



Impact of Swachh Bharat Mission on open-air defecation-free status in villages under the rural field practice area of a private medical college in Kanchipuram: A Cross-sectional study

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ABSTRACT:

Background:

Eradicating open-air defecation (OAD) by promoting the use of toilets in each household is one of the objectives of the Swachh Bharat Mission (SBM), also known as the "Clean India Mission," which was launched by the Indian government in 2014. This study was planned to monitor the progress of the mission, five years after its implementation, with the objectives of assessing household knowledge of SBM, determining the number of households that have constructed sanitary latrines under the mission, and estimating the prevalence of for practicing OAD and not utilizing the SBM toilets.

Materials and Methods: A community-based cross-sectional study was conducted among 440 households (n = 440) in 10 villages of rural field practice area of a private medical college in Kanchipuram. Each household (one participant from each household) was the sampling unit and were selected by simple random sampling using the Probability Proportion to Size (PPS) method. Data was collected using Semi-structured questionnaire.

Results: Almost 78% (n = 343) of the participants were aware that the government was constructing toilets but among them only 8.6% (n = 38) knew that it was built under the SBM. Among the study participants 95.5% (n = 420) of the households have sanitary latrines in their house and 55.9% (n = 246) constructed toilets under the SBM scheme. The prevalence of open-air defecation (OAD) was found to be 45.9% (n = 202). Pits filling up quickly (42.3%), feeling uncomfortable (17.5%), inadequate toilet size (8.9%), and combination of the above (9.3%) were the reasons for not utilizing SBM toilets. Reasons for practicing OAD were 130 (29.5%) comfort as the main reason, while 52 (11.8%) used for other purposes like storage, 20 (4.5%) reported no sanitary latrines at home. Association was found between age (p = 0.000), education (p = 0.003), socioeconomic status (p = 0.001), and number of family members (p-value = 0.002) with practicing of OAD.

Conclusion: SBM knowledge was low among the participants. Though households-built toilets under SBM missions, there were reasons for not using them. Despite five years of SBM success, many households in the study area still practice OAD. Reinforcement is needed in improving sanitation in the study area.



INTRODUCTION:

Open-air defecation (OAD) refers to the practice of defecation in outdoor spaces. Open-air defecation can contaminate drinking water sources, which is a major risk to public health. This practice poses significant health risks, contributing to the spread of diseases, such as diarrhoea, cholera, and typhoid, as well as environmental contamination¹. According to the 2022 data, 420 million people worldwide are practicing open defecation. Sub-Saharan Africa accounted for the largest share among the seven regions, followed by South Asia². The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) released their Joint Monitoring Program (JMP) report for water supply, sanitation, and hygiene for households for the year 2022, which was 11% in India³. World Bank data show that 17% of the rural population and 1% of the urban population are practicing OAD in India⁴. The NFHS-5⁵ data showed that 72.6% of the households had better sanitary facilities compared to 52.5% in the NFHS-4⁶ data in Tamil Nadu. This represented a significant improvement. The Government of India was motivated to eliminate OAD and launched the Swachh Bharat Mission (SBM) or 'Clean India Mission' in 2014. Eradicating open-air defecation (OAD) by promoting the use of toilets in each household is one of the objectives. Toilet building is an essential component of the Swachh Bharat Mission. Under the mission, all villages, Gram Panchayats, Districts, States and Union Territories in India declared themselves "open-defecation free" (ODF) by 2 October 2019, the 150th birth anniversary of Mahatma Gandhi, by constructing over 110 million toilets in rural India⁷. This study was planned to monitor the progress of the mission after five years of success and its implementation. To ensure that open-defecation behaviours are sustained, and no one is left behind, the decline of open-air defecation in India over the years has been remarkable, but the claim that open-air defecation has ended is subject to debate.

Need for the Study: The government of India started the Swachh Bharat Mission program on 2 October 2014 and declared open-air defecation free in all states on 2 October 2019 under the Swachh Bharat Mission programme⁷. This cross-sectional study was planned to understand the current scenario of the Swachh Bharat mission program after 5 years of its induction and how far the Mission has been successful in maintaining proper sanitation that would lead to a healthy lifestyle in the rural area.

The objectives of the study are,

1. To assess the knowledge of the Swachh Bharat Mission among the rural population belonging to the field practice area of a private medical college in Kanchipuram.
2. To quantify the number of households that have constructed sanitary latrines under the Swachh Bharat Mission.
3. To estimate the prevalence of open-air defecation (OAD) among the households and reasons for practicing OAD and not utilizing the SBM toilets.

