# Menstrual Hygiene Management and Gender-Responsive Sanitation System Design

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## 1. Introduction and Purpose

Globally over 2.4 billion people lack access to improved sanitation and over half of these are women.[1] Over the course of their lives, women and girls spend 6-7 years menstruating, a time of increased vulnerability and heightened need for appropriate WASH services beyond the daily sanitation challenges they face.[3, 4] Sanitation environments and facilities that facilitate hygienic, convenient, and private menstrual hygiene management (MHM) amenities are critical for women and girls to live productive and healthy lives.[2] Due to the heightened need for adequate WASH services to facilitate menstrual hygiene management among women and girls, calls for gender-responsive sanitation design have increased.

Improved understanding about women and girls' menstrual hygiene behaviors and preferences is critical to informing and implementing gender-responsive design that delivers benefits and ensures system adoption and use. Few findings specifically detail the preferences and coping behaviors of women and girls of menstruation age that are key to designing inclusive system design. In this analysis, we examine **two key behaviors related to menstrual hygiene management** that are important to sanitation system design:

- **(1) Factors associated with continued or discontinued use of a sanitation facility during menstruation, and**
- **(2) Factors associated with the use of a reusable and disposable menstrual hygiene products.**

Awarded by the Bill & Melinda Gates Foundation's Reinvent The Toilet Challenge, RTI has developed a waste processing system that disinfects liquid waste for reuse as non-potable water. The system operates off-grid and is powered by energy drawn from solid waste combustion.** The ongoing R & D process of the RTI system reflects technical performance improvements, risk mitigation, and recommendations drawn from user adoption-focused data collection. While uncommon in early-stage technology development, importance is given to user-focused data because prevailing evidence suggests that technologies that do not reflect user preferences, beliefs, and attitudes may present significant barriers to adoption downstream. Thus, RTI's user studies seek to identify user preferences and incorporate meaningful findings into the system's design and user interface.

The scant existing literature related to menstrual hygiene focuses on detailing the lack of adequate sanitation for women and girls and populations affected, as well as cultural taboos surrounding menstruation,[3] but these are infrequently incorporated into program WASH promotions, programs, and facility design.[2] Several studies find that preferences of women regarding sanitation facilities change markedly during menstruation, [7, 8, 9] suggesting that availability of disposal options and water for cleaning are important. Further, heightened need for hygiene and privacy during menstruation causes women and girls to discontinue use of specific facilities, contingent upon access and awareness.[6]

Few findings in the literature detail decisions related to menstrual product choice, particularly as it is heavily determined by access and awareness.[9] The extant literature related to preferences includes several experiments of new products introduced to women and girls yet do not detail background characteristics associated with these preferences.[10]

## 2. Data

Data is drawn from RTI's household survey conducted Ahmedabad, India, which sought to understand sanitation behaviors and preferences for incorporation in the R&D of RTI's toilet system. The survey was implemented in 1,213 randomly selected households from 12 slum communities in which RTI's local partner and nongovernmental organization (NGO), Self Employed Women's Association (SEWA), is active. Trained enumerators from SEWA's research staff interviewed the respondents, who were male or female primary household decision makers. The survey covered a range of topics including perceptions of current sanitation, attitudes toward sanitation improvements, and water reuse and menstrual hygiene management (MHM). Questions deemed sensitive, including all questions related to menstrual hygiene and behavior, were delivered to respondents by a same-sex enumerator. RTI designed the survey instrument in collaboration with Mumbai-based Network for Economics, Engineering, Research and Management (NEERMAN), which included content informed by two previous rounds of user-focused data collection.

In our analysis we use a sub-sample of survey respondents restricted to include (1) households with female members of menstruation age (defined as 13-48 years of age if it was reported that there is was a female of menstruation age in the household, and 10-60 years of age otherwise), and (2) who provided information about primary facility use. Using information from the household roster, we analyze results of women of menstruation age individually, a total sample of 2407 women. Individual-level characteristics in the analyses include age, primary facility choice for defecation, urination, and menstruation, and gender, while other indicators are collected at the household and community level.

## 3. Methods

Four distinct sanitation options prevalent in Ahmedabad city are included in this analysis, including (1) open defecation; (2) community toilets, (3) public toilets, and (4) private toilets, which may include a sewered latrine or small drain *mori*. Households could select more than one "primary toilet" if members used both facilities "frequently".

