

Psychosocial stress associated with sanitation practices: experiences of women in a rural community in India

Siddhivinayak Hirve, Pallavi Lele, Neisha Sundaram, Uddhavi Chavan, Mitchell Weiss, Peter Steinmann and Sanjay Juvekar

ABSTRACT

This study examined sources of psychosocial stress related to the use of toilet facilities or open defecation by women and adolescent girls at home, public places, workplaces and in schools in a rural community in Pune, India. The mixed methods approach included focus group discussions among women, key informant interviews, free listing and a community survey of 306 women. Nine per cent of the study households and most seasonal migrant women workers lacked access to toilets. Fear for personal safety, injury or accidents, lack of cleanliness, indignity, shame and embarrassment due to a lack of privacy were significant sources of stress related to open defecation. Seasonal migrant women workers perceived the lack of privacy as a significant source of psychosocial stress but did not fear for their personal safety or injuries, despite their general lack of access to toilet facilities. Women resorting to open defecation feel stressed and harassed by community leaders trying to enforce open defecation-free policies. Our study highlights the need for sanitation programs to consider the specific needs of women with regard to latrine maintenance, safety and privacy offered by sanitation installations. Specific strategies to address the sanitation and hygiene issues of seasonal migrant populations are also required.

Key words | hygiene, India, psychosocial stress, sanitation, toilets, WASH

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INTRODUCTION

The lack of basic sanitation is a reality for a large proportion of the population in low- and middle-income countries, and is a particular concern for women and girls without access to these essential facilities. India was a signatory to the Colombo Declaration in 2011 that acknowledged the crisis in the sanitation situation in South Asia, recognized the potential of sanitation to empower communities and renewed commitment to deliver sustainable sanitation and hygiene for all (Narayanan *et al.* 2012). India has made slow progress toward attaining target 7c of the millennium development goals (MDGs), with 47% of all households having access to latrines in 2011, up 11% since 2001 (Government of India 2011; WHO & UNICEF 2014). Since 1986, the Central Rural Sanitation Program has focused on latrine construction as a strategy to end the practice of open defecation. In 1999, the Total Sanitation Campaign

expanded the concept of sanitation to include personal hygiene, home sanitation, safe water, excreta disposal and waste water disposal. It adopted a 'demand-driven' approach that focuses more on latrine use than latrine construction (Ministry of Rural Development 2007). The Nirmal Bharat Abhiyan (Clean India Campaign) that replaced the Total Sanitation Campaign in 2012 emphasizes recognition of communities through incentives and awards to motivate sanitation behavior change (Ministry of Drinking Water & Sanitation 2012). The Saint Gadgebaba Gram Swachata Abhiyan (Clean Village Campaign) named after a 19th century local folk hero, launched by Maharashtra State in 2000, was a community led campaign to create awareness, demand for sanitation and encourage toilet use through behavior change. Instead of providing household level subsidies for building toilets, the campaign recognizes

communities with awards (Chandran 2008). Despite these high-profile programs, inequities in coverage and regional disparities mean that a significant fraction of the population, especially in slums and rural areas, continue to resort to open defecation (Barnard *et al.* 2013). A mere 10% of India's 240,000 villages are open-defecation-free (Das & Mistri 2013). Sanitation conditions are even worse in congested urban slums where more than a third of India's urban population reside (WaterAid India 2008; Ministry of Statistics & Programme Implementation 2013). The situation in non-notified slums, which have no legal status, is particularly severe (Subbaraman *et al.* 2012).

The link between water, sanitation and hygiene (WASH), and health, education and socioeconomic development is well-documented. Increased school absenteeism and a higher incidence of diarrhoeal and gastrointestinal diseases resulting in stunted growth and a generally negative impact on health is seen in children attending schools with inadequate sanitation facilities (Jasper *et al.* 2012; Kov *et al.* 2013). A considerable body of research focuses on material needs for latrine construction, engineering challenges, economic constraints and health and environmental issues while the impact of gender and sociocultural norms on community sanitation behavior is comparatively neglected (Mehrotra & Patnaik 2008). India's effort to accelerate sanitation coverage has been documented periodically by national and international development agencies in reports and peer-reviewed publications (Ganguly 2008; Pardeshi *et al.* 2008; Barnard *et al.* 2013; Patil *et al.* 2014), but social aspects are seldom addressed. A case study of the Total Sanitation Campaign in a district in Haryana in India found that the absence of toilets cannot be attributed to economic constraints but rather to a lack of awareness about the benefits of sanitation and insufficient social acceptability of accessing toilets within households (Gupta & Pal 2008). Even fewer studies attempt to understand traditional barriers to sanitation that are based on cultural concepts of cleanliness, purity and pollution (Reddy & Snehalatha 2011).

