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The Sociocultural Context of Family Size Preference, Ideal Sex Composition, and Induced Abortion in India: Findings From India's National Family Health Surveys

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Abstract

In this study, the author examined the effect of family size preference and sex composition of living children as determinants of induced abortion among women in India by analyzing 90,303 ever-married women aged 15–49, included in India's second National Family Health Survey, conducted in 1998–99. Multivariate logistic regression methods were used to examine the association between induced abortion and possible determinants. The results indicated that a woman's desire to limit family size with preferred sex composition of children, coupled with her autonomy and the sociocultural context, largely determines her experience of induced abortion in India.

Induced abortion is a complex issue that occurs at the interface of cultural attitudes, prejudices, and modern technology, and it is a sensitive issue because it directly enters into the private arena of pregnancy and reproductive rights. In the global context, in which induced abortion is restricted by law and even criminalized in several countries, India enjoys the dubious distinction of being a country in which induced abortion is legal but largely unsafe and unavailable (Ravindran, 2002). Under the 1971 Medical Termination of Pregnancy (MTP) Act, a woman in India can legally obtain an induced abortion up to 20 weeks of gestation if her pregnancy carries the risk of grave physical injury, endangers her mental health, is the result of contraceptive failure (in case of a married woman) or rape, or is likely to produce a child with physical or mental abnormalities (Ministry of Health and Family Welfare, 2003). The MTP Act was enacted with a view toward containing the size of the family. In some cases, however, the desire for a small family may have outweighed the desire for a child of a specific gender, leading to abortions where the sex of the fetus was different from that desired by the family. The MTP Act stipulated that an abortion may lawfully be done in qualified circumstances, but the unscrupulous connived to misuse the law to have abortions conducted for the purpose of sex selection. Later, innovative technologies made sex selection easier, and without the regulations to control the use of such technologies, these technologies began to be misused for sex-selective abortions. These actions necessitated enactment of the Pre-natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act (PNDT) in 1994. This act was amended in 2002 in an effort to close loopholes contained in the original act. Sources of data on induced abortion in India

somehow fail to provide consistent estimates of induced abortions in India (Ganatra, 2000; Johnston, 2002; Khan, Barge, Kumar, & Almroth, 1998), but most researchers using direct and indirect methods of estimation seem to agree that there are between five and seven million induced abortions per year (Chhabra, 1996; Chhabra & Nuna, 1994; Coyaji, 2000; Faundes & Hardy, 1997; Indian Council of Medical Research, 1989; Jejeebhoy, 1999; Saha & Chatterjee, 1998).

The sociocultural, demographic, and public health importance of induced abortion in India requires a more thorough understanding of the factors associated with it. Much less is known about the socioeconomic and gender power context underlying a woman's experience of undergoing an induced abortion (Duggal & Ramachandran, 2004). Identifying these and other factors that lead to induced abortion has important policy implications (Pallikadavath & Stones, 2006; Visaria & Visaria, 1995). In India, the social and cultural context within which the induced abortions are performed and the levels and characteristics of women resorting to induced abortion are unknown. Using nationally representative data, we examined the different factors that lead women in India to have induced abortions.

The Sociocultural Context of Family Size Preference, Ideal Sex Composition, and Induced Abortion

Studies in India have identified a variety of sociocultural and economic factors that influence couples to want male children, such as continuation of family lineage, ritual and religious purpose, economic reasons, old age dependence, upward social mobility, providing additional status to the family, and source of power (Arnold & Liu, 1986; Bardhan, 1985; Basu, 1989; Belanger, 2002; Caldwell, Reddy, & Caldwell, 1989; Coombs, 1979; Coombs & Sun, 1978; Das Gupta, 1987; Dharmalingam, 1996; Dyson & Moore, 1983; Gu & Li, 1994; Kapadia, 1966; Lahiri, 1984; Lavelly Li & Li, 2001; Miller, 1981, 1997; Oldenburg, 1992; Skinner, 1997; Westley, 1995; Williamson, 1976). The root of son preference in India lies in deeply entrenched social, cultural, and economic discrimination against women and girls and there is evidence that this type of gender bias is increasing and spreading in modern India (Bose & Trent, 2006).

Abortion of fetuses because they are female is a profound and increasing problem throughout South Asia (Banister, 2004; Belanger & Khuat, 2007; Bossen, 2007; Hesketh & Xing, 2006; Junhong, 2001). Given India's patrilineal and patriarchal system, a cultural preference for sons may be a factor driving recourse to induced abortion in India, as women carrying female fetuses may decide to terminate their pregnancies (Arnold, Kishor, & Roy, 2002; Sudha & Rajan, 1999). Strong son preference and associated sex-selective abortion are also believed to be largely responsible for a declining child sex ratio in India (Agrawal, 2004; Arnold et al., 2002; Bose, 2001; Das Gupta & Bhat, 1997; Nanda, 2006; Retherford & Roy, 2003; Sen, 2003; Sudha & Rajan, 1999; Unisa et al., 2003, 2007; Visaria & Visaria, 1995). Several studies, census findings, and media reports show that there is a steadily declining child sex ratio in the country, especially in Punjab, Haryana, and Delhi—home to some of the most affluent regions in India. In Punjab and Haryana, the child sex ratios are a deplorable 846 and 830, respectively (Census of India, 2011). Statistics show that for every

1,000 boys there are 300 girls among “higher caste” families in Punjab, one of India’s wealthiest states. In addition, some microstudies in northern India demonstrated a widespread acceptance of the practice of sex selection of the fetus, and several researchers have documented indirect evidence in the form of increasing sex ratios at birth in hospitals or within communities (Agrawal, 2004; Booth, Verma, & Beri, 1994; Gu & Roy, 1995; Khanna, 1997; Sachar et al., 1990; Sahi & Sarin, 1996). The issue is not confined to the poor—the distortion of the sex ratio between boys and girls has also been found in more affluent communities. In urban India, families abort daughters because they have access to technology.

Sex-selective abortion, however, is not only the result of an unintended or unwanted pregnancy. Indeed, it is the gendered preference for a certain type of pregnancy that guides the decision to undergo sex-selective abortion (Mallik, 2002). In India, the pressure to have sons has intensified as couples strive simultaneously to reduce family size and ensure the birth of the desired number of sons, leading to increased acceptance of and reliance on the use of sex-selection strategies to achieve those results (Gurung, 2004; Rao, 2002). The use of coercive measures in implementing population policies—particularly undue emphasis on the use of permanent methods—can easily lead to an intensifying trend toward sex determination and sex-selective abortion (Mallik, 2002). The silent enforcement of India’s coercive two child policy has been identified as the source of the country’s troubles with abortion of baby girls and the resulting deficit of women. Sex-selective abortion is a new and growing method of control of family sex composition (Chhabra, 1996; Das Gupta & Bhat, 1997). Researchers have also argued that Asia’s rising proportion of sons has been associated with the introduction of government population and family-planning policies, which were aiming at reducing fertility rates. Consequently, the limitation of female births helps the desired number of sons to remain within the reconfigured family-size norm.

