ORIGINAL ARTICLE

Predictors of third and Higher order births in India

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Abstract	Introduction	Methodology	Results	Conclusion	References	Citation	Tables / Figures

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Citation

Article Cycle

Abstract

Background: Total fertility rate (TFR) reflecting population growth is closely related to higher order parity progression. Many Indian states reached replacement level of TFR, but still states constituting nearly 40% population are with TFR ≥ 3. The predictors are the desire of son's, poor contraceptives practices, younger age at marriage, child loss and shorter birth spacing. **Objective:** This analysis assessed the degree of relation of 3rd and higher order parity progression with the above mentioned predictors. **Material and Methods**: State/Union Territories wise proportions of women: progressing to ≥3 births, more sons desire, birth spacing <24 months, adopting modern contraception and median marriage age <18 years along with infant mortality rate (IMR) were taken from NFHS-III report. Correlation matrix and stepwise forward multiple regression carried. Significance was seen at 5%. **Results:** Hindi speaking states constituting 38.92% nation population recorded TFR ≥3. Positive correlation of mothers progressing ≥ 3 births was highest (0.746) with those desiring more sons followed by IMR (0.445); while maximum negative correlation with those practicing modern contraceptives (-0.565) followed by median age at marriage (-0.391). Multiple regression analysis in order identified desire of more sons, practicing modern contraception and shorter birth spacing as the significant predictors and jointly explained 77.9% of the total variation with gain of 15.5% by adding modern contraceptive practice and 8.3% by adding shorter birth spacing. **Conclusions:** Desire of more sons appeared the most important predictor to progress ≥3 births that is governed by society culture and educational attainment, require attitudinal change. Further, mothers need motivation to practice both spacing and terminal methods once family is complete.

Key Words

Fertility rate; Parity Progression; Contraceptive; Correlation; NFHS

Introduction

Total fertility rate (TFR), defined as the total expected births to a couple in the whole reproductive span of life experiencing current fertility rate, is a standardized measure of fertility; higher is the TFR higher is the parity progression (r2 = 0.902; based on NFHS-III data reports of states). India was the first country to launch family planning (FP) program in 1952, still observing higher TFR; though continuously declining TFR but at slower rate. NFHS surveys reported reduction from 3.36 during NFHS-I to 2.84 during NFHS-II and further to 2.66 during NFHS-III. The TFR of NFHS-III indicated much higher fertility rate to arrive at replacement level (just over two children per woman). Urban areas though have reached the replacement level but constitute only about 30% of the population, while in rest 70% rural areas it is still as high as 2.96. A wide range of variation in TFR by states recorded (NFHS-III); ranging from 1.8 in Goa, Andhra Pradesh and Tamil Nadu to 4.0 in Bihar. Besides Bihar; Uttar Pradesh, Rajasthan and Madhya Pradesh in north,

Jharkhand in the east and Arunachal Pradesh, Meghalaya, and Nagaland in the northeast had TFRs 3.0 and above. Only in western and southern states with exception in Gujarat (TFR = 2.4), TFR is near or below the replacement level. Delhi, Himachal Pradesh, Punjab and Sikkim have also attained replacement level fertility. The states with high TFR (3.00 and above) constituting about 40% of the population. Out of these, major states are Hindi speaking states e.g. Uttar Pradesh, Bihar, Madhya Pradesh and Rajasthan including Jharkhand. With the present level of TFR, the goal targeted by National Population Policy - 2000 will be a dream for the nation. To achieve the TFR at replacement level, a concentrated effort is required in states with high TFR level. As stated above, higher TFR is mainly due to higher order parity progression i.e. 3rd or beyond and mainly affecting factors are desire of sons (sex preference), lower marriage age, poor contraceptives practices either spacing or terminal methods, giving frequent births with low spacing (below 24 months) and having loss of child, especially during infancy or childhood, though these are also interrelated and governed by the prevailing culture (1,2,3,4,5,6,7,8). These mentioned affecting factors responsible for higher order parity progression can only be modified through intensified information, education and communication (IEC) activities giving lesson of consequential effects of early age of marriage, shorter spacing between births, larger family size and then how these can reduce IMR along with benefits of contraceptive practices of spacing followed by terminal methods. Successful intervention is the only tool to get reduction in parity progression; resulting to decreased TFR to reaching the replacement level. It is evident that greater attention is required in the states (Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan and Jharkhand) that constitute 38.34% population. The most important dimension of intervention is that one has to identify the most feasible one or two factors that can have largest impact on TFR reduction or in other words parity progression. And hence, for the purpose of intervention it is imperative to know the extent of contribution of the affecting factors separately and jointly as well, so as the maximum reduction in proportion of mothers moving to higher order parity is achieved.

