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Falling Fertility Rate in India: A Public Health Hazard

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ABSTRACT

India's falling fertility rate, now below the 2.1 replacement level, signals a demographic shift with both successes (family planning) and emerging prime public health concerns, including rising infertility from lifestyle and environmental factors (pollution, stress, obesity etc.), impacting economic growth and aging populations, necessitating a focus on comprehensive reproductive health beyond mere numbers. While indicating improved female education and empowerment, this transition creates new challenges like workforce shrinkage and increased dependency on seniors, alongside unmet reproductive needs, making infertility a significant public health hazard. While family planning is a riproaring success, the rapid dip below replacement, coupled with rising infertility, creates a complex public health challenge that India needs to address proactively to balance demographic shifts and ensure inclusive reproductive well-beingThe present paper elicits Urban and Rural TFR in States & Uts, low fertility and high fertility states in India and reasons for low fertility, high fertilityu and fertility variations in males and females

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Key Words: Fertility Rates, Male and Female Fertility Rates, Health Hazards in India

1. INTRODUCTION

Infertility, once considered an urban issue, is now a growing concern across India, impacting rural and semi-urban areas due to factors like environmental pollution, lifestyle changes, and limited access to healthcare. The declining fertility rate necessitates region-specific fertility treatments, increased awareness, and accessible care in Tier 2 and 3 cities to address this public health challenge and ensure inclusive parenthood. Infertility was always viewed as a largely urban issue due to lifestyle, workplace pressures, and delayed parenthood for the longest period. While these factors contribute to infertility in the metros, the reality of the presence of infertility in the tier 2 and rural areas is often overlooked. Infertility today spans urban, semi-urban, and rural areas, depending on geography, socioeconomic status, and environmental parameters. As per the recent figures of the National Family Health Survey (NFHS-5), there is a concerning trend. India's overall fertility rate has fallen to 2.0 below the replacement level of 2.1 for the first time. Presently, India is at a critical demographic junction. This is indicative of a broader problem: infertility is emerging as a public health problem, rather than merely a couple's issue relegated to the four walls of their homes.

The Urban Struggle

In cities, the major reasons for infertility are advanced maternal age, high stress levels, inactive lifestyle, unhealthy diet and less intimacy.More couples are opting to conceive later, usually in their mid-to-late thirties, which can biologically diminish the fertility potential. In men, lifestyle-related declines in sperm quality and quantity are also being noted. In Tier 2 cities, the reasons vary from health conditions such as undiagnosed PCOS, obesity, to increased alcohol and tobacco use and heightened stress levels.

Toxicity from the environment—such as industrial pollutants, water with heavy metal contamination can be among those contributing to declining fertility. Male infertility is also on the rise, with research demonstrating decreasing semen quality amongst both urban and semi-urban populations. Studies in Thoothukudi, an industrial city, showed that pollution of the environment by chemical industries may have been responsible for endocrine disruption. This may have caused infertility and stillbirths as well as birth defects. Rural India also has its unique set of challenges. Infertility is caused by malnutrition, ignorance, contact with agrochemicals and pesticides, and untreated conditions such as pelvic inflammatory disease that can harm reproductive organs. In many areas of rural India, extensive application of industrial fertilizers and pesticides has provoked debate on their long-term effects on hormonal function and reproduction, particularly among farming communities.

A 2023 review in the Journal of Human Reproductive Sciences verifies that exposure to pesticides in rural populations in agricultural belts such as Punjab and Western UP has been linked to changed sperm parameters, reduced sperm count and compromised ovarian function in females. Moreover, socio-cultural stigma and lack of access to reliable diagnostic care can make infertility a silent burden in rural areas. What we're witnessing is a complex mix of biological, environmental, and social factors that differ by region yet are united by one common thread, which is the growing need for accessible and high-quality fertility care. This is where India's fertility industry is starting to come of age. Fertility treatment can no longer be a generic model. The heterogeneity of the country demands region-specific, bespoke treatment patterns considering local dietary patterns, stress levels, exposure to the environment, and even socio-cultural practices. By taking fertility care out of metros and into Tier 2 and Tier 3 areas, we are witnessing a change.