In India, a mere physical separation of toilets for men and women may not address women's sanitation-related needs that are deeply embedded within gender-specific cultural values of dignity and shame. It is now increasingly recognized that gender-responsive sanitation does not mean only 'separate toilets for women' that respond to

women's physiological need to relieve themselves but should also respect the integrity, dignity and status of women in the process (Tilley *et al.* 2013). The link between inadequate sanitation and violence against women has also seldom been explored (Abrahams *et al.* 2006; Amnesty International 2010).

Equally important as the physical health impact of sanitation are the mental and social health consequences of the various forms of emotional stress resulting from limited access to sanitation facilities, whether at home, at the workplace, in schools, when traveling or during long visits to public places such as markets. Cultural values resulting in gender inequity make women particularly vulnerable even where toilet facilities are available, and further amplify the stress arising from limited sanitation. Women who practice open defecation are likely to face higher levels of psychosocial stress compared to those with access to latrines as a result of deeply ingrained feelings of shame and indignity related to nudity and defecation. For open defecation, women often have to wait till dark or rise early, confront the fear of physical and sexual harassment and relieve themselves in haste (Bapat & Agarwal 2003). The link between sanitation and psychosocial stress is not well-studied, however. Does lack of access to toilets influence feelings of indignity, shame and embarrassment? Does the fear for personal insecurity, injury or safety induce stress when women defecate in open fields? Does the threat of societal punitive action compound the stress associated with lack of access to toilet facilities? These questions provided the analytic framework for this study (Figure 1). We aim to examine the

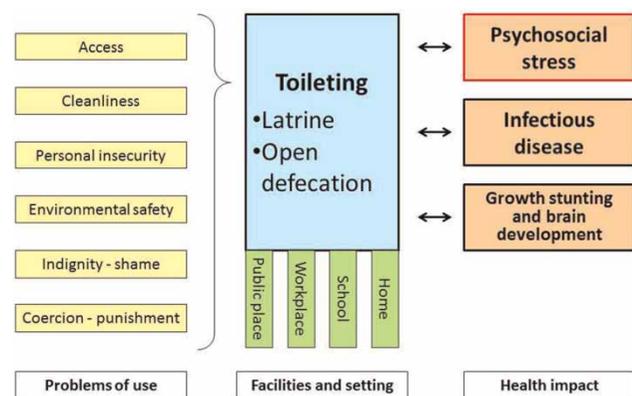


Figure 1 | Conceptual model for sanitation in different settings, problems of use and health impact.

sources and extent of psychosocial stress related to latrine use or open defecation by women and adolescent girls at home, workplace or school and public places in a rural community in Western India.

METHODS

Study setting

Vadu is located 30 km north-east of Pune city in Maharashtra state in Western India. It is a well-defined rural area of more than 100,000 people residing in 22 villages who have been monitored under the aegis of the Vadu Health and Demographic Surveillance System (HDSS) since 2002. Vadu receives seasonal rains and has a predominantly agrarian economy. A state highway passes through the area and the four villages situated along the highway have seen rapid industrialization, urbanization and in-migration from other rural areas. Health facilities include one rural hospital in the non-government sector, one rural hospital and several health centers in the public sector and more than 30 small general and maternity hospitals in the private sector. The area is served by a weekly market at two villages along the highway.

Study design and data collection tools

The study used a cross-sectional design with a mixed methods approach that included a community survey, focus group discussions (FGD), key-informant interviews (KII) and free listing exercise. For the survey, a simple age-stratified random sample of 470 women was generated from the HDSS database, that included a total of 26,185 resident women, to achieve an evaluable sample size of 150 adolescent girls (13–17 years) and 150 women (18–35 years). A structured and pre-tested survey questionnaire was administered at the respondents' homes to collect information on access, availability and adequacy of WASH-related resources. Various psychosocial stressors related to latrine use or open defecation were also investigated. Psychosocial stress was assessed with questions on concerns for personal security, injury, cleanliness and privacy, perceived indignity, shame or embarrassment and

