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International Growth Centre

Culture and the Health of Transition

Understanding Sanitation Behaviour in Rural north India

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Culture and the health transition: Understanding sanitation behaviour in rural north India

Key facts

- Poor sanitation spreads bacterial, viral, and parasitic infections including diarrhoea, polio, cholera, and hookworm. Despite this, 70% of rural Indian households defecate in the open, without a toilet or latrine. Over 60% of the people worldwide who defecate in the open live in India. Bangladesh, which shares a border with India, has a rural open defecation rate of only 5%.
- Based on a survey of around 3,200 households, and 100 in-depth interviews, this research finds that having a household latrine is widely seen to damage the purity of the home. Open defecation, on the other hand, is widely seen to promote purity and strength, and is also associated with health and longevity.
- A further reason for particularly poor hygiene in Indian public spaces is due to the ongoing renegotiation of caste-based social rules. Most Hindus remain inflexibly opposed to emptying their own latrine pits. As part of a push for greater equality, people from the lowest "untouchable" castes resist emptying latrine pits because this work is widely seen as degrading and reinforcing of their low social status.

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Introduction

One of the most important events in history is the set of health and mortality transitions that developed countries experienced in recent centuries and that developing countries have been experiencing in recent decades. It is therefore appropriate that health transitions have received significant attention from demographers and scholars of development. Prominent theories debate the relative importance of candidate explanations: income, nutrition, medical care, public health interventions, and knowledge of the germ theory of disease, each of which might matter differently in different contexts (McKeown and Record, 1962; Szreter, 1988; Preston and Haines, 1991; Pritchett and Summers, 1996; Deaton, 2013). In this paper we focus on India, home to one-fifth of all births today, to ask why unusually poor sanitation persists as a cause of India's slow health transition.

Culture and social forces shape health behaviours and interact with other determinants of health transitions (Caldwell, 1993; Caldwell et al., 1990, 1989).[1] This article documents cultural, social, and religious factors influencing sanitation behaviours in rural north India, where widespread open defecation has profound implications for population health. It constitutes an important contribution to the literature on health in developing countries because India's health transition is widely recognised to be proceeding more slowly than its economic performance would predict (Drèze and Sen, 2013). Further, poor public hygiene in general, and widespread open defecation in particular, are increasingly understood to be major threats to the health of the Indian population, and particularly to the survival and physical growth of children (Deaton and Drèze, 2009; Spears, 2012; Geruso and Spears, 2014).

Understanding India's exceptionally slow transition to safe sanitation is of broad demographic concern: over 1 billion people worldwide defecate in the open, without a toilet or latrine; 60% of these live in India (UNICEF & WHO, 2012). India's high rates of open defecation and slow adoption of latrine use are anomalous in international comparisons: the rest of the world has been steadily improving sanitation and eliminating the practice of open defecation, but rates of open

1. Caldwell et al. (1990) provides examples of how culture influences health behaviour, with a focus on cultural influences on child care practices and on women's education, both of which are widely recognised to play important roles in infant and child mortality and morbidity. Prior literature at the intersection of demography and development has identified a number of other cases where culture shapes population-level health outcomes. For instance, a culture of strong son preference in many parts of Asia means that many parents discriminate so severely against female children that mortality and abortion rates for girls are much higher than those for boys, leading to millions of "missing women" (Sen, 2003; DasGupta, 1987; Murphy, 2003; Arnold et al., 2002). In eastern Africa, uniquely high rates of HIV/AIDS are in large part due to culturally-specific ways of forming concurrent sexual partnerships (Mah and Halperin, 2010; Halperin and Epstein, 2004). Religious and ethnic group membership also influence whether or not men are circumcised, a practice which is protective against HIV (Bongaarts et al., 1989; Caldwell, 1995; Sawires et al., 2007).

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defecation in India remain stubbornly high. To motivate our focus on culture, rather than other explanations for India's exceptionally poor sanitation, we show that India has far higher open defecation rates than other regions where people are poorer, literacy rates are lower, and drinking water is more scarce. In rural India, 70% of households do not have a toilet or latrine (Government of India, 2012c); however, in rural sub-Saharan Africa, where people are poorer, only about 35% of households defecate in the open. In rural Bangladesh, only 5% of people defecate in the open, and in rural China, 2%of people defecate in the open (UNICEF & WHO, 2012).

In contrast to much of the existing literature on improvements in basic sanitation in other parts of the world, which describe investments in physical infrastructure (Preston and Van de Walle, 1978; Cain and Rotella, 2001; Cutler and Miller, 2005), this paper focuses on an analysis of culture and behaviour.[2] Although understanding sanitation infrastructure and technology are important to understanding open defecation, rural north India's sanitation problems have little to do with lack of infrastructure per se. We analyse original qualitative and quantitative data to explore how beliefs, values, and norms about purity and pollution of private spaces and of bodies support the practice of open defecation and contribute to low demand for latrine use. Further, we find that rural India's unique history and continuing practice of caste-based social exclusion complicate the adoption of the inexpensive latrine technologies that are an alternative to open defecation in other parts of the developing world.

In the first section of the paper, we present background information on links between sanitation, health, and mortality; on the apparent puzzle of widespread open defecation in rural India; and on key cultural concepts relating to life in north Indian villages. Second, we introduce our data and methods. We analyse both original qualitative data and quantitative data from the SQUAT survey, a survey of approximately 3,200 households and 22,800 persons in five states in north India. Third, we present our findings: we find that having an inexpensive latrine at home is considered by many to be ritually impure, and that latrine pit emptying presents special challenges in a society that is renegotiating caste and untouchability. We find that open defecation is seen as promoting purity and strength, particularly of male bodies, which is important because men typically decide which large financial investments a household makes. Fourth, we consider how the cases of latrine construction and latrine use that do occur in rural India reflect and reinforce the cultural interpretations that perpetuate open defecation among the majority of the rural population.

2. There are a few studies from history and epidemiology that illustrate the importance of culture for sanitation behaviour. For instance, Barnes (2006) describes how cultural attitudes toward hygiene and excreta disposal in rural France during the mid to late 1800s interacted with messages spread by the government about infectious disease. Cairncross (2003) notes that public health researchers working to reduce parasite infections in the American South in the early 1900s argued that racial differences in parasite burdens between poor blacks and poor whites was in part due to the fact that black families had more control over their children, and were therefore better able to enforce latrine use.

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We conclude with a discussion of these findings for public policy. For decades, Indian sanitation policy has focused on the construction of pit latrines, which, when they are actually built, are unlikely to be used (Coffey et al., 2014; Barnard et al., 2013). Government programs have paid little attention to transforming the meanings of open defecation and latrine use that we describe here. These cultural meanings are far more important for explaining rural north India's high rates of open defecation, and the resulting disease and mortality burden, than has previously been understood.

Background and context

Sanitation and public health

Sanitation is widely recognised as an important part of a successful health transition, especially where population density is high (Preston, 1975; McGreevey et al., 2008; Cutler and Miller, 2005; Hathi et al., 2014). Poor sanitation spreads bacterial, viral and parasitic infections including diarrhoea, polio, cholera and hookworm (Feachem et al., 1983). The negative externalities associated with poor human waste management mean that it is of public importance. Indeed, poor management of human waste in industrialising Western cities led to increasing morbidity and mortality until public officials made the necessary investments in sewage infrastructure and in behaviour change campaigns to reduce the transmission of disease (Snow, 1855; Barnes, 2006; Dye, 2008). Recent research highlights the continuing importance of improving sanitation in developing countries for sustaining and hastening reductions in mortality and morbidity (Humphrey, 2009; Fink et al., 2011; Spears, 2013).

The combination of widespread open defecation and high population density in rural India mean that the health and human capital consequences of poor sanitation are likely to be especially high. Hathi et al. (2014) use data from 172 Demographic and Health Surveys to show that the consequences of open defecation for infant mortality and child height are worse where population density is high than where it is low. In India, even rural regions often have very high population densities. For instance, the primarily rural states of Uttar Pradesh and Bihar are home to about 300 million people, and have population densities that exceed 800 persons per square kilometre.[3] Spears (2012) and Spears and Lamba (ming) show that even very modest improvements in open defecation rates in rural India have statistically detectable effects on infant mortality, child height, and child cognitive achievement.

3. For comparison, a population density of 800 persons per square kilometre is about 170% of the population density of New Jersey, the United States' most density populated state at 467 persons per square kilometre.

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The Indian sanitation puzzle

International comparisons

Table 1 presents summary statistics comparing sanitation, drinking water access, GDP, poverty, and literacy in India and other developing regions and countries. The regions shown – south Asia, sub-Saharan Africa, and south east Asia – are the three poorest regions in the world. Within those regions, we show country-level summary statistics for countries that have populations of at least 100 million people. Table 1 shows that sub-Saharan Africa had only 65% of the GDP per capita of India, but only about half of the rural open defecation. In particularly sharp contrast, Bangladesh, which borders India, has less than half of the GDP per capita, and yet only 5% of rural Bangladeshis defecate in the open.

India's high rates of open defecation are also surprising in light of its literacy statistics and the widespread availability of drinking water infrastructure, which is often assumed to be related to latrine use. Table 1 shows that women's literacy in India is similar to women's literacy in other parts of south Asia and in sub-Saharan Africa, and that men's literacy is higher in India than in these other places. Among these regions and countries, access to improved drinking water is uniquely high in rural India; more than 90% of rural Indians have access to improved drinking water. Indeed, rural India has even better drinking water infrastructure than in rural Indonesia, where less than a third of the rural population defecates in the open. Table 1 suggests that explanations for why rural open defecation rates are higher in India than other developing regions cannot rely on differences in poverty, literacy rates, or water access.

Rural sanitation technology

What sorts of technologies allow poor households in sub-Saharan Africa, South East Asia and other parts of South Asia avoid open defecation? Because constructing sewers and sewage treatment facilities in rural areas is very costly, many rural households in other developing countries build and use simple, inexpensive latrines to contain faeces underground. The World Health Organization (WHO) publishes guidelines on how to make pit latrines[4] that reduce the transmission of faecal pathogens (WHO, 1996).[5] These guidelines recommend using an underground soak pit with a volume of around 60 cubic feet; such a latrine pit is expected fill up after approximately five years

4. Cairncross (1987) provides a further explanation of inexpensive latrine and toilet options that are appropriate for use in rural areas of developing countries.

