WPS8044

Policy Research Working Paper 8044

Underreporting of Gender-Based Violence in Kerala, India

An Application of the List Randomization Method

George Joseph
Syed Usman Javaid
Luis Alberto Andres
Gnanaraj Chellaraj
Jennifer L. Solotaroff
S. Irudaya Rajan

WORLD BANK GROUP
South Asia Region
April 2017

Policy Research Working Paper 8044

Abstract

This paper analyzes the incidence and extent to which domestic violence and physical harassment on public/private buses is underreported in Kerala, India, using the list randomization technique. The results indicate that the level of underreporting is over nine percentage points for domestic violence and negligible for physical harassment on public/private buses. Urban households, especially poor urban households, tend to have higher levels of incidence of domestic violence. Further, women and those who are professionally educated tend to underreport more than others. Underreporting is also higher among the youngest and oldest age cohorts. For physical harassment on public/private buses, rural population—especially the rural non-poor and urban females—tend to underreport compared with the rural poor and urban males.

This paper is a product of the South Asia Region. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at gjoseph@worldbank.org.

Underreporting of Gender-Based Violence in Kerala, India: An Application of the List Randomization Method

George Joseph, Syed Usman Javaid, Luis Alberto Andres, Gnanaraj Chellaraj, Jennifer L. Solotaroff, and S. Irudaya Rajan[1]

JEL Classification: C93, J16

Key Words: Gender, Gender Based Violence.

[1] George Joseph is a Senior Economist, Water Global Programs (GWAGP), World Bank. gjoseph@worldbank.org; Syed Usman Javaid is a consultant to the Social Development Unit (GSU06), South Asian Region, World Bank. Sjavaid1@worldbank.org; Luis Alberto Andres is a Lead Economist, Water Global Programs (GWAGP), World Bank. landres@worldbank.org; Gnanaraj Chellaraj is an independent consultant for the World Bank. gchellaraj@worldbank.org; Jennifer Solotaroff is a Senior Social Development Specialist, Social Development Unit (GSU06), South Asian Region, World Bank. jsolotaroff@worldbank.org; and S. Irudaya Rajan is a Professor, Center for Development Studies, Thiruvananthapuram, Kerala, India. rajan@cds.ac.ins.

I. Introduction

In this paper, we analyze the underreporting of two types of violence against women and girls—domestic violence and physical harassment on public/private buses[2]—in Kerala, India, using the list randomization technique. Past studies indicate that domestic violence is underreported in many developing countries (Palermo et al., 2014; Devries et al., 2013; Whitaker et al., 2007). However, the extent of underreporting of domestic violence rates has not been systematically analyzed despite the existence of new and improved techniques such as list randomization (Blair et al., 2015; 2014; Blair and Imai, 2012; Imai, 2011). In the past, these techniques have been used to measure and analyze sensitive subjects such as illegal migration in the United States (McKenzie and Siegel, 2013), abortion in Mexico (Lara et al., 2004), as well as employee theft in the United States (Wimbush and Dalton, 1997). Surprisingly, however, to our knowledge these techniques have not been used to analyze the underreporting of domestic violence in any country.

Violence against women and girls is a widespread problem all over the world, in developing and industrialized countries alike. Ever since the widely-reported gang rape on public transport in Delhi in 2012, the issue of gender-based violence and harassment in India has taken on increasing significance (Shakya et al., 2017). There is greater awareness not only of violence against women and girls perpetrated by males in South Asian countries, but of violence perpetrated by female relatives as well, such as by mothers who commit murders against daughters for choosing to get an education instead of getting married—or for marrying the "wrong" person.[3] Furthermore, violence against women in some states in

[2] Domestic violence and public physical harassment are two types of gender-based violence (GBV). This study considers only the subset of women and girls who experience these types of GBV, as opposed to men and boys. In this context, "domestic violence" follows the legal definition of "Any abusive, violent, coercive, forceful, or threatening act or word inflicted by one member of a family or household on another…" (http://legal-dictionary.thefreedictionary.com/Domestic+Violence), except that the survey question pertains only to female household members experiencing domestic violence. Similarly, "sexual harassment" and "physical harassment" in this study follow the UNHCR definition of sexual harassment in public spaces—"Any unwelcome sexual advance, request for sexual favor, verbal or physical conduct or gesture of a sexual nature, or any other behavior of a sexual nature that might reasonably be expected or be perceived to cause offence or humiliation to another" (UNHCR 2005, p. 3) and that occurs in public places.

[3] http://timesofindia.indiatimes.com/world/pakistan/Mother-kills-pregnant-daughter-in-name-of-honour-in-Pakistan/articleshow/52798087.cms

India is institutionalized by extra-judicial organizations in villages such as the Khap Panchayats.[4] Studies also indicate that domestic violence in India has been a major problem over numerous generations and even thousands of years (Martin et al., 2002) and that rates of domestic violence are especially high in northern India (Martin et al., 1999). Although considerably lower than for northern India, the rates remain relatively high by international standards for states such as Kerala (Nithya, 2013) and in the urban areas of South India in general (Rocca et al., 2009).

Violence against women is highly prevalent in both developing and industrialized countries. Globally, one in three women will face violence in their lifetimes (WHO, 2013). Even in U.S. states such as Mississippi, domestic violence is very high and very little has been done to combat the problem.[5] Violence has an adverse impact on the survival rates of women and girls, their health and education, and makes it difficult for them to be productive members of society (Solotaroff and Pande, 2014). Globally, the mortality and disability rates of women due to violence are as high as cancer rates (WHO, 2013). Furthermore, survivors of sexual assault are three times more likely to suffer from depression, six times more likely to suffer from post-traumatic stress disorder, 13 times more likely to abuse alcohol, 26 times more likely to abuse drugs, and four times more likely to contemplate suicide than those who were not sexually assaulted (WHO, 2013).

Domestic violence also has high macroeconomic costs in many countries. In Vietnam, both out-of-pocket expenditures and lost earnings represented nearly 1.41 percent of the GDP in 2010 (Duvury et al., 2012). Even in advanced countries such as the United Kingdom, total costs linked to domestic violence were estimated at around 10 percent of GDP (Santos, 2013).

Despite the costs of violence against women and girls, research on its prevalence continues to be constrained by conventional survey questions, whose accuracy depends mostly on the content of questions asked, extent of privacy, protection from retaliatory behavior by others, and the cooperation of

[4] http://ncw.nic.in/pdfReports/ReportbyJamiaMilia.pdf
[5] http://www.refinery29.com/93029

the respondent. When surveys such as India's National Family and Health Surveys (NFHS) involve direct questions about sensitive information, as in the case of violence against women, respondents may fail to cooperate—through either nonresponse or dishonest response (Chaudhuri and Mukerjee, 1988; Tourangeau and Yan, 2007). As a result, the quality and reliability of prevalence data tend to be poor. Without correction, such data will likely yield undesirable outcomes such as over- or under-estimation (bias) of the actual prevalence or incidence of violence and inaccurate relationships between the variables of interest. This will result in inaccurate conclusions and recommendations and, in turn, wrong policy choices (Tourangeau and Yan, 2007).