With more than 50 per cent of the centres located in small towns now, there is greater access, earlier intervention, and most importantly, awareness. Awareness on subjects like irregular menstrual cycles, male factor-induced infertility problems are being relentlessly pushed in Tier 2 areas as well as rural areas. There is also the benefit of more advanced technologies being available in the underserved regions. The aim is to provide international standard quality fertility treatment, along with bearing in mind the regional sensitivities. With greater insight into regional specificity and a concerted effort to normalize fertility discussions across the board, India can tackle its own fertility crisis, geography by geography. Through an all-encompassing tackling of these issues, the right to parenthood is in reach and inclusive for all Indians.(By Mr Shobhit Agarwal, CEO, Nova IVF Fertility)

2. REASONS FOR INFERTILITY

Effective Family Planning Programme Implementation

It helps create a social atmosphere that is favourable to family planning, promoting the acceptance of a "small family norm.

Changing Social Attitudes towards marriage and reproduction

Women are increasingly exercising choice by marrying late or not at all, often prioritizing careers and financial independence over motherhood.

High Parenting Standards

The social expectation of intensive parenting (spending significant time and resources on each child's development) makes having many children seem overwhelming or impractical.

3. GOVERNMENT INITIATIVES FOR POPULATION GROWTH

National Population Policy (2000)

The National Population Policy (2000) set the goal of stabilising population by achieving replacement level fertility focusing on maternal and child health and wider access to contraception.

Expanded Contraceptive Basket: New options like Injectable contracptive (Antara) and Cebtchroman (Chhaya)

Added alongside condoms, pills, IUCDs and sterilisation to give people more choice

Mission Parivar Vikas: Focused programme in 7 high-fertility and 6 North-Eastern states to make family planning services more accessible.

High Parenting Standards: The social expectation of **intensive parenting** (spending significant time and resources on each child's development) makes having many children seem overwhelming or impractical.

Improved Health and Lower Infant Mortality: Better health conditions, indicated by a lower Infant Mortality Rate (IMR), are linked to higher contraceptive use and lower fertility.

Weakening of Son Preference: A strong preference for sons can keep fertility rates high, as couples may continue having children until they achieve a desired number of sons.

Rising Infertility and Use of Abortion: Many experts observe that rising rates of infertility in both men and women and abortions are important factors which could be contributing to this decline in fertility.

4. IMPACT OF DECLINING TOTAL FERTILITY RATE

Positive impact

Economically Active Population: As fertility rates have declined, the proportion of the population in the "economically active" age group of 15-59 years has **correspondingly increased.**

Stimulate Economic Growth: Falling fertility rates can boost economic growth by encouraging higher workforce participation, greater savings, and increased investment in physical and human capital.

Reduce Social Inequities: The slowing of population growth provides an opportunity to ensure that public services like education and health are available to everyone which can help reduce social and regional disparities.

Environmental Sustainability: Reduce pressures on the environment associated with climate change, depletion of natural resources, and environmental degradation.

Negative Impact

Impede economic and social progress: Fewer births and smaller populations naturally mean fewer workers, savers, and spenders, potentially sending an economy into contraction.

Ageing population: States with a longer history of low fertility rates, such as Kerala (TFR 1.5), now have the highest proportion of elderly persons at 15.1%.

Uneven Regional Growth: Fertility variations may deepen **regional inequalities and affect representation.**

All States reporting higher than replacement level TFR are in northern India — Bihar, Uttar Pradesh, Madhya Pradesh, Rajasthan, and Chhattisgarh.

Irreversibility of Fertility Decline: Once fertility declines, it rarely rebounds.

Countries like South Korea, which tried to stem the demographic crisis have failed and the fertility rate plunged from 0.78 in 2022 to 0.72 in 2023.

Way Forward

- **Adopt a differential policy approach:** While low-TFR states may need pro-natal incentives, high-TFR states still require sustained investment in female education and accessible health services.
- **Rights-Based Family Planning:** Maintain the current rights-based approach to family planning by expanding the basket of contraceptive choices (moving beyond female sterilization).

