

Barriers of household toilet utilization among toilet owners in a rural area of Northern India: An analytical cross-sectional study

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ABSTRACT

Background: Open defecation continues to prevail among toilet owners despite effective implementation of the Swachh Bharat Mission (Gramin). We conducted this study to determine toilet utilization rates and learn about the barriers to toilet use in the rural areas. By understanding the barriers, physicians can provide targeted education and become better equipped to manage their patients' conditions and advocate for their demands. **Materials and Methods:** We conducted a cross-sectional study on the households of the rural field practice areas of the department in central Uttar Pradesh by the census method. House listing was procured from the departmental records. The questionnaire was directed at both the household level and individual level. **Results:** The proportion of households with access to a toilet was found to be 91.1% of which 504 households were included in the study. Among the toilet owners, 115 (22.8%) households were not using toilets exclusively by all the members. At the individual level, age groups (of 20-59 years, and ≥60 years) and female gender were found to be significantly associated with open defecation. At the household level, government assistance for toilet construction and livestock keeping was found to be associated with open defecation. Major barriers to toilet use were childhood habits, dearth of toilets in the farming grounds/workplace, women during menstruation and having a non-functional toilet. **Conclusion:** This study indicates that merely installing a household toilet does not ensure exclusive utilization of toilet and the practice of open defecation might continue to be prevalent if corrective measures are not undertaken.

Keywords: Individual household toilets, open defecation, toilet utilization

Introduction

In India, as reported by National Family and Health Survey-5 (NFHS-5), only 70.2% of households have access

to improved sanitation facilities.^[1] A study found that open defecation was reported even in areas with high toilet coverage.^[2] While achieving full coverage of household toilets is a primary goal, it does not signify full utilization and purposive use, henceforth, requiring further researches on the constraints and behaviours of those who prefer to continue open defecation. Understanding these barriers can assist family physicians provide targeted education, advocacy, and identify causes of

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sanitation-related illnesses, contributing to meeting global sanitation goals and improving patient care.

The current study was conducted in the rural field practice areas of the Department of Community Medicine of a medical college in northern India. The objective was to determine the proportion of household toilets in these areas, their utilization rates at household and individual levels, and find out the barriers to the toilet utilization among the toilet owners.

Materials and Methods

Study setting and design

The study was conducted in the rural field practice areas under the Department of Community Medicine of a Medical College in central Uttar Pradesh are comprised of three villages that fall within 5 km radius; namely the villages of Geenja, Ujhiyani and Bhaguiya. These villages are mainly dependent on agriculture, animal rearing and manual labour. According to the latest data available (the year 2019) from the office of the Department of Community Medicine, the number of households in Geenja, Ujhiyani, and Bhaguiya were 355, 228, and 169, respectively, making a total of 752 households. An approximate population of 3079, 1668, and 1032 reside in the village of Geenja, Ujhiyani, and Bhaguiya, respectively, making a total population of 5779. We conducted an analytical cross-sectional study in households of these three villages between January 2020 to October 2021.

Sampling and sample size

For this study, the census sampling design was adopted as the best method to fulfil the objectives of this study. All the households in the rural field practice area were eligible for participation and were subjected to inclusion criteria for selection in the study. The head of the family in each household was taken as the principal respondent. In cases where the head of the family was unavailable/unwilling for interview, any family member of age more than 18 years who could provide reliable information was sought for the interview. For the individual-level interview on defecation practices of members having access to Individual Household Latrines (IHHLs), all members of the family were selected above the age of three completed years. Households that were non-consented, found locked or no adult member was present on the third visit, migrated or house not found while being listed on the records were excluded from the study.

Data collection technique and tools

The questionnaire was prepared by integrating survey questions developed by World Health Organization (WHO) and the Joint Monitoring Program/Water, Sanitation and Hygiene (JMP/WASH).^{1,3,4} Pre-testing of the questionnaire was performed to check the clarity, relevance and validity of the questions in a village with a similar population profile as that of the three subject villages. For reliability, the questionnaire was

