INTRODUCTION

Background of Study

In the past five years, the Swachh Bharat Mission (SBM), the Government of India's flagship sanitation scheme, oversaw latrine construction throughout rural India at an unprecedented scale. This strong push for latrine construction has led to a notable increase in latrine access among households in rural India. However, just because someone owns a latrine does not mean they regularly use it. Questions remain about the extent to which new latrine owners consistently use the latrines they have built with the help of SBM subsidies. To address the challenge of ensuring new latrine owners use their latrines instead of continuing to practice open defecation (OD), 8% of the total budget for the rural SBM is allocated for information, education, and communication (IEC) activities aimed at promoting latrine use and eliminating open defecation.

To better understand how latrine owners—especially those who recently built their latrines through financial assistance from the Swachh Bharat Mission (Gramin)—perceive and use their latrines, we conducted a study of 1,872 latrine-owning households in Manigachhi block, Darbhanga district, Bihar. In addition, we designed and tested a series of low-touch nudges aimed at increasing latrine use among latrine owners. In this report, we present the results of a randomized controlled trial of the nudge intervention, as well as findings from the complementary survey and qualitative research. We also share our recommendations for future sanitation programming.

Questions We Answer

- What types of latrines do households in this geography have?
- Where do individuals with household latrine access defecate?
- How do individuals perceive their latrine(s)?
- What sanitation messaging and communications do households recall hearing in the past few months?
- How do three key behavioural barriers—anxiety over pit-emptying, gender norms, and experience of latrine use—impact the perception and use of latrines?
- Can a set of low-touch nudges reduce the salience of these three behavioural barriers and thereby reduce open defecation rates?

1. The most recent official statistics are available on the SBM online dashboard: https://sbm.gov.in/sbmdashboard/
ABOUT THE INTERVENTION

Together with our implementing partner FINISH Society, we designed and tested a set of seven nudges aimed at promoting latrine use and thereby reducing open defecation. A nudge is “any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid.” True to the definition of a nudge, the intervention was low-cost, easy to implement, and easy to avoid. The nudges sought to change the choice architecture surrounding latrine use by diminishing the salience of behavioural barriers to latrine use.

Behavioral Barriers

To design our nudges, we first partnered with ideas42, an organisation specialising in behavioural science for policy and programming, to determine the key behavioural barriers to latrine use in rural Bihar. Through reviewing the existing literature and conducting field visits, we selected three critical behavioural barriers for our focus:

1. Pit-emptying: Individuals may be anxious that their pits will fill, but they might underestimate how long this will take. In addition, people of all castes may wish to avoid emptying their latrine pits since this activity is considered impure and was historically performed by the lowest castes, often against their will. Finally, people do not fully understand the process that must be undertaken to empty a pit. Together, these three factors lead to a faulty mental model of latrines as a limited resource. Therefore, latrines are a source of anxiety and uncertainty, and latrine owners have a lower motivation to use their latrines. In our survey, 70.2% of respondents reported worrying about the fact that their pit would fill, while 37.1% of respondents felt confident they would be able to find an acceptable pit-emptying method when needed.

2. Gender norms: Men and women understand latrines as primarily intended for use by women in the home. For example, in our baseline survey, 94% of respondents say women’s use of latrines is more important than men’s, and only half of respondents believe that it is appropriate for women and men to share the same latrine.

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In addition, 99% of respondents in our baseline survey agree with the statement that protecting the dignity of women is a primary reason for owning a latrine. These factors, combined with a large average household size, may lead men to choose open defecation and reserve the household latrine primarily for women’s use.

3. **Convenience and experience:** Many people may find latrine use unpleasant and consider it an inconvenience or hassle. In addition, households may struggle with finding the right materials and time to clean their latrines. For example, 67.3% of respondents in our survey report that cleaning and maintaining their latrine is a lot of work.

**Nudges**

We designed nudges aimed at addressing each of these behavioural barriers. The nudges were created through an iterative process—we started with a list of hundreds of potential designs and shortlisted the seven most promising designs together with input from a variety of sanitation stakeholders. The nudges were prototyped in the field before each design was finalised. The following lists each nudge, grouped by the behavioural barrier it addresses:

1. **Pit-emptying barrier**
   - Pit-emptying poster that visually displays how pit-emptying works and how to determine when a pit is ready to be emptied
   - Expected date of pit-emptying written on the pit-emptying poster that is unique to each household and provides approximate timing for when the household’s latrine pit(s) will need to be emptied

2. **Gender norms barrier**
   - Poster of family near latrine along with health messaging intended to frame latrine use as an activity for the whole family
   - Latrine use schedule to help households coordinate latrine use between the men and women of the household and reduce waiting time for latrine use.

