

A cross-sectional study on sanitation and hygiene in rural villages in Southeastern Maharashtra: On our way to achieving the Sustainable Development Goal No. 6

Rachhanaa S Pawaskar¹, Gajanan D Velhal¹

¹Department of Community Medicine, BKL Walawalkar Rural Medical College, Sawarde, Chiplun, Ratnagiri, Maharashtra, India

Corresponding Author

Rachhanaa S Pawaskar

E-mail ID: dr.rachhanaa01@gmail.com



Submission: 27.12.2023

Acceptance: 21.03.2024

Publication: 31.03.2024

https://www.doi.org/10.56136/BVMJ/2024_02759

Abstract

Introduction: Sustainable Development Goal (SDG)-6 highlights the importance of clean water and sanitation. The Swachh Bharat Mission, a flagship program of the Government of India, aims at ensuring the availability and sustainable management of water, hygiene, and universal access to effective systems for disposing of waste, especially in rural areas; this, in turn, is of mammoth importance for achieving the SDG-6 by 2030. The present study was thus devised to determine the availability of sanitation facilities and assess the knowledge, attitude, and practices regarding hygiene among residents of villages in Southeastern Maharashtra. **Materials and Methods:** This community-based study used a multistage sampling technique to select study participants. The duration of the study was one month. The study involved 1663 participants. A Marathi-translated version of the pretested questionnaire was used, which enquired about the socio-demographic details, availability of water and sanitation facilities along with questions to assess the knowledge, attitude, and practice regarding sanitary latrines, use of footwear, hand washing, and domestic waste disposal. Association of socio-demographic profile with different parameters assessed in the questionnaire was assessed using SPSS software (version 26.0); results were considered significant if $p < 0.05$. **Results:** The study involved 1663 participants with a mean age of 36.7 years, (SD=12.9 years). Water was available to all the households. All the villages had an open drainage system. Sanitation facilities were lacking in 23 households. Open-air defecation was practiced in 6.9% of the households. All the family members used footwear while going out in 68% of the households. Hand-washing was practiced by 43% of the population. Sixty-nine percent of the study participants disposed of domestic waste in the garbage pits dug in their backyard which was later burnt, whereas 31% disposed of in the surrounding premises. **Conclusion:** Open defecation still exists. The awareness regarding sanitation, footwear use, hand washing, and domestic waste disposal was better among literate participants. With just a few years left to the 2030 deadline to achieve the SDGs, we must inject a sense of urgency and immediately accelerate our actions at the individual and community levels.

Keywords: Villages, Sanitation, Hygiene, Sustainable Development Goal (SDG)

Introduction

Sustainable Development Goal (SDG)-6 highlights the importance of clean water and sanitation. The Swachh Bharat Mission (SBM), a flagship program of the Government of India, aims at ensuring the availability and sustainable management of water, hygiene, and universal access to effective systems for disposing of waste, especially in rural areas. This, in turn, is of mammoth importance for achieving the SDG-6 by 2030. In this regard, a lot of efforts were made under the Clean India Mission (well known as 'Swachh Bharat Mission') by the Government of India. The purpose of this SBM is to create awareness and social movements in India to increase the toilet coverage, end open-air defecation and adopt safe, hygienic practices^(1,2) from the year 2014.

All villages of the districts were declared as Open Defecation Free^(1,3) on October 2, 2019 in India. Although sanitation

coverage is 100% in rural India⁽¹⁾, open defecation continues in large numbers⁽³⁾. Data from a survey done in November 2019 by the National Statistical Office also calls India's open defecation-free status into question⁽⁴⁾. The use of the existing toilets is low in rural areas^(5,6) since people in rural India perceive open defecation as a traditional behavior that is healthier, cleaner, and "religiously acceptable." Challenges in achieving India's sanitation mission include a spectrum of reasons, such as lack of piped water and inhibitions among people about constructing and using toilets^(6,7). It is crucial to warrant the use of built toilets to ultimately accentuate universal access to sanitation, so as to meet Sustainable Development Goals, which can be achieved via sanitation-related behavioral change⁽³⁾.

