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Fertility patterns and differential in India

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Fertility Patterns and Differential in India

Abstract

Background: The study attempts to study fertility Patterns and Differential in India considering the background characteristics including different Castes, educational levels, wealth index, mortality rates, religious groups, and also to determine factors affecting them. For the study, the data used are from the five rounds of the National Family Health Survey such as NFHS-1 (1992-93), NFHS-2 (1998-99), NFHS-3 (2005-06), NFHS-4 (2015-16) and NFHS-5 (2019-21). The data are collected from the twenty-five states in which the factors such as total fertility rate, residence, education, religion, caste, and wealth index were taken from background characteristics of NFHS-2 to NFHS-5 whereas the missing data in between and for NFHS-1 (1992-93) are obtained through interpolation.

Method: The data is balanced panel data, the panel data regression model is used to determine the factors that influence the fertility pattern and differential using Eviews 12 software.

Results: The study found fertility differential among caste, religion, wealth index, mortality index, educational level, and residence. And the fertility differential is found to be affected by contraceptive use, birth order, age at first marriage, birth interval, unmet need for family planning, and sex preference among the couples.

Conclusion: The empirical results for the panel data indicate that TFR widely varied within different states of India due to the effect of various factors. And it is extremely necessary to conduct such analysis on district-level data.

Keywords: Fertility, Urban, rural, religion, socioeconomic

1. Introduction

India is a multifaceted developing nation with several ethnicities, traditions, social conventions, and economical environments. After post-independence, the country's population growth rate has accelerated alarmingly with a total population of 1210 million as per the Indian census 2011, negatively affecting every area of economic development where poverty, unemployment, poor health, and environmental degradation are the main issues (Som K. , 2018).After the 1950s, due to western industrialization, urbanization, and socio-economic development, there is advancement in medical sciences and the adoption of public health measures in developing nations which declined the mortality rates (Devi A. T., 2013) but no decline in the fertility rates. This increase in fertility level has become a vital topic for many demographers and policymakers. India launched the family planning program in 1952 (Gogoi, 2018a) and came into effect in 1960. Since then, the developing countries like India, the fertility rate began to fall and it continued over the next decades (Roy S. , 2017).

Fertility is a process for the biological continuation of human civilization (Devi A. T., 2013) and is defined as the total number of live births produced during their reproductive lives (Singh P. , 2019). The child-bearing age cohort of women is considered to be 15-49 years. Fertility levels determine the age structure which in turn governs the social, economic, and demographic characteristics of the population (Hassan, 2020).

1.2 Theoretical Framework of Fertility Differential

Social scientists and demographers had searched for systematic theories of fertility that would explain the differences in fertility and changes in fertility levels. Some of the theories that explain fertility are biological theories, social or cultural theories, economic theories, and socioeconomic theories. The biological theories are those which consider the law regulating the human population to be the same as that which regulates the growth of plants and animals (Spencer, 2017). This includes the density and diet principles (Doubleday, 2010). Malthus, while contributing to population theory, made a principle of fertility that fertility varies inversely with the density of population (Malthus, 1826,). Again, according to Sadler's theory, increasing density decreases fertility and increases mortality, this, in turn, increases fertility (Sadler, 2013). Thomas Doubleday in 1841 propounded *the true law of population* that explains the relationship between population growth and the diet of the people. According to him, poverty stimulates population growth, as a diet of the poor is insufficient (Doubleday, 2010). Another explanation is the biological theory of fertility propounded by Corrado Gini. This theory explains the basic factors of population growth characterized by biological change rather than social and economic change. According to Gini, the decline in fertility is due to a decline in fecundity (Gini & Felice Vinci, 2016).

The social theory includes social capillarity and cultural lag. Social theories stated that Human volition has an important role in declining fertility. Arsene Dumont, a French philosopher states that one has the urge to rise in the social state or scale. He has compared this urge to the inevitable physical law of nature the force of capillarity (Dumont, 1890). According to the cultural lag theory of fertility differentials, in countries where fertility has been declining, attitudes and practices conducive to diminishing fertility have been adopted first by the better-educated, wealthier, and socially more favored groups and transmitted in course of time to the intermediate and lower status group. According to this theory birth control especially contraception has been a recent development and has been introduced lately in human culture (Newson, Postmes T, & P, 2005) (Sforza & Feldman, 1981). Economic theories propounded by Liebenstein 1957 are based on the assumptions that decisions regarding family size are influenced by economic consideration and the theory is built within the macro-economic framework. Economic variables considered while explaining fertility behavior are a commodity, the utility of children, the cost of children, opportunity cost, shadow price, and demand theory (Leibenstein, 1974) (Libenstein, 1957). Easterlin has provided a more comprehensive theory of fertility which is a combination of sociology and economics of human fertility. According to this theory, as parents are more concerned about the number of grown-up living children rather than the number of births, the principles determinant of fertility operate are through the demand for children, the supply of children, and the costs of fertility regulation (Easterlin, 1961) (Cedric, 2004).

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2. Data Sources & Methodology

The main objectives of the study are to examine fertility differential considering the background characteristics including different Castes, educational level, wealth index, mortality rates, religious groups and also to determine factors affecting them. For the study, the data used are from the five rounds of the National Family Health Survey such as NFHS-1 (1992-93), NFHS-2 (1998-99), NFHS-3 (2005-06), NFHS-4 (2015-16) and NFHS-5 (2019-21) are designed to collect data for making various demographic estimates, such as fertility, mortality, maternal and child health. The data are collected from the twenty-five states (Table 1 in Appendix) in which the factors such as total fertility rate, residence, education, religion, caste, and wealth index were taken from background characteristics of NFHS-2 to NFHS-5 whereas the missing data in between and for NFHS-1 (1992-93) are obtained through interpolation. Thus, the data is balanced panel data, the panel data regression model is used to determine the factors that influence the fertility pattern and differential using Eviews 12 software.

Panel data analysis is a statistical method widely used to analyze data that are collected for multiple periods and over the same individuals or entities. The important models for modeling Panel data are Pooled Ordinary Least Square (OLS), fixed-effect model, random effect model, and Feasible Generalized Least Square (FGLS) models (Wooldridge, 2009). However, the three mainly used panel analyses are the independent Pooled OLS regression model, fixed-effect model, and random effect model (Basumatary & Devi, 2022). Pooled panel analysis assumes homogeneity of all sections in a panel data study and does not treat each section differently. There are no unique characteristics of individuals within the measurement set and no universal effects over time in pooled OLS regression. So, the intercept is assumed to be the same for different entities in pooled OLS regression. However, individuality among different cross-sections allows to have its own intercept (the intercept may be different for the cross-sections), and heterogeneity is assumed in the fixed effect model with time-invariant. There are unique attributes of individuals which do not vary across time and are correlated with independent variables. The random effect model known as the variance components model is also a popular technique for modeling panel analysis. This method allows for heterogeneity and is also time-invariant but the individual specific effect is uncorrelated with the independent variables(Adefemi, A. A 2017). The different intercept for different entities in the fixed and random effect model is because of randomness in selecting data, and those differences in intercept are captured by the RE model(Baltagi, 1985).