5. To prevent the transmission of disease, pits should be covered, and the latrine seat should have either a water seal that prevents flies from entering and leaving the pit, or a cover that remains in place while the latrine is not in use. The bottom of a latrine pit should be two meters above the ground water table in order to prevent contamination of drinking water. In most places in rural India, the ground water table is low enough that hygienic latrines can be built with no threat of contaminating the groundwater.

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if used regularly by two adults and four children. When a latrine pit fills up, households must either construct a new pit or empty the old one.[6] The Indian government endorses WHO-recommended latrines, and similar types of inexpensive pit latrines for use in rural India (Government of India, 2007).

Rural Indian households are unlikely to use the kinds of affordable pit latrines that prevent the spread of disease in other developing countries. India's NFHS-2005 found that only about a fifth of rural Indian households that use a latrine use a pit latrine. In Bangladesh, 94% of rural households that do not defecate in the open use a pit latrine (DHS-2012), and in Nigeria, this figure is 87% (DHS-2008). Rural Indian households that own a latrine are, in contrast, far more likely to own an expensive septic tank.

The prevalence of open defecation in rural India, despite relatively favourable poverty rates, literacy rates, and water access, as well as the absence of inexpensive pit latrines suggests a puzzle: why do so many people in rural India defecate in the open, rather than adopt the affordable latrines that have played a major role in reducing the disease burden in other developing countries?

Culture & religion in rural north India

Although culture and religion are often treated as distinct concepts both among researchers and in people's own accounts of their lives, it is impossible to characterise and understand the culture of north Indian villages without reference to Hinduism and the structure it provides for social and personal life. Ideas that have their origins and strongest expression in Hindu texts, rituals, and norms thoroughly influence the everyday behaviour of both Hindus and non-Hindus in rural north India. In all of the places where data were collected, Hindus make up between 80 and 90 percent of the total population, and a slightly higher fraction of the rural populations. To provide background for our findings about the meanings of latrine use and open defecation in north Indian villages, we present a cultural context that draws heavily upon anthropological work about the everyday practice of Hindu religion and Hindu culture.

Purity & pollution

Although this paper deals specifically with rural north Indian ideas about what is pure and what is polluting and what is clean and what is unclean, we note that many societies have ideas about purity and pollution that are related to what is dangerous, taboo, or profane (Douglas, 1966). Across societies, objects, situations or persons that are polluting are seen as a threat to sacred spaces or to a person's body. In rural north India, as in other societies, "some pollutions are used as

6. Two-pit latrines reduce the health hazards of manual emptying of latrine pits. In a two-pit model, the faeces in the full pit can be left to decompose for several months while the household defecates in the second pit. Faeces that have been allowed to decompose will not transmit bacterial infections, but may still transmit parasites.

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analogies for expressing a general view about the social order" (Douglas, 1966, p. 4). That is, ideas about purity and pollution are used to create social divisions as well as physical ones.

In Indian society, purity and pollution are strongly related to subordination and hierarchy, and are practiced intensely, especially by members of "higher" castes, such as Brahmins (Harper, 1964). Rules about purity and pollution govern personal behaviour, social interaction, how people interact with public and private spaces, and how they interact with their bodies. The specifics of how purity and pollution are practiced differ across sub-castes and households, from place to place, and they change over time. Nevertheless, the ideas about pollution and purity that we describe here are broadly applicable and have important consequences for human behaviour across India.

Khare (1962), which explores the relationship between practices of purity/pollution and household hygiene practices, explains that in rural north Indian villages, the words "dirty" and "clean" are ritual concepts as well as physical ones. There is overlap between physical cleanliness and ritual purity in some instances and not in others. For example, some things are both ritually polluting and physically dirty, such as human faeces and used menstrual cloths. A drain that removes waste water from the house, although it might be kept physically clean, is nevertheless considered ritually polluting. In Khare's study, vegetable peels strewn on the floor, or rat excreta in the flour, were seen as physically dirty but not ritually polluting.

Pollution and danger are transmitted not only by certain spaces and objects, but also by naturally occurring situations and sometimes by people. For instance, death and childbirth pollute both the people who experience them and the spaces in which they occur. Purity and pollution are recognised as the unifying idea of the India caste system (Dumont, 1980). People from lower castes are seen as inherently less pure than people from higher castes. People from the lowest castes are sometimes referred to as "untouchables", or dalits,[7] and are seen as permanently polluted and polluting to others.

Caste & untouchability

The pollution that dalits embody is often used as a justification for their oppression and extreme social exclusion. In rural India, members of dalit castes have traditionally been expected to do dirty, degrading tasks for higher caste households (Shah et al., 2013). Manually cleaning human faeces is considered to be the most degrading of these tasks. Purity and pollution hierarchies exist even among dalit castes; people belonging to castes which clean human faeces are considered to be the most polluted, and thus are often even more marginalised than people belonging to other dalit castes. The fact that dalits perform "dirty" work is often used as evidence of their permanent ritual pollution, and has been used as justification for excluding them from schools, public water sources,

7. See Zelliot (1992) for a discussion of these terms.

and more dignified employment (see Valmiki (2003)).

Today, untouchability and caste-based social exclusion is being renegotiated in rural India. The government has classified many of the lowest castes as "Scheduled Castes," and enacts affirmative action policies for members of Scheduled Castes in schools, jobs and public office. The exclusion of dalits from public places and water sources is less common than it once was, but it is still common for caste Hindus, that is, Hindus who are not from one of the untouchable castes, to refuse to eat food or take water from the houses of dalits and to exclude untouchables from temples. An important part of dalits' struggle for equality has been through resistance to performing the kinds of degrading tasks that are associated with untouchability (Shah et al., 2006).

A caste Hindu may suffer social consequences if he or she is seen performing the kinds of tasks that are associated with untouchability. It is, therefore, uncommon for people other than the most marginalised among dalits to clean sewers, drains, latrine pits, or public places. Milner (1987), and more recently Teltumbde (2014), argue that these links between cleaning and caste mean that public spaces in India are uniquely filthy; most people see it as someone else's job to clean up. Milner also argues that people treat dirt as "primarily social, rather than physical," and place more emphasis on social purity and group order than on physical cleanliness. Lüthi (2010) suggests that caste-based notions of purity and pollution also impede the widespread acceptance of the germ theory of disease.

Private spaces & the body

Avoidance of pollution and the promotion of purity matters far more in private spaces, and with respect to one's own body, than it does in public spaces (Gupta, 2000). Indeed, of residents of a south Indian city, Lüthi (2010) writes: "outside of private and sacred zones like temples, [people] have no interest in cleanliness. Their interest in cleanliness stops at the doorsteps of private homes, and habits related to the outside define it as an irrelevant rubbish dump" (79).

In contrast, people take considerable effort to maintain purity of the home and the body. Maintaining the purity of the body is associated with strength, health, vigour and masculinity (Alter, 2011; DasGupta Sherma, 1998). If unavoidable polluting activities, such as defecation, are handled with discipline and proper adherence to ritual, they can be made less polluting. For instance, in an early ethnography of village life in India, Padfield (1896) describes the morning routines of a high caste (Brahmin) man, who rises two hours before dawn, goes to defecate in the open, returns, and takes a bath to counteract the pollution associated with defecation. Only after his bath does he commence the day by praying, and then eating. Joseph Alter's recent work on wrestlers in north India also highlights links between defecation and purity, and how practices to keep men's bodies pure display to others evidence of an inner state of morality (Alter, 2011).

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Practicing purity & pollution

Caste, gender and religion are related to how, and how strictly, a person in rural India practices purity and pollution. Indian Muslims, for instance, practice purity and pollution somewhat differently than the Hindu majority (Jeffery, 1997; Ali, 2002), although there are also many parallels in their beliefs and behaviours. Women in rural India are seen as inherently less pure than men (Fuller, 2004; Thompson, 1985), and so may experience less social benefit from strict adherence to purity and pollution rules. People from higher castes typically spend more time and economic resources maintaining and demonstrating their ritual purity than do people from lower castes.[8] Despite the fact that the ideas about purity and pollution described here are most intensely practiced by high caste Hindu men, this system motivates the behaviour of a large fraction of the population.

Data and methods

Field sites and fieldwork

Qualitative data

This paper primarily draws on data from 100 in-depth, semi-structured qualitative interviews carried out by the authors in Valsad district of Gujarat, Rewari district of Haryana, Fatehpur district of Uttar Pradesh, and Parsa district of southern Nepal[9] between November, 2013 and May, 2014. Two-thirds of interviews were carried out in households in which at least one member had switched from open defecation to regular latrine use in the 10 years prior to the survey. One third of the interviews were carried out in households in which every member defecates in the open. The authors also did extensive pre-testing of the interview guide in Sitapur district of Uttar Pradesh, and follow-up fieldwork in Jaipur, Rajasthan; Sitapur, Uttar Pradesh; Muzaffarpur and Sheohar districts of Bihar; and Tiruvannamalai and Vellore districts of Tamil Nadu. The Appendix discusses selection of the field sites and respondents, interview protocols, and analysis of the data in detail, and provides a map of the locations of the field sites.

8. However, sociologists of India have noted that upwardly mobile members of lower castes tend to adopt ritual purity-related practices associated with higher castes (Srinivas, 2003).

9. We decided to visit the terai region of southern Nepal, which borders the Indian states of Bihar and Uttar Pradesh, because open defecation rates there are lower than in rural India: the 2011 Nepal DHS reports an open defecation rate of about 50%, compared to the 2011 Indian census open defecation rate of about 70%. Because of these differences in open defecation rates, we had expected to find different attitudes, beliefs and behaviours about open defecation; however, we found that these were quite similar to attitudes, beliefs and behaviours in rural north India. Indeed, differences in open defecation rates between the Nepali terai and rural India are not primarily due to the adoption of inexpensive latrines, but to higher rates of septic tank use. According to the 2011 DHS, only about 7% of households in the Nepali terai use inexpensive latrines.