acceptability of available toilet facilities or open defecation sites. Individuals were asked to rate their feelings related to using toilet facilities or open defecation on a four-point Likert scale. These perceptions and feelings were further explored through seven FGDs (three among adolescent girls and two each among young adult women and elderly women residing in the study area). Two FGDs conducted among seasonal migrant workers provided information on sanitation-related stress faced by this population. Each FGD comprised eight to nine participants. Psychosocial stress was inferred from negative emotions evoked when women talked about challenges related to latrine use or open defecation in the domains of convenience, access, perceived personal security, environmental safety, etc. A community perspective was sought through KIIs with 10 local leaders and village council members (Gram Panchayat), 6 school teachers and 5 health care staff including health workers, doctors and accredited social health activists. The free listing exercise was used to define a woman's perception of a 'good' toilet based on a convenience sample of 25 women and 25 adolescent girls independent of the survey and FGD and KII participants.

Data management, quality control and analysis

The responses to the community survey questionnaire were captured directly in an electronic form on laptop computers. Appropriate consistency checks, range checks and skips minimized the scope for data entry errors. The survey data were analyzed in STATA v11. Difference in means and frequencies of psychosocial stressors between women who used latrines and those practicing open defecation were tested using a Student's *t*-test and chi square test.

All FGDs and KIIs were audio recorded, transcribed in Marathi, the local language, translated into English and coded using the MaxQDA software. Ten per cent of all transcripts as well as all translations were verified for completeness and accuracy by a social scientist. We defined qualitative codes that captured six major psychosocial stressors related to latrine use or open defecation, viz. personal insecurity, environmental safety, access, feelings, cleanliness, and coercion/punishment. The code 'personal insecurity' captured all direct or indirect references to perception of threat or actual experiences of physical

violence, or mental and sexual harassment faced by women while using latrines or practicing open defecation. The code 'environmental safety' captured the fear of personal injury due to snake or scorpion bites, animal attacks, thorn injuries, etc., related to toilet use. The code 'access' captured references to obstacles that prevented access such as toilet use only in darkness, long waiting times for toilets to be free, locked toilets, toilets too far away, etc. The code 'feelings' captured emotions such as shame, indignity, embarrassment, disgust, etc., that a woman perceived due to insufficient privacy, safety, cleanliness, etc., during toilet use. The code 'cleanliness' captured all references to the respondent's perception of cleanliness of the toilet or open space. The code 'coercion/punishment' captured all direct and indirect references to punitive or coercive measures related to open defecation that were perceived by the respondent. When the domains defined by the codes overlapped, they were assigned multiple codes. Qualitative coding was verified by at least two researchers. Qualitative data were analyzed separately for toilet use at home and when outside at the workplace, in public places (e.g. market place, bus stand) or in school. Findings from different study methods were considered with reference to one another through a process of triangulation.

Data from the free listing exercise were analyzed with the Visual Anthropac software. Smith's salience index was derived from both frequency and order of the item in the free listing (Smith 1993). For a given subject 'S', the percentile rank of an item A was calculated as $\frac{n_s - r_A}{r_A}$, where 'n_s' was the total number of items in the list and 'r_A' was the rank order of item A. The average percentile rank of an item across all lists was the item's gross mean percentile rank - its salience index. The method took into account the open-ended nature of the free listing exercise and incorporated both how often and how early an item occurred in the free listing.

Ethics statement

The study protocol was approved by the Ethics Committee of the King Edward Memorial Hospital Research Center, Pune, India and the Ethics Commission of Basel, Switzerland. Women were enrolled after obtaining written informed consent to participate in the study. For adolescent

girls aged less than 18 years, informed parental consent was obtained in addition to assent.

RESULTS

A total of 308 (66%) women (165 adolescent girls aged 13–17 years; 143 women aged 18–35 years) participated in the survey. The age and education profile of the 162 women who could not be traced was not significantly different from that of those who responded (data not shown). There were no refusals to participate. Two women were excluded from analysis as information on their defecation practice was missing.

Toilets at home

Ninety per cent of women had access to their own private toilets or one that was shared between multiple households. One per cent of women used public toilets whereas 9% of the women practiced open defecation with no significant difference between adolescents (8%) and adult women (10%). There was a significant difference in overall educational attainment between the two groups with those who practiced open defecation being generally less educated. The proportion of farm laborers was significantly higher among open defecators compared to latrine users (25 vs. 18%) but there was no significant difference in age, marital status, family type or size between open defecators and latrine users. A significantly lower proportion of women who engaged in open defecation reported access to a water source within the house or yard compared to latrine users (33 vs. 64%; Table 1). All except two women who used latrines considered them sufficiently clean. In contrast, 67% reported that the defecation site was dirty (Table 2).