Before panel regression is conducted, the unit root test is run to check each series for stationarity. The null hypothesis is assumed that it is non-stationary series, while the alternate hypothesis assumed that it is a stationary series. In this context, the data series of states are tested at levels and first differences for stationarity using individual unit root ADF Fisher to conduct a unit root test. Descriptive statistics are used to present the factors such as total fertility rate, residence, education, religion, caste, wealth index, mortality rates, use of any method of contraception, birth order, age at first marriage, birth interval, unmet need for family planning and sex preference which are included in the analysis.

The Lagrange Multiplier, Chow and Hausman tests were conducted to determine an appropriate model. Firstly, the pooled least square is run and then the Lagrange multiplier test such as the Breusch-Pagan LM test is done to check a suitable model between the pooled least square and random effect model where the null hypothesis of the Breusch-Pagan LM test assumed the absence of a random effect while the alternative hypothesis expresses the presence of a random effect. Here, the null hypothesis will be rejected when p<0.05 and accept when p>0.05 at a 5% level of significance. If it rejects the null hypothesis, a further fixed effect model is run and then the chow test (Likelihood Test) is done to check an appropriate model between the pooled least square and fixed effect model where assumed the null hypothesis assumed the absence of a fixed effect while the alternative hypothesis assumed the presence of a random effect. Furthermore, a random effect model is run, if it rejects the null hypothesis and then the Hausman test is done to check between the random effect and fixed effect models where the null hypothesis shows the presence of a random effect whereas the alternative hypothesis expresses the absence of a fixed effect. Here, the null hypothesis will be rejected when p<0.05 and accept when p>0.05 i.e. at a 5% level of significance. If the test accepts the null hypothesis, then the random effect model will be accepted as a suitable model whereas, if the test rejects the null hypothesis then the fixed effect model will be taken as the best model for the estimation.

Furthermore, tests such as autocorrelation and multicollinearity test were done to find statistical support in the panel data regression.

2.1 Model to be estimated

Model 1: Fertility differential amongst residence (rural, urban), education level (No education, Middle school, High school & above)) and religion (hindu , muslim), random effect model is found better suited. Here the slope/coefficient of various variables are examined to know the fertility differential

The random effect model for residence, education and religion is

$Y_{it} = \propto +\beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + (\alpha_i - \alpha) + \varepsilon_{it}$-(1)

Where $Y_{it} = Total\ Fertility\ Rate_{it}$ is the Dependent variable; i = states & t = time

X_{1it}(Rural), X_{2it}(urban), X_{3it}(No education), X_{4it}(Middle education), X_{5it}(High school & above), X_{6it}(Hindu), X_{7it}(Muslim) are the Independent variables.

β_1, β_2, β_3, β_4, β_5, β_6&β_7 are the coefficients of the independent variables. ε_{it} is the error term.

α is the values of the specific state i and captures the state effect.

Model 2: Fertility differential amongst different caste (scheduled caste, scheduled tribes, other backward class), wealth (low wealth, medium wealth, high wealth) and mortality (infant mortality and child mortality), here fixed effect model is found better suited.

The fixed effect model is

Y_{it}=$\alpha_i + \beta_1 X_{SCit} + \beta_2 X_{STit} + \beta_3 X_{OBCit} + \beta_4 X_{LWit} + \beta_5 X_{MWit} + \beta_6 X_{HWit} + \beta_7 X_{IMit} + \beta_8 X_{CMit} + \varepsilon_{it}$ - (2)

Where $Y_{it} = Total\ Fertility\ Rate_{it}$ is the Dependent variable; i = states & t = time

X_{SCit}(Scheduled Caste),X_{STit}(Scheduled Tribe), X_{OBCit}(Other Backward Class), X_{LWit} (Low wealth), X_{MWit}(Medium wealth), X_{HWit}(High wealth), X_{IMit}(Infant Mortality), X_{CMit}(Child Mortality) are independent variables.

β_1, β_2, β_3, β_4, β_5, β_6, β_7&$\beta_8$are the coefficients of the independent variables. ε_{it} is the error term.

$\alpha_i$is the values of the specific state i and captures the state effect.

Model 3: Factors determining the fertility differential, here the fixed effect model is found best suited.

The fixed effect model is:

Y_{it}=$\alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4_{it}} + \beta_5 X_{5_{it}} + \beta_6 X_{6_{it}} + \beta_7 X_{7_{it}} + \beta_8 X_{8_{it}} + \cdots\cdots + \beta_{13} X_{13_{it}} + \varepsilon_{it}$ - (3)

Where $Y_{it} = Total\ Fertility\ Rate_{it}$ is the Dependent variable; i = states & t = timeX_{1it}(Any Method of Contraception), X_{2it} (First Birth order), X_{3it}(Second Birth order), X_{4it}(Third Birth order), X_{5it}(Fourth Birth order), X_{6it}(Median age at first marriage from 25 to 49), X_{7it}(Since the preceding birth interval of the median number of the month), X_{8it}(Unmet need for spacing), X_{9it} (Unmet need for limiting), X_{10it}(Want more sons than daughters), X_{11it}(Want more daughters than sons), X_{12it}(Want at least one son) &X_{13it}(Want at least one daughter) are Independent variables.

β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9, β_{10}, β_{11}, β_{12}& $\beta_{13}$are the coefficients of the independent variables

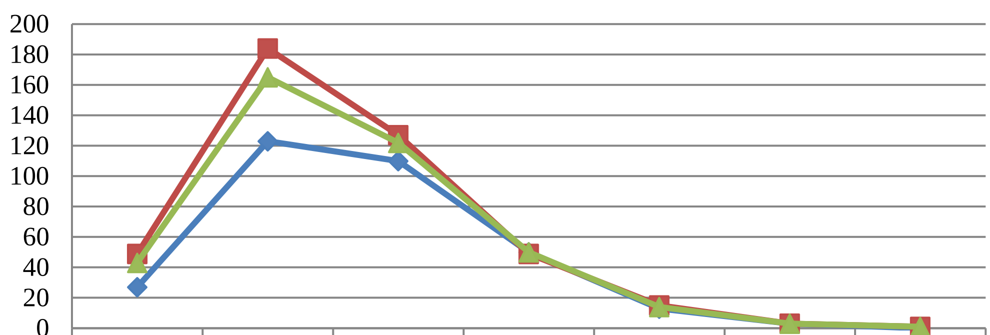
$\varepsilon_{it}$is the error term. $\alpha_i$is the values of the specific state i and captures the state effect.

