

Identifying Socio-economic Barriers to Hygienic Menstrual Absorbent Use among Unmarried Girls in the Impoverished States of India

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Abstract

Menstrual Hygiene Management (MHM) among the adolescent and young women is a serious public health problem. This paper examines the socio-economic inequalities contributing to the use of hygienic menstrual absorbent during menstruation among unmarried young women in India and the Empowered Action Group (EAG) states. District Level Household and Facility Survey (2008) India, a nationally representative community based data, were used. Concentration indices were computed to assess inequality in the use of hygienic menstrual absorbent and further it was decomposed to identify the per cent contribution. Unavailability of toilets at the households (42%), living in the rural area (20%) and the number of years of schooling (27%) contributed about 90 per cent of the total socio-economic inequalities in using hygienic menstrual absorbent at all India level and in the EAG states with the exception of Assam where low economic status and residence in rural area explained the inequality. Recognizing MHM as a public health concern is the first step towards addressing the problem. The provision for subsidized sanitary napkins supply needs to be supplemented with the basic public health measures such as water supply and toilet facility at the household level, particularly in the resource scarce settings.

Keywords: Sanitary napkin, menstrual hygiene, young women, inequality, decomposition, India.

I. Introduction

Although menstruation among girls is a biological and natural physiological function on attainment of menarche, yet it is historically contingent and socially patterned (Garg & Anand, 2015; Sommer & Sahin, 2013; Yagnik, 2014). From the time immemorial, the notions of 'purity' and 'pollution' attributed to menstruation disguise the girls with a culture of silence in the Indian subcontinent. Menstruation is dealt with utmost secrecy surrounded by the socio-cultural beliefs and taboos of the society, implicating menstruation as a dirty, impure or polluting phenomenon. Some of the societal restrictions imposed to women during menstruation include debarring from all sorts of religious function including prohibition to enter a religious place, restricting access to kitchen with a ban on touching food items and utensils, isolating the menstruating women from the living room, hiding themselves from the sight of men, not allowed to bath, etc. (Juyal et al., 2013; Jogdand & Yerpude, 2011; Mudey et al., 2010). The adolescent girls – an age at which a majority of them start menstruating shape an understanding about menstruation more like a curse for being a person of female gender. The stigma and discrimination may have potential ill effects in the ways the girls feel about their body and manage their menstruation.

World-wide women have adopted different strategies to deal with menstruation. They use sanitary pads, menstrual cups, clothes, etc., as menstrual absorbent. In India the use of sanitary pad, which is considered as a better menstrual absorbent, is very low. Only one in three (37.2%) young unmarried women use sanitary napkins or locally prepared napkins (IIPS, 2010). Stark differences are observed in the use of sanitary napkins by socio-economic status of young women (Anand, Unisa, & Singh, 2015a; Thakur et al., 2014). The young women with high school and above education are

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eight times more likely to use sanitary napkins as compared to young women with no education (Anand, Unisa, & Singh, 2015a). Similarly, young women from higher wealth quintile are five times more likely to use sanitary napkins during menstruation as compared with those from low wealth quintile (Ibid., 2015a; Garg, Goyal, & Gupta, 2012). Disparity in the use of sanitary napkins persists by the place of residence of the girls (Juyal, Kandpal, Semwal, & Negi, 2012). Girls from urban area are better educated about MHM (Patle & Kubde, 2014) and are more likely to use sanitary napkins as compared with those from rural area (Juyal et al., 2012).

Clothes and rags are the most common forms of menstrual absorbent used in low-income settings such as India (Mahon & Fernandes, 2010). Often times, the use of clothes or rags is unhygienic because it is generally an old and used clothes re-used during menstruation. Various studies have indicated that the clothes used to absorb menstrual blood are washed hurriedly without applying soap or disinfectant solutions, dried in a secluded place with no direct sunlight and air in order to avoid the sight of men (Baridalyne & Reddaiah, 2004; Juyal et al., 2012; Mahon & Fernandes, 2010; Mudey, Kesharwani, Mudey, & Goyal, 2010). Unhygienic practices during menstruation affect the health of the women. The use of clothes elevates the risk of Reproductive Tract Infections (Anand, Singh, & Unisa, 2015b; Das et al., 2015; Juyal, Kandpal, & Semwal, 2014; Khanna, 2005). Among those who used clothes, around 66 per cent suffered from genital infections as compared to only 12 per cent among those who used sanitary napkins (Das et al., 2015). Some of the studies have also indicated that the menstrual problems were the leading gynaecological complaints among the women (Kumar et al., 1995; Bhatia et al., 1997; Bhatia & Cleland, 1995). Moreover, dysmenorrhoea, oligomenorrhoea, menorrhagia and polymenorrhoea are highly reported by the adolescent and young girls in India (Dambhare, Wagh, & Dudhe, 2012; Juyal, Kandpal, & Semwal, 2014; Katiyar et al., 2013; Mohite & Mohite, 2013; Mudey et al., 2010).