Hookworm infestation is a public health problem, especially in rural areas, due to reluctance to footwear usage⁽⁸⁾. Hand

washing with soap is a cost-effective way of preventing a plethora of disease conditions^(2,9). Domestic waste disposal practices in rural areas are a matter of concern⁽¹⁰⁾. Knowing the current state of awareness regarding the issues mentioned above can help devise tailor-made policies to tackle the problems effectively and develop resilient communities.

Therefore, this study was planned to determine the availability of water and sanitation facilities and assess the knowledge, attitude, and practices of residents of villages in Southeastern Maharashtra regarding hygiene. The objectives of the study were:

- To determine the availability of water and sanitation facilities by conducting a house-to-house visit.
- To assess the knowledge, attitude, and practices regarding the usage of sanitary latrines, footwear, hand washing, and domestic waste disposal.
- To determine the association between the socio-demographic factors and awareness (knowledge, attitude, and practices) regarding the usage of sanitary latrine, footwear, hand washing and domestic waste disposal.

Material and Methods

It was a community-based cross-sectional study. The Study duration was one month (December 2019 to January 2020). Sample size was calculated using OpenEpi, Version 3, open-source sample size calculator.

Sample size

$$n = [DEFF \times Np(1-p)] / [(d^2 / Z_{1-\alpha/2}^2 \times (N-1) + p \times (1-p))]$$

- Population size (for finite population correction factor or FPC)(N): 1,14,618
- % frequency of actual sanitation facility coverage in the rural areas⁽⁴⁾ (p): 53%
- Confidence limits as % of 100 (absolute +/- %)(d): 4%
- Design effect (for cluster surveys- $DEFF$): 1

A sample size of 1663 households was thus obtained with a 99.9% confidence level.

Multistage sampling was employed. The study was conducted in the Lohara Tehsil of Dharashiv (Formerly Osmanabad) district, comprising four Primary Health Centers (including 19 sub centers, 55 villages) catering to a total population of 1,14,618 individuals.

