

## Sex composition and son preference in India and major states: Evidence from the National Family Health Survey-4 (2015-16)

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### ARTICLE INFO

#### Keywords:

Sex composition  
Son preference  
Stopping behavior  
Major states and India

### ABSTRACT

The impact of prenatal preferences and family size on the sex ratio of children in patriarchal societies like India has been a major concern for demographers and policy makers. Parents continue to bear children until they achieve their desired number of children and the desired sex composition. There is abundant empirical evidence to show a close relationship between sex preference and fertility. This paper provides pragmatic evidence from India that son preference has pronounced effects on the sex composition of children ever born at the family/micro level. We used the National Family Health Survey-4 data consisting of 455,694 ever-married mothers, aged 15–49, for this study. By assuming that the child sex ratio is a binomial distribution for a Bernoulli random variable, we considered three dependent variables for this study are ideal number of sons, actual number of sons and desired for next child. Women who had attained the highest level of education had a 56% lower preference for sons than others. As far as, regional differences are concerned, women in the northern region preferred the boy child more than those in the southern and western regions.

### 1. Introduction

A skewed sex ratio, resulting in a shortage of girls, is detrimental to the health and welfare of women as well as to the human development of India. There is a great concern about this issue for at least two reasons: First, it is widely argued that son preference is slowing the transition to lower levels of fertility. This is because women continue to bear children until the desired number of sons is reached. Second, son preference implies gender discrimination, which is manifested in a broad range of sex-selective behaviors.<sup>1–10</sup> Sex-selective rates of abortion, infanticide, sex-specific health care, and nutrition leads to sex-selective mortality and, thus, distorted sex ratios. Apart from a few exceptions, states in the northern plains and in the central upland show child sex ratios that are well above 110 males per 100 females. Ratios in south-east India reach around 105 males per 100 females. In some selected states like Kerala and Puducherry, they are almost balanced.<sup>11</sup> This uneven distribution of the sex ratio across the regions is accompanied by a similar distribution of son preference.<sup>12,13</sup>

A number of studies have examined the relationship between household wealth status and excess girls' mortality.<sup>14–16</sup> Son preference may be lower among women from poorer households because women

too are considered an economic asset in poorer households. Substantial research has been suggests a role for women's education and employment in lowering son preference.<sup>17</sup> Son preference and devaluation of girls may occur in Indian states with low economic growth, high poverty rates, low literacy rates, and lack of opportunities for women in economic and social settings. Additionally, religion, patriarchy, traditions, and culture also largely affect fertility trends and son preference.<sup>18,19</sup> There is little disagreement that individual characteristics and social norms are both important in understanding gender inequality in India. The present study contributes to the literature by focusing on son preference as an outcome of interest and by conceptualizing an individual's son preference as emerging from a complex process that is influenced by factors at different levels – the society, the household, and the individual. The objective of this paper is to analyze and understand the phenomenon of son preference in India and its major states.

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<https://doi.org/10.1016/j.cegh.2020.04.005>

Received 1 February 2020; Received in revised form 31 March 2020; Accepted 6 April 2020

Available online 18 April 2020

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## 2. Methods and materials

### 2.1. Sources of data

National Family Health Survey (NFHS)-4 data was used for this study. In the survey, 699,686 ever-married women aged 15–49 were interviewed in all 28 states and the 8 UTs.<sup>20</sup> We restricted the sample to mothers, who had ever had any children, resulting in a sample size of 455,694 ever-married women aged 15–49. For details of sampling, see IIPS and Macro International (2015-16).

## 3. Variables

### 3.1. Dependent variables

To know about the number of ideal children, the women were asked, “Would you like to have another child or would you prefer not to have any more children?” The NFHS-4 constructed the ideal proportion of sons from questions about a woman's ideal number of children and her ideal number of sons. Specifically, the women were asked “If you could go back to the time when you did not have any children and could choose the exact number of children to have in your whole life, how many would that be?” The women were also asked, “How many of these children would you like to be boys and how many would you like to be girls?” Respondents were given the option of specifying the number of boys, the number of girls, and the number of children of “either” sex they wanted. The question related with desire for another children was also analyzed by actual sex composition of children.