3. Discussions

3.1 The fertility pattern and differential of India

The Age-Specific Fertility Rates (ASFR), the Total Fertility Rates (TFR), and the Crude Birth Rates (CBR) by the residence of India are shown in table 1 (in Appendix) from NFHS-1 to NFHS-5. It is seen from the table that the ASFR of India is higher in rural as compared to urban areas in respective age groups but continuously declining both in rural and urban areas during the periods. Since the child-bearing period of women is from 15 to 49 years and it is observed that the fertility rate is different for the different age groups. It is highest in the age group 20-24 years, starts declining after 30-34 years, and is nearly zero in the age group 45-49.

Figure 1: Age-specific Fertility Rate of India from age group 15-19 to 45-49 years.

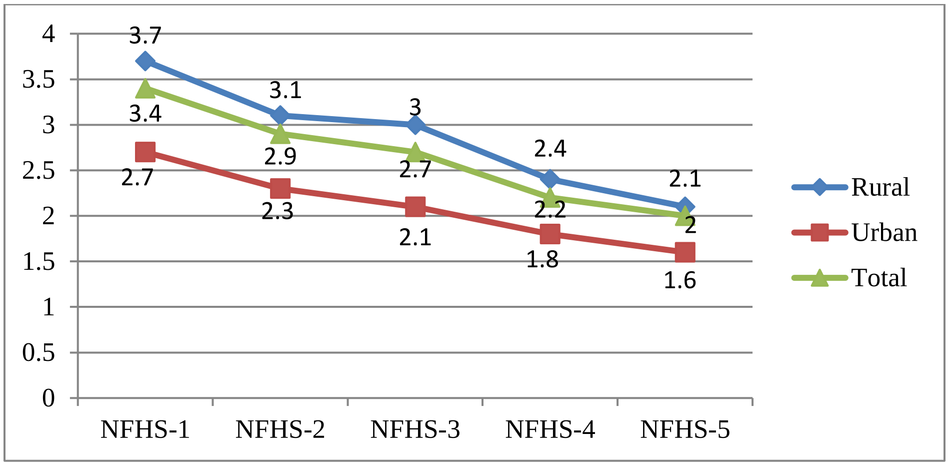


	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Urban	27	123	110	50	13	3	0
Rural	49	184	127	49	15	3	1
Total	43	165	122	50	14	3	1

Source: National Family Health Survey-5, 2019-21.

It is observed from figure 1 that the Age-specific fertility rate (ASFR) follows a pattern among women with rates starting from very low in the very young age group 15-19, rising peak at the age group 20-24, and then gradually declining thereafter until it reaches zero at the age group 45-49. Again, the ASFR of the rural population shows a higher peak than the ASFR of the urban population. Usually, the age pattern of fertility follows a bell-shaped curve though the shape of this bell varies from one population to another depending on factors such as the age of women at marriage, the level of physiological sterility, the proportion of marriage person, the incidence of widowhood and separation, customs about lactation and post-partum abstinence, the level of contraceptive and other (Balasubramanian, 1980). On the other hand, it is observed that the TFR of all of India which was 3.39 children per woman in 1992-93 has declined to 2.85 in 1996-98, 2.68 in 2005-06, 2.18 in 2015-16, and 1.99 in 2019-21 as depicted in table 1 (in Appendix). Again, the TFR of India shows the fertility decline in both the rural and urban areas. The women in all-India on average give birth to two children (1.99) in 2019-21 as compared to three children (2.85) in 1996-98.

Figure 2: Pattern of Total Fertility Rate (TFR) of India.



Source: National Family Health Survey (NFHS), 1992-93 to 2019-21.

Figure 2 depicts the pattern of the Total Fertility Rate from NFHS-1 to NFHS-5. Initially, the peak of TFR in all of India was slightly high and then starts declining afterward. Similarly, the peak of TFR in rural and urban areas was slightly high and declined afterward. Again, it also shows that the TFR for the rural population is higher as compared to the urban population.

The differential in fertility is determined by background characteristics like a place of residence, years of schooling, religion, caste/tribe, and wealth which is shown in table 2 (Appendix).

TFR for respective periods decreases as years of schooling increase as depicted in table 2 (Appendix). In countries like India, the relationship between fertility and education is not simple.

Many studies had found a negative relationship between the number of children ever born and the educational attainment of women (Som & Mishra, 2020). Religion affects the fertility rate of an individual where the TFR is observed more for Muslims, followed by Hindus and Christians and TFR is lowest for Jainism from NFHS-2 to NFHS-5. Caste wise the TFR is highest in Scheduled caste (3.15) in NFHS-2 and Scheduled tribe (3.12) in NFHS-3, (2.48) in NFHS-4, and (2.09) in NFHS-5, followed by other backward classes. Fertility differential also arises due to the differences in wealth as shown in the table where the lower the wealth index, the higher the total fertility rate and vice versa. However, many studies had found a negative relationship between the educational attainment of a wife and the number of children ever born (Rele, 1976). TFR (NFHS-4) is observed more for Muslims (2.62), followed by Hindus (2.13), and Christians (1.99), and the lowest total fertility rate is observed for Jainism. However, although Muslim exhibit higher fertility, the Hindu-Muslim fertility differences were small. One of the important institutional factors responsible for depressing the fertility of Hindus in the past had been the low incidence of widow remarriage (Balasubramanian, 1980). In India, there is a social ban on the remarriage of Hindu widows, particularly among the upper class. Caste-wise total fertility is highest for the scheduled tribe (2.48), followed by scheduled caste (2.26) and other backward classes (2.22). The fertility differential is also due to the differences in wealth, that is, the higher the wealth index, the lower the total fertility rate as shown in table 3 in appendix.

4. Results

4.1 Test of stationarity/Panel Unit Root Test

The unit root test is conducted to check each series for stationarity. The null hypothesis is assumed that it is non-stationary series, while the alternate hypothesis assumed that it is a stationary series. In this context, the data series of states are tested at levels and first differences for stationarity using individual unit root ADF Fisher to conduct a unit root test. According to the results shown in table 1, the tests suggest that all the individual series except total fertility rate, no education, primary education and high school level or above education, infant mortality rate, child mortality rate, any method of contraception, unmet need for spacing, want more sons than daughters, want more daughters than sons, want at least one daughter accept the null hypothesis at level ($p>0.05$) which is non-stationary and further it appears to be stationary at first difference, I(1) processes.