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Quantitative data

We supplement our analysis of the qualitative data with results from a complementary quantitative survey that was designed by the authors and carried out between November, 2013 and April, 2014. Data for the Sanitation Quality, Use, Access and Trends (SQUAT) survey data was collected for approximately 23,000 individuals in about 3,200 households in the Indian states of Haryana, Uttar Pradesh, Bihar, Rajasthan, and Madhya Pradesh. Coffey et al. (2014) provide a description of this survey and its main findings.

Methods for analysing culture & health behaviour

Many demographers and other researchers have considered the question of how culture can be said to influence demographic processes, both in situations of stasis and in situations of change (Hammel, 1990; Greenhalgh, 1990; Kertzer and Fricke, 1997; Fricke, 2003).[10] Such literature informs our analysis of how rural north Indian culture influences sanitation behaviour, with serious consequences for mortality and morbidity.

Among accounts of cause and effect, cultural explanations require special methods. Fricke (2003) explains that "[d]escriptions of culture are necessarily descriptions of systems of meaning requiring different criteria of validity than causal explanations appropriate to individual variation" (p. 478). We follow this literature in emphasising that an adequate interpretation of how culture influences behaviour depends on its coherence with what is known about patterns of behaviour and their meaning in a local context. In our case, we observe that sanitation behaviour – and its meaning to participants in our interviews – coheres with a broader system of beliefs, values, and norms that have been described by other scholars of rural north India.

In our fieldwork, we put special emphasis on households in which one or more members have adopted latrine use in the recent past. This strategy is useful because it allows us to interview respondents during an "unsettled period" (Swidler, 1986), a time in which at least one person in the household is changing his or her regular defecation behaviour. This is also typically a time when the household is making a large financial investment in a latrine or toilet. At such a time, we have an opportunity to observe which ideas are emphasised, which are deemphasised, and how these ideas interact with economic decision-making. Studying latrine owners confirms the results of prior studies that find that many people in households that own latrines nevertheless defecate in the open (Coffey et al., 2014; Barnard et al., 2013). Qualitative interviews with these individuals enable us to separate the issues of access to a private latrine from use of a latrine. In interviews where some people are not using a latrine that other members of their households do use, we learn from intra-household disagreement; from changing attitudes and behaviours; and from expectations, rules, and

10. For example, there exist particularly well developed accounts of cultural influences on fertility behaviour; see Greenhalgh (1995).

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opportunities that apply to some household members but not others.

Understanding open defecation in rural north India

Here we describe our findings about the meanings of latrines and open defecation in rural north India. We find that the affordable latrines of the type used in other parts of the developing world are seen not only as physically dirty, but also as ritually polluting. The continuing existence and renegotiation of untouchability in rural India helps explain the unique resistance to manual pit emptying. In contrast, open defecation is not only socially acceptable, it is seen as a wholesome activity that promotes physical health and the purity of the body.

The meaning of an affordable latrine

Latrines & pollution

Khare (1962) explains that some objects are considered both ritually polluting and physically dirty, others are physically dirty but not ritually polluting, and still others are physically clean but nevertheless ritually polluting. Some of our respondents viewed all latrines as ritually polluting, no matter how physically clean they are kept. One such young man, a Brahmin from Haryana,[11] misappropriates the germ theory of disease in explaining the ritual pollution he associates with having a latrine at home:

> *If a latrine is in the house, there will be bad smells, germs will grow. Latrines in the house are like... hell. The environment becomes completely polluted. There is no benefit of lighting [religious candles and lamps], no benefit at all.*

When he and other respondents refer to "bad smells," they are referring at least as much to ritual distaste as to physical distaste; latrines in rural India presumably smell no worse, on average, than in the many other countries where they are widely used. Instead, respondents frequently invoked "bad smells" as an ostensibly secular, but nevertheless unmistakable, reference to ritual pollution.

This young man's distaste for latrines, and the distaste we find among other conservative rural Hindus, has to do with the importance of maintaining purity in the home. These values about maintaining purity in the home which are similar to those expressed by participants in other studies

11. We find that dalits and Muslims are less likely to use words that refer specifically to ritual pollution but not to physical pollution, perhaps because language about ritual pollution is often used in reference to their own bodies. However, dalits and Muslims very often share with caste Hindus the views of latrines and latrine use that we describe here.

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of domestic purity and pollution, such as Khare (1962) and Lüthi (2010). Several participants feel that having latrines close to kitchens poses a threat to the purity of the home. A middle aged Gujarati man from a mid-ranking Hindu caste explains: " [A latrine] should be 25-30 feet away from the kitchen. In cities, those assholes eat and shit in the same place. In our village, people don't live like that, we keep these things separate, and that's a good thing. It's filthy, no?"

Research on pollution and purity in South India finds that people are particularly concerned about the accumulation of trash inside their homes. Lüthi (2010) writes, "waste should not be stored anywhere inside, [so] there are no waste bins, and rubbish is simply dropped on the floor to be swept later" (72). People in rural north India may be similarly concerned about the accumulation, rather than the mere presence, of faeces near their homes.

In households without latrines, we found that elderly and handicapped family members often defecate within the home or the compound.[12] These faeces are later disposed of outside, often by women, who sometimes admit to being disgusted by the task, but who also see it as a duty to their elders. Distaste for the presence of latrines, together with the acceptance of the occasional need for someone to defecate in or near the private, sacred space of the home, coheres with Lüthi's finding that waste can be put on the floor and then cleaned up, but should not be stored in or near the house.

Rejection of government latrines

Although some conservative rural Hindus find latrines of any sort distasteful, most people feel that expensive latrines with large pits or septic tanks are not polluting, but rather are a useful addition to a wealthy person's home. Expensive latrines with large pits or septic tanks help their owners avoid pollution in part because they help avoid the problem of pit emptying. Latrines with smaller pits, such as those recommended by the WHO and those provided by the government, are almost uniformly seen as polluting. Almost all of the households that we interviewed had some exposure to simple latrines because of the government's long-running latrine construction programs. Of the 78 families we interviewed in India, 18, or about a quarter of them, had been recipients of government latrines, although of these only 8 families had at least one member who was using the government latrine regularly.[13] Others had seen or heard about government latrines from relatives and neighbours. One respondent had worked as a mason constructing government latrines.

12. Small children are allowed to defecate almost anywhere–whether in the house, in the village lanes, or in the spaces between homes–without suffering social consequences. People do not believe that the faeces of small children are ritually polluting, despite the fact that child faeces are more likely to spread infectious diseases than adult faeces.

13. Among these, 6 had invested their own money to increase the size of the pit. In the 2 households that had not invested additional money, the latrine was used by only one or two members of the family.

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The latrines that are promoted and built by the Indian government are expensive by the standards of other developing countries. Despite this, people refer to government latrines, with considerable disdain, as "temporary," "fake," or "kaccha," a word that is used to describe something that is incomplete, inferior, or made from natural materials. Very often, people who receive government latrines do not use them for defecation at all; they may repurpose the materials or use the latrine superstructure to bathe or wash clothes. A high caste Hindu man from Uttar Pradesh who defecates in the open explains why he did not accept the government latrine that the village leader offered him:

> *Yes, the pradhan wanted to give me a latrine, but I didn't take it. I don't have so much space, and as you can see I have Lord Shiva's temple in front of my house, there is also Barhamdev baba's temple. And so if I get a latrine built here, I would not like it...Brother, I do not like [having a latrine inside the house] either, if these things are in the house then they pollute the house. I really don't like that...I am the kind of person who lives in a clean and pure place, I feel polluted in having a latrine. It gives off bad smells, the smell of dirtiness will come.*

"Small pits" & pit emptying

In addition to associating government latrines with the pollution of private spaces, people reject these inexpensive latrines because of concerns about pit emptying. We came to understand the importance of pit emptying to rural north India's sanitation outcomes by looking at how privately constructed pits differ from the pits recommended by the WHO and the Indian government. In both the SQUAT survey and the qualitative interviews, we asked respondents about the kinds of latrines that they find acceptable and the kinds to which they aspire. Figure 1 shows the size of pits recommended by the WHO (WHO, 1996), those recommended by the Indian government in its 2012 guidelines (Government of India, 2012b), and the median pit size among latrines owned by households interviewed for the SQUAT survey. In the SQUAT survey, among latrines that were being used by at least one member of the household, less than 4% had pits that were 60 cubic feet or less. The median pit size of a latrine that is being used by at least one household member is 250 cubic feet. Figure 1 also plots the size of a "10 by 10 by 10" pit, the ideal pit size described by many of our respondents in the qualitative interviews.[14]

The main reason why people find "small pits" so objectionable is because they have to be emptied

14. Only on a very few occasions did we encounter privately constructed latrines with pits close to the size recommended by the government or the WHO; these were built by poor families with a disabled member or by Muslim households. Hindu owners of such latrines viewed them as shameful objects. On one occasion, a caste Hindu household would not admit that the affordable latrine they had built for their son, who had polio and could not walk, was indeed a latrine. On another occasion, an elderly Hindu man refused to show one of us his latrine; later, when he was no longer present, his grandson explained that he was ashamed of how simple the latrine was. It was, in fact, a serviceable and hygienic latrine that met WHO standards.

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manually. Most people wrongly believe that these pits fill up in a matter of months, rather than years, and require frequent manual emptying. Mechanical emptying of small pits is often impractical, both because it is excessively costly to pump small quantities of sewage, and because affordable latrines are often built in places that are difficult for vacuum trucks to access. In order to avoid emptying latrine pits, many people make septic tanks so large that they do not need to be emptied in their lifetimes. A man in Uttar Pradesh who defecates in the open and does not own a latrine explained: "pit emptying does not happen here... you would get a new pit dug so deep that it would never fill up." A woman with a 450 cubic foot latrine pit in Gujarat explained why her household had invested so much money in the pit: "if we made [the pit] less expensively, it would not last a lifetime."