- **Plan for an Ageing Population:** This includes considering the sustainability of social security and pension systems.
- **Affordable and Subsidized Childcare:** Implement universal, high-quality, and subsidized **crèche/childcare** facilities (like the "Palna Scheme") across urban and semi-urban centers to ensure women can continue their careers.
- **Gender-Neutral Parental Leave:** Enforce and encourage the use of **paid parental leave for both parents** to normalize shared caregiving and reduce the career penalty for mothers

5. FERTILITY RATE IN INDIA 2025

The **Total Fertility Rate (TFR)** for India as per the census 2011 was 2.4 per woman. As per recent studies and surveys, the majority of Indian state's fertility rate has fallen well below the replacement level of 2.1 and the country is fast approaching the replacement level itself. According to the National Family Health Survey (NFHS-5), The total fertility rate of India stands at 2 as of 2024. In rural areas of India, the Fertility rate is 2.1, and in Urban areas of India, it's 1.6.

Indian States by Fertility Rate

In most Indian States Fertility rate has declined in the last decade and it's now below the National Average of 2. There are now only five states that have a TFR above the replacement level of fertility of 2.1 children per woman: Bihar (2.98), Meghalaya (2.91), Uttar Pradesh (2.35), Jharkhand (2.26), and Manipur (2.17). Among the bigger States/UTs, it varies from 1.6 in Delhi to 3 in Bihar. For rural areas, it varies from 1.7 in West Bengal to 3.1 in Bihar. For urban areas, such variation is from 1.4 in West Bengal to 2.4 in Bihar.

6. TOTAL, URBAN AND RURAL TFR IN STATES & UTS

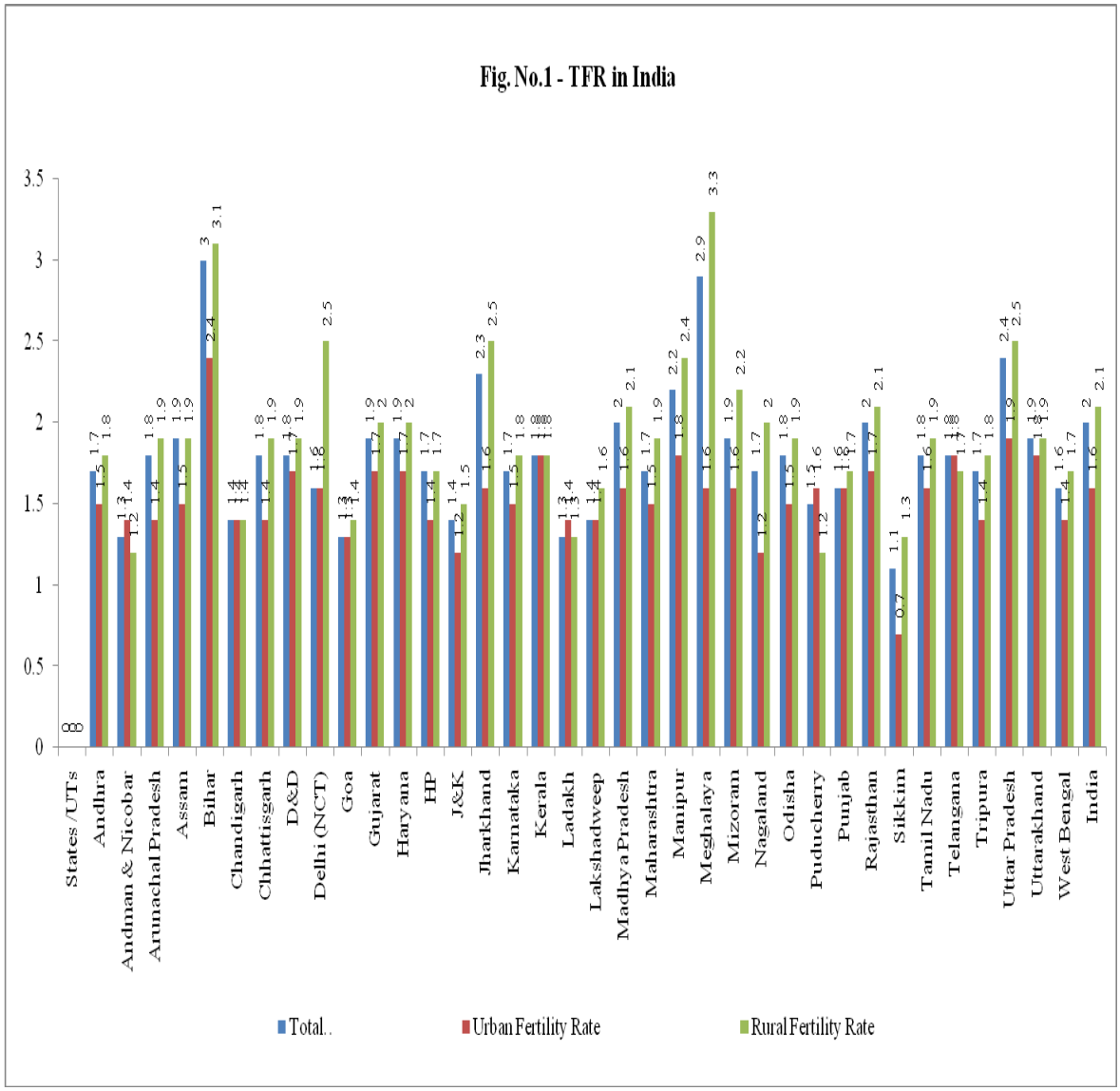
Table 1 and Fig.1 show the total, urban and rural TFR in India.

