

Lack of Toilets and Violence against Indian Women: Empirical Evidence and Policy Implications

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Abstract

It is now well-accepted among policy makers that the provision of water, sanitation and hygiene is a basic human right. Yet, millions of people lack access to basic toilet facilities, which anecdotal evidence suggests may increase violence against women. We examine the relationship between the lack of toilet facilities in the Indian household on non-family violence (i.e. not family member) against Indian women. Using the latest 2005-2006 National Family Health Surveys (NFHS-3) data, we relate the lack of toilet facilities in Indian households (when members use bush or pit latrines to relieve themselves) to non-family violence against Indian women. Multilevel logistic regression results, using data from 60,847 Indian women, indicate that after controlling for economic prosperity and other covariates, lack of toilet facilities in the household is positively related to non-family violence against urban Indian women but not for rural Indian women. Further, this relationship is stronger for poor urban women. Additional analysis indicate that the findings are robust. The paper's insights indicate that the lack of toilet facilities in households is a source of violence against urban Indian women. We offer policy recommendations to reduce non-family violence against urban Indian women.

Although women have made significant gains in education, health and even political power over the past fifty years, physical violence against women and girls worldwide “persists at alarmingly high levels,” according to an analysis that Secretary General Ban Ki-moon presented to the General Assembly (New York Times March 10, 2015)¹. Physical violence against women arises from many sources within and outside their homes. In this paper, we examine the relationship between the lack of toilet facilities in Indian households and violence against Indian women committed by non-family members, including strangers, former partners, employer, teacher, and police, which we term as non-family violence (Abrahams et al. 2014).

In focusing on the lack of toilet facilities and non-family violence against Indian women, our research addresses the recent calls from marketing scholars including 1) Chakravarti (2006) and Mick et al.’s (2012) call for researchers to engage in transformative consumer research that seeks to encourage, support, and publicize research that benefits consumer welfare and quality for individuals living across the world, 2) Shultz et al.’s (2012) call for transformative research in developing markets with the primary goal of improving consumer well-being. They note (p. 179) that “our primary interest is social welfare: the phenomena, forces, factors, and policies that affect welfare” and 3) Stewart’s (2014) recent call for research on social problems with a view to generate public policy implications to improve consumer welfare.

From a substantive perspective, in 2010, the United Nations General Assembly adopted a resolution on the “Human Right to Water and Sanitation,” which explicitly recognized the basic human right to water and sanitation. The Human Rights Council subsequently affirmed by consensus, “that the human right to safe drinking water and sanitation is derived from the right to

¹ at <http://www.nytimes.com/2015/03/10/world/un-finds-alarmingly-high-levels-of-violence-against-women.html> accessed on March 15, 2015.

an adequate standard of living and inextricably related to the right to the highest attainable standard of physical and mental health, as well as the right to life and human dignity.“ Indeed, it is now well-accepted that the provision of water, sanitation and hygiene (WASH) is considered a basic human right (Winkler, Satterthwaite, and De Albuquerque 2014). Yet, millions of people around the world lack access to basic toilet facilities.

Lack of access to toilet facilities has been associated with various infectious diseases including diarrhea, soil-transmitted helminth infection, trachoma, and schistosomiasis (Pruss-Unstun et al. 2008). Open defecation has been related to stunting in India (Spears, Ghosh, and Cumming 2013) and in other countries (Fink, Günther, and Hill 2011). However, other recent evidence suggests no benefits of latrines on health outcomes. In a randomized controlled trial study in 100 rural villages in the state of Odisha, India, 4586 households in 50 villages were assigned to latrine construction and promotion and 4894 households in 50 villages were assigned to no treatment (Clasen et al. 2014). They report that latrine intervention was not protective against diarrhea both in children younger than five years and in individuals in all age groups, perhaps because people did not use them.

When a household lacks toilet facilities, its residents are forced to use open areas, including bushes and communal pit latrine to relieve themselves. While open defecation is shameful for men and women, it is especially problematic for women. Because of the shame associated with public defecation, women who use the bush/open fields to relieve themselves, do so either very early in the morning or late at night to achieve some privacy. This creates unsafe conditions, increasing the women’s vulnerability to attacks from miscreants in their communities. In support of this idea, a study in two large cities in India, Pune and Mumbai, reports that when toilet facilities are located far from their homes, women reported facing risks

of attacks and violence if they walked alone to use them especially at night (Bapat and Agarwal 2003).

An exploratory study² sponsored by two NGOs, Sanitation and Hygiene Applied Research for Equity (SHARE) and WaterAid, highlighted the experiences of women living without access to adequate sanitation facilities in two Indian cities, Bhopal and New Delhi, and in Kampala, Uganda. Women interviewed for this study reported that they had routinely experienced harassment when they used public toilets or open defecation sites. They were subject to rude remarks, brick-throwing, stabbing and, even sexual assault. Below, are some of the verbatim comments of the women:

“The toilets are far from our homes... A man can just go anywhere to pass urine, but a woman has to walk all the way to the toilets.”

“It is more dangerous for a woman than a man because an attacker can take money from you and rape you... but a man will only be robbed of money.”

“We have had one-on-one fights with thugs in order to save our daughters from getting raped. It then becomes a fight that either you kill me to get to my daughter or you back off.”

“I have three young daughters. I cannot let them go alone... I go with them every time one of them has to go for defecation. I have to make many trips during the day. But I have no other choice.”

Overall, the anecdotal evidence suggests a positive relationship between the lack of sanitation facilities in homes and non-family violence against Indian women. However, this relationship has not been systematically studied, which we focus on in this research.

We extend developments in social disorganization theory in sociology (Shaw and McKay 1942) to explain urban violence and delinquency in city neighborhoods in the United States to examine the relationship between the lack of toilet facilities in Indian households and the incidence of non-family violence against Indian women. A pertinent question that arises is

² At www.wateraid.org/se/~media/Files/Sweden/nowhere-to-go.pdf accessed in December 3, 2014.

whether the effects of lack of toilet facilities in households on non-family violence against women are likely to be different across urban and rural India? Developing countries, including India, have experienced increased urbanization over the past two decades. According to the Indian Census of 2011, urbanization in India increased from 28% in the 2001 Census to 31% in the 2011 Census, resulting in an urban Indian population of 377 million. The rapid urbanization in India has increased population density in many communities increasing pressure on essential services including water and sanitation. Some homes in crowded urban Indian communities do not have toilet facilities. As a result, women have to go outside the home to relieve themselves, increasing their vulnerability to violent attacks from miscreants. Thus, we anticipate that the relationship between the lack of toilet facilities in Indian households and non-family violence against Indian women will be strong in urban areas in India.