Women’s Status and Induced Abortion

The social and demographic context of induced abortion in India is very much formed by women’s overall status in the household (Bose & Trent, 2006). Researchers around the world have found that women’s status and autonomy are critical in promoting change in reproductive attitudes and behavior, especially in patriarchal societies (Das Gupta, 1987; Dyson & Moore, 1983; Jeffery & Basu, 1996). Women’s status is most often conceptualized in terms of economic power and access to and control of resources (Mason, 1984). Research shows that women’s active participation in domestic decision making also indicates their power within the household (Balk, 1994; Dyson & Moore, 1983; Mason, 1984; Mason & Taj, 1987; Meekers & Oladosu, 1996; Oppong, 1983; Standing, 1983). Gains in women’s status are usually associated with lower fertility and increased reproductive choice (Bulatao & Lee, 1983; Kasarda, Billy, & West, 1986; Oppong, 1983). Economically active women are thought to desire smaller families because of the associated opportunity costs of childbearing (Kasarda et al., 1986; Schultz, 1997). Because of the state of gender relations in India, women frequently gain status both within their families and in society as a whole by giving birth to sons (Arnold, 2001; Das Gupta, 1987, 1994; Kishor, 1993, 1995; Miller, 1997). Women’s status is also frequently conceptualized in terms of their educational attainment: women with higher levels of education have lower fertility (the strength of this

relationship is well documented for India: Dreze & Murthi, 2001; Dreze & Sen, 1995; Jain & Nag, 1986; Murthi, Guio, & Dreze, 1995; Pallikadavath & Stones, 2006; Parikh & Gupta, 2001). A review of qualitative studies conducted in India (Ganatra & Hirve, 2002; Ravindran & Balasubramanian, 2004; Visaria, Ramachandran, Ganatra, & Kalyanwala, 2004) found out that women's need to postpone births to meet the demands of ongoing education or to take up or continue employment and the desire to limit family size in the absence of effective and accessible contraception may lead to abortion (Marston & Cleland, 2003). Other likely factor is that educated women are more likely than uneducated women to have information about and access to abortion services. Because educational attainment and access to abortion services are both expected to increase among women in India, as a result of current national policies and programs and the country's general economic development, a rise in abortion ratios can be anticipated. Sometimes induced abortion can also be a method of obtaining lower fertility where induced abortion itself is used as a contraceptive method (Güldal & Semin, 1999; Pandey, 2002).

In view of above discussion, the specific objectives of this study are to explore the induced abortion scenario in the states of India and its change over time and to explore the associations among family size preference, sex composition of living children, women's autonomy, and sociodemographic characteristics with the likelihood of induced abortion among adult women in India.

Data and Methods

Data

Data were mainly retrieved from India's second National Family Health Survey (NFHS-2), conducted during 1998–99 (International Institute for Population Sciences [IIPS] & ORC Macro, 2000). To study the changes in the induced abortion scenario in India over time, however, data from NFHS-1, conducted during 1992–93 (IIPS, 1995), also have been used. The NFHS-2 collected demographic, socioeconomic, and health information from a nationally representative probability sample of 90,303 ever-married women aged 15–49 years residing in 92,486 households (88,562 households and 89,777 ever-married women in the case of NFHS-1). All the states of India are represented in the sample (except the small Union Territories), covering more than 99% of the country's population. The sample is a multistage cluster random sample with an overall response rate of 98%. Details of sample design, including sampling framework and sample implementation, are provided in the basic survey reports for all India (IIPS, 1995; IIPS & ORC Macro, 2000). It is important to mention here that the data from the third round of NFHS, that is, NFHS-3 conducted during 2005–06 (IIPS & Macro International, 2007), could not be used for this analysis. In NFHS-3, women were not specifically asked about induced abortion, which limits its use for any induced abortion analysis.

Response variable—In NFHS-2, information on pregnancies that did not result in a live birth is collected using the birth history section. For each interval between births, as well as the interval before the first birth and after the last birth, each woman was asked whether she had any stillbirths, spontaneous abortions, or induced abortions, and, if yes, how many she

had. This information was summed to obtain the total number of nonlive births of each type she has had in her lifetime. In most countries, the reporting of nonlive births—particularly induced abortions—is inadequate, and retrospective surveys tend to underestimate incidences of induced abortion (Rossier, 2003). It is therefore also likely that there is some underreporting of these events in NFHS-2. In NFHS-1, however, respondents were also asked whether they had any stillbirths, spontaneous abortions, or induced abortions, and, if yes, how many—but this was not asked as a part of birth history. We dropped NFHS-1 for further in-depth analysis, except for the statewise differential and change in the experience of induced abortion among women, because the data are not exactly comparable. Moreover, only NFHS-2 data give information on specific reproductive morbidities experienced by women in the past 3 months, which is an important outcome of the study.

In NFHS-2, each ever-married woman aged 15–49 years was asked about her birth history. Detailed answers were sought about the women's experience, including about induced abortion, miscarriages, and stillbirths, in the context of their birth history. The dependent variable is dichotomous, indicating whether or not a woman experienced an induced abortion in her whole life.

Covariates—The main study variables are women's family size preference categorized into wants equal numbers of sons and daughters, wants more sons than daughters, wants fewer sons than daughters, and sex composition of living children, categorized into 1 child—1 son, 1 child—no sons, 2 children—2 sons, 2 children—1 son, 2 children—no sons, 3+ children—2+ sons, 3+ children—1 son, 3+ children—no sons, no living children. Other variables included in the analysis are women's age at effective marriage; urban, rural residence; religion; caste/tribe; couple's education; couple's working status; wealth index; media exposure; women's autonomy; and states of India. Two groups of states were created based on the differences in their sociocultural and demographic characteristics in terms of son preference, child sex ratio, women's literacy, and health care seeking behavior for further in-depth study. The first group of states includes the northern states of Delhi, Punjab, and Haryana, and the second group includes the southern states of Andhra Pradesh, Karnataka, and Kerala. For definition of variables see Table 3.

Statistical Analysis

We first examined interstate differentials in the experience of induced abortion among women using NFHS-1 and NFHS-2 data. Analysis of the determinants, however, is limited to only NFHS-2 data. Bivariate analysis is carried out to explore the differential in induced abortion and sex composition of living children, family size preference, women's autonomy, and sociodemographic characteristics of women, followed by a chi-square to test significance level. Association between induced abortion and underlying factors is examined through unadjusted and adjusted logistic regression models. The dependent variable was whether or not a woman had an induced abortion in her life.

The results are presented in the form of odds ratios (ORs), with 95% confidence intervals (95% CIs). The estimation of CIs takes into account design effects resulting from clustering at the level of the primary sampling unit. In the survey, certain states and certain categories

of respondents were oversampled. Appropriate weights such as national weight and state weights were used to restore the representativeness of the sample. A pooled sample weight was used for analyzing the correlates of induced abortion for two groups of states (three states formed each group) representing different cultural and demographic scenarios. To explain more pooled sample weight: if more than one states' data are pooled together, the individual and state weights remain no longer representative for the pooled data and need to be adjusted. A piece of external information is needed for adjustment. In this analysis, the total target population at the time of the survey has been used from the Census of India for each state to compute the factor and pooled weight. The analysis was conducted in STATA version 10.

The analysis presented here is based on all reported induced abortion cases. Abortions that are reported in NFHS as induced abortions are most likely to be legal induced abortions. The extent, however, to which women may have self-reported both legal and illegal types of abortions in the survey is indefinite.

Human Subjects Informed Consent

The survey received ethical clearance from IIP's Ethical Review Board. The analysis presented in this study is based on secondary data analysis of the above survey with all identifying information removed. The survey obtained informed consent from each respondent before face-to-face interviews.

Results

Induced Abortion by Women's Parity

Overall, in India, 3.1% and 2.6% of women ever experienced induced abortion during 1992–93 and 1998–99, respectively (see Table 1). In NFHS-2, however, 0.4% of women have experienced induced abortion more than once during her lifetime. A considerable variation in induced abortion was seen according to women's parity in both rounds of NFHS. Induced abortion was found to be at its maximum at second parity, decreasing in subsequent parities in both rounds of NFHS. For example, 4.2% and 3.8% of induced abortions were observed at women's second parity in NFHS-1 and NFHS2, respectively, decreasing to 3.8% and 2.8% at third parity, and remaining almost constant in subsequent parities. This indicates that induced abortion is higher at parities 2–3 and lowest at parity 0.