### 3.2. Other background variables

- (1) **Mother's education:** No education, primary (1–5 years), secondary (6–10 years), higher (11 or more years of schooling).
- (2) **Caste:** Scheduled caste/scheduled tribe (SC/ST), other backward caste (OBC), and other (socio-economically advanced castes).
- (3) **Residence:** Household classified as being in an urban or rural area
- (4) **Religion:** Hindu, Muslim, other
- (5) **Regions:** Household classified as being in one of six geographic regions (see NFHS-4 final report for states in each region, and IIPS and Macro International, 2015-16).
- (6) **Wealth Index:** The index was generated through a principal component analysis of 33 household assets and housing characteristics (IIPS and Macro International, 2015–2016)
- (7) **Mother's Age:** < 20, 20–24, 25–29, 30–34, 35–39, 40–44 and 45–49
- (8) **Family size:** Numbers of living children in the family

### 3.3. Statistical analysis

It is assumed that a child's sex has a binomial distribution and is a Bernoulli random variable, which takes the value 1 if the sex of the child is male (mean ideal sons > .55) and 0 if otherwise (mean ideal sons ≤ .55) in this method. Each female in a family has Ni children (which shows her number of trials) in family i. There are Zi sons in family i. The ideal proportion of sons is similar to the model's actual proportion of sons, where “ideal Zi” may be the ideal probability of sons without controlling the family size.<sup>21</sup>

The ideal probability of having sons is:

$$\text{Logit (Ideal Zi)} = \sum \alpha_j \text{Age}_i + \alpha_7 \text{Education} + \alpha_8 \text{Caste} + \alpha_9 \text{Tribe} + \alpha_{10} \text{Urban} + \alpha_{11} \text{Wealth} + \alpha_{11} \text{Regions} + \alpha_{12} \text{Religions} \dots \dots \quad (1)$$

For the second dependent variable, the desire for another child had three categories (not wanted, wanted and undecided) and multinomial model was used keeping not wanting any children as reference category.

**Table 1**  
Selected characteristics of households and women (=476,619) of India by NFHS-4.

Independent Variables	%
Mother's age (mean)	30.0
<b>Education</b>	
No education	27.5
Primary	12.5
Secondary	47.3
Higher	12.8
<b>Caste</b>	
Scheduled caste	21.2
Scheduled tribe	09.5
OBC	45.2
None of them	24.1
<b>Residence</b>	
Urban	34.6
Rural	65.4
<b>Religion</b>	
Hindu	81.6
Muslim	13.8
Christian	2.3
Other religion	3.3
<b>Regions</b>	
North	13.6
Central	23.7
East	22.1
North-east	3.5
West	14.4
South	22.8
<b>Wealth Index</b>	
Poorest	17.7
Poorer	19.6
Middle	20.6
Richer	21.2
Richest	21.0
<hr/>	
Dependent Variables	
<b>Actual children (mean)</b>	
Total children ever born	2.7
Total sons ever born	1.7
Total daughters ever born	1.6
The actual proportion of sons	0.52
The actual proportion of daughter	0.48
<b>Ideal children (mean)</b>	
<b>Total ideal children</b>	2.3
Total ideal sons	1.3
Total ideal daughters	1.1
Total ideal either son or daughter	1.7
The ideal proportion of sons	0.55
The ideal proportion of daughter	0.45

## 4. Results

Table 1 shows the characteristics of sampled households and women. Around 27.5% of the women in the sample had never attended school. Nearly three-quarters of the women lived in rural areas. The majority of the women (81.6%) were Hindu; approximately 13.8% were Muslim. About 10% of the women in this sample belonged to one of the scheduled tribes. One-fourth (23.8%) of the sample lived in the southern region, one-fourth (22.1%) in the eastern region, and the lowest (3%) in the north-eastern region. On average, the women included in the analysis had a total of 2.7 children and 1.6 sons. Hence, the overall proportion of sons was 0.52. The ideal number of children desired by women was 2.3 and desired son is 1.3.