This paper addresses the problem of underreporting prevalence by utilizing the list randomization technique—an alternative to the method of direct questioning—to measure the incidence of domestic violence and physical harassment of women on public and private buses in the Indian state of Kerala. The purpose of this paper is to measure (1) the incidence of domestic violence and physical harassment on public and private buses in Kerala; (2) the extent of underreporting of the incidence of both forms of violence listed; (3) the incidence of both forms of violence among population sub-groups; and (4) the incidence of underreporting of both forms of violence based on respondent characteristics to understand the types of respondents who are more likely to underreport. Some caveats of the study should be noted as well. The levels of incidence of domestic violence and physical harassment on public/private buses that are presented in this study can be viewed as a lower bound of these rates. This is because the incidence that is measured through this study is at the household level and not at the individual level. In cases where there is more than one woman facing domestic violence or physical harassment on public/private buses in a household, the rate of incidence at the individual level can be higher.

Our results indicate that the level of underreporting is over nine percentage points for domestic violence and negligible for physical harassment in public/private buses. Urban households, particularly the urban poor households, tend to have higher levels of incidence of domestic violence. Further, professionally educated and females tend to underreport more. Underreporting is also higher in the

youngest and oldest age cohorts. For physical harassment on public/private buses, it is the rural population, particularly the rural non-poor, and urban females who tend to underreport compared to rural poor and urban males.

The paper proceeds as follows: In the next section, we review literature that motivates the study. In section III, a simple model is developed and specification is set out. In Sections IV and V, we provide the results and discuss their implications. In Section VI we conclude.

II. Background and Literature Review

The question of whether domestic violence is underreported in most countries has been discussed in academic circles as well as in the media. As mentioned earlier, the extent of underreporting of domestic violence has not been analyzed using techniques such as list randomization. However, there are related strands of research that help motivate our analysis.

The National Family Health Survey of India (2005-06) finds that the percentage of ever-married women who have experienced physical violence at the hands of their husbands in Kerala is 15.3 percent, compared to 35.1 percent for India as a whole (Ministry of Health and Family Welfare, 2005-06). Moreover, studies indicate that domestic violence is an endemic problem in many Indian states and has existed for thousands of years (Kavitha, 2012; Martin et al., 2002; 1999). A large number of studies focus on dowry-related violence, and during the 1980s there were frequent reports of dowry deaths called “bride burning” (Chowdhry, 1997). In recent years, despite economic development, dowry payments in India are on the rise (Anderson, 2007; 2003). Dissatisfaction with the amount of dowry has resulted in increasing violence against brides, particularly in rural India (Sekhri and Storeygard, 2014; Bloch and Rao, 2002). A study in the Salem district of Tamil Nadu indicates that larger dowries reduce marital violence by increasing the economic resources of the marital household, enhancing the social status of the groom and his family, and serving as an asset over which the woman enjoys relatively more control. However, while women with generous dowries may benefit, a continued upward spiral in dowry expectations will

exacerbate daughter aversion and may fuel sex-selective abortion and female infanticide (Srinivasan and Bedi, 2007). Evidence also indicates that the implementation of the Protection of Women from Domestic Violence Act in 2005 has significantly reduced dowry violence, while at the same time reporting of such violence has increased in north and central India (Das, 2015). Research also finds that the effectiveness of anti-dowry laws may be limited without additional strategies that mobilize women, families, and communities to challenge the widespread acceptance of dowry and to promote gender equity (Rocca et al., 2009). Finally, a recent study (Shakya et al., 2017) finds that since 2012, reporting of intimate partner violence has increased significantly in the state of Maharashtra, while the acceptance of existence of such violence has increased by both men and women, possibly as a result of the prominent Delhi rape case at the end of that year.

Research results on risk and protective factors for violence are mixed. The long-practiced tradition of dowry unequivocally increases the risk of violence. Other forms of contribution to household wealth, such as working outside the home, are not accepted in many communities in the country, although engagement in paid work by women has led to declines in marital violence in Uttar Pradesh over time (Bhattacharya et al., 2011). Chin (2012) finds similar results in other states. However, other studies find that community and institutional acceptance of violence against women negates the positive impact of women's education and working outside the home (Boyle et al., 2009), and a study in southern India produced diametrically opposite results compared to the study in Uttar Pradesh (Krishnan et al., 2010).

Kerala is an interesting case for analyzing the prevalence of violence against women and girls in that it performs better than other Indian states on a host of human development indicators for women. It has a favorable female sex ratio[6] of 1,058 females to 1,000 males compared to India's 933, a high female literacy rate of 92.1 percent compared to India's 65.5 percent, and a high female life expectancy rate of 77 years compared to the national 67.7 years (Sakhi, 2004). At the same time, economic impoverishment, malnourishment, low political participation rates, and low labor force participation rates are prevalent

[6] The Merriam-Webster Medical Dictionary defines *sex ratio* as "the proportion of males to females in a population as expressed by the number of males per hundred females" (http://www.merriam-webster.com/medical/sex%20ratio), accessed on September 29, 2016.

among women in Kerala (Panda and Agarwal, 2005), although the situation is much better in the state regarding these indicators than in the rest of India. In addition, more households in Kerala have migrants abroad compared with any other state in the country (Zachariah and Rajan, 2015; Chellaraj and Mohapatra, 2011).

Similar studies have been undertaken in other countries. Globally, gender inequality, gender norms and social cohesion play a major role in domestic violence (VandeeEnde et al., 2012). In Bangladesh, results suggest that membership in microcredit organizations does not increase the odds of domestic violence (Bhattacharya and Amin, 2013). Working outside the home in Bangladesh is associated with increased violence, but only for less-educated households (Heath, 2014). The higher the education of the household, the lower the odds of violence in Bangladesh (Koenig et al., 2003), though they are also higher for perceived willful transgressions by female household members (Yount et al., 2013). In general, women in South Asia are also afraid to seek help from relatives or acquaintances (Ahmed et al., 2009). In a cross section of African countries for which data are available, Alesina et al. (2016) find that ancient socioeconomic conditions determine social norms about gender roles, family structures, and intra-family violence, which persist even when the initial conditions change. Norms about marriage patterns, living arrangements, and the productive role of women are associated with contemporary violence. Finally, women's contemporary economic role affects violence in a complex way, which is itself related to traditional norms from ancient times and current power-bargaining dynamics within the marriage. In general, families with agrarian traditions enforce gender roles (Alesina et al., 2013). For thirty different Sub-Saharan African countries it was also found that resource inequality, both aggregate and within the household level increases intimate partner violence (Cools and Kotsadam, 2017). In Tanzania, women who own businesses are more likely to face domestic violence if they are self-employed and without partnership (Vyas et al., 2015). Domestic violence increased sharply in Rwanda after the genocide of 1994 (La Mattina, 2017). For Mexico, Liu and Fullerton (2015) find that higher female social status—measured by educational, economic, and political standings—is associated with lower rates of homicide

of women and lower intimate partner violence rates (Liu and Fullerton, 2015). Attitudes towards gender violence vary across countries, and in Vietnam a greater share of women justify domestic violence against them than do men (Yount et al., 2014a). Women in rural Minya, Arab Republic of Egypt, who are exposed to intimate partner violence may escalate their housework to satisfy local customs of feminine domesticity, while at the same time substituting economic activities for non-spousal care work to enhance their economic independence from violent partners (Yount et al., 2014b).

Violence against women is prevalent in industrialized countries as well. In the United Kingdom, higher unemployment rates are associated with higher rates of domestic violence (Anderberg et al., 2016). Decreases in gender wage gaps are associated with decreases in violence against women in the United States (Aizer, 2010).

