ISSN: 0022-1074

Vol. 63 Special Issue 2017-2018

The Journal of Family Welfare

FPA India
Family Planning Association of India

THE JOURNAL OF FAMILY WELFARE

Founded in 1954

Published biannually
by the

FAMILY PLANNING ASSOCIATION OF INDIA

HEADQUARTERS

Bajaj Bhawan, Nariman Point, Mumbai 400 021 (India)
Telephone : 2202 9080 / 4086 3101
Fax1: 91-22-4086 3201 / 02
E-mail : fpai@fpaindia.org
Website : http://www.fpaindia.org

The Journal of Family Welfare is devoted to discussing views and providing information on all aspects of sexual and reproductive health including family planning, HIV/AIDS and related issues.

Annual Subscription
India : Rs. 100 post free
Foreign : US $35.00 including postage
Back issues: Rs. 35 or US $12.00 per copy

Vol. 63, Special Issue 2017-18

THE JOURNAL OF FAMILY WELFARE

NOTE FROM THE EDITOR

Dear Readers,

First of all, sincere apologies for delay in printing of the Journal of Family Welfare issue 2017-2018. We thank you for your understanding and the cooperation during this time. We have faced difficult and challenging times in recent past that has impacted on the regularity of the journal. A plan has been formulated to bring it back on time and ensure that the Journal of Family Welfare now in a new and improved avatar.

This time we have received manuscripts on various issues ranging from sterilization perceptions to rural health issues. For this issue the papers are on topics of fertility trends, family planning, reproductive health care, gender inequality in family planning programs, towards marriage in young adults and rural health issues.

There is a featured article on Postpartum intrauterine contraceptive devices (PPIUCD) inserter by PSI. Through this article we learn of PPIUCD inserter - another option for services providers which is easy to use, comes in one sterile package, which simplifies the overall insertion process. This is a great method, expanding the contraceptive choices.

Another paper by Population Council – India examines the dynamics of sterilization incidence, prevalence and age pattern of use in India and selected states.

We are planning to make The Journal of Family Welfare an online publication from 2020. Do share with us your views and opinions in writing at publication@fpaindia.org. Any paper/s that you wish to submit, either individually or collaboratively, are appreciated and will make a substantial contribution to the development and success of the journal

Please enjoy the volume number 63, with articles and ideas with a new angle and different view. The Journal of Family Welfare will continue to provide academic papers and other articles on family planning and sexual and reproductive health.

We also invite you to write to us, in case you would like to review some of our articles as a peer reviewer. We look forward to hearing from you.

Dr Kalpana Apte
Editor-in-Chief
The Journal of Family Welfare; and
Secretary General
Family Planning Association of India

STERILIZATION IN INDIA: INCIDENCE, PREVALENCE AND AGE PATTERN OF USE

FAUJDAR RAM, ABHISHEK KUMAR, GOVIND SINGH AND NIRANJAN SAGGURTI

Background

Globally, of the 778 million users of any method of contraception, 716 million women are protected using modern method of contraception from the risk of pregnancy. Of these, nearly 250 million are the users of sterilization - 75% of from China and India. It is expected that the sterilization prevalence in most Asian countries is likely to remain stable or decline slightly apart from China, India and Republic of South Korea where it is likely to fall substantially.[1] Though the prevalence of sterilization in India is not one of the highest[2] but due to size of population, number of users of sterilization in India is one of the highest.

In 2015-16, there were 133 million total users of any form of contraception in India with 119 million of them users of the modern contraception. Among the modern methods in India, 90 million were users of the sterilization in 2015-16. Unfortunately, the sterilization incidence that indicates the rate at which population ages 15-49 in area begin to use in a given year is generally not available due to unreliable service statistics in most of the country.

Age pattern of the use of sterilization is important for measuring the impact of its use on fertility. However, being a permanent method of contraception, in principal the decision to undergo sterilization will depend on the completion of desired family size and preferred sex composition of the desired size. Though initial studies indicated a larger impact of the use of sterilization on fertility when fertility is high,[3,4] it is necessarily not true.

Faujdar Ram, Advisor, Email: framusha@gmail.com, Abhishek Kumar, Programme Officer, Email: akumar@popcouncil.org, Govind Singh, Programme officer, Email: gsingh@popcouncil.org and Niranjan Saggurti, Country Director, Population Council, India Country office, New Delhi-110003, Email: nsaggurti@popcouncil.org

The age at sterilization may also decline as the program matures due to unavailability of women at higher ages who may have undergone the sterilization procedure. [5] This implies new users must come from younger cohort. At the same time changing marriage pattern (late marriage) may push the age at sterilization towards higher age. In contemporary India with total fertility rate (TFR) of 2.3 as per Registrar General India, 2017, nearly 80% of TFR comes from below age 30 or 94% below age 35 and therefore impact of sterilization above such age will be minimal and probably new users have to come from compressed age range of below 35 or 30.

In this context present paper attempts to analyse sterilization incidence, prevalence and age pattern over time and discuss future trajectory and its possible implications on the recent programmatic emphasis laid on spacing methods especially post London submit in 2012 that emphasized on a voluntary approach to family planning (Ministry of Health & Family Welfare Government of India, 2014, India's 'VISION FP 2020' Nirman Bhawan, New Delhi-110011).[6]

Data and Time Period

All rounds of National Family Health Survey (NFHS), 1992-2016 are used for a PAN-India analysis but the state analysis will be done only from the last two time periods of the NFHS survey - 2005-06 and 2015-16. The all India sample size in each NFHS is given below and for details on sample size and design one can see respective report of the survey as stated in last column of the Table 1.

Table 1

Time, Sample Size and Respondent in each round of the NFHS, 1992-16

Survey Name	Year conducted	Sample Size	Respondent	Reference to report for details
NFHS 1	1991-92	90000	Ever married women age 15-49	International Institute for Population Sciences (IIPS) 1995, National Family Health Survey (MCH &FP), 1992–93: Bombay: IIPS
NFHS 2	1998-99	89199	Ever married women age 15-49	International Institute for Population Sciences (IIPS) and ORC Macro. 2000. National Family Health Survey (NFHS-2), 1998–99: India, Mumbai: IIPS
NFHS 3	2005-06	124385	Women age 15-49	International Institute for Population Sciences (IIPS) and ORC Macro. 2007. National Family Health Survey (NFHS-3), 2005-06: India, Mumbai: IIPS
NFHS 4	2015-16	699686	Women age 15-49	International Institute for Population Sciences IIPS) and ICF. (2017). National Family Health Survey (NFHS-4), 2015-16: India. Mumbai: IIPS

Incidence rate is not available, but the survey data can be used to estimate the sterilization incidence.[1] In DHS a question on the "year of start of use of method" is asked to user of each method. Unlike spacing methods which may have high discontinuation and failure, the use of sterilization at the time of survey and year they started use will be nearly same subject to failure and attrition due to mortality. Both these factors are minimally low and may be assumed to be negligible. By combining current use and age at sterilization can also provide annual acceptors for incidence estimation.

We have selected 13 states (Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal) for the present paper that constituted around 80% of India's population in 2011.

Sterilization Prevalence Rate

The prevalence of use of any method with sterilization separately for female and male from last four round of NFHS is given in Table 2.

Table 2

Percent of currently married women using any method of contraceptives and sterilization (female and male), India, 1970-2016

Country/States	1992-93			1998-99			2005-06			2015-16		
	Any CPR	Female Sterilza-tion	Male Sterili-zation	Any CPR	Female Sterilza-tion	Male Steriliza-tion	Any CPR	Female Sterilza-tion	Male Steriliza-tion	Any CPR	Female Sterilza-tion	Male Steriliza-tion
India	40.7	27.4	3.5	48.2	34.1	1.9	56.3	37.3	1.0	53.5	36.0	0.3
Haryana	49.7	29.8	5.0	62.4	38.7	2.1	63.4	38.2	0.7	63.7	38.1	0.6
Punjab	58.7	31.5	2.5	66.7	29.3	1.6	63.3	30.8	1.2	75.8	37.5	0.6
Rajasthan	31.8	25.4	2.4	40.3	30.8	1.5	47.2	34.2	0.8	59.7	40.7	0.2
Madhya Pradesh*	36.7	26.5	5.2	44.3	35.7	2.2	55.9	44.3	1.3	51.4	42.2	0.5
Uttar Pradesh*	19.8	11.7	1.4	28.1	14.9	0.7	43.6	17.3	0.2	45.5	17.3	0.1
Bihar*	23.2	17.4	1.3	24.5	19.2	1.0	34.1	23.8	0.6	24.1	20.7	0.0
Odisha	36.3	28.3	3.4	46.8	33.9	1.7	50.7	33.1	1.0	57.3	28.2	0.2
West Bengal	57.7	26.5	4.3	66.6	32.0	1.8	71.2	32.2	0.7	70.9	29.3	0.1
Assam	43.0	12.2	2.4	43.3	15.7	1.0	56.5	13.0	0.2	52.4	9.5	0.1
Gujarat	49.3	37.5	3.5	59.0	43.0	2.3	66.6	42.9	0.6	46.9	33.6	0.1
Maharashtra	54.1	40.3	6.2	60.9	48.5	3.7	66.9	51.1	2.1	64.7	50.7	0.4
Andhra Pradesh*	47.4	38.5	6.7	59.6	52.7	4.3	67.6	62.9	2.9	64.4	62.4	1.0
Karnataka	49.4	41.2	1.5	58.3	51.5	0.7	63.6	57.4	0.2	51.8	48.6	0.1
Kerala	63.3	41.8	6.5	63.7	48.5	2.5	68.6	48.7	1.0	53.1	45.8	0.1
Tamil Nadu	49.8	37.6	2.0	52.1	45.2	0.8	61.4	55.0	0.4	53.2	49.4	0.0

Source: STAT Compiler, DHS program, https://www.statcompiler.com/en/

The prevalence of any method is given only to examine changes in sterilization prevalence vis-à-vis over all progress in family planning after 1990. The prevalence rate (male and female together) has increased from 30.8 in 1992-93 to 38.3% in 2005-06 then declined to 36.3% in 2015-16. There has been continuous decline in male sterilization from 3.5% in 1992-93 to almost zero 0.3% in 2015-16 whereas female sterilization prevalence increased from 27.4% to 37.3 (almost 10 points during 1992-2005) then declined by 1.3 percent points by 2015-16; in 10 years the share of male sterilization in total sterilization prevalence was 11.4% in 1992-93 and declined to below one percent (0.8%) in 2015-16. The estimation of incidence for male sterilization would be difficult with such a low prevalence.

The lowest female sterilization prevalence was in Uttar Pradesh (11.7%) where male sterilization was also one of the lowest (1.4%) in 1992-93 and the highest prevalence was in Kerala with male sterilization being relatively high (6.5%) next to Andhra Pradesh. There were 6 states where female sterilization prevalence was more than 35% with huge variation in male sterilization prevalence. These states are Kerala (41.8% and 6.5%), Karnataka (41.2% and 1.5%), Maharashtra (40.3% and 6.2%), Andhra Pradesh (38.5% and 6.7%), Tamil Nadu (37.6% and 2.0%) and Gujarat (37.5% and 3.5%). Himachal Pradesh (not shown in Table) was one of the outliers in terms of male sterilization prevalence being highest at 13.2% and female sterilization at 32.6%. The scenario did not change much but there was huge progress in female sterilization in many states especially southern but male sterilization declined in all. Uttar Pradesh remained at the bottom at 14.9% female sterilization but male sterilization falling below one percent (0.7%) but Andhra Pradesh with 52.7% and Karnataka with 51.5% female sterilization over passed Kerala (48.5%). In all these states male sterilization declined substantially especially Kerala from 6.5 to 2.5%, Maharashtra from 6.2 to 3.7%, Andhra Pradesh from 6.7 to 4.3%. Himachal Pradesh experienced a decline from 13.2 to

7.3% where female sterilization increased from 32.6 to 45.1%.

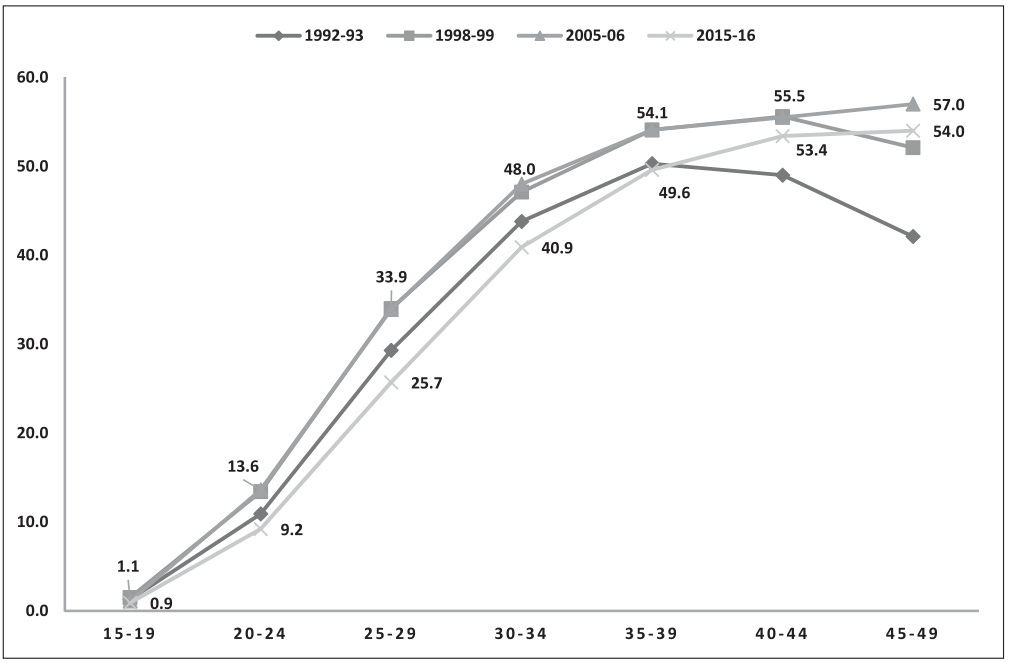
By 2005-06, male sterilization has almost been rare as only Himachal Pradesh (6.3%), Jammu & Kashmir (2.6%), Chhattisgarh (3.3%), Maharashtra (2.1%) and Andhra Pradesh (2.9%) has male sterilization prevalence above two percent. On the other hand, female sterilization prevalence has substantially increased in all the state. Andhra Pradesh with almost 63% of its married women ages 15-49 sterilized was on top followed by Karnataka (57.4%), Tamil Nadu (55%) and Maharashtra (51.1%) where more than half of the married women had sterilization. The latest round of NFHS in 2015-16 has given completely unexpected results. By this time male sterilization prevalence has become rare (all below one percent except Himachal Pradesh 2.4%) and female sterilization prevalence has either remained same or has declined significantly in many states. Major decline being in Gujarat (42.9% to 33.6%), Karnataka (57.4% to 48.6%), Tamil Nadu (55% to 49.4%), Kerala (48.7% to 45.8%) and Himachal Pradesh (49.0% to 34.5%). The states of Punjab (30.8% to 37.5%) and Rajasthan (34.2% to 40.7%), have experienced increase in the female sterilization prevalence. Over all there is a decline of only 1.3 % points at national level.