METHODOLOGY:

The present study is a community-based cross-sectional study that was conducted among households in 10 villages of the rural field practice area of a private medical college in Kanchipuram. The study units were households.

The 10 villages have 2793 households. A sampling frame for each village was drawn. The sample size was calculated based on the study by Yogananth N et al⁸ in Dharmapuri, 2018 which reported 55% open-air defecation in a rural village. In this present study, 440 households were the sample size calculated using 95% confidence interval, 5% absolute precision & 10% non-response rate. the sampling units for each village was finalized by using Probability Proportion to Size (PPS) (table 1). Using the Simple random sampling method the expected sample size of 440 households were included in the study.

Table 1: Shows Probability Proportion to Size (PPS) method for including households in the study.

S.No	Village Name	Total no. of. House per village	No. of the households included per Village
1	Vadamavanthal	239	38
2	Namandi	357	56
3	Arasakuppam	581	91



4	Pillanthangal	323	50
5	Thirupanangadu	433	68
6.	Velakulam	160	26
7.	Thalikal	130	21
8.	Hariharapakam	220	35
9.	Ozhukuvakam	100	16
10.	Setithangal	250	39
	Total	2793	440 Households

Inclusion criteria: Each household (one participant from each household) was the sampling unit. The study participant should have lived in the household for a minimum of 1 year, one participant/resident from each household, mostly the head of the family answered to the questionnaire that was developed for the study.

Exclusion criteria: People who were below 18 years of age, relatives if visited, individuals with severe hearing disability, and intellectual disabilities, and individuals who were not willing to participate were excluded from the study.

Data Collection method: A pilot study was conducted among 40 households which helped us in pretesting and refining the questionnaire. A semi-structured questionnaire which included the Swatch Bharat Mission questionnaire⁵ was used to collect pertinent information regarding demographics, open defecation practices, usage of home sanitary latrines, and sanitary latrines constructed by Swatch Bharat Mission and its usage.

One participant/resident from each household, preferably the head of the family and if not available, the next eldest person of the family, was interviewed personally.

Statistical analysis: The collected data was entered in Microsoft Excel. Coding of the variables was done. Analysis was done using SPSS software (Version 27, IBM). Descriptive statistics and Chi-square tests were

used to find the association between categorical variables. A p-value less than 0.05 was considered statistically significant.

Ethical considerations: Ethical clearance was obtained from the Institutional Ethical Committee (Ref No: MMCH&RI/PG/61/OCT/22) before conducting the study. Informed consent was obtained.

RESULT

The total number of participants in the study was 440(N = 440), of which 40.9% (n = 180) were males and 59.1% (n = 260) were females, with a mean age of 45 years. 37.7% (n = 166) belong to the age group of 25 – 40 years, 48% (n = 211) in 41 – 60 years, and 14% (n = 63) were above 61 years. Illiterate formed in 22.3% (n = 98), 39.3% (n = 173) had primary education, 22.7% (n = 100) had higher secondary education, and 15.7% (n = 69) were graduates. 74.5% (n = 328) lived as nuclear families and 25.5% (n = 112) as joint families. Families having members less than four was 73.9% (n = 325) and 26.1% (n = 115) having more than four. In terms of Socio-economic status 5.2% (n = 23) belong to upper class, 12.5% (n = 55) middle class, and 82.3% (n = 362) lower class. Nearly all participants 99.1% (n = 436) lived in their own house, with majority 61.8% (n = 272) living in semi-pucca and 37.7% (n = 166) in pucca, followed by kutchra 0.5% (n = 2).

Table 2: Knowledge of Swachh Bharat mission among study participants

Questions	Frequency	Percentage
Are you aware that the government is constructing free toilets in households?		
Aware	343	78%
Unaware	97	22%
Total	440	100%
Free toilets are built by the government in houses, do you know under which mission it's built?		
Yes	243	55.2%
No	100	22.7%



Not applicable	97	22.1%
Total	440	100%
If yes, what is the name of the mission?		
Correct	38	8.6%
Wrong	205	46.6%
Not applicable	197	45
Total	440	100%
If wrong, any member of the household has heard about the Swachh Bharat Mission (Thumai India iyakam)?		
Yes	118	26.8%
No	88	20.0%
Not applicable	234	53.2%
Total	440	100%
If yes, what does the Swachh Bharat Mission help in?		
Clean environment village	80	18.2%
Toilet construction	38	8.6%
Prevent disease	0	0%
Avoid plastics	0	0%
Any others	0	0%
All of the above	0	0%
Not applicable	322	73.2%
Total	440	100%

Knowledge on Swachh Bharat mission (Table 2):

Among the study participants, 78% (n = 343) were aware of the government's initiative to construct free toilets in households. Although 55.2% (n = 243) knew that toilets were constructed under government mission only 8.6% (n = 38) knew the correct name of the

mission - SBM. Among those who knew about the mission (n = 243), 18.2% (n = 80) knew that it was related to clean environments in villages and 8.6% (n = 38) correctly identified its Objectives as household toilet construction.

