

# Assessing high-profile public messaging for sanitation behaviour change: evidence from a mobile phone survey in India

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*The UN Sustainable Development Goals call for the elimination of open defecation by 2030. Assessing global progress will require learning from India's sanitation efforts because of its ambitious program of high-profile behavior change messaging to tackle open defecation, and because open defecation is widespread in India. In 2014, the Prime Minister announced a policy called the Swachh Bharat Mission (SBM), which aimed to eliminate open defecation by 2019. However, the 2015–16 National Family Health Survey –4 found that about 55% of rural and 11% of urban Indian households lack a toilet or latrine. To assess the extent of public awareness of the SBM, we use a mobile phone survey to ask about people's knowledge of the existence and purpose of the SBM. We report representative estimates of awareness of the SBM among adults in Delhi (2016), Uttar Pradesh (2016), Mumbai (2016–17), Rajasthan (2016–17), Bihar (2018), Jharkhand (2018), and Maharashtra (2018). While much of the SBM's activities took place in its last two years, we find that, at the time of the survey, no more than one-third of adults in any state are aware that the SBM intends to promote toilet and latrine use. Awareness was particularly low in Uttar Pradesh, where one in eight people who defecates in the open worldwide lives. While the SBM was very active in constructing latrines, the lack of awareness we find suggests that the SBM was less successful in raising the awareness required for large-scale behavior change in promoting latrine use.*

**Keywords:** behaviour change, health, India, open defecation, Swachh Bharat Mission (SBM)

A LARGE BODY OF RESEARCH establishes the importance of sanitation for child survival and health (Esrey et al., 1991; Cutler and Miller, 2005; Fink et al., 2011; Preston and Haines, 2014; Kayser et al., 2019). Yet, around the world, nearly a billion people defecate in the open; that is, they defecate outside without using a toilet or latrine. The faeces that they leave in the environment spread parasites and other diseases.

Among the United Nations Sustainable Development Goals (SDGs) is the worldwide elimination of open defecation by 2030 (WHO and UNICEF, 2017). That means it is of global importance to understand programmes and policies

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targeting sanitation behaviour. India is an especially important case to learn from: nearly 60 per cent of those worldwide who defecate in the open live in India (WHO/UNICEF JMP, 2012), a country where high population density exacerbates the threat of open defecation (Hathi et al., 2017). Indeed, according to the 2015–16 National Family Health Survey-4, about 55 per cent of rural households and 11 per cent of urban households do not have a toilet or latrine.

India is also an important case to learn from because of recent, high-profile political attention paid to rural sanitation policy. In 2014, the Prime Minister of India launched the Swachh Bharat Mission (SBM, Hindi for ‘Clean India Mission’), which was intended to end open defecation, and also improve waste management. Considering the importance of open defecation to health in India ((Hathi et al., 2017), it is understandable that India would choose a goal even more ambitious than the SDGs. But it is also a challenging goal. A wide range of statistical sources agree that open defecation in India has long been declining at the slow speed of one percentage point per year: meeting the SBM goal would have required accelerating this decline 12-fold, starting in 2014 (Coffey and Spears, 2017).

What can global sanitation efforts learn from the SBM? A key challenge is that accelerating the decline of open defecation principally requires changing the choices and behaviour of hundreds of millions of people. Yet, despite its high profile, the design of the SBM is similar to prior government sanitation programmes such as the Total Sanitation Campaign and the Nirmal Bharat Abhiyan: while aiming to change sanitation behaviour, it focuses on constructing latrines. Indeed, only a small fraction of the central government’s SBM budget – 3 per cent – is devoted to what government documents call ‘information, education, and communication’ (MoDWS, 2017). Yet, the experience of prior sanitation programmes suggests that the SBM cannot succeed if it is simply another rural construction scheme: many people in India do not use functional latrines that they already have, and many more choose not to make or buy a latrine that they could already afford (Coffey et al., 2017b).