Induced Abortion Scenario in States of India

Table 2 and Figures 1 and 2 present the percentage of women who have ever experienced induced abortion in India by state during both rounds of NFHS. (The population covered in NFHS-2 differs slightly from that in NFHS-1. The NFHS-1 did not include Sikkim and the Kashmir region of Jammu and Kashmir. The NFHS-2 covered all the 26 states, but the survey work in Tripura was delayed considerably as a result of some local problems. Therefore, estimates for Tripura are not included in the national estimates of the national report. The population of the regions not common in the two surveys is small, however, and should have only a negligible effect on the comparability of the national estimates from the two surveys.) Overall, in India, almost 3% of women experienced induced abortion in

NFHS-1 (3.1%); this statistic remains almost the same in NFHS-2 (2.6%). An urban–rural differential is seen in induced abortion, being substantially higher in urban areas (5.6% in NFHS-1 and 4.9% in NFHS-2) than in rural areas (2.2% in NFHS-1 and 1.9% in NFHS-2).

A substantial statewise variation in induced abortion among women in India can be seen. In NFHS-1, Delhi showed the highest incidences of induced abortion (10.9%), followed by Tamil Nadu (9.6%), Assam (6.4%), Goa (6.1%), and Manipur (5.7%). In contrast, induced abortions were low (less than 1%) in Mizoram, Meghalaya, Nagaland, and Bihar. Overall, an almost similar pattern was found during NFHS-2, with the same groups of states falling in the high and low categories of experiencing induced abortion among women. Tamil Nadu shows the highest incidences of induced abortion (7.7%), followed by Manipur (7.5%), Delhi (7.2%), Tripura (5.1%), Assam (4.6%), and Punjab (4.5%). Tamil Nadu was ranked highest in the NFHS-2 but was second—after Delhi—in NFHS-1. States such as Punjab, Orissa, Manipur, Gujarat, and Maharashtra also have shown an increase in induced abortion cases among women.

Induced Abortion by Socioeconomic, Demographic, and Maternal Characteristics

Data on induced abortion among ever-married women aged 15–49 years in India by selected socioeconomic, demographic, and maternal characteristics are presented in Table 3.

Experience of induced abortion has been explored according to women's family size preference, sex composition of living children, age at effective marriage, type of residence, religion, caste/tribe, wealth index, couple's education and working status, mass media exposure, and women's autonomy.

Experience of induced abortion significantly differs by these background characteristics of women. Experience of induced abortion was higher among women who have two living children with either one (4.2%) or two (3.7%) sons than among women who have two children without a son (2.8%). This illustrates the significance of sex composition of living children on experience of induced abortion among women. This signifies that women have achieved this ideal family size with desired sex composition with sex selective abortion. A significant positive relationship is also seen in the experience of induced abortion with women's age at effective marriage, wealth status, couple's education, mass media exposure, and autonomy of women. Women residing in urban areas and belonging to other castes and other religions were also found to experience higher rates of induced abortion than their counterparts. Overall, a positive association between affluence and induced abortion is evident in our study.

Association Between Family Size Preference, Sex Composition of Living Children, and Induced Abortion

Table 4 presents unadjusted and adjusted logistic regression results showing the association between family size preference, sex composition of living children, and other sociodemographic factors and induced abortion among women. Unadjusted results show that the likelihood of experiencing induced abortion was 1.7 times higher (OR, 1.66; 95% CI, 1.40–1.96; $p < .001$) among women who have two living children with one son than among women who have only one male child. The association remains unchanged (OR, 1.60; 95%

CI, 1.34–1.90; $p < .001$) when other predictors such as socioeconomic and demographic factors and location/state were controlled in the adjusted model. It is interesting to note however, that family size preference becomes nonsignificant when the sex composition of living children is added to the adjusted model.

Women who reside in urban areas or belong to other castes were 1.3 times more likely to have an abortion (OR, 1.29; 95% CI, 1.16–1.43; $p < .001$) than women residing in rural areas and belonging to scheduled castes (OR, 1.26; 95% CI, 1.10–1.45; $p = .001$). The likelihood of experiencing induced abortion, however, was found to be 25% lower among Muslim women (OR, 0.75; 95% CI, 0.65–0.87; $p < .001$) than among Hindu women. The couple's education status was also associated with induced abortion. The odds of induced abortion increased to 1.7 times when both husband and wife are literate, in reference to the odds for illiterate couples (OR, 1.70; 95% CI, 1.45–2.01; $p < .001$).

Women who have partial or full exposure to mass media were found to be positively associated with experiencing induced abortion in the unadjusted model. The direction of odds, however, gets somewhat indeterminate in the adjusted model (OR, 1.38; 95% CI, 1.16–1.64; $p < .001$ for full exposure; OR, 1.47; 95% CI, 1.29–1.68; $p < .001$ for partial exposure). Women with higher autonomy were 1.2 times more likely (OR, 1.20; 95% CI, 1.08–1.34; $p = .001$) to experience induced abortion than women with lower autonomy. Women belonging to the higher wealth index were consistently found to be positively associated with experiencing induced abortion both in the unadjusted and adjusted models. The likelihood of experiencing induced abortion was almost two times higher (OR, 1.89; 95% CI, 1.53–2.33; $p < .001$) among women belonging to the fourth wealth index and three times higher (OR, 3.02; 95% CI, 2.41–3.80; $p < .001$) among women belonging to the highest wealth index than women in the lowest wealth index. Other sociodemographic factors such as age at effective marriage and couple's working status were not found to be significantly associated with induced abortion in the adjusted model.

To adjust the state differential in induced abortion, we introduced state as a predictor variable in the adjusted model. The likelihood of experiencing induced abortion was found to be more than six times higher in Tamil Nadu (OR, 6.28; 95% CI, 4.64–8.51; $p < .001$) and more than five times in Manipur (OR, 5.28; 95% CI, 2.72–10.24; $p < .001$) and Assam (OR, 5.26; 95% CI, 3.70–7.48; $p < .001$) compared with Kerala. The odds of women experiencing induced abortion was also two to three times higher in Delhi (OR, 2.83; 95% CI, 1.95–4.10; $p < .001$) and Punjab (OR, 2.34; 95% CI, 1.62–3.37; $p < .001$)—the states with an imbalanced child sex ratio. The likelihood of experiencing induced abortion however, was found to be significantly lower among women in Karnataka (OR, 0.58; 95% CI, 0.38–0.88; $p = .011$) and Andhra Pradesh (OR, 0.68; 95% CI, 0.47–1.00; $p = .047$).

Association Between Family Size Preference, Sex Composition of Living Children, and Induced Abortion in the Two Different Sociocultural Set-Ups

To see the association between induced abortion and underlying factors in these two different sociocultural set-ups, we again restored logistic regression models separately for these two groups of states. Table 5 presents adjusted logistic regression results showing the associations between sex composition of living children, family size preference, and other

sociodemographic factors and induced abortion among women in two different models: model 1 for Delhi, Punjab, and Haryana and model 2 for Andhra Pradesh, Karnataka, and Kerala. The results were found to be quite different in the two models. In model 1, sex composition of living children, residence, and couple's educational status were found to be significant for induced abortion. The likelihood of experiencing induced abortion was more than two times higher among women who have two living children with two sons (OR, 2.71; 95% CI, 1.55–4.72; $p < .001$), one son (OR, 2.12; 95% CI, 1.24–3.63; $p = .006$), or no son (OR, 2.61; 95% CI, 1.32–5.17; $p = .006$) compared with women having one male child. In addition, women who reside in urban areas were two times more likely to have an induced abortion (OR, 2.06; 95% CI, 1.52–2.80; $p < .001$) than women residing in rural areas. Couple's education was also positively and consistently associated with women's experience of induced abortion in this group of states. The likelihood of induced abortion was two and half times greater (OR, 2.45; 95% CI, 1.36–4.41; $p = .003$) when both the husband and wife were literate compared with illiterate couples.