Age pattern of sterilization prevalence

Age pattern of sterilization prevalence is depicted in Figure 1 and it indicates progress over time. Surprisingly it may be noted that except last two age groups, the prevalence in 2015-16 is lower than that observed more than 20 years ago in 1992-93. Interestingly, the overall prevalence in 2015-16 is 5.5% points higher compared to 1992-93 despite the decline in prevalence of sterilization among the oldest 2 cohorts. It may also be seen that age specific prevalence in 1998-99 and 2005-06 are almost the same except last age group even though over all prevalence is higher by 2.3% point in 2005-06 (36.0% in 1998-99 to 38.3% in 2005-06). The overall prevalence may be higher due to differences in age structure and marital distribution. It is noted that percent women age 20-24 years married before age 18 was 26.8% in 2015-16 compared to 47.4% in 2005-06 (IIPS 2017, India Fact Sheet, NFHS 4, 2015-16, iipsindia.org). In essence, focusing on last two survey 10 years apart, a huge drop in prevalence is noticed for 20-24, 25-29 and 30-34 age group. In 20-24 particularly, prevalence declined by 32.4%, in 25-29 by 24.2% and in 30-34 by 14.8%. The delays in marriage and developing preference for spacing methods could be a reason for such change – an encouraging trend.

Figure 1

Age specific prevalence of sterilization, India, 1992-2016



The state wise age specific sterilization prevalence is given in Table 3 from last two surveys and corresponding change is given in the bottom of the table. The age pattern expectedly is similar to all India with relatively low prevalence in 20-24 age group except in Karnataka (32.4 and 16.6%), Madhya Pradesh (12.5 and 11.2%), Maharashtra (19.5 and 12.8% and Tamil Nadu (20.2 and 17.0%). In 2015-16 all states except above have prevalence below 10%. During 10 years from 2005-06 substantial decline has taken place in all the ages and all the states except Punjab and Rajasthan. Punjab experienced increase through age 30-34 to 45-49 and Rajasthan through 25-29 to 45-49. The biggest decline in 20-24 age group is observed in Kerala (69%) followed by in Uttar Pradesh (67%), Bihar (54%) and Karnataka (49%). In Gujarat, Maharashtra, West Bengal and Haryana a decline has been in the range of 40-30% in that order. In the state of Punjab, Madhya Pradesh and Tamil Nadu decline has been low among the 20-24 cohort.

Women in other two prime age groups 25-29 and 30-34 have experienced substantially high decline in sterilization prevalence. In first age group state that experienced more than 30% decline are Gujarat (42%), Karnataka (34%), Uttar Pradesh (34%) West Bengal (33%), Haryana and Kerala 31%. Whereas, Gujarat (36%), Bihar (28%), Odisha (23%) and UP (20%) experienced decline of more than 20%. In the older age groups, a low decline as in general observed but prevalence is maintained probably due to ageing of earlier cohort where incidence rate was high.

Table 3

Age specific sterilization prevalence in the selected states of India, 2005-16

State	Year/Age	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Bihar	2005-06	0.0	9.0	20.8	39.9	37.6	39.9	40.2
	2015-16	0.1	4.1	16.3	28.6	32.3	32.7	29.3
Gujarat	2005-06	0.8	10.2	32.4	52.0	61.8	67.7	64.7
	2015-16	1.2	6.4	18.9	33.5	45.0	53.1	55.3
Haryana	2005-06	0.0	9.0	35.4	49.0	56.9	55.4	57.9
	2015-16	0.3	6.2	24.3	40.9	55.7	64.1	67.9
Karnataka	2005-06	4.1	32.4	57.8	69.3	73.5	74.2	73.9
	2015-16	1.9	16.6	37.9	53.6	64.5	64.7	69.2
Kerala	2005-06	0.0	7.8	29.8	55.1	63.4	67.0	71.7
	2015-16	0.0	2.4	20.4	44.8	57.6	64.3	65.1
Madhya Pradesh	2005-06	0.6	12.5	40.9	62.5	65.9	62.8	66.7
	2015-16	1.0	11.2	35.0	51.2	59.2	58.9	62.2
Maharashtra	2005-06	1.6	19.5	46.0	64.7	73.7	77.8	75.3
	2015-16	1.0	12.8	35.7	59.3	69.1	74.4	77.1
Odisha	2005-06	0.0	6.1	22.8	39.1	53.3	56.4	61.3
	2015-16	0.0	4.7	16.8	30.0	38.3	42.3	47.8
Punjab	2005-06	0.0	4.4	20.9	36.2	44.8	48.2	53.1
	2015-16	0.0	4.0	15.0	33.7	49.5	60.3	64.2
Rajasthan	2005-06	1.2	9.4	29.7	47.0	52.0	52.7	56.4
	2015-16	0.4	7.1	28.7	50.2	59.2	66.5	65.6
Tamil Nadu	2005-06	0.9	20.2	53.0	65.8	69.9	63.1	66.8
	2015-16	1.9	17.0	38.5	54.0	61.2	63.1	60.5
Uttar Pradesh	2005-06	0.4	4.5	12.7	24.0	27.6	27.6	30.7
	2015-16	0.0	1.5	8.4	19.2	26.9	29.9	20.9
West Bengal	2005-06	0.8	11.6	32.4	39.8	49.0	50.3	49.0
	2015-16	0.5	7.8	21.7	35.6	39.6	47.7	46.0

State/Age Change during 2005-2016	20-24	25-29	30-34	35-39	40-44	45-49
Bihar	-54.4	-21.6	-28.3	-14.1	-18.0	-27.1
Gujarat	-37.3	-41.7	-35.6	-27.2	-21.6	-14.5
Haryana	-31.1	-31.4	-16.5	-2.1	15.7	17.3
Karnataka	-48.8	-34.4	-22.7	-12.2	-12.8	-6.4
Kerala	-69.2	-31.5	-18.7	-9.1	-4.0	-9.2
Madhya Pradesh	-10.4	-14.4	-18.1	-10.2	-6.2	-6.7
Maharashtra	-34.4	-22.4	-8.3	-6.2	-4.4	2.4
Odisha	-23.0	-26.3	-23.3	-28.1	-25.0	-22.0
Punjab	-9.1	-28.2	-6.9	10.5	25.1	20.9
Rajasthan	-24.5	-3.4	6.8	13.8	26.2	16.3
Tamil Nadu	-15.8	-27.4	-17.9	-12.4	0.0	-9.4
Uttar Pradesh	-66.7	-33.9	-20.0	-2.5	8.3	-31.9
West Bengal	-32.8	-33.0	-10.6	-19.2	-5.2	-6.1

Note: Negative means decline and positive means increase in sterilization prevalence

Incidence

In our knowledge no incidence has been estimated using NFHS except one that used NFHS 1 data.[1] The female sterilization incidence for India based on five-year average (1988-92) preceding the survey was 1.8 per 100 currently married women. Data did not show huge fluctuation over five years preceding the survey (1.7 to 2.0%). The estimated incidence by age, all ages, 5 years preceding each survey and average of 5 years is given in the Table 4. The age specific incidence for India depicted in Figure 2. It may be mentioned that data from NFHS 4 for year 2015 has not been taken as the date and end of survey covers few months of 2015 and only for phase one states. Hence, we estimate incidence for year 2010-14. The estimate here is different than that given in EngenderHealth[1] as we have included male sterilization with female sterilization. Often it is argued that data for preceding years may be affected by recall lapse as woman may not remember the year the procedure was performed. But year wise incidence rate in the Table 4 does not reflect any such problem. The 5-year average preceding each survey indicates incidence of 2.02% during 1988-92, 2.19 during 1994-98, 2.16 in 2001-06 and 1.84% in 2010-14. It seems incidence rate began to decline preceding NFHS 3 and the decline continued with accelerated pace reaching to the incidence of 1.84% preceding NFHS 4.

Table 4

Age specific sterilization incidence rate, India, 1992-14

Age	NFHS 1					
	1992	**1991**	**1990**	**1989**	**1988**	**1988-92**
15-19	0.57	0.56	0.07	0.04	0.04	0.26
20-24	2.44	2.78	2.03	1.16	0.93	1.87
25-29	3.40	4.07	3.63	3.76	3.82	3.74
30-34	2.43	2.95	3.06	3.25	4.16	3.17
35-39	1.19	1.19	1.35	2.06	2.82	1.72
40-44	0.56	0.49	0.65	0.88	1.30	0.78
45-49	0.11	0.20	0.22	0.32	0.63	0.30
Total	**1.87**	**2.16**	**1.92**	**1.92**	**2.21**	**2.02**
Age	**NFHS 2**					
	1998	**1997**	**1996**	**1995**	**1994**	**1994-98**
15-19	0.76	0.30	0.05	0.06	0.00	0.23
20-24	4.13	3.06	1.88	1.59	0.86	2.31
25-29	3.94	3.98	4.48	4.37	4.52	4.26
30-34	2.42	2.38	2.95	3.79	4.39	3.18
35-39	1.24	0.89	1.36	1.96	2.57	1.60
40-44	0.29	0.45	0.46	0.81	0.92	0.59
45-49	0.15	0.29	0.15	0.18	0.44	0.24
Total	**2.29**	**2.03**	**2.04**	**2.23**	**2.34**	**2.19**
Age	**NFHS 3**					
	2005	**2004**	**2003**	**2002**	**2001**	**2001-05**
15-19	0.51	0.29	0.18	0.00	0.00	0.20
20-24	3.86	3.26	2.41	1.37	0.82	2.35
25-29	4.38	4.51	4.37	4.33	3.49	4.22
30-34	2.44	2.72	3.72	3.60	3.84	3.26
35-39	0.83	1.28	1.62	1.80	1.83	1.47
40-44	0.33	0.38	0.66	0.51	0.71	0.52
45-49	0.04	0.02	0.19	0.20	0.29	0.15
Total	**2.21**	**2.24**	**2.33**	**2.11**	**1.92**	**2.16**
Age	**NFHS 4**					
	2014	**2013**	**2012**	**2011**	**2010**	**2010-14**
15-19	0.30	0.37	0.12	0.01	0.01	0.11
20-24	1.40	2.77	1.85	1.23	0.45	1.42
25-29	1.72	3.45	3.79	3.46	2.86	3.34
30-34	1.20	2.15	2.58	2.78	3.88	2.94
35-39	0.46	1.00	1.23	1.39	2.39	1.60
40-44	0.22	0.42	0.47	0.64	1.26	0.76
45-49	0.13	0.18	0.23	0.31	0.63	0.40
Total	**1.77**	**1.81**	**1.74**	**1.90**	**1.98**	**1.80**

The age specific incidence reflects highest incidence of more than 3.5% in 25-29 age group and slightly lower in 30-34 age group. It was seen in earlier section that the sterilization prevalence from NFHS 2 and 3 were similar which also consistently reflected in age specific incidence (see Figure 2). However, since then incidence, i.e. between NFHS 3 and 4 has declined substantially in each prime age group 20-35.

Figure 2

Age specific sterilization acceptance rate, India

The sterilization incidence rate for selected states using data from last two surveys is given in Table 5. Age specific estimation has not been done by state due to sample size limitation in states especially in NFHS 3.

Table 5

Sterilization incidence rate, India and States using data from NFHS 3 and 4

Country/States	NFHS 3					2001-05	NFHS 4					2010-14
	2005	2004	2003	2002	2001		2014	2013	2012	2011	2010	
India	2.21	2.24	2.33	2.11	1.92	2.16	1.77	1.81	1.74	1.90	1.98	1.84
Andhra Pradesh*	3.27	3.30	3.83	3.69	3.55	3.53	3.31	3.20	2.95	2.67	3.33	3.09
Assam	0.81	0.60	0.94	0.85	0.72	0.79	0.54	0.68	0.67	0.66	0.71	0.65
Bihar	2.24	2.22	1.85	1.22	1.38	1.78	1.87	1.72	1.71	1.52	1.79	1.72
Gujarat	1.62	2.32	2.62	1.98	2.12	2.13	1.25	1.45	1.38	1.81	1.71	1.52
Haryana	1.88	1.64	2.27	2.62	1.69	2.02	1.58	1.58	1.59	1.59	2.01	1.67
Karnataka	3.70	3.10	3.50	2.89	2.55	3.15	2.33	2.24	2.34	2.23	2.00	2.23
Kerala	2.48	2.07	2.29	2.11	2.56	2.30	1.70	1.51	2.14	1.93	2.10	1.88
Madhya Pradesh	3.80	3.05	3.04	2.75	2.32	2.99	2.40	2.29	2.59	2.70	2.62	2.52
Maharashtra	2.92	2.56	2.96	2.67	2.76	2.78	2.26	2.59	2.03	2.44	2.35	2.33
Odisha	1.38	1.86	1.18	0.99	1.36	1.35	1.39	1.50	1.57	1.95	1.65	1.61
Punjab	1.66	1.21	1.54	1.28	1.58	1.45	0.98	1.07	1.14	1.79	2.37	1.47
Rajasthan	2.11	2.40	2.74	2.43	1.50	2.24	1.96	2.04	1.95	2.29	2.77	2.20
Tamil Nadu	2.98	3.75	2.72	2.70	2.54	2.94	2.11	2.38	2.04	2.06	2.22	2.16
Uttar Pradesh	1.28	1.59	1.55	1.52	1.00	1.39	0.93	0.89	1.00	1.06	1.08	0.99
West Bengal	1.13	1.64	1.80	1.70	1.62	1.58	1.33	1.25	1.00	1.51	1.36	1.29

In order to compare the survey's-based incidence in Table 5, we provide in Table 6 the incidence from Health Management Information System (HMIS) data. It may be observed that with few exceptions two estimates are not substantially different especially keeping standard error of the estimates in mind in NFHS 4. In India the sterilization incidence comes out to be 1.84% against 1.91% from HMIS-a difference of just .07 points. An interesting point is NFHS 4 indicates a decline in incidence from 1.98 in 2010 to 1.77 in 2014 whereas HMIS during the same time period shows a decline from 2.22 to 1.63. Such change seems to be consistent with the change in prevalence discussed earlier. The difference between NFHS and HMIS could be due to the share of private sector which might not be some extent captured by HMIS due to limited number of private facilities reporting to HMIS.

The state level comparison provides very similar inference seen at national level. Mention may be made that at the state level, the confidence interval of the estimate will be relatively larger. The incidence rate for 2010-14 is lowest in Uttar Pradesh from both the data source (0.99% from NFHS 4 and 0.86% from HMIS) and highest is for Andhra Pradesh (3.09% from NFHS 4 followed by Madhya Pradesh) whereas from HMIS Madhya Pradesh comes at top (3.39% followed by Bihar (2.82%), Karnataka (2.51%) and Gujarat (2.48%). It may be noted that NFHS 4 overestimates incidence for Andhra Pradesh (0.68), Haryana (0.18), Kerala (0.55), Maharashtra (0.10), Punjab (0.18), Uttar Pradesh (0.13) and West Bengal (0.12). Incidence rate is substantially underestimated by NFHS 4 for Assam (-0.39) Bihar (-1.10), Gujarat (-0.96), Karnataka (-0.28) and Madhya Pradesh (-0.87). These are the states where mCPR in NFHS 4 has declined substantially compared to NFHS 3.