translated to the local dialects of the villages and the interviews were performed in their dialects to enhance the understandability and consistency of the responses. To ensure that the tool is internally consistent, the data from the pilot study was subjected to a reliability test using Cronbach's alpha. A Cronbach alpha of >0.7 was achieved and hence the tool was accepted. A door-to-door survey was conducted starting from a point/landmark in the village until all the households were covered. If any household refused to take part in the study, that house was skipped and the survey continued from the next or adjacent one. In situations where houses were found locked or adult members unavailable for interview, a re-visit was organized later. The households unavailable after two re-visits were dropped from the study. Households listed but not found or had difficulty locating were excluded from the study. The validated semi-structured and pre-tested questionnaire was used to collect information from the head of the family. In case he/she is unavailable at the time of the survey, any adult member (>18 years) who can provide reliable information was interviewed. Prior to every interview, verbal as well as written consent was obtained after a full explanation of the purpose of the study. Each respondent was interviewed regarding his/her family's socio-demographic profile, ownership of IHHL and number of family members above the age of three and their genders, and if any of the family members with access to household toilets practiced open defecation, the household was categorized as 'non-exclusive toilet user'. On the other hand, households with none of the family members practiced open defecation were categorized under 'exclusive toilet users'. For the ease of identification, the non-exclusive toilet users were classified as practicing 'open defecation'. If any member of the household was found to be practicing open defecation, the household was categorized as nonexclusive toilet users and the respective family member(s) sought for interview to establish the reason for non-use. All efforts were made to interview individual members who practice open defecation despite having access to a household toilet, if not achieved, the statements of the head of the family were considered reliable on behalf of the respective members.

Data analysis

For easier identification, each family was assigned a unique code that corresponded to the departmental house numbers. The data was then put into Microsoft Excel version 2019 for Windows, where it was revised and refined. In the event of differences or errors, the appropriate study tool forms were matched and repairs were performed. Statistical Package for Social Sciences (SPSS) Version 24.0, IBM Inc. Chicago, USA software was used to code and analyse the data. The study tool was tested for internal consistency using Cronbach's alpha. Descriptive analysis was used to determine the frequencies and proportions of responses. Univariate analysis for each variable with the practice of open defecation was undertaken. Logistic regression was applied to determine categorical factors associated with the dependent variable at a P value of <0.2 . A P value of <0.05 at a 95% confidence interval was considered statistically

significant. Wherever it was deemed appropriate, use of graphical representation of data was considered.

Ethical considerations

Ethical clearance was granted from the Institutional Ethical Committee of the Uttar Pradesh University of Medical Sciences (UPUMS), Saifai, Etawah before commencing the study (ID-91/2019-20) and local permission was obtained from the village heads (mukhiya). Informed written consent was obtained from each of the participants after providing the purpose, nature and the procedure of the study. Assurance of maintaining strict confidentiality was provided to the participants. The option of withdrawing from the study was accessible at all stages without any clauses.

Results

Study participants and sociodemographic characteristics

Of the total households surveyed for inclusion in the present study, 685 houses (91.1%) had access to an IHHL and 67 (8.9%) lacked one. Of the households with access to a toilet, after applying exclusion criteria, a final sample of 504 households was taken for further analysis [Figure 1].

Among 504 household-level respondents, 468 (82.0%) were between 20 and 59 years of age and 413 (72.3%) were men. The majority (98.2%) were Hindus. In all, 454 (90.1%) household heads were either illiterate or only had primary school education and 390 (77.4%) of them were unskilled workers. The majority (69.0%) of households belonged to the lower

middle or lower socioeconomic status category, as determined by the modified B.G. Prasad classification using the head of the household's employment status.

Practice of open defecation in the study areas

Of the total households with access to an IHHL, 115 (22.8%) households were not using toilets exclusively by one or more family members. The members that continued to practice open defecation despite having access to an IHHL consisted of 164 (12.6%) male members and 192 (16.1%) female members [Table 1].

The majority of males practising open defecation belonged to the age group of 20–59 years (61.6%), followed by elderly males (22.0%). Similarly, the majority of females practising open defecation despite having access to a toilet fell in the age group of 20–59 years (73.4%). The proportion of practicing open defecation by elderly women was lower than that of elderly males [Figure 2]. Overall, a slightly higher proportion of open defecation was observed among females (16.1%) than males (13.7%) [Table 2].

Association between socio-demographic factors with the practice of open defecation

At the individual level, age and gender have been found to have an association with open defecation. At the household level, type of assistance for toilet construction and livestock keeping were also found to be statistically significant. No significant association had been found between open defecation and factors such as family type, educational and employment status, and socioeconomic status [Table 2].