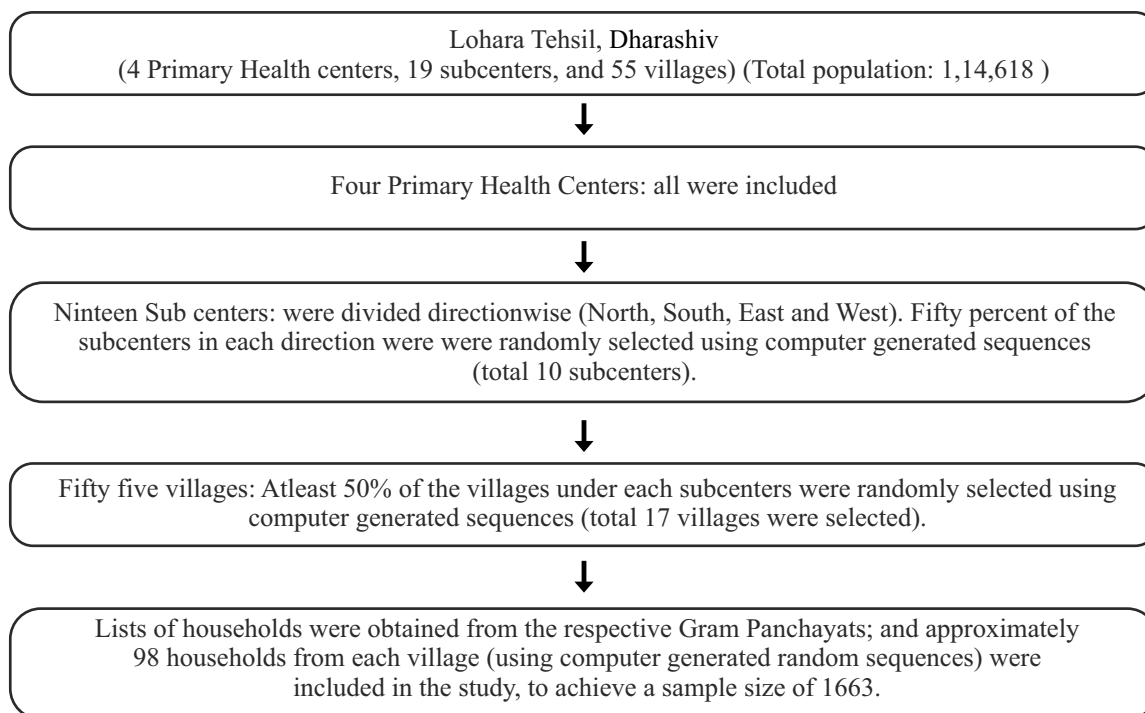


Figure 1: Flow diagram showing the details related to multistage sampling

One individual from each selected household fulfilling the inclusion criteria (preferably the head of the family) was recruited into the study. The inclusion criteria were: 1. Permanent residents of the villages (that is, those whose names are there in the list maintained by *Gram Panchayat*) 2.

Age \geq 18 years. A semi-structured study questionnaire enquiring about the study participants' knowledge, attitude, and practices was used. Also, the investigator checked the presence of a sanitary latrine, the presence of soap at the hand washing site in the house, and domestic waste segregation.

Table 1: Distribution of questions/scoring patterns in each domain

Parameters	No. of questions assessing			
	Knowledge	Attitude	Practice	Total Score
Sanitary latrine usage	03	04	02	09
Footwear usage	01	02	01	04
Hand washing	01	02	03	06
Domestic waste disposal	01	03	01	05

One mark was given for every correct answer. The study participant was required to correctly answer all the questions from knowledge, attitude, and practice domains in order to be considered as 'aware'. Thus, a participant was considered to be:

- i. Aware regarding the usage of sanitary latrine if he/she scored 09,
- ii. Aware regarding footwear usage if he/she scored 04,
- iii. Aware regarding hand washing if he/she scored 06, and
- iv. Aware regarding domestic waste disposal if he/she scored 05.

Operational definitions

Awareness: An individual was considered as 'aware' if he/she correctly answered all the questions from knowledge, attitude, and practice domains in the study.

Sanitation: Availability of water for day-to-day use, use of sanitary latrine for disposal of human excreta, and managing household solid waste via segregation.

Availability of water: Water was obtainable for day-to-day use in quantities sufficient for the entire household, as perceived by the study participant.

Socio-economic class: Modified Kuppaswamy Scale, 2019 was used to determine socio-economic class.⁽¹¹⁾

Data analysis: Statistical Analysis was done using Statistical Package for Social Sciences (SPSS) software (version 26.0). Data has been presented as numbers and proportions. Association between the variables was calculated using chi-square test and p-value<0.05 was considered as statistically significant.

Results

The study involved 1663 participants with a mean age of 36.7±12.9 years. The majority were male participants (n=1314, 79%) and 21% (n=314) were females. Table 2 describes the socio-demographic profile of the study participants.

Table 2: Socio-demographic profile of the study participants (N=1663)

Variable	n (%)
Gender	
Male	1314 (79)
Female	349 (21)
Education	
Illiterate	460 (28)
Literate	1203 (72)
Types of family	
Nuclear	648 (39)
Extended	1015 (61)
Socio-economic class (Modified Kuppaswamy Scale, 2019)	
Class 1	96 (6)
Class 2	166 (10)
Class 3	1212 (72)
Class 4	189 (11)

Water was available to all the households. The village had an open drainage system. Sanitary latrine facilities were lacking in 23 households. Open-air defecation was practiced in 6.9% (n=114) of the households. Of the total 1663 study participants, 621 used footwear (37%). Hand washing facility was available in 43% of households, and all family members practiced hand washing. Majority (69%) disposed of

domestic waste in the garbage pits dug in their backyard, whereas 31% disposed in the surrounding premises.

The details regarding knowledge, attitude, and practices regarding the usage of sanitary latrine, footwear; hand washing, and domestic waste disposal are given in Table 3, 4, and 5, respectively.