Table 6

Sterilization Incidence rate by states and India using data from HMIS, 2010-2015

Country/States	2010-11	2011-12	2012-13	2013-14	2014-15	2010-15	Difference*
India	2.22	2.06	1.91	1.77	1.63	1.91	-0.07
Andhra Pradesh*	2.98	2.89	2.32	2.12	1.77	2.41	0.68
Assam	1.40	1.29	0.98	0.86	0.71	1.04	-0.39
Bihar	2.75	2.75	3.10	2.77	2.75	2.82	-1.10
Gujarat	2.73	2.69	2.30	2.15	2.57	2.48	-0.96
Haryana	1.66	1.52	1.54	1.42	1.34	1.49	0.18
Karnataka	2.74	2.44	2.55	2.38	2.44	2.51	-0.28
Kerala	1.44	1.32	1.36	1.30	1.23	1.33	0.55
Madhya Pradesh	4.93	4.43	2.69	2.48	2.53	3.39	-0.87
Maharashtra	2.25	2.20	2.48	2.31	1.96	2.24	0.10
Odisha	1.79	1.79	1.80	1.68	1.27	1.66	-0.05
Punjab	1.60	1.34	1.26	1.19	1.07	1.29	0.18
Rajasthan	2.60	2.33	2.31	2.18	2.15	2.31	-0.11
Tamil Nadu	2.27	2.28	2.11	2.14	2.05	2.17	-0.01
Uttar Pradesh	1.16	0.95	0.84	0.74	0.64	0.86	0.13
West Bengal	1.49	1.18	1.15	1.06	0.97	1.17	0.12

**Difference is NFHS 4 for 2010-14 to HMIS 2010-15*

Attrition due to mortality and ageing

The sterilization (male and female) users are calculated using prevalence in 2015-16 and age wise married women extrapolated using the 2001 and 2011 census. Attrition due to mortality is calculated using users of sterilization in 2015-16 and SRS based life tables for year 2015-16 (RGI, 2017). The users who die within the age interval 15-49 is taken to estimate attrition effect on mCPR (last column in Table 7) if they are not replaced by new users. On the other hand, effect of ageing is based on users ages 45-49 and 40-44 who would be out of reproductive age group by 2020 and 2025.

It may be seen from the Table that effect of attrition due to mortality is not substantial nevertheless mCPR does decline by 0.32 every 5 years means in India. In absolute terms around 7,90,000 women who have had undergone sterilization die within the age of 15-49. There is some variation across the states. It is important to note that ageing of users of sterilization would have greater effect on mCPR if they are not replaced by new users of any methods. It may be noted that there were 15.6 million users in 45-49 age group who would have to be replaced to maintain the same mCPR for next 5 years. During 2020-25 this number is 18.5 million. In terms of rate annually mCPR may decline by 1.2 to 1.5 percent points if new users are not added. The effect of ageing is obviously high in Kerala, Tamil Nadu, Maharashtra and Punjab. Madhya Pradesh and Rajasthan would also face substantial effect of ageing. The analysis clearly indicates doubling of efforts is required in order to recruit new users of any methods so as to replace those women who are sterilised between the age 45-49 and will be moving out reproductive age range.

Table 7

Likely effect of ageing and attrition due to mortality on mCPR beyond 2015 (Using NFHS 4 and Life Table of 2011-15 from SRS

Country/State	Ageing Cohort for Next 10 Years**		mCPR decline by 2020*	mCPR decline by 2025*	mCPR decline due to Attrition*
	40-44	45-49			
India	18491796	15581752	6.2	7.4	0.32
Bihar	797588	597751	3.1	4.2	0.18
Gujarat	993744	874177	6.9	7.9	0.24
Haryana	468393	395718	7.5	8.9	0.29
Karnataka	1124751	1073113	8.1	8.4	0.42
Kerala	810634	743711	9.8	10.7	0.20
Madhya Pradesh	1233546	1054090	7.0	8.2	0.35
Maharashtra	2507073	2133842	8.8	10.3	0.37
Odisha	542286	512490	6.1	6.5	0.31
Punjab	533590	487959	8.9	9.7	0.29
Rajasthan	1250634	1023836	7.2	8.7	0.30
Tamil Nadu	1542773	1288152	8.4	10.1	0.40
Uttar Pradesh	1469059	837006	2.2	3.9	0.18
West Bengal	1396273	1108178	5.4	6.8	0.33

**Note: Due to ageing of users of sterilization of age 45-49 mCPR may decline every 5 years If no new users replace them from any methods. It is per 100 married women as in 2015*

*** Calculated using Eligible Women (EW) as in 2015 by age and age specific sterilization prevalence from NFHS 4*

Discussion and Conclusion

"There has been a noticeable change in the attitude of the Government of India in favour of sterilisation in the last few years. Till 1959 sterilisation was not officially accepted as a method of population control; today many State Governments, particularly those of Maharashtra and Madras, are planning ambitious programmes of sterilisation with financial support from the Government of India".[3] With early hesitant starting with probably not very scientific evidences[3,7,8,9] India started initially few sterilizations; predominantly Vasectomy.[10] Scenario of male sterilization to female sterilization probably changed after 1976-77. During this time India had undertaken through coercive measures nearly 6.2 million Vasectomy and 2.1 million Tubectomy (hardly 25% female sterilization). By early 1980s Tubectomy share increased to 78.6% and now almost 98%. Such a drastic shift may not be just due to perceptions build around experiences and stories of the 1976-77 but also due to technological development for female sterilization. Nevertheless, irreversible change could be attributed to program emphasis and fertility goal blindly followed even after the experience of 1976-77. Goals in terms of replacement fertility set in 6th Five years Plan and continuation until Cairo 1994 may be an example of such priority. In addition, achievement of replacement fertility predominantly through sterilization in Kerala, Tamil Nadu and Andhra Pradesh strengthened government point of view to achieve demographic goals.

With such historical background sterilization continued to be one of the most used methods in India and it is females who often undergo the procedure. Over time despite many efforts to promote male sterilization prevalence of male sterilization has been declining. In the present paper sterilization prevalence, incidence and age pattern has been examined for India and selected states. The sterilization prevalence rate (male and female together) has increased from 30.8% in 1992-93 to 38.3% in 2005-06. It then declined to 36.3% in 2015-16, a total decline of 2.0 percent points which is mainly due to decline in prevalence of male sterilization. The share of male sterilization in total sterilization prevalence was 11.4% in 1992-93 which declined to below one percent (0.8%) in 2015-16. In view of changing age pattern of marriage and diminishing stock of women at higher ages, this paper hypothesized that new acceptors would come from the ages 20-34. The addition of these new users will also be a function of change in ideal family size and change in method choice.

The evidence of this ongoing change can also be seen in the age pattern of sterilization prevalence where a majority of sterilization users were found to be from the older cohort. As highlighted earlier, except the last two age groups (40-44, 45-49), prevalence of sterilization in 2015-16 was lower than that observed more than 20 years ago in 1992-93 though the overall prevalence in 2015-16 was 5.5% points higher compared to 1992-93. It may also be seen that age specific prevalence in 1998-99 and 2005-06 were almost the same except the last age group even though over all prevalence was higher by 2.3% point in 2005-06 (36.0% in 1998-99 to 38.3% in 2005-06). The high overall prevalence could be attributed to differences in age structure/ marital distribution. It was noted that percent women age 20-24 years married before age 18 was 26.8% in 2015-16 compared to 47.4% in 2005-06 (IIPS 2017, India Fact Sheet, NFHS 4, 2015-16, iipsindia.org). In comparison with 2005-06 huge drop in prevalence for 20-24, 25-29 and 30-34 age group was also identified. In the 20-24 age group prevalence declined by 32.4%; in 25-29 age group by 24.2% and in the 30-34 age group by 14.8%. The delay

in marriage and developing preference for spacing methods and rightly so could be a reason for such change (IIPS 2017, India Fact Sheet, NFHS 4, 2015-16, iipsindia.org).

During the last 10 years starting 2005-06 substantial decline has taken place in all the ages and all the states except Punjab and Rajasthan in sterilization prevalence. Punjab experienced an increase through age 30-34 to 45-49 and Rajasthan through 25-29 to 45-49. From the PAN India perspective, the lowest prevalence was found among the youngest cohort of women from the 20-24 age group, Karnataka (32.4 and 16.6%), Madhya Pradesh (12.5 and 11.2%), Maharashtra (19.5 and 12.8% and Tamil Nadu (20.2 and 17.0%). The biggest decline in 20-24 age group in the last 10 years was observed in Kerala (69%) followed by in Uttar Pradesh (67%), Bihar (54%) and Karnataka (49%). Significant declines in prevalence were also found in Gujarat, Maharashtra, West Bengal and Haryana. These declines are reflected in the overall sterilization prevalence in many states. Going forward, it is critical to consider such changes which poses a challenge for family planning programmes and policies as we shift to spacing methods. The shift to spacing would require policy and programmes to put more focus on other considerations such as a systems of continuous grievances redressal mechanism to reduce discontinuation. Ageing of sterilization users in past belonging to the older cohorts would be another challenge. To counter this and to maintain mCPR, we need a larger number of new users to replace them. As noted 18.5 million sterilization users in 40-44 and 15.6 million in age 45-49 will be out in next 10 years resulting into reduction in 6-7 percent points at all India level and more so in many states with higher share of sterilization such as many of the southern states.

Sterilization incidence has been estimated using information on year of initiation of the method. This has been compared with incidence from HMIS data. The first observation is that the incidence from both sources compares well with each other and reflect the decline incidence in last 10 years. Age specific incidence estimated from survey indicates that the highest incidence in the 25-29 age group and then declines sharply with age. It has also been observed that Uttar Pradesh had the lowest incidence and at the same time higher unmet need for limiting of children. These may be due to the inability of the health system in Uttar Pradesh provide services to its people which leads to larger use of traditional methods.

There is substantial decline in incidence in all those states where mCPR has declined significantly indicating some concern about data from the latest round of NFHS. The decline in prevalence and incidence (overall and in certain age group) is matter of concern. There is need of an examination of data on family planning from NFHS 4 in some states. This has also been observed while fitting Bongaarts refined model for each state (Jayachandran and Stover 2018).[11] Nevertheless, the changes in age pattern of sterilization prevalence may be considered as positive change given the reduction in prevalence among women from the younger cohorts which may be indicative of changing patterns in age of marriage and increased use of spacing methods. However, in these changing contexts, the paper also highlights the challenges that the family planning efforts in India may face such as the increased volume of users of spacing methods that could possibly increase discontinuation and failure which contribute significantly to unintended pregnancy. The paper also emphasises the need to increase the number of new users to offset the ageing of the sterilization users of women from the 40-44 and 45-49

age group in the next 10 years. Addressing these issues would be critical in order to sustain and improve India's family planning efforts and meet our commitment of 2020.

Acknowledgement

This paper was prepared as part of the RASTA initiative of the Population Council, jointly supported by United States Agency for International Development (USAID) through Evidence Project and the Bill & Melinda Gates Foundation. The Evidence Project is made possible by the generous support of the American people through the United States Agency for International Development (USAID) under the terms of cooperative agreement no. AID-OAA-A-13-00087. The contents of this paper are the sole responsibility of the authors and do not necessarily reflect the views of USAID, the United States Government, the Bill & Melinda Gates Foundation or the Population Council. Authors would like to thank all team members of the RASTA who have contributed to this paper.

References

1. EngenderHealth. 2002. Sterilization Incidence and Prevalence, Chapter 2 from Contraceptive Sterilization: Global Issues and Trends.
2. U N. 2017. World Family Planning Highlights, Department of Economic and Social Affairs, United Nations, New York.
3. Agarwala, S.N. 1964. Sterilisation as a population control device its economics. The Economic Weekly July 4.
4. Nortman, Dorothy, L. 1980. Voluntary sterilization: Its demographic impact in relation to other contraceptive methods, Paper of the East-West Population Institute, Honolulu.
5. Ross, J.A. and Potter, R.G. 1980. Changes in acceptors and users ages: A test of an explanatory mechanism. Population Studies, 34(2):367-380.
6. Agarwala, S N 1961 Fertility Control Through Contraception, New Delhi, Directorate General of Health Services, Ministry of Health, 1961, p 32, 47 and 21.
7. Gopalaswamy, R.A. 1962. Family planning: Outlook for government action in India. In: Cycle, V. Kise (Ed) Research in Family Planning, Princeton: Princeton University Press. P. 78.
8. Chitre, K.T. 1964. Sterilization as a method of family limitation and its implementation in the family planning programme. Maharashtra Medical Journal, 11(2):288.
9. Laxmi, P. 1964. Family planning programme in Madras state: The role of sterilisation as a method of family planning. Maharashtra Medical Journal, 11(2):271-272.
10. Family Planning News, February 1962, p 42 and April 1962, p 82. In Satara 1,400 operations were performed at a cost of Rs 44,682 and in Jalgaon 1,071 operations at the cost of Rs 18,454.60.
11. What Factors Explain the Fertility Transition in India?, April 2018 This publication was produced for review by the United States Agency for International Development. It was prepared by A.A. Jayachandran and John Stover for the Health Finance and Governance Project

REPOSITIONING OF FAMILY PLANNING PROGRAMME IN INDIA: ISSUES AND STRATEGIES EMERGING FROM NFHS-4 (2015-16)

SHRI KANT SINGH AND GUDAKESH

INTRODUCTION

Family planning is a prerequisite for the universal access to sexual and reproductive health component of Sustainable Development Goals (SDGs) and it is also an important indicator for tracking progress on improving maternal health.[1] In developing countries, about 818 million of sexually active women of reproductive age (15-49) want to avoid pregnancy or delay child-bearing for at least two years or want to stop pregnancy and limit their family size. About 140 million (17%) of these women are not using any method of family planning, while 75 million (9%) are using less effective traditional methods.[2] In Southern, Central and Southeast Asia, the use of modern contraceptive use is less than the global average; with only 47 percent of married women, aged 15–49 years using modern contraceptives, although higher proportions want to prevent pregnancy.[3,4] That is why, SDGs target 3.7 focuses on ensuring universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes by 2030.[1]

The most recent estimates of contraceptive prevalence among currently married women aged 15-49 years in 2015-16 revealed that 48 percent women in India were using any modern method of contraception, which has reduced from 49 percent in 2005-06 and 13 percent reported unmet need of contraception, marginally reduced from 14 percent reported decade back.[5] This stagnation in family planning in India has been

Shri Kant Singh, Professor, Department of Mathematical Demography & Statistics and Gudakesh, Project Officer, International Institute for Population Sciences, Govandi Station Road, Deonar, Mumbai-400 088.

followed by two episodes of slowdown, first in 1977 in the post-emergency recoil and recovery of programme in the country and second after International Conference on Population and Development (ICPD) 1994, when Government of India was one of the signatories of ICPD Program of Action (PoA) and hence promptly adopted the RCH approach, where acceptor based family planning targets were abolished in April 1995. It is against this backdrop; this article aims to highlight the changing scenario of family planning programme in India and issues and strategies emerging from the evidence generated from the recently conducted NFHS-4, which may be vital for the repositioning of family planning programme in India.