Table 1
TFR in India

Sl. No.	States /UTs	Total Fertility Rate	Urban Fertility Rate	Rural Fertility Rate
1	Andhra	1.7	1.5	1.8
2	Andman & Nicobar	1.3	1.4	1.2
3	Arunachal Pradesh	1.8	1.4	1.9
4	Assam	1.9	1.5	1.9
5	Bihar	3.0	2.4	3.1
6	Chandigarh	1.4	1.4	1.4
7	Chhattisgarh	1.8	1.4	1.9
8	D&D	1.8	1.7	1.9
9	Delhi (NCT)	1.6	1.6	2.5
10	Goa	1.3	1.3	1.4
11	Gujarat	1.9	1.7	2.0

12	Haryana	1.9	1.7	2.0
13	HP	1.7	1.4	1.7
14	J&K	1.4	1.2	1.5
15	Jharkhand	2.3	1.6	2.5
16	Karnataka	1.7	1.5	1.8
17	Kerala	1.8	1.8	1.8
18	Ladakh	1.3	1.4	1.3
19	Lakshadweep	1.4	1.4	1.6
20	Madhya Pradesh	2.0	1.6	2.1
21	Maharashtra	1.7	1.5	1.9
22	Manipur	2.2	1.8	2.4
23	Meghalaya	2.9	1.6	3.3
24	Mizoram	1.9	1.6	2.2
25	Nagaland	1.7	1.2	2.0
26	Odisha	1.8	1.5	1.9
27	Puducherry	1.5	1.6	1.2
28	Punjab	1.6	1.6	1.7
29	Rajasthan	2.0	1.7	2.1
30	Sikkim	1.1	0.7	1.3
31	Tamil Nadu	1.8	1.6	1.9
32	Telangana	1.8	1.8	1.7
33	Tripura	1.7	1.4	1.8
34	Uttar Pradesh	2.4	1.9	2.5
35	Uttarakhand	1.9	1.8	1.9
36	West Bengal	1.6	1.4	1.7
	India	2.0	1.6	2.1