Manual pit emptying & untouchability

Due to its history of caste-based oppression, manual pit emptying presents special subjective challenges in rural India that are not present in the same way in other societies. Since avoiding "dirty work" such as cleaning faeces has been central to dalits ' struggle for equality, few dalits are willing to empty latrine pits. Indeed, employing a "manual scavenger," someone who cleans human faeces by hand, was made illegal in some states in 1993, and in all states in 2013.[15] Although the Indian government does not classify emptying a "two-pit" latrine as manual scavenging,[16] many people we interviewed associate manual emptying of latrine pits with manual scavenging. Our fieldwork suggests that in many places, presumably because demand for such labour exceeds supply, the few dalits who empty latrine pits are able to command higher wages for doing these types of jobs than for other types of manual work, such as construction or agricultural labour, which can also be physically demanding and hazardous to health.[17]

15. The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act is not importantly enforced; a 2013 article in The Hindu, a widely circulated Indian newspaper, claimed that there has not been a single case of manual scavenging prosecuted since the law took effect (Staff, 2013).

16. Emptying fresh faecal sludge from a latrine pit anywhere in the world would be hazardous to health. The Indian government claims to promote WHO-recommended two-pit latrines, in which the faecal sludge in a full pit is left unused for several months and allowed to convert to manure, while the household uses the second pit. However, many rural people are unaware of the technical details of two-pit technology. Where the government has built toilets, little has been done to educate people about the reasons for using two pits. Where we have explained the conversion of full, unused pits into manure, caste Hindus, and non-untouchable Muslims nevertheless claim that the emptying such pits would have to be done by untouchables.

17. An NGO employee who wanted to improve pit emptying services in rural Bihar explained to us that the few dalits who engaged in pit emptying were well paid, but suffered extreme social exclusion. He said: "for them [people who empty latrine pits] it was like this: if you earn well, but you can't go to a restaurant, and you can't go to a temple, then what is the use?" We note that no quantitative data of which we are aware would allow confirmation of the claim that dalits are paid more for latrine pit emptying than for other manual work.

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An interview with a caste Hindu anganwadi worker – a village-level government employee whose job is to implement an early childhood education and nutrition program – illustrates the problems around pit emptying in rural India. In addition to running the early childhood program, the anganwadi worker is supposed to promote sanitation in the village. She had received a government latrine which she and her family use. After several years of use, the pit needed to be emptied. Initially, the anganwadi worker did not admit to us that she had hired someone from a manual scavenging caste to empty the pit; as a government worker, she recognises that part of her role is to represent the sanctioned messages of the modernising state, which include official condemnation of manual scavenging. Instead, she claimed that she had hired a vacuum truck from a nearby town. When we pointed out that it would be impractical to clean a small pit with a vacuum truck, she recanted, and admitted to hiring a manual scavenger.

Even if the market for pit emptying services were to run smoothly, there is reason to believe that people may nevertheless find having a latrine pit emptied near their home an unpleasant, disgusting, and perhaps even shameful experience. Faeces are subjectively similar to menstrual blood, menstrual pads and placentas; prior research finds that people want these polluting bodily objects to "become invisible." In her study of placenta disposal in rural Uttar Pradesh, Pinto (2013) finds that
"[t]he invisibility of the discarded placenta is essential...Many women feel its visibility is 'shameful,' not just embarrassing but socially threatening to the family" (110-111). Similarly, Lüthi (2010) finds that women in urban Tamil Nadu burn menstrual cloths because disposing them on public trash heaps, as they do other trash, would be shameful; indeed, she suggests that women do not dispose of trash in plastic bags so that neighbour are aware that they have not discarded any "very polluting" objects (73). Our respondents' discomfort with the idea of having a pit latrine emptied manually near their homes suggests that similar processes may be at play; we suspect that large septic tanks allow faeces to disappear or become subjectively "invisible" in a way that affordable pit latrines do not.

The meaning of open defecation

Many outside observers, including urban Indians, assume that rural people, especially women, are "forced to defecate in the open" due to the lack of "access to latrines."[18] However, many rural people feel that open defecation it is a natural and positive part of village life. It is rarely seen as socially unacceptable or shameful to defecate in public places.[19] There are some places where social

18. For some current examples from major Indian newspapers, see Nigam (2014) and Express News Service (2014).

19. We found exceptions to this rule in some villages in Gujarat and Haryana where most people had latrines and villages were urbanising quickly.

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rules dictate that adults and older children[20] should not defecate: within the confines of the village, near a temple, too close to someone's house, or in crops that are soon to be harvested. However, most other places – including the shores of ponds, the banks of rivers, along well-travelled roads or paths, behind public buildings, and in canals, fields, orchards, and forests – are socially acceptable places to defecate.

Here, we describe the perceived benefits of open defecation for our respondents. Even among latrine owners, open defecation is widely associated with health, strength, and purity of the body. Although open defecation can be burdensome for some women, particularly young women whose mobility outside the home is restricted, women often express the same views about the benefits of open defecation that men do.

The benefits of open defecation

For most people we interviewed, and especially for middle-aged and older people, open defecation is saliently linked to health, longevity and strength. A middle-aged woman in Haryana explains why people who own latrines defecate in the open:

> *People go outside for this reason, I'll tell you why... people say, I'll take a walk outside, so if there is any illness, it will get some open air, don't you think? The stomach's fullness also reduces a bit, and walking also makes [blood flow in the veins]... brother, a person who can walk will go out in the open, a person who cannot walk will remain on his cot.*

Although defecation is inherently polluting for bodies, enacting a morning routine that involves rising early, taking a walk, defecating in the open, and taking a bath is associated with the purity of the body. An older, dalit man from Haryana who had used latrines in the Indian army, and who built a latrine for his daughters-in-law and grandchildren to use, but who defecates in the open, explains:

> *I do not want to go inside the latrine... one benefit of going out in open is that one can have some exercise and the second is that all the impurities of ones breath get out... but if one eats and drinks and goes to the latrine in the house one would not live long.... this is the reason why people in the villages live long – for 100 years – and the people in the cities live only 60, 70, 80 or 85 years.*

These sentiments about the benefits of open defecation are echoed by others who stress the wholesomeness of morning routines that involve open defecation, and who feel that defecating in the house is "dangerous" for bodies. A young middle-caste man in Parsa, Nepal who does not own

20. Babies and children up to four or five years old defecate in their own houses and in the village without social consequences.

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a latrine explains:

> *People here do not use latrines. They said that we'll go early in the morning...There are orchards, there are mango trees all around. When they go there early in the morning before sunrise, when they go to defecate early in the morning, at four in the morning, waking up at four in the morning, at four... then getting up while it is still dark everyone gets some fresh air as well...Some five to ten people in the village have latrines but they do not use them because people only use latrines who are sick and so are not able to go out and defecate in the open. Only in such a condition does a man use a latrine. Otherwise you should comfortably go, comfortably go and take in the clean outdoor environment, take in some fresh air, and then return home. Village men are strong because they work in the fields and because there they also get fresh air. If you have a latrine, and a place for bathing, and you defecate in your house, and you do not take a walk anywhere, you do not get out, then you will have pains in your body.*

Women & open defecation

Indian government documents invoke the "dignity of women" as a reason to promote latrines in rural areas (Government of India, 2012a, 2014). During our fieldwork, we often encountered government slogans, painted on walls or displayed on posters in government offices, that promote latrine use by pointing out the apparent contradiction between practices that enforce women's modesty and open defecation. Some of these slogans even reinforce social norms that restrict the mobility of young women in order to promote latrines.[21]

There are several ways in which the everyday practice of open defecation is a gendered one. In our interviews, men typically place greater stress on the benefits of open defecation than women do, perhaps because open defecation is seen as promoting and signalling traits important for masculinity, such as strength and vigour. Some of the respondents we interviewed built latrines primarily because they felt that the women in the household faced special difficulties defecating in the open; for instance, women are sometimes expected to defecate earlier in the morning than men. Among households that own a latrine, women are more likely to use available latrines than men, and young women are more likely to use latrines than older women; the implications of these patterns of latrine use for latrine adoption are discussed further below. Both men and women talk about how people should not approach places where members of the opposite sex are defecating in the open.

However, most respondents find nothing objectionable about women defecating in the open, and many women express positive attitudes toward open defecation for the same reasons that men do.

21. A common slogan in Uttar Pradesh is "Daughters-in-law and daughters should not go outside, make a toilet in your house."

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Indeed, the SQUAT survey found that in the Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh sample, about a fifth of women and girls living in households with a working latrine regularly defecate in the open. Attitudes toward open defecation among young married women, whose "dignity" is of particular concern and whose movement outside the home is especially restricted, are mixed. In some households, young married women are expected to defecate in the open in the dark, or to be accompanied by another family member. In the SQUAT survey, 13% of women who defecate in the open, and 18% of women 18-25 who defecate in the open, reported having to defecate in the dark. These restrictions can be quite burdensome, and in such situations young women tend to find latrines highly desirable. In other households, young women defecate during daylight hours, or in groups. Many women in such situations report enjoying the social aspects of open defecation, and the temporary freedom it provides them. One of four daughters-in-law in a dalit household in Haryana which owns a latrine explained, "The reason that we go outside [to defecate] is that we get to wander a bit... you know, we live cooped up inside." A young Muslim woman in Uttar Pradesh, who owns a latrine, explains that by defecating in the open:

> *"... you can get some fresh air, and some peacefulness. If you're cooped up in the house all day, then you go outside and your mind and body get refreshed. There is this benefit of going outside [to defecate]."*

In short, we find that ideas about taking a walk, exposing oneself to fresh air, and defecating in the open as ways to promote the body's purity and strength are especially important for Hindu men, but that the perceived benefits of open defecation cross caste, religious, age and gender boundaries. So, despite the fact that young women are more likely to use available latrines than men or older women, this behaviour may not necessarily reflect their own preferences. The behaviour of young women in rural north Indian villages is highly regulated; higher-ranking family members often perceive a duty to prevent or discourage young women from leaving the area near the home for any reason, including defecation. As a result, latrine use among young women may, in many cases, reflect a constraint rather than a preference.

Hindus & Muslims

If ideas about purity and pollution that have their origins in Hinduism importantly influence defecation behaviour in rural India, we might expect to find differences latrine ownership and use between Indian Hindus and Indian Muslims. Indeed, India's 2005 DHS finds that rural Muslim households are 19 percentage points less likely to defecate in the open than rural Hindu households, despite the fact that they are poorer on average.[22] Rural Muslims are not only more likely than

22. Geruso and Spears (2014) find that the difference between Muslim and Hindu infants' exposure to open defecation in their primary sampling units fully accounts for the "Muslim mortality paradox" that 14 per 1000 more Muslim babies than Hindu babies survive infancy despite worse economic circumstances.