Methods and Materials

The basic data used in this paper have been taken from two rounds of National Family Health Surveys namely NFHS-3 (2005-06) and NFHS-4 (2015-16). The NFHS-3 was conducted in 2005-06, shortly after the National Rural Health Mission (NRHM) was launched. The primary objective of the 2015-16 NFHS was to provide essential data on health and family welfare, as well as data on emerging issues at national, state and district levels. Therefore, data from the fourth round was useful in setting a benchmark and examining the progress the country has achieved in the health sector over time. In all, NFHS-4 covered 601,509 households, 699,686 women age 15-49, and 103,525 men age 15-54 from 28,583 PSUs composed of villages in rural areas and CEBs in urban areas spread across 640 districts of India. Details about the NFHS-4 designs, tools and protocols are presented in the national report of NFHS-4, and all relevant information are available in the public domain on http://rchiips.org/ NFHS/districtfactsheet_ NFHS-4.shtml.[5] The study uses univariate analysis followed by regression analysis to draw inferences from the data.

Results and Discussions

The situation analysis of progress in family planning programme in India, after independence, reveals some complexities hampering the effectiveness of the programme. India launched a nationwide Family Planning Programme in 1952, a first of its kind among the developing countries with the objective of "reducing birth rate to the extent necessary to stabilize the population at a level consistent with the requirement of the national economy". After a long history of 66 years of the family planning programme, India still has a substantial proportion of couples (13%) with unmet needs. According to the recent round of National Family Health Survey (2015-16), a substantial proportion of women have still distanced themselves away from any method of contraception during their reproductive period. However, the situation of fertility and family planning in India varies significantly across different states.

In India, southern states and states like Maharashtra, Himachal Pradesh, Jammu and Kashmir, Punjab, West Bengal and Odisha, have experienced a low level of fertility. However, bigger states such as Uttar Pradesh, Bihar, Rajasthan and, Jharkhand need to reduce their fertility level, which is still higher than the replacement level. Further, because of their larger population base, these states drive high population growth rate of the country. Despite having an old history of family planning programmes, the 2011 census results showed that India continued to have one of the most rapidly growing populations in the world by adding 181 million people in the decade preceding the census. Between 2001 and 2011, the decadal growth rate of population was estimated at 17.6 percent, which was lesser by 3.9 percent points from the growth rate of the period 1991-2001 (21.5%).

A fact worth mentioning is that the family planning programmes of the countries like China, Malaysia, and Thailand, though launched later than India, have been far more instrumental in reducing the infant and maternal mortality rates, as well as achieving lower fertility rates in a substantially shorter span of time. A notable difference in the programmes adopted by the other countries and India in the context of family planning was the emphasis on birth spacing methods in the initial stages of the programme and limiting methods, i.e., sterilization, further along, the way for the countries like China, Malaysia, Taiwan, Hong Kong, etc. On the contrary, India stressed on adoption of limiting methods early on after the launch of the family planning programme, while spacing methods like condoms, Intra Uterine Devices (IUDs), oral contraceptive pills found few takers initially.[6] The Indian family planning programme is characterized by two decelerated phases in the achievement of its stipulated targets. The 1971 census demonstrated the annual population growth rate to be the highest during the decade from 1961-71, indicative of a deficient outcome of the population stabilization programme during this period. So, the government experienced a need for launching a camp-based family planning approach in the 1970s. The first instant of the slackened pace in the programme was experienced by the country after the emergency period of 1975-77, predominantly due to coercion from the government's side to adopt sterilization and birth control on a mass scale, which was met with widespread resistance, a general disdain towards family planning and an eventual change in the ruling party in India. The forceful implication of the family planning programme scathed the public to such an extent that the next political party which came into power had to rename the 'family planning programme into an all-encompassing and more holistic-sounding 'family welfare programme, which took all the issues related to maternal and child health, nutrition and, mortality under its purview, putting them into sharp perspective along with the ominous issue of family planning.

The second instance of the slackened pace in the programme came after the conclusion of the International Conference on Population and Development (ICPD) held at Cairo in September 1994, where it was decided to take concrete steps regarding the unmet need of couples for spacing and limiting methods. The East Asian countries carried out an assertive programme and brought down their fertility rates close to the replacement level in a short span of time, ignoring individual choices and women's rights in the process. As a result, the ICPD conference specifically focussed on these facets of the course of action to be adopted, namely, women's rights, reproductive health, poverty elevation and even sustainable development, which would all play monumental roles in the decline of the unmet need of contraception in the countries. The holistic approach adopted then saw more programmes finding themselves merged with the family planning programme in India, to improve all the aspects of a woman's life by the concept of Integration and decentralization. An integration of thirteen programmes were merged with the family planning programme with the vision of Maternal and Child Health Services' utilization impacting and strengthening the family planning services. In this process, though, child survival and safe motherhood took precedence and the family planning programme took a backseat after 1995, which resulted into the second wave of the slackened pace of the family planning programme in India. The impact of these policy changes is evident till now in the

persistent stagnant proportion of couples using modern contraceptives in India since the last decade. The issues raised in India and other developing countries likewise provided substantial clues to initiate a new programme called FP2020, where a group of 70 countries expressed their shared concern and strategized the repositioning of their respective family planning programmes.

In the London Summit on Family Planning in 2012, 70 developing countries, including India adopted Family Planning 2020 (FP 2020), the objective of which is to address the unmet need for contraception, spacing births as well as limiting births by 2020. For India, the vision is not only limited to providing contraceptive services to the additional 48 million couples during 2012-20 which would help averting 23.9 million births, 1 million infant deaths and over 42,000 maternal deaths by 2020. Under FP2020, an array of the programme has been integrated, which focuses on the improvement of the quality of care as well as provides the choice for the adoption of various family planning methods and services to its users. In this regard, spacing methods like IUDs, oral pills, and condoms are garnering more attention as compared to sterilisation.[7]

Situation Analysis of the use of Family Planning Programme in India

After putting lots of effort to enhance the alternative methods for family planning, the share of female sterilization is still very high among all the other methods. It is evident from Table 1 that female sterilization has a two-thirds, share in both the rounds of NFHS at 66 percent in 2005-06 and 67 percent in 2015-16. The share of condom and pills have marginally increased from 2005-06 to 2015-16, but the share of IUD/PPIUD in the contraceptive method mix has reduced during the same period. Female sterilization was found to be the most popular method among illiterate and less educated women in both the rounds of the survey. In NFHS-4, the share of female sterilization was 79 percent among women who never attended school, whereas it was only 45 percent for women who attended 12 or more years of schooling. Similarly, the share of female sterilization was higher among women belonging to Christian (79%), Buddhist (77%) and Hindu (70%) religion. On the contrary, this share was lowest among Muslim (46%) and Sikh women (52%). The share of condom and IUD/PPIUD use showed an increasing trend with increasing years of schooling. It was also higher among women who were not employed and belonged to Sikh and Jain religion in both rounds of the survey. Further, the share of condom uses and IUD/PPIUD methods for family planning were found more among the women who belonged to other castes (15% and 3.5%) and the highest wealth quintile (20% and 5%) respectively.

Table 1

Changes in share of use of four major modern methods of contraception by currently married women age 15-49 in India by some selected background characteristics, 2005-16

Background characteristic	NFHS-3				NFHS-4			
	Female sterilization	Pill	IUD/ PPIUD	Condom/ Nirodh	Female sterilization	Pill	IUD/ PPIUD	Condom/ Nirodh
Schooling								
No schooling	76.2	3.5	1.2	4.2	79.1	4.8	1.1	4.6
<5 years	74.1	6.2	1.1	4.3	73.7	11.2	1.5	4.0
5-7 years	70.0	6.8	2.4	7.5	71.7	8.7	2.3	7.0
8-9 years	57.3	8.5	4.1	10.8	59.5	11.3	3.2	11.5
10-11 years	53.9	6.5	6.0	15.9	62.5	7.9	3.8	14.0
12 or more years	33.1	6.4	9.8	29.9	44.9	7.0	6.8	26.3
Employment								
Not employed	58.0	7.2	3.9	12.5	61.2	8.9	3.1	13.0
Employed for cash	75.9	3.6	2.0	6.1	77.7	4.9	2.3	6.5
Employed not for cash	76.3	2.7	1.9	4.4	77.1	3.8	1.6	6.0
Religion								
Hindu	69.0	4.7	2.8	8.3	70.2	6.3	2.6	9.6
Muslim	46.6	12.5	3.9	14.9	45.9	17.9	3.1	15.9
Christian	70.7	2.4	4.2	6.3	78.5	6.3	3.3	4.7
Sikh	47.2	3.9	11.9	23.8	51.7	3.5	8.8	23.4
Buddhist	79.9	2.4	1.0	5.5	76.8	5.0	2.2	11.1
Jain	54.5	2.1	8.0	26.1	61.5	2.4	5.0	21.8
Other	56.1	15.8	2.4	7.1	35.5	40.0	3.8	6.7
Caste/tribe								
Scheduled caste	69.6	5.1	1.5	7.3	70.1	7.1	2.2	9.1
Scheduled tribe	73.7	4.6	1.7	3.5	74.1	8.5	2.4	4.7
Other backward class	73.2	3.3	2.8	7.7	72.4	4.7	2.7	9.5
Other	55.2	8.3	4.5	13.3	55.7	12.0	3.5	14.6
Don't know	81.9	2.4	2.6	1.8	57.0	16.8	3.8	9.6
Wealth index								
Lowest	69.4	5.5	0.9	2.8	69.3	10.5	1.2	4.3
Second	72.4	5.5	1.0	4.1	68.0	11.4	1.7	6.0
Middle	73.8	5.3	1.4	5.5	72.0	7.5	1.8	7.7
Fourth	68.6	5.6	3.0	9.6	69.4	6.1	3.1	11.0
Highest	51.7	5.5	7.0	19.6	58.6	4.4	5.2	20.3
Total	**66.3**	**5.5**	**3.0**	**9.2**	**67.3**	**7.7**	**2.8**	**10.5**

Overall, the share of pills in the family planning method has increased from 3 percent to 8 percent from NFHS-3 to NFHS-4. The highest share of use of pills has been found among women who were not employed (9%), belonged to "others" religion (40%) and Muslim (18%) religion, "other" caste group (12%) and those who were among poor (11%) and poorest (11%) wealth quintiles. Whereas this share was lowest among women who never went to school (4.8%), belonging to Jains (2.4%) and Sikh (3.5%) religion, among OBC and among those women who belonged to the highest wealth quintile (4.4%).

Table 2 presents the changes in the share of utilization of four major modern methods of contraception among currently married women aged 15-49, India, 2005-16. It is evident from the results that, fourteen states are showing a declining trend in the share of female sterilization. The maximum reduction in sterilization took place in Mizoram (22% points), followed by Arunachal Pradesh (17% points) and Odisha (16% points) between 2005-06 and 2015-16. Few states in the Northern (Delhi and Punjab), Central (Chhattisgarh and Madhya Pradesh), Eastern (Bihar and Jharkhand) and North-eastern (Mizoram and Sikkim) region showed an increasing trend of female sterilization. While, the share of female sterilization has increased in all the Western and Southern states, among all the Southern states only Kerala has a share of female sterilization below 90 percent (86%) in 2015-16, and Andhra Pradesh had the highest share of 98 percent. The Southern states were first in achieving below replacement level fertility and their TFR now stands at 1.8 and below. In most of the Northern, Eastern, and North-eastern states, the share of female sterilization was less than 60 percent. In Uttar Pradesh, the share of female sterilization was 38 percent in 2015-16, which has reduced from 2005-06. Whereas, in Bihar, the share of female sterilization was 86 percent during NFHS-4, which is 16 percentage points higher in comparison to the third round of NFHS.

Table 2

Changes in share of use of four major modern methods of contraception among currently married women aged 15-49, India, 2005-16

State	NFHS-3				NFHS-4			
	Female sterilization	Pill	IUD	Condom/ Nirodh	Female sterilization	Pill	PPIUD	Condom/ Nirodh
North								
Delhi	34.4	6.7	7.5	34.2	36.1	5.3	9.9	36.5
Haryana	60.3	4.4	7.4	18.6	59.8	4.4	8.8	18.8
Himachal Pradesh	67.5	3.7	1.9	15.8	60.6	2.6	1.6	22.2
Jammu & Kashmir	50.0	8.9	5.1	15.2	42.6	11.2	4.9	19.6
Punjab	48.7	4.6	8.7	24.5	49.5	3.6	8.7	24.9
Rajasthan	72.5	4.2	3.4	12.1	68.2	4.0	2.0	14.6
Uttaranchal	54.1	7.1	2.5	26.5	51.3	6.2	3.0	30.1
Central								
Chhattisgarh	76.5	2.6	1.5	5.5	80.1	2.9	2.8	6.8
Madhya Pradesh	79.2	3.0	1.3	8.6	82.3	2.5	1.0	9.6
Uttar Pradesh	39.7	3.9	3.2	19.7	38.0	4.2	2.6	23.7

State	NFHS-3				NFHS-4			
	Female sterilization	Pill	IUD	Condom/ Nirodh	Female sterilization	Pill	PPIUD	Condom/ Nirodh
East								
Bihar	69.8	3.8	1.8	6.7	86.3	3.3	2.1	4.2
Jharkhand	65.5	10.6	1.7	7.6	76.9	6.5	2.5	5.5
Orissa	65.3	13.8	1.0	5.9	49.2	21.1	1.9	5.9
West Bengal	45.2	16.4	0.8	6.0	41.2	28.2	1.7	8.3
Northeast								
Arunachal Pradesh	52.1	18.8	7.9	6.5	35.4	33.2	10.1	4.4
Assam	23.0	18.2	2.3	4.1	18.1	42.2	4.2	5.2
Manipur	16.8	10.9	10.9	8.4	13.1	17.8	15.7	5.5
Meghalaya	39.1	20.2	6.2	9.9	25.5	48.6	7.8	5.3
Mizoram	71.6	17.7	7.8	2.3	49.3	37.4	9.3	3.7
Nagaland	33.3	15.8	17.5	8.8	34.3	15.1	25.3	4.9
Sikkim	36.8	22.2	5.2	7.1	37.7	24.8	13.5	11.1
Tripura	26.8	33.2	1.4	4.9	21.7	41.0	0.9	3.0
West								
Goa	53.5	3.1	4.6	15.6	62.0	1.1	3.4	27.0
Gujarat	64.4	3.9	6.6	8.7	71.6	3.0	6.4	10.4
Maharashtra	76.4	3.6	4.5	9.3	78.2	3.9	2.5	11.0
South								
Andhra Pradesh	93.0	0.4	0.7	0.7	98.3	0.3	0.3	0.3
Karnataka	90.3	1.3	3.9	2.7	93.8	0.8	1.5	2.5
Kerala	71.0	0.6	3.4	8.0	86.3	0.4	3.0	4.9
Tamil Nadu	89.6	0.3	3.4	3.7	92.9	0.4	3.6	1.5
Telangana	-	-	-	-	94.8	0.5	0.7	0.9
India	**66.3**	**5.5**	**3.0**	**9.2**	**67.3**	**7.7**	**2.8**	**10.5**

Note: - state not exists

The use of oral pills as a choice of family planning method is more prevalent in the North-eastern, and Eastern states in comparison to other parts of the country. It was highest in Meghalaya with the share of 49 percent followed by Assam (42.2%) and Tripura (41%). Oral Pills' share was less than one percent in almost all the Southern states. Similarly, the share of IUD/PPIUD was highest in Nagaland (25.3%) followed by Manipur (15.7%) and Arunachal Pradesh (10.1%). In Bihar where TFR is the highest among all the states, the share of Oral Pills and IUD/PPIUD showed a declining trend from NFHS-3 to NFHS-4. From Table 2 it is evident that the use of the condom is maximum in the Northern region compared to the other parts of the country and all the states of this region are showing an increasing trend of use of the condom as a spacing method of family planning. The share of the condom was 37 percent in Delhi and 30 percent in Uttarakhand, which are the highest among all the states. The Southern states show a declining pattern of the condom use as a choice of family planning method. Overall, the recent findings of NFHS-4 show that the dominance of female sterilization is still high in all the

states and spacing methods especially Oral Pills and IUD/PPIUD are not getting much preference.