Is the SBM succeeding in spreading the message that the government would prefer people to use toilets and latrines rather than defecate in the open? Unfortunately, it is impossible to know: there is no credible, nationally representative, independent survey to track and manage the decline in open defecation over time. There are clear discrepancies in measuring how successful the SBM has been overall, with one government survey claiming that 93 per cent of rural households had access to latrines by early 2019 (MoDWS, 2019), and another finding that over 25 per cent of rural households did not have a latrine at the end of 2018 (MoSPI, 2018). Despite reports of improvements in latrine access, a study of four north Indian states (Gupta et al., 2019) found significant open defecation even among latrine owners: across Madhya Pradesh, Uttar Pradesh, Rajasthan, and Bihar, among those who do and do not own latrines, approximately 44 per cent of individuals over the age of two defecate in the open. What is critical for health is the use of latrines, and latrine use behaviour will not change unless people are aware of the imperative to change the way they defecate. Therefore, this paper focuses on the SBM’s success in making people aware of its goal of behaviour change. We have conducted a representative mobile phone survey in Delhi, Mumbai, urban Uttar Pradesh, rural Uttar Pradesh, urban Rajasthan,

rural Rajasthan, urban Bihar, rural Bihar, urban Jharkhand, rural Jharkhand, urban Maharashtra, and rural Maharashtra which aimed to answer a simple question: are Indians aware of the goal of the SBM to promote the use of toilets and latrines?

The remainder of the paper proceeds as follows. In the Methods section, we describe the mobile phone data collection process, and the specific questions used to assess awareness. In the Results section, we present survey findings about the extent of awareness across urban and rural areas of each state, by sex and levels of education. We explore the implications of these findings in the Discussion.

## Methods

We use data from a mobile phone survey called the Social Attitudes Research, India (SARI) survey, which measures opinions on a range of public policies in India. From March 2016 to August 2018 we conducted a survey of 13,783 randomly selected adult respondents in Delhi, Mumbai, Uttar Pradesh, Rajasthan, Bihar, Jharkhand, and Maharashtra. Delhi and Mumbai are large cities where residents are perhaps most likely to be familiar with the policy goals of the central government. We interviewed people in Maharashtra as an example of a large, non-southern state that has made relatively more progress on sanitation than many of the large, northern states: the 2011 Census found that less than half of households in Maharashtra did not have a toilet or latrine. We interviewed people in Uttar Pradesh, Rajasthan, Bihar, and Jharkhand because, in contrast, they all have very high fractions of people who defecate in the open: the 2011 Census found that about 65 per cent of households in Uttar Pradesh and Rajasthan and 77 per cent of households in Bihar and Jharkhand did not have a toilet or latrine. Indeed, because of its large population of about 200 million people, one-eighth of people worldwide who defecate in the open live in Uttar Pradesh. Uttar Pradesh must therefore be central to any sanitation behaviour change effort.

### *Sampling and respondent selection*

Interviews were conducted by phone. Representative samples in each state were constructed by using probability-weighted random digit dialling and within-household respondent selection. Ten-digit mobile phone numbers were created by combining five-digit serial numbers that the Telecom Regulatory Authority of India (TRAI) issues to mobile phone companies for each mobile phone circle, with five digits that are randomly generated. The number of times a particular five-digit serial code is used is proportional to the number of subscriptions that each mobile phone company has issued. SARI interviewers call these mobile phone numbers in a random order.

Within households, male and female adult respondents ages 18 to 65 were randomly selected from a list of adults in the household to ensure that even individuals who do not own their own mobile phones are included in the sampling frame. Additionally, in later samples, respondents were selected such that even the least educated adults, who may be less likely to participate in a phone survey, were represented in the sample.

**Table 1** Response rates, sample sizes, and survey dates by place

Place	Response rate	Sample size			Dates conducted
	(%)	Men	Women	Total	
Delhi	16	668	573	1,241	March – July 2016
Uttar Pradesh	25	673	700	1,373	March – July 2016
Mumbai	16	1,695	n/a	1,695	August 2016 – May 2017
Rajasthan	25	1,611	1,749	3,360	August 2016 – May 2017
Bihar	20	1,450	1,988	3,438	March – August 2018
Jharkhand		459	551	1,010	March – August 2018
Maharashtra	27	920	746	1,666	April – August 2018

Note: Response rates for Bihar and Jharkhand cannot be calculated separately because Bihar and Jharkhand mobile numbers are pooled into the same mobile circle. State of residence is only known for individuals who began the survey, but not for every valid phone number called.

### *Response rates and weighting*

Table 1 provides sample sizes for each place where the survey was conducted. We note that in Mumbai, only men were interviewed: to make sure that respondents were comfortable, SARI interviewers only interviewed respondents of the same sex, and it was not possible during the time of the survey to find Marathi-speaking female interviewers to conduct interviews with women in Mumbai. Table 1 also shows the months during which the survey was conducted in each place, and the response rate for that place. Response rates are computed as the number of surveys in which a respondent answered at least a third of the survey questions divided by the number of mobile numbers that were valid (as opposed to non-existent or switched off) when they were first called.