Table 3: Details of toilets and practice of OAD in the households

Questions	Frequency	Percentage
Is there a toilet in your house		
Yes	420	95.5%
No	20	4.5%
Total	440	100%
If no (n=20), Why there is no toilet in your house?		
Not Interested	12	2.7%
Lack of space	7	1.6%
Unaffordable to build your toilet	1	0.2%
Not applicable	420	95.5%
Total	440	100%
If there is a toilet in your house, do all members use it for its purpose?		
Used by all members of the household	238	54.1%
Not Used by one or few members of the household	182	41.4%
Don't have a toilet	20	4.5%



Total	440	100%
If Practicing OAD, why do you Practice OAD?		
OAD comfortable	130	29.5%
Using for another purpose e.g., Storeroom	52	11.8%
No toilet	20	4.5%
Not applicable	238	58.6%
Total	440	100%

Toilets and practice of OAD in the households (Table 3):

Among 440 study participants, 95.5% (n = 420) had sanitary latrines at house, while 4.5% (n = 20) lacked this amenity. Reasons for this no toilets in the house were indifferent attitudes 2.7% (n = 20). Of households with sanitary latrines, 54.1% (n = 238) reported all members using them, while 41.4% (n = 182) stated only

some used them. Among participants practicing it, 29.5% (n = 130) cited comfort as the main reason, while 11.8% (n = 52) used sanitary latrines for other purposes like storage, and 4.5% (n = 20) reported lacking sanitary latrines at home. **So, the prevalence of open-air defecation is 45.9% (n = 202).**

Table 4: Details of government constructed sanitary latrines in households and reasons for not using them.

Questions	Frequency	Percentage
Was the toilet built by government in your house?		
Yes	246	55.9%
No	194	44.1%
Total	440	100%
Are you using a government toilet for its purpose for what it was built?		
Yes	80	18.2%
No	166	37.7%
Not applicable	194	44.1%
Total	440	100%
How comfortable is the toilet built by the government?		
Not comfortable	77	17.5%
Comfortable	266	60.5%
Don't know	97	22%
Total	440	100%
If not Comfortable, what is the Reason?		
Toilet is small	39	8.9%
Pits fills fast	186	42.3%
All of the above	41	9.3%
Not applicable	174	39.5%
Total	440	100%
If not using the government toilet for its purpose, what are the other purposes you're using for?		
Storage room	62	14.1%
Birds house	80	18.2%
Animal House	24	5.5%
Not applicable	274	62.3%
Total	440	100%

**Government constructed sanitary latrines in households and reasons for not using them (Table 4):**

Among the household studied, 55.9% (n = 246) had a government toilet built at home. However, only 18.2% (n = 80) used it as intended, while 37.7% (n = 166) repurposed it. The majority of study participants 60.5% (n = 266) expressed discomfort with the free sanitary

latrines constructed by the government. Reasons for discomfort included small size 8.9% (n = 39), fast-filling pits 42.3% (n = 186), and a combination of factors 9.3% (n = 41), according to participants. There other purposes of using the toilets were storage room 14.1% (n = 62), a bird house 18.2% (n = 80), and animal house 5.5% (n = 24).

Table 5: Sociodemographic variables associated with open-air defecation

Variables		Practicing OAD	Not Practicing OAD	P Value
Gender	Female	112(25.4%)	148 (33.6%)	0.04*
	Male	90(20.4%)	90(20.4%)	
Age	25 – 40 years 166(37.7%)	47 (10.6%)	119 (27.2%)	0.000*
	41 – 60 years 211(48%)	113 (25.7%)	98 (22.3%)	
	Above 61 years 63(14.3%)	42 (9.8%)	21 (4.4%)	
Education	Illiterate 98 (22.3%)	57 (12.9%)	41 (9.3%)	0.003*
	Primary education 173(39.3%)	83 (18.8%)	90 (20.5%)	
	Higher education 100(22.7%)	41 (9.2%)	59 (13.4%)	
	Graduate 69(15.7%)	21 (4.8%)	48 (10.9%)	
Socio economic status	Upper class 23(5.2%)	7 (1.6%)	16 (3.6%)	0.001*
	Middle class 55(12.5%)	19 (4.3%)	36 (8.2%)	
	Lower class 362 (82.3%)	176 (40%)	186 (42.3%)	
Total no of family numbers	Four and above 325 (73.9%)	139 (31.6%)	186 (42.3%)	0.002*
	Below four 115(26.1%)	63 (14.3%)	52 (11.8%)	
P < 0.05* is significant				