Two menstrual hygiene products were included in the analysis, reusable cloths and disposable menstrual pads, which were most widespread in our sample. Respondents were asked to identify the type of menstrual absorbent product that women in their household used. Thus, in this analysis products are reported at the household level, whereas facility use information is representative of each individual household member.

We model the likelihood of discontinuing use of a primary sanitation facility while menstruating (model I) and use of menstrual products (model II) as a function of characteristics related to the respondent $U$, menstruating women in the household $V$, household $W$, and community characteristics $X$, by primary facility and product type sub-samples. We control for availability and access of multiple primary facilities and disposal options.

In this model *switchfacility* and *menstrual_product_use* are binary indicators for discontinuing use of a primary facility during menstruation, as reported by the survey respondent. Additional covariates include composite indicators for respondent preferences for hygiene, privacy, and convenience. Using logistic regression analysis, we model this relationship as:

$$I. \quad (p)\ switchfacility = f(U, V, W, X)$$

$$II. \quad (p)\ menstrual\_product\_use = f(U, V, W, X)$$

## 4. Results

*Descriptive statistics*. In our sample, private toilets were used most frequently. Disposal options were reported as available at over half of the built facilities used frequently, however acquiring menstrual hygiene products was much less common.

Relative to Census data for urban Gujarat, the RTI sample is generally poorer, less educated and more likely to reside in a scheduled caste majority community (30%). 9% of sample was located in a community that is over 60% Muslim.

| | Open Defecation | Community Toilets | Public Toilets | Private Toilets |
|---|---|---|---|---|
| % of sample relying primarily on facility* | 16.6% | 10.6% | 7.1% | 73.0% |
| % discontinue primary facility use | 11.3% | 5.3% | 7.0% | 3.1% |
| % disposal available | | 64.1% | 74.3% | 54.9% |
| % product available for purchase | | 17.6% | 8.8% | |
| Average cost, per use | Rs. 0 | Rs. 2-3 defecation | Rs. 1-2 defecation | |
| Average Travel Time to Facility (mins) | 7.4 (5.0) | 5.2 (3.4) | 6.5 (4.7) | |
| Average Wait Time at Facility (mins) | | 8.0 (6.9) | 9.3 (11.5) | |
| Access to more than one primary facility | 100% | 29.3% | 26.3% | 9.1% |
| % of sample relying on disposable MHM product | 22.3% | 50.6% | 30.3% | 34.6% |
| % of sample relying on reusable MHM product | 70.1% | 51.4% | 66.1% | 63.6% |

## 4. Results *(continued)*

*Facility switching during menstruation*

- **Women discontinue use of primary sanitation facilities with some regularity during menstruation.**

  While approximately 5% of all women in the sample switched away from a sanitation facility they identified as using frequently, over 11% of OD-reliant households discontinued use. Use of public and community toilets were significantly related to discontinuing use of a primary facility during menstruation.
- **Household wealth/income may act as a barrier for menstruating women in open defecation-reliant households from switching to an alternative facility during menstruation.**
- **When given options, women's likelihood to discontinue use of a primary facility increases. Women in households with multiple primary facilities were most likely to discontinue use of at least one facility during menstruation.**

  Switching to an alternative facility is contingent upon being availability and access to other options; when given facility alternatives that are able to be used frequently, women are likely to use sanitation facility options during menstruation.
- **Heterogeneous drivers of facility use during menstruation persist among different primary facility users and require further study.**

*Menstrual hygiene product use*

- **Reusable cloths were most commonly used; their use is correlated with low-income households and individuals using sanitation facilities where water access is not available.**

  Over 60% of the sample used reusable cloths as a menstrual absorbent and 32% relied on disposable pads.
- **Disposal availability at facilities plays an important role in determining product use.**

  When disposal options are available at a facility, disposable products are more likely to be used by menstruating women.
- **Menstruating women of older ages are more likely to use reusable cloths than disposable products when no disposal is available.**

  Younger women are more likely to use disposable products, even when no disposal option is available.
- **Low-income households are significantly more likely to use reusable products when disposal options are not available.**

  When the benefits of convenient disposal are not able to be realized, low-income households are less likely to spend resources on disposable products.
- **Convenience-seekers are less likely to use reusable products, particularly, when disposal options are available.**

  Convenience benefits of disposable goods are more pronounced if disposal is available; further, when disposal is available, women with high convenience preferences are able to select a less time-intensive menstrual product option.