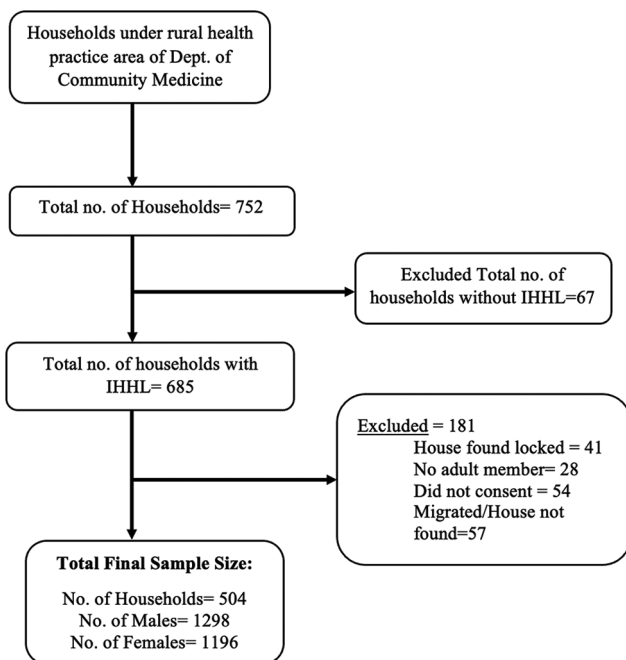


Figure 1: Flowchart depicting the total number of households and individuals that participated in the study. *IHHL: Individual household latrine (including shared toilets)

Table 1: IHHL utilization rates among the toilet owners

Variable	Exclusive toilet users		Non-exclusive use/Open defecation	
	n	(%)	n	(%)
Household level	389	77.2	115	22.8
Individual level				
Male	1134	87.4	164	12.6
Female	1004	83.9	192	16.1

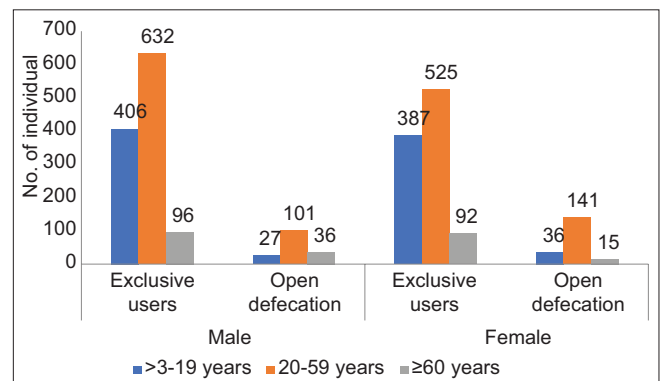


Figure 2: Distribution of individuals who practiced open defecation in terms of age and gender

Table 2: Association of sociodemographic variables according to toilet use

Characteristics	Open defecation*		Exclusive toilet use		χ^2	P
	n	%	n	%		
Individual level (n=2494)						
Age group (years)						
3–19	63	7.4	793	92.6	53.646	<0.001
20–59	242	17.3	1157	82.7		
>59	51	21.3	188	78.7		
Gender						
Male	164	12.6	1134	87.37	5.945	0.015
Female	192	16.1	1004	83.95		
Household level (n=504)						
Family type						
Nuclear	64	21.2	238	78.8	1.629	0.443
Three generation	29	23.6	94	76.4		
Joint	22	27.8	57	72.2		
Education level						
No formal education	16	43.2	21	56.8	2.562	0.332
Primary school	92	22.1	325	77.9		
Secondary school	6	18.8	26	81.3		
>Graduate	1	5.6	17	94.4		
Employment status						
Unemployed	3	15.8	16	84.2	1.443	0.920
Unskilled	92	23.6	298	76.4		
Skilled/Semi-skilled	17	21.0	64	79.0		
Profession/semi-professional	2	20.0	8	80.0		
Retired/Pensioner	1	25.0	3	75.0		
SES**						
Class I	0	0.0	9	100.0	2.107	0.388
Class II	5	15.2	28	84.8		
Class III	22	19.3	92	80.7		
Class IV	60	23.3	198	76.7		
Class V	28	31.1	62	68.9		
Source of financial assistance						
Government assisted	26	16.3	134	83.8	5.741	0.017
Self-financed	89	25.9	255	74.1		
Livestock						
Yes	90	26.8	246	73.2	9.013	0.003
No	25	14.9	143	85.1		

Values in bold are statistically significant factors; *Irregular use despite having access to IHHL;**Modified BG Prasad Scale according to monthly AICPI at the time of data collection

At the individual level, age groups of 20–59 years (OR 2.6 [95% CI 1.9 to 3.5]) and ≥ 60 years (OR 3.4 [95% CI 2.3 to 5.1]), and female gender (OR 1.3 [95% CI 1.1 to 1.7]) were found to be significantly associated with open defecation. At the household level, government assistance for toilet construction (OR 1.8 [95% CI 1.1 to 2.9]) and livestock keeping (OR 2.1 [95% CI 1.3 to 3.4]) were found to be statistically significant with open defecation [Table 3].