Table 2 shows the odds ratios for characteristics of women who want a high proportion of sons. Panel 1 of Table 2 includes the sample of all mothers. Panel 2 is restricted to mothers who have completed their families. An odds ratio below 1 suggests that women with a given characteristics have a lower ideal proportion of sons; an odds ratio above 1 suggests that they have a higher ideal proportion. Among

**Table 2**

Multivariate logistic regression estimates show the effects of family size and socioeconomic characteristics on sex composition of children (ideal proportion of sons) of India by NFHS-4.

Background Characteristics	All Families (437705)			Background Characteristics	Completed Families (320734)		
	Odds	P-value	[95% CI]		Odds	P-value	[95% CI]
<b>Family size</b>				<b>Family size</b>			
One*	1.00	–		One*	1.00	–	
Two	0.89	0.000	[0.87–0.91]	Two	0.44	0.000	[0.42–0.45]
3+	2.14	0.000	[2.09–2.19]	3+	1.5	0.000	[1.45–1.55]
<b>Education</b>				<b>Education</b>			
No Education*	1.00			No Education*	1.00		
Primary	0.77	0.000	[0.76–0.79]	Primary	0.79	0.000	[0.77–0.81]
Secondary	0.66	0.000	[0.64–0.67]	Secondary	0.69	0.000	[0.67–0.70]
Higher	0.57	0.000	[0.55–0.59]	Higher	0.63	0.000	[0.6–0.66]
<b>Residence</b>				<b>Residence</b>			
Urban*	1.00			Urban*	1.00		
Rural	1.10	0.000	[1.08–1.12]	Rural	1.11	0.000	[1.09–1.14]
<b>Regions</b>				<b>Regions</b>			
North*	1.00			North*	1.00		
Central	1.58	0.000	[1.55–1.62]	Central	1.57	0.000	[1.53–1.61]
East	1.65	0.000	[1.61–1.69]	East	1.62	0.000	[1.57–1.66]
North-east	1.32	0.000	[1.28–1.36]	Northeast	1.23	0.000	[1.18–1.28]
West	0.81	0.000	[0.78–0.83]	West	0.84	0.000	[0.81–0.87]
South	0.94	0.000	[0.91–0.97]	South	0.94	0.000	[0.9–0.97]
<b>Age</b>				<b>Age</b>			
> 20*	1.00			> 20*	1.00		
20–24	1.09	0.03	[1.01–1.17]	20–24	1.02	0.81	[0.85–1.23]
25–29	1.08	0.05	[1.00–1.16]	25–29	1.14	0.15	[0.95–1.37]
30–34	1.03	0.42	[0.96–1.11]	30–34	1.16	0.12	[0.97–1.39]
35–39	1.06	0.16	[0.98–1.14]	35–39	1.18	0.07	[0.99–1.42]
40–44	1.09	0.02	[1.01–1.18]	40–44	1.21	0.04	[1.01–1.45]
45–49	1.12	0.000	[1.04–1.21]	45–49	1.24	0.02	[1.03–1.48]
<b>Religion</b>				<b>Religion</b>			
Hindi*	1.00			Hindi*	1.00		
Muslim	1.33	0.000	[1.30–1.37]	Muslim	1.16	0.000	[1.13–1.20]
Christian	1.25	0.000	[1.20–1.30]	Christian	1.17	0.000	[1.12–1.23]
Others	0.93	0.000	[0.89–0.96]	Others	0.86	0.000	[0.82–0.90]
<b>Wealth</b>				<b>Wealth</b>			
Poorest*	1.00			Poorest*	1.00		
Poorer	0.88	0.000	[0.86–0.89]	Poorer	0.91	0.000	[0.88–0.93]
Middle	0.79	0.000	[0.70–0.81]	Middle	0.83	0.000	[0.80–0.85]
Richer	0.76	0.000	[0.74–0.78]	Richer	0.81	0.000	[0.78–0.84]
Richest	0.67	0.000	[0.65–0.69]	Richest	0.72	0.000	[0.69–0.75]
<b>Caste</b>				<b>Caste</b>			
SC*	1.00			SC*	1.00		
ST	0.92	0.000	[0.90–0.94]	ST	0.90	0.000	[0.87–0.93]
OBC	1.05	0.000	[1.03–1.08]	OBC	1.08	0.000	[1.06–1.11]
Others	0.88	0.000	[0.86–0.91]	Others	0.92	0.000	[0.90–0.95]