In general, violence against women and girls is a global problem (VanderEnde et al., 2012; Watts and Zimmerman, 2002). It can span generations in a vicious circle (Pollak, 2004) and is a major public health issue particularly in developing countries (Heise et al., 1994). In schools in both industrialized and developing countries, violence against women and girls continues to be a problem (Leach, 2006). It has serious economic and health consequences, including an adverse impact on the survival rates of women and girls, their health, education, and being a productive member of society (Solotaroff and Pande, 2014; Kishor and Johnson, 2006; Campbell, 2002). It is associated with higher HIV prevalence in Sub-Saharan Africa (Durevail and Lindskog, 2015), reduced GDP in Vietnam (Duvvury et al., 2012), significantly worse nutrition outcomes for girls when compared to girls who live in households without domestic violence (Ackerson and Subramanian, 2008), and increased childhood mortality in India (Koenig et al., 2010). Despite its prevalence and impact on societies, violence against women and girls is underreported in most countries around the world because of the failure of respondents to answer, or answer truthfully, sensitive questions in the surveys (Palermo et al., 2014; Devries et al., 2013; Whitaker et al., 2007). Hence the need to tackle the issue of underreporting such violence in order to effectively measure the problem and, in turn, address it by developing and implementing appropriate policies and programs.

In recent years, new techniques have been developed to measure the extent of underreporting of sensitive behaviors using household surveys (Lara et al., 2004). They include— among others— the list randomization or item count technique (Blair et al., 2015; Tsuchiya et al., 2007; Houston and Tran, 2001; Anderson and Miller, 1990), randomized response method (Pollock and Beck, 1976; Goodstadt and Gruson, 1975; Greenberg et al., 1971; Warner, 1965), three card method (Droitcour et al., 2001), nominative method (Sirken, 1970), and Bogus Pipe method (Tourangeau et al., 1997). Several studies have used list randomization in other fields where the respondents have a tendency to withhold information about sensitive issues. Blair et al. (2014) have developed a statistical test and multivariate regression models for comparing and combining the results from list randomization and endorsement experiments, showing that when carefully designed and analyzed, the two survey experiments can produce substantively similar empirical findings. Blair and Imai (2012) have found similar results. When using the National Race and Politics Survey, Imai (2011) has employed the item count technique to measure the degree of racial hatred in the United States. The results indicate that the level of hatred is higher relative to that reported in conventional surveys. Similar results have been found for vote buying in Nicaragua (Gonzales-Ocantos et al., 2012). Finally, Rosenfeld et al. (2016) have found that while direct questioning leads to significant underestimation of sensitive votes against the anti-abortion referendum in Mississippi, indirect survey techniques yield estimates much closer to the actual vote count, with endorsement experiment and randomized response yielding the least bias.

Despite the urgent need to more accurately estimate the prevalence of gender-based violence (GBV), and despite the recent development of statistical and survey techniques discussed above to address this issue, research on the extent of underreporting of GBV is virtually non-existent for any country. Studies of physical violence and harassment on buses and other forms of transport are also virtually non-existent. Hence, by applying the list randomization technique to survey questions about GBV in Kerala, India, this study intends to fill this gap in the literature.

III. Data and Methodology

In our research, we use the List Randomization method, discussed in detail in this section, to estimate both the incidence and the extent of underreporting of domestic violence and physical harassment on private and public buses in Kerala.

The list randomization method, also known as the item-count technique (ICT) and the unmatched count technique, was introduced by Anderson and Miller (1990). Respondents are divided into control and treatment groups, with the former given a set of true-false statements that are both relevant and inoffensive to the respondents' socio-economic or political context. The treatment group is given one true-false statement in addition to the ones given to the control group. The additional statement is about the sensitive issue. The respondents of each group are asked to report the number of statements they agree with, and it is expected that those in the treatment group will give true answers about the sensitive statement which they might not if questioned directly. The mean value of true answers by the control group is then subtracted from the mean value of true answers by the treatment group to get the average proportion of people who agree that the sensitive statement is indeed true. Examples of application of the list randomization technique include findings on condom use among college students (LaBrie and Earleywine, 2000), voting for bribes (Gonzalez-Ocantos et al., 2012), shoplifting (Tsuchiya et al., 2007), theft at the workplace by employees (Wimbush and Dalton, 1997), welfare and unemployment benefits (Van der Heijden et al., 2000), use of microcredit loans for non-business purposes (Karlan and Zinman, 2012), and illegal migration (McKenzie and Siegel, 2013).

The Kerala Migration Survey (KMS) 2014 was the sixth in the series of an ongoing migration monitoring studies conducted by the Centre for Development Studies, Trivandrum. The first survey was conducted in 1998 (Zachariah and Rajan, 2015). The total sample size in KMS 2014 was 14,575 households, including 10,000 new households and 4,575 households which were interviewed in the previous round in 2010 (Zachariah and Rajan, 2015). Questions about GBV and attitudes on gender-relevant issues were also added to the household questionnaire of the KMS 2014. To implement the list

randomization technique, we divided the sample of households into treatment and control groups so that, of all sampled households in each primary sampling unit, every alternative household was classified as a treatment household and the rest as the control households. The two groups were questioned on domestic violence and physical harassment on public/private buses using both the list randomization and the direct questioning techniques.

i) *Domestic Violence*

Question for the list randomization method: Could you tell me how many of the following four statements you regard as true?

A. *At least one member of my household plans on opening a new business in the next five years*
B. *The economic situation of my household has improved considerably over the past five years.*
C. *In my household, all girls below the age of 14 go to or have gone to school.*
D. *At least one woman member of my household has faced physical aggression from her husband anytime during her life.*

The treatment group was asked questions A through D, whereas the control group was asked only questions A through C.

The following question, used for direct questioning, was administered to all households regardless of their treatment status. *Has at least one woman member of your household faced physical aggression from her husband anytime during her life? (1- Yes 2- No 3- Don't Know 4- No Response).*

ii) Physical Harassment on Public/Private Buses

The following question was asked for the list randomization method: *Could you tell me how many of the following four statements you regard as true?*

A. *At least one member of my household uses public/private buses for transportation every day.*

B. *The number of people using public/ private buses has increased in my locality in the last two years.*

C. *Road accidents have become less in my area in the last two years.*

D. *At least one woman/girl in my household has faced physical harassment while travelling on public/private buses during the past year.*

Again, the treatment group was asked questions A through D, whereas the control group was asked only questions A through C.

For direct questioning to all households regardless of their treatment status, the following question was asked: *Has at least one woman/girl in your household faced physical harassment while travelling on public /private buses during the past year? (1- Yes 2- No 3- Don't Know 4- No Response).*

In both cases, the mean estimate from the control group's answers was subtracted from that of the treatment group to estimate an incidence rate of domestic violence as well as an incidence rate of physical harassment while travelling on public and private buses. Moreover, the mean of answers from direct questioning was subtracted from the incidence of each form of violence calculated through the list randomization method to estimate the rate of underreporting in each case. In addition, this rate of underreporting was calculated for various sub-groups such as rural vs. urban households to assess the characteristics that are associated with both higher incidence of violence as well as of underreporting. The rate of underreporting was analyzed using the individual characteristics of the respondents.

IV. Results

The first part of the analysis involves a test of randomization between the treatment and control groups to ascertain whether the treatment and control groups are statistically similar in observable characteristics, such as the number of females per household, religion, level of education, poverty status, and so on. The results of the two-sided t-test of difference between means shown in Table 1 suggest that the control and treatment groups are not statistically different for any of the characteristics. This confirms

that the survey team implemented the experiment as instructed, and the only difference between the treatment and control groups is the number of statements (four or three, respectively) they are expected to state their agreement on.