Source: National Family Health Survey 5



Source: National Family Health Survey 5

States with High Fertility Rate

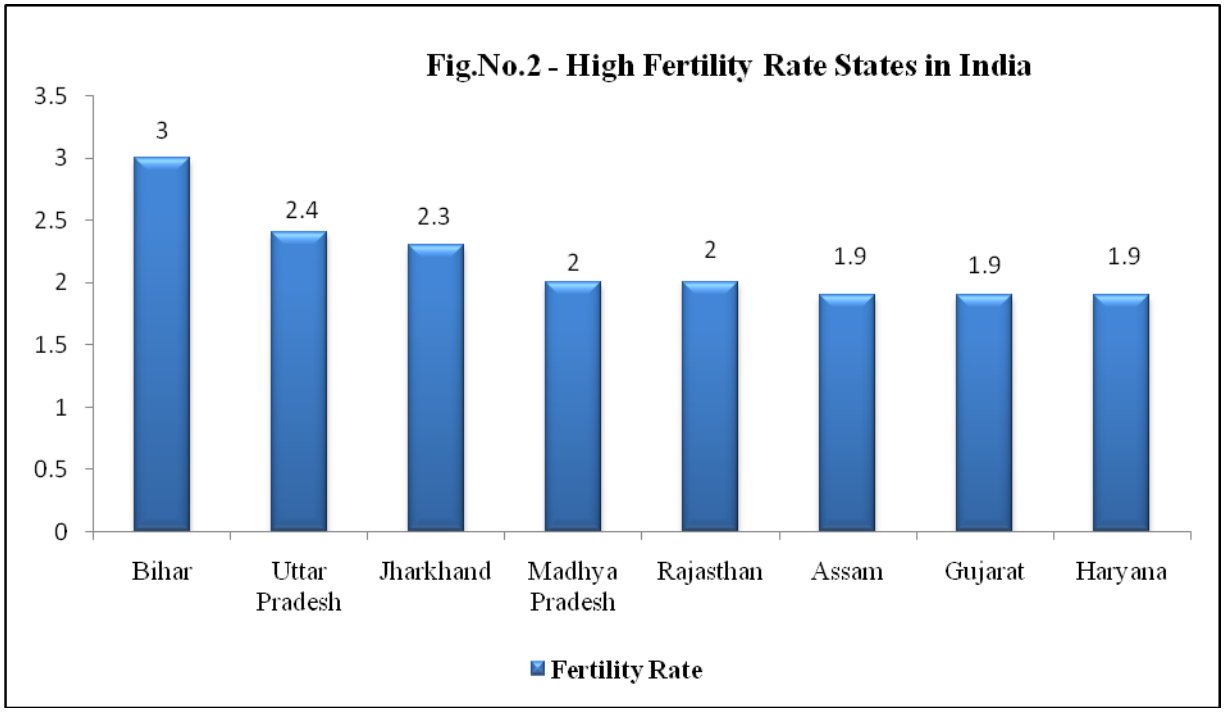
The top 5 Big Indian States by Fertility rate as per National Family Health Survey are Bihar, Uttar Pradesh, Jharkhand, Madhya Pradesh and Rajasthan. The table 2 and fig.2 show the top 5 Big Indian States by Fertility rate.

Table 2
High Fertility Rate States in India

Sl. No.	States	Fertility Rate
1	Bihar	3
2	Uttar Pradesh	2.4
3	Jharkhand	2.3
4	Madhya Pradesh	2
5	Rajasthan	2