Note: \*indicates reference category \*\*\* $p < 0.001$ ; \*\* $p < 0.01$  and \* $p < 0.05$ .

women with the highest level of education, the odds of wanting sons are 43% lower than among women with no schooling. Women who belong to the Scheduled Tribes want a significantly lower desire for sons. Rural women want a higher proportion of sons than urban women. Muslim women want significantly more sons than Hindu women. Finally, women living in southern and western India want fewer sons than women living in all the other regions. These findings suggest that son preference has not changed significantly across cohorts. The main difference between all families (panel 1) and complete families (couples who either are sterilized or who state that they do not want any more children; panel 2) is that age is not a significant predictor of the proportion of sons for women who have completed their families. In panel 1, mother's age has a significant and positive relationship with the proportion of sons. This finding is not surprising because older women will have had a longer time to practice different stopping behavior, whereas younger women may still be trying to have their desired number of sons. The findings presented in Table 3 show that actual sex composition, found to be an important indicator for gender bias in composition of children. The women living in the northern and central regions want a slightly higher proportion of sons. There is a little evidence of systematic under-reporting of female births, biological

determinants, or sex-selective abortion. Table 3 shows that characteristics of women who want a high proportion of sons and characteristics of those who have a high proportion of sons are not similar. A woman may have a strong son preference, but she may not achieve this goal.

In Table 4, an odds ratio below 1 suggests that women in a given state have a lower son preference, and an odds ratio above 1 suggests that they have a higher son preference. In this table, we have taken Kerala as a reference category. All the states show odds ratios more than one, meaning a higher ideal proportion of sons than in Kerala, with the ratios being highly statistically significant except Himachal Pradesh.

In Table 5, the percentage of women experiencing fertility desires for the next child based on the sex composition of their living children shows that only 23% of the women want more children. The scenario is the same for all the major states. At the country level, 26% of the women with the child sex combination of 0 sons and 2 daughters want more children; the same pattern is seen in the case of women with the sex combination 0 sons and 3 daughters. This means that all these are women who probably have a desire for a male child (Table 6). For the sex combination 0 sons and 2 daughters, Bihar tops the list of states in terms of women who want more children (63%), followed by Rajasthan and Uttar Pradesh. In south India, only around 7–8% women with this

**Table 3**

Multivariate logistic regression estimates show the effects of socioeconomic characteristics on the actual sex composition of children ever born (actual proportion of sons) (N = 476,619).

Background Characteristics	Odds	P-value	[95% Confidence Interval]
<b>Mother's Age</b>			
< 20*	1.00	— —	
20–24	0.79	0.000	[0.75–0.84]
25–29	0.71	0.000	[0.67–0.75]
30–34	0.70	0.000	[0.66–0.74]
35–39	0.73	0.000	[0.69–0.77]
40–44	0.79	0.000	[0.75–0.83]
45–49	0.84	0.000	[0.80–0.89]
<b>Education</b>			
No school*	1.00	— —	
Primary	0.93	0.000	[0.91–0.094]
Secondary	0.86	0.000	[0.85–0.87]
Higher	0.86	0.000	[0.84–0.88]
<b>Caste/tribes</b>			
Scheduled caste *	1.00	— —	
Scheduled tribe	0.98	0.080	[0.96–1.00]
OBC	1.00	0.770	[0.98–1.01]
Others	0.98	0.080	[0.96–1.00]
<b>Residence</b>			
Urban *	1.00	— —	
Rural	1.03	0.000	[1.01–1.04]
<b>Religion</b>			
Hindu *	1.00	— —	
Muslim	1.03	0.000	[1.01–1.05]
Christian	0.98	0.140	[0.95–1.01]
Other religion	0.99	0.320	[0.96–1.01]
<b>Geographic Region</b>			
North *	1.00	— —	
Central	1.01	0.520	[0.99–1.02]
East	0.98	0.030	[0.96–1.00]
North-east	0.99	0.570	[0.97–1.02]
West	0.95	0.000	[0.93–0.97]
South	0.84	0.000	[0.83–0.86]
<b>Wealth Quintile</b>			
Poorest *	1.00	— —	
Poorer	1.05	0.000	[1.03–1.07]
Middle	1.06	0.000	[1.04–1.08]
Richer	1.06	0.000	[1.03–1.08]
Richest	1.09	0.000	[1.06–1.12]

\*indicates reference category \*\*\*p < 0.001; \*\*p < 0.01 and \*p < 0.05.