Table 1 Results of the stationarity test

Panel Unit Root Test					
Method: ADF Fisher Unit Root Test					
Variables		Stationary at level		Stationary at the single difference	
		Statistic	Prob.	Statistic	Prob.
TFR (Total Fertility Rate)		89.9	0.0004	NA	NA
RESIDENCE	Rural	59.7	0.1628	104.5	0.0000
	Urban	65.4	0.0706	94.4	0.0001
EDUCATION	No education (illiterate)	99.6	0.0000	NA	NA
	Primary level	148.2	0.0000	NA	NA
	High school or above level	141.5	0.0000	NA	NA
RELIGION	Hindu	31.6	0.9798	83.3	0.0021
	Muslim	27.1	0.9783	63.6	0.0101
CASTE	SC	30.7	0.9854	84.4	0.0017
	ST	50.03	0.472	86.7	0.0010
	OBC	35.3	0.9416	81.3	0.0034
WEALTH INDEX	Low wealth index	41.3	0.8021	144.2	0.0000
	Medium wealth index	34.8	0.9487	119.5	0.0000
	High wealth index	41.2	0.8051	82.5	0.0026
MORTALITY RATES	Infant mortality rate	103.6	0.0000	NA	NA
	Child mortality rate	71.6	0.0239	NA	NA
CONTRACEPTIVE USE	Any method of contraception	67.4	0.05	NA	NA
BIRTH ORDER	First Birth Order	28.9	0.9926	108.3	0.0000
	Second Birth Order	32.7	0.972	94.2	0.0002
	Third Birth Order	52.6	0.3737	155.8	0.0000
	Fourth or more Birth Order	41.6	0.7921	86.1	0.0011
AGE AT FIRST MARRIAGE	Median age at first marriage (25-49 years)	42.2	0.7734	68.7	0.0405
BIRTH INTERVAL	The median number of birth interval	31.4	0.9815	73.2	0.0176
UNMET NEED FOR FAMILY PLANNING	Unmet need for spacing	96.5	0.0001	NA	NA
	Unmet need for limiting	63.04	0.1018	77.1	0.0082
SEX PREFERENCE	Want more sons than daughters	82.1	0.0028	NA	NA
	Want more daughters than sons	69.1	0.0378	NA	NA
	Want at least one son	65.1	0.0738	79.8	0.0046
	Want at least one daughter	70.03	0.0322	NA	NA

* NA – Not Applicable.

Here, the stationarity of variables such as fertility rate, residence, education, religion, caste, wealth index, mortality rates, contraceptive use, birth order, age at first marriage, birth interval, unmet need for family planning and sex preference is examined (Table 1). Each variable except fertility rate, contraceptive use, age at first marriage and birth interval are categorized in the following ways: residence – Rural and Urban, education – No education, Primary level and High School & above level, religion – Hindu and Muslim, caste – SC, ST and OBC, wealth index –

low wealth, medium wealth and high wealth, mortality rates – Infant mortality and Child mortality rates, birth order – First birth order, Second birth order, Third birth order and Fourth or more birth order, unmet need for family planning -Unmet need for spacing and Unmet need for limiting, sex preference – Want more sons than daughters, Want more daughters than sons, Want at least one son and Want at least one daughter.

Tables 2 and 3 present the descriptive statistics of the given variables in terms of their mean, median, standard deviation, skewness, Kurtosis, Jarque-Bera, probability, sum, sum square deviation, and minimum and maximum values.

Table 2: Descriptive statistics for dependent and independent variables

	Variables							
	TFR	**Rural**	**Urban**	**No education**	**Primary education**	**High school level and above**	**Hindu**	**Muslim**
Mean	2.5	2.6	1.9	3.2	2.7	1.8	2.08	2.7
Median	2.3	2.5	1.8	3.1	2.5	1.8	2	2.5
Maximum	4.8	5.2	3.1	7.8	7.3	4.8	3.9	6
Minimum	1.1	1.2	1	0.4	1	1	0.8	1.1
Std.Dev.	0.7	0.7	0.4	1.1	1	0.5	0.5	0.8
Skewness	0.8	0.7	0.5	1	1.6	2.1	0.8	1
Kurtosis	2.9	3.07	2.5	5.8	7.4	10.6	4.3	4.3
Jarque-Bera	13.8	11.03	6.4	63.2	161.9	398.1	25.6	31.8
Probability	0.0009	0.004	0.03	0.000	0.000	0.000	0.000003	0.000
Sum	312.7	327.7	244.6	405.1	343.5	235.1	260	338.9
Sum Sq. Dev.	76.5	74.1	25.9	157.4	129.5	36.7	42.1	91.7
Observations	125	125	125	125	125	125	125	125

Table 3 Descriptive statistics of dependent and independent variables

Variables	Mean	Median	Maxi-mum	Mini-mum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Sum	Sum Sq. Dev.	Obs.
TFR	2.5	2.3	4.8	1.1	0.7	0.8	2.9	13.8	0.0009	312.7	76.5	125
SC	2.2	2.1	4.8	1.1	0.7	1.3	4.9	57.1	0.0000	280.6	62.9	125
ST	2.5	2.4	6.3	1	0.8	1.4	6.1	92.5	0.0000	323.4	84.6	125
OBC	2.1	2	5.3	1	0.7	1.2	5.6	71.7	0.0000	266.2	64.5	125
Low wealth index	3.5	3.4	6	1.7	0.9	0.3	2.4	3.8	0.14	440.7	105.3	125
Medium wealth index	2.7	2.6	4.6	1.6	0.6	0.5	2.6	7.7	0.02	338.3	53.09	125
High wealth index	1.8	1.8	3.5	1	0.3	0.8	5.7	54.2	0.0000	228.2	16.8	125
Infant mortality rate	43.4	37.9	111	4.4	22.6	0.7	3.2	11.7	0.002	5425.9	63348.8	125
Child mortality rate	15.4	10.8	59.8	0	12.2	1.2	4.5	47.6	0.0000	1932.4	18582.7	125
Any method of contraception	51.9	55.9	75.8	13	15.5	-0.5	2.3	9.6	0.007	6488.7	30069.6	125
First Birth Order	35.7	35.8	59.4	19.8	8.7	0.3	2.3	4.01	0.13	4466.9	9481.3	125
Second Birth Order	29.3	29.3	43.3	19	5.7	0.19	2.3	3.08	0.21	3673.1	4130.8	125
Third Birth Order	15.5	15.9	23.2	5.9	3.2	-0.5	3.3	7.6	0.02	1943.8	1344.5	125
Fourth or more Birth Order	18.7	18	46.5	1.3	11.3	0.4	2.1	6.9	0.03	2339.1	15836.2	125
Want more sons than daughters	23.2	22.4	57.6	4.7	12.07	0.5	2.5	7.2	0.02	2901.7	18075.4	125
Want more daughters than sons	4.8	3.4	24.4	0.4	5.08	2.3	7.6	224.7	0.00000	608	3212.5	125
Want at least one son	82.5	84.4	99.5	45.1	10.8	-0.8	3.7	19.4	0.00006	10317	14473.01	125
Want at least one daughter	79.01	79.8	99.3	45.2	10.6	-0.5	3.3	7.8	0.02	9876.7	14129.8	125
Median age at first marriage	18.8	18.8	25	14.5	2.2	0.3	2.8	2.9	0.2	2362.2	624.9	125
The median number of months	33.8	31.7	64.4	27.4	6.4	2.2	9.05	298.2	0.00000	4225	5087.9	125
Unmet need for spacing	7.4	6.8	23.2	2.3	4.1	1.2	5.09	57.9	0.00000	937	2109.8	125
Unmet need for limiting	7.1	6.7	17.4	1.5	3.1	0.7	3.3	12.8	0.001	897.2	1216.8	125