The major problems spontaneously reported by women who used latrines were the unavailability of water (14%), inadequate lighting (10%), a long waiting time (4%) and unclean toilets (3%). In contrast, the major problems spontaneously reported by open defecators were uncleanliness (46%), unavailability of water (42%), unsafe feeling (23%) and the long distance to the defecation site (19%). Ninety-four per cent of the latrine users had no concerns with

Table 1 | Individual and household characteristics of women survey respondents from Vadu, India ($n = 306$ community survey respondents)

	Overall ($n = 306$)	Open defecators (A) ($n = 28$)	Latrine users (B) ($n = 278$)	Difference A and B, p -value
Mean age in years (SD)				
Adolescent girls	14.9 (1.5)	15.3 (1.6)	14.9 (1.5)	0.318
Adult women	30.0 (6.8)	31.7 (7.9)	29.9 (6.6)	0.336
Women (%) with				
No education	5%	14%	4%	0.050
Primary education	55%	54%	56%	
Secondary and higher education	40%	32%	40%	
Women (%) from joint family	47%	46%	47%	0.989
Marital status (%) of women				
Never married	52%	50%	53%	0.940
Currently married	47%	50%	46%	
Mean family size (SD)	5.6 (2.6)	5.9 (2.7)	5.6 (2.5)	0.556
Household head occupation (%)				
Cultivator	51%	43%	51%	0.387
Farm laborer	4%	25%	18%	0.000
Service/worker	38%	18%	40%	0.022
Households (%) with				
Public water source	43%	43%	43%	0.975
Shared water source	24%	32%	23%	0.302
Private water source	32%	21%	33%	0.208
Households (%) with water source				
Within house	17%	4%	19%	0.044
Within yard	44%	29%	45%	0.089
Outside yard	39%	68%	36%	0.001

regard to personal safety when using latrines but among open defecators, 36% were afraid of accidents, injury, snake bites or animal attacks and 5% feared mental or sexual harassment (Table 2). Women rated cleanliness and availability of water (salience of 0.581 and 0.542, respectively, as estimated from the free listing exercise; Table 3) as important features of a 'good' toilet. Compared to women latrine users, a significantly higher proportion ($p < 0.001$) of open defecators reported feeling worried, rushed, irritated, depressed and tensed (Figure 2).

Sources of stress

Sixty-four per cent of the open defecators reported some level of stress due to a perceived lack of personal safety as a woman compared to 6% of latrine users ($p < 0.001$)

(Figure 3). Many instances were reported in FGDs where women expressed fear or threats to their personal security during open defecation. These fears were related to being verbally, physically or sexually abused or harassed. A village chief (38 years, male) explained, 'Yes, it is a tension (worry). If you sit in the closed toilet then there is no fear but if you sit in an open place then there always remain tension that somebody may watch us'. Fear of snake, scorpion and crab bites during the rainy season, thorn injury, attacks by cattle and accidental falls were articulated by all women in FGDs as worries when going out for open defecation before dawn or after dusk.

Community leaders and teachers indicated that the Gram Panchayats were under intense pressure from the district authorities to ensure that their village was open-defecation-free. Gram Panchayats adopted a mix of coercive

Table 2 | Stressors associated with toilet use or open defecation at home or when in school or at the workplace reported by women in Vadu, India ($n = 306$ community survey respondents)

	Home			School ($n = 127^a$)	Workplace ($n = 56^a$)
	Latrine users ($n = 278$)	Open defecators ($n = 28$)	<i>p</i> -value		
Access					
Within house/school	18%	0%	0.000	6%	9%
Within yard	56%	0%		82%	38%
Outside yard	26%	100%		13%	53%
Water availability	84%	19%	0.000	84%	62%
Cleanliness					
Clean/clean enough	99%	33%	0.000	82%	71%
Unclean/very dirty	1%	67%		18%	29%
Problem with defecation					
Never	95%	29%	0.000	74%	59%
Sometimes	4%	46%		18%	30%
Usually/always	1%	25%		8%	11%
Stressors ^b					
None	76%	38%	0.000	54%	43%
Not clean	3%	46%	0.000	21%	15%
No water available	14%	42%	0.000	14%	22%
Not safe	0%	23%	0.000	0%	7%
Toilet too far	0%	19%	0.000	0%	9%
No lighting	10%	0%	0.000	5%	0%
Long wait	4%	0%	0.295	5%	1%
Locked	1%	0%	0.589	0%	0%
No privacy	0%	0%	0.756	1%	3%
Safety concerns ^c					
None	94%	59%	0.000		
Physical abuse	1%	0%	0.661		
Verbal/sexual abuse	1%	5%	0.247		
Injury, snake bite, etc.	5%	36%	0.000		
Delay relieving oneself					
Never/sometimes	98%	100%	0.594		
Usually/always	2%	0%			