**Table 4**

Multivariate logistic regression estimates show the effects of states on the ideal sex composition of children ever born ideal proportion of sons for all family (n = 330,392) and completed family (n = 248,633) by NFHS-4, 2015-16.

States (n = 330,392)	Odds	P-value	States (n = 248,633)	Odds	P-value
Kerala*	1.00	—	Kerala*	1.00	—
Andhra Pradesh	1.02	0.76	Andhra Pradesh	1.03	0.62
Bihar	7.10	0.00	Bihar	7.36	0.00
Gujarat	1.59	0.00	Gujarat	1.73	0.00
Haryana	1.66	0.00	Haryana	1.81	0.00
Himachal Pradesh	0.60	0.00	Himachal Pradesh	0.65	0.00
Jammu and Kashmir	3.03	0.00	Jammu And Kashmir	2.95	0.00
Karnataka	1.38	0.00	Karnataka	1.38	0.00
Madhya Pradesh	2.51	0.00	Madhya Pradesh	2.66	0.00
Maharashtra	1.20	0.00	Maharashtra	1.31	0.00
Odisha	1.93	0.00	Odisha	2.22	0.00
Punjab	1.00	0.97	Punjab	1.15	0.01
Rajasthan	2.44	0.00	Rajasthan	2.61	0.00
Tamil Nadu	2.09	0.00	Tamil Nadu	2.13	0.00
Uttar Pradesh	4.98	0.00	Uttar Pradesh	5.32	0.00
West Bengal	1.32	0.00	West Bengal	1.47	0.00

**Note:** \*indicates reference category \*\*\*p < 0.001; \*\*p < 0.01 and \*p < 0.05.

**Table 5**

Percentage of women experiencing fertility desires for next child based on the sex composition of their living children by NFHS-4, 2015-16.

India	Wanted	No More	Undecided	Sample size
0 sons & 0 daughters	78.3	16.5	5.3	57,099
1 sons & 0 daughters	47.9	47.0	5.1	58,123
0 sons & 1 daughters	59.2	35.3	5.5	44,210
2 sons & 0 daughters	4.7	93.7	1.5	55,051
3 sons & 0 daughters	2.5	96.3	1.2	12,105
4 sons & 0 daughters	2.1	96.2	1.7	2306
2 sons & 2 daughters	0.9	98.0	1.1	19,264
3 sons & 1 daughters	0.9	97.5	1.6	9254
1 sons & 3 daughters	3.3	95.2	1.5	13,579
0 sons & 2 daughters	25.6	70.4	4.0	26,678
0 sons & 3 daughters	23.8	72.4	3.9	8026
0 sons & 4 daughters	23.4	73.6	3.1	2411
Total	36.2	60.1	3.7	308107

**Note:** Wanted: wants within 2 years, wants after 2+ years and wants unsure timing and No More: wants no more, sterilized (respondent or partner) and declared infecund.

sex combination want more children (Fig. 1).

**5. Discussion**

Son preference varies with the educational level of women and their religion, caste, income, and economic background in India. Similar to our findings, other studies have also emphasized the role of education in reducing the son preference in women.<sup>22,23</sup> In caste terms, Scheduled Tribe women have a lower desire for sons as compared to women from other castes. This may be due to the higher gender egalitarian norms among tribal communities in India. When making a region-wise comparison, women from the northern region prefer boy children more than those from the southern and western regions, which is a major reason why in states like Punjab and Haryana, the proportion of sons are higher as compared to other southern states like Kerala. It is observed from the NFHS-4 data that women who are economically disadvantaged irrespective of their religion (whether Hindu or Muslim) want the highest proportion of sons.