MHM is one of the foremost reasons for school absenteeism as well as dropout among the adolescent girls in low and middle-income countries. Many girls stay away from the school during the time of menstruation (Dambhare et al., 2012). The global origin of interest in MHM is in fact due to the worldwide concern for narrowing the gender gap in education, where the girls' education was understood to be highly affected due to menstrual experiences and the unavailability of toilet facilities in schools (Sommer, Hirsch, Nathanson, & Parker, 2015). The MHM problem among girls and women in India received very little attention although it is a serious public health concern. A growing body of research on MHM appeared in the last decade explored menstruation related knowledge and practices among the adolescent and young women (Acharya, Yadav, & Baridalyne, 2006; Garg et al., 2012; Mudey et al., 2010; Singh, Kandpal, & Roy, 2011). These studies reported that a majority of the adolescent and young women grossly lack information and the means to manage their menstruation. Girls in the rural area were particularly in a disadvantaged position. Some of the studies conducted in Africa (Sommer, 2010; Sommer et al., 2016; Sommer, Vasquez, Worthington, & Sahin, 2012; Sommer & Sahin, 2013) as well as South Asia (Mahon & Fernandes, 2010; Sahin, 2015) had a dominant focus to understand the linkages between the availability of toilet facility in the school premises and the school attendance of girls. A majority of the studies observed that the school dropouts and absenteeism were much lower in schools having toilet facility for girls. However, in general very little is known about the factors responsible for MHM among the adolescent and young women at the community level.

A community based large scale database permits a better representation of the adolescent and young women in a context such as India where considerable number of girls never enrolled in a school. Besides, the earlier studies often investigated the individual and family level factors but neglected the structure affecting MHM. Additionally, a very robust data analysis technique employed in this paper allows to provide percentage contribution of each of the factors contributing towards MHM. The understanding of the socio-economic inequalities in using hygienic menstrual absorbent can form an evidence base to better inform the policy and programme design for an effective intervention. Therefore, we examined the socio-economic inequalities contributing to the use of hygienic menstrual absorbent during menstruation among unmarried young women in India and the Empowered Action Group (EAG) states. The selected EAG states are the most populous states and

lag behind the other progressive states. They are referred as EAG states needing a special focus on population stabilization, health care services and overall socio-economic development—a clear background of low-income settings of India.

II. Data and Methods

We used data from the third round of DLHS (IIPS, 2010) conducted in 2007-08 in 601 districts from 34 states and union territories. The survey was carried out by the International Institute for Population Sciences, Mumbai under the stewardship of the Ministry of Health and Family Welfare, Government of India. DLHS-3 adopted multi-stage stratified sampling design to select a primary sampling unit (PSU) and the required number of households for interviewing the respondents. From each district, 50 PSUs which were census villages in rural areas and wards in urban areas were selected in the first stage by systematic probability proportional to size (PPS) sampling technique. The PSUs were allocated to rural and urban areas of each district proportionally to the actual rural-urban population ratio. Fieldwork of the survey was conducted from December 2007 to December 2008.

Bilingual questionnaires (vernacular and English) were used to collect information from the sampled households, ever married women aged 15-49 years, and unmarried adolescent and young women aged 15-24 years. A total of 1,66,260 unmarried women were interviewed of which we included information of 1,63,530 women who attained menarche. The interviewer sought the consent of the parents in the case of minor respondents (less than 18 years old). The information gathered included knowledge of family life education or sex education, awareness about legal age at marriage, awareness about contraception, menstruation related problems, knowledge of RTI/STI, HIV/AIDS and its source of information. The survey followed a complex design, thus, the results are representative after applying appropriate sampling weights. The sampling weight is calculated and provided in the data file. We have used unmarried women's sampling weight in our analysis. A detailed account of survey design and methods are available elsewhere (IIPS, 2010).