We test the relationship between the lack of toilet facilities in households and non-family violence against Indian women using the most recent national population-based data from India, the 2005-2006 National Family Health Survey-3 (NFHS-3 2007). We estimate multilevel logistic regression models using survey data of 60,847 women in 22 states in India.

After controlling for the economic prosperity of the household (using an adjusted household wealth index which excludes its toilet facilities) and other covariates, the lack of toilet facilities in households is positively related to non-family violence against urban Indian women (increases by 45%), but not for rural Indian women. The positive relationship between lack of toilet facilities in the household and non-family violence is stronger for poor urban Indian women, as defined by the bottom two quintiles of the wealth index. The findings are robust to the use of alternative measures of lack of toilet facilities in the household and definition of non-family violence, and sampling variations.

Additional analysis indicates that the lack of toilet facilities in the household is not related to intimate partner violence (i.e. from domestic partners, including husbands) against urban Indian women, indirectly, increasing our confidence in the relationship between the lack of toilet facilities in Indian households and non-family violence against urban Indian women. The paper's insights identify the lack of toilet facilities in households as a source of violence against urban Indian women. We propose public policy actions to reduce non-family violence against urban Indian women.

In the following sections, we first provide a brief overview of social disorganization theory and then extend it to the relationship between the lack of toilet facilities in Indian households and non-family violence against Indian women. We then describe the method that we use to empirically test this relationship followed by the results of model estimation. We conclude by summarizing the key findings, offering policy recommendations for improving access to safe toilet facilities for Indian women to reduce non-family violence against them, and discussing the study's limitations and opportunities for further research.

THEORY

In this section, we offer a brief overview of social disorganization theory developed in sociology to explain violence in urban communities in the United States. Following that, we apply social disorganization theory to the phenomenon of non-family violence against Indian women who live in households without toilet facilities.

Social Disorganization Theory

Social disorganization theory was developed by sociology scholars, Shaw and McKay (1942) in their seminal work on juvenile delinquency in urban areas in the United States. Social

disorganization has been defined as the “inability of a community structure to realize the common values of its residents and maintain effective social controls” (Sampson and Groves 1989). According to Shaw and McKay’s classic work (1942), the same socio-economically disadvantaged areas in 21 US cities continued to experience high delinquency rates over several decades despite changes in the racial and ethnic composition of the residents.

So, how does social disorganization in the community affects crime rates? The social disorganization approach (Kornhauser 1978) views local communities in terms of systems of friendship, kinship and acquaintanceship networks, as well as formal and informal associational ties rooted in family life and ongoing socialization processes (Sampson and Wilson 1995). Depletion in the stock of social capital, defined as social networks, norms of reciprocity and trust in others (Putnam 1993) that facilitate cooperation among community residents is a distinguishing characteristic of socially disorganized communities. Thus breakdown in social capital and social controls is a key driver of social disorganization.

Scholars in social disorganization theory have identified the specific factors that increase delinquency and violence in the community. Increases in population density reduce the ability of a community to maintain surveillance and guardianship of youth and strangers (Sampson and Raudenbush 1999). As the number of persons in a community increases, it is more difficult for residents to know others who live in the area. When this occurs, residents are less able to recognize their neighbors or be concerned with their activities, increasing delinquency and crime. Residential mobility in a community also increases social disorganization as high population turnover results in more new faces, making it difficult for residents to distinguish between new residents and strangers, decreasing social control and increasing crime (Hartnagel and Lee 1990).

Sampson and Groves (1989) tested social disorganization theory using survey data from 10,905 residents in 238 communities in Great Britain. Their findings confirmed that “low economic status, ethnic heterogeneity, residential mobility, and family disruption lead to community social disorganization, which in turn, increased crime and delinquency rates” (p. 775). Kelly (2000) used data from urban counties in the United States and report empirical evidence in support of the effects of social disorganization in communities on violent crimes.

Overall, theoretical development and empirical evidence support the idea that social disorganization in the community, which increases with population density, poverty, ethnic heterogeneity and residential mobility, decreases social capital and social controls, and increases crime in the community.

Social Disorganization, Lack of Toilet Facilities and Non-Family Violence against Indian Women

In emerging economies such, as in India, the social composition of communities is changing rapidly because of substantial internal (i.e. intra-country) migration including from rural areas to urban areas, from small cities to big cities, and even from one area of the country to another area where economic prospects may be better (Castaldo, Deshingkar, and McKay 2012; Lucas 1997). Thus, we anticipate that the level of social disorganization in communities in both urban and rural areas in India will be high, decreasing social capital decreasing and social controls, and increasing the risk of non-family violence, more generally, but especially in vulnerable populations, such as children and women.

Thus, we propose that when women who live in Indian households without toilet facilities, are forced to go outside their homes into the community to relieve themselves, they are

being exposed to socially disorganized communities and may be subject to violence from non-family males in the community, increasing the incidence of non-family violence against them.

What might social disorganization theory say about the relative incidence of non-family violence against urban (vs. rural) Indian women in households without toilet facilities? As noted above, according to social disorganization theory, normative consensus and social controls are undermined by increasing population size, density and heterogeneity characteristics of urban communities. As the population density of the community increases, variation in the population characteristics increases, resulting in poor communication among groups of the community's residents. Thus, it may be difficult for crowded, and diverse urban communities (such as those in urban India) to regulate themselves because of decreased social capital and social controls. Consistent with this logic, urbanization of communities in the United States has been shown to be associated with increased crime rates (Palloni et al. 2001). Extending this logic, we propose that the lack of toilet facilities in households in urban India (vs. rural India) will be more strongly related to non-family violence against Indian women.

METHOD

We first describe the data and following that, the key independent variable (lack of toilet facilities), the dependent variable (non-family violence), and additional covariates that may affect non-family violence against Indian women.