Aims & Objectives

In view of the above fact, the present analysis was carried with the following objectives:
1. To assess the relation of higher order parity progression with marriage age, desire of more sons, practice of any modern methods (terminal and spacing), birth spacing and IMR.
2. To assess the extent of joint effect of significantly contributing factors to higher order parity progression

Material and Methods

The state wise information on the following variables from NFHS-III survey report was extracted:
1. Proportion of women progressing to ≥ 3rd order parity
2. Proportion of women having desire of more sons
3. Proportion of eligible couples adopting modern method of contraception
4. Proportion of women giving birth with spacing below 24 months
5. Median age at marriage
6. Infant mortality rate

The proportion of women progressing to 3rd or higher order parity was treated as outcome and rest as the predictors. Firstly, Pearson correlation coefficient of outcome variable with all the predictors was obtained, and then step forward multiple regression analysis was carried to identify the significantly contributing predictors along with their joint effect on the outcome. Statistical significance was seen at $p < 0.05$.

Results

As shown in Table 1, states with TFR to replacement level (2.22) or below constitute 35.91%, between 2.23-2.49 about one fifth and much higher TFR (3 or more) 38.92% of the country population. About two fifth of the country population, especially Sikkim Arunachal Pradesh, Madhya Pradesh, Rajasthan, Jharkhand, Nagaland, Uttar Pradesh, Bihar and Meghalaya need special attention to reduce TFR.

Table 2 indicating simple correlation coefficient reveals that only four predictors out of five e.g. mothers desiring more sons, eligible couples adopting modern method of contraception, lower marriage age and infant mortality are significantly correlated to mothers progressing 3rd or higher order birth. Mothers desiring more sons and high infant mortality rate were positively correlated, while eligible couples adopting modern method of

contraception and marrying at lower age showed negative correlation. The highest positive correlation coefficient of mothers progressing 3rd or higher order birth was 0.746 with those showing desire of more sons followed by infant mortality rates (0.445). While maximum negative correlation was seen with eligible couple's adopting modern method of contraception (-0.565) followed by age at marriage (-0.391). The significant negative correlation between the predictors was found only between infant mortality and median marriage age (-0.658); more were the mothers with lower marriage age higher was the infant mortality. (Table 3)

In the step forward multiple regression analysis, desire of more sons emerged as the first important factor to predict the mothers proceeding 3rd and higher order birth. The state wise variation in mothers proceeding 3rd and higher order birth explained was more than fifty percent (54.1%) through the proportion of mothers having desire of more sons. The next operating factor was eligible couples adopting modern method of contraception that contributed additional 15.5% to explain the variation (a total combined 69.6% variation explained). The third factor added was marriage age explaining 8.3% of the variation (a total combined 69.6% variation explained). Rest of the factors e.g. females giving birth with spacing below 24 months and infant mortality rate did not emerged to contribute significantly to explain the variation to mothers moving 3rd and higher order births.

Discussion

India was the first country to introduce family planning programme in 1952 to population control, but could not contribute substantially due to poor awareness, poor socio economic condition, prevailing social and cultural values of son preference and moreover higher IMR and MMR and women had higher order parity progression. Population policy 2000 documented the target of TFR to the level of replacement (2.1) by the year 2010; but as figured in three round NFHS surveys, a continuous decline from 3.36 in NFHS-I to 2.84 in NFHS-II and further to 2.66 in NFHS-III was observed, but still much higher than the replacement level with a wide range of variation between states. Recent third round NFHS survey indicated some states reached even below replacement level, some near to it but some even more than 3 and these are almost all Hindi speaking states and constitute more than one third of the populations. As such targeted effort is the present need to stop higher order pregnancies so as TFR reaches to the replacement level. The parity progression showed very high positive correlation with desire of more sons (r = 0.744) followed by infant mortality (r = 0.445); negative correlation with eligible couples adopting modern method of contraception (r = -0.565) and age at marriage (r = -0.391) indicating that these can bring major reduction in TFR if modified. The marriage age and IMR showed high negative correlation (r = -0.658), means higher IMR was found in those states where more marriages below 18 years were taking place. Multiple step-forward regression analysis was carried that indicates the characteristics entered in order with their contribution to explain the variation of observed parity progression to 3rd and higher order. As evident by the values of multiple correlation coefficients, these in order along with added contribution were desire of more sons (R^2 = 0.541), eligible couples adopting modern method of contraception (R^2 = 0.696), median age at marriage below 18 years (R^2 = 0.779). It is evident from this analysis that son preference is the most important factor to decide the parity progression. Study carried in 2012 has also reported that at any given parity, the last-born child of women who had stopped childbearing was more likely to be a son than a daughter indicating desire for sons appears to be a significant motivation for parity progression (1). Women with both sons and daughters but more sons are more likely to be modern FP users than nonusers as compared to women with both sons and daughters but more daughters (2). Practice of sterilization that is a measure to discontinue the child bearing process is influenced by son preference. The son preference is not similar throughout the country, as evident by the study carried in 2002 that states gender preference effects on contraception are the strongest in the western region followed by the northern and north central regions and lowest in the south followed by eastern regions. The variation of son preference by region is clearly the reflection of regional culture (3). Not only son preference, sterilization in the Indian family planning programme is largely determined by the socioeconomic conditions (4). The son preference to stop further child bearing process is reflected as at parities lower than three, the predicted probability of sterilization is higher for women with at least one son than for those with only daughters (5), but