Table 3 presents the changes in the unmet need for family planning and demand of contraception satisfied among currently married women aged 15-49 years by some selected background characteristics. Overall, there is no change in unmet need (12.9%) from 2005-06 to 2015-16 in India. Unmet need by age shows that among women belonging to 15-19 age groups it has reduced from 27 percent to 22 percent in the last one decade. Whereas, unmet need among women belonging to 20-24 and 25-30-year age group, was 21 and 16 percent respectively in 2005-06, which has increased to 22 percent for 20-24 and 19 percent for 25-30-year age groups in last one decade. Results of logistic regression also show a strong association between age and unmet need, the unmet need of women belonging to 20-24 years and 25-29 years of age group was more than seven times higher in comparison to women belonging to 15-19 years age group. Level of demand satisfaction has reduced among all the ages from NFHS-3 to NFHS-4, except for women of 15-19-year age group. Demand for family planning method is very high at younger ages.

Table 3

Changes in unmet need of family planning and demand of contraception satisfied among currently married women aged 15-49 years by some selected background characteristics, India, 2005-16

Background characteristic	NFHS-3			NFHS-4		
	Unmet need	ODS Unmet need	Demand satisfied	Unmet need	ODS Unmet need	Demand satisfied
Age						
15-19 ®	27.1		32.4	22.2		40.1
20-24	21.1	8.49***	61.2	22.3	7.01***	56.5
25-29	16.0	6.55***	77.9	18.7	7.32***	72.0
30-34	11.0	4.80***	86.4	12.5	6.00***	83.3
35-39	7.4	3.36***	90.8	8.3	3.81***	89.0
40-44	4.3	2.57***	94.1	5.8	2.46***	91.9
45-49	1.9	1.87***	97.1	3.4	1.71***	94.7
Residence						
Urban ®	9.7		86.9	12.1		82.5
Rural	14.1	0.90***	78.9	13.2	1.03***	79.7
Schooling						
No schooling ®	13.6		79.2	11.0		83.2
<5 years	10.4	0.85***	85.8	10.1	0.65***	85.7
5-7 years	12.5	0.65***	82.5	11.7	0.54***	83.1
8-9 years	13.5	0.81***	81.3	14.1	0.61***	79.0
10-11 years	12.1	0.93*	83.1	13.6	0.73***	79.6
12 or more	10.7	0.98	85.3	17.0	0.76***	73.6
Religion						
Hindu ®	11.9		82.9	12.4		81.5
Muslim	18.8	0.57***	70.9	16.4	0.74***	73.4
Christian	12.5	1.04	82.2	12.9	1.06	79.9
Sikh	6.4	0.78*	91.2	6.4	0.90**	92.0
Buddhist	9.5	0.46***	87.7	11.1	0.43***	85.9

Background characteristic	NFHS-3			NFHS-4		
	Unmet need	ODS Unmet need	Demand satisfied	Unmet need	ODS Unmet need	Demand satisfied
Jain	7.3	0.50***	91.2	12.1	0.73***	83.7
Other	24.9	0.57**	50.4	18.3	0.87	69.7
Caste/tribe						
SC ®	13.4		80.4	12.1		82.0
ST	13.9	1.30	77.5	13.0	0.66***	79.2
OBC	13.4	1.12	80.1	13.4	0.63***	79.4
Other	11.3	1.33*	84.5	12.4	0.74***	82.3
Don't know	13.2	1.22	83.3	19.4	0.70***	69.7
Wealth index						
Lowest ®	18.2		69.9	16.7		71.5
Second	14.8	1.93***	77.6	13	1.83***	79.9
Middle	12.8	1.54***	81.6	11.5	1.28***	82.9
Fourth	10.6	1.32***	85.4	11.8	1.05***	82.9
Highest	8.1	1.12***	89.3	11.6	1.03**	83.6
Total	**12.8**		**81.5**	**12.9**		**80.6**

*Note- *p<0.05 ** p< 0.01, p<0.001, ®= reference group*

Education also shows a strong association with unmet need. Educated women are less likely to have unmet need in comparison to illiterate women in both the rounds. Unmet need was found to be highest among others (18.3%) followed by Muslim (16.4%) women and it was lowest among Sikhs (6.4%) in 2015-16. Results of regression analysis indicate that Hindu women are more likely to have the unmet need than women of other religions. Across all groups, it can be seen, that the programme has not been able to address the need for family planning. Investing in the adolescent is the most effective way to achieve population stabilization in the niche of time; therefore, there is a strong need to focus on newly married couples.

Table 4

Changes in unmet need of family planning and demand of contraception satisfied among currently married women aged 15-49, India, 2005-16

State	NFHS-3			NFHS-4		
	Unmet need	Demand satisfied	TFR	Unmet need	Demand satisfied	TFR
North						
Delhi	7.8	89.5	2.1	15.0	78.5	1.8
Haryana	8.3	88.4	2.7	9.3	87.3	2.1
Himachal Pradesh	7.2	90.9	1.9	15.7	78.4	1.9
Jammu & Kashmir	14.5	78.4	2.4	12.3	82.3	2.0
Punjab	7.3	89.6	2.0	6.2	92.4	1.6
Rajasthan	14.6	76.4	3.2	12.3	82.9	2.4
Uttarakhand	10.8	84.6	2.6	15.5	77.5	2.1
Central						
Chhattisgarh	10.1	84	2.6	11.1	83.8	2.2
Madhya Pradesh	11.3	83.2	3.1	12.1	80.9	2.3
Uttar Pradesh	21.2	67.3	3.8	18.0	71.6	2.7

State	NFHS-3			NFHS-4		
	Unmet need	Demand satisfied	TFR	Unmet need	Demand satisfied	TFR
East						
Bihar	22.8	59.9	4.0	21.1	53.2	3.4
Jharkhand	23.1	60.7	3.3	18.4	68.7	2.6
Odisha	14.9	77.3	2.4	13.6	80.8	2.1
West Bengal	8.0	89.9	2.3	7.5	90.5	1.8
Northeast						
Arunachal Pradesh	18.8	69.7	3.0	21.5	59.5	2.1
Assam	10.5	84.3	2.4	14.1	78.7	2.2
Manipur	12.4	79.7	2.8	30.1	43.9	2.6
Meghalaya	35.0	40.9	3.8	21.2	53.4	3.0
Mizoram	17.3	77.5	2.9	20.0	63.8	2.3
Nagaland	26.1	53.2	3.7	22.3	54.4	2.7
Sikkim	16.9	77.4	2.0	21.7	68.3	1.2
Tripura	10.3	86.5	2.2	10.7	85.7	1.7
West						
Goa	13.1	78.7	1.8	17.5	60.0	1.7
Gujarat	8.0	89.2	2.4	17.0	73.4	2.0
Maharashtra	9.4	87.7	2.1	9.7	87.0	1.9
South						
Andhra Pradesh	4.7	93.5	1.8	4.6	93.7	1.8
Karnataka	9.6	86.9	2.1	10.4	83.3	1.8
Kerala	8.9	88.6	1.9	13.7	79.5	1.6
Tamil Nadu	8.5	87.8	1.8	10.1	84.0	1.7
Telangana	-	-	-	7.4	88.6	1.8
India	**12.8**	**81.5**	**2.7**	**12.9**	**80.6**	**2.2**

Note: - state not exists

Using linear regression between TFR and CPR, it is observed that a one percent point increase in CPR will reduce TFR by 0.026 per woman. Six major states that constitute more than two-fifths of the total population of the country viz. Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Uttar Pradesh and Rajasthan have TFR far from replacement fertility. For example, Bihar is having a TFR of 3.4 and percentage of currently married women aged 15-49 using the modern methods of contraceptive is 23 percent, needs to increase it to 73 percent to achieve the replacement level of fertility. Similarly, Chhattisgarh needs to increase the percentage of currently married women using modern methods of contraceptive from 55 to 58 percent, for Jharkhand, from 38 to 53 percent, for Madhya Pradesh, the increase should be from 50 to 53 percent, for Rajasthan from 38 to 58 percent and finally for Uttar Pradesh from 32 to 55 percent. The estimation is based on the premises that the other proximate determinants of fertility like the index of post-partum in-fecundability, index of marriage and index of induced abortion, which are remains unchanged.

Conclusions

The findings of the study provide strategies as a way forward in repositioning the family planning programme in India. The process of repositioning can be done using the following strategies:

1. There is a strong need to strengthen capacity building of health functionaries and staff focusing on increasing accountability with transparent support and conducive environment. Contraceptive discontinuation rates in these states are still very high because of various reasons such as method failure, side effects, health concerns and others. Improvement in the quality of care is quite essential for the success of new methods of family planning. Increasing the reach of family planning services and better quality is vital to reduce unmet need and level of fertility. It includes the availability of various methods, information, and effective communication from health workers as well as better counselling. Health workers such ASHA and ANM are a very crucial part of family planning services. Although these service providers are playing an important role in providing services and motivating people to use the contraceptives, they need better training and knowledge about modern contraceptives, so that they can provide better advice to target population thus multiplying the effects of these services. Use of modern spacing method is very low in all the parts of the country (Table 2) and the discontinuation rate is also very high because of various reasons (Table 5). Trained health workers can solve method failure, side effects and other issues. Along with that, they may be able to provide advice related to new and effective alternative methods. Further, maintaining a relationship with communities is also very important to propel the acceptance and use of modern methods. ASHA health worker must be trained to convince and develop a good relationship with the beneficiaries. Door-to-door visit by health workers is the best way to provide the service and help people from issues related to using of contraceptives.

Table 5

Twelve-month contraceptive discontinuation rates among currently married women in India, 2015-16

State	Reason for discontinuation							
	Method failure	Desire to become pregnant	Other fertility related	Side effects/ health concerns	Wanted more effective method	Other method related reason	Other reason	Any reason
Condom/ Nirodh								
Uttar Pradesh	4.3	12.4	7.6	2.2	1.2	7.6	8.6	44
Madhya Pradesh	1.3	16.6	4.9	2.3	2.7	4.7	12.7	45.1
Bihar	2.4	7.4	18.4	1.2	0.9	7.9	24.8	63
Rajasthan	1.8	15.1	7.1	1.9	1.2	3.1	12	42.2
Karnataka	0.0	30.0	6.0	4.1	1.0	7.6	24.2	73
Tamil Nadu	0.2	23.2	7.4	3.9	1.2	12	23.2	71.1
Kerala	1.5	20.2	21.2	3.2	1.4	6.3	14.3	68.2
Andhra Pradesh	*	*	*	*	*	*	*	*
India	2.9	14.9	6.9	3.0	2.2	6.5	10.8	47.2
IUD or PPIUD								
Uttar Pradesh	1.3	2.0	3.0	9.6	1.4	1.8	2.9	21.9
Madhya Pradesh	1.0	3.1	3.4	13.6	1.7	3.0	8.6	34.4
Bihar	(5.2)	(2.9)	(2.3)	(9.0)	(1.2)	(6.5)	(6.3)	(33.3)
Rajasthan	0.7	5.8	1.4	7.4	1.7	1.5	2.6	21.1
Karnataka	(0.2)	(7.4)	(4.0)	(9.3)	(2.7)	(4.4)	(10.2)	(38.2)

State	Reason for discontinuation							
	Method failure	Desire to become pregnant	Other fertility related	Side effects/ health concerns	Wanted more effective method	Other method related reason	Other reason	Any reason
Tamil Nadu	0.4	13.1	4.4	10.1	0.9	9.0	10.0	47.7
Kerala	(0.7)	(11.7)	(7.7)	(11.4)	0.0	(1.8)	(1.3)	(34.6)
Andhra Pradesh	*	*	*	*	*	*	*	*
India	1.2	5.5	2.4	8.6	1.2	3.6	3.9	26.4
Pill								
Uttar Pradesh	5.5	8.6	8.7	13.3	1.3	9.5	8.6	55.4
Madhya Pradesh	1.1	17.1	6.1	9.9	3.1	5.2	11.2	53.6
Bihar	2.8	6.6	12.0	8.8	1.2	11.8	20.2	63.4
Rajasthan	1.2	14.4	9.7	9.4	2.4	6.9	7.8	51.9
Karnataka	(0.6)	(15.8)	(5.2)	(6.8)	(1.1)	(6.5)	(22.2)	(58.3)
Tamil Nadu	0.0	(30.6)	(8.2)	(11.1)	(0.1)	(12.3)	(22.4)	(84.7)
Kerala	*	*	*	*	*	*	*	*
Andhra Pradesh	*	*	*	*	*	*	*	*
India	**1.9**	**11.3**	**5.1**	**11.2**	**2.0**	**4.7**	**5.8**	**41.9**

*Note: Figure under the () are based on 25-29 unweighted cases, * number are very less*

2. Extending the concept of digital India to digitize the functioning of front-line workers with the concept of supportive supervision would be an important strategy. In the era of digital India, with the use of modern technology, service providers and seekers can be easily connected. Providing mobile phones to health workers will help them to communicate and follow the progress. It will also be beneficial to connect and solve the problems of newly married couples as well as those who want knowledge of different methods of contraception available. Further, videos and information related to family planning can be imparted effectively to the ASHAs as well as the clients. Such an innovative strategy would be effective.

3. Opening the clinics at block level under PPP, initially for EAG states with active support from various corporate houses under their CSR commitments, which will be completely devoted to fulfilling the needs of people for family planning such as providing good quality of contraceptive as well as making them well informed about the basket of choices available can be done. Availability of safe abortion and post-abortion facilities would also be an important service provided in these centers. The charge of services available at these clinics should be free of cost for the poor people and minimal for people who cannot afford it. In those states, where the fertility is low, these services can be provided at its actual price but in high fertility states, there is a strong need to provide these services at a subsidized rate.

4. To improve the reach of the programme, a partnership with NGOs will be very beneficial. Few NGOs, such as Janani is running Surya clinic in Bihar and Rajasthan, Parivar Seva Sanstha is running Marie Stops clinic in different parts of the country. PSI is also successfully running PEHEL project in Uttar Pradesh, Rajasthan, and Delhi, which aims at providing affordable family planning services and knowledge to people about both

IUDs and abortions. These NGOs are very effectively providing high quality services for family planning very effectively. Engaging private partners and utilizing their provision of Corporate Social Responsibility (CSR) can also boost the pace of family planning services. Although, there are several corporates contributing to the health sectors through their CSR initiatives, however, only a few of them are focussing on family planning. They can play an important role in imparting knowledge and improving the facilities, especially in high focused pockets of the country, where the reach of public services is very limited.

5. Further, removal of sterilization incentives for service providers at different levels, especially for those states which have already achieved replacement level fertility can be a good option and use of that amount for providing incentives for PPIUD would be a good option. In addition to that, stopping incentive-based sterilization where fertility is already below the replacement level like in the Southern region states and states like Punjab, West Bengal, and Maharashtra will help cost-cutting; thus, the money saved by curtailing the incentives can be used to improve quality of services in the same states or other states which have a long way to go to reach the replacement level of fertility in high focused states and districts, where Mission Parivar Vikash is currently being implemented.