6	Assam	1.9
7	Gujarat	1.9
8	Haryana	1.9

Source: National Family Health Survey 5



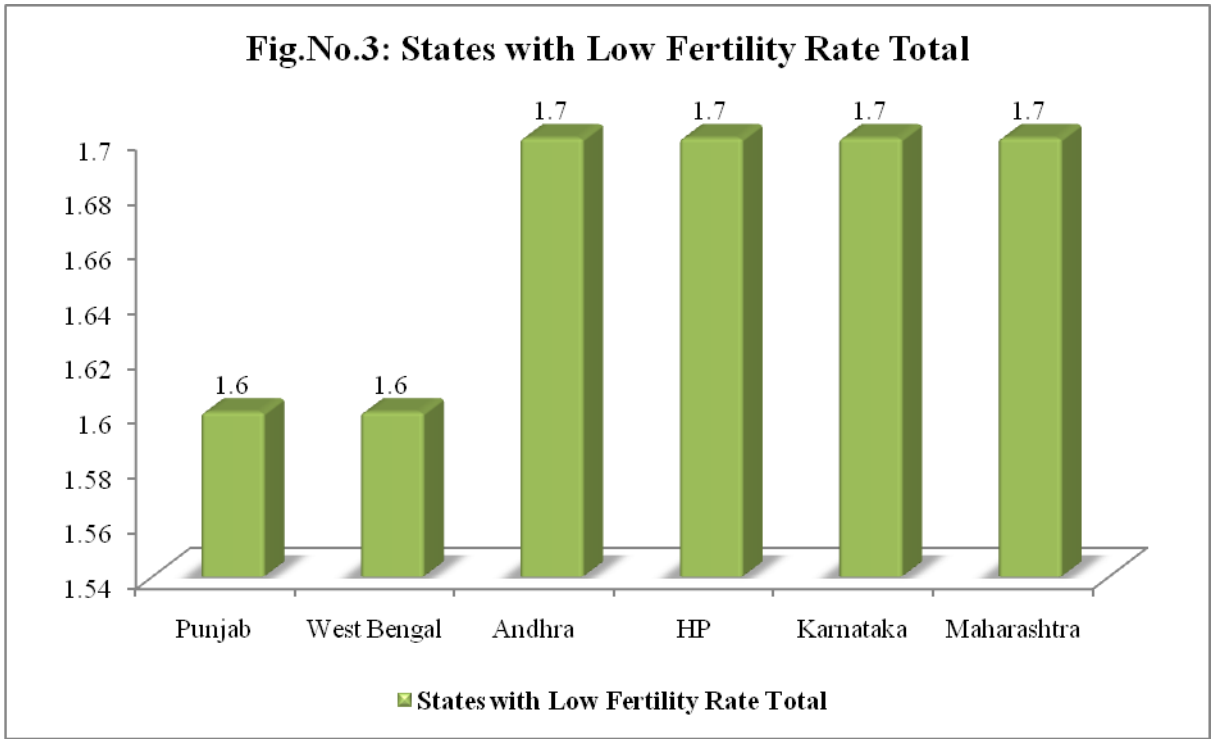
States with Low Fertility Rate

The 5 Big Indian States by Lowest Fertility rate as per are Punjab, West Bengal, Andhra, Himachal Pradresh, Karnataka and Maharashtra and are shown in the table 3 and fig.3.

Table 3
States with Low Fertility Rate

Sl. No.	**States**	**Total**
1	Punjab	1.6
2	West Bengal	1.6
3	Andhra	1.7
4	HP	1.7
5	Karnataka	1.7
6	Maharashtra	1.7