In contrast, in model 2, wealth status and caste/tribe were found to be significant for induced abortion for group 2 states. Women belonging to the highest wealth index (OR, 6.76; 95% CI, 1.94–23.52; $p = .003$) and belonging to scheduled tribes (OR, 7.05; 95% CI, 2.41–20.59; $p < .001$) were almost seven times more likely to abort than women belonging to the lowest wealth index and scheduled caste women. Neither family size preference nor sex composition of living children, however, was found to be significant for women's experience of induced abortion in these states.

Discussion

In this study the association between sociodemographic factors and likelihood of induced abortion by women, using nationally representative individual level data from NFHS-2, have been examined. The results of the study showed that a woman's desire to limit family size with preferred sex composition of children, coupled with her autonomy and the sociocultural context, largely determines her experience of induced abortion.

In this study we found a substantial statewide variation in induced abortion among women in India. In both NFHS-1 and NFHS-2, almost the same groups of states fall in the high and low categories of prevalence of induced abortion. Also an urban–rural differential has been found in induced abortion among women, with incidence of induced abortion being substantially higher among women in urban than in rural India. Women who lived in rural areas were less likely than their urban counterparts to have had an induced abortion. This may reveal not only a lack of abortion services in rural India but also a lower demand for abortion as a result of limited exposure to the media and to the outside world (Pallikadavath & Stones, 2006). Other reasons could be that urban residence promotes a more antinatal lifestyle and increases the cost of having children (Easterlin, 1983). Desired family size is lower in urban areas than in rural areas. Moreover, social and cultural norms promoting small family size are more readily diffused in urban areas because of better media access and greater exposure to diverse social groups (Babu, Nidhi, & Verma, 1998; Dreze & Murthi, 2001). It can also be said that the government's family planning message is more

widely dispersed in urban than rural areas. Urban residents not only have more exposure to the media but also have greater access to government health services (Jesani & Iyer, 1993).

Delhi and Tamil Nadu show the highest incidences of induced abortion. The fully urban character of Delhi and Tamil Nadu and its correspondingly well-developed health infrastructure, including legalized abortion services, could be the key factor for the state's higher rate of induced abortions among women. A high female literacy rate is yet another factor leading to higher reporting of induced abortions (Babu et al., 1998). This may also be the reason that Goa is found to have a relatively higher incidence of induced abortion. In contrast, the tribal and backward character of Mizoram, Nagaland, and Meghalaya, along with the inaccessibility and isolation of these northeastern states from the mainstream population, could account for the lower incidence of induced abortions among women in these states. It is an extraordinary fact that other northeastern states such as Manipur, Assam, and Tripura have shown a higher prevalence of induced abortion. The reason for this may be that the women in these states are using abortion as a means of contraception, as the use of either traditional contraceptive methods or less-reliable methods such as rhythm/safe period and withdrawal is found to be higher (IIPS & ORC Macro, 2000). The failure of the traditional methods of birth control may have led women to resort to induced abortion. Abortion is one of the oldest methods of averting unwanted births, and studies show that couples will switch to induced abortion as a method of birth control if they find contraceptive methods unreliable (Iranmahboob & Zinab, 2003).

The association between women's sex preference and sex composition of living children and experience of induced abortion has been examined in this study. Bearing male children is an important feature of family formation in India and is a significant determinant of induced abortion among women (MacQuarrie, Edmeades, McAulay, Nyblade, & Malhotra, 2007). Boy preference is so ingrained in the Indian family system that many women do not feel that they have done their wifely duty until they produce a son. The only way they feel their life is fulfilled is if they produce a son (Gentleman, 2006). In this study we showed that women who have two living children with one being a son were almost twice as likely to have experienced induced abortion. It may be more likely that to achieve this composition, induced abortion might have played an important role for these women. Retherford and Roy (2003) used NFHS-2 data to point out that small family norms, which currently appear to be strongest in families that already have two children, and the large proportion of women who wish to stop childbearing after having three children and who have a strong sex preference, mainly for sons, clearly determine the sex of the third child. Therefore, despite the positive effect of son preference on family size, individual son preference is also expected to increase the risk of induced abortion in India. Similar to our result indicating higher induced abortion rates among women with two living children, other studies have also reported the average number of children living at the time of medical termination of pregnancy (MTP) acceptance to be two to four (Gupta, 1976; Jamshedji & Kokate, 1990; Khan, Patel, & Chandrasekhar, 1990; Rao & Kanbargi, 1980; Thakore, Shah, & Agarwal, 1974).

Family size preference has not turned up as a significant variable in our model, as it used to be greatly biased by the present sex composition of living children. Asking a question about ideal family size is sometimes criticized on the grounds that women tend to adjust their ideal

family size upward as the number of their living children increases in a process of rationalizing previously unwanted children as wanted. It is argued that the question about ideal family size prompts many women to state the actual number of children they already have as their ideal. Son preference is culturally imbedded in Indian society, but its strength varies substantially from one part of the country to another. The NFHS-2 findings for India show that son preference tends to be stronger in the northern part of the country than elsewhere. The weakest son preference is found in Meghalaya, Mizoram, Tamil Nadu, Kerala, Karnataka, and Goa (IIPS & ORC Macro, 2000).

In this study we found women's autonomy to be greatly associated with their experience of induced abortion. An earlier study by this author in rural northern India had a similar result (Agrawal, 2004; Agrawal & Unisa, 2007). Other studies also found that women with no restrictions on their movement were twice as likely to attempt an induced abortion than those with few restrictions (MacQuarrie et al., 2007). It is widely recognized, however, that women in developing countries are often not the sole decisionmakers regarding childbearing, contraceptive use, and induced abortion. This is especially true in societies based on patriarchal family systems, in which women's decision-making power is restricted by social norms governing gender roles, household power dynamics, and communication patterns (MacQuarrie et al., 2007). A number of studies have also documented household abortion decision-making dynamics specific to the Indian context (Elul et al., 2004).

The age distribution of the induced abortion seekers in many studies shows a higher proportion of women in the younger age groups, that is, between 20 and 34 years of age (Chhabra & Nuna, 1994; Jamshedji & Kokate, 1990; Khan et al., 1990; Rao & Kanbargi, 1980; Somasundaram & Mehta, 1984). According to government records, more than two-thirds of abortions take place among women under age 30 years in India. We also agree with this finding (analysis not shown). It may be expected that working women will be more likely to have abortions than nonworking women because of inherent conflicts between their roles as employees and their roles as mothers, along with their desire for smaller family size and lower tolerance for unplanned pregnancies (Bose & Trent, 2006). This could also be a result of the women's need to postpone births or to take up or continue employment. Evidence from several small studies, however, suggests that the reasons why women in India seek induced abortions are diverse (Arnold et al., 2002; Bairagi, 2001; Bankole, Singh, & Haas, 1998; Booth et al., 1994).

We found the couple's education and, more specifically, women's education to be significantly associated with induced abortion. This finding is consistent with a review of qualitative studies conducted in India (Ganatra & Hirve, 2002; Ravindran & Balasubramanian, 2004; Visaria et al., 2004). The likely factor could be that educated women are more likely than uneducated women to have information and access to induced abortion services. Many other studies have shown that, by and large, educated women were taking advantage of the MTP facility (Jamshedji & Kokate, 1990; Khan et al., 1990; Rao & Kanbargi, 1980; Rao & Panse, 1975). The Indian Council of Medical Research study (1989), however, found a very large percentage (more than 60%) of abortion acceptors, both legal and illegal, to be illiterate. Because educational attainment and access to abortion services are both expected to increase among women in India as a result of current national policies

and programs and the country's general economic development, a rise in abortion ratios can be anticipated (Pallikadavath & Stones, 2006).