3. **Convenience and experience barrier**
   - Fresh coat of paint for latrines that are not already painted to increase the salience and pleasantness of the latrine
   - Radio fixed inside latrine to provide an opportunity for entertainment while using the latrine and to reframe latrine use as an enjoyable experience
   - Toilet kit of cleaning supplies including a brush, phenyl, and Odonil to facilitate cleaning and make latrine use more pleasant.  

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**Figure 1: Behavioural barriers and related nudges**

<table>
<thead>
<tr>
<th>Anxiety and uncertainty around pit-emptying</th>
<th>Pit-emptying Poster</th>
<th>Expected date of Pit-emptying</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latrines framed and understood as primarily for women’s use</td>
<td>Family with Latrine poster</td>
<td>Male/Female toilet use schedule</td>
</tr>
<tr>
<td>Sub-optimal experience of using latrines relative to OD</td>
<td>Fresh coat of paint</td>
<td>Radio affixed inside latrine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toilet kit: cleaning supplies</td>
</tr>
</tbody>
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6. Odonil is a widely available air-freshening product in India.
KEY EXPERIMENTAL FINDINGS
Below, we present findings from our randomised controlled trial.

1. Low-touch nudges did not reduce open defecation rates

Figure 2 shows the main respondent open defecation rates for households in the treatment group who received the nudges and households in the control group who did not receive the nudges. We find no statistically significant difference between the two groups (23.3% of respondents in the control group reported open defecation compared to 22.5% in the treatment group). This result is the same for all other measures of open defecation. Thus, we cannot rule out the possibility that the intervention had no effect on open defecation behaviour.

2. Low-touch nudges reduced the salience of the experience barrier, but did not reduce the salience of the pit-emptying and gender barriers to sustained latrine use.

Figure 3 shows the treatment effect (difference between the treatment group who received the nudges and the control group who did not) of the nudges on the salience of each behavioural barrier. The barrier salience is measured using an index that combines responses to a set of questions assessing the strength of each barrier. Overall, we find no statistically significant treatment effects of the nudges on the pit-emptying and gender barriers. We do, however, find a statistically significant effect of the nudges on our measure of the experience barrier.

KEY SURVEY FINDINGS
Below, we present findings from our survey of 1,872 households, with 4,207 total respondents.

3. Nearly all latrine owners we surveyed use their latrine at least occasionally, but almost a quarter also sometimes defecate in the open.

Our study asked respondents to report on their defecation practices in a unique way. Rather than asking about respondents’ usual practices, we allowed respondents to report both defecating in the open and/or using their latrine within the past week. In addition, we asked each main survey respondent (1 per household) to report the practices of every other household member. This allows us to analyse the extent to which people exclusively use their latrine, exclusively defecate in the open, or practice both.
Figure 4 presents our primary measures of open defecation. We find that 24.6% of households have at least one member who defecates in the open at least once per week. We find that 23% of main respondents (n=1,792) practiced open defecation at least once per week, while 21.3% of all respondents over the age of 18 (n=4,207) practiced open defecation at least once per week. We also find that 7% of all respondents and 2.6% of main respondents practice exclusive open defecation.

Overall, we find that exclusive open defecation rates are quite low compared to ocasional open defecation rates. Most latrine owners use their latrines at least occasionally, but almost a quarter of latrine owners we surveyed also occasionally defecate in the open.

4. Most households we surveyed had single-leach pit latrines. Often, these latrines were built without full knowledge of the different available types of latrines (single-pit vs. twin-pit) and the costs and benefits of each.

Figure 5 provides a breakdown of the types of latrines owned by the households in our sample. Pit latrines are defined as any latrine with one or two small pits, where neither pit is a septic tank. We defined latrines as septic tank latrines when 1) people self-reported that they had a septic tank and/or 2) the containment structure consisted of a large, sealed container shaped like a box. This is how septic tanks are most often designed in this region. Septic tank latrines are more expensive and often older than pit latrines. In addition, they are not a focus of the SBM. In order to approximate a sample that represented the target audience of the SBM, we excluded households owning septic latrines from our sample. Therefore, our breakdown of latrine types is only for those that are pit latrines to begin with.

The majority of pit latrines are leach-pit latrines, which allow for liquid to leach from the pit into the ground. About 7% of households had pit-style
latrines that did not leach, in some cases since households had sealed their latrine pits themselves or requested a contractor to do so.