Data

We use the 2005-2006 NFHS-3 (NFHS-3 2007) conducted under the stewardship of the Ministry of Health and Family Welfare (MOHFW), Government of India with the International Institute for Population Sciences (IIPS), Mumbai, India serving as the nodal agency for the

surveys. Funding for NFHS-3 was provided by the United States Agency for International Development (USAID), the United Kingdom Department for International Development (DFID), the Bill and Melinda Gates Foundation, The United Nations' Children's Fund (UNICEF), United Nations Population Fund, and the Government of India.

The NFHS-3 provides information on population, health and nutrition in India on 109,041 households, which are representative at the national and state levels. The NFHS-3 fieldwork was conducted by 18 research organizations between December 2005 and August 2006. Trained data collectors interviewed adult members in each selected household to obtain socioeconomic and demographic information about the household and its family members. Data collectors performed face-to-face interviews with 124,385 women aged 15 to 49 years from the responding households. Given the sensitive nature of the women's survey, extensive efforts were made to protect the participants and to ensure data quality. The individual response rate, i.e., the number of completed interviews per 100 eligible women identified in the households, was 95 percent for the country as a whole (93 percent in urban areas and 96 percent in rural areas).

In Table 1, we report the frequencies of women in the full, urban, and rural samples of Indian women by various Indian states in NFHS-3. Definitions of urban and rural areas follow the definitions of the 2011 Indian Census. The sample of 60,847 women for which we have complete data on the variables required for the model is split across urban (28,348; 46.59 %) and rural (32,499; 53.41%). Thus, of the 124,385 women surveyed, data on domestic violence are provided by less than 50% of those surveyed. In NFHS-3, the domestic violence component is placed at the end of the survey so that fatigue combined with social desirability biases may result in systematic under-reporting of domestic violence (Ellsberg et al. 2001)

As evidence of under-reporting of domestic violence in the NFHS-3, of the 33 states and Union territories in India, only 22 states are represented in the sample reported in Table 1. Non-family violence was not reported by women in the states of Haryana, Jammu and Kashmir, Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh, Uttaranchal, and the Union territories of Delhi, Pondicherry, Daman and Diu, Andaman and Nicobar Island, and Chandigarh.

---- Insert Table 1 here ----

Non-Family Violence against Women

Non-family violence is an act of physical violence conducted against a woman by a person who is not a family member, including strangers, former partners, employer, teacher, and police, which we term as non-family violence (Abrahams et al. 2014). The act of violence includes being pushed, shaken, or threw something, ever slapped, ever punched with fist or something harmful, ever kicked or dragged, ever tried to strangle or burn, ever threatened or attacked with knife/gun or other weapon, physically forced sexual acts when not wanted, ever twisted arm or pulled her hair. We measured non-family violence as a categorical variable (1 if report of non-family violence in the previous twelve month period, 0 otherwise).

In Table 2, we provide the descriptive statistics of the variables. Reports of incidence of non-family domestic violence are similar across urban and rural Indian women (mean = .009). The incidence of violence against women is universally under-reported (Ellsberg et al. 2001), suggesting these data may represent the minimum levels of violence that occur.

---- Insert Table 2 here ----

Lack of Toilet Facilities in the Household

The NFHS-3 collects data on various characteristics of households. One such characteristic is the toilet facilities in the household. We measured the lack of toilet facilities in the household if its household members used bush or any type of communal pit latrine (include ventilated improved pit latrine, pit latrine with a slab, and pit latrine without slab/open pit) for their toilet needs using a dummy variable (1 if house lacks toilet facilities, 0 otherwise). Toilet facilities which are not included in the measure include flush to piped sewer system, flush to septic tank, flush to pit latrine, flush to somewhere, flush: don't know where, composting toilet, and dry toilet.

From Table 2, we see that the lack of toilet facilities in Indian households for the women in the full sample is high at 44.3%. As might be expected, the lack of toilet facilities in the household for women living in rural areas is even higher at 68.1%. It is much lower, although not insubstantial, at 16.9% for women living in urban areas in India.

Other Covariates that Affect Non-Family Violence against Indian Women

In modeling the relationship between the lack of toilet facilities in the household to non-family violence against Indian women, we control for other characteristics of the women, household, and the community, that may affect non-family violence against the women. First, as economic prosperity is related to violence against women (Jewkes 2002), we consider the household's economic prosperity, which we measure using the household wealth index. The household wealth index is constructed using NFHS-3 data on household assets and dwelling characteristics. The household assets data includes ownership of various consumer items, such as a television, a radio, a bicycle, roofing and flooring. Each asset is assigned a weight (factor score) that is generated through principal components analysis, and the resulting asset scores are

standardized in relation to a standard normal distribution with a mean of 0 and standard deviation of 1 (Rutstein and Johnson 2004).

As the key independent variable in the study is the lack of toilet facilities in the household, we adapt the household's wealth index including all assets typically considered in its construction, but exclude its toilet facilities. We constructed this index separately for the full, urban, and rural samples of Indian households. We use this adjusted household wealth index, which excludes toilet facilities as a covariate to control for the household's economic prosperity in the model of non-family violence against Indian women.

We also include five characteristics of the women as covariates that may affect the incidence of non-family violence against them: 1) age measured in number of years as violence against Indian women may decrease as they age (Fernandez 1997), 2) education in number of years of schooling as educated women, compared to uneducated women, may be subject to threats and attacks (Caldwell 1986), and/or may be willing to report incidents of domestic violence, 3) whether they were employed or not, as this may affect the incidence of non-family violence (Malhotra and Mather 1997), 4) whether the women were married or not as this may also influence non-family violence against them, and 5) the number of children five and under as the presence of young children may systematically affect non-family violence against Indian women. In addition, we also consider the number of women living in the household as they may reduce non-family violence against women.

Finally, as community characteristics can affect the incidence of non-family violence against Indian women, (Koenig et al. 2006) we also consider the two characteristics of the community, the primary sampling unit (PSU) for the NFHS-3 surveys as covariates in the model

of non-family violence against Indian women: 1) the mean economic prosperity of the PSU and 2) the proportion of men in the PSU with a secondary education.