The second part of the analysis involves measuring the number of individuals who answer 3 (agreed with three statements) as a proportion of statements they agree to within the control group. A large proportion suggests that many of the respondents could be concerned that their anonymity is not assured**.** We measure this proportion for all households and respondent sub-groups such as urban households or poor households. The results suggest that the proportion of individuals who agree with the three statements in the control group is not large, particularly for domestic violence. In the general analysis of all households, this number is 8.73 percent in the case of domestic violence and 20.43 percent in the case of physical harassment on public/private buses.

The results for the overall analysis through list randomization suggests that about 15 percent of households have women who suffer from violence perpetrated by their husbands during their lifetime, whereas only 1 percent of households have women who suffer from physical harassment while using either public or private buses during the preceding year. This incidence when measured through direct questioning is 5.6 percent for the former and 2.6 percent for the latter. The rate of underreporting, which is the difference between incidences measured through list randomization vs. direct questioning, is 9.39 percentage points for domestic violence. For physical harassment while using public/private buses, on the other hand, the analysis suggests over-reporting of 1.79 percentage points (Table 2).

(i) Analysis with Population Sub-groups

The results (Tables 3 and 4) show that when compared to rural population, urban population tends to have higher incidence of domestic violence as well as higher levels of underreporting. In the case of domestic violence, list randomization shows a rate of incidence of 12 percent of lifetime violence among women in rural households, while this rate is 19 percent for urban households; both are significant at the one-percent level. Further, the difference between estimates of direct questioning and randomized listing

technique (11.6 and 8 percentage points respectively for urban and rural households) shows that urban residents are typically more likely to underreport than rural residents. Meanwhile, in the case of physical harassment on public/private buses, the difference in incidence is slightly higher in rural households when compared to urban households. However, the results for prevalence of this form of violence using list randomization for urban households are statistically insignificant. For rural areas, however, the extent of underreporting is about 3 percentage points for physical harassment on public or private buses.

Poorer households, as measured by those with red ration cards, report slightly more instances of domestic violence compared to relatively non-poor households. Furthermore, the rate of underreporting is higher among poorer households when compared to their less poor counterparts for domestic violence. These patterns continued to exist when we divide the groups further into sub-groups for poverty within rural and urban households. Poorer households report a slightly higher incidence of domestic violence in both rural and urban settings. Moreover, poorer households have higher instances of underreporting compared to non-poor households, in both urban and rural areas for this form of violence. The highest incidence as well as underreporting of violence is among poor urban households for reporting on domestic violence (Table 3). For physical harassment on buses, the incidence of underreporting is the highest for non-poor rural households, but this rate of underreporting is much smaller compared to that of domestic violence. In general, underreporting of physical harassment on public/private buses is much lower for all categories. However, for physical harassment on buses, the only statistically significant result is the estimation of incidence using list randomization for rural households with a blue ration card (non-poor) at 9 percent with a corresponding underreporting value of 7 percentage points (Table 4). In addition, results suggest that those households who owned their own homes have a higher level of incidence and higher rate of underreporting for domestic violence compared to those that did not own their homes.

(ii) Analysis of Underreporting Using Individual Characteristics of Respondents

Since characteristics of respondents are known, it is possible to understand whether there exist any systematic differences across respondents in terms of underreporting based on gender, employment status, age, education, religion, and a combination of these factors.

As expected, underreporting is higher among female respondents compared to males (Tables 5 and 6) for domestic violence. This is true for both rural and urban areas. When compared by locality, contrary to expectations, rural females and males tend to have lower rates of underreporting compared to urban females and males, respectively, with the difference particularly large for males: 11 vs. 3 percentage points for urban vs. rural males respectively. The results for list randomization for physical harassment on buses are not statistically significant.

Employed respondents have lower rates of underreporting compared to unemployed respondents for domestic violence, while the difference is negligible for physical harassment on public/private buses and results for list randomization are statistically insignificant. Breaking down this finding by gender, employed females have marginally higher rates of underreporting compared to employed males for both domestic violence (Table 5) and physical harassment on public/private buses (Table 6).

In terms of age cohorts, respondents from the youngest (30 years and younger) and oldest age cohorts (50 and over) have higher rates of underreporting for domestic violence compared to those of the middle cohort (Between 30 and 49 years). The youngest cohort has the highest rate of underreporting. For physical harassment on public/private buses, the rate of underreporting is negligible and insignificant in most cases.

Education can potentially help people to overcome social norms and taboos concerning modesty, thus reducing the hesitation to report sensitive issues. Quite surprisingly, underreporting in the case of domestic violence tends to be highest among the professionally educated who typically hold medical, engineering, or management degrees, followed by the least educated group with an educational attainment

of secondary school and below. In particular, both women and men with professional degrees have the highest rate of underreporting, with men having at least a marginally higher rate of underreporting than women in this category. For the least educated group with educational attainment of secondary school and below, female respondents far exceed their male counterparts in terms of underreporting domestic violence. This is also true for the education category of high school and diploma. There is no clear pattern in the case of physical harassment on public or private buses, but males with professional degrees have the highest rate of underreporting.

In terms of religion, respondents who identified themselves as Hindus have the highest rates of underreporting followed by Muslims and then Christians for domestic violence (Table 5). Females have higher rates of underreporting of domestic violence compared to males for all religions (Table 5), with the highest underreporting rates for Hindu women respondents followed by Muslim and Christian female respondents respectively. There is no clear pattern regarding this for physical harassment on public or private buses.

V. Discussion

The incidence of lifetime domestic violence in Kerala, as measured by the list randomization method, is 15 percent, while it is only 5.6 percent from direct questioning, which indicates a 9.4 percentage point rate of underreporting for domestic violence. In terms of physical harassment on public/private buses, the analysis finds an incidence rate closer to 1 percent and an over-reporting rate of 1.8 percentage points. This finding is of particular interest, as the incidence of physical harassment on buses has not been estimated in the past (as mentioned in the literature review), nor have past studies used the list randomization method to study underreporting of gender-based violence. The difference between the results for domestic violence and physical harassment in public/private buses may be due to the fact that the former is perpetuated by intimate partners and relatives while the latter is perpetuated by strangers. Women may be more likely to report harassment by strangers than violence by people on whom they are economically dependent. Hence, this result is not surprising.

Domestic violence is higher in urban than in rural households. The analysis also suggests that poorer households have a slightly higher incidence of domestic violence than better-off households. With regards to physical harassment on public/private buses, the patterns are less clear; the incidence is slightly higher in the urban than in the rural areas when using the direct questioning method, while the reverse is true when using the list randomization method. However, results for incidence of physical harassment on buses using the list randomization method for urban households are statistically insignificant.

Demographic characteristics of respondents also allow us to understand better patterns of underreporting of both domestic violence and physical harassment on public/private buses. As expected, women tend to underreport the incidence of domestic violence in their households more than men, with urban males and females underreporting more than their rural counterparts. Respondents belonging to the younger cohort of below 30 years are more likely to underreport than the older cohorts, but the oldest cohort has higher underreporting than the middle cohort in general. Quite surprisingly, professionally educated men and women, who tend to hold high social status in Kerala, are more likely to underreport the incidence of domestic violence in their households. More primary research is indeed needed to unravel the puzzling relationship between education and social norms and underreporting of sensitive behavior. Among the religious groups, Hindus are more likely to underreport domestic violence in their households followed by Muslim and Christian respondents. Hindu women tend to be more conservative in reporting than women from the other religions. The analysis does not suggest any clear patterns on the underreporting of physical harassment on public/private buses by the respondents.