Overall, 61.5% of latrines were single-pit latrines, while 24.4% were double pit. This presents a challenge for future faecal sludge management (FSM). Twin-pit latrines are composting—once one pit is filled, waste is diverted to the second pit while the first is left untouched to complete the composting process. In a single-pit system, waste cannot be diverted. Given this, the contents of a single pit must be emptied as soon as it is full and before composting can take place.

The prevalence of single-pit latrines may be explained by a lack of information among households about best practices for latrine construction. 44% of respondents reported that they were not aware of the different types of available pits when their latrines were constructed.

5. Of those who have emptied latrine pits before, only 17% practiced self-emptying. In terms of preferences, pit emptying by machine is the most preferred method for pit-emptying, followed by emptying by a manual scavenger.

We asked respondents two key questions on pit emptying. Firstly, whether they had ever had a latrine they owned emptied in the past. Secondly, we asked about their most-preferred methods of pit-emptying.

Among those who have previously had a latrine pit emptied (14.5% of all respondents), only 17% practiced self-emptying. One-third used machine emptying, and about half hired a manual scavenger.

Figure 6 provides a breakdown of the preferred emptying methods. 71% of all respondents listed emptying by a machine as their most-preferred method of pit-emptying. We find no significant differences in pit-emptying preferences between single-pit and double-pit latrine owners.

During in-depth interviews, respondents mentioned the high availability of pit-emptying machine services in the area along with time and cost as key factors that make pit-emptying by machine the most appealing method. In some cases, the reduced time for emptying by machine relative to manual emptying may make the total cost of machine emptying lower than manual emptying.

The second most preferred pit-emptying method is emptying by a manual scavenger, with 23% of respondents listing this as their most preferred option. Preferences for manual scavenging persist despite the illegality of the practice. Manual scavenging is highly associated with caste identity—most manual scavengers come from a small set of lower-caste groups. Nonetheless, based on our survey, preferences for machine and manual emptying are broadly similar across upper-caste and lower-caste groups.

6. Most individuals surveyed recalled encountering sanitation messages from NGO workers, television, and friends and family. Health benefits and purity were the most frequently recalled messages, followed by convenience or comfort and women’s dignity.

As per Figure 7, the three most common means through which respondents recalled hearing sanitation related messaging in the recent past were visits by NGO workers (recalled by 24.1% of respondents), television (22.7%), and from family and friends (22.6%).

Figure 7: Commonly recalled means of hearing sanitation messaging

- Visit by NGO worker: 24.1%
- Television: 22.7%
- Friends/Family: 22.6%
- Self-help Group: 10.1%
- Nigrani Samiti: 8.9%
- Newspaper/Magazine: 8.3%
- Home visit by Swachhagrahi: 5.6%
- All other sources: 12.4%

*All other sources include: Home visits by ASHA/AWW/ANM workers, text message, voice messages, WhatsApp, posters, Facebook, audio speakers, audiovisual vans, nukkad nataks and melas/rallies.

As per Figure 8, health benefits (recalled by 48.6% of respondents), purity (39.5%), convenience or comfort (29.5%), and protecting the dignity of women (26.5%) were the most commonly cited reasons for using latrines. Overall, more people recalled hearing messages through interpersonal communication than through media sources, with the exception of television.

Figure 8: Commonly recalled messages

- Health Benefits: 48.6%
- Purity: 39.5%
- Convenience/comfort: 29.5%
- Dignity of women: 26.5%
- Privacy: 15.0%
- Benefits of women: 13.4%
- Latrine construction: 11.4%
- All others: 25.8%
7. Anxiety and uncertainty around pit-emptying are present, but are not a binding constraint to latrine use.

As per Figure 9, 70.2% of respondents report that they are anxious that their latrine pit(s) will fill up, and only 37.1% of respondents report that they are confident they will find a way to empty their latrine pits once they are full. Together, these findings suggest that people do worry about needing to empty their pits. Nevertheless, this worry may not have much effect on defecation practices and behaviour. Only 14.5% of respondents say that they use their latrine less frequently due to worry over pit-emptying. The findings from our qualitative research support this conclusion. Many individuals we spoke to were nervous about the cost and process of pit-emptying, but also realised that they would, eventually, find an acceptable solution to empty their pits such as pit-emptying machines. The positive aspects of latrine use may outweigh worry over pit-emptying when people choose whether or not to use their latrine.

![Figure 9: Pit-emptying](image)

8. Men and women both believe toilets are primarily for women’s use and dislike sharing the same latrine among household members of different genders.