Besides region, cultural and religious values play a role in determining the social and gender norms, which in turn influence son preference. In Hinduism, the major religion in India, sons are crucial. Among Hindus, a dead parent's soul can attain heaven only if that person has a son to light the funeral pyre, and salvation can be achieved through sons who offer ancestral worship.<sup>24</sup> Girls and women do have some importance, such as giving away a daughter in marriage (Kanyadaan) is considered meritorious.<sup>25</sup> Studies suggest that son preference also exists among other religious groups such as the Sikhs<sup>26,27</sup> and the Muslims<sup>28</sup> Nasir and Kalla 2006.<sup>2</sup>

We found that women who stop with two children have 57% sons on average, whereas women who stop with 3 or more children have only 50% sons. This implies that large-sized families have a relatively lower desire for sons. Women are not able to always attain their preferred sex composition; it is a matter of luck for those who are able to do so. Social factors like the custom of dowry, the practice of considering the male child as the bread winner of the family, as “gharkachirag” and as “budhapekasahara,” and the practice of considering the girl child as “paraayadhan” need to be changed. Property ownership rights in the family are given to men. There is an absence of autonomy of women in household decisions. The gender bias against women in the nutritional intake, education, and medical treatment also been exhibited in many studies in India.

This paper emphasizes the need for the gender budgeting in implement policies. Gender budgeting can be an effective approach to bridge gender inequalities in all spheres of life and contribute to inclusive and sustainable development. Women's education plays a very

**Table 6**

Multinomial analyses showing relative risk (RR) of the effects of different factors on the chances of women experiencing an additional child birth in major states of India by NFHS-4, 2015-16.