4.2 Result of Multicollinearity test

The Multicollinearity test for residence, education, religion, caste, wealth index, mortality rates, contraceptive use, birth order, age at first marriage, birth interval, unmet need for family planning and sex preference is done using variance inflation factor (VIF). A VIF should be less than equal to 10. In particular, the Multicollinearity test suggests that there is no Multicollinearity among the variables in the sample of 25 states of India as the VIF of all the variables is less than 10 which is shown in table 4.

Table 4 Results of Multicollinearity Test

Variance Inflation Factors		
Variable		**Centered VIF**
RESIDENCE	Rural	3.102449
	Urban	2.678513
EDUCATION	No education (illiterate)	3.268400
	Primary education	2.836016
	High school or above	1.354558
RELIGION	Hindu	2.735976
	Muslim	2.072438
CASTE	Scheduled Caste (SC)	2.082563
	Scheduled Tribe (ST)	2.129688
	Other Backward Class (OBC)	1.486293
WEALTH INDEX	Low wealth index	1.669308
	Medium wealth index	1.922616
	High wealth index	1.721112
MORTALITY RATES	Infant mortality rate	5.158202
	Child mortality rate	6.394873
CONTRACEPTIVE USE	Any method of contraception	4.172720
BIRTH ORDER	First Birth Order	4.119707
	Second Birth Order	2.444350
	Third Birth Order	2.114329
	Fourth or more Birth Order	5.028815
AGE AT FIRST MARRIAGE	Median age at first marriage from age group 25 to 49	1.508525
BIRTH INTERVAL	Since preceding birth interval of median number of month	1.697910
UNMET NEED FOR FAMILY PLANNING	Unmet need for spacing	3.637037
	Unmet need for limiting	1.993648
SEX PREFERENCE	Want more sons than daughters	3.187261
	Want more daughters than sons	1.661151
	Want at least one son	2.663045
	Want at least one daughter	2.579579

4.3 The estimation models for Panel data

To determine an appropriate model for panel data, Lagrange Multiplier, Chow and Hausman tests were done using Eviews 12 software as shown in table 5. The Lagrange multiplier test, a test such as the Breusch-Pagan LM test is done as depicted in table 5. The null hypothesis of the Breusch-Pagan LM test shows the absence of a random effect while the alternative hypothesis expresses the presence of a random effect. The results show that all these tests reject the null hypothesis of no random effect ($p<0.05$) which means the pooled OLS model is not suitable for analysis. Therefore, the Lagrange multiplier test indicates random regression is an appropriate model over pooled OLS model.

Table 5: Results of Lagrange Multiplier Test for Random Effects

Lagrange Multiplier Tests for Random Effects			
Null hypothesis: No effects			
Alternative hypothesis: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives			
Test hypothesis			
RESIDENCE, EDUCATION & RELIGION			
Test	**Cross-section**	**Time**	**Both**
Breusch-Pagan	12.13148(0.0005)	0.226894(0.6338)	12.35838(0.0004)
CASTE, WEALTH & MORTALITY RATES			
Test	**Cross-section**	**Time**	**Both**
Breusch-Pagan	55.44799(0.0000)	0.223163(0.6366)	55.67116(0.0000)
CONTRACEPTIVE USE, BIRTH ORDER, AGE AT FIRST MARRIAGE, BIRTH INTERVAL, UNMET NEED FOR FAMILY PLANNING & SEX PREFERENCE			
Test	**Cross-section**	**Time**	**Both**
Breusch-Pagan	5.873457(0.0154)	16.24429(0.0001)	22.11775(0.0000)

Further, to determine a suitable model between the Pooled Effect Model and the Fixed Effect Model, the chow test (Likelihood Test) was performed. The results show that the probability value of the cross-section effect is less than a 5% level of significance as it rejects the null hypothesis of pooled OLS and accepts the alternative hypothesis of the fixed effect model as shown in table 6. Hence, the fixed effect is an appropriate model over pooled effect for all the given variables.

Table 6: Results of Chow test for Fixed Effects

Redundant Fixed Effects Tests			
Test cross-section fixed effects			
RESIDENCE, EDUCATION & RELIGION			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	2.581491	(24,68)	0.0012
CASTE, WEALTH & MORTALITY RATES			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	10.332472	(24,67)	0.0000
CONTRACEPTIVE USE, BIRTH ORDER, AGE AT FIRST MARRIAGE, BIRTH INTERVAL, UNMET NEED FOR FAMILY PLANNING & SEX PREFERENCE			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	3.145191	(24,62)	0.0002

Furthermore, to identify whether the random effect or fixed effect model is a more suitable model for estimation, the Hausman test is done as shown in table 7. In the Hausman test, the null hypothesis shows the presence of a random effect whereas the alternative hypothesis expresses the absence of a fixed effect. As the probability value of the test statistic is greater than a 5 % level of significance ($p>0.05$), so the null hypothesis is accepted which implies that the random effect regression is the best model over fixed effect regression for factors such as residence, education and religion. On the other hand, the probability value of test statistics is less than a 5% level of significance ($p<0.05$) for caste, wealth index, mortality rates, contraceptive use, birth order, birth interval, unmet need for family planning and sex preference. Hence, the alternative hypothesis of fixed effect is accepted which means that the fixed effect regression is the best model for the analysis.