Variables

The respondents were asked about the methods they used to prevent bloodstains from becoming evident during menstruation with the options such as used clothes, sanitary napkins, locally prepared napkins, used nothing at all and any other method. We have considered the use of sanitary napkins and other locally made napkins as the hygienic method of practice during menstruation. A binary outcome variable (taking the value of one or zero) was computed from the different methods used by the respondents during menstruation, namely whether or not a woman used sanitary/locally prepared napkin during menstruation.

The socio-economic and demographic variables used are either continuous variables or dichotomized into disadvantageous and advantageous groups. Independent variables for decomposition analysis included age of the respondent, years of schooling of the respondent, economic status (poor/non-poor), following Muslim religion (Muslim/Non-Muslim), belong to Scheduled Caste-Scheduled Tribes (SCs-STs/Others), hail from rural areas (rural/urban), did not work in the last 12 months (worked/did not work), never attended family life/sex education (did not attend/attend), not aware about RTI/STI (unaware/aware), and unavailability of toilet facility (available/unavailable). Age and years of education of unmarried women were kept as continuous variables.

An index of economic status was computed using household amenities, assets and consumer durables. The principle of factor loading to amenities, assets and durables derived by factor analysis was used for the computation of wealth index. Households were categorized from the poorest to the richest groups corresponding to the lowest to the highest quintiles at the national level. The procedure to calculate wealth index was similar to the one followed in Demographic Health Surveys (Rutstein & Johnson, 2004). The wealth quintile distribution was used to determine poor and rich

households and in the estimation of socio-economic inequalities in terms of concentration indices (CIs) for further modelling. The bottom two quintiles, i.e., poorest and poor were grouped as poor or economically poor and the top three quintiles, i.e., richest, rich and middle were grouped as non-poor. The selection of independent variables was determined from the existing literature (Anand, Singh, & Unisa, 2015b; Anand, Unisa, & Singh, 2015a; Juyal et al., 2012; Mudey et al., 2010).

Statistical analysis

The concentration index quantifies the degree of socio-economic related inequality in a health (or other) variable of interest. It has been used extensively in previous studies to measure and to compare the degree of socio-economic inequality in child health (Arokiasamy, Jain, Goli, & Pradhan, 2013) and survival (Pradhan & Arokiasamy, 2010), malnutrition (Wagstaff & Watanabe, 1999), adult health (Hosseinpoor et al., 2006; Lawes, Hoorn, & Rodgers, 2008), maternal and child health utilization (Chalasani, 2012) contraceptive use (Creanga, Gillespie, Karklins, & Tsui, 2011) health care utilization (Hosseinpoor et al., 2006; Van Doorslaer et al., 2000) etc. In this paper, we have used the concentration index (O'Donnell & Doorslaer, 2008) to measure socio-economic inequalities in the use of sanitary napkins among the adolescent and young women. The index value varies between -1 to +1. A concentration index of 0 indicates no income inequality, while more the index deviates from 0, the greater the magnitude of the wealth-related inequality. The larger the absolute value of concentration index, the more pronounced the inequality is. A negative concentration index indicates that the favourable condition or the use of a sanitary napkin is concentrated among the poor, while a positive index suggests a favourable condition, i.e., the use of a sanitary napkin is concentrated among the rich.

The concentration index can be defined in terms of covariance between the health variable and the fractional rank in the living standards distribution. (O'Donnell & Doorslaer, 2008).

$$C = \frac{2}{\mu} \text{cov} (h,r) \quad (1.1)$$

Where h is the health (or other) variable of interest, i.e., sanitary napkin use by the i^{th} individual, r is the fractional rank in terms of household economic status and μ is the mean of the health utilization variable and cov denotes the covariance.

Inequalities across the income distribution or socio-economic status in a variable y can be decomposed into their causes (Wagstaff, van Doorslaer, & Watanabe, 2003). We have used the method proposed by Wagstaff et al. (2003) to decompose socio-economic inequalities (computed as concentration indices) in the use of sanitary napkins by unmarried adolescent and young women into its determinants. A decomposition analysis allows one to estimate the contribution of individual factors to income related inequality (i.e., the gap between poor and rich) in a health variable in which each contribution is the product of sensitivity of health with respect to that factor and the degree of income-related inequality in that factor.