^aIncludes women who engage in open defecation and latrine users.

^bPercentage sums up to more than 100 as multiple responses were allowed.

^cSafety concerns for toilet use at home, workplace or school.

strategies to discourage open defecation and motivational strategies to encourage households to build toilet facilities. Gram Panchayats constituted 'Good morning' committees that went around the village in the early morning to discourage open defecation. Committee members often resorted to insulting, chasing away, and physically or verbally abusing

open defecators as explained by a 32-year-old lady school teacher,

'The head of our school and the teachers participated. There is a Marathi movie "Yedyanchi Jatra" which has a scene where people squat for open defecation and the

Table 3 | Features of a 'good' toilet (sorted by importance) as identified by women in the free listing exercise, Vadu, India ($n = 49$ respondents)

Item	Frequency (%) ^a	Average rank ^b	Smith's salience index ^c
Clean	72.9	1.83	0.581
Water available	75	2.06	0.542
Toilet cleaning materials available	29.2	3.29	0.151
Tiles fitted	20.8	2.5	0.15
Cannot say (have no toilet)	14.6	1	0.146
Toilet lighted/electricity	31.3	3.8	0.131
Easy access	12.5	3	0.066
Toilet outside house	6.3	2.67	0.045
Functional door	8.3	3.5	0.039
Good condition	6.3	3	0.038
Independent/separate	4.2	1.5	0.037
Ventilation	8.3	5	0.036
Proper drainage	6.3	4	0.034
No fear of safety	6.3	2.67	0.031
Clean safe surrounding	6.3	4.33	0.026
Privacy	2.1	1	0.021
Spacious	2.1	2	0.018
Adequate number available	4.2	3.5	0.016
Western type toilet (for elderly)	2.1	3	0.01
Gender separated toilet	2.1	4	0.008
Away from kitchen	2.1	5	0.007
Septic tank cleaned on time	2.1	4	0.005
Both Indian and western type available	2.1	5	0.004
Place to wash hands available	2.1	5	0.004
Dustbin available	2.1	7	0.003
Indian type toilet	2.1	7	0.003

^aProportion of the free listing on which this item appears expressed as a percentage.

^bAverage rank or position of the item on the list.

^cSmith's salience index ranges from 0 to 1 (higher values indicate greater importance of the item).

owner of the farm throws stone at them and ask those people not to sit there. We did the same thing (throw stones and chase away people who came for open defecation). I was not there but the teachers at that time did this.

At 4 o'clock in the morning the school head and teachers remained present and they had stopped people from open defecation and given punishments'.

This fear of punitive action (fines and social humiliation) contributed to the stress of women who did not have access to toilets.

'People go to the bank of the river for open defecation. This was controlled by the Good morning committee. People are scared of them and two of them died (accidental fall, drowning while being chased) because they used to go for open defecation' (Female health worker, 42-year old).

Forty-four per cent of the open defecators reported some level of stress due to a lack of privacy compared to 3% of the latrine users ($p < 0.001$) (Figure 3). During FGDs women expressed indignity over having to hasten or even suppress defecation and stand up when people or vehicles approached. Such shame, embarrassment and stress were also felt when carrying a water tumbler in the hand on the way to the toilet. Some women also felt embarrassed and awkward to go to their own private toilet in the presence of family elders. Sanitation-related stress had increased in recent years due to increased population and the disappearance of isolated open places where women could defecate. A female health worker (42 years) explained, 'They have the problem of finding an unfrequented (adosha) place. Now there are no open spaces remaining (due to increasing population) as there were in the past which is a kind of hassle (kuchambana)'.