Table 3: Knowledge about sanitary latrine, footwear, hand washing with soap, and domestic waste disposal among the study participants

Statement	Participants who answered correctly (n) (%)
Using sanitary latrine protects from the transmission of diseases	1013 (60.9)
Open defecation has concerns like safety issues, snake/scorpion bites etc.	98 (5.89)
Know the government schemes for the construction of sanitary latrine	981 (59)
Footwear protects from the transmission of diseases	621 (37.3)
Segregating domestic waste before disposal is a healthy practice	25 (1.5)
Hand washing with soap gives protection against diseases	765 (46.1)

Table 4: Attitude about sanitary latrine, footwear, hand washing with soap, and domestic waste disposal among the study participants

Statement	Yes [n (%)]	No [n (%)]
You feel the need for sanitary latrine in house	1431 (86.2)	232 (13.8)
The opportunity for a morning walk will be missed, by sanitary latrine	234 (14)	1429 (86)
You are in favor of constructing sanitary latrine	1431 (86.2)	232 (13.8)
You believe that it is expensive to construct a sanitary latrine and, therefore, it is feasible to defecate in open	114 (8.66)	1549 (91.34)
You feel that buying footwear is expensive	554 (33.3)	1109 (66.7)
You feel that there is a need to wear footwear	1109 (66.9)	554 (33.1)
You feel the need to segregate domestic waste	25 (1.5)	1638 (98.5)
You feel that burning domestic waste is the appropriate way to dispose of waste	738 (44.4)	925 (55.6)
You feel that there is a need to wash hands with soap (and water)	765 (45.5)	898 (54.5)
You feel that it is expensive to buy a soap for hand washing	883 (53)	780 (47)
It is a waste of time to wash hands	898 (54)	765 (46)

Table 5: Practice regarding usage of sanitary latrine, footwear, hand washing with soap and domestic waste disposal among the study participants

Statement	Frequency (n) (%)
Sanitary latrine present in the house (Checked by investigator)	1332 (80)
Using sanitary latrine routinely (Asked to study participant)	1013 (60.9)
Using footwear regularly (Asked to study participant)	1109 (66.7)
Presence of soap at hand washing site house (Checked by investigator)	
Wash hands with soap before having food (Asked to study participant)	765 (46)
Wash hands with soap after using washroom (Asked to study participant)	
Domestic waste segregation (Checked by investigator)	25 (1.5)

Out of the total study participants, Literacy was found to be significantly associated with awareness regarding the usage of sanitary latrines, footwear, hand washing, and domestic

waste disposal (Refer to Table 6 for details), whereas gender ($p=2.336$), type of family ($p=3.738$) and socio-economic status ($p=0.06$) were not significantly associated.

Table 6: Association between literacy of the study participants and awareness regarding sanitary latrine, footwear, hand washing with soap and domestic waste disposal

Variables		Literate (N=1203)	Illiterate (n = 406)	Total (N=1663)	Chi-square value (df=1)	'p' value
		(n) (%)	(n) (%)	(n) (%)		
Awareness regarding sanitary latrine usage	Yes	907 (75.3)	106 (23)	1013 (60.9)	56.986	0.003*
	No	296 (24.6)	354 (76.9)	650 (39.1)		
Awareness regarding footwear usage	Yes	721 (59.9)	388 (84.3)	1109 (66.7)	58.201	0.006*
	No	482 (40.1)	72 (15.6)	554 (33.3)		
Awareness regarding handwashing	Yes	667 (55.4)	98 (8.14)	765 (46.1)	44.231	0.01*
	No	536 (44.5)	362 (78.7)	898 (53.9)		
Awareness regarding domestic waste disposal	Yes	659 (54.8)	79 (16.5)	738 (44.3)	34.909	0.007*
	No	544 (45.2)	381 (83.4)	925 (55.7)		

* $p<0.05$ Statistically significant

Discussion

The present study revealed that the knowledge that the use of sanitary latrine protects disease transmission or promotes well being was found in 61% of study participants. Another cross-sectional study in a rural parts of Maharashtra⁽¹²⁾ done by Bharadwaj et al. in 2013 found that people had knowledge that open air defecation may lead to diseases by caused due to consumption of contaminated food and water by the fecal matter (34.7%). This underlines the fact that the knowledge of those residing in rural areas has improved over time. Out of the 1431 study participants who felt the need to have a sanitary latrine in their house, 1332 had it in their house. Out of these 1332 households, sanitary latrine was used only in 1013 (76%) households. A study done in a rural area of Tamil Nadu⁽¹³⁾ by Veerapu et al. in 2013 found that 76.5% of the study participants who had sanitary latrines in their houses were using them routinely. On probing into the reason for not using the sanitary latrine despite having it in their houses ($n=319$), it was found that those from the 312 households preferred using common toilets because they believed that using in-house toilets causes contamination of the house and is not a 'holy practice' to defecate in the house. They had sanitary latrines constructed in their houses because of the subsidies that the government had provided and they used the place as a storeroom. Those from the remaining seven households of 319 preferred open defecation over using the