RESULTS

We first provide model-free evidence of the relationship between the lack of toilet facilities in Indian households and non-family violence against Indian women. Following that, we describe the multilevel logistic regression modeling approach that we use to empirically test the relationship, and present the estimation results. We then present the results of additional analysis that establishes the robustness of the relationship between the lack of toilet facilities and non-family violence against Indian women.

Model-Free Evidence

The model-free evidence in Figure 1 indicates a statistically significant difference in the incidence of non-family violence against urban Indian women in households with and without toilet facilities ($p < .05$) while there is no difference between households with and without toilet facilities in the reports of non-family violence against Indian women in both the full and rural samples.

---- Insert Figure 1 here ----

Modelling Approach

The NFHS-3 data have a hierarchical structure, with women clustered in households (where the lack of toilet facilities are measured) in the PSU, so that non-family violence incidents against women are not independent, as women share common exposure to the PSU. Thus, we use generalized linear model (GLM) to estimate the relationship between the lack of toilet facilities in the household on the incidence of non-family violence against Indian women,

which allows us to correct for the lack of independence of observations for Indian women living in PSUs with certain characteristics (McCullagh and Nelder 1989). Using the GENMOD procedure in SAS 9.2, we estimated generalized linear models with a logarithmic link function and a binomial error distribution. Thus, the estimates are marginal population-averaged effects, with standard errors corrected for the lack of independence among the observations within PSUs.

As noted above, in addition to the key explanatory variable of lack of toilet facilities in the household, we include the following covariates: women's age, education, whether the woman was employed, whether the woman was married, and the number of children below five years in the household, and two household-level variables, adjusted household wealth index and the number of women living in the household, and two PSU-level variables, the mean adjusted household wealth index and the proportion of men with a secondary education.

Estimation Results

We present the results of the multilevel logistic regression model for the full, urban, and rural samples of Indian women in Models 1-3 in Table 3. In Model 1 in Table 3, for the full sample of Indian women ($n = 60,847$), after controlling for different covariates, there is no evidence of a positive relationship between the lack of toilet facilities in the household and non-family violence against women ($b = .124$, *not significant (ns)*).

In Model 2 in Table 3, for the sample of urban Indian women ($n = 28,348$), there is evidence of a positive relationship between the lack of toilet facilities in the household and non-family violence against women ($b = .373$, $p < .05$). This translates into an odds ratio of 1.45, suggesting that non-family violence against urban Indian women is 45% higher when the household lacks toilet facilities. In Model 3 in Table 3, for the sample of rural women ($n =$

32,499), there is no evidence of a relationship between the lack of toilet facilities in the household and non-family violence against rural Indian women ($b = .044, ns$).

---- Insert Table 3 here ----

We next discuss the effects of the different covariates. As expected, adjusted household wealth index is negatively related to non-family violence against Indian women in the full ($b = -.216, p < .05$) and urban samples ($b = -.176, p < .10$). However, there is no relationship in the rural sample ($b = -.138, ns$). The woman's age is associated with lower non-family violence against women in the full ($b = -.015, p < .05$) and urban ($b = -.029, p < .01$) samples. Again, there is no relationship in the rural sample ($b = -.002, ns$). The education of Indian women is associated with higher incidence of non-family violence against women in both the urban ($b = .033, p < .05$) and rural samples ($b = .126, p < .01$) suggesting that while education empowers women in family and spousal relationships (Jewkes 2002) it does not appear to protect them against non-family violence.

The woman's employment status is negatively associated with non-family violence against urban Indian women ($b = -.077, p < .05$) but not in the full ($b = -.125, ns$) and rural samples ($b = -.069, ns$). There is a negative relationship between a woman's marital status and non-family violence against Indian women in the full ($b = -.528, p < .01$) and rural samples ($b = -.775, p < .01$), but not in the urban sample ($b = -.228, ns$). The number of children of the woman under five years of age is associated with lower non-family violence in the full ($b = -.163, p < .01$) but not in the urban samples ($b = -.074, ns$) and rural samples ($b = -.077, ns$). The number of women living in the home is not related to non-family violence against Indian women (full sample: $b = -.012, ns$; urban sample: $b = -.005, ns$; rural sample: $b = -.023, ns$).

With respect to PSU-level covariates, the mean adjusted household wealth index of the PSU is negatively related to non-family violence against rural Indian women ($b = -.367, p < .01$) but not in the full and urban samples (full sample: $b = -.141, ns$; urban sample: $b = .093, ns$). The proportion of men with a secondary education in the PSU is not related to non-family violence against urban Indian women in the three samples (full sample: $b = -2.094, ns$; urban sample: $b = .039, ns$; rural sample: $b = -3.630, ns$). Overall, consistent with the model-free evidence reported in Figure 1, the results indicate that the lack of toilet facilities in Indian households is associated with higher non-family violence for urban Indian women but not for rural Indian women.

Additional Analysis

Robustness Analysis. We next examine the robustness of the relationship between lack of toilet facilities in the household and non-family violence against urban Indian women to alternative definitions of key variables and sampling variations.

1) *Definition of lack of toilet facilities in the household.* To do this, we estimate a model using an alternative measure of lack of toilet facilities that includes only the use of bush (i.e. excludes communal pit latrines). We report the results of this estimation in Model 2 in Table 4. For the readers' convenience, in Model 1 of Table 4, we report the results for the urban sample of Indian women reported in Model 2 of Table 3. The lack of toilet facilities in the household, defined as using only the bush for toilet needs, is associated with higher non-family violence ($b = .436, p < .05$) against urban Indian women, translating into an increase of 55%, 22% higher than when the definition includes communal pit latrines.

---- Insert Table 4 here ----

2) *Definition of non-family violence.* We next examine the results using an alternative definition of non-family violence against women which excludes violence committed by their employers.

We report the results in Model 3 in Table 4. Again, the lack of toilet facilities in the household is associated with higher non-family violence against urban Indian women ($b = .277, p < .10$).

3) *Economic status of women.* We next examine the relationship between lack of toilet facilities in the household on non-family violence against poor urban Indian women. We define poor urban Indian women as those who are in the bottom two quintiles of the adjusted household wealth index ($N = 12,018$). We report the results in Model 4 in Table 4. Lack of toilet facilities in households in the sample of poor urban Indian women is associated with higher non-family violence ($b = .630, p < .01$), translating into an increase of 88%, 98% higher than when the sample includes all urban Indian women. We did not find support for a relationship between the lack of toilet facilities in the household and similarly defined poor rural Indian women.