Table 7: Results of the Hausman Test

RESIDENCE, EDUCATION & RELIGION			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	2.722161	7	0.9095
CASTE, WEALTH & MORTALITY RATES			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	23.307297	8	0.0030
CONTRACEPTIVE USE, BIRTH ORDER, AGE AT FIRST MARRIAGE, BIRTH INTERVAL, UNMET NEED FOR FAMILY PLANNING & SEX PREFERENCE			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	22.983362	13	0.0419

Table 8 Random Effect Model explaining Fertility differential among Residence, Education and Religion

RANDOM EFFECT MODEL					
Dependent Variable: TFR					
Method: Panel Least Squares					
Cross-sections included: 25					
Total panel (balanced) observations: 100					
Variable		**Coefficient**	**Standard Error**	**t-statistic**	**Prob.**
C		-0.122062	0.197071	-0.619381	0.5372
RESIDENCE	Rural	0.153751	0.079744	1.928041	0.0569***
	Urban	-0.162595	0.109472	-1.485265	0.1409
EDUCATION	No education(illiterate)	0.401354	0.064909	6.183355	0.0000*
	Primary education	0.244216	0.077679	3.143922	0.0022*
	High school or above education	0. 354777	0. 103669	3.422202	0.0009*
RELIGION	Hindu	0.578533	0.076337	7.578641	0.0076*
	Muslim	0.125636	0.039131	3.210657	0.6965
R^2		0.831339			
Durbin- Watson stat.		1.474463			

* 1% level of significance, ** 5% level of significance, *** 10% level of significance

4.4 Results explaining fertility differential among Residence, Education and Religion

4.4.1 Residence and Fertility

A rural-urban residence is considered one of the important factors influencing the fertility differential. From the estimated results, it is found that TFR in rural (0.153751) is higher than TFR in urban (-0.162595). This study found that rural women have higher fertility than urban women. Many studies showed a similar rural-urban differential in fertility (Htun & Ard-am, 2015). The rural-urban fertility difference is due to the socio-economic differential between women living in rural areas and urban areas (Qadeer, 2002), that is, rural women are likely to marry at an early age than urban women (Kulkarni (2011); Das et al. (1955); Zarate (1967)). Also, the urban residence has better facilities than the rural which stimulated more likely to use contraceptives (Sisouphanthong et al. 2000; Retherford, Thapa 2003).

4.4.2 Education and Fertility

Education is one of the significant socioeconomic factors affecting the differential in fertility. While considering the slope of education level, it is found that TFR is higher for illiterate (0.401354) followed by high school or above level of education (0.354777). The results indicated that TFR decrease as the education of women increases. Women belonging to the reproductive age group of 15 to 49 years, having higher education had the lowest fertility as compared to women with only primary and no education (IIPS & Macro International, (2007)). This indicates that educated women are more likely to delay entry into marital unions (Reddy, 2003), increase the duration of the childbearing period (Roy & Hossain, 2017), use contraception and have a small family size than uneducated women (Martin, 1995). Education changes the fertility behaviour of women (Bbaale & Mpuga, 2011) which means after attainment of secondary level of education, women are exposed to information, may enjoy greater autonomy to decide about employment and marriage-related issues; and are aware of their reproductive health (Basu, 2002) and the health of their children (Adhikari, 2010). This study has demonstrated that better education can lead to higher productivity, lower fertility and better health status, not only at an individual level but also from a micro-level point of view (Dreze& Murthy, (2001) ; James, (2011)).

4.4.3 Religion and Fertility

Religion plays an important role in determining the attitude of people toward limiting fertility. The estimated results show that the TFR of the Hindu religion is higher than Muslim religion but the slope coefficient of Muslim women is not significant. The other studies found that the TFR of the Muslim population is higher compared to the Hindu population (Visaria, (1974); Balasubramanian, (1984); Das & Pandey, (1985); Arokiasamy, (2002); Mari Bhat & Zavier, (2003); (Adhikari, 2010)). This could be due to religious restriction, cultural backwardness and inadequate knowledge and misconceptions about modern family planning methods (Albsoul-Younes et al. (2003)) in most societies which play an important role in the acceptance of or creating resistance to family planning (Pearce, (2001); Mistry, (1995); Adioetomo, (1995); Mulatti, (1995)). In addition, the low level of education among women is one of the major causes of high fertility among Muslims (Quraishi (1996)& Jeffery and Jeffery (2002). Furthermore, high fertility among Muslim women could be due to early age at marriage (Tafforeau, (1990)), high son preference and polygamy which may lead to pregnancy rivalries leading to higher fertility (Shumayla& Kapoor, 2017; Sargent & Cordell (2003).

Table 9 Fixed Effect Model explaining fertility differential among Caste, Wealth and mortality rates

FIXED EFFECT MODEL						
Dependent Variable: TFR						
Method: Panel Least Squares						
Cross-sections included: 25						
Total panel (balanced) observations: 100						
Variable		**Coefficient**	**Standard Error**	**t-statistic**	**Prob.**
	C	1.611092	0.116169	13.86857	0
CASTE	SC	0.001761	0.073444	0.023973	0.9809
	ST	0.165845	0.056809	2.919327	0.0048*
	OBC	0.020171	0.048148	0.418937	0.6766
WEALTH INDEX	Low wealth index	0.018658	0.099005	0.188451	0.8511
	Medium wealth index	0.254648	0.128731	1.978144	0.0520**
	High wealth index	-0.332287	0.139694	-2.378678	0.0202**
MORTALITY RATES	Infant mortality rate	0.015994	0.004197	3.811094	0.0003*
	Child mortality rate	0.006676	0.007225	0.924048	0.3588***
	R^2	0.914109			
	Durbin-Watson Stat.	1.884638			

* 1% level of significance, ** 5% level of significance, *** 10% level of significance.

3.5 Results explaining fertility differential among Caste, Wealth and mortality rates (Table 9)

3.5.1 Caste and Fertility

While considering the TFR based caste-wise, it is established that the TFR of ST (0.165845) is higher than the TFR of OBC (0.020171). Women belonging to the ST category had higher fertility than OBC (Nagadeve & Dongardive, 2021) as women living in rural areas have low literacy rates, have son preference, and use contraception only after attaining desired family size (Roy et al., (2015)) and lower use of any modern method (Tharun & Muniswamy, 2022). Higher fertility rates increase health risks and problems belonging to STs/SCs (Wankhede & Paswan, 2011).

3.5.2 Wealth index and Fertility

In the wealth index, the slope coefficient of the low wealth index is higher than the high wealth index. Also, the TFR of medium wealth (0.254648) is greater than high wealth (-0.332287). Women aged 25-49 in the highest wealth quintile were married over four years later than women in the lowest wealth quintile (Singh P. , 2019). According to Adhikari (2010), an inverse relationship was observed between wealth status and fertility, with significantly lower fertility among the richest women compared to fertility among the poorest. It could be that poor people perceive children as a source of income which motivates them to have more children (Karki, 1982) and the poorest people have less access to education and family planning methods.

3.5.3 Mortality rates and Fertility

The influence of infant and child mortality on fertility is considered one of the most important factors. It is found that the infant mortality rate showed a positive and significant association with TFR. In other words, a one percent increase in the infant mortality rate, on average, results in a 0.015% increase in TFR. On the other hand, a positive but insignificant relationship is examined between child mortality and TFR. When the mortality rate is high, the level of fertility also becomes high as women who had a child-death experience were likely to have a higher number of children than those who had no such experience to ensure the survival of at least a few of them which leads to a higher risk of uncontrolled fertility (Balakrishnan & Mahadevan (1987); Adhikari (2010)). Women who marry at an early age and bear a child also result in a high incidence of infant mortality and deterioration of the mother’s health (Khan A. A., 2008). The impact of the high fertility rate on health is mainly reflected in the high rates of maternal & child mortality (Kumar, (2018); Miller, (1989); Miller et al., (1992)).