As per Figure 10, nearly all respondents, 97.8%, agreed that it is more important for women to use latrines than for men to use latrines. In addition, only 51.4% of respondents believe that it is alright for men and women to use the same latrine. Latrines are clearly understood as primarily intended for women’s use. We learned from our qualitative assessment that men and women often have difficulties using the latrine when they need to. This is due to the large number of people in each household that share a single latrine. In addition, men practice open defecation significantly more than women (28% of men versus 20% of women reported practicing open defecation within the past week). Taken together, these findings demonstrate that latrine use is often framed and understood as a primarily female activity.
9. Most respondents enjoy using their latrines and prefer latrine use to open defecation. However, some face difficulties cleaning and maintaining their latrines.

As per Figure 11, nearly all respondents (99.2%) report that they enjoy using their latrine. Few respondents report that they find open defecation more pleasant than latrine use, and 93% of respondents find latrine use to be more convenient than open defecation, especially since open defecation often requires taking a long walk to the field early in the morning. Overall, these findings paint a broadly positive view of people’s experience using their latrines. Despite this positive assessment of latrines, some households do face difficulty keeping their latrines clean. 67.3% of main respondents say that cleaning their latrine requires a lot of work, and 22.3% say that their latrine is dirty.

**RECOMMENDATIONS**

1. Nudges promoting latrine use are not a promising method to address persistent open defecation. The right approach to ending remaining open-defecation behaviour would need to focus on changing behaviours, norms, and perceptions of the practice of open defecation itself rather than promoting latrine use and would also need to be more intensive than low-touch nudges.

Our nudges were created and prototyped through a thorough design process and, overall, implemented properly in most households. Nevertheless, we identified two upstream challenges to the effectiveness of the nudge intervention that may have hindered the nudges’ effectiveness:

- **Targeting persistent behaviour**: Exclusive open defecation rates are very low. Based on the qualitative assessment, those who continue to open defecate have highly persistent behaviour that is often influenced by structural factors, such as a lack of latrines near agricultural fields or a large number of family members sharing one latrine. Nudges, which are a low-touch class of intervention, may not be well-suited to catalyze behaviour-change among individuals who continue to practice a behaviour despite access and availability to a latrine.
Targeting the right behaviour: Open defecation and latrine use are not perfect substitutes. Based on the qualitative assessment, those who continue to practice open defecation often do so not because they dislike latrine use but because they prefer open defecation or face structural challenges to sustained exclusive latrine use. Our nudges sought to promote latrine use through increasing the ease of use and salience of latrines, which did not decrease open defecation. Targeting the practice of open defecation more explicitly would be better.

These two challenges impacted each set of nudges differently. The nudges addressing the pit-emptying barrier did not change behaviour due to the easy availability of machine-emptying services and manual scavenging. The nudges addressing gender norms were not strong enough to change the salience of these norms. The nudges addressing experience, while improving people’s perceptions and experience of latrine use, did not address open defecation directly and thus did not change open defecation rates.

Impact evaluations often are associated with a discussion on how the quality of implementation could affect results. Our implementation quality was in line or better than what could be expected by real-world nudge implementation. Additionally, it is important to note that the central challenges we identified to the effectiveness of nudges are upstream of implementation. The quality of implementation could possibly be a reason for intervention failure in a world where these upstream challenges do not exist, but in the current circumstance implementation quality is not the binding constraint to nudge effectiveness.

2. Most latrine owners use their latrines, but many latrines are single-pit. This necessitates a focus on rural faecal sludge management (FSM) policy to ensure pit contents are properly handled once new latrines are ready to be emptied.

Single-pit latrines need to be emptied before the contents of the pit can be adequately composted. Solutions are required to ensure that the contents of single-pit latrines are not disposed untreated into nearby fields. Potential solutions include constructing more faecal sludge treatment plants and co-treatment sewage treatment plants, retrofitting single-pit into double-pit latrines, and developing safe methods of constructing trenches in farmland.

3. To promote sustained latrine use, focus on cleanliness.

We found that providing people with cleaning materials reduces the perceived unpleasantness of latrines, increasing the enjoyability of latrine use. Most of the latrines we encountered (61%) were constructed in the past year through the Swachh Bharat Mission. As this latrine infrastructure ages, ensuring that families continue to care for and invest in maintaining their latrines may be a crucial component of ensuring the sustainability of the program. Providing cleaning supplies for families may play a role in helping ensure continued upkeep of latrines by building the habit of caring for the latrine and improving the overall pleasantness and experience of latrine use. Future research should focus on this and other factors that may promote a greater sense of ownership and willingness to invest in one’s latrine.