4) *Age of women.* We next examine the robustness of the results to the age of the woman. In Model 5 in Table 4, we report the results of a model that only includes urban Indian women over the age of 25. The lack of toilet facilities is associated with higher non-family violence ($b = .502, p < .05$) even for the sample of older urban Indian women.

5) *Intimate Partner Violence.* A priori, we do not expect to see any relationship between the lack of toilet facilities in the household and intimate partner violence (husband or live-in partner) against urban Indian women. We nonetheless examine this relationship as the lack of a positive relationship here will strengthen confidence in the positive relationship between the lack of toilet facilities in the household and non-family violence against urban Indian women. We define intimate partner violence as physical violence against the women by her intimate partner (urban

sample: mean = .479). Note that reports of intimate partner violence are much higher than reports of non-family violence in NFHS-3.

In Model 6 in Table 4, we report the results of a model estimating the relationship between the lack of toilet facilities in the household, and intimate partner violence against urban Indian women. We included all household and women covariates included in the model of non-family violence. As expected, the lack of toilet facilities in the household is not related to intimate partner violence ($b = -.078, ns$) against urban Indian women. This evidence of a null relationship between the lack of toilet facilities in the household and intimate partner violence against urban Indian women increases our confidence in the positive relationship between the lack of toilet facilities in the household and non-family violence against urban Indian women.

Other Covariates. We next report the results pertaining to other covariates, the woman's religion and caste (these results are not tabulated in the interest of brevity, but are available upon request from the authors) when each of these two variables is included in the model of non-family violence against urban Indian women (Model 2 in Table 3):

1) *Religion.* India has many religions with Hinduism being the majority religion. To examine whether Indian women of different religions are differentially affected by non-family violence, we classified a woman's religion as majority religion if she was a Hindu (1 if Hindu, 0 otherwise). The results indicate a positive relationship between the lack of toilet facilities in the household and non-family violence against urban Indian women ($b = .375, p < .05$). However, the religion of the woman is not related ($b = -.031, ns$) to non-family violence against urban Indian women.

2) *Caste.* Indian society is stratified by castes, with societal privileges accorded to individuals varying by their caste affiliations. Thus, we next examine whether the woman belonged to a

lower caste (1 if lower caste, 0 otherwise) was related to non-family violence against urban Indian women. The results indicate a positive relationship between the lack of toilet facilities in the household on non-family violence against urban Indian women ($b = .373, p < .05$). However, the lower caste status of the woman is not related ($b = -.195, ns$) to non-family violence against urban Indian women.

DISCUSSION: FINDINGS AND PUBLIC POLICY IMPLICATIONS

Water, sanitation, and hygiene have been identified as key priorities by the World Bank and United Nations in their Millennium Development Goals. Yet, progress toward these goals has fallen below expectations, with negative outcomes, especially for economically disadvantaged populations in many developing countries, including in India. Millions of individuals in India do not have access to toilet facilities in their households. While, there is mixed evidence on the effects of lack of toilet facilities in India on pediatric health outcomes, there are no systematic investigations on a possible relationship between the lack of toilet facilities on health or other outcomes for adults, specifically, Indian women. We address this by focusing on non-family violence against Indian women.

From a theoretical perspective, marketing scholars (Shultz et al. 2012) have noted that the study of developing markets has primarily been the domain of economists and financial analysts and exhort marketing scholars to join this conversation with a view to improve the welfare of millions of impoverished consumers in developing markets. Addressing this call for research, we examine the relationship between the lack of toilet facilities in households for individuals on the safety of millions of impoverished Indian women.

Moreover, safety of individuals is a basic human need (Maslow 1943; Scott et al. 2011), essential for the realization of higher needs. We identify the lack of toilet facilities in urban

Indian households as a factor that threatens the safety of millions of urban Indian women. In doing so, our research addresses the recent calls from scholars (Chakravarti 2006; Mick et al. 2012; Stewart 2014) for transformative research by marketing scholars that generates policy implications that benefit the welfare and well-being of individuals living across the world.

Key Empirical Insights

Our findings indicate that the lack of toilet facilities in Indian households household is associated with higher non-family violence against urban Indian women. Further, the relationship between lack of toilet facilities in the household and non-family violence against urban Indian women is robust to whether the lack of toilet facilities is defined as using the bush and communal pit latrines (45% higher) or only using the bush (55% higher). And this relationship is much stronger (88% higher) for poor urban Indian women, defined as the bottom two quintiles of the adjusted household wealth index.

On a positive note, the lack of toilet facilities in Indian households is not related to non-family violence against rural Indian women even though the lack of toilet facilities in Indian households is higher in rural households than urban households and the level of reporting of non-family violence by women in the NFHS-3 survey is similar across urban and rural samples of Indian women (see Table 1).

We contend that the empirical support on the positive relationship between the lack of toilet facilities in Indian households and non-family violence against urban Indian women, which is stronger for poor urban Indian women but is not evident for rural Indian women, indirectly provides support for the proposed theoretical mechanism of social disorganization through the lack of social capital, which is likely to occur more in urban areas than rural areas in India

(Lucas 1997), as urban areas are characterized by social disruption because of the migration from rural areas in India (Castaldo, Deshingkar, and McKay 2012).

We next discuss the insights on the relationship between other covariates and non-family violence against urban Indian women. First, the economic prosperity of the household is negatively related to non-family violence of urban Indian women (-17%) suggesting the higher risk of poor urban Indian women. Second, a woman's age is negatively related to non-family violence against urban Indian women (- 3%) although non-family violence even occurs among urban Indian women older than 25 years. Third, the education of a woman, somewhat dismally, is positively related to non-family violence against them (3% for urban Indian women and 13% for rural Indian women). This represents a departure from past research which indicates that educated women may be protected against domestic (intimate partner) violence (Jejeebhoy 1998) We conjecture that this may be occurring also because reporting of non-family violence may be higher by more educated women (correlation = .03, $p < .01$) and/or that educated women may be venturing more outside their homes, exposing themselves to hazards of non-family violence in the community. Fourth, the marital status of the women is not related to non-family violence against urban Indian women although it is negatively related to non-family violence against rural Indian women (-46%) So, all urban Indian women, not just young women or married or unmarried women are susceptible to incidence of non-family violence. Fifth, the employment of the woman is negatively associated with non-family violence against urban Indian women, although the relationship between the lack of toilet facilities in Indian households on non-family violence against Indian women persists even with the exclusion of violence caused by the women's employer. After controlling for the lack of toilet facilities in the household and other covariates, the mean wealth and the number of men with secondary education in the PSU (i.e.

community) are not related to non-family violence against urban Indian women. However, the mean household wealth index in the PSU decreases non-family violence against rural Indian women. Finally, the religion and caste of the woman are not related to non-family violence against urban Indian women.