Table 10: Results of the Fixed Effect Model on factors determining fertility differential

FIXED EFFECT MODEL					
Dependent Variable: TFR					
Method: Panel Least Squares					
Cross-sections included: 25					
Total panel (balanced) observations: 100					
Variable		**Coefficient**	**Standard Error**	**t-statistic**	**Prob.**
	C	1.901719	0.810144	2.347385	0.0221
CONTRACEPTIVE USE	Any method of contraception	0.009345	0.006636	1.408371	0.1640
BIRTH ORDER	First Birth Order	-0.032471	0.014016	-2.316619	0.0238**
	Second Birth Order	-0.007677	0.016971	-0.452344	0.6526
	Third Birth Order	-0.027726	0.017966	-1.543226	0.1279
	Fourth or more Birth Order	-0.009401	0.009557	-0.983629	0.3291
AGE AT FIRST MARRIAGE	Median age at first marriage from age group 25 to 49	0.004761	0.020887	0.22796	0.8204
BIRTH INTERVAL	Since the preceding birth interval of the median number of month	-0.000804	0.014987	-0.053662	0.9574
UNMET NEED FOR FAMILY PLANNING	Unmet need for spacing	0.068188	0.03049	2.236429	0.0289**
	Unmet need for limiting	0.024531	0.01552	1.580597	0.1191
SEX PREFERENCE	Want more sons than daughters	0.035821	0.007451	4.807252	0.0000*
	Want more daughters than sons	-0.059287	0.030207	-1.962717	0.0542***

	Want at least one son	-0.001302	0.006083	-0.214076	0.8312
	Want at least one daughter	-0.011909	0.009324	-1.277255	0.2063
R^2		0.883332			
Durbin-Watson Stat.		2.328714			

* 1% level of significance, ** 5% level of significance, *** 10% level of significance.

3.6 Factors determining fertility differential (table 10)

3.6.1 Contraceptive use and Fertility

Contraceptive use or family planning method is one of the most important factors which affect fertility directly. The use of any method of contraception is found to have a positive but insignificant effect on the fertility rate. This is because women who use contraception had less number of children than those who did not use contraception. After all, women adopt contraception with the rising level of education (Martin, 1995). Also, the urban residence has better health-related facilities which stimulated more likely to use of contraceptives (Sisouphanthong et al. (2000); Retherford, Thapa (2003)).

3.6.2 Birth order and Fertility

Among the birth order, the first birth order is found to have a negative as well as significant effect on the fertility rate which means on average, a one percent increase in the first birth order will decline the fertility rate by 0.03%. Moreover, second birth order, third birth order and fourth birth order or more also have a negative but insignificant effect on the fertility rate. It shows a positive relationship between birth order and fertility, that is, women with higher birth order have a greater family size than those with first birth order (Murphy & Knudsen, 2002; Kumar P. , 2018). Children from higher-order births are known to be at greater risk of dying during infancy and early childhood (Mary, (2003); Sadia, (2010); Howell *et al*. (2016)).

3.6.3 Age at first marriage and Fertility

Age at first marriage is an important proximate determinant influencing fertility (Nyi, 2005). According to the estimation result, the median age at first marriage from 25 to 49 years of age is found to have a positive but insignificant association with the fertility rate. The lower age at first marriage increases the childbearing period and contraceptive use is low (Kabir et al. (2001); Sarkar, (2010)) which, in turn, increases fertility in societies. Many studies conducted in India found a negative relationship that the fertility rate declines and the mean age at marriage increases (Borkotoky& Unisa, (2014); Bharati and Dastidar, (1990); Das and Dey, (1998); Varma et.al, (1999); Khongsdier, (2005), Sahu, (2006); IIPS, (2007)). In addition, it was found that older age at marriage reduces fertility (Coale, (1975); Som& Mishra, (2020); Sibanda et al. (2003); Adioetomo, (1995); Mohammad, (1985); Serbessa, (2003)) which implies that when a woman marries at an older age, the greater is the chances that she attended school or been employed (Patnaik, 1981), using contraceptives (Bbaale & Mpuga, 2011) and having a more equal relationship with her husband (Karzi & Zeba, 1986) than early age at marriage (Kazi & Sathar, 1986). A woman at an early age of marriage starts to have more children, especially in developing countries where contraceptive use is not widespread which, in turn, have less access to education and increases high-risk unwanted pregnancies affecting the health of both mother and child (Balakrishnan & Mahadevan, 1987).

3.6.4 Birth interval and Fertility

Birth interval[1] is a major determinant of fertility as well as an important indicator of socioeconomic development. In this study, the estimated results show that since preceding birth interval of a median number of months[2] affects the fertility rate negatively but is not statistically significant. If the birth interval is long then there is more increase in the likelihood of child survival (Potter, 1988) and a preceding birth interval of fewer than 18 months increases the two-fold risk of infant mortality as compared to birth intervals of 36 months or longer (Fosto et al., (2013)). Women who have already a son tend to have a longer birth interval as compared to women without a son (Khan et al. (2016)). Due to the death of a preceding child, the interval for the next birth tends to decrease ((Khan et al. (2016); Chakraborty et al. (1996); Kamal & Khalid, (2012)) as women want to have more children (Setty-Venugopal & Upadhyay,(2002)). Women belonging to high-wealth families have significantly long birth intervals due to education and lifestyle (Kamal & Khalid, 2012). Women who are less educated have shorter birth intervals compared to the women who are educated and educated women are more likely to use contraception to prolong their birth spacing (Tulasidhar, 1993) due to their knowledge regarding the negative effect of short birth intervals as well as benefits of small family size (Som & Mishra, 2020).