For any linear additive regression model of health (y), such as

$$y = \alpha + \sum_k \beta_k x_k + \varepsilon, \quad (1.2)$$

The concentration index for y, C, can be written as follows:

$$C = \sum_k \left(\frac{\beta_k \bar{x}_k}{\mu} \right) C_k + \frac{GC_\varepsilon}{\mu}, \quad (1.3)$$

Where μ is the mean of y, \bar{x}_k is the mean of x_k , C_k is the concentration index for x_k , and β_k is the regression coefficient, and GC_ε is the generalized concentration index for the error term (ε). Equation (1.3) shows that C is made up of two components. The first one is the deterministic or

‘explained’ component. This is equivalent to a weighted sum of the concentration indices of the k regressors where the weight for x_k is the elasticity [An elasticity is a unit-free measure of (partial) association, i.e. the percentage change in the dependent variable (health or health utilization; sanitary napkin use in our study) associated with a percentage change in the explanatory variable] of y with respect to x_k ($\eta_k = \frac{\beta_k \bar{x}_k}{\mu}$). The last component, i.e., residual component reflects the income related inequality in health/health utilization that is not explained by systematic variation in the regressors by income which should approach zero for a well-specified model.

Methodological steps of decomposition

The decomposition analysis is carried out in the following steps:

- a) Computed the coefficients of the explanatory variables (β_k) by regressing the health/utilization variable against its determinants through an appropriate model.
- b) Calculated the mean of health (or other) variable of interest and each of its determinants (μ and \bar{x}_k).
- c) Calculated the concentration indices for the health (or other) variable and for the determinants (C and C_k) using equation (1.1) along with generalized concentration index of error term (GC_ε).
- d) The pure contribution of each predictor is estimated by multiplying the health (or other) variable elasticity with respect to the predictor and its concentration index $\left(\frac{\beta_k \bar{x}_k}{\mu}\right) C_k$.
- e) Percentage contribution of each predictor is calculated by dividing its pure contribution by the concentration index of health variable $\left(\frac{\beta_k \bar{x}_k}{\mu}\right) \frac{C_k}{C}$.

The analysis was performed using STATA (version 13) and ADePT (version 5.0) of World Bank.

III. Results

Prevalence of sanitary napkin use in the states of India

One-third (32%) of the adolescent and young unmarried women used sanitary napkins during menstruation to absorb menstrual blood in India (Figure 1). Noticeably, all the EAG states excluding Uttarakhand were below the national average in their use. Other states such as Maharashtra, Karnataka, West Bengal, Meghalaya, Gujarat, and Assam were also below the national average in their use. The lowest prevalence in their use amongst others were Chhattisgarh (10%), followed by Bihar (14%) and Orissa (15%). The states where the majority of the adolescent and young unmarried women used them were Mizoram (87%), Arunachal Pradesh (75%), Sikkim (61%), Kerala (61%), Goa (57%) and Tamil Nadu (53%). On the other hand, their use was between 40 to 50 per cent in Himachal Pradesh, Uttarakhand, Punjab, Haryana and Jammu & Kashmir.

Socio-economic inequalities in the use of sanitary napkins

Concentration index value showing inequality in their use at all India level is positive (0.363), indicating the concentration of their use among the rich (Figure 2). When we calculated the CI for the selected high-focus states, somewhat similar result emerged. The CI value was remarkably higher in the EAG states and Assam with the exception of Uttarakhand. Among the EAG states, the value of CI was the highest in Chhattisgarh (0.692) followed by Orissa (0.595), Jharkhand (0.571), Bihar (0.568), Uttar Pradesh (0.536), Madhya Pradesh (0.535), Assam (0.510) and Rajasthan (0.442). The higher values of CI in EAG states suggest a greater concentration of their use among the socio-economically well-off stratum in the society.

Figure 1: Utilization of sanitary napkins by adolescent and young unmarried women in India and States, DLHS (2007-08)