Source: National Family Health Survey 5

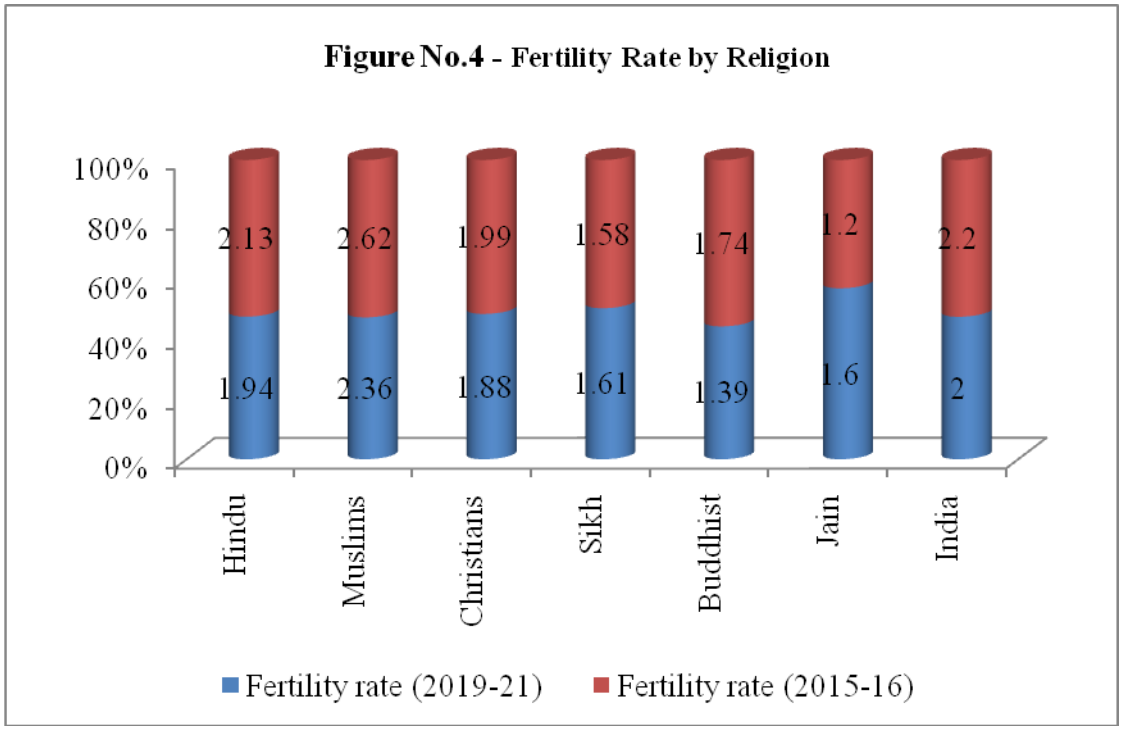


Fertility Rate by Religion

The National Family Health Survey data (Table 4 and Fig.4) shows that the Fertility rate has declined in each religious group. Muslim TFR has fallen by 9.9%, for Hindus by 8.9%, for Christians by 5.5%, and for Sikhs, it rose by 1.9%. The total fertility rate is the highest among Muslims (2.36) followed by Hindus (1.94) and Christians (1.88). Other than Muslims the TFR has fallen in all religious groups below the replacement level of 2.1.

Table 4
Fertility Rate by Religion

Sl. No.	**Religion**	**Fertility rate (2019-21)**	**Fertility rate (2015-16)**
1	Hindu	1.94	2.13
2	Muslims	2.36	2.62
3	Christians	1.88	1.99
4	Sikh	1.61	1.58
5	Buddhist	1.39	1.74
6	Jain	1.60	1.20
7	**India**	**2.00**	**2.20**



Male Fertility Rates

While specific 2025 state-wise male infertility rates aren't available, male factors contribute to 40-50% of India's overall infertility, affecting millions, with rising trends linked to lifestyle, obesity, and pollution, and data suggests higher burdens in certain regions, though precise state breakdowns for men are missing, with focus instead on national trends and general fertility rates.

Male infertility in India

Male infertility, experts say, is being driven by a confluence of modern stressors, ranging from poor lifestyle habits like smoking and alcohol use to rising obesity, environmental pollutants, and hormonal imbalances. Yet, societal stigma and silence continue to impede timely diagnosis and treatment. Dr. Ameet Patki, President of ISAR, warned that while India's IVF market is projected to soar, from USD 750 million in 2020 to a staggering USD 3.7 billion by 2030 those figures represent more than just business growth.

"Behind the market expansion are millions of emotionally taxing, often invisible journeys. Nearly half of these involve male-factor infertility, but men remain largely absent from the conversation," Dr Patki said at the just-concluded summit, which was hosted by the Integrated Health & Wellbeing (IHW) Council in collaboration with the Indian Society for Assisted Reproduction (ISAR) and supported by the Indian Fertility Society (IFS). This exclusion has real-world consequences: delays in diagnosis, gendered treatment approaches, and emotional distress for couples navigating the healthcare system.

According to Kamal Narayan, CEO of the IHW Council, "Male infertility is no longer a fringe issue, it is a national health priority. We cannot talk about inclusive fertility care without addressing this

reality head-on." The summit brought together clinicians, embryologists, hospital leaders, legal experts, and patient advocates in a bid to realign India's fertility care narrative.

One notable moment came with the launch of the book How to Freeze Your Biological Clock by Dr. Gunjan Gupta, Medical Director of Gunjan IVF World. Though primarily aimed at guiding women through fertility preservation, the book also contributes to the broader conversation around evidence-based and gender-inclusive fertility planning. The message from experts is clear: India's fertility ecosystem must move beyond stigma and adopt a scientifically grounded, emotionally attuned approach that acknowledges infertility as a shared burden and male reproductive health as a critical part of the solution.

7. FEMALE INFERTILITY RATES IN INDIA

The female infertility rate in India is estimated to be between 3.9% and 16.8% for primary infertility, with overall infertility rates rising to around27.5 million couples affected by infertility in recent studies. Some studies indicate an overall infertility rate as high as 15% in specific regions or demographics, with significant variation across different states. Factors contributing to this increase include lifestyle changes, delayed marriages, and a rise in secondary infertility.

Estimated prevalence

Overall infertility

Approximately 27.5 million couples in India are affected by infertility, according to recent figures.