Barriers in the utilization of IHHL at the individual level

The practice of open defecation was found to be more prevalent among the 20–59 years age group in both the genders. Among males, the most common reason for not utilizing the IHHL was reported to be due to an inherent childhood habit of defecating in the open (70 out of 164 males), of which the majority were

of the age group 20–59 years old. In contrast, females tend to practice open defecation mostly during menstruation (53.6%) of which, 45.3% belonged to the 20–59 years age group and 16 were adolescent girls. A proportion of 28.7% males and 20.8% females reported having non-functional IHHLs that hindered their use. Some men (7.9%) and women (4.2%) expressed that they consider the IHHL to be unhygienic and hence avoid using them on a regular basis. The unavailability of a toilet facility in the vicinity of the fields or work place was also reported to be a reason for open defecation as reported by 17.1% of males and 0.5% females [Figure 3].

Discussion

Across the study areas in this study, 389 (77.2%) households owned IHHLs and were exclusively used by all members while 115 (22.8%) owned but were not exclusively used by all family

Table 3: Factors associated with practice of open defecation among toilet owners at the individual and household level

Characteristics	Open defecation		Toilet use		OR	95% CI	P
	n	%	n	%			
Individual level (n=2494)							
Age Group (years)							
3–19*	1	-	-	-	-	-	-
20–59	242	9.7	1157	46.4	2.6	1.9–3.5	<.001
≥60	51	2.0	188	7.5	3.4	2.3–5.1	<.001
Gender							
Male*	1	-	-	-	-	-	-
Female	192	7.7	1004	40.3	1.3	1.1–1.7	0.015
Household level (n=504)							
Financial assistance							
Self-financed*	1	-	-	-	-	-	-
Government	89	17.7	255	50.6	1.8	1.1–2.9	0.018
Livestock keeping							
No	1	-	-	-	-	-	-
Yes	90	17.9	246	48.8	2.1	1.3–3.4	0.003

*Reference category Values in bold are statistically significant factors

members. In the present study, the overall toilet ownership rate calculated before excluding households for further survey was found to be 91.1% which does not align with the national data published by Swachh Bharat (100%).^[5] Although higher than that reported by Panda PS *et al.*, (70.3%) who conducted a study in a rural village of Raipur district, this study's household toilet proportion is lower than that reported by NARSS (Uttar Pradesh) for the year 2018–19 (97.8%).^[6,7] The rural areas of Chandigarh had a toilet coverage rate of 97% in 2019 as reported in the study by Ravindra K *et al.*^[8] In 2017, a rural village in the neighbouring country of Nepal had a toilet coverage of 75.9% in a study conducted by Budhathoki SS *et al.*^[9]

As stated in the study's rationale, mere ownership does not guarantee exclusive toilet usage. The result of this study is that out of 504 households having access to a toilet facility, 115 (22.8%) had at least one person who performed open defecation verified this. In contrary, the study in rural Nepal reported only 5.7% of households practising open defecation despite having a toilet in 2017.^[9] A higher proportion of 54.8% non-utilization of toilets was reported from a rural area in South India by Yogananth N *et al.*, in 2018.^[10]

Of the 2494 people in the present study who had access to a household toilet, 356 (14.3%) did not use their toilet on a regular basis. This proportion is similar to that reported by Venkateswarlu M. in which 19.3% of respondents were practising open defecation in spite of having access to a household toilet.^[11] Overall, a slightly higher proportion of preferring open defecation was observed among females (16.1%) than males (13.7%). This finding is consistent with that of previous research that reported a higher proportion among females.^[2] In the present study, females chose not to use the toilet or,

