



Infertility Burden Across Indian States: Insights from a Nationally Representative Survey Conducted During 2019-21

Varun Agiwal¹, R. Sai Madhuri², Sirshendu Chaudhuri^{3*}

1- Lecturer, Indian Institute of Public Health, Hyderabad, India

2- Research Assistant, Indian Institute of Public Health, Hyderabad, India

3- Assistant Professor, Indian Institute of Public Health, Hyderabad, India

Abstract

Background: Infertility is an escalating global concern, impacting approximately one-sixth of the reproductive age population worldwide. Employing data from the National Family Health Survey-5 (NFHS-5, 2019-21), this study assessed the prevalence of primary infertility at both national and state levels in India.

Methods: The data of the study was extracted from the National Family Health Survey and Individual file (women file) of the fifth round of NFHS encompassing a sample of 491,484 currently married women in the age group of 15–49 years.

Results: The findings showed that the prevalence of infertility is 18.7 per 1,000 women among those married for at least five years and currently in union. This prevalence increases as the duration of marriage decreases. On a state-level analysis, regions such as Goa, Lakshadweep, and Chhattisgarh exhibit the highest burdens.

Conclusion: These findings underscore the growing challenge posed by primary infertility in India, calling for targeted interventions and policy measures. The establishment of a national infertility surveillance system is of pivotal importance in addressing this pressing public health issue.

Keywords: Female infertility, India, Infertility, NFHS, Reproductive health.

To cite this article: Agiwal V, Sai Madhuri R, Chaudhuri S. Infertility Burden Across Indian States: Insights from a Nationally Representative Survey Conducted During 2019-21. *J Reprod Infertil.* 2023;24(4):287-292. <https://doi.org/10.18502/jri.v24i4.14156>.

* Corresponding Author:
Sirshendu Chaudhuri,
Assistant Professor; Indian
Institute of Public Health,
Hyderabad, India
E-mail:
sirshendusisu@gmail.com

Received: Sept. 5, 2023

Accepted: Oct. 7, 2023

Introduction

The prevalence of infertility is increasing rapidly, affecting almost one out of every six adult people of reproductive age (1). The socio-economic status of low- and middle-income countries makes the condition even more complicated (2). It necessitates the need for affordable and high-quality treatment of infertility as identified by the World Health Organization (WHO) (3).

In India, being the largest populous country, the major demographic focus has remained on population control (4). However, due to the large population in the reproductive age group, and with the changing lifestyle, the country contributes to a large proportion of global infertility. Earlier estimates from the representative sample of the coun-

try shows that the prevalence of infertility is 17.9% and the proportion remained static in the last two decades (5). Despite the high prevalence, unfortunately, the condition is hardly managed in primary health care as it does not come under the purview of any of the national health programs (6). This fact reflects how ignorant the country is in addressing the condition. Nevertheless, in the absence of any reliable primary and secondary estimates, it is important to update the relevant data from other sources to enable the policy makers to put substantial efforts in addressing the challenge. In this paper, national and state-level burden of primary infertility (from now onward primary infertility will be written as infertility) was estimated in India based on National Family

Health Survey-5 (NFHS-5) data (2019-21). The estimate updates the earlier estimation of infertility based on NFHS-1 to 4 as mentioned in a previously published article (5).

Methods

The data of the study was extracted from the NFHS-5 survey. The National Family Health Survey is a comprehensive and extensive multi-stage survey conducted across India, encompassing a representative sample of households covering 36 states and Union Territories (UT). It furnishes crucial data on various aspects such as fertility, mortality, family planning, maternal and child health indicators, *etc.* The survey's scope extends to both national and regional levels, enabling to extract valuable insights from the health and well-being of families across the country. In the present study, Individual file (women file) of the fifth round of NFHS was used encompassing the sample of currently married women of the age group of 15–49 years. Like the previous published article, seven variables were utilized to define primary infertility. The variables included currently married women who have been married for five years or more, are not currently pregnant, have never used contraceptives, have had no terminated pregnancies, and have zero children ever born (5, 7).