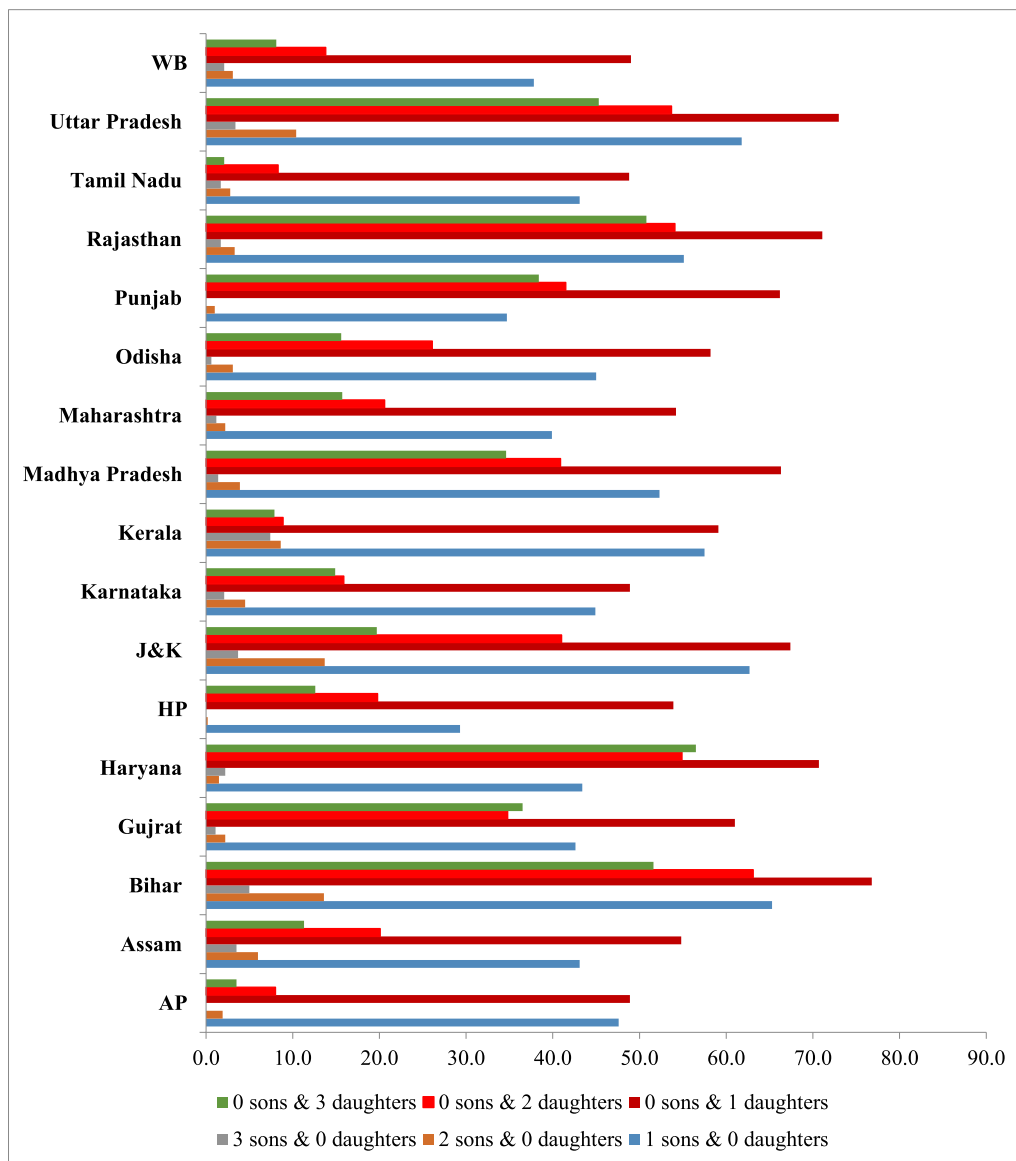
Yes	Wanted			Undecided		
	RR	P-value	[95% CI]	RR	P-value	[95% CI]
<b>Education</b>						
No Education*	1.00	–	–	1.00	–	–
Primary	0.88	0.00	[0.83–0.92]	0.89	0.02	[0.81–0.98]
Secondary	0.95	0.02	[0.91–0.99]	1.03	0.39	[0.96–1.12]
Higher	1.33	0.00	[1.25–1.41]	1.63	0.00	[1.47–1.82]
<b>Regions</b>						
North *	1.00	–	–	1.00	–	–
Central	1.11	0.00	[1.06–1.16]	0.68	0.00	[0.62–0.73]
East	0.88	0.00	[0.84–0.93]	0.67	0.00	[0.61–0.73]
North-east	0.88	0.00	[0.82–0.94]	3.07	0.00	[2.79–3.38]
West	0.80	0.00	[0.76–0.85]	0.57	0.00	[0.51–0.63]
South	0.74	0.00	[0.71–0.78]	0.77	0.00	[0.71–0.85]
<b>Sex Combinations</b>						
0 sons & 0 daughters*	1.00	–	–	1.00	–	–
1 sons & 0 daughters	0.42	0.42	[0.05–3.41]	0.13	0.13	[0.01–1.82]
0 sons & 1 daughters	0.72	0.76	[0.09–5.87]	0.18	0.21	[0.01–2.57]
2 sons & 0 daughters	0.17	0.13	[0.02–1.64]	0.08	0.09	[0.00–1.51]
3 sons & 0 daughters	0.02	0.03	[0.00–0.70]	0.09	0.29	[0.00–7.75]
4 sons & 0 daughters	0.02	0.04	[0.00–0.82]	0.07	0.24	[0.00–6.08]
2 sons & 2 daughters	0.01	0.01	[0.00–0.24]	0.08	0.28	[0.00–7.33]
3 sons & 1 daughters	0.01	0.01	[0.00–0.29]	0.10	0.31	[0.00–8.73]
1 sons & 3 daughters	0.04	0.07	[0.00–1.23]	0.13	0.36	[0.00–10.97]
0 sons & 2 daughters	1.62	0.67	[0.17–15.40]	0.30	0.42	[0.02–5.61]
0 sons & 3 daughters	0.32	0.53	[0.01–10.65]	0.41	0.7	[0.00–35.80]
0 sons & 4 daughters	0.400	0.61	[0.01–13.32]	0.42	0.71	[0.00–36.74]
<b>Family size</b>						
One*	1.00	–	–	1.00	–	–
Two	0.14	0.02	[0.03–0.76]	0.30	0.39	[0.02–4.65]
Three/max	0.75	0.88	[0.02–28.15]	0.23	0.55	[0.00–25.54]
<b>Age-Group</b>						
> 20*	1.00	–	–	1.00	–	–
20–24	0.65	0.00	[0.59–0.72]	0.71	0.00	[0.60–0.84]
25–29	0.39	0.00	[0.35–0.43]	0.50	0.00	[0.42–0.59]
30–34	0.18	0.00	[0.16–0.20]	0.31	0.00	[0.26–0.37]
35–39	0.07	0.00	[0.06–0.07]	0.16	0.00	[0.13–0.19]
40–44	0.02	0.00	[0.02–0.02]	0.09	0.00	[0.07–0.11]
45–49	0.01	0.00	[0.00–0.01]	0.07	0.00	[0.06–0.09]
<b>Religion</b>						
Hindu*	1.00	–	–	1.00	–	–
Muslim	2.35	0.00	[2.24–2.47]	2.22	0.00	[2.05–2.40]
Christian	1.35	0.00	[1.20–1.51]	1.29	0.01	[1.07–1.55]
Others	0.87	0.00	[0.81–0.94]	0.75	0.00	[0.64–0.87]
<b>Tribes</b>						
SCs*	1.00	–	–	1.00	–	–
STs	1.06	0.04	[1.00–1.12]	1.21	0.00	[1.10–1.34]
OBCs	0.96	0.03	[0.92–0.99]	0.96	0.31	[0.89–1.04]
Others	0.76	0.00	[0.73–0.80]	0.96	0.32	[0.88–1.04]
<b>Wealth</b>						
Poorest*	1.00	–	–	1.00	–	–
Poorer	0.77	0.00	[0.74–0.81]	0.84	0.00	[0.77–0.91]
Middle	0.69	0.00	[0.65–0.72]	0.81	0.00	[0.74–0.89]
Richer	0.70	0.00	[0.66–0.74]	0.78	0.00	[0.70–0.86]
Richest	0.69	0.00	[0.65–0.74]	0.69	0.00	[0.61–0.78]
<b>Residence</b>						
Urban*	1.00	–	–	1.00	–	–
Rural	1.11	0	[1.07–1.15]	1.00	0.93	[0.94–1.07]