## 5. Discussion and Technical Recommendations

Findings from RTI's descriptive analyses identify broader lessons, as well as important technical additions to the RTI system's R & D process. First, **giving more resources** – in terms of disposal options or accessible facilities – may deliver important alternatives for women to follow preferences related to facility and product choice. Second, the importance of **keeping costs low** for both facilities and products becomes clear, as income/wealth can act as a barrier to menstrual hygiene alternatives. Third, **considerable heterogeneity among menstruating women exists** and the range of outcomes from sub-sample analyses suggest that different facilities and their attributes may warrant a different set of motivations for the menstruating women who use them.

**These findings confirm the importance of incorporating multiple, gender-specific amenities in the RTI Reinvented Toilet design.** More specifically, they motivate the continued inclusion of a **menstrual product disposal amenity** within the system that ensures convenience, hygiene and privacy for women. Further, the **system should be prepared to process multiple types of menstrual products** – reusable and disposable – to be cleaned and disposed of within the unit; care to make these activities remain hygienic, private, and convenient is critical.

## References

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4. Rourtray, Schmidt and Jenkins (2015)
5. Hyatt, L. "Menstruation Matters: How Periods are Keeping Girls out of Schools" (2014)
6. Rajmaran, Travasso, and Heymann, "A qualitative study of access to santation among low-income women in Bangalore, India" (2013)
7. Mason, L, "Adolescent schoolgirls' experiences of menstrual cups and padsin rural western Kenya: a qualitative study", 2015

| Sub-sample | OD | Community toilets | Public toilets | Private toilets | Full sample | Disposal | | No disposal | | Full sample | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Discontinue use of facility* | | | | | *Use of menstrual hygiene product* | | | | | |
| ***not all covariates represented**** | | | | | | *Reusable* | *Disposable* | *Reusable* | *Disposable* | *Reusable* | *Disposable* |
| Female respondent | -0.924** | 1.018 | -25.03*** | -0.801* | -0.525* | 0.294 | -0.215 | 0.505 | 0.673** | 0.364** | 0.143 |
| Large number of household members | 0.117 | 1.474 | 28.01*** | -0.315 | -0.00601 | -0.284 | 0.107 | 0.428 | -0.446** | 0.0472 | -0.111 |
| Menst. women: age (25-35) | 0.129 | -0.347** | -1.008*** | 0.230 | -0.0251 | 0.0572 | 0.105 | 1.368*** | -1.843*** | 0.593 | -0.516 |
| Menst women: age (35-48) | 0.243 | -0.108 | 0.196 | 0.231 | 0.101 | 0.331 | 0.0144 | 3.118*** | -3.736*** | 1.370 | -1.063 |
| Multiple primary facilities | 0.863** | -0.0430 | 21.55*** | 6.307*** | 2.159*** | 0.211 | -0.283 | 0.238 | 0.451 | 0.339 | -0.0585 |
| Household income (log) | | | | | | -0.198 | 0.0148 | -0.372* | 0.0426 | -0.297*** | 0.0321 |
| Asset count | 0.138* | 0.0586 | 0.299 | -0.122* | -0.0247 | | | | | | |
| Convenience-seeker | -0.531 | -1.805 | 4.152 | 0.348 | -0.266 | -1.185*** | 1.529*** | 0.331 | -0.0902 | -0.619*** | 0.955*** |
| Hygiene-seeker | 1.371** | -7.685** | 3.925*** | 1.890** | 0.151 | -0.479 | 0.491 | 0.166 | -0.168 | -0.211 | 0.174 |
| Privacy-seeker | 0.472 | 3.754** | -24.66*** | -1.757** | -0.459 | -0.00721 | 0.128 | -0.0280 | -0.260 | -0.160 | 0.140 |
| Water access | | | | | | -0.449** | 0.331 | -0.147 | 0.0771 | -0.387* | 0.284 |
| Primary: OD | | | | | 1.120 | | | | | | |
| Primary: Comm. | | | | | 1.240** | | | | | | |
| Primary: Public | | | | | 2.190** | | | | | | |
| Disposal available | | | | | -1.242*** | | | | | 0.171 | 0.370** |
| N | 339 | 210 | 131 | 1,387 | 1,756 | 1,038 | | 729 | | 1,767 | |