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rural Hindus to own latrines, they are also more likely to own affordable latrines. India's 2005 DHS found that only 4% of rural Hindu households used inexpensive pit latrines, compared to 15% of rural Muslim households. If Hindus understand the presence of simple pit latrines to be polluting, and if, as Jeffery (1997) and Ali (2002) suggest, Muslims often practice purity and pollution differently than Hindus, it makes sense that rural Indian Muslims would be more likely to construct simple, inexpensive pit latrines.

Data from the SQUAT survey show that Muslims are also more likely to use the latrines that they own. Figure 2 uses SQUAT survey data to show the fraction of people who regularly defecate in the open, conditional on latrine ownership. We break up these results into four groups: Muslims who own privately constructed latrines, Muslims who own government provided latrines, Hindus who own privately constructed latrines, and Hindus who own government latrines. Because it is so common to find government latrines or government- provided latrine parts that are not in use, we only include latrines that at least one person is using among "owned" latrines. For both government and privately constructed latrines, Muslims are less likely to defecate in the open conditional on latrine ownership than Hindus. Further, there is a large gap between the fraction of Hindus who use a privately constructed latrine, and the fraction who use a government constructed latrine; this gap is not present for Muslims. This figure is consistent with a story in which Hindus are more concerned about pit emptying than Muslims.

Muslim participants in our qualitative study are often aware of differences in open defecation and latrine use between the two groups. An older Muslim woman in Uttar Pradesh who owns and uses a latrine explains:

> *The way of life varies from place to place. For all the Muslims it is fine [to use a latrine]. But Hindus are always headed outside to defecate in the open... only they know why they do this. [Her son then interjected, suggesting that open defecation among Hindus is less widely practiced than it once was. However, the woman objected, saying:] It's not that it is something that's left over from the old days! Even if Hindus have made a latrine, still they go out to defecate in the open. Now for our people [Muslims], it's not a problem [to use a latrine]. If we have a latrine in the house, we will use it.*

Despite the fact that many respondents are aware of differences in sanitation behaviour between Hindus and Muslims, it is beyond the scope of this paper to explore in detail differences in attitudes and beliefs between religious groups. It is also important to note that many of the Muslims we interviewed expressed views about impurity of latrines, concerns about pit emptying and benefits of open defecation that are similar to those expressed by Hindus. Indeed, relative to Muslims in other parts of the developing world, Muslims in rural India are relatively unlikely to build and use latrines. According to the 2005 DHS, 56% of rural Indian Muslim households defecate in the open. This contrasts with 6% of rural Bangladeshi households (2012 DHS) and 40% of rural Muslim

households in Nigeria (2008 DHS). We suspect that the differences in open defecation rates between rural Muslims in India and in other parts of the world reflect the fact that rural Indian Muslims live amongst a Hindu majority for whom open defecation is normative, and for whom affordable latrines are counternormative.

Understanding the latrines that exist & their use

We have shown why the kind of latrines that are used to reduce open defecation and improve the disease environment in other parts of the developing world are not socially acceptable in rural India: they introduce ritual impurity into private spaces that should be kept ritually pure. Further, the manual emptying of latrine pits presents special challenges due to India's history of caste-based oppression. As a result of the subjective need to construct a very large latrine pits, rural Indians have an expensive idea of what constitutes a minimally acceptable latrine.[23] Here, we argue that the expensive latrines with large pits that we do observe in rural areas, and the ways in which they are used by the households that own them, ultimately reinforce the practice of open defecation among the many rural poor.

Latrine ownership is for the wealthiest people

Although some conservative rural Hindus find latrines of any sort distasteful, most people feel that an expensive latrine with a very large pit or septic tank is not polluting, but instead is a useful asset. It is an appropriate, although not necessary, addition to a house that is made out of bricks and cement, and already has rooms for other purposes, such as cooking, sleeping, and bathing.[24] These latrines are considered convenient for occasions when someone has diarrhoea; at night when it is difficult to walk far from the house; or when the household has an elderly or handicapped member who cannot defecate in the open. Due to their cost, these latrines are considered a luxury item that only wealthy people can afford.

National data for rural India supports these qualitative findings. Over the last 20 years, significant improvements have been made to rural houses, but similarly widespread investments have not been made in latrines. India's 1991 census found that 40% of rural houses had permanent, or pacca,

23. Indeed, we asked respondents in the quantitative study to estimate the cost, part by part, of a minimally acceptable latrine, they estimated that it would cost, on average, 21,000 rupees, or US$350 dollars at exchange rates, to construct a latrine worth using. See Coffey et al. (2014) for further details.

24. Only one of 65 households that had a member who switched from open defecation to regular latrine had a house that was completely kaccha, that is made out of temporary or impermanent materials. In this household, the latrine was made by a young man, who otherwise worked as a mason, for his elderly grandfather who had become too weak to defecate in the open. The elderly man was grateful for the latrine, but ashamed that he was no longer able to defecate in the open, and that his family had gone to considerable expense to construct a latrine for him. Despite the fact that the household was poor, and their house made out of mud, the latrine was made out of bricks and cement, and had a large pit and an attached bathroom.

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walls, and 21% of rural houses had permanent roofs. By 2011, 58% had permanent walls, and 61% had permanent roofs. However, by 2011, 30% of rural households owned latrines, compared to 9% in 1991. Increasingly, many rural Indians can afford both permanent houses and latrines, especially latrines that have to be emptied every five or ten years, but are far more likely to invest in houses.

The high cost of constructing a suitably large latrine pit contributes to the slow adoption of latrines. Our interviews suggest that the way in which a small group of wealthy and influential villagers build latrines reinforces open defecation among the many poor, who cannot afford such expensive latrines. The adoption of only expensive latrines with large pits, but not of more affordable latrines, reflects Srinivas's (2003) observation that part of what it means to demonstrate upward mobility in Indian villages is to adopt more intense practices of purity and pollution.

Awareness of others' expensive latrines with large pits influences how poor people interpret their own sanitation options. A dalit woman who we interviewed in Uttar Pradesh received a simple, usable latrine from the government; her two small children use it regularly. The latrine was clearly convenient for her: she did not have to worry about her young children walking far from the house, and she did not have to clean up their faeces, which would otherwise be left in the outdoor area in front of her house. Yet, she said that she had not wanted to accept the latrine; she only did so because the village leader had not given her a choice. She said that the children would stop using the latrine when they were old enough to defecate in the open unaccompanied. Despite the fact that latrine was functional and convenient, she viewed it with contempt and shame. She explains why:

> *The pradhan made this [latrine]. If we'd made it, we'd have made it the way we wanted. All of this Indira Vikas money has come, so the pradhan has made it. But he only got a very little pit dug. If we made it the way we wanted, then wouldn't we have used a whole room full of bricks? How can a poor man...? It costs 20 or 25 thousand rupees to [make a latrine].*

The "room full of bricks" to which the woman refers, and which she could not afford, is the pit. She, and many other respondents, likens the investment that would be needed to build an acceptable latrine pit to the investment that would be needed to build an extra room for a house. What she received instead was a physical reminder of the inferiority and unfreedom historically assigned to dalits, especially in matters of sanitation.

The expense required to make a latrine with a large pit, together with the social acceptability of open defecation, imply that it makes little sense for poor people to construct and use latrines. Using the language of physical uncleanliness to refer also to ritual uncleanliness, a wealthy middle-caste man in Gujarat who owns two latrines with large pits explains why he does not expect his poorer neighbours, who belong to a marginalised Adivasi group, to build latrines, or even to use the latrines they receive from the government:

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"The [latrines] that you get from the government are no use, they are so small... their pits are so small that in two or three months they will fill up. There will be bad smells and filth in the surroundings. For Adivasi people, who don't have much land, wouldn't they make a house rather than a latrine? [If they made latrines] it would be dirty."

Latrine use is for weak people

Not only does the way in which latrines are constructed in villages reinforce open defecation among the many poor, so does the way in which they are typically used. Panel A of figure 3 uses data from the SQUAT survey to plot open defecation by sex and age group among individuals living in households that own a latrine; panel B plots the same information for the 66 latrine-owning households from the qualitative data. Overall rates of open defecation conditional on latrine ownership were higher for the qualitative interviews, but the age and sex patterns of open defecation are similar. We find that, at all ages, men are less likely to use an available latrine than women, and that the people who are most likely to use latrines are those with the least decision making authority in the household: young women and elderly people. The demographic groups with the most decision making authority in rural households – middle-aged and senior men – are the groups which are most likely to defecate in the open conditional on owning a latrine.

We were repeatedly told that latrine use is appropriate for the lowest ranked members of rural households: elderly people, young children, pregnant women, and the disabled. A middle-aged woman in Haryana talks about why her family built a latrine:

For the old people, like this old lady [signalling her mother-in-law] she couldn't walk, so we made [the latrine] for her... where would this old lady go? And for little kids, or if a woman has given birth and she can't go outside. After a baby is born she will defecate inside the house.

It is common knowledge that many men who own latrines do not use them, and in many of the villages we visited, latrine owners and non-latrine owners alike share the view that people who have no physical problems walking long distances and no social constraints keeping them near the home would find it preferable to defecate in the open. A young dalit man whose household had received funds for a government latrine, but had not built one, explained: "We have the fields and the jungle, which are good... here people who can walk go there. Those who can't walk will use latrines. We can walk to the fields, so we go there."

Because latrines are most likely to be used by the household members with the least economic decision-making power, they are generally not investment priorities. Building a latrine may become a priority when it is forced by a newly developed weakness: advancing age, injury, or the restrictions governing a daughter-in-law who has recently moved into the household. But these very weaknesses remind people that latrines and latrine use are not everyday necessities, but occasional conveniences that only the wealthy can afford. When wealthy, high-status men who own latrines are seen

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choosing to defecate in the open despite owing a latrine, they publicly reinforce open defecation as the desirable choice for the strong.