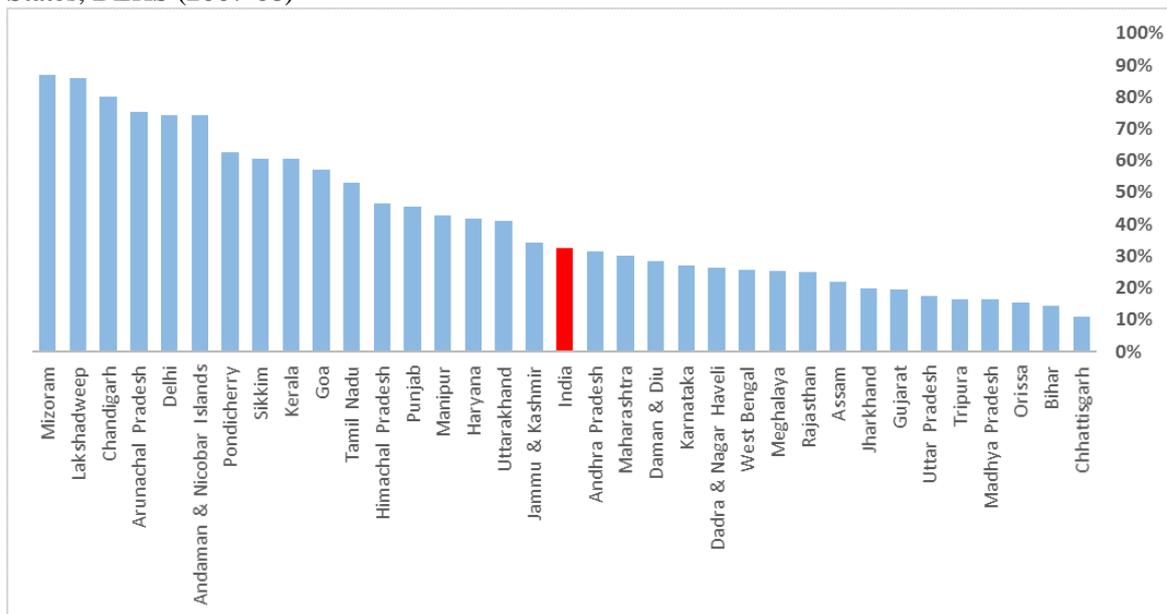
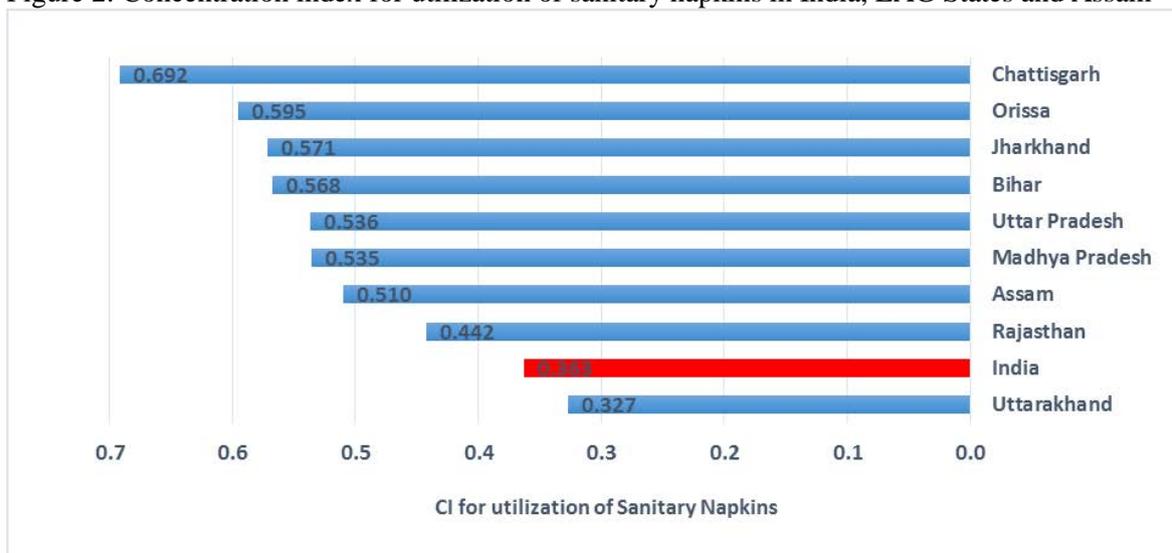


Figure 2: Concentration index for utilization of sanitary napkins in India, EAG States and Assam



Decomposition analysis

Results of concentration indices highlighted the magnitude of concentration of sanitary napkin use among the richer stratum of the study population. However, the concentration indices do not explain the mechanism and pathways that lead to such high levels of inequalities in the state and national levels. Therefore, in this section, we calculated the major determining factors in the use of sanitary napkins after decomposing the concentration indices.