The samples sizes shown in Table 1 are consistent with the sizes other representative samples used to analyse awareness of public programmes. Although these response rates may appear low to researchers who are accustomed to working with field survey data collected in face-to-face interviews, they are high compared with phone surveys done in other countries. For example, a Pew Research Center study from the United States found an average response rate of 9 per cent in its 2012 surveys (Kohut et al., 2012).

As is common practice with phone survey data, we weight our results to adjust for the fact that people from some demographic groups were overrepresented in our raw data and others were underrepresented. We use the 2011 Census of India to construct survey weights that account for the intersection of sex (male, female), place of residence (urban, rural), education (no schooling, primary, middle, secondary, above secondary), and 10 age group categories. For more information on the survey, its full questionnaire, and its sampling and weighting strategy, see details in Coffey et al. (2018) and Hathi et al. (2020) describing the SARI survey and methodology. Analyses of the raw data showed that those with less education were less likely to be represented in all samples. Thus, if there is a bias that some Indians are not accessible to a phone-based sampling frame, it almost certainly would bias the sample towards an understanding of the SBM.

### ***Measuring SBM awareness***

Two questions about the SBM were included amidst a survey that asked about a wide range of demographic and social topics. First, respondents were asked, 'Have you heard of the Swachh Bharat Mission?' and an answer of yes and no was recorded.

In the interpretation of the results of this question, it is important to note that there is no verification that a 'yes' answer is correct: respondents could be thinking of another programme, or could be merely trying to appear informed. Then, respondents who had answered 'yes' were asked, 'What does the Swachh Bharat Mission do?' Respondents were encouraged to volunteer as many responses as they wished, and surveyors coded multiple responses using Qualtrics survey software.

In our analysis, we study two variables: the fraction of respondents who reported having heard of the SBM, and the fraction of respondents who have heard of the SBM and included among their responses that its goals involved toilets or latrines (irrespective of how many additional correct or incorrect goals they may have also listed).

### ***Limitations***

A limitation of the present study is that the survey data that we report on here can offer only a small snapshot of the overall progress or stasis of the SBM. To understand the progress of India's decline in open defecation – and especially to learn from possible strategies to accelerate change – more specialized surveys are needed. Nationally representative open defecation tracking data, for careful evaluations of creative latrine use promotion strategies, and for qualitative investigations of rural Indians' understandings of the latrines that they use and the latrines that they do not, should be collected as well (Rosenboom and Ban, 2017).

### ***Ethics statement***

The study was approved by the institutional review board (IRB) at r.i.c.e. (RICE Institute, Inc., #16-003), a research institute for compassionate economics. Verbal consent for the phone interview was taken from all the participants before the interview began; the IRB approved this verbal consent procedure. No compensation was paid to study participants. In order to ensure anonymity, participants' names were not collected, and phone numbers have been removed from the dataset prior to data sharing. Funding for data collection was provided through a centre grant from the Bill & Melinda Gates Foundation. The funder had no involvement in the study design, collection, analysis, or interpretation of the data, or in writing about results.

## **Results**

Table 2 presents the main result: we find that few respondents understand the goals of the SBM. The results for rural places are particularly important because the vast majority of open defecation in India is in rural India: according to

**Table 2** Percentage of respondents who know that the SBM intends to promote latrine use

	Rural UP 2016 (%)	Urban UP 2016 (%)	Rural RJ 2017 (%)	Urban RJ 2017 (%)	Delhi 2016 (%)	Mumbai 2017 (%)	Rural BH 2018 (%)	Urban BH 2018 (%)	Rural JH 2018 (%)	Urban JH 2018 (%)	Rural MH 2018 (%)	Urban MH 2018 (%)
<b>Heard of SBM</b>												
Women and men	36	49	41	60	62	n/a	39	63	43	63	60	74
Women	20	44	32	49	57	n/a	25	51	30	56	55	68
Men	50	54	49	70	65	72	51	73	55	69	65	79
<b>Said SBM is for latrines/OD</b>												
Women and men	7	6	35	32	9	n/a	23	29	27	26	34	30
Women	2	6	21	23	7	n/a	19	24	18	20	34	29
Men	9	7	43	38	10	20	25	32	32	31	34	32
No. of men and women interviewed	920	444	2,229	1,124	1,239	1,694	2,469	961	658	350	991	674

Notes: UP: Uttar Pradesh; BH: Bihar; JH: Jharkhand; MH: Maharashtra; OD: open defecation  
In Mumbai, interviews were only done with men.

the 2015–16 NFHS-4, about 90 per cent of households without a toilet or latrine live in rural, rather than urban, places. Only a small percentage of rural respondents volunteer that promoting toilets or latrines is a goal of the SBM: 7 per cent of adults in rural Uttar Pradesh, 35 per cent of adults in rural Rajasthan, 23 per cent of adults in rural Bihar, 27 per cent of adults in rural Jharkhand, and 34 per cent of adults in rural Maharashtra. Even in more recent years when government efforts have been considerably more intense, no more than about one-third of adults said that the SBM is about latrine use in any of the places we surveyed. Slightly over a third of respondents in rural Uttar Pradesh report having heard of the SBM at all. And in urban Maharashtra, where we found the highest fraction of adults who had heard of the SBM (approximately three-quarters of respondents), still less than one-third of respondents understand that its goal is to promote latrine use.