6. Ensuring uninterrupted supply of various contraceptives to family planning centers and from these centers to users is very important to ensure sustained use of spacing methods. Tracking the progress through intensified monitoring is also essential for the success of any programme. Regular follow-ups and generating data related to the use of family planning would be further helpful in making services better.

7. Adopting and intensifying the social marketing of contraceptives adopting the concept of brand promotion and product positioning through self-help groups among women may be helpful in filling up the critical gaps in the contraceptive promotion, especially in remote rural areas of EAG states.

References

1. Dockalova, B., Lau, K., Barclay, H. and Marshall A. 2016. Sustainable Development Goals and Family Planning 2020. The International Planned Parenthood Federation (IPPF). United Kingdom. June. p 1-12.

2. Darroch, J.E, Sedgh, G. and Ball, H. 2011. Contraceptive technologies: Responding to women's needs. New York: Guttmacher Institute. April:201(1).

3. Najafi-Sharjabad, F., Yahya, S.Z, Hejar, Abdul Rahman M.H and Manaf, R.A. 2013. Barriers of modern contraceptive practices among Asian women: A mini literature review. Global Journal of Health Science. Sept. 5(5):181.

4. Guttmacher Institute. 2010. Facts on investing in family planning and maternal and newborn health. Available at http://www.guttmacher.org/pubs/FB-AIU-summary.pdf

5. International Institute for Population Sciences & ICF. 2017. National Family Health Survey (NFHS-4), 2015–16: India. Dec. Available at http://rchiips.org/nfhs/NFHS-4Reports/India.pdf

6. Srinivasan, K. 2017. Population Concerns in India: Shifting Trends, Policies, and Programmes. SAGE Publishing India; Jul 17.

7. Family Planning Division, Ministry of Health & Family Welfare. 2014. India's `vision FP 2020'. Ministry of Health & Family Welfare Government of India, Nirman Bhawan, New Delhi-110011. Nov. Available at Https://advancefamilyplanning.org/sites/default/files/resources/FP2020-Vision-Document%20India.pdf

MIGRATION AND CHILD IMMUNISATION IN MUMBAI, INDIA

NILESH C. GAWDE, SIVAKAMI M. AND BABU V. BONTHA

Introduction

Migration has been integral to the development of human civilization. In recent centuries, numbers of migrants have increased exponentially. Internal migration within a nation is more common than international migration. This is of high public health significance, particularly for most low- and middle-income countries (LMICs), yet it attracts less attention than the international migration, especially on issues related to health and well-being. The number of internal migrants in India is more than the total population of United States of America.[1] Yet, health of internal migrants has not received much attention until recently. In Indian context, predominant cause of migration to urban areas is employment related and is expected to improve the conditions of their living. However, the hazardous working and living conditions in urban areas put poor migrants at higher risk of developing health issues. These health consequences can negate the positive effects due to improved income.

Among the internal migrants, children are the particularly vulnerable group and may disproportionately experience adverse health outcomes. Secondary data from demographic and health surveys show that the child survival is poorer among migrants than their urban counterparts and this effect is found to be more pronounced in bigger cities.[2,3] There is also evidence that rural-urban migrant children may fair worse than rural non-migrants in terms of survival.[4] Poor survival

Nilesh C. Gawde, Assistant Professor, Sivakami M., Professor and Chairperson, Centre for Health and Social Sciences, School of Health Systems Studies, Tata Institute of Social Sciences, Deonar, Mumbai - 400088 and Babu V. Bontha, Scientist G and Head, Division of Socio-behavioural and Health Systems Research, Indian Council of Medical Research, V. Ramalingaswami Bhawan, Ansari Nagar, New Delhi - 110029

of migrant children in India has been primarily attributed to poor socioeconomic status of migrants and lack of access to health care.[5] The poor vulnerable migrant children get exposed to poor sanitary and living conditions in the urban slums and are likely to have deleterious effects on their nutritional and health status. Health promotion, prevention of diseases and recovery from an illness episode depend upon their access to health care. There are evidences from developing countries that poor migrants were largely excluded from urban services, including access to health care.[6-10] However, the evidence is minimal regarding access to health interventions among migrant children in India.

Among child health interventions, immunization is one of the most important preventive health interventions and saves many lives.[11] However, the coverage of immunization is likely to be poor among marginalized and vulnerable populations including migrants. There is some evidence that internal migration is associated with poor utilization of immunization services. In an Ethiopian study, rural-rural migration was associated with poor immunization.[12] A study in Beijing found measles coverage to be less among migrant children.[13] In Guangdong province of China, migration was associated with poor immunization, but the migrant children were sampled from both urban and rural areas of the province.[14] Being a recent migrant and belonging to a socio-economically disadvantaged group were key determinants.

Among Indian studies, the disadvantage faced by migrant children has been documented in recent years.[15-18] A recent meta-analysis which included studies from China, Nigeria and India identified that rural-urban migrants were less likely to be fully immunized.[19] However, this meta-analysis also adds that the findings represent only 11 studies in select parts of the three countries and generalization will be difficult. This review thereby also highlights important gap in global health research, especially issues around migrants.

No data is however available for Mumbai, the city which received highest number of internal migrants from 1991 to 2001. Immunization services are available in both public and private sector. The later provides it at market rates but does not maintain records. The Municipal Corporation of Greater Mumbai (MCGM; public sector) provides the services free of cost at health facilities and in the community. Data on immunization is routinely collected by public health department and gets reflected in the Health Management Information System (HMIS). However, this includes only service data from public sector and fails to provide reliable estimates of immunization coverage in population. Large scale population surveys like National Family Health Survey (NFHS) and District Level Household and Facility Survey (DLHS) provide reliable estimates of immunization coverage. However, neither HMIS nor population level surveys provide data on immunization among migrant children.

National Health Mission (NHM) of India aims at reducing inequities in healthcare provision to urban marginalized communities including migrants and their children. However, the NHM neither have data on immunization coverage among migrant children nor its determinants. Hence, there is a need to find out immunization coverage among migrant children in Mumbai. It is equally important to find out the determinants of immunization and barriers faced by migrants in accessing these services. Addressing this research gap will help government plan appropriate

strategies to reduce inequities in access to immunization.

Methods

Study design and method

This study is part of a larger multi-centric study in Indian cities to assess access to healthcare for migrants. This paper is limited to utilization of immunization among migrant infants in Mumbai. A cross-sectional study design with quantitative survey method was used to collect information on immunization among migrant infants and predictor variables by using pilot tested interview schedule.

Functional definition of migrant children

A person whose last usual place of residence [defined as a place (village/town) where the person had stayed continuously for a period of six months or more] was different from the present place was considered as a migrant. A migrant child was defined as a child from a household where all members are migrants and have been living in Mumbai for a period of 30 days to ten years. Immunization data was collected only for the migrant children aged less than two years.

Sampling framework

Cost of living pushes poor migrants to live in slums. Hence, six wards of suburban Mumbai with higher proportion of slum population were purposively selected. Cluster random sampling was used for selecting the migrant households. Clusters were identified by listing all slums in the selected wards and then selecting clusters with higher proportion of migrants. The sample size for the ward was determined in proportion to slum population of each ward. Sample size was further divided among clusters in proportion to estimated population of migrants.

Study participants

Currently married migrant women above 18 years of age who had delivered a baby in the previous two years from the date of interview were eligible to participate in the infant immunization component of the study. A total of 3909 eligible households (randomly selected) were approached; of whom 3725 consented to participate. Among these 3725 households, 234 women met inclusion criteria for infant immunization component and were interviewed.

Outcome measure

Complete immunization against six vaccine-preventable diseases was the primary outcome measure to understand access to immunization. Complete immunization includes children aged 12 to 23 months who had received vaccines for six vaccine preventable diseases including one dose of BCG (Bacillus Calmette Guerin), three doses of DPT (diphtheria, pertusis and tetanus), three doses of oral polio vaccine (OPV) and one dose of measles.

Explanatory variables

Age of woman, difference in age between woman and her husband, education of woman, parity, type of family, family income, religion and caste, years since migration and home state were considered as independent variables for access to immunization. Age of woman, difference in age between woman and her husband, education of woman, parity, and years since migration were included as continuous variables in the analysis. Logarithmic transformation of family income was used. Family type of woman's household was classified either as nuclear or joint. A nuclear household is defined as one that consists of parents and their unmarried children. Single variable of religion and caste was created with three categories. First included all Muslim

(irrespective of castes), second included all scheduled caste (except Muslims) and scheduled tribes and third included upper caste Hindu. Home state was classified in two categories, namely intra-state migrants and inter-state migrants.

Migration status of children was classified families who had migrated to Mumbai in less than two years, two to five years and more than five years. However, for multivariate analysis, duration since migration was included as a continuous variable in regression equation. Migrant women often visit hometown during pregnancy, may deliver there and return to city later. Similarly, access to immunization depends upon duration of stay in Mumbai during first year of life of infant. Complete immunization involves vaccines against six diseases given over a period of nine months. Hence, stay in Mumbai during first year of life was categorized as stay for nine months and more or less than nine months and was used as independent variable for complete immunization. Given the gender inequities within society, sex of the child was also included as an independent variable for the immunization coverage.

Analysis

Quantitative data was collected from August 2011 to April 2012 and entered in SPSS version18. Descriptive analysis of socio-demographic variables, living conditions, migration characteristics and immunization coverage was conducted.

Both unadjusted and adjusted analyses were performed to identify factors associated with the outcome measures. Unadjusted analyses were done to identify socioeconomic groups with better utilization of immunization. Since in the present analysis, the dependent variable is dichotomous in nature, (completely immunized or not), the technique of logit regression has been adopted which is suited to assess the influence of certain variables on the probability of occurrence of an even, in this analysis, the probability of receiving immunization service.

Ethical considerations

The study was approved by the Institutional review board of the first two authors and have been performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. Eligible respondents were provided participant information sheet and informed consent form in the language understood by them. In case of illiterate respondents, these documents were read in language understood by them in presence of a witness. Interviews were conducted for those who consented to participate. All participating migrant women were informed that their responses would be treated anonymously.

Results

Out of the 234 children included in the study, 28 (12%) were from families who had migrated to Mumbai less than two years from the date of interview. Another 54 (23%) had migrated to Mumbai between previous 2 to 5 years and remaining 152 (65%) had migrated between 5 to 10 years. Table 1 shows age-appropriate immunization rates among these three groups. Proportions of children receiving a vaccine was usually low among families had migrated less than two years and families had migrated at least five years ago had highest proportion of children receiving each and every vaccine.

Table 1

Reception of various vaccines appropriate for age among the children by migration duration in Mumbai, India

Age appropriate vaccinations	Duration of migration			
	< 2 years Number (percent)	2 - 5 years Number (percent)	≥ 5 year Number (percent)	Total Number (percent)
Vaccines to be received at birth for all children	n = 28	n = 54	n = 152	n=234
BCG (0-1 month)	25 (89.3)	47 (87.0)	146 (96.1)	218 (93.2)
OPV-0	20 (71.4)	40 (74.4)	117 (77.0)	177 (75.6)
Hepatitis B -0	8 (28.6)	16 (29.6)	50 (32.9)	74 (31.6)
Vaccines to be received at 6 weeks of age (1½ month)	n = 28	n = 53	n = 142	n=223
DPT -1	22 (78.6)	43 (81.1)	126 (88.7)	191 (85.7)
OPV – 1	22 (78.6)	43 (81.1)	126 (88.7)	191 (85.7)
Hepatitis B - 1	15 (53.6)	32 (60.4)	100 (70.4)	147 (65.9)
Vaccines to be received at 10 weeks of age (2½ month)	n = 28	n = 52	n = 137	n = 217
DPT – 2	17 (60.7)	30 (57.7)	98 (71.5)	145 (66.8)
OPV – 2	17 (60.7)	30 (57.7)	98 (71.5)	145 (66.8)
Hepatitis B - 2	10 (35.7)	21 (40.4)	76 (55.5)	107 (49.3)
Vaccines to be received at 14 weeks of age (3½ month)	n = 27	n = 48	n = 132	n = 207
DPT – 3	13 (48.1)	22 (45.8)	82 (62.1)	117 (56.5)
OPV – 3	13 (48.1)	22 (45.8)	82 (62.1)	117 (56.5)
Hepatitis B – 3	9 (33.3)	16 (33.3)	60 (45.5)	85 (41.1)
Vaccines to be received at 9-12 months	n = 20	n = 40	n = 108	n = 168
Measles (9-12 months)	7 (35.0)	18 (45.0)	59 (54.6)	84 (50.0)
Vitamin – A	6 (30.0)	16 (40.0)	42 (38.9)	64 (38.1)
Various vaccines to be received by 12 months of age	n = 18	n = 32	n = 81	n = 131
Fully immunized against six VPDs	5 (27.8)	14 (43.8)	45 (55.6)	64 (48.9)
Fully immunized against seven VPDs	3 (16.7)	12 (37.5)	34 (42.0)	49 (37.4)

** Six vaccine preventable diseases (VPDs) include TB, Polio, Diphtheria, Pertussis, Tetanus and Measles, seventh VPD is Hepatitis B*

Among vaccines to be given at birth, utilization of BCG was 93% whereas that of zero dose polio was 76% and zero dose hepatitis B vaccine (HBV) was 32%. The utilization of OPV and DPT vaccines declined from 86% for first dose to 67% for second dose and further to 57% for third dose. Similarly, the proportion of children who received HBV declined from 66% (first dose) to 49% (second dose) to 41% (third dose). Of the 168 children aged nine months and above, only 84 (50%) had received measles vaccine. Utilization for first dose of vitamin A was further less with just 64 (38%) receiving it.

A total of 131 children were aged 12 months or more. Out of these 131, only 64 (49%) children were completely immunized against six vaccine preventable diseases. A total of 49 (37%) were completely immunized against seven vaccine preventable diseases. The children from families who migrated during past two years had least complete immunization rates and those from

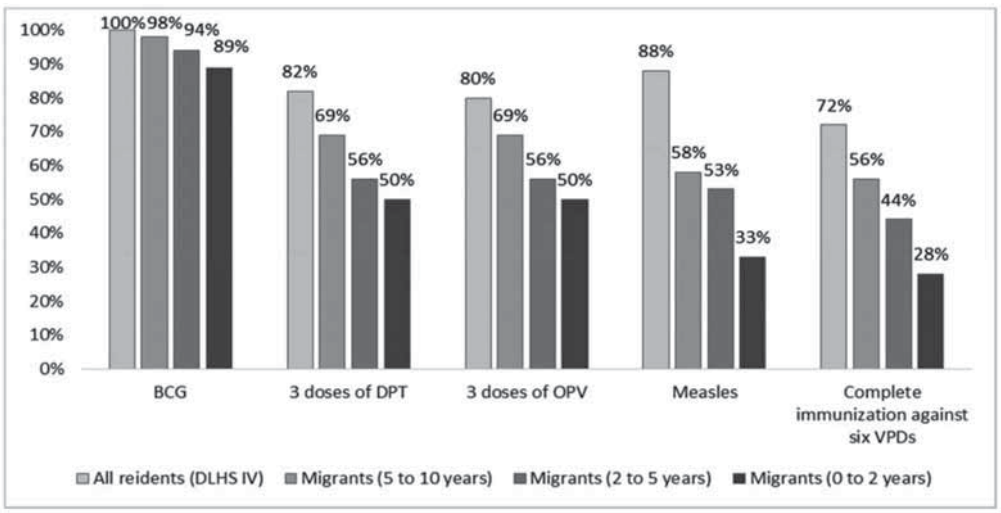
families with at least five years of stay in Mumbai had highest complete immunization rates.