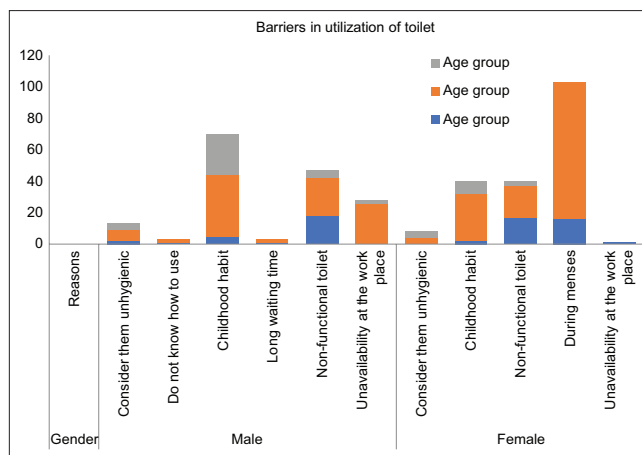


Figure 3: Reasons for non-utilization of toilet by individuals despite having a household toilet by age and gender

more precisely, not to share with the men of the house during their menses due to a common taboo against impurity during menses (53.6%). Contrary to Routray P *et al.* study findings, availability of household toilets did not affect adolescent girls and adult women in their behaviour of toilet use during their menstruation.^[12] In the present study, among males, the majority of people with inconsistent toilet use fell in the age group of 20–59 years (61.0%) with the most common reason being childhood habit (42.7%) followed by unavailability of a toilet facility in the vicinity of the fields or workplace (17.1%). As the majority are farmers, men often do not find improved sanitary facilities in the vicinity of the work area and hence are more likely to be forced to open defecate.

In the present study, age was found significantly associated with open defecation in 20–59 years of age group [OR 2.6 (95% CI 1.9 to 3.5)] and ≥60 years [OR 3.4 (95% CI 2.3–5.1)] as compared to those with age less than 19. Female gender was also found to have a statistically significant association with open defecation (OR 1.3 (95% CI 1.1–1.7) primarily owing to the practice during menstruation. These results contrast with those of Yogananth N *et al.*, who found that neither age nor gender was a predictor of open defecation.^[10] At the household level, contrary to the finding of significant association between family size and open defecation by Jain A *et al.*, this study did not find any association of neither family size nor family type with the practice of open defecation.^[13] An association of open defecation and ownership of government financed toilet was found (OR 1.8 (95% CI 1.1 to 2.9)). This corroborates the findings in the study conducted by Yogananth N *et al.*^[10] Additionally, previous research has shown that low-quality construction of government-assisted toilets creates significant hurdles to toilet adoption.^[2,14,15] Other plausible reasons might be late adoption, existing habitual practice of open defecation or lack of awareness. Livestock keeping was also found to be significantly associated with open defecation (OR 2.1 (95% CI 1.3 to 3.4)). Sara S *et al.*, conducted a study in rural Tanzania to

determine factors that facilitate toilet adoption and found that among other factors, livestock keeping was strongly associated with open defecation practice (OR 0.22 (95% CI 0.063 to 0.75)). Although it is a well-known phenomenon that those who work in fields and rear livestock, often transporting them long distances for grazing, are destined to encounter situations when they are without a toilet, the reasoning behind this might need to be further explored.^[16] Family physicians are essential in promoting and ensuring community health as primary care providers. They may detect possible health hazards, educate patients on good hygiene practices and encourage behaviours that stop the spread of diseases linked to poor sanitation by recognizing how the community uses toilets. In the community, family doctors are regarded as reliable providers of health information who adopt a holistic approach. They can participate in community education initiatives, offer resources and work with regional organizations to enhance hygiene practices and general community well-being by being aware of the community's toilet usage habits.

Limitations

The findings of this study must be interpreted in the context of the study's many limitations. In order to begin, it should be noted that the study was carried out among a relatively homogenous group of people who had the same ethnic, occupational and religious backgrounds. As a consequence, the findings of the study can only be extrapolated to a mostly rural area. Because of the cross-sectional character of this study, it is possible that the temporal association between certain variables and open defecation is not clearly established. It is conceivable that respondents' social desirability bias, especially at the individual level, has an impact on their self-reported toilet usage, despite the fact that they did not use the toilet. Impact of shared IHHLs among households on the practice of open defecation could not be established in the present study and can be a subject of further research.

Conclusion

This finding in the study has shown that the mere ownership of a household toilet does not guarantee its exclusive use in the rural field practice areas. A variety of circumstances, including childhood habits, dearth of toilets in the farming grounds, women during menstruation and having a non-functional toilet among others, influenced the non-usage of household toilets. Factors such as age, females, having government-assisted toilet constructions and livestock keeping as predictors of the practice of open defecation. In the context of this study's findings, the majority of women in reproductive age groups opt for open defecation during their menstruations that can make them vulnerable to sexual violence, apart from the known health consequences. The behavioural and social barriers at both the household and individual levels impede toilet use. A more elaborate behavioural study will help understand these various barriers which in turn will help formulate steps for action.

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Conflicts of interest

There are no conflicts of interest.

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