Anonymized data was extracted from NFHS-5 after taking due permission from the Demographic and Health Survey (DHS). The data analysis was done in STATA version 14.0. Descriptive statistics was used to estimate the distribution. The burden of infertility was expressed as prevalence per 1,000 married women who are currently in union. In addition to burden of infertility after five years of marriage, the burden for women whose marriage duration is one to four years was estimated as well. Those observations were excluded where no component of the outcome variable could be extracted.

Results

The data from a sample of 491,484 women from NFHS-5 were analyzed. The prevalence of infertility in India during 2019-20 was 18.7/1,000 among women who have been married for at least five years and who are currently in union. The prevalence increases when the duration of marriage is decreased. The prevalence is the highest when the duration of marriage is one year (42.9/1,000) compared to the duration of marriage being

more than two years (30.7/1,000), three years (24.1/1,000), and four years (20.7/1,000) (Table 1).

State-level analysis suggests that the state/UTs with the highest burden include Goa (49.4/1,000), Lakshadweep (47.3/1,000), and Chhattisgarh (31.6/1,000) considering the minimum marriage duration of five years or more. On the contrary, the prevalence was low in the states/UTs like Ladakh (6.2/1,000), Uttarakhand (9.6/1,000), and Meghalaya (9.7/1,000) (Figure 1). The state-level distributions remain similar even when adjusting for variations in the duration of marriage (Table 1).

Discussion

In this study, the primary infertility prevalence was estimated across the various states and Union Territories (UTs) in India, utilizing data sourced from the National Family Health Survey-5 (NFHS-5). To provide a more comprehensive understanding of the temporal aspects of infertility, estimates were also presented based on the duration of marriage, thereby shedding light on the period prevalence of infertility in this context.

Infertility studies often encounter several substantial challenges, including variations in the definition of infertility, methodological differences, and limitations in generating population-based estimates, as indicated by the World Health Organization (WHO) report (1). Nonetheless, existing evidence suggests a notable upward trend in the prevalence of infertility (1). A large meta-analysis indicated that the global pooled prevalence of primary infertility may reach as high as 51.5% (8). A recent report by the World Health Organization underscores that one out of every six individuals experiences lifetime infertility, with a minimal difference in burden between low- and high-income countries. In India, the available literature pertaining to population-based infertility burden remains limited to specific subpopulations (9). An earlier analysis, based on NFHS-1 to 4 data, suggests that one out of every six women faced childlessness during the years 2015-16 (5). Though state-wise estimates were not provided, it was observed that the southern states bore the heaviest burden. Our current findings indicate a marginal increase in infertility prevalence compared to the estimate from 2015-16, with the southern states continuing to exhibit the highest prevalence in the country. When considering the trends over the last three decades, India experi-