Comparison of immunization between migrant and all resident children:

District Level Household Survey (DLHS) round IV report of suburban Mumbai provided information on utilization of immunization among all children (both migrants and non-migrants) aged 12-23 months (International Institute for Population Sciences [IIPS], 2015). This data though not strictly comparable was compared with the utilization levels found in the present study among children aged 12-23 months (n = 131). Figure 1 shows disparities in utilization of immunization; i.e. migrants, especially the recent ones had clear disadvantage. There was a clear gradient across all four vaccines as well as complete immunization rates with general population having highest rates followed by migrants with longer duration of stay in Mumbai and least among the recent most migrants.

Figure 1

Comparison of Infant Immunization coverage rates among children aged 12-23 months among migrants and general population, Mumbai



** Six vaccine preventable diseases (VPDs) include TB, Polio, Diphtheria, Pertussis, Tetanus and Measles*

Complete immunization rates across various background characteristics including migration status and duration of stay in Mumbai are presented in Table 2. Complete immunization rate was found to be higher among children born to mothers aged 25 and more (59%) compared to those born to younger women (44%) but this difference was not statistically significant. Immunization rates were least among children born to illiterate mothers (34%) and fathers (28%) and highest among children born to parents with higher educational status. Immunization status positively correlated with both father's and mother's education. Upper caste Hindu had highest rates (63%) followed by scheduled castes and tribes (47%) and least among Muslims (33%). Coverage was significantly higher among those living in joint families (86%) in Mumbai compared to nuclear ones (44%). Intra-state migrants (from Maharashtra) had significantly better immunization rate (78%) compared to those from other states (37%). Children who resided in Mumbai for at least nine months during infancy had higher immunization rate (56%) as

compared to those who spent less than nine months in the city (44%). Table 2 also shows that complete immunization rates did not statistically differ across income groups, gender and birth order.

Table 2

Bivariate analysis of complete immunization against six VPDs in Mumbai, India (n = 131)

Socio-demographic characteristic	Complete immunization against six VPDs	Incomplete or no immunization	Chi square statistics
	Number (percent)	Number (percent)	(P value)
Age of mother (in completed years)			
Below 25	37 (43.5)	48 (56.5)	$\chi 2 = 2.17$ ($p = 0.14$)
25 and above	27 (58.7)	19 (41.3)	
Education mother			
Illiterate	12 (34.3)	23 (65.7)	$\chi 2 = 8.53$* ($p=0.01$)
Primary	15 (40.5)	22 (59.5)	
Secondary and above	37 (62.7)	22 (37.3)	
Education of father#			
Illiterate	7 (28.0)	18 (72.0)	$\chi 2=10.93$* ($p < 0.01$)
Primary	9 (34.6)	17 (65.4)	
Secondary and above	48 (60.8)	31 (39.2)	
Monthly income of family (in Rs.)#			
Less than 5000	18 (50.0)	18 (50.0)	$\chi 2 = 0.02$ ($p=0.98$)
5000 to 9999	36 (48.6)	38 (51.4)	
10000 and above	10 (50.0)	10 (50.0)	
Religion and caste#			
Upper caste Hindu	38 (63.3)	22 (36.7)	$\chi 2=10.19$* ($p < 0.01$)
Hindu Scheduled caste and scheduled tribes	8 (47.1)	9 (52.9)	
Muslims	16 (32.7)	33 (67.3)	
Type of family			
Nuclear	52 (44.4)	65 (55.6)	$\chi 2 = 6.95$* ($p < 0.01$)
Joint	12 (85.7)	2 (14.3)	
Native state			
Maharashtra	29 (78.4)	8 (21.6)	$\chi 2=16.37$* ($p<0.01$)
Other states	35 (37.2)	59 (62.8)	
Duration of migration			
Less than 2 years	5 (27.8)	13 (72.2)	$\chi 2=4.99$ ($p=0.08$)
2 years to less than 5 years	14 (43.8)	18 (56.2)	
5 years or more	45 (55.6)	36 (44.4)	
Duration of stay during infancy			
≥ 9 months in Mumbai	34 (55.7)	27 (44.3)	$\chi 2 = 1.30$ ($p= 0.25$)
< 9 months in Mumbai	30 (44.1)	38 (55.9)	
Sex of child			
Male	34 (49.3)	35 (50.7)	$\chi 2 = 0.01$ ($p = 0.91$)
Female	30 (48.4)	32 (51.6)	
Birth order			
First	28 (50.0)	28 (50.0)	$\chi 2 = 0.42$ ($p=0.80$)
Second	21 (51.2)	20 (48.8)	
Third or more	15 (44.1)	19 (55.9)	

*VPD – Vaccine Preventable Disease, # Sample size is less than 131 as data for some individuals was not available, * $p < 0.05$*

Results of logit regression analysis for complete immunization against six vaccine preventable diseases with adjusted odd ratios are presented in Table 3. Age of mother was positively associated with complete immunization of child with adjusted odds ratio (AOR) of 1.226 (1.009-1.490). Mother's education also increases the chance of complete immunization coverage with AOR of 1.169 (1.019 – 1.341). Children from nuclear families were less likely (AOR 0.116; 0.020 – 0.684) to get immunized compared to those from joint families. Children who were in Mumbai for at least nine months during first year of life had higher odds of 2.849 (1.066 – 7.613) getting completely immunized. The effect of variables such as religion and caste and home state observed in unadjusted analysis did not turn out significant in adjusted analysis.

Table 3

Results of logit regression analysis for complete immunization in Mumbai, India

Explanatory Variables	Adjusted odds ratio (CI)	P value
Age of woman (in completed years)	1.226 (1.009 – 1.490)*	0.040
Difference in age between woman and her husband	1.171 (0.955 – 1.435)	0.129
Education of woman (in completed years of schooling)	1.169 (1.019 – 1.341)*	0.025
Parity	0.851 (0.520– 1.392)	0.520
Type of family		
Joint	Reference	
Nuclear	0.116 (0.020– 0.684)*	0.017
Family income (in log)	0.718 (0.236 – 2.183)	0.559
Religion/caste		
Hindu non SC, ST#	Reference	
Hindu SC, ST#	1.379 (0.300 – 6.338)	0.249
Islam	0.500 (0.154 – 1.623)	0.679
Years since migration	1.083 (0.910 – 1.289)	0.367
Duration of stay in Mumbai during infancy		
≥ 9 months in Mumbai	Reference	
< 9 months in Mumbai	2.849 (1.066 – 7.613)*	0.037
Home state		
Maharashtra	Reference	
Other states	0.398 (0.119 – 1.332)	0.135
Sex of child		
Female	Reference	
Male	0.963 (0.376 – 2.468)	0.937
Constant	0.012	
-2 Log likelihood ratio	122.336	
N	122	

*#SC –scheduled caste, ST – scheduled tribe, *P< 0.05, **P< 0.01*

Of the 234 children, mothers of 229 (98%) reported seeking immunization service. Only five (2%) did not seek any immunization service. Table 4 shows that most common source for receiving vaccines for children was urban health post (105; 45%) followed by community outreach camp (63; 27%) and from government hospital (28; 12%). All these three are public sector providers. Private practitioners administered vaccines to only nine (4%) children.

Table 4

Source of immunization services and reasons for partial/no immunization in Mumbai, India (n =229)

Immunization services	Number	Percent
Source of immunization service*		
Urban Health Post	105	44.9
Community outreach camp	63	26.9
Govt. hospital	28	12.0
Private practitioner	9	3.8
Others	26	11.1
Did not approach any healthcare provider	5	2.1
Reasons for no/ partial immunization (n = 139)		
Not aware of location and/or timing of immunization services	38	27.3
Not aware about complete immunization schedule	35	25.2
Illness of child	17	12.2
Afraid of side effect	9	6.5
Child was at native	9	6.5
Doctor/ health staff behaviour or refusal of services for lack of immunization or identity card	8	5.8
Did not feel need to vaccinate child	7	5.0
Forgot that dose was due	7	5.0
None to accompany to health centre	5	3.6
Others	4	2.9

** Multiple responses*

Out of 234 children, only 95 (41%) had received all vaccines as per their age. Reasons for partial or no immunization among the rest 139 (59%) have also been presented in Table 4. Most common reason was lack of knowledge regarding location of immunization centres (38; 27%). A total of 35 respondents (25%) reported that they did not know about complete immunization schedule. Illness of child (17; 12%), fear of adverse effects (9; 7%) and child being at hometown (9; 7%) were next common reasons. Eight (6%) women reported not accessing services due to non-cordial behaviour of healthcare providers or refusal of services when they did not carry immunization card. Seven (5%) women reported not feeling need to vaccinate child whereas seven (5%) others reported forgetting the vaccine schedule.

Discussion

The present study shows that nearly half of internal migrant infants staying in slum in Mumbai do not receive complete course of immunization. Complete immunization rate among migrant infants is poorer compared to that in general population of suburban Mumbai.[20] This finding is like that documented in recent meta-analysis.[19] The study findings are also very similar to the Delhi study;[15] both the studies were in metropolitan settings in India and reflect the vulnerability induced health inequities among poor migrants.

Since the study was designed keeping in mind the poverty, livelihood insecurity and associated vulnerability; almost all had only modest income levels. They belonged to lower socio-economic strata and were mostly living in non-notified slums. The poor utilization could be associated with migration or poverty or both. When compared with all Mumbai suburban area rates, the lower

immunization rates in this study could be associated with poverty itself. The migration status seemed to add to this risk posed by poverty. The intra-group comparison among migrants in the present study clearly shows that the immunization rates improved with years since migration. The recent most migrants who had migrated in less than two years had the lowest utilization of immunization. This phenomenon has also been reported from Delhi.[15] Thus, being a recent migrant and poverty both seem to play role in reducing access.

The mechanisms through which migration reduces immunization access are important to note. Lack of familiarity with city, its infrastructure and services seem to the key barriers in accessing healthcare. The study observed that often migrant men were busy during work hours and almost all women in the study were home makers and did not interact much with neighbours to get to know about what is happening in the neighbourhood. This posed a great challenge for women with young children to get familiarized themselves with the nearby public health facility. As the migrants settle, they gain more knowledge about the city resulting in improved access health care services including child immunization as was observed among children of women who stayed in Mumbai for more than five years.

This study brought out temporary reverse migration among pregnant women is one of the important factor for poor immunization. Many women travel to their hometowns for delivery and postpartum care and return after a variable period of time. Multivariate analysis shows that duration of stay in city during first year of child is positively associated with complete immunization. Why was the immunization coverage lower among children who were not in Mumbai throughout their first year of life? There could be a few possible reasons.

First, the rural area may have weaker health services resulting in poor immunization. Geographic access to health facility has been a barrier in rural areas, although immunization services are provided free of cost, there are indirect costs associated with utilization of services and often these social risks prevent seeking care.[21] Most of the women in the study reported having migrated from Empowered Action Group (EAG) states which have poor immunization rates than Maharashtra.[22]

Second, it is possible that migration itself limits access to health services at either ends (Mumbai and hometown) and creates additional vulnerability for families who migrate. Recent studies have documented that the immunization coverage among migrant children is poorer than the rural non-migrant infants from their hometowns.[12,18,23]

Third, immunization coverage also depends upon the knowledge of mothers regarding immunization services in the city. Most common reason reported for no or partial immunization was that mothers did not know these locations and/or timing of immunization services. Lack of knowledge regarding immunization schedule was the next common reason. These two chief reasons for not immunizing as well as many other reasons can be addressed by information and health education which are specifically targeted for migrants. Limited period of stay in city during infancy creates barriers for the public health workers in reaching to these migrant children for immunization. The migrants themselves are highly mobile and move from one slum pocket to other and hence the health workers face difficulties to follow them. Even the community health volunteers (now Urban Accredited Social Health Activists or U-ASHA) find it difficult to

identify eligible children. Further, young migrant women largely interact less with neighbours and health volunteers which makes it difficult for the public health workers to reach them and their children.

Apart from duration of stay in city, multivariate analysis identified other factors. Immunization improved significantly with increase in age and years of education of the mother. This advantage offered by age has also been found to exist among migrants.[15,23,24] This is often attributed to more say in household, more confidence and experience in using health services.[25] Maternal education is also positively correlated as was found earlier.[15,26] It is likely that age and education operate through better knowledge regarding immunization and thereby better access. Although, this proposition is not tested in this study; there is evidence that maternal health literacy positively influences utilization of immunization services.[27] Again, contact with health worker or community volunteer is the key to improve health literacy.

Gender differentials have been documented in the past regarding vaccination of infants. However, the data over last two decades indicates that the gender differentials have declined and there is minimal difference at aggregate level.[28,29] Government's persistent effort to provide immunization services free in public health facilities through Universal Immunization Programme seem to have benefited the girls as the gender gap in immunization coverage seems to have disappeared which has also been pointed out in other studies based on large scale population surveys like NFHS. Studies focusing specifically on migrants have also reported the same.[15,23,30,31]

Children from joint families had better access to immunization. In joint families, the household responsibilities can be shared which can make the mother access immunization service while another person in family takes care of other children and household chores. With many families being nuclear where woman has to do multi-tasking and lack social capital, immunization of children suffers.

Although, the provider side challenges are not presented in this study, a few points need mention here to provide better health care services for urban poor in general and migrants in particular. Qualitative component of the larger study (unpublished) highlights the issue of under provision for urban primary healthcare overall. The Auxiliary Nurse Midwife is the most peripheral health staff, but on an average, she caters to population of up to 25000. They have responsibility for multiple health interventions including immunization. These issues of inadequacy and distribution of human resources need priority attention. NHM is expected to provide much needed boost in terms of resources for healthcare in urban areas[32]. This is expected both by improving the ANM population ratio and by creating enabling environment for community participation through *Mahila Arogya Samities* (Women's Health Committees) in slums.

Availability of human resource does not provide complete solution to the issue. The mothers reported that the behaviour of healthcare providers is not always cordial and migrant-sensitive, and the migrants may be refused services for not having immunization card or other identity proof.[10] The system needs to be responsive to the healthcare needs of migrants.

The study has certain limitations. Only the women who were in Mumbai at time of the study could be interviewed. The infants who were in their hometowns could have different age-appropriate immunization status. However, the chief outcome indicator was complete immunization among 12-23 months

which would not get affected in case of temporary back migration to hometown. The data for immunization was largely taken from immunization card but in certain cases where the card was not available self-reported data was collected which may have results in some recall bias despite the necessary care was taken.

Research has identified that immunization coverage is poor among migrants as compared to other urban residents. Whether it is worse than their rural non-migrant counterparts, the evidence is weak currently. Recent literature has started exploring the access to healthcare for children who are left behind in village while parents migrate to cities for work. There is lack of evidence in India with respect to such left behind children. Although this study lays down social and structural determinants of immunization access, there is a need to design and field test interventions that can address these inequities. NHM should aim at reducing these inequalities and innovative solutions involving the community and service providers need to be piloted. Interventional research is necessary to let the government know which strategies work and which do not. Successful models can then be scaled up to reduce inequities in access to healthcare for migrant children.