The results of the decomposition analysis in their use at the national level are presented in Table 1. The model explains a major part of the inequality (0.2260 of 0.2304) in sanitary napkins use with a residual value of 0.0044. In other words, the selected socio-economic determinants explain about 98 per cent of the total socio-economic inequalities at the national level to understand the determining factors contributing to sanitary napkin use. The remaining 2 per cent constitute the unexplained residual component. The results illustrate the relative contributions of the selected socio-economic determinants by taking the total explained component as 100 per cent. At the all India

level, unavailability of a toilet (43%) emerged as the largest contributor to the socio-economic inequalities in the use of sanitary napkins, followed by years of schooling (27%) and the rural residence of the adolescent and young unmarried women (20%).

Table 1: Contribution of various socio-economic co-variates total inequality in utilization of sanitary napkins for India, DLHS, 2007-08

| Determinants | Elasticity | Concentration Index | Contribution to CI | Per cent Contribution |
|---|------------|---------------------|--------------------|-----------------------|
| Age | 0.1339 | 0.0148 | 0.0020 | 0.87 |
| Years of schooling | 0.7179 | 0.0847 | 0.0608 | 26.92 |
| Poor economic status | 0.0779 | 0.1498 | 0.0117 | 5.16 |
| Belonging to Muslim religion | 0.1856 | -0.0050 | -0.0009 | -0.41 |
| Belonging to SC/ST caste | -0.1092 | 0.0968 | -0.0106 | -4.68 |
| Belonging to rural areas | 0.1385 | 0.3214 | 0.0445 | 19.70 |
| Not worked in last 12 months | -0.0038 | -0.3199 | 0.0012 | 0.54 |
| Did not receive family life/sex education | 0.0914 | 0.1129 | 0.0103 | 4.57 |
| Unaware about RTI/STI | 0.0661 | 0.1508 | 0.0100 | 4.41 |
| Unavailability of toilet | 0.4210 | 0.2304 | 0.0970 | 42.91 |
| | | | 0.2260 | 100.00 |

Table 2 provides the results of decomposition analysis of socio-economic inequalities in sanitary napkins use by EAG states and Assam. The results suggest that the contribution of unavailability of toilet in the households was more than 40 per cent in Chhattisgarh (50%), Uttar Pradesh (46%) and Orissa (42%); 20-40 per cent in Madhya Pradesh (36%), Jharkhand (32%), Bihar (31%), Rajasthan (28%) and Uttarakhand (24%). The number of years of schooling was another important contributor in the use of sanitary napkins: Madhya Pradesh (42%), Uttarakhand (37%), Rajasthan (35%), Bihar and Uttar Pradesh (25%). Place of residence was the third most pertinent contributor to the total inequality in the use of sanitary napkins; place of residence showed the highest contribution in the state of Assam (47%). This state follows a unique pattern as compared with the EAG states and at the national level. There 70 per cent of the inequality is attributable to the residential status and economic status of the household of the unmarried adolescent and young women.

Table 2: Contribution of various socio-economic covariates in utilization of sanitary napkins in India and EAG states, 2007-08

| Determinants | India | MP | AS | BH | CG | JH | OR | RJ | UP | UK |
|--------------------------------------|-------|------|------|------|------|------|------|------|------|------|
| Age | 0.9 | -0.5 | 1.2 | 6.5 | 3.5 | 1.4 | -0.2 | 0.3 | 2.9 | -2.0 |
| Years of schooling | 26.9 | 42.2 | 10.0 | 24.4 | 15.4 | 22.7 | 23.8 | 35.4 | 25.2 | 37.5 |
| Poor economic status | 5.2 | 2.0 | 21.7 | 9.2 | -0.7 | 10.3 | 12.4 | 2.4 | 1.2 | 1.8 |
| Belonging to Muslim religion | -0.4 | -0.4 | 2.3 | 0.7 | 0.6 | -1.5 | -0.4 | -0.2 | -2.5 | -2.1 |
| Belonging to SC/ST caste | -4.7 | 1.6 | 0.0 | -0.7 | 2.6 | 2.3 | 3.3 | 2.0 | 1.8 | 1.3 |
| Belonging to rural areas | 19.7 | 15.4 | 46.5 | 24.9 | 27.0 | 28.7 | 14.1 | 28.1 | 19.0 | 32.5 |
| Not worked in last 12 months | 0.5 | -0.1 | 0.0 | -0.1 | -1.5 | 0.0 | -0.7 | 0.2 | 0.6 | 0.8 |
| Did not receive family life/sex edn. | 4.6 | 2.3 | 7.3 | 2.4 | 2.5 | 2.2 | 3.8 | 0.7 | 3.3 | 2.6 |
| Unaware about RTI/STI | 4.4 | 1.4 | 2.3 | 2.1 | 1.1 | 1.7 | 1.9 | 2.9 | 2.6 | 3.6 |
| Unavailability of toilet | 42.9 | 36.1 | 8.6 | 30.5 | 49.5 | 32.0 | 41.9 | 28.3 | 45.9 | 24.1 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