Chhabra and Nuna (1994) point out that induced abortion is a universal need, cutting across communities, class, and even cultural and religious backgrounds. We found induced abortion among Muslim women to be considerably lower than among Hindu women, and it is still lower among scheduled caste/scheduled tribe women than other caste women. This may reflect both less access to and less demand for induced abortion among Muslim women, owing to religious norms. Muslim women in India have both higher fertility (Dreze & Murthi, 2001), and their religious beliefs often preclude the use of abortion (Babu et al., 1998; Bose & Trent, 2006; Pallikadavath & Stones, 2006; Rao & Kanbargi, 1980). Studies also suggest that women who do not belong to a scheduled caste or tribe are more likely to obtain abortions (Agrawal & Unisa, 2007; Babu et al., 1998), and Khan and colleagues (1990) found considerable variation by caste composition of the MTP acceptors in a three Indian cities study.

We found women's higher wealth status to be significantly and positively associated with experience of induced abortion. Higher standards of living or higher income increase the likelihood of obtaining an abortion (Bose & Trent, 2006). The reason for this increase may be that women who belong to households with a higher standard of living have better access to health services, in general, and abortion services, in particular. In addition, services from private practitioners are more expensive than government health services; therefore, women with higher wealth status are likely to have greater access to both public and private abortion services. This implies that women in India who can afford to have abortions of unwanted pregnancies do so and get the desired sex composition of children.

Distinct cultural differences between the states in northern India and the states in southern India have important implications for abortion behavior. There is some evidence that the incidence of legal abortions is higher in the south than in the north (Mishra, Ramanathan, & Rajan, 1998). Induced abortion for northern women is probably more often viewed as one of many forms of birth control, whereas induced abortion for southern women is probably more often viewed as a resolution of contraceptive failure (Bose & Trent, 2006). Generally speaking, these sociocultural differences between northern and southern India translate into greater overall women's status and lower levels of son preference in the south. These underlying cultural and contextual influences on southern and northern women's behavior should result in important regional differences in the predictors of induced abortion (Bose & Trent, 2006). Our result for abortion differential in the two groups of states in India suggests that induced abortion in the first group of states, comprising Delhi, Punjab, and Haryana, is strongly influenced by women's preference for limiting family size with desired composition of sex than in the second groups of states, comprising Andhra Pradesh, Kerala, and Karnataka. This may be a result of pervasive son preference and sex-selective abortion practices. Son preference, coupled with family size preference, significantly increases the likelihood of induced abortion in the first group of states in northern India, but it has no significant effect in the second group of states in southern India. The underlying cultural and contextual factors result in important differences in the predictors of induced abortions in the two groups of states. The other reason could be that the southern states have higher women's

literacy rates and development indices, which means they may have better and more effective contraceptive use. It was also anticipated that there would be less variation in abortion-seeking behavior across different groups of women in the southern group of states than in the northern group. The perception of small family norm is comparatively a new occurrence in the northern states of India, which gradually emerged with increasing women's education and employment. The diffusion of the small family norm, however, is greater and already existed for southern women in contrast to northern women (Basu, 1992; Guilmoto & Rajan, 2001). Therefore, the individual characteristics of women have a weak effect on the likelihood of experience of induced abortion for the southern women compared with women from the north.

Limitations of the Study

Although rigorous methods were employed to maintain the data quality of NFHS, some limitations are inherent to a cross-sectional survey of this type, which involves reporting of past behaviors. Because abortion is a sensitive topic for many people, it is commonly underreported in national surveys (Arnold et al., 2002), and information about women who have induced abortions is limited probably because of recall lapse error and reluctance to reveal such incidences. It is likely that illegal abortions, or abortions performed with indigenous methods, are not reported, are underreported, or are reported as spontaneous abortions (Unisa et al., 2007). To minimize this bias, however, NFHS-2 interviewers were specially trained to ask questions that could help distinguish among induced abortions, miscarriages, and stillbirths (Pallikadavath & Stones, 2006).

Our analysis shows that about 3% of women experienced induced abortion in NFHS-1 (1992–93), and the percentage declined slightly (2.6%) in NFHS-2 (1998–99). Less reporting of induced abortion cases during NFHS-2 could be a result of the passage of the PNDT in 1994, which prohibits the use of prenatal diagnostic techniques for the purpose of antenatal sex determination (Ministry of Health and Family Welfare, 2005). The 1994 law was an attempt to reverse India's rampant use of sex-selective abortion and the lopsided sex ratio this has produced (Power, 2006). India's 2011 census showed that there were 914 girls to every 1,000 boys, down from 927 in 2001, 945 in 1991, and 962 in 1981. Moreover, not a single district in India had a child sex ratio of less than 800 in 1991, whereas in 2001, there were 14 that have decreased to six in 2011. A comparison of the sex ratio at birth for the period 1996–98 with 1992–95 suggests that the importance of sex-selective abortion has grown in the post-1995 period (Arnold et al., 2002) despite the passage of the act. The passage of this law coupled with uproar in the mass media regarding adverse sex ratio in India might have lead women not to report induced abortion.

Another limitation of this study is the potential endogeneity between women's experience of induced abortion and parity/sex composition of living children. It is quite plausible that women have obtained their current sex composition (and number of living children) through induced abortion or abortions. As women who are currently at second parity are most likely to have experienced induced abortion, it seems that women who are trying to limit their family size may be more likely to experience induced abortion. The directionality of the association is unclear, however, as the abortion could have happened either before or after

the achievement of a specific parity/sex composition. Therefore, although we do get a consistent pattern of experience of induced abortion of women with sex composition of living children, the results need to be interpreted with caution.

Women interviewed in NFHS-2 were not asked to provide the exact dates of pregnancy terminations. In the birth history segment of the questionnaire, they were asked to report whether they had a terminated pregnancy between each birth, as well as before and after the first and last births. Because the pregnancy outcome record is linked to the birth records, the only way to determine the approximate date of when an induced abortion occurred is to look at abortions that happened after the most recent birth or births.

Last, this study used relatively older data (NFHS-2 data conducted in 1998–99) rather than the latest round of the survey, that is, NFHS-3 conducted in 2005–06. This is largely because we cannot exclude the induced aborted information from NFHS-3 data. In NFHS-3 women were not specifically asked about induced abortion, but all eligible women were asked to provide binary answer to the question, “Have you ever had a pregnancy that miscarried, was aborted, or ended in a stillbirth” (available at www.nfhsindia.org). Thus, it was not possible to exclude the induced abortion cases from the data, as a woman can have any of the above pregnancy outcome in her life. Thus there was only one question for all the outcomes and the answer was either yes or no without referring to any specific outcome. Therefore, NFHS-2 is the only available survey, where married women were specifically asked about induced abortion. Despite the fact that the data is slightly older, we believe that the sociocultural context of family size preference, ideal sex composition, and induced abortion in India has not changed much during the last decade. We believe that the pattern of association will remain similar, irrespective of the data being 10 years old, and we could not find any other large scale nationally representative study done on induced abortion in India. In this way with the existing limitation of data this study is an important contribution to the existing literature on induced abortion in India.

Conclusions and Policy Implications

Induced abortion is possibly the most discordant women’s health issue that policymakers and planners face, particularly in developing countries. This study tried to explicate the social cultural context of family size preference, ideal sex composition, and induced abortion scenario in India. The study added some empirical finding on determinants and consequences of induced abortion; they could be useful for policy formulations in India. Given the recent evidence on low child sex ratios in India as a whole, and in some regions in particular, the incidence of induced abortions in India can be said to be indicative of women achieving the desired sex composition within small families (Chhabra & Nuna, 1994; Das, Desai, & Patel, 2000). Our study shows that, in India, induced abortion is more common among women in the second parity, which reflects the influence of women’s desire to limit family size with desired sex composition of children. An important finding of this study is that the sex composition of children continues to be strong and significantly associated with women’s experience of induced abortion, even after controlling for education, work status, wealth status, media exposure, women’s autonomy, and urban/rural residence. This reflects that women are using induced abortion to achieve their desired family size and sex

composition. The National Population Policy in India promotes a two-child norm, but it is gender blind in what it proposes. Given the known climate of “son preference” in India, the states not have been clearer about its population policy and family planning (renamed “family welfare”) program. The rearing of a daughter is seen as an unnecessary expenditure, and the illegal but persisting dowry system sends parents into debt. If state policy discourages more than two children, how logical it seems to families to “choose” to have only sons and meet the government’s norm. In insisting that Indian couples should accept and adopt the two-child norm, the state has failed to see this.