tubectomy was the preferred one. Now encouraging observation is that 46% men expressed the need for involvement of men in Reproductive Health (6). Reduction in IMR associated positively with parity progression is an essential component to reduce; though, IMR is greatly influenced by female literacy, female labour force participation rates, urbanization and some socio-cultural variables e.g. poverty, percentage of SC/STs, but can be reduced through accelerating the immunization program; this will not only reduce TFR rather will directly increase the birth spacing and will also benefit both mother and child to their better health (7,8). Similar findings had also been reported by various researchers. One of the study from Manipur following logistic regression analysis indicated that at each age couples' desire of number of son ($\beta=1.37$, $P<0.01$) had significantly positive and sex of second live birth ($\beta= -0.60$, $P<0.05$) had significantly negative impact on the third birth transition (9). Another study from Manipur based on binary logistic regression analysis on the transition of third birth identified five predictors: type of family, education of wife, age at marriage, couple's desire number of son and sex of previous child; but reported highly significant associated risk of 74% to each increment in the couple's desire number of son ($P<0.01$, $OR=1.74$ 95%CI: 1.42-2.143) (10). Study from Delhi on Gujjars based on multiple regression analysis revealed age of the woman, ideal number of children, desired number of sons and infant mortality were the responsible for increasing fertility (a positive correlation); while woman's age at marriage, use of birth control methods and woman's education had reducing effect on woman's fertility (11). Ethiopian study reported highest fertility level in one of the districts called Butajira in the country, the reason stated was that community is desirous of large family size so as children can assist parents in their subsistence farming and care of them in old age (12). Mathematically with half of the probability of being male birth, 25% women giving two live births will have no son and obviously these will move to third order birth.

Conclusion

Thus, it seems desire of son or more sons than daughter is the predominating factor to progress to third and higher order births. This will lead to low contraceptive practice resulting to higher fertility.

Recommendation

Motivation to small family norm with indiscriminate sex and promotion of contraceptive use is required.

Limitation of the study

District level analysis instead of state level will yield more precise estimates.

Relevance of the study

Still sex preference is dominating in the society

Authors Contribution

Each author shared from conceptual framework to analysis and write up.

Acknowledgement

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Tables

TABLE 1 STATES SHOWING VARIATION IN TFR ALONG WITH THEIR SHARE TO TOTAL POPULATION OF THE COUNTRY

TFR	States	Percent of Population
1.79-2.22	Andhra Pradesh, Goa, Tamil Nadu, Kerala, Himanchal Pradesh, Punjab, Karnataka, Delhi, Maharashtra and Tripura	35.91
2.23 – 2.49	West Bengal, J & K, Orissa, Assam and Gujarat	19.94
2.50 – 2.99	Uttarakhand, Chhattisgarh, Haryana, Manipur and Mizoram	5.24
3.00 & above	Sikkim Arunachal Pradesh, Madhya Pradesh, Rajasthan, Jharkhand, Nagaland, Uttar Pradesh, Bihar and Meghalaya	38.92

TABLE 2 PEARSON CORRELATION COEFFICIENTS BETWEEN OUTCOME AND THE PREDICTORS ALONG WITH CORRELATIONS COEFFICIENTS BETWEEN THE PREDICTORS

Characteristics	Proportion progressed ≥ 3rd order births	Proportion desiring at least one son	Proportion of eligible couples adopting modern method of contraception	Proportion with median marriage age below 18 years	Proportion giving birth with spacing below 24 months
Proportion desiring at least one son	0.744 (**)				
Proportion of eligible couples adopting modern method of contraception	-0.565 (**)	-0.358			
Proportion with median marriage age below 18 years	-0.391 (*)	-0.245	-0.214		
Proportion giving birth with spacing below 24 months	0.219	0.179	0.296	-0.284	
Infant mortality rate	0.445 (*)	0.217	-0.151	-0.658 (**)	0.057

TABLE 3 SIGNIFICANT PREDICTORS TO MOTHERS PROGRESSING ⸝ 3RD PARITY IN THE ORDER OF THEIR CONTRIBUTION ALONG WITH COEFFICIENT OF DETERMINATION

Predictors	βis	SE of βis	Standardized coefficients of βis	t value	p value	Adjusted R square (Multiple correlation coefficient)
Constant	25.20	7.07	--	3.56	0.002	--
Proportion desiring more sons	0.58	0.14	0.44	4.18	0.000	0.541
Proportion of eligible couple adopting any modern methods	-0.48	0.09	-0.59	5.44	0.000	0.696
Proportion giving birth with spacing below 24 months	0.86	0.26	0.32	3.28	0.003	0.779