Public Policy Implications

The paper's findings suggest an urgent need to ensure the provision of access to safe toilet facilities for urban Indian women to reduce the incidence of non-family violence against them. We recognize that this is a serious, costly, and non-trivial challenge especially in the short-term because the primary problem is that some urban households in India have no toilet facilities. So, the only enduring solution to this problem is the provision of safe and affordable housing with toilet facilities inside the home. While this is the only permanent solution to this issue, it cannot be easily implemented in the short-term on wide scale as it calls for considerable resource commitment and entails substantial infrastructural hurdles. Thus, we offer some policy initiatives that may be undertaken immediately by the Indian government and international aid and non-governmental organizations (NGOs) to address the lack of toilet facilities in urban Indian households with a view to decreasing non-family violence against urban Indian women.

Safe, Communal Toilet Facilities. In the short-term, we believe the lack of toilet facilities in households may be best-addressed by constructing centrally-located, well-lit communal toilets with plumbing and secured doors with locks in urban communities for easy access by all individuals, including women and children. The Indian government can set target metrics to ensure that these communal toilets are within easy reach (say within five minutes of walking) of all urban residents. The funding for these communal toilets may be met by a new urban variant, that we propose, of the "Mahatma Gandhi National Rural Employment Guarantee Act" (or,

MGNREGA), an Indian labor law that aims to guarantee the ‘right to work.’ MGNREGA aims to ensure livelihood security in rural areas by providing at least 100 days of wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work. We propose the implementation of the new Mahatma Gandhi National Urban Employment Guarantee Act (MGNEGA) tasked primarily with the construction of a large number of communal toilets in urban areas in India. Partial funding for these communal toilets may be obtained from large multinational corporations (e.g., Johnson and Johnson, Kimberly Clark, Procter and Gamble, and Unilever) who may be keenly interested in funding such an initiative as part of fulfilling their corporate social responsibility obligations in India, which is a very large, and growing market for their products. Indeed, this paper’s insights may be useful to senior management in these companies who can use this paper’s insights to proactively engage with local community leaders in India to sponsor the construction of safe, communal toilet facilities in urban communities in India.

We note that policing of these facilities, using both men and women from within the community, may be necessary to ensure the safety of the women using public toilet facilities. The staffing for such policing activities may again be facilitated by labor services under the MGNEGA scheme or by volunteering overseen by local community leaders, who have a vested interest in improving the safety of their communities and the well-being of their community members.

Incentives to Encourage Toilet Construction in Indian Households. In addition, the Indian government can also undertake an initiative to encourage the construction of toilets in households. For example, the Indian government can consider providing cash vouchers to home owners and may be, even tenants in urban housing tenements (where ownership of the living

premises may be established through squatters' rights) to encourage the construction of toilets in household. To facilitate this, of course, a crucial first step would be the construction, by local government, of public sewage systems in communities, where they do not currently exist, to which homes can connect to. Given the potential for financial fraud in such programs, it may be necessary to set up a third party inspection system to ensure that the funds earmarked for toilet construction, are, in fact, being utilized to build toilets in the households.

Public Education Campaigns. It may not only be necessary to build communal toilets, but it may also be critical to undertake promotion efforts to ensure that these new communal toilet facilities are used by the women for whom it is intended. Such promotion efforts, which may involve advertising on television, wall-paintings, and radio, will entail substantial resource commitments. We perceive an opportunity for international NGOs and bodies such as the United Nations and World Health Organizations and multinational corporations to take an active role in funding the awareness and behavioral change campaigns aimed at increasing the safety of urban (and rural) Indian women in using the communal toilet facilities.

Other Policy Initiatives to Protect Indian Women from Domestic Violence. While building, policing, and encouraging the use of safe toilets may reduce the incidence of non-family violence against urban Indian women, they represent only the first step. Some of these violent behaviors in males may be ingrained over time and are indeed, implicitly condoned by males in the society (Chakrabarti and Cullenberg 2013). Thus, in addition to providing toilet facilities, it would be important to undertake advocacy efforts to dismantle discriminatory legal frameworks, policies, practices and ingrained beliefs that put women and girls at risk for assault by miscreants in their communities. Again, this is an area where international organizations including for example, the United Nations, the World Health Organization, and the Bill and

Melinda Gates Foundation can work jointly with the Indian government to undertake awareness and education programs on the rights and responsibilities of individuals, especially focused on the rights of women. These advocacy efforts will have benefits that extend beyond their impact on reducing non-family violence against Indian women in households without toilet facilities.

Limitations and Opportunities for Further Research

Our research has some limitations that offer opportunities for further research. First, in this exploratory empirical study, we used correlational survey data from NFHS-3 and focused on non-family violence against Indian women. While our robustness checks including the lack of evidence relating the lack of toilet facilities in the household and intimate partner violence against urban Indian women, increase confidence in the findings, randomized control trials of toilet facilities in households with control and treatment including in India and in other developing countries, to examine the causal effect of toilet facilities in the household on non-family violence would be useful.

Second, in the NFHS-3, the domestic violence component is at the end of the survey, and non-response may be high because of fatigue in addition to issues related to shame and social desirability biases in reporting domestic violence (Ellsberg et al. 2001). One way to reduce social desirability biases in future data collection efforts in India and other developing countries and to improve data collection in slums would be to use mobile phones, which have a very high penetration, especially in urban India (Rashid and Elder 2009).