Table 1. Prevalence of infertile women in 1000 married ones

| Infertile women Married women | Marriage duration ≥ 1 year | | Marriage duration ≥ 2 years | | Marriage duration ≥ 3 years | | Marriage duration ≥ 4 years | | Marriage duration ≥ 5 years | |
|----------------------------------|---------------------------------|------------------|----------------------------------|------------------|----------------------------------|------------------|----------------------------------|------------------|----------------------------------|------------------|
| | N | n (prevalence) * | N | n (prevalence) * | N | n (prevalence) * | N | n (prevalence) * | N | n (prevalence) * |
| India | 491484 | 21089 (42.9) | 473697 | 14530 (30.7) | 454714 | 10958 (24.1) | 436803 | 9044 (20.7) | 419293 | 7853 (18.7) |
| Jammu And Kashmir | 13439 | 518 (38.5) | 12841 | 283 (22) | 12279 | 191 (15.6) | 11778 | 164 (13.9) | 11287 | 141 (12.5) |
| Himachal Pradesh | 7446 | 226 (30.4) | 7202 | 150 (20.8) | 6926 | 118 (17) | 6659 | 106 (15.9) | 6446 | 95 (14.7) |
| Punjab | 14694 | 503 (34.2) | 14163 | 331 (23.4) | 13635 | 255 (18.7) | 13143 | 207 (15.7) | 12604 | 178 (14.1) |
| Chandigarh | 478 | 18 (37.7) | 462 | 11 (23.8) | 454 | 8 (17.6) | 438 | 6 (13.7) | 424 | 5 (11.8) |
| Uttarakhand | 8969 | 254 (28.3) | 8626 | 155 (18) | 8282 | 106 (12.8) | 7958 | 84 (10.6) | 7682 | 74 (9.6) |
| Haryana | 15113 | 470 (31.1) | 14556 | 291 (20) | 13959 | 203 (14.5) | 13413 | 152 (11.3) | 12861 | 136 (10.6) |
| NCT Of Delhi | 7121 | 241 (33.8) | 6873 | 168 (24.4) | 6604 | 135 (20.4) | 6336 | 107 (16.9) | 6097 | 90 (14.8) |
| Rajasthan | 28432 | 1411 (49.6) | 27367 | 943 (34.5) | 26197 | 680 (26) | 25088 | 521 (20.8) | 23997 | 443 (18.5) |
| Uttar Pradesh | 60519 | 2478 (40.9) | 58197 | 1708 (29.3) | 55724 | 1245 (22.3) | 53332 | 991 (18.6) | 51093 | 852 (16.7) |
| Bihar | 30393 | 1381 (45.4) | 29196 | 836 (28.6) | 27948 | 593 (21.2) | 26779 | 449 (16.8) | 25599 | 380 (14.8) |
| Sikkim | 2084 | 79 (37.9) | 2025 | 58 (28.6) | 1957 | 43 (22) | 1884 | 36 (19.1) | 1802 | 30 (16.6) |
| Arunachal Pradesh | 12943 | 495 (38.2) | 12417 | 316 (25.4) | 11898 | 218 (18.3) | 11485 | 166 (14.5) | 11049 | 147 (13.3) |
| Nagaland | 5435 | 187 (34.4) | 5179 | 132 (25.5) | 4953 | 105 (21.2) | 4729 | 93 (19.7) | 4493 | 82 (18.3) |
| Manipur | 5041 | 151 (30) | 4850 | 116 (23.9) | 4643 | 92 (19.8) | 4412 | 77 (17.5) | 4192 | 68 (16.2) |
| Mizoram | 4070 | 185 (45.5) | 3909 | 132 (33.8) | 3773 | 109 (28.9) | 3655 | 98 (26.8) | 3517 | 91 (25.9) |
| Tripura | 5594 | 180 (32.2) | 5392 | 114 (21.1) | 5172 | 79 (15.3) | 4954 | 65 (13.1) | 4746 | 55 (11.6) |
| Meghalaya | 7640 | 192 (25.1) | 7342 | 106 (14.4) | 7078 | 80 (11.3) | 6795 | 67 (9.9) | 6466 | 63 (9.7) |
| Assam | 24700 | 1071 (43.4) | 23773 | 705 (29.7) | 22731 | 485 (21.3) | 21737 | 403 (18.5) | 20803 | 341 (16.4) |
| West Bengal | 15877 | 590 (37.2) | 15304 | 396 (25.9) | 14703 | 300 (20.4) | 14129 | 255 (18) | 13576 | 223 (16.4) |
| Jharkhand | 18757 | 825 (44) | 18091 | 598 (33.1) | 17304 | 441 (25.5) | 16567 | 365 (22) | 15911 | 324 (20.4) |