Overall awareness of the existence of the SBM is lower in rural places and is lowest in rural Uttar Pradesh. In all of the places we study, there is a clear difference by respondent sex: men are more likely than women to have heard of the SBM and to report that the SBM has to do with latrines. Awareness of the SBM's goal is highest in Rajasthan and Maharashtra, yet even here, no more than approximately one-third of adults know that the goal of the SBM is to promote latrine use. In Rajasthan, the gap in knowledge between men and women is greatest: in rural Rajasthan, 43 per cent of men know that the SBM intends to promote latrines while only 21 per cent of women do, and in urban Rajasthan, 38 per cent of men know the SBM's goal while only 23 per cent of women do. Part of the explanation for the lower levels of awareness among women than men, and in rural areas compared with urban areas, may be because of differences in average education and literacy levels, which could influence the effectiveness of large-scale information and awareness campaigns. For example, one prominent campaign led by an international organization was completely in English, and government information in rural areas is often in written form on wall paintings.

Instead of mentioning toilets, latrines, or defecation, respondents who report a goal for the SBM are more likely to claim that it is about general cleanliness, or garbage and litter. Some respondents said that they thought that the Prime Minister wanted people to clean their houses or their villages.

Table 3 shows awareness of the SBM's goal to promote latrine use by respondent education. In many of the places we surveyed (rural and urban Uttar Pradesh, rural Rajasthan, rural Bihar, rural and urban Jharkhand, and urban Maharashtra) people with secondary school education and above are more likely than less-educated people to know that the SBM intends to promote latrine use. The pattern is particularly stark in urban and rural Uttar Pradesh. Although we might expect a government programme to be more able to communicate its goals to more educated people, this finding also suggests that the government is not reaching those people who are most likely to defecate in the open and least likely to adopt latrine use. Coffey et al. (2017a) use panel data from the India Human Development Survey to find that Indian households in which adults had more education in 2005 were more likely to adopt latrines by 2011.

**Table 3** Recognition of latrine use as an SBM goal is concentrated among the most educated

	Rural UP 2016 (%)	Urban UP 2016 (%)	Rural RJ 2017 (%)	Urban RJ 2017 (%)	Delhi 2016 (%)	Mumbai 2017 (%)	Rural BH 2018 (%)	Urban BH 2018 (%)	Rural JH 2018 (%)	Urban JH 2018 (%)	Rural MH 2018 (%)	Urban MH 2018 (%)
<b>Said SBM is for latrines/OD</b>												
Secondary school +	15	12	41	34	9	20	30	35	34	34	32	37
Secondary school	3	2	37	37	10	23	28	22	26	24	26	30
Middle school	7	0	40	25	8	17	19	51	22	11	31	35
Primary school	5	0	39	27	10	19	23	34			38	24
No schooling	3	0	24	34	0	14	15	6	14	25	42	7
No. of men and women interviewed	920	444	2,229	1,124	1,239	1,694	2,469	961	658	350	991	674

Notes: UP: Uttar Pradesh; BH: Bihar; JH: Jharkhand; MH: Maharashtra; OD: open defecation  
 In Mumbai, interviews were only done with men. Sample sizes in Jharkhand were too small for analysis of all education sub-groups.



## Discussion and conclusions

What can this evidence teach sanitation researchers and policy-makers concerned with the Indian case, and what can it teach sanitation professionals and behaviour change efforts worldwide? When we began data collection in 2016, India was approximately halfway through the five-year span of the Swachh Bharat Mission. We find that although a meaningful fraction (ranging from about one-third to three-fourths) of the respondents in each place we surveyed report having heard of the SBM, fewer people are aware of the SBM's goal of promoting latrine use. In rural Uttar Pradesh, which, among the places that we surveyed, has the highest number of people who defecate in the open, awareness of the SBM's goal of promoting latrine use is particularly low and is concentrated among the most educated respondents. For India, these data are clear: both in large cities where it is relatively easy for the government to spread public messages, and in states that are critical to any effort to eliminate open defecation, many people are not aware of the SBM's goal to eliminate open defecation.