VI. Conclusions

As measured by the list randomization method, the share of households with women having ever experienced domestic violence in Kerala is 15 percent, and for physical harassment on private/public buses in the past year, the rate is 1 percent. Of these, the incidence of domestic violence is significantly higher than that which is estimated by the direct questioning method, indicating that this form of violence

is highly underreported. Incidences of violence are estimated to be higher in urban households compared to rural ones, but higher among the poor in both urban and rural areas.

In terms of underreporting, females tended to underreport relative to males. Underreporting tends to be higher among urban households. Underreporting also tends to be highest for the professionally educated males and females, and thus shows a tendency to rise with education. In terms of religion, Hindus record higher rates of underreporting compared to other religious groups in the study. Among all the religious groups, women tend to underreport more than men. Furthermore, Hindu women tend to underreport more than Muslim and Christian women. There are no clear patterns of underreporting or over-reporting of physical harassment in public/private buses.

Overall, list randomization estimates higher rates of domestic violence as compared to direct questioning methods and provides a strong benchmark for measuring the incidence of domestic violence as well as physical harassment on public and private buses. However, it should be noted that Kerala has relatively lower rates of these types of violence compared to most states, particularly states located in north and central India. It is possible, or even likely, that the rates are heavily underreported for these states as well. Future studies therefore should further explore the misreporting of gender-based violence in the states of central and northern India.

The levels of incidence of domestic violence and physical harassment in public/private buses that are presented in this study can be viewed as a lower bound of these rates. This is because the incidence that is measured through this study is at the household level and not at the individual level. In cases where there are more than one woman facing domestic violence or physical harassment in public/private buses in a household, the rate of incidence at the individual level can be higher.

Apart from this difference in measurement at the household level, the prevalence of domestic violence as calculated by this study is about the same as that calculated by the India National Family Health Survey (NFHS) of 2005-06, where the incidence is measured at the individual level. However,

these two numbers are not comparable for two additional reasons. First, the NFHS calculated the prevalence of domestic violence in 2005-06, about 10 years prior to this study. Second, the manner in which the NFHS asks questions about physical violence—as a form of domestic violence—is very different from the manner in which the list randomization method poses these questions. The NFHS specifically defines what physical aggression is, whereas this study left the definition of physical aggression open to interpretation by the respondent. It could be that the respondent does not consider certain acts, such as pushing, as acts of violence by the husband, which would contribute even more to the underreporting of domestic violence. Future studies need to combine the inquiry methodology used by this study (list randomization) and the wording of questions as used by the NFHS. This will lead to an even more accurate estimation of domestic violence, at the same time contributing to alternate and shorter methods of data collection—particularly on sensitive issues like gender based violence.

Bibliography

Ackerson, L.K. and Subramanian, S.V. 2008. “Domestic Violence and Chronic Malnutrition among Women and Children in India." *American Journal of Epidemiology*, 167: 1188-1196.

Anderberg, D., Rainer, H., Wadsworth, J. and Wilson, T. 2016. “Unemployment and Domestic Violence: Theory and Evidence.” *Economic Journal*, 126: 1947-1979.

Ahmad, F., Driver, N., McNally, M.J. and Stewart, D.E. 2009. “”Why Doesn’t She Seek Help for Partner Abuse?” An Exploratory Study with South Asian Immigrant Women.” *Social Science and Medicine*, 69: 613-622.

Aizer, A. 2010. “The Gender Wage Gap and Domestic Violence.” *American Economic Review*, 100: 1847-1859.

Alesina, A., Brioschi, B. and La Ferrara, E. 2016. “Violence against Women: A Cross-Cultural Analysis in Africa.” Working Paper Series, No. 21901, NBER.

Alesina, A., Giuliano, P. and Nunn, N. 2013.”On the Origins of Gender Roles: Women and the Plough.” *Quarterly Journal of Economics*, 128: 469-530.

Anderson, R.J. and Miller, G.L. 1990. A Simple Randomized Parallel Algorithm of List-Ranking.” *Information Processing Letters*, 33: 269-273.

Anderson, S. 2007. “The Economics of Dowry and Brideprice". *Journal of Economic Perspectives*, 21: 151-174.

Anderson, S. 2003. “Why Dowry Payments Declined with Modernization in Europe but are Rising in India.” *Journal of Political Economy*, 111: 269-310.

Bhattacharya, A. and Amin, S. 2013. “Microcredit and Domestic Violence in Bangladesh: An Exploration of Selection Bias Influences.” *Demography*, 1819-1843.

Bhattacharya, M., Bedi, A.S. and Chhachhi, A. 2011. “Marital Violence and Women’s Employment and Property Status: Evidence from North Indian Villages.” *World Development*, 39: 1676-1689.

Blair, G., Imai, K., and Zhou, Y-Y. 2015. “Design and Analysis of the Randomized Response Technique.” *Journal of American Statistical Association*, 110: 1304-1319.

Blair, G., Imai, K., and Lyall, J. 2014. “Comparing and Combining List and Endorsement Experiments: Evidence from Afghanistan.” *American Journal of Political Science*, 58: 1043-1063.

Blair, G. and Imai, K. 2012. Statistical Analysis of List Experiments.” *Political Analysis*, 20:47-77.

Bloch, F. and Rao, V. 2002. “Terror as a Bargaining Instrument: A Case Study of Dowry Violence in Rural India". *American Economic Review*, 92: 1029-1043.

Boyle, M.H., Georgiades, K., Cullen, J. and Racine, Y. 2009. “Community Influences on Intimate Partner Violence in India: Women’s Education, Attitudes towards Mistreatment and Standards of Living.*” Social Science and Medicine*, 69: 691-697.

Campbell, J.C. 2002. “Health consequences of intimate partner violence.” *Lancet*, 13: 1331-1336.

Chellaraj, G. and Mohapatra, S. 2011. “Impact of Migrant Remittances on Household Expenditures in India.” Paper Presented at the Migration and Remittances Conference, Colombo, Sri Lanka, June 12-15, 2011

Chaudhuri, A. and Mukherjee, R. 1988. Randomized Response: Theory and Technique. Marcel Dekker, New York.

Chowdhry, P. 1997. “Enforcing Cultural Codes: Gender and Violence in Northern India.” *Economic and Political Weekly,* 32: 1019-1028.

Chin, Y-M. 2012. “Male Backlash, Bargaining, or Exposure Reduction?: Women’s Working Status and Physical Violence in India.” *Journal of Population Economics,* 25: 175-200.

Cools, S. and Kotsadam, A. 2017. “Resources and Intimate Partner Violence in Sub-Saharan Africa.” *World Development,* 95: 211-230.

Das, S. 2015. “The Effect of the Adoption of a Pro-Women Domestic Violence Policy on Dowry Violence: Empirical Evidence from India.” *Economic Record,* 91: 78-93.

Devries, K.M., Mak, J.Y.T. and Garcia-Moreno, C. 2013. “The Global Prevalence of Intimate Partner Violence against Women, *Science,* 340: 1527-1528.