sanitary latrines available in their houses, quoting the reason that defecating in the open was a 'comfortable practice' and that they were 'used to' doing the same. These findings underscore the importance of sanitation-related behavior change, for merely providing subsidies/making a facility available doesn't ensure its use; the willingness to use the facility should come from within – for which creating awareness is of utmost importance. Of the total study participants, 114 considered it expensive to construct a sanitary latrine in their house. In this study, the practice of open-air defecation was prevalent in 6.9% of the households, which is far less as compared to studies conducted in the rural areas of Maharashtra (study done by Bharadwaj et al. in 2013)⁽¹²⁾ (67%) and Tamil Nadu (study done by Banda et al. in 2007)⁽¹⁴⁾ (74.2%). In the present study, amongst the 1663 study participants, 1109 felt the need to wear footwear, and those feeling the need were using it. The knowledge that use of soap for hand washing protects disease transmission and is good for health was satisfactory. Similar findings were recorded in another community-based cross-sectional study in West Bengal⁽¹⁵⁾. The present study reported that 46% of the study participants used soap and water to wash their hands, whereas 79.49% of the study participants in a study done in a rural community in Pandve et al. from Pune⁽¹⁶⁾ in the year 2017 were using soap and water for handwashing. There were only 46% of the study participants who had knowledge about

washing hands with soap and water. Those who knew this had the hand washing facility at their homes. Most of the study participants (53%) felt that buying soap for hand washing was expensive; while 54% felt that it was a waste of time to wash hands with soap and water. Thus, this finding underlines the need for creating awareness regarding hand washing. The domestic waste was segregated into 25 households, and bio-degradable waste was dumped in the backyards and was used as manure for plants in the backyard; in the remaining households, both the bio-degradable and non-biodegradable waste was burnt in the premises of the house. These findings highlight the study participants' negligent behavior, which may be due to a lack of awareness regarding segregation, health hazards of burning domestic waste, and/or a lack of sense of responsibility towards the environment. Literacy was found to be significantly associated with the awareness regarding the usage of sanitary latrine⁽¹²⁾, footwear⁽¹³⁾, hand washing^(13,16), and domestic waste disposal^(13,15), which is comparable to the findings of other studies. The findings of the present study are alarming, taking into consideration the aim to achieve the SDGs by 2023 and warrant immediate action at individual, community, and national levels.

Conclusions

There is water available in all the households. However, Open defecation is practiced in the study area. The awareness regarding sanitation, footwear use, hand washing and domestic waste disposal is better in literate study participants. The study highlights the need of public awareness regarding safe sanitation, footwear use, hand washing, and domestic waste disposal in Southeastern Maharashtra, in order to achieve SDG 6 by 2030.

Acknowledgement

The authors sincerely thank Mr. Joshi, Sparsh Rural Hospital, Sastur, Dharashiv; for his support during data collection.

Conflict of Interest: Nil

Source of Support: Nil

Copyright © 2024 Bharati Vidyapeeth Medical Journal (BVMJ). This is an open access article, it is free for all to read, download, copy, distribute, adapt and permitted to reuse under Creative Commons Attribution Non - CommercialShareAlike: CC BY-NC-SABY 4.0 license.

ORCID

Rachhanaa S Pawaskar  0000-0003-4276-9953

Ethical consideration

Institutional Ethics Committee Approval was taken.

Authors' Contribution

RP: Conceptualization and designing of the research study, Data collection, implementation, data analysis, Interpretation and manuscript writing, Reviewing and approving the final version of manuscript; GV: Conceptualization and designing of the research study, Interpretation and manuscript writing, Reviewing and approving the final version of manuscript.