Third, the NFHS-3 data is collected on behaviors of violent acts occurring in the previous twelve months. The use of a narrow time frame may underestimate the magnitude of non-family violence, as many women suffer from physical and emotional effects of violence long afterward. Thus, this study's findings may be viewed as a conservative estimate of the relationship. Also, in

NFHS-3, there are no data on violence against Indian men, so a comparable analysis on the relationship between lack of toilet facilities and non-family violence against Indian men is not possible.

In conclusion, using the NFHS-3 data, we find correlational evidence that the lack of toilet facilities in Indian households is positively related to non-family violence against urban Indian women and that this relationship is stronger for poor urban Indian women. These findings generate public policy implications for various stakeholders including NGOs, government, state, and local officials and consumers, which if implemented, will improve the physical and mental well-being of millions of urban Indian women.

Figure 1: Model-Free Evidence: Lack of Toilet Facilities and Non-Family Violence against Indian Women

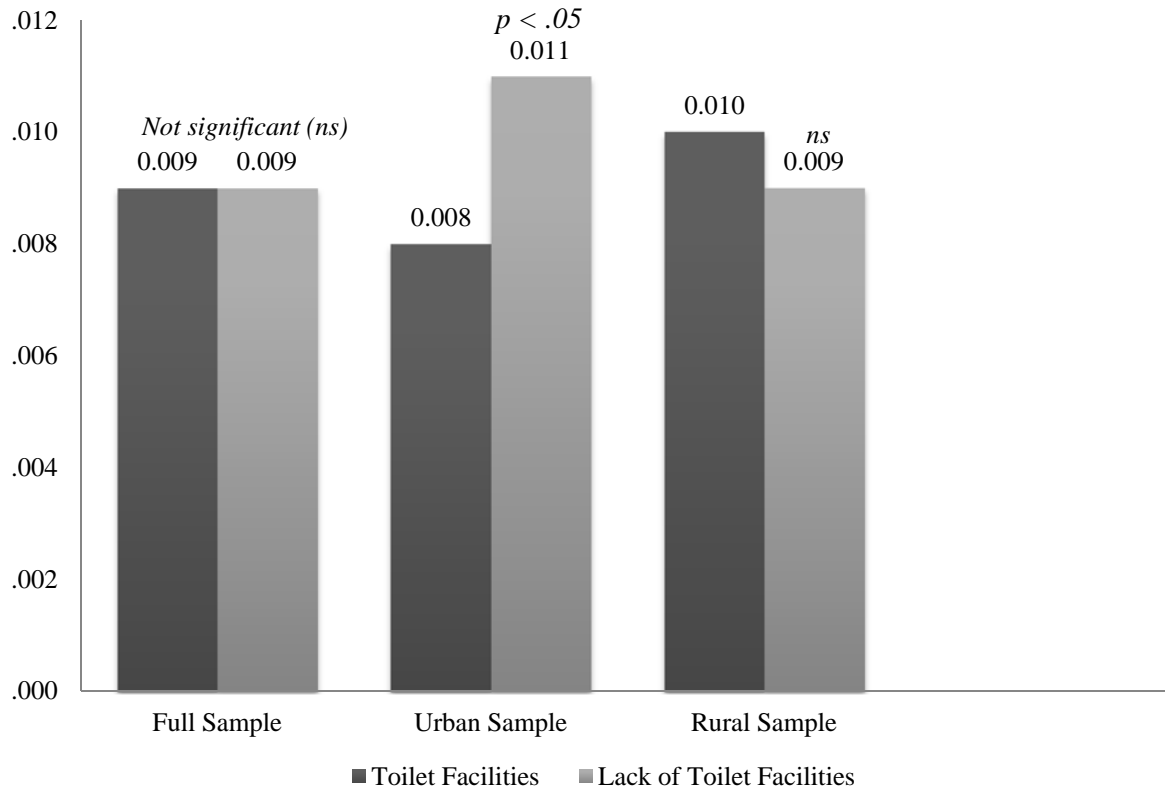


Table 1
Urban, Rural, and Full Samples by States

State	Full Sample Frequency (%)	Urban Sample Frequency (%)	Rural Sample Frequency (%)
Bihar	2,391 (3.93)	909 (3.21)	1,482 (4.56)
Sikkim	1,452 (2.39)	542 (1.91)	910 (2.80)
Arunachal Pradesh	1,151 (1.89)	351 (1.24)	800 (2.46)
Nagaland	2,789 (4.58)	1,361 (4.80)	1,428 (4.39)
Manipur	2,921 (4.80)	1,281 (4.52)	1,640 (5.05)
Mizoram	1,251 (2.06)	656 (2.32)	595 (1.83)
Tripura	1,322 (2.17)	324 (1.14)	998 (3.07)
Meghalaya	1,424 (2.34)	595 (2.10)	829 (2.55)
Assam	2,727 (4.48)	879 (3.10)	1,848 (5.69)
West Bengal	4,690 (7.71)	2,451 (8.65)	2,239 (6.89)
Jharkhand	1,963 (3.23)	706 (2.49)	1,257 (3.87)
Orissa	3,116 (5.12)	921 (3.25)	2,195 (6.75)
Chhattisgarh	2,461 (4.04)	805 (2.84)	1,656 (5.10)
Madhya Pradesh	4,341 (7.13)	2,233 (7.88)	2,108 (6.49)
Gujarat	2,538 (4.17)	1,084 (3.82)	1,454 (4.47)
Maharashtra	6,116 (10.05)	4,235 (14.94)	1,881 (5.79)
Andhra Pradesh	4,973 (8.17)	3,085 (10.88)	1,887 (5.81)
Karnataka	4,057 (6.67)	1,556 (5.49)	2,501 (7.70)
Goa	2,299 (3.78)	1,187 (4.19)	1,112 (3.42)
Kerala	2,362 (3.88)	815 (2.87)	1,547 (4.76)
Tamil Nadu	4,504 (7.40)	2,372 (8.37)	2,132 (6.56)
Total	60,847 (100)	28,348 (100)	32, 521 (100)

Notes: Data is not available for estimation for the states of Haryana, Jammu and Kashmir, Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh, Uttaranchal, and the Union Territory of Delhi.