Droitcour, J. A., Larson, E.M. and Scheuren, F.J. 2001. "The Three Card Method: Estimating Sensitive Survey Items--With Permanent Anonymity of Response," 2001 Proceedings of the American Statistical Association, Social Statistics Section [CD-ROM], Alexandria, VA: American Statistical Association,

Durevail, D. and Lindskog, A. 2015. “Intimate Partner Violence and HIV Infection in Sub-Saharan Africa.” *World Development,* 72: 27-42.

Duvvury, N., Carney, P. and Nguyen, H.M. 2012. “Estimating the Costs of Domestic Violence against Women in Vietnam.” United Nations, Hanoi, Vietnam.

Goodstadt, M.S. and Gruson, V. 1975. “The Randomized Response Technique: A Test on Drug Use.” *Journal of the American Statistical Association* 70:814–818.

Gonzales-Ocantos, E., de Jonger, K., Melendez, C., Osorio, J. and Nickerson, D.W. 2012. “Vote Buying and Social Desirability Bias: Experimental Evidence from Nicaragua.” *American Journal of Political Science,* 56: 202-217.

Greenberg, B.G., Kuebler, R.R., Abernathy, J.R. and Horvitz, D.G., 1971. “Applications of the RR Technique in obtaining Qualitative Data.” *Journal of American Statistical Association,* 66:243-250.

Heath, R. 2014. “Women’s Access to Labor Market Opportunities, Control of Household Resources, and Domestic Violence: Evidence from Bangladesh.” *World Development,* 57: 32-46.

Heise, L.L., Raikes, A., Watts, C.H. and Zwi, A.B. 1994. “Violence against Women: A Neglected Public Health Issue in Less Developed Countries.” *Social Science and Medicine,* 39: 1165-1179.

Houston J and Tran A. 2001. “A Survey of Tax Evasion Using the Randomized Response Technique.”*Advanced Taxation,* 13: 69-94.

Imai, K. 2011. "Multivariate Regression Analysis for the Item Count Technique." *Journal of the American Statistical Association,* 106: 407-416.

Karlan, D. and Zinman, J. 2012. List Randomization for Sensitive Behavior: An Application for Measuring Use of Loan Proceeds." *Journal of Development Economics,* 98: 71-75

Kavitha, V.R.S. 2012. "Spousal Domestic Violence of Married Women in India." *Journal of Sociology and Social Anthropology,* 3: 7-13.

Kishor, S. and Johnson, K. 2006. "Reproductive Health and Domestic Violence: Are the Poorest Women Uniquely Disadvantaged?" *Demography,* 43: 293-307.

Koenig, M.A., Stephenson, R., Acharya, R., Barrick, L., Ahmed, S. and Hindin, M. 2010. "Domestic Violence and Early Childhood Mortality in Rural India: Evidence from Prospective Data." *International Journal of Epidemiology,* 39: 825-833.

Koenig, M.A., Ahmed, S. and Hossain, M.B. 2003. "Women's Status and Domestic Violence in Rural Bangladesh: Individual-and Community-Level Effects." *Demography,* 1151-1572.

Krishnan, S., Rocca, C.H., Hubbard, A.E., Subbiah, K., Edmeades, J. and Padian, N.S. 2010. "Do Changes in Spousal Employment Status Lead to Domestic Violence? Insights from a Prospective Study in Bangalore, India." *Social Science and Medicine,* 70: 136-143.

LaBrie, J.W. and Earleywine, M.E. 2000. "Sexual Risk Behavior and Alcohol: Higher Base Rates Revealed using the Unmatched-Count Technique." *The Journal of Sex Research,* 37: 321-326.

LaMattina, G. 2017. "Civil Conflict, Domestic Violence and Intra-Household Bargaining in Post-Genocide Rwanda." *Journal of Development Economics,* 124: 168-198.

Lara, D., Strickler, J., Olavarrieta, C. and Ellerston, C. 2004. "Measuring Induced Abortion in Mexico: A Comparison of Four Methodologies." *Sociological Methods Research,* 32: 529.

Leach, F. 2006. "Researching Gender Violence in Schools: Methodological and Ethical Consideration." *World Development,* 34: 1129-1147.

Liu, Y. and Fullerton, T.M. 2015. "Evidence from Mexico on Social Status and Violence against Women." *Applied Economics,* 47: 4260-4274.

Martin, S.L., Morocco, K.E., Tsui, A.O., Kupper, L.L., Chase, J. and Campbell, J.C. 2002. "Domestic Violence across Generations: Findings from Northern India." *International Journal of Epidemiology,* 31: 560-572.

Martin, S.L., Tsui, A.O., Maitra, K. and Marinshaw, R. 1999. "Domestic Violence in Northern India." *American Journal of Epidemiology,* 150: 417-426.

Mckenzie, D. and Siegel, M. 2013. "Eliciting Illegal Migration Rates through List Randomization." *Migration Studies,* 1: 276-291

Nithya, N.R. 2013. "High Literacy and Mounting Violence: A Case of Women in Kerala, India." *International Journal of Scientific and Research Publications,* 3: 1-9.

Palermo, T., Bleck, J. and Peterman, A. 2014. "Tip of the Iceberg: Reporting and Gender-Based Violence in Developing Countries." *American Journal of Epidemiology,* 179: 602-612.

Panda, P. and Agarwal, B. 2005. "Marital Violence, Human Development and Women's Property Status in India." *World Development*, 33: 823-850.

Pollak, R.A. 2004. "An Intergenerational Model of Domestic Violence." *Journal of Population Economics*, 17: 311-329.

Pollock, K.H., and Beck, Y., 1976. "A Comparison of Three Randomized Response Models for Quantitative Data." *Journal of American Statistical Association*, 71: 884-886.

Rocca, C.H., Rathood, S., Falle, T., Pande, R.P. and Krishnan, S. 2009. "Challenging Assumptions about Women's Empowerment: Social and Economic Resources and Domestic Violence among Young Married Women in Urban South India." *International Journal of Epidemiology*, 38: 569-579.

Rosenfeld, B., Imai, K. and Shapiro, J. 2016. "An Empirical Validation Study of Popular Survey Methodologies for Sensitive Questions." *American Journal of Political Science*, 60: 783-802.

Sakhi Women's Resource Center. 2004. "Gender and Decentralized Planning, Kerala, India, Trivandrum.

Santos, C. 2013. "Costs of Domestic Violence: A Life Satisfaction Approach." *Fiscal Studies: Journal of Applied Public Economics*, 34: 391-409.

Sekhri, S. and Storeygard, A. 2014. "Dowry Deaths: Response to Weather Variability in India." *Journal of Development Economics*, 111: 212-223.

Shakya, H.B., Fleming, P., Saggurti, N., Donta, B., Silverman, J. and Raj, A. 2017. "Longitudinal Associations of Intimate Partner Violence Attitudes and Perpetration: Dyadic Couples Data from a Randomized Control Trial in Rural India." Social *Science and Medicine*, 179: 97-105.

Sirken, M.G. 1970. "Household Surveys with Multiplicity." *Journal of American Statistical Association*, 65: 257-266.

Solotaroff, J.L. and Pande, R.P. 2014. *Violence against Women and Girls: Lessons from South Asia*. Washington DC: World Bank Group.

Srinivasan, S, and Bedi, A.S. 2007. "Domestic Violence and Dowry: Evidence from a South Indian Village." *World Development*, 45: 252-268.

