C4
14	Navaikulam		301772	
15	Pulimath		329505	
16	Azhoor	26829	356334	C5
17	Anjuthengu		373076	
18	Vakkom		390716	
19	Chirayinkeezhu	29627	420343	C6
20	Kizhuvilam		449657	
21	Mudakkal		480131	
22	Kadakkavoor	23037	503168	C7
23	Kallara		527216	
24	Nellanad		548984	
25	Pullampara	21673	570657	C8
26	Vamanapuram		590771	
27	Pangode		618209	
28	Nanniyode	26064	644273	C9
29	Peringammala		674417	
30	Manickal		706482	
31	Aryanad	24735	731217	C10
32	Poovachal		769197	
33	Vellanad	25306	794503	C11
34	Vithura		821116	
35	Uzhamalackal		840423	
36	Kuttichal		857471	
37	Tholicode	23056	880527	C12
38	Kattakkada		913950	
39	Anad		941317	
40	Aruvikkara	28661	969978	C13
41	Panavoor		988106	
42	Karakulam	40503	1028609	C14
43	Vembayam		1061246	

	Panchayath	Selected Panchayath population	Panchayath cumulative population	Cluster Number
44	Andoorkonam		1087447	
45	Attipra	33880	1121327	C15
46	Kadinamkulam		1161733	
47	Kazhakuttam	29469	1191202	C16
48	Mangalapuram		1224121	
49	Pothencode	24995	1249116	C17
50	Sreekariyam		1291166	
51	Kadakampally		1315707	
52	Chettivilakom	33534	1349241	C18
53	Ulloor	47005	1396246	C19
54	Vattiyookavu		1429899	
55	Balaramapuram		1461458	
56	Pallichal	38896	1500354	C20
57	Maranalloor		1532413	
58	Marukil	28746	1561159	C21
59	Vilappil		1587179	
60	Vilavoorkkal		1609927	
61	Nemom	41907	1651834	C22
62	Kalliyoor		1683413	
63	Perumkadavila	21098	1704511	C23
64	Kollayil		1726002	
65	Ottasekharamangalam		1743436	
66	Aryancode		1765648	
67	Kalikkadu	12440	1778088	C24
68	Kunnathukal		1811736	
69	Perumpazhuthoor		1844787	
70	Vellarada	37092	1881879	C25
71	Amboori		1898214	
72	Athiyanoor		1921729	
73	Kanjiramkulam	17191	1938920	C26
74	Karumkulam		1964651	
75	Kottukal		1993619	
76	Vizhinjam	42402	2036021	C27
77	Venganoor		2064763	
78	Thiruvallam	33036	2097799	C28
79	Chenkai		2130471	
80	Karode	27490	2157961	C29
81	Kulathoor		2187378	
82	Parassala	45710	2233088	C30
83	Thirupuram		2249688	
84	Poovar		2268443	

¹ Each panchayath constitute 10-12 wards. From the selected panchayath one ward was identified as cluster.

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