In conclusion, it can be said that there still is a need to focus on unmet need for contraception in India to avoid the burden of unwanted pregnancy and induced abortion among women. More extensively, there is a need to reduce son preference. The desire for sons is deeply entrenched in Indian society, and tackling this would require alteration of social norms and attitudes of Indian people (Pande & Astone, 2007). Not merely improving women’s status and giving access to higher education will help in mitigating this social problem, as it is evident in India that women with higher education, belonging to well-off families, and residing in urban areas are more frequently resorting to sex-selective abortion. Strong and stringent policies and programs are required not only at the national level but also at the regional level, which would include mechanisms to make girls valuable to the family and society and lessen gender differences within households through various social uplift programs. Such programs first need to recognize variations in women’s autonomy/status in the household and society in relation to son preference, as women in India gain higher autonomy in the household by having a son. More in-depth qualitative studies are needed at the community level to better understand the determinants of this complex and sensitive issue in India.

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Figure 1.
Induced abortion among women in India, 1992–93.

Figure 2.
Induced abortion among women in India, 1998–99.

Table 1

Induced Abortion Among Ever-Married Women Aged 15–49 Years by Parity, National Family Health Survey 1 (1992–93) and National Family Health Survey 2 (1998–99)

Women's parity	National Family Health Survey 1 (1992–93)			National Family Health Survey 2 (1998–99)		
	Total number of women	Number of women who experienced induced abortion	% induced abortion	Total number of women	Number of women who experienced induced abortion	% induced abortion
0	12,214	105	0.9	8,682	106	1.2
1	14,930	343	2.3	14,930	321	2.2
2	18,675	790	4.2	22,287	846	3.8
3	18,002	683	3.8	19,588	542	2.8
4	12,045	398	3.3	12,101	308	2.5
5	7,056	219	3.1	6,598	143	2.2
6+	6,786	227	3.3	6,117	123	2.0
Total	89,708	2,765	3.1	90,303	2,389	2.6

Table 2

Percentage of Ever-Married Women Aged 15–49 Years Who Have Ever Experienced Induced Abortion in India by State and by Region, National Family Health Survey 1 (1992–93) and National Family Health Survey 2 (1998–99)

State/region	National Family Health Survey 1			National Family Health Survey 2		
	Total number of women	Number of women who experienced induced abortion	% induced abortion	Total number of women	Number of women who experienced induced abortion	% induced abortion
India, Urban	23,420	1,314	5.6	23,643	1,154	4.9
India, Rural	66,286	1,450	2.2	66,661	1,236	1.9
India, Total	89,706	2,764	3.1	90,304	2,390	2.6
Northern region	10,621	436	4.1	20,750	673	3.2
Delhi	3,455	376	10.9	2,477	179	7.2
Haryana	2,846	117	4.1	2,908	59	2.0
Himachal Pradesh	2,961	110	3.7	3,012	69	2.3
Jammu and Kashmir	2,766	146	5.3	2,744	121	4.4
Punjab	2,995	110	3.7	2,796	125	4.5
Rajasthan	5,201	143	2.7	6,813	120	1.8
Central region	21,985	465	2.1	16,233	346	2.1
Madhya Pradesh	6,241	84	1.3	6,941	116	1.7
Uttar Pradesh	11,431	284	2.5	9,292	231	2.5
Eastern region	21,985	465	2.1	15,857	309	1.9
Bihar	5,949	53	0.9	7,024	38	0.5
Orissa	4,257	99	2.3	4,425	116	2.6
West Bengal	4,322	162	3.7	4,408	155	3.5
Northeastern region	3,390	183	5.4	11,015	393	3.6
Assam	882	13	1.5	1,117	11	1.0
Manipur	3,006	191	6.4	3,441	157	4.6
Meghalaya	953	54	5.7	1,435	107	7.5
Mizoram	1,137	5	0.4	945	7	0.7
Nagaland	1,045	1	0.1	1,048	5	0.5
Sikkim	1,149	6	0.5	818	29	3.5
Tripura	—	—	—	1,107	20	1.8
	1,100	61	5.5	1,104	56	5.1

State/region	National Family Health Survey 1				National Family Health Survey 2			
	Total number of women	Number of women who experienced induced abortion	% induced abortion		Total number of women	Number of women who experienced induced abortion	% induced abortion	
Western region	12,983	325	2.5		10,482	350	3.3	
Goa	3,141	191	6.1		1,246	55	4.4	
Gujarat	3,832	72	1.9		3,845	130	3.4	
Maharashtra	4,105	114	2.8		5,391	166	3.1	
Southern region	20,844	922	4.4		15,966	480	3.0	
Andhra Pradesh	4,275	72	1.7		4,032	35	0.9	
Karnataka	4,400	115	2.6		4,374	37	0.8	
Kerala	4,319	159	3.7		2,884	48	1.7	
Tamil Nadu	3,943	378	9.6		4,676	360	7.7	

Table 3

Induced Abortion Among Ever-Married Women Aged 15–49 Years in India by Selected Socioeconomic, Demographic, and Maternal Characteristics, National Family Health Survey 2 (1998–99)

Characteristic	Induced abortion		χ^2 p value	Total number of women
	%	Number		
Family size preference			<.001	
Wants equal son and daughter	2.9	1,779		60,507
Wants son more than daughter	2.0	549		27,853
Wants son less than daughter	3.1	58		1,857
Sex composition of living children			<.001	
1 child—1 son	2.6	202		7,770
1 child—no son	2.2	151		6,738
2 children—2 son	3.7	245		6,599
2 children—1 son	4.2	482		11,356
2 children—no son	2.8	104		3,671
3+ children—2+ son	2.4	722		30,017
3+ children—1 son	2.7	304		11,063
3+ children—no son	2.7	60		2,206
No living child(ren)	1.1	119		10,882
Age at effective marriage			<.001	
<18 years	2.0	1,155		57,236
18–21 years	3.4	874		25,805
22+ years	5.0	361		7,262
Type of residence			<.001	
Urban	4.9	1,154		23,643
Rural	1.9	1,236		66,661
Religion *			<.001	
Hindu	2.6	1,956		73,824
Muslim	2.1	240		11,319
Other	3.7	188		5,080
Caste/tribe ‡			<.001	
Scheduled caste	1.9	317		16,517
Scheduled tribes	1.3	101		7,863
Other backward class	2.7	799		29,722
Other castes	3.3	1,158		35,330
Wealth index §			<.001	
Lowest	1.0	160		16,569
Second	1.2	210		17,816
Middle	2.1	400		18,867
Fourth	3.0	563		18,948
Highest	5.8	1,056		18,103
Couple's education			<.001	

Characteristic	Induced abortion		χ^2 <i>p</i> value	Total number of women
	%	Number		
Both illiterate	1.1	265		24,979
Only husband literate	1.8	504		27,271
Only wife literate	3.2	88		2,781
Both literate	4.4	1,528		34,991
Couple's working status			.001	
Both not working	2.5	42		1,654
Only husband working	2.8	1,481		52,698
Only wife working	2.2	18		815
Both working	2.4	803		33,960
Mass media exposure ^{**}			<.001	
No exposure	1.1	418		37,412
Partial exposure	3.4	1,441		42,082
Full exposure	4.9	530		10,784
Autonomy ^{††}			<.001	
Low	2.0	648		32,679
Medium	2.4	679		28,024
High	3.6	1,064		29,602
Total ^{§§}	2.65	2,390		90,304

* Other religions include Christian, Sikh, Buddhist, Jain, Jewish, Zoroastrian, and others.