Tsuchiya, T., Hirai, Y., and Ono, S. 2007. "A Study of the Properties of the Item-Count Technique." *Public Opinion Quarterly*, 71: 253-272.

Tourangeau, R. and Yan, T. 2007. "Sensitive Questions in Surveys." *Psychological Bulletin*, 133: 859-883.

Tourangeau, R., Smith, T.W. and Rasinski, K.A. 1997. Motivation to Report Sensitive Behaviors on Surveys: Evidence from a Bogus Pipeline Experiment." *Journal of Applied Social Psychology*, 27: 209-222.

UNHCR (United Nations High Commissioner for Refugees). 2005. "UNHCR's Policy on Harassment, Sexual Harassment, and Abuse of Authority." UNHCR, Geneva. http://www.un.org/womenwatch/osagi/UN_system_policies/(UNHCR)policy_on_harassment.pdf.

VanderEnde, K.E., Yount, K.M., Dynes, M.M. and Sibley, L.M. 2012. "Community-Level Correlates of Intimate Partner Violence against Women Globally: A Systematic Review." *Social Science and Medicine*, 75: 1143-1155.

Van der Heijden, P. G., Van Gils, G., Bouts, J., and Hox, J. J. 2000, "A Comparison of Randomized Response, Computer-Assisted Self-Interview, and Face-to-Face Direct Questioning Eliciting Sensitive Information in the Context of Welfare and Unemployment Benefit," *Sociological Methods & Research,* 28, 505–537.

Vyas, S., Jansen, H.A.F.M., Heise, L. and Mbwambo, J. 2015. "Exploring the Association between Women's Access to Economic Resources and Intimate Partner Violence in Dar es Salaam and Mbuya, Tanzania." *Social Science and Medicine,* 146: 307-315.

Warner, S.L. 1965. "Randomized Response: A Survey Technique for Eliminating Evasive Answer Bias." *Journal of the American Statistical Association,* 60: 63-69.

Watts, C. and Zimmerman, C. 2002. "Violence against Women: Global Scope and Magnitude." *Lancet,* 359: 1232-1237.

Whitaker, D.J., Haileyesus, T. and Swahn, M. 2007. "Differences in Frequency of Violence and Reported Injury between Relationships with Reciprocal and Non-Reciprocal Intimate Partner Violence." *American Journal of Public Health,* 97: 941-947.

Wimbush, J.C. and Dalton, D.R., 1997. "The Base Rate for Employee Theft: Convergence of Multiple Methods." *Journal of Applied Psychology,* 82: 756-763.

World Health Organization (WHO). 2013. "Global and Regional Estimates of Violence against Women: Prevalence and Health Effects of Intimate Partner Violence and Non-Partner Sexual Violence." Geneva, Switzerland.

Yount, K.M., VanderEnde, K., Zureick-Brown, S., Anh, H.T., Schuler, S.R. and Minh, T.H. 2014a. "Measuring Attitudes about Intimate Partner Violence Against Women: The ATT-IPV Scale." *Demography,* 51: 1551-1572.

Yount, K.M., Zureick-Brown, S. and Salem, R. 2014b. "Intimate Partner Violence and Women's Economic and Non-Economic Activities in Minya, Egypt, *Demography,* 51: 1069-1099.

Yount, K.M., Halim, N., Schuler, S.R. and Head, S. 2013. "A Survey Experiment of Women's Attitude about Intimate Partner Violence against Women in Rural Bangladesh." *Demography,* 50: 333-357.

Zachariah, K.C. and Rajan, S.I. 2015. "Researching International Migration: Lessons from the Kerala Experience." Routledge, New Delhi, India.

Table 1: Test of Randomization- T Test of the Difference in Means

	Mean-Treatment	Mean-Control	P Value
Number of Females per Household	2.28	2.30	0.33
Median Age Per Household	37.35	37.20	0.54
Number of individuals Below Primary per Household	0.74	0.72	0.28
Number of individuals in Primary Per Household	1.46	1.47	0.61
Number of individuals in Secondary but with No Degree Per Household	1.51	1.54	0.16
Number of individuals with Degrees Per Household	0.36	0.34	0.18
Number of Employed Individuals Per Household	1.33	1.36	0.11
Proportion of Muslim Households	0.21	0.21	0.78
Proportion of Hindu Households	0.58	0.58	0.98
Proportion of Christian Households	0.21	0.21	0.79
Proportion of Other Religion Households	0.00	0.00	0.89
Proportion Married Individuals Per Household	2.35	2.36	0.53
Proportion of Never Married Individuals Per Household	1.66	1.66	0.93
Proportion of Widows/Widowers Per Household	0.30	0.30	0.86
Proportion divorced individuals per household	0.03	0.03	0.27
Proportion of households with ration card	0.98	0.98	0.07
Proportion of households with red ration card	0.30	0.30	0.81
Proportion of households with blue ration card	0.68	0.68	0.76
Proportion of households who own their house	0.93	0.93	0.64
Proportion of non-migrant households	0.63	0.62	0.11
Proportion of households with international migrants	0.19	0.20	0.10
Proportion of households with domestic migrants	0.07	0.07	0.39
Sample Size	**8,458**	**5,467**	

Table 2: List Randomized Measures of Domestic Violence and Physical Harassment on Public/Private Buses

.	Sample Size	Proportion of Control Giving 3 as a Response	Mean for Control	Mean for Treatment	Estimated Rate of Violence by List Randomization	Estimated Rate of Violence by Direct Question	Rate Difference (RL -Direct)
Physical Aggression from Husband	13925	8.73	1.31	1.46	0.15***	0.056	0.09
Physical Harassment on Buses	13925	20.43	1.73	1.74	0.01	0.026	-0.02

Note: *, **, *** indicate significance at 10, 5, and 1 percent levels respectively

Table 3: Estimates of Domestic Violence Rates by Population Subgroup

Households	Observations	Proportion in Control Group Giving 3 as Answer	Mean for Control	Mean for Treatment	Estimated Rate of Violence by List Randomization	Estimated Rate of Violence by Direct Question	Rate Difference (RL -Direct)
Urban	6170	8.72	1.26	1.45	0.19***	0.07	0.12
Rural	7755	8.73	1.34	1.47	0.12***	0.04	0.08
Non poor	9424	9.25	1.35	1.50	0.14***	0.05	0.09
Poor	4221	7.63	1.21	1.38	0.16***	0.06	0.10
Rural non-poor	5246	9.14	1.40	1.52	0.12***	0.04	0.08
Rural poor	2351	7.89	1.23	1.37	0..13***	0.04	0.09
Urban non-poor	4178	9.39	1.30	1.47	0.17***	0.07	0.11
Urban poor	1870	7.29	1.19	1.39	0.199***	0.08	0.12
Does not own home house	952	5.79	1.24	1.36	0.12**	0.07	0.05
Owns House	12973	8.94	1.31	1.47	0.15***	0.06	0.10

Note: *, **, *** indicate significance at 10, 5, and 1 percent levels respectively

Table 4: Estimates of Physical Harassment on Public/Private Buses Rates by Population Subgroup