Data availability statement

Data will be available with corresponding author on request

References

1. Government of India. Swachh Bharat Mission – Grameen. Department of Drinking Water and Sanitation. Ministry of Jal Shakti. Available at: <https://swachhbharatmission.gov.in/sbmcms/index.htm>. Accessed on 10 Oct 2020.
2. Bharat GK, Dkhar NB, Abraham M. Aligning India's Sanitation Policies with Sustainable Development Goals (SDGs) The Energy and Resources Institute (TERI) Discussion Paper. 2020 Jan. Available at: <https://www.teriin.org/sites/default/files/2020-01/aligning-Indias-sanitation-policy-with-the-SDGs.pdf>. Accessed on 23 Oct 2020.
3. Behera MR, Pradhan HS, Behera D, Jena D, Satpathy SK. Achievements and challenges of India's sanitation campaign under clean India mission: A commentary. *J Educ Health Promot*. 2021 Sep 30;10:350.
4. The Hindu Data Team. Is rural India 100% open defecation-free like Swachh Bharat data concludes? *The Hindu*. 2020 Jan 2. Available at: <https://www.thehindu.com/data/data-mismatch-is-rural-india-100-open-defecation-free-like-swachh-bharat-data-concludes/article30460909.ece>. Accessed on 02 Jan 2020.
5. Progress on Household Drinking Water, Sanitation and Hygiene 2000-2017. Special Focus on Inequalities. United Nations Children's Fund (UNICEF) and World Health Organization (WHO), New York. 2019. Available at: <https://www.unicef.org/reports/progress-on-drinking-water-sanitation-and-hygiene-2019>. Accessed on 05 Jan 2020.
6. Coffey D, Gupta A, Hathi P, Spears D, Srivastav N, Vyas S. Understanding Open Defecation in Rural India: Untouchability, Pollution, and Latrine Pits. *Econ Polit Wkly*. 2017 Jan 7;52(1):59-66.
7. Novotný J, Hasman J, Lepič M. Contextual factors and motivations affecting rural community sanitation in low- and middle-income countries: A systematic review. *Int J Hyg Environ Health*. 2018 Mar 1;221(2):121–33.

8. Anand T, Rahi M, Sharma P, Ingle GK. Issues in prevention of iron deficiency anemia in India. *Nutrition* 2014 Jul 1;30(7-8):764-70.
9. United Nations Children's Fund (UNICEF). Hand Washing. Available from: http://www.unicef.org/wcaro/overview_4553.html. Accessed on 02 Jan 2020.
10. Sharma NC. Government survey finds 80% rural households lack garbage collection facilities. *The Mint*. 2019 Nov 25. Available at: <https://www.livemint.com/news/india/government-survey-finds-80-rural-households-lack-garbage-collection-facilities-11574658722645.html>. Accessed on 27 Nov 2019.
11. Wani RT. Socioeconomic status scales-modified Kuppuswamy and Udai Pareekh's scale updated for 2019. *J Family Med Prim Care*. 2019 Jun 1;8(6):1846-49.
12. Bharadwaj A, Surana A, Mithra P, Singh A, Panesar S, Chikkara P. A community based cross sectional study on use of sanitary latrine in a rural setup in Maharashtra. *healthline*. 2013;4(1):89-93.
13. Veerapu N, Subramaniyan P, Praveenkumar BA, Arun G. Promotion of sanitation and hygiene in a rural area of South India: A community-based study. *J Family Med Prim Care*. 2016 Jul 1;5(3):587-92.
14. Banda K, Sarkar R, Gopal S, et al. Water handling, sanitation and defecation practices in rural Southern India: A knowledge, attitudes and practices study. *Trans R Soc Trop Med Hyg*. 2007 Nov 1;101(11):1124-30.
15. Ray SK, Dobe M, Maji S, Chakrabarty D, Roy AS, Basu SS. A pilot survey on hand washing among some communities of West Bengal. *Indian J Public Health*. 2006 Oct 1;50(4):225-30.
16. Pandve H, Chawla P, Giri P, Fernandez K, Singru S. Study of hand washing practices in rural community of Pune, India. *Int J Community Med Public Health*. 2016 Jan;3(1):190-93.