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Short Communication

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

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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.
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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 country 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

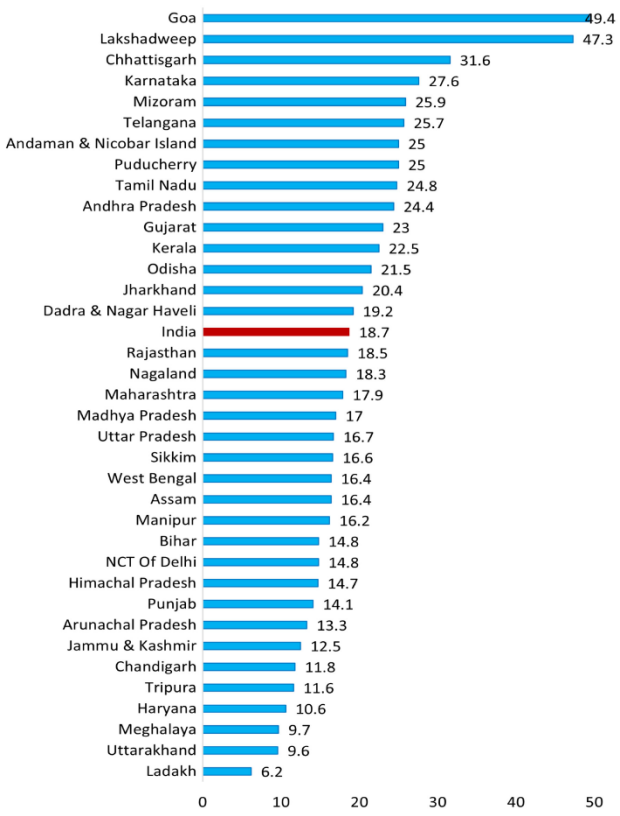

Figure 1. State-wise prevalence of infertility (per thousand women) in India during 2019-20

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.

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