Association of sociodemographic variables with OAD (Table 5): In the study, 20.4% (n = 90) of males and 25.4 (n = 112) of females practiced OAD. Middle-aged individuals 25.7% (n = 113) were more likely to practice OAD, especially those with only primary education 18.8% (n = 83). OAD was prevalent among 40% (n = 176) of lower socioeconomic status individuals and 31.6% (n = 139) of those with four or more family members. These findings were statistically significant P value <0.05.

DISCUSSION

A community-based cross-sectional study was conducted among 440 households in 10 villages residing in the rural field practice area of a private medical college in Kanchipuram. This study was conducted to assess the knowledge of Swachh Bharat Mission among the rural population belonging to the field practice area of a private medical college in

Kanchipuram, to quantify the number of households that have constructed sanitary latrines under the Swachh Bharat Mission (SBM) and To estimate the prevalence of open-air defecation (OAD) among the households and reasons for practicing open-air defecation.

In this present study, almost 78% of participants knew that the government is constructing free toilets, but only 26.8% of participants had heard of Swachh Bharat Mission and were aware that free toilets are constructed under Swachh Bharat Mission program. While few other studies like the one published by Swain P et al⁹ conducted a study on the status of sanitation and hygiene practices in the context of "Swachh Bharat Abhiyan" in two districts of Uttar Pradesh in the year 2016 reported 24% knew SBM, Another study done by Kishore YJ et al¹⁰ showed 62.2% had knowledge on SBM which was conducted among rural people of Nalgonda district in Telangana state and was carried out in the year 2018, Similar study done by Karan RK et



al¹¹ in Ranchi in the year 2015 reported 93.62% of respondent had knowledge on SBM and another research finding by Hemalatha K et al¹² reported 45%. This study which was conducted by medical students on awareness of Swachh Bharat Mission at a village in Trichy in 2020.

Even though 95.5% of the households included in the study possessed sanitary latrines, about 45.9% of the individuals practiced open-air defecation. Another investigation by Hemalatha K et al¹². discovered a similar prevalence rate of 58%, which aligns with the findings of Anuradha R et al's¹³ study in rural areas of Tamil Nadu in 2017, which reported a prevalence of 33.1%. Additionally, Panda PS et al¹⁴. conducted a study in a rural village in Raipur district in 2017, revealing a prevalence rate of 23.2%. In Comparison, Bhardwaj A et al¹⁵. conducted a study in a rural village in Maharashtra in 2013, which indicated a higher prevalence rate of 67%.

The most common reasons quoted for not using the government-constructed sanitary latrines in households were "uncomfortable" (17.5%), (8.9%) of study participants felt "toilets were too small", (42.3%) "pits filled fast", and (9.3%) felt "both of toilets were too small and pits filled fast". In (14.1%) of the households that constructed the toilet under the SBM scheme, were used as a "Storage room", (18.2%) of households used the toilet facility as a "birdhouse" and (5.5%) as an "Animal House".

The reasons for practicing open-air defecation were "not interested" and "open-air defecation is comfortable", (29.5%) and (11.8 %) respectively. A study done by Hemalatha K. et al.¹² on awareness of the Swachh Bharat Mission by medical students at a village in Trichy in 2020 revealed that unwillingness as the common reason for practicing open-air defecation, this is similar to our study findings.

In current study, there is a significant association between gender with practice of open air defecation (p-value 0.04) which is similar to a study done by Panda PS et al.¹⁴ who also reported a significant association between gender with practice of open air defecation (p-value 0.0002). In our present study, there is a strong association between age with practice of open air defecation (p-value 0.000).

In our study, there is a significant association between education with practice of open air defecation (p-value 0.003) which is similar to a study done by Panda PS et

al.¹⁴, which showed a significant association of education with practice of open-air defecation (p-value 0.0000). there is a significant association between socioeconomic status with practice of open-air defecation (p-value 0.001). Studies done by Anuradha R et al¹³ showed (p-value of 0.0016), and Panda PS et al¹⁴, (p-value of 0.0048) reported a similar finding.