Contd. Table 1. Prevalence of infertile women in 1000 married ones

| Infertile women Married women | Marriage duration ≥1 year | | Marriage duration ≥2 years | | Marriage duration ≥3 years | | Marriage duration ≥4 years | | Marriage duration ≥5 years | |
|----------------------------------|---------------------------|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|----------------------------|------------------|
| | N | n (prevalence) * | N | n (prevalence) * | N | n (prevalence) * | N | n (prevalence) * | N | n (prevalence) * |
| Odisha | 19397 | 770 (39.7) | 18713 | 573 (30.6) | 18005 | 470 (26.1) | 17286 | 404 (23.4) | 16570 | 356 (21.5) |
| Chhattisgarh | 18237 | 1028 (56.4) | 17545 | 788 (44.9) | 16836 | 637 (37.8) | 16136 | 558 (34.6) | 15486 | 489 (31.6) |
| Madhya Pradesh | 33766 | 1425 (42.2) | 32588 | 958 (29.4) | 31187 | 711 (22.8) | 29955 | 569 (19) | 28833 | 490 (17) |
| Gujarat | 23400 | 1226 (52.4) | 22638 | 884 (39) | 21853 | 667 (30.5) | 21031 | 545 (25.9) | 20216 | 465 (23) |
| Dadra & Nagar Haveli | 1737 | 85 (48.9) | 1671 | 60 (35.9) | 1592 | 42 (26.4) | 1527 | 32 (21) | 1455 | 28 (19.2) |
| Maharashtra | 24292 | 1112 (45.8) | 23434 | 723 (30.9) | 22577 | 545 (24.1) | 21826 | 447 (20.5) | 20987 | 376 (17.9) |
| Andhra Pradesh | 8020 | 362 (45.1) | 7767 | 271 (34.9) | 7522 | 227 (30.2) | 7300 | 198 (27.1) | 7054 | 172 (24.4) |
| Karnataka | 21081 | 1088 (51.6) | 20408 | 830 (40.7) | 19644 | 662 (33.7) | 18893 | 566 (30) | 18172 | 502 (27.6) |
| Goa | 1228 | 89 (72.5) | 1179 | 76 (64.5) | 1111 | 64 (57.6) | 1069 | 57 (53.3) | 1033 | 51 (49.4) |
| Lakshadweep | 790 | 77 (97.5) | 754 | 56 (74.3) | 712 | 39 (54.8) | 683 | 33 (48.3) | 656 | 31 (47.3) |
| Kerala | 7861 | 368 (46.8) | 7638 | 273 (35.7) | 7387 | 213 (28.8) | 7161 | 180 (25.1) | 6927 | 156 (22.5) |
| Tamil Nadu | 17938 | 778 (43.4) | 17300 | 583 (33.7) | 16614 | 479 (28.8) | 15966 | 420 (26.3) | 15361 | 381 (24.8) |
| Puducherry | 2410 | 109 (45.2) | 2338 | 86 (36.8) | 2265 | 67 (29.6) | 2188 | 56 (25.6) | 2120 | 53 (25) |
| Andaman and Nicobar Island | 1623 | 90 (55.5) | 1564 | 68 (43.5) | 1508 | 52 (34.5) | 1469 | 46 (31.3) | 1401 | 35 (25) |
| Telangana | 19708 | 971 (49.3) | 19110 | 725 (37.9) | 18459 | 584 (31.6) | 17857 | 510 (28.6) | 17245 | 443 (25.7) |
| Ladakh | 1340 | 56 (41.8) | 1285 | 27 (21) | 1222 | 13 (10.6) | 1185 | 11 (9.3) | 1132 | 7 (6.2) |