4. Future behaviour-change campaigns should frame latrine use as an activity that is important for both men and women.

We find that latrines are primarily understood as being intended for use by the women of the household. Future behaviour change campaigns should frame latrine use as an activity that is relevant for both men and women in order to help promote greater latrine use among men. While our nudges did not succeed in accomplishing this, we do find gender norms to be a salient barrier. An approach that is successful at changing gender norms around latrine use may also be able to lead to an increase in latrine use and decrease in open defecation.
5. Many people open defecate due to a lack of latrine access near their workplace, especially if they work in agricultural fields. Promoting safe alternatives through continued latrine construction or the “cat method” can help ensure better health.

During our qualitative fieldwork, we learned that some people practice open defecation due to distance between their workplace and their household latrine. Workplaces such as fields may not provide easy access to a latrine. Future policy making should focus on providing safe sanitation infrastructure in these areas or promoting practices that have fewer health consequences. One such method would be digging a small hole for defecation and covering the hole after finishing, or placing sand/dirt on faecal matter after defecating. Research should assess whether this method is safer than open defecation.

6. In many cases, latrines are very near to household water sources. Rigorous measurement of water quality should be undertaken to determine if nearness of pit latrines to drinking water poses a health risk for some households.

Throughout our study, we noted that many latrines are located very near to household water sources. This may lead to poor water quality and contamination. Future studies should assess the relationship between water quality and the proximity of latrines to water sources.

APPENDIX: STUDY METHODOLOGY

Data Collection

Our study analysed households in 24 randomly selected villages in Manigachhi block, Darbhanga district, Bihar that own pit-latrines (single or double) but do not own septic latrines. These households most closely approximate the households targeted by the Swachh Bharat Mission (Gramin) in the past five years. Our data collection comprised two household surveys (baseline and endline) and a set of semi-structured qualitative interviews. The baseline household survey took place in January 2019 and the endline survey in May 2019. Implementation of the nudge intervention took place over February-March 2019. Qualitative interviews were conducted over the course of one week in June 2019.

Sample

All study activities were conducted in Manigachhi block, Darbhanga district, Bihar with rural households. We chose Darbhanga district due to pre-existing research capacity in the area. We selected Manigachhi block for its similarity to the average block in northern Bihar on key demographic variables, along with its relatively low water table level. The presence of a low water table helps us avoid concerns about water quality due to nearness of latrines to drinking water sources. We obtained the list of villages in the block from the village directory of the Population Census 2011, and randomly sampled 24 villages from this list. In each study village, all pit-latrine owning households that did not own septic latrines were included in the study.

The baseline survey covered 1,872 households, and of these, 1,792 (96%) were successfully relocated and surveyed at endline. In each household, we interviewed one main respondent who provided information about themselves and other members of the household. Two out of every three respondents were female, reflecting greater availability of female respondents in households at all hours of the day. We conducted an additional set of semi-structured qualitative interviews with study households after the endline survey. The households chosen for semi-structured interviews varied on open defecation status, change in open defecation status between baseline and endline, and demographic characteristics including caste, religion, and socioeconomic status.
Key Activities

The household survey included questions related to general demographics, open defecation practice in the household, the salience of the three key behavioural barriers to latrine use, latrine infrastructure, and exposure to sanitation schemes and messaging. The endline survey additionally probed engagement with the implemented nudges. The qualitative interviews included follow-up questions aimed at generating a better understanding of why people choose their current defecation practices and their experiences of the intervention.

Data collection was carried out by IDinsight along with a trusted team of enumerators. We followed best-practice in data quality assurance, including timing-triggered audio audits, high-frequency quality checks, and a digital data collection interface designed to prevent illogical entries. In addition, we extensively piloted survey questions to ensure maximum comprehension and to avoid leading questions and promote honest answers.

In between the baseline and endline surveys, we randomly allocated one third of the study households to receive the behavioural nudge intervention (covered in detail above). The remaining two-thirds of study households received a solar lamp as a placebo intervention. We were worried about spillovers from treatment to control households. We realised during prototyping that while control households were aware the treatment households had been given “something,” they did not know the details of the intervention. Hence we decided to provide a placebo that would not be expected to affect outcomes, but would give control households the sense that they had been provided “something.” We validated this through the qualitative interviews.

Characteristics of the Population

• 61% of main respondents are female
• 50% are literate
• 45% primarily do housework, 24% non-agricultural work, and 17% agricultural work
• 28% upper caste, 51% OBC, and 17% SC/ST
• 79% Hindu, 20% Muslim, 1% other
• Average household has 5 members
• 92% of households own only one latrine
• 17% had ever had one of their latrine pits emptied
• 61% constructed their latrine within the past year
• 61.5% single leach-pit latrines, 24.4% double leach-pit latrines

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