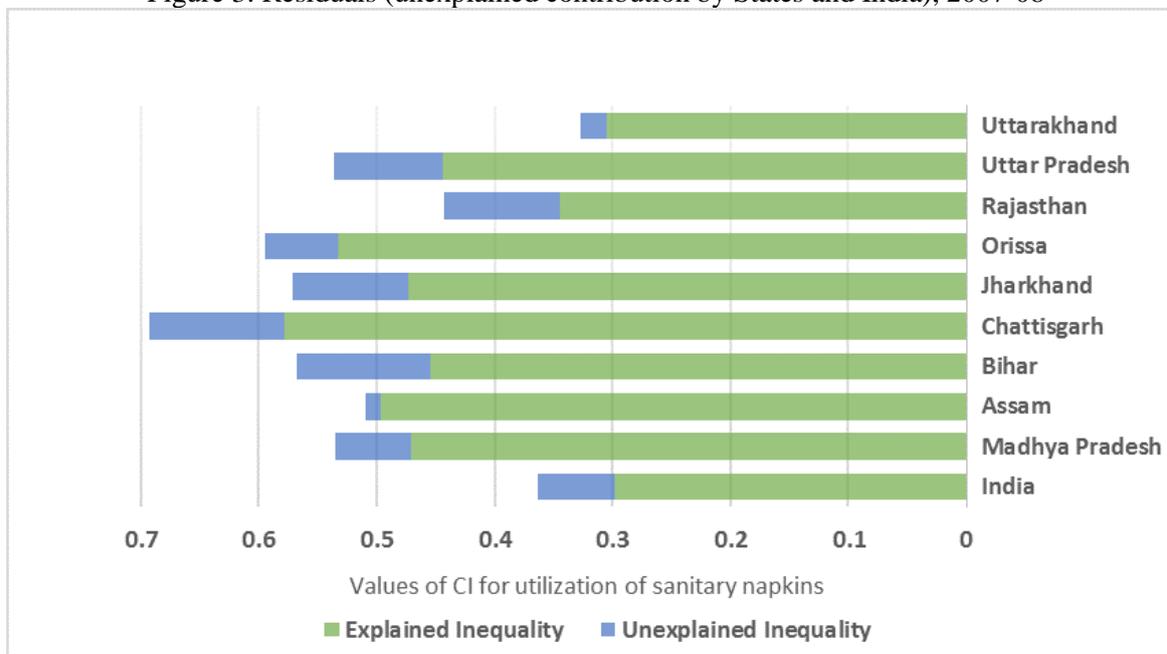
Note: MP: Madhya Pradesh; AS: Assam; BH: Bihar; CH: CG; JH: Jharkhand; OR: Orissa; RJ: Rajasthan; UP: Uttar Pradesh; UK: Uttarakhand.

Unexplained residual

Of all the ten socio-economic predictor variables fitted in the model, the unavailability of toilets at the households, less number of years of schooling, and rural residence of the respondents explain the major part of total health inequalities in most of the states (Figure 3). However, in the

case of Chhattisgarh, Bihar, Jharkhand, Rajasthan and Uttar Pradesh, the socio-economic covariates considered did not explain some part of the inequalities in the use of sanitary napkins. The results of these states show slightly higher residual than the national level residual. For example, in Chhattisgarh the total inequality measured in terms of concentration indices was 0.692, of which only 0.5781 was explained by the socio-economic covariates examined, leaving a residual of 0.1137. It implies that there are some other (unexplained) factors which may contribute to the total inequalities in the use of sanitary napkins in these states.