Primary infertility

The World Health Organization (WHO) estimates the prevalence of primary infertility in India to be between 3.9% and 16.8%

State-level variation

Infertility rates differ significantly by state. For example, one study found a 49.4/1,000 49.4 / 1 comma 000 49.4/1,000 prevalence rate in Goa compared to a much lower rate of 6.2/1,0006.2 / 1 comma 0006.2/1,000in Ladakh.

Urban vs. rural

Urban areas report higher infertility rates, with some estimates reaching 15−20%15 minus 20 %15−20%, compared to rural areas at around 8−10%8 minus 10 % 8−10%

8. CONTRIBUTING FACTORS

Delayed marriage and childbirth

Factors like delaying marriage and childbirth are linked to infertility, as fertility declines with age, particularly after 35 for women.

Lifestyle and environmental factors:

Lifestyle changes, such as a sedentary lifestyle, and poor diet are contributing to the rising rates.

Secondary infertility

While primary infertility (inability to have a first child) has remained relatively stable, secondary infertility (inability to have a subsequent child) has significantly increased, driving the overall rise in infertility statistics.

Prevalence of STIs

Studies have shown a high prevalence of Sexually Transmitted Infections (STIs) among women who report primary infertility and Pelvic Inflammatory Disease (PID).

Measurement challenges

- Estimates vary due to different definitions of infertility, time periods studied, and population samples, making direct comparisons between studies challenging.
- Female infertility increasing
- Some are related to changes in our society. A few decades ago, most women had their first child at about 21. Today, that age is closer to 26 or 27. Many couples are waiting longer to start their families – they may want to finish their educations first, or get established in their careers

Top 3 causes of female infertility

- Polycystic ovary syndrome (PCOS)
- Thyroid problems – both an overactive thyroid gland and an underactive thyroid gland can prevent ovulation.
- Premature ovarian failure – where the ovaries stop working before the age of 40.
- Prevent infertility in females?
- AI Overview
- To prevent female infertility, maintain a healthy lifestyle by eating well, exercising moderately, managing weight (avoiding being overweight or underweight), quitting smoking and excessive alcohol/drugs, reducing stress, and limiting caffeine; also, address STIs and don't delay family planning, especially after 35, as egg quality declines with age

9. TREATMENT OPTIONS

- **Lifestyle Changes:** Diet, weight management, quitting smoking/alcohol.
- **Medications:** To induce ovulation or regulate hormones (e.g., Clomiphene, FSH).
- **Intrauterine Insemination (IUI):** Placing prepared sperm directly into the uterus.
- **Assisted Reproductive Technology (ART):** Including In-vitro fertilization (IVF).
- **Surgery:** To correct structural problems like fibroids, polyps, or blocked fallopian tubes.

10. CONCLUSION

Infertility acts as a major demographic force, driven by modern life's complexities and biological realities, leading to slower population growth and aging, while simultaneously creating deep personal and societal challenges. India's current fertility rate according to the 2025 UN report has dropped to 1.9, below the replacement level of 2.1. The states still have fertility rates above the national average are Ans. Bihar, Meghalaya, Uttar Pradesh, Jharkhand, and Manipur have higher-than-average fertility rates. The factors are influencing Indians to have fewer children include Ans. Financial strain, job insecurity, lack of partner support, and healthcare pressure are major factors. India's current population is 146.39 crore and is expected to peak at 170 crore before starting to decline in about 40 years. The UN report identify as the "real fertility crisis. The real crisis is individuals being unable to achieve their desired number of children, not overpopulation.

Expect more localized research in the coming years, but for now, focus on national trends and the broad causes, as specific 2025 state-wise male infertility rates are not widely publicized. India is facing a silent reproductive health crisis: of the estimated 27.5 million individuals grappling with infertility, male factors contribute to 40–50 per cent of cases, an often-overlooked reality, according to top fertility experts. The statistic challenges longstanding perceptions that place the burden of infertility primarily on women. "For too long, infertility has been viewed through a gendered lens that sidelines men. The data now compels us to confront male infertility as a mainstream medical issue, not a marginal one," said Dr. Pankaj Talwar, President of IFS, at the 6th National IVF Summit & Awards 2025.

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