Discussion

Despite the importance of rural sanitation for India's health transition, there has been relatively little scholarly work on India's sanitation puzzle. We use new qualitative and quantitative data from multiple sites across north India to shed light on the cultural reasons for widespread open defecation. We present a coherent analysis of the meanings of latrine use and open defecation, and show how the affordable pit latrines that are used to reduce disease transmission in other developing countries are seen as ritually polluting and socially undesirable. India's history of caste-based oppression and present-day struggles for caste equality mean that latrine pit emptying poses special challenges that are not similarly present in other societies. Further, we find that open defecation is understood to help reduce personal bodily pollution associated with the act of defecation, and that it is associated with good health, wholesomeness, and masculine strength

Despite the importance of culture for rural India's sanitation crisis, the government has done little to try to change the meanings of latrine use and open defecation in villages. Sanitation policy focuses almost exclusively on constructing the kinds of latrines that villagers reject. It is clear that constructing these latrines without achieving changes in the cultural meanings of latrine use and open defecation will do little to reduce open defecation among the majority of north Indian villagers.

This paper has also outlined some reasons why attitudes and beliefs about latrines and latrine use in rural India will be especially difficult to change. The village elite has already defined an acceptable latrine as an expensive investment that is out of reach for most poor people. Affordable pit latrines require pit emptying, an unthinkable task for caste Hindus, and one that for rural dalits is a symbol of an ongoing struggle for social equality. Further, those individuals for whom latrine use is considered most appropriate are those who have the least decision making power in rigid household hierarchies. These findings, and the uniqueness of rural Indian understandings of pollution and caste, imply that sanitation behaviour change programs developed for other cultural contexts are unlikely to be successful if transplanted to rural north India.

Economic growth may allow more rural Indian households to switch from open defecation to expensive latrines with large pits in the next several decades. In the meantime, however, open defecation poses a

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major, and in many cases growing,[25] threat to health in rural India, and particularly to the health and human capital accumulation of children. Future research should explore the extent to which efforts to promote changes in the meanings of latrine use and open defecation would allow rural Indians to enjoy the same public health benefits of inexpensive latrines that are enjoyed in other developing countries.

Appendix: Data and methodology

This paper draws on both qualitative and quantitative data collected in six states in north India, and in Parsa district in the terai region of Nepal. The survey design, sampling, and summary statistics for the quantitative SQUAT survey have been described in Coffey et al. (2014). Here we describe the collection and analysis of the qualitative interviews that are the primary source of empirical data for this paper.

We conducted 65 semi-structured interviews with households in which at least one member adopted latrine use in the past 10 years, and 35 interviews with households in which every member defecates in the open. The interviews covered a variety of topics, including respondents' views on latrine ownership and use; open defecation; who in the household uses the latrine and why; the decision to make a latrine; the design of the latrine and the cost; and whether government or other organisations played a role in motivating the household or in constructing the latrine. The sampling strategy used to select households involved choosing regions, districts, villages, and households. Within households we interviewed adults who reported having decision-making authority about large household purchases. Other family members were encouraged to join the conversation and often did so. Table 2 presents region-specific information about the interviews and the respondents.

Purposive sampling

Interviews were conducted in four regions in northern India and southern Nepal; three regions are Indian states, the fourth is the terai region of Nepal.[26] Although there are important differences in household latrine ownership in these regions – in Haryana and the Nepali terai, 56% and 55% of rural households owned toilets respectively, compared to 22% in Uttar Pradesh and 33% of households in Gujarat (Census, 2011 & DHS, 2011) – we nevertheless found many common attitudes, beliefs, norms and practices around latrines and latrine use in these regions. We decided to visit the terai region of southern Nepal because it is, on average, economically poorer than many parts of north India, but Demographic and Health Survey data suggest that it has made better progress building latrines. During the course of the project, we observed that this improvement

25. Spears (2014) finds that most people in India live in a district in which the population density of people practicing open defecation increased between the 2001 and the 2011 censuses.

26. The largest administrative division of Nepal breaks the country into "mountains," "hills," and "terai."

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is driven mainly by investment in latrines with septic tanks rather than affordable latrines; this observation is supported by DHS data. A question for further research, which our paper does not answer, is why households in the Nepali terai have invested in septic tanks at a similar rate as households in Haryana, even though they are significantly poorer.

In each region or state, we visited the district in which the rate of improvement in latrine coverage between 2001 and 2011 most closely matched the improvement in latrine coverage in the region or state as a whole during this period. In Indian districts, we selected gram panchayats (GPs) from a list of GP names that was used as the sampling frame for the District Level Household Survey, 2004 (DLHS-2). The GP is the lowest level of rural government administration in India. We visited those GPs in which the estimated village level 2004 latrine coverage most closely matched the 2004 district level latrine coverage from the DLHS-2. Where a selected GP contained more than one village, or hamlet, we selected households from the village whose name matched the name of the village of the DLHS-2 sampling list; this was often the largest village. In Nepal, where no district level sample survey is available, we selected villages randomly from a list of census villages.

In each village, we completed between 4 and 6 household interviews. We selected households using an in-field randomisation procedure similar to the one used by PRATHAM to conduct the ASER surveys.[27] If no one was home in the selected household, if household members refused to participate, or if we had already interviewed enough households of that household's type (open defecators vs. households in which at least one member switched to latrine use in the past 10 years) in that village, we knocked on each door to the selected household's right until we found an appropriate household to interview. Table 3 presents summary statistics about the number of households approached as we followed this sampling strategy.

Semi-structured interviewing

Within households, we interviewed adult decision makers. In joint households, this was often an older man, but we also interviewed women and younger men if they reported being involved in either deciding to invest in a latrine, or, if they did not own a latrine, in other large purchases. We conducted an interview only if such a person were at home and available. Table 3 also presents information on the number of households for which a decision maker was not available, as well as the number of households which we screened but did not interview because they had been using a

27. We began by walking around the village and drawing a map that divided the village into between four and six sections. We then randomly selected which section to visit first. After each interview, we randomly selected a new section to visit, subject to the constraint that we did not visit a section twice until we had done at least one interview in each section. In the approximate centre of each section, we spun a spinner which indicated the direction we would proceed. We then consulted a random number sheet that indicated whether we should start from the centre of the section or the edge, and how many households to pass before stopping at a household and requesting an interview.

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latrine for more than 10 years, or were locked, abandoned, or occupied by renters.[28]

Interviews were conducted in teams of two or three interviewers; at least one of the authors led each interview. To facilitate semi-structured interviewing, we used an interview guide that listed the themes to be discussed. Interviewer teams almost always included at least one male and one female interviewer, and sometimes included a research assistant who was more familiar with the relevant regional language (Gujarati, Haryanvi, Bhojpuri). The interview guide was piloted in Sitapur district of Uttar Pradesh and is available online at www.riceinstitute.org. The interview had qualitative and quantitative components; the quantitative components included a household roster which asked about age, sex, education, occupation and latrine use for each person individually, a two page questionnaire based on an observation of the latrine, and an asset list. We asked mainly open-ended questions and encouraged respondents to give in-depth responses. We placed special emphasis on developing a rapport with respondents; for each interview we had an initial conversation about the construction of the respondent's house which allowed us to gain his or her trust and clarify our purpose in conducting the interview before talking about defecation behaviour. 87 out of 100 interviews were audio recorded to facilitate data analysis. When a respondent declined to have the interview recorded, we conducted the interview nevertheless, taking more detailed written notes. All 100 interviews were included in the analysis. Interviews lasted between one and two hours. Ethical approval for the study was obtained from Princeton University's Institutional Review Board (IRB).

Data analysis

Piloting, interviewing, primary data analysis, and follow up interviews were done over a period of thirteen months. After each day of interviewing, authors met to discuss the day's interviews. We tried to reach consensus about why the households that had built latrines did so. Based on the recording and notes taken on the discussion guides, one of the authors completed a detailed summary for each interview. These were then read and reviewed by the other authors, and in many cases, the authors listened to one another's recorded interviews as well. Meeting about, writing, and reviewing summaries from early interviews allowed us to identify themes, develop hypotheses, and test those hypotheses in future interviews. We changed the interview guide in small ways over time to accommodate new questions and ideas. Software was not used in data analysis; instead, we used memos and notes to keep track of patterns in the data, and kept tabulations related to the themes that arose during the interviews. For example, some of the tabulations related to primary reasons for building latrines, for using them, views of the health benefits of open defecation, and

28. We encountered renters only in only one village in Gujarat. In this villages, people from poorer parts of India rented small rooms and worked in nearby factories. Landlords had built blocks of latrines for people living in these rooms. We did not complete interviews among these renters because we were interested in people who had made active decisions to use latrines.

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whether anyone in the household objected to owning a latrine. Before writing, the authors met to outline the paper, and identify open questions. We did several follow-up interviews in Uttar Pradesh, Rajasthan, Bihar and Tamil Nadu to follow up on key areas of interest, especially the caste dimensions of pit emptying.

References

Ali, S. (2002). Collective and elective ethnicity: Caste among urban Muslims in India. In Sociological Forum, Volume 17, pp. 593–620. Springer.

Alter, J. S. (2011). Moral Materialism: Sex and Masculinity in Modern India. Penguin Books India.

Arnold, F., S. Kishor, and T. Roy (2002). Sex-selective abortions in India. Population & Development Review 28 (4), 759–785.

Barnard, S., P. Routray, F. Majorin, R. Peletz, S. Boisson, A. Sinha, and T. Clasen (2013).

Impact of Indian Total Sanitation Campaign on latrine coverage and use: A cross-sectional study in Orissa three years following programme implemenation. PLoS one 8 (8), e71438.

Barnes, D. S. (2006). The great stink of Paris and the nineteenth-century struggle against filth and germs. JHU Press.

Bongaarts, J., P. Reining, P. Way, and F. Conant (1989). The relationship between male circumcision and HIV infection in African populations. AIDS 3 (6), 373–378.

Cain, L. and E. Rotella (2001). Death and spending: Urban mortality and municipal expenditure on sanitation. In Annales de D´emographie Historique, Number 1, pp. 139–154. Belin.

Cairncross, S. (1987). Low-cost sanitation technology for the control of intestinal helminths. Parasitology Today 3 (3), 94–98.