Households	Observations	Proportion in Control Group Giving 3 as Answer	Mean for Control	Mean for Treatment	Estimated Rate of Violence by List Randomization	Estimated Rate of Violence by Direct Question	Rate Difference (RL - Direct)
Urban	6170	21.11	1.71	1.68	-0.04	0.04	-0.08
Rural	7755	19.92	1.74	1.79	0.05***	0.02	0.03
Non- poor	9424	20.65	1.72	1.75	0.02	0.03	-0.01
Poor	4221	20.40	1.74	1.73	-0.02	0.03	-0.05
Rural Non-poor	5246	19.84	1.72	1.80	0.09***	0.02	0.07
Rural Poor	2351	20.40	1.78	1.78	0.002	0.02	-0.02
Urban Non-poor	4178	21.74	1.73	1.69	-0.04	0.03	-0.07
Urban Poor	1870	20.62	1.70	1.67	-0.03	0.04	-0.07
Does not own house	952	21.58	1.73	1.64	-0.09	0.03	-0.12
Owns House	12973	20.35	1.73	1.75	0.02	0.03	-0.01

Note: *, **, *** indicate significance at 10, 5, and 1 percent levels respectively

Table 5: Estimates of Domestic Violence Rates by Respondent Subgroup

	Observations	Proportion in Control Group Giving 3 as Answer	Mean for Control	Mean for Treatment	Estimated Rate of Violence by List Randomization	Estimated Rate of Violence by Direct Question	Rate Difference (RL - Direct)
Male	5682	9.32	1.34	1.46	0.12***	0.06	0.06
Female	8129	8.14	1.29	1.45	0.17***	0.06	0.11
Rural Male	3194	9.1	1.39	1.47	0.08**	0.05	0.03
Urban Male	2488	9.62	1.27	1.45	0.18***	0.07	0.11
Rural Female	4500	8.25	1.31	1.47	0.15***	0.04	0.11
Urban Female	3629	7.99	1.25	1.44	0.19***	0.07	0.12
Employed	5122	9.24	1.36	1.49	0.14***	0.06	0.08
Unemployed	8689	8.26	1.28	1.44	0.16***	0.06	0.11
Employed Female	1551	7.85	1.29	1.45	0.16***	0.06	0.1
Employed Male	3571	9.85	1.39	1.51	0.13***	0.06	0.07
Age-Less than 30	1187	10.11	1.38	1.55	0.17***	0.05	0.12
Age- 30-49	5700	9.44	1.38	1.49	0.11***	0.06	0.05
Age-Above 50	6924	7.73	1.24	1.41	0.17***	0.06	0.11
Secondary and below	5852	7.89	1.22	1.39	0.16***	0.06	0.1
High School and Diploma	6456	9.22	1.36	1.5	0.13***	0.05	0.08
Degree and above	1315	8.65	1.4	1.53	0.13***	0.04	0.09
Professional degree	240	5.43	1.37	1.62	0.25**	0.05	0.2
Male Secondary and below	2522	8.44	1.27	1.39	0.12***	0.06	0.06
Male High School and Diploma	2503	9.84	1.38	1.5	0.12***	0.06	0.06
Male Degree and above	569	9.72	1.41	1.54	0.13	0.04	0.09
Male Professional Degree	110	4.65	1.23	1.49	0.26	0.05	0.21
Female Secondary and below	3330	7.45	1.18	1.38	0.2***	0.06	0.14
Female High School and Diploma	3953	8.81	1.35	1.49	0.15***	0.05	0.1
Female Degree and Above	746	7.83	1.39	1.53	0.14**	0.05	0.09
Female Professional Degree	130	6.12	1.49	1.73	0.24	0.05	0.19

Muslim	2901	12.61	1.42	1.55	0.13	0.05	0.08
Male Muslim	1132	14.81	1.46	1.58	0.11**	0.06	0.05
Female Muslim	1769	11.21	1.38	1.53	0.15***	0.05	0.1
Christian	2888	7.26	1.41	1.54	0.13***	0.05	0.08
Male Christian	1323	8.07	1.41	1.52	0.11**	0.05	0.06
Female Christian	1565	6.6	1.42	1.56	0.14***	0.05	0.09
Hindu	8006	7.69	1.23	1.39	0.16***	0.06	0.1
Male Hindu	3217	7.93	1.27	1.39	0.12***	0.06	0.06
Female Hindu	4789	7.52	1.2	1.39	0.19***	0.06	0.13

Note: *, **, *** indicate significance at 10, 5, and 1 percent levels respectively

Table 6. Estimates of Physical Harassment on Public/Private Buses Rates by Respondent Subgroup

	Observations	Proportion in Control Group Giving 3 as Answer	Mean for Control	Mean for Treatment	Estimated Rate of Violence by List Randomization	Estimated Rate of Violence by Direct Question	Rate Difference (RL - Direct)
Male	5682	19.34	1.73	1.75	0.02	0.03	-0.01
Female	8129	21.3	1.73	1.73	0.0009	0.03	-0.03
Rural Male	3194	17.97	1.72	1.79	0.07**	0.02	0.05
Urban Male	2488	21.2	1.74	1.7	-0.03	0.04	-0.07
Rural Female	4500	21.45	1.76	1.8	0.04	0.02	0.02
Urban Female	3629	21.1	1.7	1.66	-0.04	0.03	-0.07
Employed	5122	21.32	1.79	1.81	0.03	0.03	0
Unemployed	8689	19.95	1.69	1.7	0.004	0.03	-0.02
Employed Female	1551	25.75	1.84	1.89	1.87	0.03	1.84
Employed Male	3571	19.36	1.77	1.78	1.78	0.03	1.75
Age-Less than 30	1187	23.52	1.8	1.77	-0.03	0.03	-0.06
Age- 30-49	5700	23.33	1.8	1.78	-0.02	0.03	-0.05
Age-Above 50	6924	17.66	1.66	1.7	0.04*	0.03	0.01
Secondary and below	5852	18.76	1.7	1.73	0.03	0.03	0
High School and Diploma	6456	21.51	1.75	1.74	-0.004	0.03	-0.03
Degree and above	1315	23.74	1.75	1.76	0.01	0.03	-0.02
Professional Degree	240	25	1.79	1.8	0.004	0.04	-0.03
Male Secondary and Below	2522	19.73	1.74	1.78	0.04	0.03	0.01
Male High School and Diploma	2503	19.19	1.72	1.72	0.004	0.03	-0.02
Male Degree and Above	569	18.52	1.68	1.74	0.06	0.02	0.04
Male Professional Degree	110	20.93	1.63	1.76	1.71	0.01	1.7
Female Secondary and Below	3330	17.99	1.68	1.7	0.02	0.03	-0.01
Female High School and Diploma	3953	23.02	1.77	1.76	-0.01	0.02	-0.03
Female Degree and Above	746	27.76	1.8	1.77	-0.03	0.03	-0.06
Female Professional Degree	130	28.57	1.94	1.83	-0.11	0.06	-0.17

Muslim	2901	20.52	1.76	1.77	0.01	0.02	-0.02
Male Muslim	1132	23.23	1.81	1.84	0.04	0.03	0
Female Muslim	1769	18.78	1.74	1.73	-0.01	0.02	-0.03
Christian	2888	20.72	1.75	1.75	0.002	0.03	-0.03
Male Christian	1323	17.52	1.71	1.76	0.05	0.03	0.01
Female Christian	1565	23.27	1.78	1.74	-0.04	0.02	-0.06
Hindu	8006	20.38	1.71	1.73	0.01	0.03	-0.02
Male Hindu	3217	18.81	1.71	1.71	0.004	0.03	-0.02
Female Hindu	4789	21.53	1.71	1.73	0.02	0.03	-0.01

Note: *, **, *** indicate significance at 10, 5, and 1 percent levels respectively