Table 2
Profile: Urban, Rural and Full Samples of Indian Women

Variables	Full Sample (n=60,847)	Urban Sample (n=28,348)	Rural Sample (n=32,499)
Number of violent incidents from non-family members: mean (standard deviation)	.009 (.095)	.009 (.094)	.009 (.096)
Lack of toilet facilities (use of bush and pit latrines) (0/1): mean (standard deviation)	.443 (.498)	.169 (.375)	.681 (.466)
Lack of toilet facilities (only use of bush) (0/1): mean (standard deviation)	.346 (.476)	.105 (.307)	.556 (.497)
Adjusted household wealth index (excluding toilet facilities) ¹	-.051 (.978)	-.080 (.972)	-.060 (.967)
Age (years) ²	30.027 (8.875)	30.261 (8.829)	29.823 (8.910)
Education (years): mean (standard deviation)	5.965 (5.106)	7.893 (5.069)	4.283 (4.509)
Employed (0/1): mean (standard deviation)	.441 (.496)	.330 (.470)	.539 (.498)
Marital status (0/1): mean (standard deviation)	.830 (.375)	.804 (.397)	.852 (.354)
Children five and under: mean (standard deviation)	.623 (.871)	.537 (.808)	.697 (.915)
Number of women in household: mean (standard deviation)	1.431 (.741)	1.466 (.775)	1.400 (.708)
Mean adjusted household wealth index of PSU (mean (standard deviation))	-.042 (.805)	-.073 (.681)	-.045 (.714)
Proportion of men with secondary education in PSU ² : mean (standard deviation)	.993 (.018)	.994 (.016)	.992 (.019)

Notes: ¹Household adjusted wealth Index, with the exclusion of toilet component is computed separately for all, urban, and rural samples and is standardized in relation to a standard normal distribution with a mean of 0 and a standard deviation of 1. ²Primary sampling unit (PSU) is the community level at which the NFHS-3 data is collected.

Table 3
Multilevel Logistic Regression: Lack of Toilet Facilities and Non-Family Violence against Indian Women

Variables	Model 1 Full Sample	Model 2 Urban Sample	Model 3 Rural Sample
Lack of toilet facilities	.124 (.124)	.373 (.175)**	.044 (.158)
Adjusted household wealth index excluding toilet facilities	-.216 (.093)**	-.176 (.103)*	-.138 (.102)
Age	-.015 (.007)**	-.029 (.010)***	-.002 (.010)
Education	.081 (.058)	.033 (.015)**	.126 (.017)***
Employed	-.125 (.092)	-.077 (.141)**	-.069 (.122)
Marital status	-.528 (.138)***	-.228 (.199)	-.775 (.191)***
Number of children five and under	-.163 (.055)***	-.074 (.088)	-.077 (.076)
Number of women in household	-.012 (.061)	-.005 (.095)	-.023 (.078)
Mean adjusted household wealth index of PSU	-.141 (.110)	.093 (.138)	-.367 (.135)***
Proportion of men with secondary education in PSU	-2.094 (2.626)	.039 (4.206)	-3.630 (3.356)
Intercept	-2.195 (2.608)	-4.043 (4.192)	-1.038 (3.322)
Sample Size	60,847	28,348	32,499

*denotes $p < .10$, ** $p < .05$, and *** $p < .01$.

Notes: Models 1-3 use measure of lack of toilet facilities that includes the use of bush and communal pit latrines, and measure of non-family violence that includes violence from strangers, former partners, employer, teacher, and police, which we term as non-family violence

Table 4
Robustness Checks: Lack of Toilet Facilities and Non-Family Violence against Urban Indian Women

Variables	Model 1 Lack of Toilet facilities: (Urban Sample: Results from Table 3)	Model 2 Lack of Toilet facilities: Alternative measure	Model 3 Non-family violence: Alternative measure	Model 4 Bottom two quintiles adjusted wealth index	Model 5 Women who are older than 25 years	Model 6 Outcome: Intimate Partner Violence Sample
Lack of toilet facilities	.373 (.175)**	.436 (.205)**	.277 (.167)*	.630 (.207)***	.502 (.237)**	-.078 (.063)
Adjusted Wealth Index excluding toilet facilities	-.176 (.103)*	-.179 (.103)*	-.118 (.095)	-.172 (.197)	-.295 (.148)**	-.444 (.032)***
Age	-.029 (.010)***	-.028 (.010)***	-.023 (.009)***	-.026 (.014)*	-.038 (.017)***	-.018 (.003)***
Education	.033 (.015)**	.037 (.014)**	.018 (.014)	.074 (.023)**	.027 (.021)	-.088 (.006)***
Employed	-.077 (.141)**	-.062 (.140)	-.023 (.131)	-.041 (.193)	-.118 (.175)	.364 (.051)***
Marital status	-.228 (.199)	-.238 (.199)	-.447 (.194)**	-	-.333 (.340)	-
Number of children five and under	-.074 (.088)	-.070 (.088)	-.177 (.083)**	-.258 (.152)**	-.145 (.132)	.063 (.029)**
Number of women in household	-.005 (.095)	-.006 (.095)	-.034 (.089)	-.245 (.190)	.073 (.141)	-.003 (.040)
Mean adjusted household wealth index of PSU	.093 (.138)	.085 (.135)	.013 (.124)	.211 (.195)	.270 (.192)	-
Proportion of men with secondary education in PSU	.039 (4.206)	-.075 (4.291)	.830 (4.365)	2.728 (5.602)	-5.444 (4.247)	-
Intercept	-4.043 (4.192)	-4.382 (4.282)	-4.514 (4.340)	-6.800 (5.559)	1.793 (4.268)	-1.269 (1.358)**
Sample	28,348	28,097	28,062	12,018	18,578	19,830

*denotes $p < .10$, ** $p < .05$, and *** $p < .01$.

Notes: 1) Model 1 represents results from Urban Sample reported in Table 4, 2) Model 2 uses a measure of lack of toilet facilities that includes only the use of bush (i.e. excludes communal pit latrines), 3) Model 3 uses a measure of violence that excludes employer, 4) Model 4 uses sample of urban poor women i.e. in the bottom two quintiles of the adjusted household wealth index, 5) Model 5 includes sample of women older than 25 years, and 6) Model 6 uses dependent variable of intimate partner violence.

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