[†] Scheduled castes and scheduled tribes are castes and tribes that the government of India identifies as socially and economically backward and in need of special protection from social injustice and exploitation. Other castes include general caste.

[§] For assessing the economic status of the household, a wealth index has been created. The wealth index was constructed using household asset data and housing characteristics. Each household asset is assigned a weight (factor score) generated through principal components analysis, and the resulting asset scores are standardized in relation to a normal distribution with a mean of 0 and standard deviation of 1.14. Each household is then assigned a score for each asset, and the scores were summed for each household; individuals are ranked according to the score of the household in which they reside. The sample is then divided into quintiles (i.e., five groups with an equal number of individuals in each). Twenty household assets and housing characteristics include: household electrification (electricity, kerosene, gas or oil, other source of lighting), drinking water source (pipe, hand pump, well in residence/yard/plot, public tap, hand pump, well, other water source), type of toilet facility (own flush toilet, public or shared flush toilet or own pit toilet, shared or public pit toilet, no facility), type of house (pucca, semipucca, kachha), cooking fuel (electricity, liquefied natural gas, or biogas, coal, charcoal, or kerosene, other fuel), house ownership (yes, no), number of household members per sleeping room, and ownership of a car, tractor, moped/scooter/motorcycle, telephone, refrigerator, or color television, bicycle, electric fan, radio/transistor, sewing machine, black-and-white television, water pump, bullock cart or thresher, mattress, pressure cooker, chair, cot/bed, table, or clock/watch.

^{**} Mass media exposure includes regular exposure to newspaper reading, listening to radio, and watching television. Full exposure means reading newspaper at least once a week, listening to radio at least once a week, watching television at least once a week; partial exposure means either of the above three options; and no exposure means none of the above options.

^{††} Similar to the wealth index, an autonomy index has been created to determine the autonomy of the women in the household. Apart from the more commonly measured dimensions of women's status, such as education and work participation, in this study, autonomy was measured with certain direct indicators concerning women's power in the household. A set of situation-specific questions were asked to women. Each autonomy indicator is assigned a weight (factor score) generated through principal components analysis, and the resulting autonomy scores are standardized in relation to a normal distribution with a mean of 0 and standard deviation of 1. The sample is then divided into three groups (low, medium, and high), with an equal number of individuals in each group. Questions used for constructing the autonomy index include the following: (1) Are you allowed to have some money set aside that you can use as you wish? (yes, no). (2) Who makes the following decision in your household: a. What items to cook; b. Obtaining health care for yourself; c. Purchasing jewelry or other major household items; d. Your going and staying with parents or siblings. The responses for each of the above categories are Respondent, Husband, Jointly with Husband, Others in Household, Jointly with Others

in the Household). (3) Do you need permission to a. Go to the market, b. Visit relatives or friends. Response to each of the above categories is yes, no, not allowed to go.

^{§§}Number varies slightly for individual variables depending on the number of missing values.

Table 4

Unadjusted and Adjusted Odds Ratios With 95% Confidence Interval (95% CI) From Logistic Regression Analysis Showing Association Between Family Size Preference, Sex Composition of Living Children, and Induced Abortion Among Ever-Married Women Aged 15–49 Years in India and States, Controlling for Socioeconomic, Demographic, and Maternal Characteristics, National Family Health Survey 2 (1998–99; $n = 89,056$)

Predictor variable	Induced abortion							
	Unadjusted (95% CI)				Adjusted (95% CI)			
	Odds ratio	LL	UL	<i>p</i> Value	Odds ratio	LL	UL	<i>p</i> Value
Family size preference								
Wants equal son and daughter (ref)	1.00				1.00			
Wants son more than daughter	0.66	0.60	0.73	<.001	0.95	0.86	1.06	.352
Wants son less than daughter	1.07	0.82	1.39	.641	1.16	0.88	1.53	.288
Sex composition of living children								
1 child—1 son (ref)	1.00				1.00			
1 child—no son	0.86	0.69	1.06	.160	0.88	0.71	1.10	.257
2 children—2 son	1.44	1.20	1.74	<.001	1.50	1.23	1.82	<.001
2 children—1 son	1.66	1.40	1.96	<.001	1.60	1.34	1.90	<.001
2 children—no son	1.09	0.86	1.39	.477	1.07	0.84	1.38	.572
3+ children—2+ son	0.92	0.79	1.08	.322	1.37	1.16	1.62	<.001
3+ children—1 son	1.06	0.88	1.27	.537	1.33	1.10	1.60	.003
3+ children—no son	1.04	0.78	1.39	.795	1.33	0.98	1.80	.064
No living child(ren)	0.42	0.33	0.52	<.001	0.52	0.41	0.66	<.001
Age at effective marriage								
<18 years (ref)	1.00				1.00			
18–21 years	1.70	1.56	1.86	<.001	0.98	0.85	1.13	.792
22+ years	2.54	2.25	2.86	<.001	0.95	0.83	1.09	.446
Type of residence								
Rural (ref)	1.00				1.00			
Urban	2.72	2.50	2.95	<.001	1.29	1.16	1.43	<.001
Religion								
Hindu (ref)	1.00				1.00			
Muslim	0.80	0.69	0.91	.001	0.75	0.65	0.87	<.001
Other	1.41	1.21	1.65	<.001	1.04	0.87	1.24	.661
Caste/tribe								
Scheduled caste (ref)	1.00				1.00			
Scheduled tribes	0.66	0.53	0.83	<.001	0.89	0.70	1.13	.344
Other backward class	1.41	1.24	1.61	<.001	1.15	1.00	1.32	.057
Other castes	1.73	1.53	1.96	<.001	1.26	1.10	1.45	.001
Couple's education								
Both illiterate (ref)	1.00				1.00			
Only husband literate	1.76	1.51	2.04	<.001	1.24	1.06	1.45	.008

Predictor variable	Induced abortion							
	Unadjusted (95% CI)				Adjusted (95% CI)			
	Odds ratio	LL	UL	p Value	Odds ratio	LL	UL	p Value
Only wife literate	3.06	2.40	3.91	<.001	1.76	1.36	2.27	<.001
Both literate	4.26	3.74	4.86	<.001	1.70	1.45	2.01	<.001
Couple's working status								
Both not working (ref)	1.00				1.00			
Only husband working	1.14	0.83	1.55	.419	1.06	0.77	1.46	.715
Only wife working	0.90	0.51	1.57	.698	1.21	0.69	2.15	.506
Both working	0.94	0.69	1.29	.698	1.32	0.95	1.83	.099
Mass media exposure								
No exposure (ref)	1.00				1.00			
Partial exposure	3.14	2.81	3.50	<.001	1.47	1.29	1.68	<.001
Full exposure	4.58	4.02	5.21	<.001	1.38	1.16	1.64	<.001
Autonomy								
Low (ref)	1.00				1.00			
Medium	1.23	1.10	1.37	<.001	1.15	1.03	1.29	.013
High	1.84	1.67	2.03	<.001	1.20	1.08	1.34	.001
Wealth index								
Lowest (ref)	1.00				1.00			
Second	1.22	0.99	1.50	.057	1.09	0.88	1.35	.431
Middle	2.22	1.84	2.66	<.001	1.61	1.32	1.97	<.001
Fourth	3.13	2.62	3.74	<.001	1.89	1.53	2.33	<.001
Highest	6.34	5.36	7.49	<.001	3.02	2.41	3.80	<.001
State in India								
Kerala (ref)	1.00				1.00			
Andhra Pradesh	0.51	0.36	0.74	<.001	0.68	0.47	1.00	.047
Assam	2.83	2.02	3.97	<.001	5.26	3.70	7.48	<.001
Bihar	0.32	0.22	0.48	<.001	0.78	0.52	1.16	.221
Goa	2.73	1.04	7.14	.041	2.11	0.79	5.63	.136
Gujarat	2.06	1.50	2.83	<.001	2.16	1.55	3.01	<.001
Haryana	1.24	0.80	1.90	.337	1.31	0.84	2.05	.227
Himachal Pradesh	1.38	0.73	2.61	.314	1.47	0.77	2.79	.239
Jammu	2.72	1.74	4.26	<.001	3.80	2.39	6.03	<.001
Karnataka	0.51	0.34	0.77	.001	0.58	0.38	0.88	.011
Madhya Pradesh	1.00	0.72	1.39	.980	1.62	1.15	2.28	.006
Maharashtra	1.88	1.39	2.53	<.001	2.04	1.50	2.78	<.001
Manipur	4.78	2.52	9.06	<.001	5.28	2.72	10.24	<.001
Meghalaya	0.46	0.08	2.77	.395	0.72	0.12	4.47	.726
Mizoram	0.31	0.01	9.73	.502	0.30	0.01	9.51	.492
Nagaland	2.19	0.81	5.92	.122	3.03	1.07	8.57	.037
Orissa	1.60	1.13	2.26	.008	3.36	2.34	4.83	<.001
Punjab	2.76	1.95	3.91	<.001	2.34	1.62	3.37	<.001