Cairncross, S. (2003). Sanitation in the developing world: Current status and future solutions. International Journal of Environmental Health Research 13 (S1), S123–S131.

Caldwell, J. (1993). Health transition: The cultural, social and behavioural determinants of health in the Third World. Social Science & Medicine 36 (2), 125–135.

Caldwell, J. C. (1995). Lack of male circumcision and AIDS in sub-Saharan Africa: Resolving the conflict. Health Transition Review , 113–117.

Caldwell, J. C., P. Caldwell, and P. Quiggin (1989). The social context of AIDS in sub- Saharan Africa. Population and development review , 185–234.

Caldwell, J. C., S. Findley, P. Caldwell, G. Santow, W. Cosford, J. Braid, and D. Broers-Freeman (1990). What we know about health transition: The cultural social and behavioural determinants of health. The proceedings of an international workshop, Canberra, May 1989. Australian National University Health Transition Centre.

Coffey, D., A. Gupta, P. Hathi, N. Khurana, D. Spears, N. Srivastav, and S. Vyas (2014).

Revealed preference for open defecation: Evidence from new survey data. Economic & Political Weekly 49 (38), 43.

Cutler, D. and G. Miller (2005). The role of public health improvements in health advances: The twentieth-century United States. Demography 42 (1), 1–22.

DasGupta, M. (1987). Selective discrimination against female children in rural Punjab, India. Population & Development review , 77–100.

DasGupta Sherma, R. (1998). Sacred immanence: Reflections of ecofeminism in Hindu tantra. In L. Nelson (Ed.), Purifying the Earthly Body of God: Religion and Ecology in Hindu India, pp. 89–132. SUNY Press.

Deaton, A. (2013). The great escape: Health, wealth, and the origins of inequality. Princeton University Press.

Deaton, A. and J. Drèze (2009). Food and nutrition in India: Facts and interpretations. Economic & Political weekly , 42–65.

Douglas, M. (1966). Purity and danger: An analysis of concepts of purity and taboo. Routlege & Kegan Paul, Lond .

Drèze, J. and A. Sen (2013). An uncertain glory: India and its contradictions. Princeton University Press.

Dumont, L. (1980). Homo hierarchicus: The caste system and its implications. University of Chicago Press.

Dye, C. (2008). Health and urban living. Science 318, 766–769.

Express News Service (2014, June 5). A bitter inequity. The Indian Express .

Feachem, R., D. D. Mara, and D. J. Bradley (1983). Sanitation and disease: Health Aspects of Excreta and Wastewater Management. John Wiley & Sons.

Fink, G., I. Gu¨nther, and K. Hill (2011). The effect of water and sanitation on child health: Evidence from the demographic and health surveys, 1986 - 2007. International Journal of Epidemiology 40 (5), 1196–1204.

Fricke, T. (2003). Culture and causality: An anthropological comment. Population & Development Review 29 (3), 470–479.

Fuller, C. J. (2004). The camphor flame: Popular Hinduism and society in India. Princeton University Press.

Geruso, M. and D. Spears (2014). Sanitation and health externalities: Resolving the Muslim mortality paradox. University of Texas at Austin Working Paper .

Government of India (2007). Technology options for household sanitation. published in collaboration with UNICEF.

Government of India (2012a). Guidelines Nirmal Bharat Abhiyan. Technical report.

Government of India (2012b). Handbook on technical options for on-site sanitation. Technical report.

Government of India (2012c). Houses, household amenities and assets, census 2011.

Government of India (2014). Guidelines for Swachh Bharat Mission (Gramin). Technical report.

Greenhalgh, S. (1990). Toward a political economy of fertility: Anthropological contributions. Population and Development Review , 85–106.

Greenhalgh, S. (Ed.) (1995). Situating Ferti1ity: Anthropology and Demographic Inquiry. Cambridge University Press.

Gupta, D. (2000). Mistaken modernity: India between worlds. HarperCollins Publishers, India.

Halperin, D. T. and H. Epstein (2004). Concurrent sexual partnerships help to explain Africa's high HIV prevalence: Implications for prevention. The Lancet 364 (9428), 4–6.

Hammel, E. A. (1990). A theory of culture for Demography. Population & Development Review ,

455–485.

Harper, E. B. (1964). Ritual pollution as an integrator of caste and religion. The Journal of Asian Studies 23 (S1), 151–197.

Hathi, P., S. Haque, L. Pant, D. Coffey, and D. Spears (2014). Place and child health: The interaction of population density and sanitation in developing countries. Policy Research Working Paper 7124, World Bank.

Humphrey, J. H. (2009). Child undernutrition, tropical enteropathy, toilets, and handwashing. The Lancet 374, 1032 – 35.

Jeffery, R. (1997). Population, gender and politics: Demographic change in rural north India, Volume 3. Cambridge University Press.

Kertzer, D. I. and T. E. Fricke (Eds.) (1997). Anthropological Demography: Toward a new synthesis. University of Chicago Press.

Khare, R. (1962). Ritual purity and pollution in relation to domestic sanitation. The Eastern Anthropologist 15 (2), 125–139.

Lüthi, D. (2010). Private cleanliness, public mess: Purity, pollution and space in Kottar, south India. Urban Pollution: Cultural Meanings, Social Practices 15, 57.

Mah, T. L. and D. T. Halperin (2010). Concurrent sexual partnerships and the HIV epidemics in Africa: Evidence to move forward. AIDS & Behavior 14 (1), 11–16.

McGreevey, W., A. Acharya, J. S. Hammer, and L. MacKellar (2008). Propinquity matters: How better health, urbanization, and income grew together, 1870-2008. Georgetown Journal on Poverty, Law and Policy 15, 605.

McKeown, T. and R. Record (1962). Reasons for the decline of mortality in England and Wales during the nineteenth century. Population Studies 16 (2), 94–122.

Milner, M. (1987). Dirt and development in India. Virginia Quarterly Review 63, 54–71.

Murphy, R. (2003). Fertility and distorted sex ratios in a rural Chinese county: Culture, state, and policy. Population & Development Review 29 (4), 595–626.

Nigam, A. (2014, June 2). The killing fields. The Hindu .

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Padfield, J. E. (1896). The Hindu at home: Being sketches of Hindu daily life. Society for Promoting Christian Knowledge.

Pinto, S. (2013). Where there is no midwife: Birth and loss in rural India. Ph. D. thesis, Princeton University.

Preston, S. H. (1975). The changing relation between mortality and level of economic development. Population Studies 29 (2), 231–248.

Preston, S. H. and M. R. Haines (1991). Fatal years: Child mortality in late nineteenth- century America. Princeton University Press.

Preston, S. H. and E. Van de Walle (1978). Urban French mortality in the nineteenth century. Population Studies 32 (2), 275–297.

Pritchett, L. and L. H. Summers (1996). Wealthier is healthier. Journal of Human Resources, 841–868.

Sawires, S. R., S. L. Dworkin, A. Fiamma, D. Peacock, G. Szekeres, and T. J. Coates (2007).

Male circumcision and HIV/AIDS: Challenges and opportunities. The Lancet 369 (9562), 708–713.

Sen, A. (2003). Missing women – revisited. British Medical Journal 327 (7427), 1297–1298. Shah, G., H. Mander, S. Thorat, S. Deshpande, and A. Baviskar (2006). Untouchability in rural India. Sage.

Shah, S. P., R. Nair, P. P. Shah, D. K. Modi, S. A. Desai, and L. Desai (2013). Improving quality of life with new menstrual hygiene practices among adolescent tribal girls in rural Gujarat, India. Reproductive Health Matters 21 (41), 205–213.

Snow, J. (1855). On the mode of communication of cholera. John Churchill.

Spears, D. (2012). Effects of sanitation on early-life health: Evidence from a governance incentive in rural India. r.i.c.e. working paper .

Spears, D. (2013). How much international variation in child height can sanitation explain? World Bank Policy Research Working Paper 6351, World Bank.

Spears, D. (2014). Increasing exposure to open defecation density 2001–2011. r.i.c.e. working paper .

Spears, D. and S. Lamba (forthcoming). Effects of early-life exposure to sanitation on childhood cognitive skills: Evidence from Indias total sanitation campaign. Journal of Human Resources .

Srinivas, M. (2003). Religion and Society Among the Coorgs of South India. Oxford University Press.

Staff (2013, September 13). Get serious. The Hindu .

Swidler, A. (1986). Culture in action: Symbols and strategies. American Sociological Review 51 (2), 273–286.

Szreter, S. (1988). The importance of social intervention in Britain's mortality decline c.1850–1914: A re-interpretation of the role of public health. Social History of Medicine 1 (1),1–38.

Teltumbde, A. (2014). No Swacch Bharat without annihilation of caste. Economic & Political Weekly XLIX (45), 11–12.

Thompson, C. (1985). The power to pollute and the power to preserve: Perceptions of female power in a Hindu village. Social Science & Medicine 21 (6), 701–711.

UNICEF & WHO (2012). Progress on drinking water and sanitation: 2012 update. Valmiki, O. (2003). Joothan: A dalit's life. Columbia University Press.

WHO (1996). Simple pit latrines. Technical report, World Health Organization.

Zelliot, E. (1992). From untouchable to dalit: Essays on the Ambedkar movement. Manohar Delhi.