Forty-seven per cent of the open defecators reported stress due to insufficient cleanliness compared to 5% of latrine users ($p < 0.001$) (Figure 3). Cleanliness as a source of stress was apparent only in the context of shared or public toilets. An older woman in a FGD remarked, 'It is a shared toilet so there will be problems. Those who have their own toilets don't face any problems'. The rainy season is a particularly difficult time for open defecators. 'In the summer season there are lesser problems than in the rainy season when going out in the open becomes difficult for women. We don't feel like going there, it becomes very filthy' – a young married woman in a FGD.

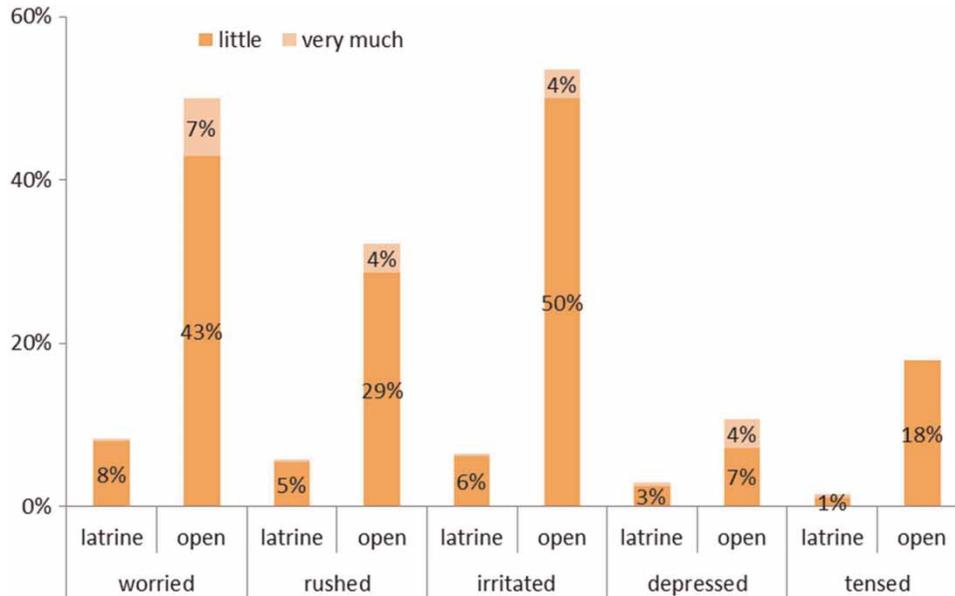


Figure 2 | Reported features of psychosocial stress associated with latrine use or open defecation at home, Vadu, India ($n = 306$ community survey respondents).

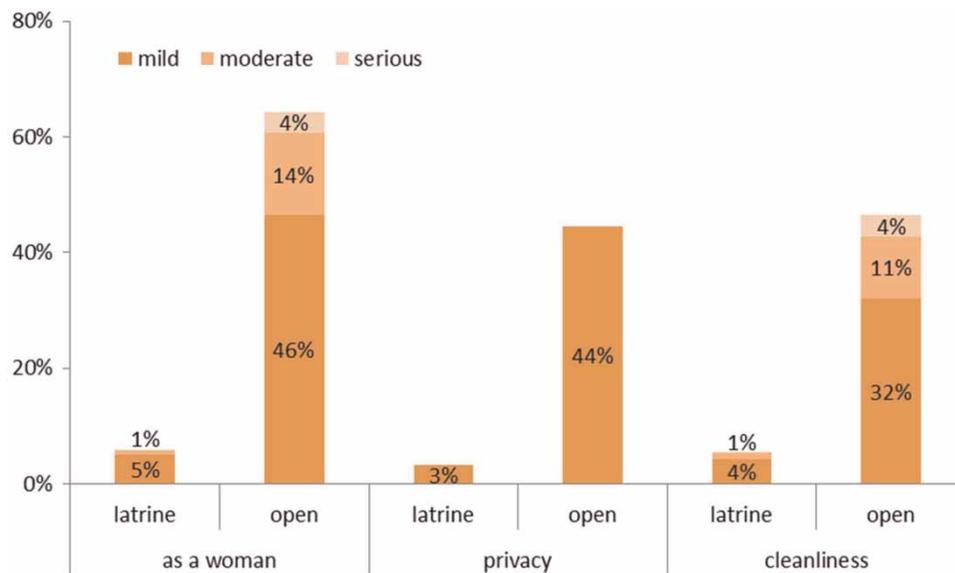


Figure 3 | Sources of psychosocial stress associated with latrine use or open defecation at home, Vadu, India ($n = 306$ community survey respondents).