3.6.5Unmet Need for family planning and Fertility

The unmet need[3] for family planning is one of the key indicators to knowing the insightful changes in fertility and reproductive health scenario. Unmet need for family planning and unmet need for spacing[4] influenced positively and significantly the fertility rate by 0.068 %. On the other hand, the unmet need for limiting[5] effects positively the TFR but is statistically insignificant. Higher rise in unmet need for family planning results in an increase in fertility (Akram et al., (2020); MOHFW, (2012)). The unmet need for spacing was largely more in the

[1]Birth Interval – It is a time between two successive live births.
[2]Median Birth Interval – It is a number of months since the preceding birth by which half of the children are born.
[3]**Unmet need** refers to the number or percentage of women currently married who are fecund and who desire to either terminate or postponed childbearing, but who are not currently using a contraceptive method. It consists of two groups - unmet need for spacing and unmet need for limiting.
[4]**Unmet need for spacing** - Those women who desire to postpone their next birth for a certain period of time (which may be 2 or more) and who do not currently use any type of contraceptive method is called Unmet need for spacing.
[5]**Unmet need for limiting** - Those women who wish for to stop the childbearing or do not want additional child but they do not use currently any type of contraceptive is called Unmet need for limiting. (Som K. S., 2018)

case of younger women rather than for limiting as in NFHS-2 (1998-99) in Maharashtra ((MOHFW), 2000).This could be due to the presence of more illiterate married women (Chandra, 1998) who mostly lack information and fear side effects followed by contraceptive method-related reasons (lack of availability and awareness), fertility-related reasons (lactational amenorrhea, desire for more children and sex preference (Rajaretnam, 1994)) (Westoff, (1978); Patil et al. (2010); Rahman, (2016)), opposition from husband and other family members, religious beliefs (Khokhar & Mehra, 2005) and lowest wealth index (Akram et al., (2020); Wulfian et al., (2017); Unicef, (2018)).

3.6.6 Sex preference and Fertility

Among the sex preference, wanting more sons than daughters are found to have a positive and highly significant effect on the fertility rate which means a one percent increase in wanting more sons than daughters will increase the fertility rate by 0.03%. Whereas wanting more daughters than sons influenced positively but not significantly the fertility rate. Also, wanting at least one son and wanting at least one daughter is found to have negative effects on the fertility rate but are not significant. Son preference is the most prominent form of gender preference among older women with more children ever born and experienced the death of a child (Barman & Sahoo, 2020). Sons are often regarded as productive assets for work on the family farm or in a family business, as providers of security in emergencies and the parent’s old age, and as conducts to carry on the family name and to perform various rites of ancestor worship (Lakshmi, 2017). Some studies in states and district-level data analysis have indicated that lower son preference in southern states of India is a powerful factor in reducing fertility there (Dyson & Moore, 1983; Kishor, 1993; Malhotra et al. 1995; Dreze and Murthi, 2001).

4. Conclusion

The study has analyzed empirically and identified the factors that affect the fertility pattern and differential in twenty-five states of India using balanced panel data regression models form 1992-1993 to 2019-21.

In the random effects model residence, education and religion, and in the fixed effects model caste, wealth index, mortality rates, contraceptive use, birth orders, age at first marriage, birth intervals, unmet need for family planning and sex preferences are the factors that affect the fertility rate. The empirical results for the panel data indicate that TFR widely varied within different states of India due to the effect of various factors. And it is extremely necessary to conduct such analysis on district-level data. The governments and different organizations' policies should focus on the above-mentioned different factors of fertility, and socioeconomic intervention policies should revise and implement to achieve further reduction in fertility differential in states of India.

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Appendix

Table 1: *The list of selected states region-wise of India*

Regions	States	Total Fertility Rate (TFR)
	Haryana	1.91
	Himachal Pradesh	1.66

Northern Region (NR)	Punjab	1.63
	Rajasthan	2.01
Central Region (CR)	Madhya Pradesh	1.99
	Uttar Pradesh	2.35
East Region (ER)	Bihar	2.98
	Jharkhand	2.26
	Odisha	1.82
	West Bengal	1.64
Northeastern Region(NER)	Arunachal Pradesh	1.8
	Assam	1.87
	Manipur	2.17
	Meghalaya	2.91
	Mizoram	1.87
	Nagaland	1.72
	Sikkim	1.05
	Tripura	1.7
Southern Region (SR)	Andhra Pradesh	1.68
	Karnataka	1.67
	Kerala	1.79
	Tamil Nadu	1.76
Country	India	1.99

Source: NFHS, 2019-21.

Table 2: *Age-specific Fertility Rates, Total Fertility Rates, and Crude Birth Rates by the residence of India*

Age	**NFHS-1(1992-93)**			**NFHS-2 (1996-98)**			**NFHS-3 (2005-06)**			**NFHS-4 (2015-16)**			**NFHS-5 (2019-21)**		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
15-19	75	131	116	68	121	107	57	105	90	35	59	51	27	49	43
20-24	203	243	231	179	222	210	166	231	209	143	205	184	123	184	165
25-29	154	177	170	127	150	143	123	146	139	114	135	128	110	127	122
30-34	71	108	97	57	75	69	48	69	62	44	55	51	50	49	50
35-39	27	51	44	18	33	28	13	31	25	12	20	17	13	15	14
40-44	6	19	15	3	11	8	4	9	7	2	5	4	3	3	3
45-49	4	6	5	1	4	3	1	4	3	0	2	1	0	1	1
TFR	2.7	3.67	3.39	2.27	3.07	2.85	2.06	2.98	2.68	1.75	2.41	2.18	1.63	2.14	1.99

***Source*:** National Family Health Survey-1 to National Family Health Survey-5

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Table 3: *Total Fertility Rates by background characteristics of India*

*NA- Not Available * () Based on 125-249 woman-years of exposure for the total fertility rate

Background characteristics	TFR(NFHS-1)	TFR(NFHS-2)	TFR(NFHS-3)	TFR(NFHS-4)	TFR(NFHS-5)
Residence					
Urban	2.70	2.27	2.06	1.75	1.63
Rural	3.67	3.07	2.98	2.41	2.14
Schooling					
No schooling	4.03	3.47	3.55	3.07	2.82
Less than 5 years complete	3.01	2.64	2.45	2.43	2.30
5-7 years complete	} 2.49	} 2.26	2.51	2.38	2.21
8-9 years complete			2.23	2.19	2.12
10-11 years complete	} 2.15	} 1.99	2.08	1.99	1.88
12 or more			1.8	1.71	1.78
Religion					
Hindu	3.30	2.78	2.59	2.13	1.94
Muslim	4.41	3.59	3.40	2.62	2.36
Christian	2.87	2.44	2.34	1.99	1.88
Sikh	2.43	2.26	1.95	1.58	1.61
Buddhist/neo- Buddhist	NA	2.13	2.25	1.74	1.39
Jain	NA	1.90	(1.54)	1.20	1.60
Other	2.77	2.33	3.98	2.57	2.15
Caste/tribe					
Scheduled caste	3.92	3.15	2.92	2.26	2.08
Scheduled tribe	3.55	3.06	3.12	2.48	2.09
Other backward class	NA	2.83	2.75	2.22	2.02
Other	3.30	2.66	2.35	1.93	1.78
Wealth index					
Low	NA	3.37	3.89	3.17	2.63
Medium	NA	2.85	2.58	2.07	1.89
High	NA	2.10	1.78	1.54	1.57
Total	3.39	2.85	2.68	2.18	1.99

and 25-49 unweighted cases for the mean number of Children-ever born.

Source: NFHS-1, NFHS-2, NFHS-3, NFHS-4 & NFHS-5.