In our present study, there is a significant association between the total number of family members with practice of open-air defecation (p-value 0.002) which is similar to a study done by M T et al.¹⁶ which also had a significant association between the total number of family members with practice of open air defecation (p-value 0.01).

Conclusion:

The prevalence of open-air defecation is 45.9%. Knowledge of Swachh Bharat Mission was poor in the study population. More than half of the households had toilets constructed from Swachh Bharat Mission, but they were primarily used for storage, housing for animals and birds, and continued to practice open air defecation. open-air defecation is practiced by both genders equally. A strong association was found between age, education, Socioeconomic status, and total no of family members with open-air defecation. Even after 5 years of "The Mission (Swachh Bharat Mission)" success, a significant percentage of households in the study area are still practicing open-air defecation.

Recommendation and action plan:

People are not maintaining the correct practices and utilizing the toilets despite the Swachh Bharat mission's significant efforts to end open-air defecation. The study population has a practice gap that needs to be bridged in order to sustain the practice. The Swachh Bharat mission requires strong government and administrative support as well as public cooperation is much more important to sustain the successful mission. From our end, we will take action to sustain the right behavior through health education, and awareness campaigns and reinforce the correct practice to the public.

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REFERENCE

1. Sanitation [Internet]. [cited 2024 Apr 30]. Available from: <https://www.who.int/news-room/fact-sheets/detail/sanitation>
2. World Bank Blogs [Internet]. [cited 2024 Mar 25]. World Toilet Day: 420 million people are defecating outdoors. Available from: <https://blogs.worldbank.org/en/opendata/world-toilet-day-420-million-people-are-defecating-outdoors>
3. Population practising open defecation (%) [Internet]. [cited 2024 Mar 25]. Available from: [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/population-practising-open-defecation-\(-\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/population-practising-open-defecation-(-))
4. World Bank Open Data [Internet]. [cited 2024 Mar 25]. World Bank Open Data. Available from: <https://data.worldbank.org>
5. International Institute for Population Sciences (IIPS) and ICF. 2021. National Family Health Survey (NFHS-5), 2019-21: India: Volume II. Mumbai: IIPS.
6. International Institute for Population Sciences (IIPS) and ICF. 2017. National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS.
7. Ministry of Drinking Water and Sanitation. Swachh Bharat Mission Gramin Dashboard. Available: <https://swachhbharatmission.gov.in/sbm/cms/index.htm> [Accessed 12 Feb 2024].
8. Yogananth N, Bhatnagar T: Prevalence of open defecation among households with toilets and associated factors in rural south India: an analytical cross-sectional study. *Trans R Soc Trop Med Hyg.* 2018, 112:349-60. 10.1093/trstmh/try064
9. Swain P, Pathela S. Status of sanitation and hygiene practices in the context of “Swachh Bharat Abhiyan” in two districts of India. *Int J Community Med Public Health* 2016;3:3140-6.
10. Kishore YJ, Naidu NK, Sreeharshika D, Harikrishna B, Malhotra V. Study to assess knowledge, perception and practices regarding Swachh Bharat Abhiyan among rural people of Nalgonda district in Telangana state. *Int J Community Med Public Health* 2018;5:3399-405.
11. Karan RK. Report on Impact Assessment of Swachh Bharat Abhiyan Project Implemented by Aarogya Foundation India in Blocks of Jharkhand State. Ranchi: Asian Development Research Institute; 2015. p. 16-7
12. Hemalatha K, Thangaraj P. Impact of swachh bharat summer internship by medical students at a village in Trichy, Tamil Nadu. *Int J Health Allied Sci* 2020;9:251-7
13. Anuradha R, Dutta R, Raja JD, Lawrence D, Timsi J, Sivaprakasam P. Role of community in swachh bharat mission. their knowledge, attitude and practices of sanitary latrine usage in rural areas, Tamil Nadu. *Indian J Community Med* 2017; 42:107-10
14. Panda PS, Chandrakar A, Soni GP. Prevalence of open-air defecation and awareness and practices of sanitary latrine usage in a rural village of Raipur district. *Int J Community Med Public Health* 2017; 4:3279-82.
15. Bhardwaj A. A Community based cross sectional study on use of sanitary latrines in a rural setup in Maharashtra. *healthline_pISSN 2239-337X/eISSN 2320-1525* 2013;4
16. M T, S M, Kulothungan K, et al. (December 15, 2022) The Use of Sanitary Latrines and the Practice of Open-Air Defecation in a Rural Setup in Perambalur District: A Cross-Sectional Study. *Cureus* 14(12): e32547. DOI 10.7759/cureus.32547