Primary and Secondary Infertility among women in India: Prevalence and Correlates

Harihar Sahoo, Chander Shekhar and Labhita Das

Introduction

Infertility is a critical public health issue that affects millions of people globally, characterized by the inability to conceive after 12 months of regular unprotected sexual intercourse. Worldwide, it is estimated that between 8–12% of couple experience infertility at some point during their reproductive years, impacting an estimated 50–80 million individuals. Infertility is not merely a medical condition but also a social and emotional challenge, particularly in regions where cultural norms place a high value on fertility and childbearing. The World Health Organization (WHO) highlights that infertility, both primary (where conception has never occurred) and secondary (where prior pregnancies have occurred), poses significant physical, emotional, and psychological burdens on individuals and families.

In India, infertility has received relatively less attention compared to issues such as high fertility rates and family planning. The Indian government's reproductive health programs have historically focused on population control rather than addressing the complexities of infertility. According to census data from 1981, infertility in India affected 4–6% of couples, with primary infertility being a notable concern. More recent studies estimate the overall prevalence of primary infertility to range from 3.9% to 16.8%. However, the prevalence and determinants of infertility vary widely across different regions, social groups, and economic strata. Infertility in India is a multifaceted issue influenced by biological, socioeconomic, and cultural factors. Women's access to fertility treatment, awareness of reproductive health, and cultural expectations all play significant roles in shaping infertility trends. Furthermore, societal pressure and stigma often disproportionately affect women, who are frequently blamed for infertility despite male factors being responsible in approximately half of all cases. The primary objective of this study is to explore the prevalence and potential determinants of primary infertility among Indian women using comprehensive data from the National Family Health Survey (NFHS).

The study of infertility in India is further complicated by the lack of direct questions about infertility in large-scale surveys like the NFHS. Researchers often have to rely on proxy indicators such as marital duration, contraceptive use, and childbearing history to estimate infertility rates. Despite these challenges, studies consistently show that infertility remains a significant public health issue in India, with wide-ranging social and economic consequences. Given the infertility scenario among females in India and around the world, the present study would explore the pattern and assess the role of several socio-economic and demographic determinants of primary infertility among the currently married women in India.

Data and Methods

The data used in this study was sourced from the fifth round of National Family Health Survey (NFHS), a large-scale, multi-stage survey that collects data from a representative sample of households across India. The NFHS provides information on various indicators such as fertility, mortality, family planning, maternal and child health, nutrition, and

domestic violence at the national, state, and district levels. The NFHS-5 also collected information on the causes of each episode of contraception discontinuance in the 60 months prior to the survey, as well as month-by-month histories of a number of reproductive events such as pregnancy status, pregnancy outcomes, and contraceptive use. A calendar matrix with rows for the months and columns for the data was used to store monthly information It covered 707 districts and 36 states and Union Territories, based on the 2011 census classification.

For this study, the individual files (women's files) from fifth round of the NFHS were utilized, focusing on women in union aged 20–49 years. The data spans from 2019-21 and is used to assess the prevalence of infertility. The sample size in NFHS-5 consisted of 724,115 women. Among them, the number of currently married women was 512,408. Since the survey did not ask direct questions about infertility, six variables (*Age, duration of cohabitation, use of contraceptive methods, Children ever born, Children born in last five years and desire for children*) were used to construct variables for primary and secondary infertility. The women who did not have any birth, pregnancy termination and used no contraception in the calendar duration were kept in a variable. Drawing from previous research, it was assumed that women married for five years or more, currently in a union, have desire for children, with no terminated pregnancies, and who had never used contraceptives or borne children, might be experiencing infertility issues. For secondary infertility women who had a birth before 5 years and in cohabitation, currently in union, not using any contraceptives, have desire for children with no terminated pregnancies were considered.

Bivariate and multivariate analyses were carried out. The predictors in the model included age, age at first marriage, place of residence, religion, caste, education, mass media exposure, standard of living, diet, smoking habits, hypertension, respiratory diseases, cardiovascular diseases, BMI, and thyroid conditions.

Results

The analysis revealed that the prevalence of primary and secondary infertility among women was 1.5% and 13.7% respectively. The southern region reported the highest prevalence of primary infertility with 2.1%. Highest level of secondary infertility was also observed in southern region (22%) and lowest in Eastern region (10.5%). Nationally, infertility (both primary and secondary) rates were highest among women aged 30-34 years (2.7% and 21.5% respectively) and lowest among women aged 20-24. The prevalence of infertility is higher among Hindu women compared to women from other religions, among women who use smoke and smokeless tobacco. Obesity is another key factor, with 2% of obese women experiencing primary infertility and 16% women experiencing secondary infertility. Among the women who had a diversified diet was observed to have lower rates of infertility. It was found that, women suffering from thyroid disorders have the highest rates of infertility. Moreover, infertility rates were observed to be higher among the women with diabetes, any respiratory diseases or cardiovascular diseases (bivariate results are not shown in the Table).