Note: want no more: reference category, \*indicates reference category \*\*\*p < 0.001; \*\*p < 0.01 and \*p < 0.05.

important role in determining gender preferences; so more care and policy programs should be implemented by the government in this sphere. Several social awareness programs are needed by the government to change the perspective towards the girl child and the preference for the boy child in the society. The practice of regarding women as the weaker sex also needs to be changed to reduce the preference for sons.

## 6. Conclusion

Son preference plays an important role in shaping the gender distribution of the population. Economic conditions and educational attainment is an important factor influencing the desire for more sons. Cultural values, religious practices, and a strong patriarchal social structure force women or families to seek sex-selective abortion or to practice discrimination against the girl child. The problem of skewed sex ratio is a result of an entire spectrum of gender issues in the society.



**WB:** West Bengal, **J&K:** Jammu & Kashmir **HP:** Himachal Pradesh, **AP:** Andhra Pradesh

**Fig. 1.** Percentage of women experiencing fertility desires for next child based on the selected sex composition of their living children in major states of India by 2015–16 (NFHS-4)

**WB:** West Bengal, **J&K:** Jammu & Kashmir **HP:** Himachal Pradesh, **AP:** Andhra Pradesh.

More gender sensitive policies at all levels (such as more educational and working opportunities for women) may improve the value of the girl child. At the same time, culturally sensitive interventions are also needed in regions/communities which depict a strong son preference.

**6.1. Policy implication**

There is a need to review programs and social interventions aimed at reducing the gender gap in child and adolescent mortality and develop a strategic plan for effective implementation and monitoring of all integrated interventions. The PCPNDT Act is a well-intentioned piece of social legislation that strengthens the practice of medical ethics by providing a legal incentive for the Indian physicians to uphold their obligations. While the PCPNDT Act succeeds in acknowledging and drawing attention to a grave societal problem, its failure to curb female selective abortion can't be overlooked. There is a need to develop a mechanism for real-time monitoring of pregnancy without affecting access to abortion services to women who have an unintended

pregnancy.

**Ethical approval**

The study used data sets that are available in the public domain; thus, there was no requirement to seek ethical consent.

**Author's contribution**

AKY and AA contributed in conceptualizing the study. AKY, AA, RAS and SJ were responsible for the analysis. All authors contributed to the interpretation of the data, and critically revised all versions of the manuscript and approved the final version.

**Availability of data and materials**

Secondly data-based study.

## Funding

No funding available.

## Declaration of competing interest

None declared.

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