Toilets at workplace

Sixteen per cent of the women reported open defecation at their workplace. Twenty-nine per cent of the women reported that toilets at their workplace were unclean or dirty with unavailability of water (22%) as the most

common problem (Table 2). Separate toilet facilities for men and women were available at most formal workplaces viz. factories and industries. During FGDs, women did not express any concerns about access, personal security and safety, cleanliness, or any shame, indignity or embarrassment related to toilet use at their workplace.

Seasonal migrant workers – no options

Seasonal migrant workers (sugarcane harvesters and stone quarry workers) set up temporary thatched dwellings in open fields and practice open defecation in the fields nearby. They perceived the risk of snake or scorpion bites as part of their nomadic lifestyle and did not link it specifically to open defecation. They were more stressed by the embarrassment, shame and indignity due to the lack of privacy. They did not express concerns of being harassed as long as they defecated only in the open spaces designated by their contractor. During FGDs, young migrant women workers (18–45 years) expressed a sense of helplessness on their plight as expressed by one of them, ‘If we say “build us bathrooms”, who will build it for us? For survival we have to roam and as there are no facilities available, we have to go out’.

Toilets at schools

Six per cent of the adolescent girls reported they would practice open defecation when at school. About 88% of the girls reported toilet facilities located adjacent to the school and 84% of the girls reported onsite availability of water (Table 2). The most common problem faced by the girls when using toilet facilities at school was insufficient cleanliness (21%) and unavailability of water (14%). During KIIs, all 10 community leaders and 3 of the 6 teachers felt that schools had an adequate number of ‘good’ toilets. Three teachers felt that toilets especially in government schools were poorly maintained and dirty, which discouraged girls from using them, a view shared by all the school-going girls. School toilets for boys and girls were often located in the same structure albeit with separate entrances. Still, girls felt embarrassed to use the toilets due to the presence of boys nearby. One teacher (male, 45 years) acknowledged the potential of mental or verbal abuse that adolescent girls faced at schools that lacked functional toilets,

‘Girls in the age group of 14–17 year have become women at that age. These things are natural but the mentality of people remains different. Because of a lack of toilet facilities these girls might face bad experiences (anuchit). They often have to face this weird mentality (vikrut)’.

This sense of threat to personal security was not apparent during the FGD with girls.

Toilets at public places

In all study villages, public toilets were built and maintained by the Gram Panchayat. It was generally reported in FGDs that many more public toilets were needed, especially at the marketplace and at public bus stands. All respondents felt that public toilets were in a bad condition. They blamed the Gram Panchayat for the poor maintenance and dirty condition of the public toilets though it was also acknowledged in a FGD that the low civic sense of people who used the toilets were equally to blame. Women faced serious problems when they went to the marketplace.

‘If you have visited a market place then you will have realized that women sit there continuously from 7 or 8 o’clock in the morning till 7.30 in the evening. Has anybody thought about them? If there is no facility, then what will women do in such a situation? Has anybody tried to know what they feel at heart and asked them how they manage for such long hours?’ (Female teacher, 32-year old).

DISCUSSION

Research on sanitation driven by strategic interests (e.g. attaining MDGs) tends to focus on the situational status or the evaluation of sanitation strategies and programs. The adverse impact on the social and mental health including various forms of stress that result from limited access to sanitation facilities are neglected considerations in arguing for proper sanitation as a priority agenda for women’s health. This is one of the first studies to examine sources of psychosocial stress related to sanitation faced by women in India. We found that 9% of the households surveyed lacked access to toilet facilities and that a significantly higher proportion of women working on farms practiced open defecation compared to women in service, a difference that was not seen among women cultivators. It was beyond the scope of this study to infer if these differences could be attributed to cultural norms and beliefs or were a

reflection of their socioeconomic status. Similarly, those engaging in open defecation were more likely to have a water source outside the yard (i.e. further away) than latrine users. Further research is needed to examine if difficult or lacking access to water is a reason for not establishing latrines or simply represents the concurrent deficits resulting from poverty and low socioeconomic status. Our study documents a significant burden of stress due to inadequate access to latrines, manifested as fear for personal safety through injury or accidents, physical and sexual abuse, and indignity, shame and embarrassment due to the lack of privacy and cleanliness. These concerns were predominantly associated with open defecation and the use of public toilets. Other forms of stress consequent to improper garbage and waste water disposal and poor menstrual hygiene management are related issues that we examine separately in another paper.