Predictor variable	Induced abortion							
	Unadjusted (95% CI)				Adjusted (95% CI)			
	Odds ratio	LL	UL	p Value	Odds ratio	LL	UL	p Value
Rajasthan	1.06	0.75	1.50	.751	1.73	1.20	2.49	.003
Sikkim	1.07	0.10	11.76	.953	1.15	0.10	13.59	.910
Tamil Nadu	4.93	3.69	6.57	<.001	6.28	4.64	8.51	<.001
West Bengal	2.16	1.60	2.91	<.001	3.42	2.50	4.68	<.001
Uttar Pradesh	1.51	1.12	2.02	.006	2.72	2.00	3.71	<.001
Delhi	4.62	3.24	6.58	<.001	2.83	1.95	4.10	<.001
Arunachal Pradesh	0.58	0.07	5.13	.624	0.85	0.09	7.60	.884
Tripura	3.19	1.79	5.68	<.001	4.59	2.54	8.26	<.001

Ref: Reference category; Dependent variable: Induced abortion (0 = No; 1 = Yes).
 For definition of variables see Table 3.

Adjusted Odds Ratios With 95% Confidence Interval (95% CI) From Logistic Regression Analysis Showing Association Between Family Size Preference, Sex Composition of Living Children, and Induced Abortion Among Ever-Married Women Aged 15–49 in Model 1 for High Abortion States (Delhi, Punjab, and Haryana; $n = 8,023$) and Model 2 for Low Abortion States (Andhra Pradesh, Karnataka, and Kerala; $n = 11,103$), Controlling for Socioeconomic, Demographic, and Maternal Characteristics, National Family Health Survey 2 (1998–99)

Induced abortion								
Predictor variable	High abortion states Model 1 (95% CI)				Low abortion states Model 2 (95% CI)			
	Odds ratio	LL	UL	p value	Number of women	Odds ratio	LL	UL
Family size preference								
Wants equal son and daughter (ref)	1.00				5,568	1.00		
Wants son more than daughter	1.16	0.88	1.52	.299	2,370	0.97	0.54	1.76
Wants son less than daughter	1.36	0.55	3.36	.503	85	0.65	0.17	2.50
Sex composition of living children								
1 child—1 son (ref)	1.00				649	1.00		
1 child—no son	1.83	0.96	3.47	.064	489	1.30	0.53	3.20
2 children—2 son	2.71	1.55	4.72	<.001	794	1.19	0.47	3.04
2 children—1 son	2.12	1.24	3.63	.006	1,204	1.21	0.54	2.70
2 children—no son	2.61	1.32	5.17	.006	263	1.02	0.36	2.93
3+ children—2+ son	1.58	0.92	2.71	.096	2,732	1.56	0.70	3.47
3+ children—1 son	1.92	1.09	3.37	.023	1,067	1.38	0.57	3.36
3+ children—no son	2.03	0.79	5.21	.143	143	1.32	0.32	5.46
No living child(ren)	0.30	0.11	0.82	.019	682	1.24	0.52	2.97
Age at effective marriage								
<18 years (ref)	1.00				2,948	1.00		
18–21 years	0.95	0.67	1.37	.799	3,738	0.51	0.28	0.93
22+ years	1.04	0.78	1.38	.804	1,337	0.82	0.49	1.40
Type of residence								
Rural (ref)	1.00				3,981			
Urban	2.06	1.52	2.80	<.001	4,042	0.90	0.58	1.40
Religion								
Hindu (ref)	1.00				5,751	1.00		

Predictor variable	Induced abortion									
	High abortion states Model 1 (95% CI)					Low abortion states Model 2 (95% CI)				
	Odds ratio	LL	UL	p value	Number of women	Odds ratio	LL	UL	p value	Number of women
Muslim	1.09	0.58	2.04	.785	367	0.78	0.42	1.44	.425	1,647
Other	1.41	1.08	1.84	.011	1,905	1.32	0.72	2.44	.373	827
Caste/tribe										
Scheduled caste (ref)	1.00				1,781	1.00				1,729
Scheduled tribes	3.25	0.76	13.88	.112	24	7.05	2.41	20.59	.000	469
Other backward class	0.77	0.50	1.20	.251	1,454	1.86	0.78	4.44	.162	4,794
Other castes	1.06	0.76	1.48	.747	4,764	2.16	0.90	5.20	.085	4,111
Couple's education										
Both illiterate (ref)	1.00				1,374	1.00				3,018
Only husband literate	1.85	1.03	3.32	.038	1,954	1.39	0.67	2.91	.380	2,230
Only wife literate	2.47	1.05	5.79	.037	224	1.59	0.53	4.74	.406	497
Both literate	2.45	1.36	4.41	.003	4,471	1.32	0.61	2.85	.477	5,358
Couple's working status										
Both not working (ref)	1.00				130	1.00				174
Either husband or wife working	4.89	0.67	35.55	.116	6,823	0.57	0.19	1.68	.309	5,798
Both working	7.05	0.96	51.89	.055	1,070	0.69	0.22	2.11	.510	5,131
Mass media exposure										
No exposure (ref)	1.00				1,612	1.00				2,500
Partial exposure	1.54	0.92	2.56	.098	4,715	1.23	0.61	2.49	.565	6,207
Full exposure	1.33	0.75	2.35	.332	1,696	1.16	0.50	2.66	.728	2,396
Autonomy										
Low (ref)	1.00				2,528	1.00				2,937
Medium	1.44	1.05	1.98	.023	2,149	1.22	0.73	2.04	.440	3,625
High	1.33	0.99	1.77	.055	3,346	1.06	0.64	1.76	.809	4,541
Wealth index										
Lowest (ref)	1.00				42	1.00				1,377
Second	0.29	0.03	2.75	.284	230	1.24	0.34	4.46	.742	1,706
Middle	0.24	0.04	1.67	.150	956	2.75	0.88	8.61	.083	2,405
Fourth	0.37	0.06	2.40	.297	2,279	3.07	0.93	10.13	.065	3,094

Predictor variable	Induced abortion					
	High abortion states Model 1 (95% CI)			Low abortion states Model 2 (95% CI)		
	Odds ratio	LL	UL	LL	UL	Number of women
Highest	0.55	0.08	3.63	1.94	23.52	2,521

Ref. Reference category; Dependent variable: Induced abortion (0 = No; 1 = Yes).
For definition of variables see Table 3.