Figure 3: Residuals (unexplained contribution by States and India), 2007-08



VI. Discussion

We examined the widespread socio-economic inequalities in the use of sanitary napkins among the unmarried young women in India. The study also explored the contribution of the major determining factors for the persisting disparities in the use of hygienic methods during menstruation. The primary factors identified as the determinants in the use of hygienic methods included availability of toilet facility at the household level, followed by higher number of years of schooling of the young women, urban residence and rich economic status respectively. A greater concentration in the use of sanitary napkins is observed among the socio-economically well off sections of the society across EAG states and at all-India level. The major factors contributing to the inequality in the use of sanitary napkins slightly varied from state to state. Although the availability of toilet facility at the household was the leading factor contributing to the inequality in the use of sanitary napkins, being a rural resident was the most important factor in Assam and less number of years of schooling in the case of Madhya Pradesh, Uttarakhand and Rajasthan.

The Census of India 2011 revealed Chhattisgarh, Bihar and Odisha as some of the states palpably lacking toilet facilities in the household. Congruently, women in these three states have the lowest use of hygienic methods demonstrating a possible relation between having a toilet in the household and the use of hygienic method. Studies have suggested that lack of WASH (water, sanitation and hygiene) facilities in the school was one of the main reasons for dropouts among adolescent menstruating girls in resource scarce settings (Mahon & Fernandes, 2010; Sommer, 2010; Sommer et al., 2015). On the other hand, previous studies have also indicated availability and accessibility issues as some of the factors contribute in the use of sanitary napkins. In particular, those who are economically poorer (Anand, Unisa, & Singh, 2015a; Garg, Goyal, & Gupta, 2012) and those residing in rural areas were less likely to use sanitary napkins (Juyal et al., 2012). Similarly,

girls from urban area were better educated about MHM and, therefore, were more likely to use them (Patle & Kubde, 2014). While this paper complements the existing literature on the major determining factors in the use of sanitary napkins among the unmarried young women, it also provides percentage contribution of each of these factors in resource constraints settings in order that health planners are better informed for designing adequate health and development intervention.

Whereas the findings of the study augmented the earlier research and advanced the understanding in the socio-economic inequality in the use of sanitary napkins during menstruation, the results must be interpreted with caution. Often the girls in low-income settings use a mix of both sanitary napkins and clothes. However, we categorized those who used sanitary napkins alone as using hygienic method and those who used both sanitary napkins and clothes as not using hygienic method. The users of both clothes and sanitary napkins may be from a varied socio-economic background. Research on the users of both methods may be useful in understanding MHM among them. Moreover, there may have been different results observed had they (those using both clothes and sanitary napkins) been categorized as using sanitary napkins. Secondly, those using clothes may not necessarily be vulnerable to adverse health outcome if the cloth is properly washed with disinfected solution and dried in the sunlight. However, the survey data did not provide information on how the clothes were washed, nor the number of times the girls changed menstrual absorbent. Therefore, we categorized the use of both sanitary napkins and clothes simultaneously as not using hygienic method. Thirdly, the inequality in the use of sanitary napkins may vary in different cultural contexts. This paper fails to address the inequality by cultural differences. In-depth qualitative exploration may be useful to understand the determinants of the use of sanitary napkins, apart from the ones experimented in this study- it would help in understating the unexplained residuals in the model. Lastly, the findings of the study pertain to unmarried young women and hence cannot be generalized to other groups of women.

MHM is a global public health concern with strong linkages to the sustainable development goals number three (good health and wellbeing), four (quality education), five (gender equality), and six (clean water and sanitation). However, MHM remains a neglected priority in most of the resource poor settings such as India. The provision of providing subsidised sanitary napkins under the scheme *Rashtriya Kishor Swasthya Karyakram* in India is a welcome step. However, without addressing the provision of toilet facility at the household level, it is not likely to deliver the desired outcome. This study calls for a reconsideration in designing menstrual health interventions taking into account the necessity of the basic public health components such as water and sanitation facility at the household level. Toilets with running water facility ensure two critical aspects of menstrual hygiene management. Privacy in the toilet reassures a girl that she is not being watched by others while she is wearing or changing a sanitary napkin or a piece of cloth, and hence eliminating all possible apprehension of shame and stigma. Second, she will be able to wash the blood stains and clean her genitalia while changing a sanitary napkin or a piece of cloth comfortably in the closed doors. Space for personal hygiene at the household level can protect women from infections as well (Das et al., 2015). Therefore, maintaining a safe and hygienic menstruation can be ensured with the availability of a toilet and water facility that can enhance privacy. In the last few years, the construction of toilets under *Swachh Bharat Mission* in India has reached a record high. However, construction of toilets alone would not suffice, the Mission needs to make sure availability of water supply so that the toilets are used for the intended purposes.

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