Adolescent girls reported stress if toilet facilities at school were dirty or did not offer privacy. These concerns were not sufficiently addressed by just providing separate toilet facilities for boys and girls as girls felt embarrassed even approaching toilets in full view of boys. Seasonal migrant workers living in temporary dwellings in open fields practiced open defecation as a way of life and did not perceive the lack of latrines as an indignity nor did they fear for their personal safety when going out for open defecation. The main source of stress for seasonal migrant workers was lack of privacy due to vehicular and human traffic.

In a recent survey in five states in the Hindi heartland of India, researchers found that despite having a latrine, 18% of households still had a household member (usually men) who did not use it (Sanitation, Quality, Use, Access and Trends (SQUAT) survey, Research Institute for Compassionate Economics, 2014, unpublished). Despite having a toilet that was built primarily for the daughter-in-law of the house, the men in the household still preferred to defecate in the open considering it to be 'healthier' or due to habit and tradition. The exclusion of men's sanitation preferences and behavior precluded our study to compare and contrast this gender-based preference of toilet behavior in a different cultural setting. Similarly, the extent to which cleanliness, perceptions of personal insecurity, shame, indignity and embarrassment induce sanitation-related stress may vary in different cultural contexts and regions in India.

We did not disaggregate our analysis of sanitation-related stress between adolescents and adult women as there was no significant difference in the sanitation practices between the two groups. It was also beyond the scope of our study to examine clustering of sanitation practices (variability within and between villages). Though not evident from the survey or the FGDs involving adolescent school-going girls, the researchers sensed that girls may often avoid toilets at school and delay relieving themselves till they return home (field notes of FGD moderator). It is also interesting to contrast the differing opinions of cleanliness of school toilets between teachers and community leaders who were responsible for maintaining them and the school-going girls who actually used them. Similarly, some teachers in KIIs expressed concerns regarding threats to the personal security of adolescent girls during toilet use, a concern not voiced by adolescents in FGDs. This could possibly be due to a difference in perceptions or reflect a potential social desirability bias on the part of the girls in not reporting negative aspects of their school. In our study, stress was reported directly or inferred indirectly from self-reported situations or references to negative emotions expressed with terms such as shame, embarrassment, awkwardness, irritation, etc. Therefore, it is possible that some situations were incorrectly identified as stressful or at times inadvertently missed. During qualitative interviews, subtle references that indicated discrimination in the context of hygiene and sanitation by the native population against migrants from socioeconomically weaker population sections were noted. It remains to be examined whether such discrimination further adds to the burden of sanitation-related stress faced by migrants in their daily life.

India's sanitation policies have primarily focused on building latrines, assuming that lack of access is the main problem facing India's poor and rural population. Our study indicates that coercive and punitive strategies to ensure compliance with policies were adopted more often than educational and motivational strategies, an approach that invariably adds to stress and vulnerability of the weaker sections of the society. Our study suggests that providing toilet facilities will not only reduce disease but also reduce the stress associated with open defecation currently faced by women who lack access to proper toilet facilities. Access to proper sanitation services is inextricably linked

to the broader human rights framework – right to health, education and equality. Moreover, a woman's right to equality requires that sanitation be not just sensitive to her biological needs but also tailored to her emotional and psychological needs. Enjoyment or violation of these rights is a sensitive indicator of gender discrimination.

Our study raises several questions that have policy and intervention research implications. Will ensuring adequate water supply overcome cultural, behavioral and other barriers, reduce sanitation-related stress and facilitate toilet access and use? Is partitioning or distancing of school toilets for boys and girls enough to overcome the embarrassment that has deep-rooted gender stereotyped sociocultural origins, faced by girls using toilets within direct or indirect sight of boys?

Can mobile toilets address the sanitation-related problems faced by seasonal migrants? Can provision of toilet facilities by employers, both in the organized and unorganized sector, be regulated?

CONCLUSION

Our study indicates a significant link between psychosocial stress and the practice of open defecation. It furthers the current thinking and discourse on the Nirmal Bharat Abhiyan (Clean India Campaign) in not only building and improving access to toilets but also addressing sociocultural, environmental and behavioral barriers to their usage specifically by women, adolescent girls and seasonal migrant populations. By addressing the sanitation needs of women, not only will their physiological needs be satisfied but they will also be empowered by offering them dignity and integrity in one of the basic aspects of life.

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