Table 1: Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing relationship between infertility and selected background variables, women aged 20-49

Background Variables	Primary infertility	Secondary infertility	Background Variables	Primary infertility	Secondary infertility
Age			**Exposure to mass media**		
20-24®			No®		
25-29	3.97***(3.66-4.32)	7.29***(6.86-7.75)	Yes	0.96 (0.9-1.03)	0.92***(0.89-0.96)
30-34	3.62***(3.31-3.95)	8.70***(8.18-9.25)	**Diabetes**		
35+	1.78***(1.63-1.94)	4.21***(3.95-4.48)	No®		
Wealth Index			Pre-diabetic	1.09**(0.99-1.21)	1.01 (0.95-1.08)
Poor®			Diabetic	1.13 (0.96-1.33)	1.07 (0.97-1.18)
Middle	0.94*(0.87-1.01)	0.97 (0.93-1.01)	**Thyroid**		
Rich	0.88***(0.81-0.95)	0.98 (0.94-1.03)	No®		
Region			Yes	2.01***(1.79-2.26)	1.51***(1.4-1.62)
North®			**Respiratory disease**		
Central	1.58***(1.45-1.73)	1.15***(1.09-1.21)	No®		
East	1.57*** (1.43-1.72)	1.16***(1.1-1.23)	Yes	0.76**(0.6-0.95)	0.80***(0.7-0.91)
North East	0.73*** (0.65-0.84)	1.22***(1.15-1.3)	**Alcohol**		
West	1.56***(1.41-1.73)	1.07**(1-1.13)	No®		
South	2.10***(1.92-2.3)	1.73***(1.64-1.82)	Yes	1.04 (0.87-1.26)	0.86***(0.77-0.95)
Educational attainment			**Tobacco**		
No education®			No®		
Primary	1.05 (0.96-1.14)	1 (0.95-1.06)	Yes	1.07 (0.83-1.39)	1.37***(1.22-1.53)
Secondary	0.99 (0.93-1.07)	1.15***(1.1-1.2)	**Smoking**		
Higher	0.88**(0.79-0.97)	0.99 (0.94-1.05)	No®		
Place of residence			Yes	1.20***(1.08-1.35)	1.11***(1.05-1.18)
Urban ®			**Dietary diversity**		
Rural	0.93**(0.87-0.99)	0.92***(0.88-0.95)	No®		
Religion			Yes	0.82***(0.71-0.95)	1.14***(1.06-1.22)
Hindu®			**Body Mass Index**		
Muslim	0.9**(0.83-0.98)	1.35***(1.29-1.42)	Underweight®		
Christian	0.69***(0.6-0.8)	1.26***(1.18-1.34)	Normal	1.25***(1.15-1.35)	1.27*(1.21-1.34)
Others	0.99 (0.86-1.13)	1.26***(1.18-1.35)	Overweight	1.6***(1.46-1.76)	1.49*(1.41-1.58)
Caste			Obese	1.88***(1.67-2.12)	1.65*(1.53-1.77)
Scheduled caste®					
Scheduled tribe	1.15***(1.05-1.25)	1.42***(1.35-1.5)			
OBC	0.89***(0.83-0.96)	0.98 (0.93-1.02)			
Others	0.89***(0.82-0.96)	0.96 (0.91-1.01)			

Note: ®: Reference category; Significance level *p < 0.1. **p < 0.05. ***p < 0.01

The issue of infertility was found to be more prominent in the southern region. This may be attributed to lifestyle factors and the higher age at marriage among women in southern states, contrasting with trends in the northern states. The findings indicate that age play a

critical role in determining primary infertility across regions of India, reinforcing earlier studies in the field. Furthermore, urban women face a higher rate of infertility than their rural counterparts, potentially due to environmental and lifestyle differences. This aligns with the evidence that environmental factors and living conditions significantly influence infertility. Educational attainment and living standards are also key determinants of infertility. The study found that infertility rates decrease as education and living standards rise, likely because more educated and wealthier women have greater access to fertility treatments and healthcare. However, this contradicts some literature suggesting that women from higher socioeconomic strata are more exposed to lifestyle-related infertility risk.

Body mass index (BMI), dietary habits, and thyroid disorders are significant contributors to infertility further highlighting the role of diet in reproductive health. Overweight and obese women, as well as those suffering from thyroid issues, are more prone to infertility. While earlier studies had not consistently emphasized the role of these factors, this study underscores their importance.

In conclusion, primary and secondary infertility in India is influenced by a complex array of factors, including age, education, socioeconomic status, diet and health conditions such as obesity and thyroid disorders. Addressing infertility require a multifaceted approach, considering both medical and lifestyle interventions, to reduce the burden of infertility across various regions and social groups.