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Figure 1: Latrine pit volume in comparative perspective

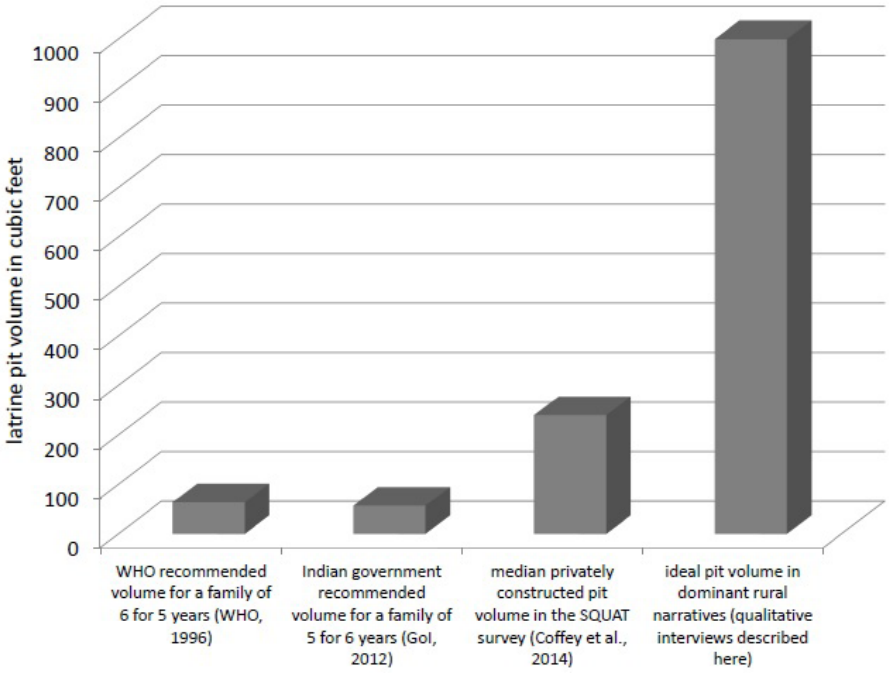

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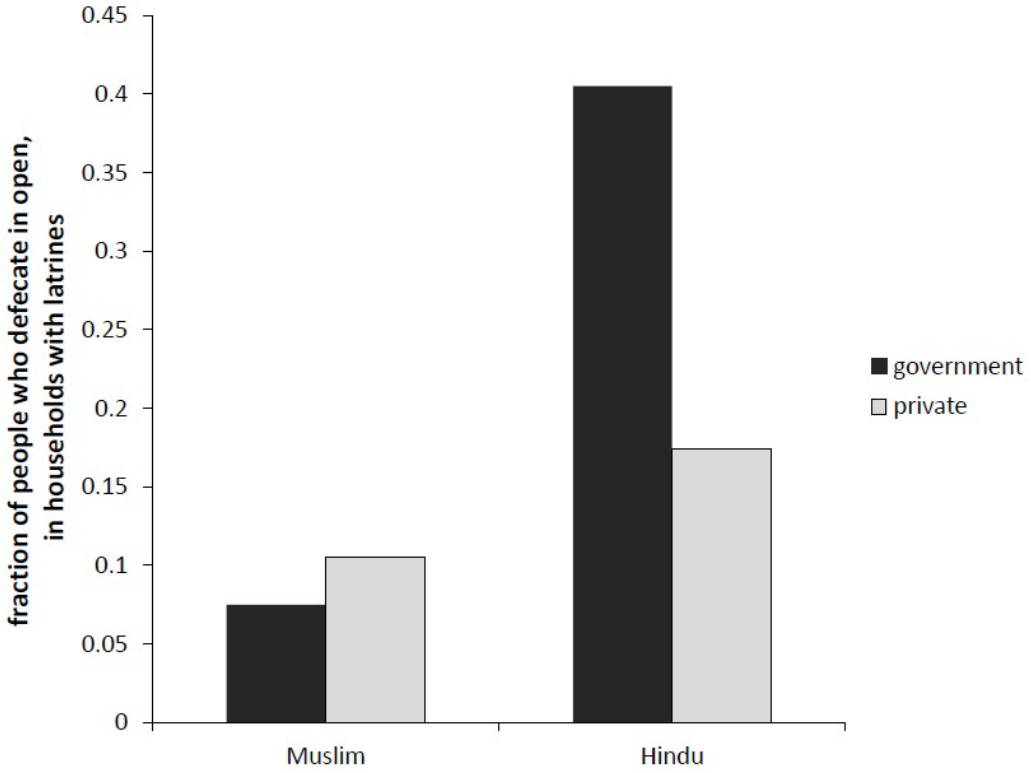
Table 1: Comparisons of development outcomes in India & the world's 3 poorest regions

	Indicator	% open defection	% rural open defection	% rural drinking water access	GDP/Capita (US $)
	Source	JMP, 2012	JMP, 2012	JMP, 2012	World Bank, 2012
India		48.3	65.0	90.7	5,050
South Asia	all South Asia	38.1	52.5	89.3	4,666
	Pakistan	23.1	34.3	89.0	4,360
	Bangladesh	4.0	5.0	84.4	2,364
Sub-Saharan Africa	All Sub-Saraharan Africa	24.9	34.4	52.5	3,263
	Nigeria	23.0	31.5	49.1	5,291
Southeast Asia	All Southeast Asia	12.5	17.1	84.7	9,446
	Indonesia	21.9	30.7	76.4	8,855
	Indicator	% poverty HCR ($1.25/day)	% poverty HCR ($2/day)	% literate among women	% literate among men
	Source	World Bank, mult. years	World Bank, mult. years	World Bank, mult. years	World Bank, mult. years
India		24.7	60.6	50.8	75.2
South Asia	All South Asia	24.8	60.4	50.1	72.7
	Pakistan	12.7	50.7	42.0	67.0
	Bangladesh	43.3	76.5	55.1	62.5
Sub-Saharan Africa	All Sub-Saharan Africa	40.7	62.7	49.0	69.1
	Nigeria	62.0	82.2	41.4	61.3
Southeast Asia	All southeast Asia	18.1	58.2	91.0	95.1
	Indonesia	16.2	43.3	90.1	95.6

Open defecation, drinking water and poverty figures are individual, rather than household level estimates. Literacy figures are shown for people 15 years and older. Figures labeled "JMP" are from the WHO-Unicef Joint Monitoring Report, 2012. World Bank figures are taken from the World Bank Development Indicators series, available at www.data.worldbank.org. For all indicators, regional estimates are computed without Myanmar and Somalia, for which data are missing. Literacy rates for sub-Saharan Africa do not include Ethiopia, Sudan, or South Sudan; these data are missing. Brunei, Singapore, Eritrea, Equatorial Guinea and south Sudan are not included in regional poverty estimates due to missing data.

Figure 2: Latrine use among people in households with latrines, by religion and latrine type



Latrine use computed using data from the SQUAT survey. For more information on these data, see Coffey et al. (2014).

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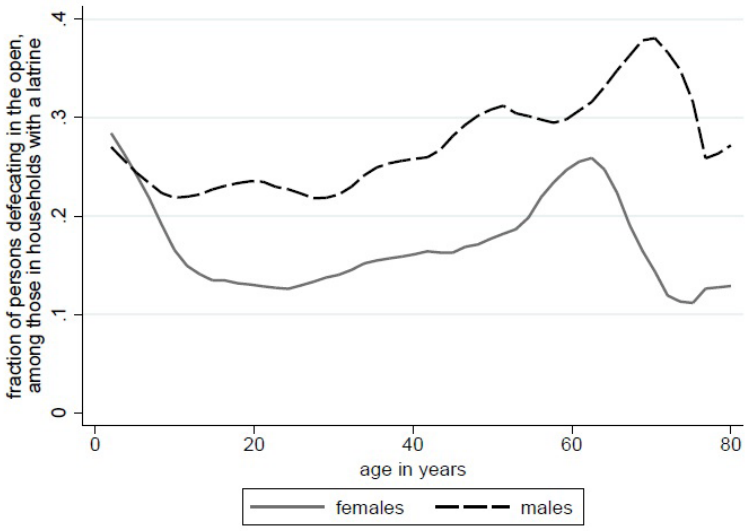
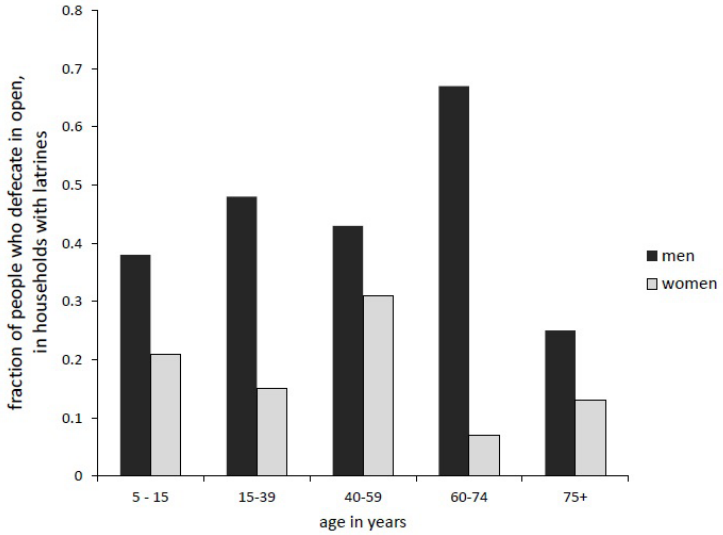
Figure 3: Open defecation among people in households with latrines, by sex & age

Panel A: SQUAT survey data (9,628 persons)



Panel B: Qualitative survey data (555 persons)



The figure in panel A is reprinted from Coffey et al. (2014) and uses data from the SQUAT survey. The figure in panel B uses data from the qualitative interviews. See the Appendix for more information about these data.

Figure 4: Appendix figure: Map of districts visited for qualitative interviews

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Table 2: Appendix table: Households and respondents in the qualitative study

	no. of villages visited	total no. of households interviewed	households in which all members defecate in open	households in which at least one person uses a latrine	no. of households with multiple respondents
Rewari, Haryana	4	24	10	14	14
Fatepur, Uttar Pradesh	5	25	8	17	15
Valsad, Gujarat	5	29	9	20	17
Parsa, Nepal	4	22	7	15	14

	no. of households in which primary respondent is male (18-40)	no. of households in which primary respondent is male (40+)	no. of households in which primary respondent is female (18-40)	no. of households in which primary respondent is female (40+)
Rewari, Haryana	4	9	4	7
Fatepur, Uttar Pradesh	9	7	5	4
Valsad, Gujarat	8	5	3	13
Parsa, Nepal	6	11	2	5

Table 3: Appendix table: Households and respondents in the qualitative study

	all defecate in open	at least one latrine user
households approached	348	111
completed interviews	35	65
partial interviews	2	2
refusal	6	24
decision maker not available	11	18
no longer needed that type of interview in village	294	2
using a latrine for more than 10 years	107	
locked/renting	82	

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