Beyond trying to understand how well the SBM is achieving one of its core goals, this investigation also serves an additional pragmatic purpose. The government has made considerable investment in the SBM's visibility and brand. Indeed, the programme's logo, Gandhi-style round glasses accompanied by the words 'Swachh Bharat', is common in newspaper advertisements, official signs and posters, on new 2,000 rupee notes, and throughout government offices. One practical question about this strategy is to ask what the logo connotes to the average citizen. These results indicate that it is unlikely that the mere sight of the SBM logo is likely to make most Indians think about latrines at all. If the connotation of the SBM is not the promotion of latrine use, the visibility of the SBM brand may be doing little to achieve its important goal. If so, this would be an important lesson for India, for the SDGs, and for any country whose policy-makers are considering using such a top-down behaviour change programme to change established health behaviours.

Promoting the use of the millions of latrines that the SBM is funding will require talking about open defecation behaviour: explicitly, repeatedly, and with careful attention to the reasons that many people in rural India give for choosing to defecate in the open. As many researchers have now shown, the persistence of open defecation in rural India is promoted by the norms and ideas of purity and pollution that support the hierarchy of the caste system (Teltumbde, 2014; Routray et al., 2015; Coffey et al., 2017b), and especially by fear of the implications of latrine pits filling and needing to be emptied.

Several recent interventions funded through the International Initiative for Impact Evaluation to overcome these barriers and promote latrine use behaviour have had limited or no success, highlighting even further the difficulty in inducing meaningful change in behaviour (3ie, 2019). For example, one study implemented in six districts in Bihar used community meetings to target barriers to latrine use, such as ambiguity around pit filling rates and emptying, alongside household visits to ask for commitments to latrine use. Despite these efforts, researchers found that

even though latrine access had increased over the course of the intervention due to SBM, toilet use may not be sustained because of the difficulty in changing misconceptions about pit emptying. A study in four north Indian states (Gupta et al., 2019) examined changes in open defecation and latrine ownership between 2014 and 2018, and found that open defecation declined from 70 per cent to 44 per cent among people over the age of 2. This is a meaningful decline in open defecation. However, the study finds that almost all of this change is attributable to increases in latrine ownership, rather than from changes in behaviour among those who own latrines.

Unfortunately, these results may be no surprise in light of the focus of the SBM on latrine construction rather than behaviour change. 'Information, education, and communication' (IEC) activities were limited by the programme guidelines to 3 per cent of the spending at the central level, and even this is often unspent or not concentrated on addressing barriers to rural latrine use. Indeed, the policy institute Accountability Initiative's 2019–20 Budget Brief (Kapur and Deshpande, 2019) indicates that the SBM overall never met the benchmark of utilizing the SBM's full allocation for IEC activities in any year of the programme. Our findings also resonate with a separate Accountability Initiative survey by Kapur et al. (2016), which documented that latrine construction alone accounted for 97 per cent of the total expenditure between April 2015 and February 2016, and spending on IEC had fallen under the SBM from 3 per cent of total expenditure in 2014–15 to only 1 per cent in 2015–16. The study also surveyed villagers in 10 districts, across five states. In only 1 out of the 10 districts were more than 15 per cent of rural respondents aware of any type of sanitation promoter. Other studies of sanitation IEC activities in rural India have uncovered comparable challenges (Boisson et al., 2014).

Our results highlight the challenges facing public behaviour change programmes in any country where education and literacy are low (Dutta-Bergman, 2005) or where state capacity is low (Slutkin et al., 2006; Swaminathan and Thomas, 2007). More broadly, we contribute to a literature in development economics that documents that programmes and policies are often not implemented nearly as completely as described in official documentation (World Bank, 2003; Chaudhury et al., 2006; Banerjee et al., 2008).

These results also may offer implications for researchers and policy-makers interested in behaviour change programmes and policies in any developing country. First, while SARI was not intended to track the progress of the SBM, phone surveys can be a useful tool in assessing programme effectiveness in real time. And second, state capacity and the attendance, effort, and monitoring by ground-level public staff are well-recognized to be key constraints in development economics and policy (World Bank, 2003; Chaudhury et al., 2006; Banerjee et al., 2008). Our data about the SBM suggests that, so far, even high-level political attention and high-profile mass messaging have not proven to generate effective awareness, and may not be an adequate substitute for ground-level bureaucratic staff (Coffey and Spears, 2017).

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