



A randomized, controlled study of a rural sanitation behavior change program in Madhya Pradesh, India

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Sector	Water and Sanitation
Abstract	<p>Poor sanitation and open defecation are thought to be a major cause of diarrhea and intestinal parasite infections among young children. In 1999, India launched the Total Sanitation Campaign with the goal of achieving universal toilet coverage in rural India by 2012. This paper reports on a cluster-randomized, controlled trial that was conducted in 80 rural villages in Madhya Pradesh to measure the effect of the program on toilet access, sanitation behavior, and child health outcomes. The study analyzed a random sample of 3,039 households and 5,206 children under five years of age. Field staff collected baseline measures of sanitation conditions, behavior, and child health and re-visited households 21 months later. The analysis finds that implementation of the program activities was slower than the original timeline (only 35 percent of villages were triggered more than six months before the follow-up survey). Nevertheless, the Total Sanitation Campaign successfully increased toilet coverage by 19 percent in intervention villages compared with control villages (41 percent v. 22 percent), while reported open defecation decreased by 10 percent among adults (74 percent v. 84 percent). The intervention also led to some improvements in water quality and protozoan infection, but consistent improvements were not observed across multiple child health outcomes (diarrhea, helminth infections, child growth). However, the exposure period was likely to have been too short to result in any benefit of the sanitation interventions on child health. Given the large improvements in toilet construction documented, an additional follow-up survey with a longer period of exposure would yield valuable information on the effects of improved sanitation conditions on health outcomes.</p>
Gender Connection	Gender Informed Analysis
Gender Outcomes	Open defecation among women
IE Design	Clustered Randomized Controlled Trial
Intervention	<p>The TSC included subsidies for and promotion of individual household latrines, school sanitation and hygiene education, Anganwadi toilets, and community sanitation complexes. The TSC also supported rural sanitary marts and production centers. The TSC included several unique features that distinguished it from earlier approaches to rural sanitation in India, including:</p>



	<ul style="list-style-type: none"> • A campaign-mode implementation approach • A focus on demand generation through behavior change and communication campaigns • A shift from high subsidy to low subsidy regimes • A flexible menu of technology options • An award, called the Nirmal Gram Puraskar (NGP), which is awarded to communities who are Open Defecation Free (ODF), defined as 100% of the population with access to a private or shared toilet, and that meet all of the other total sanitation requirements. The award includes money and formal recognition to help incentivize entire communities.
Intervention Period	2009-2011
Sample population	The sample consisted of 3,039 households and 5,206 children under five years of age in the Dhar and Khargone districts of Madhya Pradesh
Comparison conditions	Comparison group were expected not did notto receive TCS activities until after the evaluation. However, discussions with project staff identified that 8 and possibly 10 of the 40 control villages may have received the program.
Unit of analysis	Household and individual level
Evaluation Period	2009-2011
Results	<p>Despite the absence of full exposure to the program at the time of our follow-up measurement, we found that the TSC increased toilet coverage by 19 percentage points in intervention villages compared to control (41% v. 22%). Improvements in sanitation-related behavior were more modest: reported open defecation among adults decreased by 10 percentage points (e.g., 73% v. 83% among women) and correct child feces disposal increased by 9 percentage points (27% v. 18%). Among households in the intervention arm with a JMP improved toilet, 41% of men and 38% of women reported practicing daily open defecation. 41% reported that adults still practiced daily OD. We found that program impacts on toilet coverage and sanitation-related behavior were concentrated almost entirely among households without a toilet at baseline and households that were below the poverty line, which is consistent with the program design that provided higher amounts of subsidies to such households. Reduced levels of E. coli in intervention household drinking water and lower Giardia prevalence in intervention children are consistent with the possibility that the TSC program reduced waterborne transmission of this pathogen in intervention villages. However, we found no evidence for reductions in helminth infection or diarrheal disease, and no evidence for more distal impacts on anemia or growth during the study period.</p>
Primary study limitations	<p>The study faced the challenges typically not encountered in well-controlled efficacy trials such as imperfect compliance with treatment assignment and poor fidelity of intervention implementation. We found that by 21 months of follow-up, none of the intervention villages achieved the program goal of 100% households having and using IHLs that can safely confine feces; the average household level coverage of JMP defined improved sanitation facilities was 40% (range: 5%–79%). ITT estimates of program impacts with imperfect compliance will underestimate the effect possible under perfect compliance.</p> <p>Another challenge was that the actual follow-up measurement at 21 months was the latest possible point we could measure outcomes under the possibility threat of program expansion into control villages and contractual constraints with the</p>



	<p>evaluation funding. Although it was possible that impacts on diarrheal disease could begin relatively soon after intervention, as documented in short-duration efficacy trials, we would expect impacts on enteric parasite infection, anemia, and growth to potentially accrue more slowly. The longer follow-up could have led to potentially higher levels of IHL coverage or, conversely, lower levels of use (if IHLs are not maintained). Despite this limitation, our estimates of IHL coverage and reported use are broadly consistent with other independent measures following rural sanitation programs in India.</p> <p>Self-reported outcomes can be subject to differential, biased reporting in unblinded trials. To the extent that our measurements of reported outcomes were subject to courtesy bias, we may have over-estimated IHL use or under-estimated open defecation prevalence in the study population. Furthermore, if the bias was differential by treatment group, then we would expect the study to have over-estimated the improvements due to intervention because we would expect the intervention households to be more sensitized to the stigma of open defecation</p>
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Reference(s)	Patil, S.R., Arnold, B.F., Salvatore, A.L., Briceno, B., Ganguly, S., et al. (2014). The Effect of India's Total Sanitation Campaign on Defecation Behaviors and Child Health in Rural Madhya Pradesh: A Cluster Randomized Controlled Trial. PLoS Med 11(8)
Link to Studies	http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001709
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