* Prevalence calculated as per thousand population

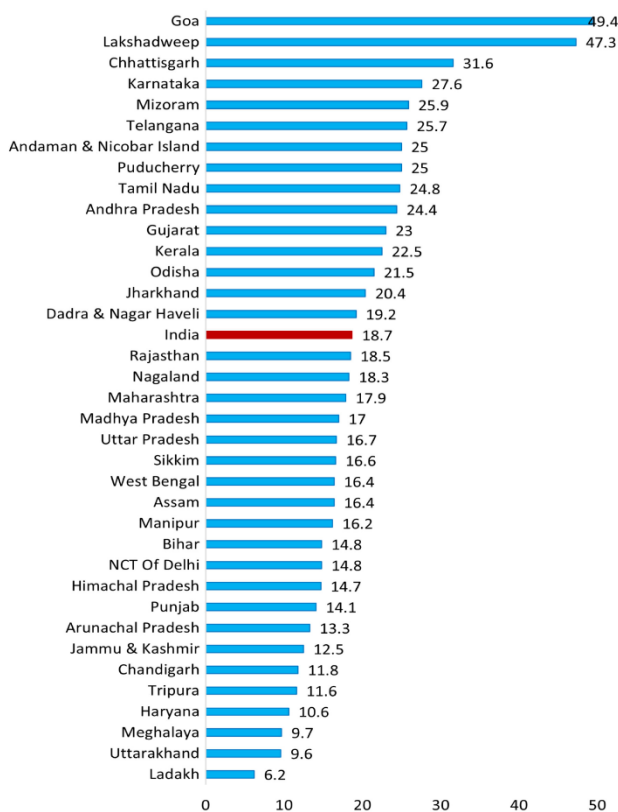


Figure 1. State-wise prevalence of infertility (per thousand women) in India during 2019-20

enced a gradual decline in infertility prevalence until 2005-06, after which there has been a gradual increase (5).

In the present study, the period prevalence of infertility was calculated at both national and state/UT levels, considering various durations of marriage. The burden of infertility significantly diminishes within the first three years of marriage. However, the rate of decline tapers off thereafter, signifying that fertility management becomes increasingly challenging with longer durations of marriage. This observation underscores the profound negative social impact of infertility, particularly for women (3).

This study lays a crucial foundation for the formulation of policies and guidelines aimed at addressing infertility in India. Regrettably, to date, the country has been lacking robust evidence on infertility and its associated impact, thus hindering the development of population-level policies (6). Despite these contributions, our analysis possesses certain limitations. The main focus was exclusively on women as a proxy indicator and not directly on couples, primarily due to the absence of

a direct question on infertility for couples in the NFHS. Furthermore, our study included only currently married women, excluding those who are widowed, separated, or in non-marital cohabiting relationships. Consequently, our current estimate may underestimate the actual prevalence of infertility.

Conclusion

The prevalence of primary infertility in India is gradually on the rise. These findings underscore the pressing need for targeted interventions and policy initiatives to confront the infertility challenge in the country. Recognizing the substantial burden and regional disparities is of paramount importance for policymakers and healthcare providers as they work towards developing and implementing effective strategies for both prevention and management. Additionally, establishing a country-level surveillance system could be invaluable in gathering firsthand information on infertility and its associated challenges.

Conflict of Interest

Nil.

References

1. World Health Organization: Infertility prevalence estimates, 1990–2021 [Internet]. Geneva: World Health Organization; cited 2023 Nov 13. Available from: <https://www.who.int/publications-detail-redirect/97-8920068315>.
2. Patel M. The socioeconomic impact of infertility on women in developing countries. *Facts Views Vis Obgyn.* 2016;8(1):59-61.
3. World Health Organization: Infertility [Internet]. Geneva: World Health Organization; cited 2023 Nov 13. Available from: <https://www.who.int/news-room/fact-sheets/detail/infertility>.
4. Wang GT. Population control policies and implementations in India. *J Sociol Soci Work.* 2019;7(2): 135-44.
5. Purkayastha N, Sharma H. Prevalence and potential determinants of primary infertility in India: Evidence from Indian demographic health survey. *Clin Epidemiol Global Health.* 2021;9:162-70.
6. Amodini KN, Chaudhuri S. Infertility management in India: Issues and potential solutions. *J Obstet Gynecol India.* 2023;73(4):368–9.
7. Ganguly S, Unisa S. Trends of infertility and childlessness in India: findings from NFHS data. *Facts Views Vis Obgyn.* 2010;2(2):131-8.

8. Hazlina NHN, Norhayati MN, Bahari IS, Arif NANM. Worldwide prevalence, risk factors and psychological impact of infertility among women: a systematic review and meta-analysis. *BMJ Open*. 2022;12(3):e057132.
9. Katole A, Saoji AV. Prevalence of primary infertility and its associated risk factors in urban population of central India: a community-based cross-sectional study. *Indian J Community Med*. 2019;44(4):337-4.