Summary

The access to immunization was found to be poor among migrants in Mumbai. Migrant pregnant women travel back temporarily to native place for childbirth resulting in reduced access to immunization for their children. The poor access is also due to social and structural factors, lack of felt need among migrants, lack of social support available to migrants, inadequate resources for health programmes which lack migrant specific focus. There are key research and policy implications of these findings.

References

1. Registrar General of India, Census of India. 2001. Data Highlights Migration tables D 1, D 2, D 3. Available from http://censusindia.gov.in/Data_Products/Data_Highlights/Data_Highlights_link/data_highlights_D1D 2D3.pdf.
2. Brockerhoff, M. 1995. Child survival in big cities: the disadvantages of migrants. Social Science Medicine, 40(10):1371-83.
3. Islam, M.M and Azad, K.M.A.K. 2008. Rural–urban migration and child survival in urban Bangladesh: Are the urban migrants and poor disadvantaged? Journal of Biosocial Science, 40(1):83-96.
4. Antai, D., Wedrén, S., Bellocco, R. and Moradi, T. 2010. Migration and child health inequities in Nigeria: A multilevel analysis of contextual and individual-level factors: Migration and health inequities in Nigeria. Tropical Medicine and International Health, 15(12):1464–1474.
5. Stephenson, R., Matthews, Z. and McDonald, J.W. 2003. The impact of rural-urban migration on under-two mortality in India. Journal of Biosocial Science, 35(1):15-31.
6. Hu, X., Cook, S. and Salazar, M.A. 2008. Internal migration and health in China. The Lancet, 372(9651):1717–1719.
7. Babu, B.V., Swain, B.K., Mishra, S. and Kar, S.K. 2010. Primary healthcare services among a migrant indigenous population living in an Eastern Indian city. Journal of Immigrant and Minority Health, 12:53-59.
8. Borhade, A. 2011. Health of internal labour migrants in India: Some reflections on the current situation and way forward. Asia European Journal, 8:457-60. doi: 10.1007/s10308-011-0293-z.
9. Lohiya, N.A., Nongkynrih, B. and Gupta, S.K. 2014. Migrants to urban India: Need for public health action. Indian Journal of Community Medicine, 39(2):73-75.
10. Gawde, N.C., Sivakami, M. and Babu, B.V. 2016. Utilization of maternal health services among internal migrants in Mumbai, India. Journal of Biosocial Science, 48(6):767-96. doi: 10.1017/S0021932016000195.
11. Oyo-Ita, A., Wiysonge, C.S., Oringanje, C., Nwachukwu, C.E., Oduwole, O. and Meremikwu, M.M. 2016. Interventions for

improving coverage of childhood immunization in low- and middle-income countries. *Cochrane Database Syst Rev*. 2016;(7):1–97. Advance online publication. http://doi.org/10.1002/14651858.CD008145.pub3.

12. Kiros, G.E. and White, M.J. 2004. Migration, community context, and child immunization in Ethiopia. Social Science and Medici ne, 59(12):2603-16.

13. Hu, X., Xiao, S., Chen, B. and Sa, Z. 2012. Gaps in the 2010 measles SIA coverage among migrant children in Beijing: Evidence from a parental survey. Vaccine, 30(39):5721-5.

14. Han, K., Zheng, H., Huang, Z., Qiu, Q., Zeng, H., Chen B. and Xu, J. 2014. Vaccination coverage and its determinants among migrant children in Guangdong, China. BMC Public Health, 14(1):203. doi: 10.1186/1471-2458-14-203.

15. Kusuma, Y.S., Kumari, R., Pandav, C.S. and Gupta, S.K. 2010. Migration and immunization: Determinants of childhood immunization uptake among socioeconomically disadvantaged migrants in Delhi, India: Migration and immunization. Tropical Medicine and International Health, 15(11):1326–1332.

16. Pandit, N., Trivedi, A. and Das, B. 2011. A study of maternal and child health issues among migratory construction workers. Healthline, 2(2):16-18.

17. Anand, S., Verma, P., Sinha, U. and Mahawar, P. 2014. Evaluation of primary immunization coverage in migratory versus non-migratory labour population of urban area in Bhopal city. Pediatric On call, 11:2. doi:10.7199/ped.oncall.2014.35.

18. Pakhare, A., Pawar, R., Lokhande, G. and Datta, S. 2014. Does seasonal migration for sugarcane harvesting influence routine immunization coverage? A cross-sectional study from rural Maharashtra. Indian Journal of Public Health, 58(2):116-120.

19. Awoh, A.B. and Plugge, E. 2016. Immunization coverage in rural–urban migrant children in low and middle-income countries (LMICs): A systematic review and meta-analysis. Journal of Epidemiology and Community Health, 70(3):305–311. doi:10.1136/jech-2015-205652.

20. International Institute for Population Sciences. District Level Household and Facility Survey 4, 2015. District Fact sheet. Suburban Mumbai. Available from https://www.census2011.co.in/census/district/356-mumbai-suburban.html.

21. Finlayson, K. and Downe, S. 2013. Why Do Women Not Use Antenatal Services in Low- and Middle-Income Countries? A Meta-Synthesis of Qualitative Studies. PLOS Medicine. 10(1):e1001373. doi:10.1371/journal.pmed.1001373.

22. International Institute for Population Sciences (IIPS) and Macro International. 2007. National Family Health Survey (NFHS-3), 2005–06: India: Volume I. Mumbai: IIPS.

23. Antai, D. 2010. Migration and Child Immunization in Nigeria: individual- and community-level contexts. BMC Public Health, 10:116. doi: 10.1186/1471-2458-10-116.

24. Waldhoer, T., Haidinger, G., Vutuc, C., Haschke, F. and Plank, R. 1997. The impact of sociodemographic variables on immunization coverage of children. European Journal of Epidemiology, 13:145–149.

25. Gabrysch, S. and Campbell, O.M. 2009. Still too far to walk: Literature review of the determinants of delivery service use. BMC Pregnancy Childbirth, 9(1):34. doi:10.1186/1471-2393-9-34.

26. Phukan, R.K., Barman, M.P. and Mahanta, J. 2008. Factors associated with immunization coverage of children in Assam, India: over the first year of life. Journal of Tropical Pediatrics, 55(4):249-52. doi: 10.1093/tropej/fmn025. Epub 2008 May 1.

27. Johri, M., Subramanian, S.V., Sylvestre, M.P., Dudeja, S., Chandra, D., Koné, G.K., Sharma, J.K. and Pahwa, S. 2015. Association between maternal health literacy and child vaccination in India: a cross-sectional study. Journal of Epidemiology and Community Health, 69(9):49-57. doi: 10.1136/jech-2014-205436. Epub 2015 Mar 31.

28. Singh, P.K. 2013. Trends in child immunization across geographical regions in India: Focus on urban-rural and gender differentials. PLOS One. 8(9):e73102. doi: 10.1371/journal.pone.0073102. eCollection 2013.

29. Prusty, R.K. and Kumar, A. 2014. Socioeconomic dynamics of gender disparity in childhood immunization in India, 1992-2006. PLOS One. 9(8):e104598. doi: 10.1371/journal.pone.0104598. eCollection 2014.

30. Barretto, T.V. and Rodrigues, L.C. 1992. Factors influencing childhood immunization in an urban areas of Brazil. Journal of Epidemiology and Community Health. 46:357–361.

31. Antai, D. 2009. Inequitable childhood immunization uptake in Nigeria: a multilevel analysis of individual and contextual determinants. BMC Infect Dis. 2009;9:181. doi: 10.1186/1471-2334-9-181.

32. Government of India (GOI), Ministry of Health & Family Welfare. 2013. National Urban Health Mission Framework for Implementation May. Available from http://nhm.gov.in/images/pdf/NUHM/Implementation_Framework_NUHM.pdf.

IS MALE PROVIDER A BARRIER IN PROVIDING REPRODUCTIVE HEALTH SERVICES FOR WOMEN?

NUPUR MUKHERJEE, M.E. KHAN, RAHUL D. BHAWSAR AND WAJAHAT ULLAH KHAN

Background

Providing quality reproductive health services to women is a major challenge for the state and national governments, particularly in rural areas. This situation is largely because of strong *purdah* system, prevailing social norms, lack of women empowerment and their shyness that does not allow women to seek treatment for their reproductive health problems that often demands internal examinations from male doctors posted at PHCs. Very few trained female doctors are available who are willing to be posted at primary health centers (PHC) and or in rural areas. As a result, most of the PHCs in rural areas are having male doctors to provide the required services. Given this context the present study focuses on four basic questions.

- Does gender of the providers influence utilization of services provided by PHC in rural areas?
- Does male providers at PHC are a barrier in availing RH services by women patients?
- What is the preference of community members in seeking services from male and female providers and how this preference changes under different constrains?
- Does the quality of services provided vary with gender of the providers?

Methodology

There were total 66 PHCs in Baroda district in year 2016, 50 of which were managed by Male Medical Officers (MMO)

Nupur Mukherjee, Researcher, Centre for Research in Development and Change, a division of CORT, M.E Khan, President, Center for Operations Research and Training (CORT), Atlanta. mekhan@cortindia.com, Rahul D. Bhawsar and Wajahat Ullah Khan, Researchers, Center for Research in Development and Change, a division of CORT

and remaining were managed by Female Medical Officers (FMO). To address the research questions mentioned above, five PHCs with male medical officers and five PHCs with female medical officers were chosen purposively. While choosing the PHC attempt was made to ensure that the pair of selected PHCs were matching with respect to population size coverage and approach to PHC facility.

A mixed approach of qualitative and quantitative methods was used to collect complementary data so that the findings could be triangulated to get a precise answer to the research question. It included:

- Review of records maintained for the out door patients to measure utilization of the PHC services by gender and age of the patients: For this from all study PHCs out patient information was collected for the last six months (January to June 2016). For all the patients, their age, sex, sickness and if any of them had come for treatment of Reproductive Health (RH) problem. RH problem was available only from 5 PHCs – three managed by lady medical officer (LMO) and two PHCs managed by male medical officer (MMO). This is one of the limitation of the study.
- Informal interview of providers and men and women from the community served by PHCs. The medical officer in charge of the PHC, and two paramedics like ANM, and PHN /LHV were also informally interviewed to understand their view on challenges in providing quality of services. Do they feel that sex of providers is a barrier in providing quality RH services to patients? Besides, three private medical practitioners practicing in those areas were interviewed in- depth as key informants on prevalent RH problems and their views where the RH patients prefer to go.

To get community view on these issues, from each of the study PHCs, 5 male clients, 5 women clients were selected purposively, and in-depth interview was conducted. The key issues that were discussed included their preferences for the sex of the doctors before seeking treatment, particularly reproductive health problems. From men, it was further asked whether they would have any objection for treatment of their wives by male doctor and the extent they were flexible under certain condition like non availability of lady doctor in the PHC.

Direct observation of the quality of services provided by male and female doctors: Services provided at each of the study PHC was observed for one day by trained male and female social scientist. Observation was recorded using a pre tested checklist addressing to behavior and sensitivity with which doctor deals with patients particularly with their reproductive health problems. Some of the key dimensions included: client–provider interaction measured in terms of taking detailed medical history, careful listening to client's problems, patience answering to client's questions. Other included carrying out physical and or internal examination, maintenance of audio and visual privacy, follow up instruction etc.

The data was carefully reviewed, transcripts of all qualitative data were prepared, codified and analyzed. The key that emerged from the study has been summarized in the following section.

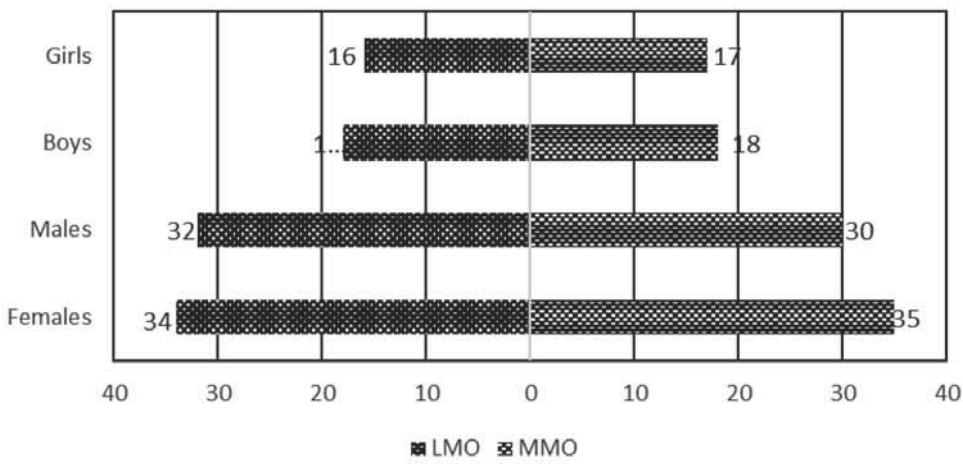
Findings

Utilization of PHC services headed by male and female doctors

Does the utilization of PHC vary by sex of medical officer in-charge? To answer this, service statistics of turn over of the patients during the last six months, collected from each of the 10 study PHCs was analyzed. Five of the 10 study PHCs

were managed by male medical officer (MMO), while female medical officer (FMO) were heading the remaining five PHCs. The patient's turn over data was divided by gender and age – adult males, adult females, and boys and girls less than 13 year. The analysis is presented in Figure 1. As the figure shows, the proportion of male and female patients was almost identical. For example, the percentage of adult women patients was about 34% in PHCs headed by female medical officer where the corresponding figure was 35% in PHCs managed by male doctors. Similarly, around one third of the total patients turnover was of adult male patients irrespective whether a male or a female doctor headed the PHC. No difference was observed in the proportion of boys' and girls' patients by the gender of the doctor. So, the distribution of the total turnover of the patients show no difference in the utilization of health services by men and women from PHCs headed by male and female medical officer.

Figure 1: Total turnover of patients in PHCs run by LMOs and MMOs (%)



The average turnover of patients of individual PHCs headed by male and female doctor showed wide variation. The average total turnover of patients in PHCs managed by male doctor ranged from 230 to 895 per month while the corresponding figures for PHCs headed by a lady doctor ranged from 352 to 503 per month. Analysis showed that many factors contributed to such wide variation including location of the PHC, duration of the doctor posted at those PHCs which again varied from 8 months to 6 years and the credibility of the doctor about his diagnostic skills and prescription of drug. Such doctors are locally called "doctor with good hand".

The average number of patient turnover at PHCs managed by male and female doctors was estimated as 573 (SD=238) and 428 (SD=63) per month respectively. The coefficient of variation of patient turn over of the PHCs with male doctors and female doctor was 41.6% and 14.8%, indicating larger variation in turn over of patients among male doctors than among female doctors.

Utilization of PHCs for reproductive health services headed by male and female

doctors: To understand how gender of the providers influence number of patients seeking reproductive health services of the PHC, the turnover of patients with reproductive morbidity was analyzed by gender of the doctor heading the PHCs. For the purpose of this study any pregnancy and delivery related morbidity and menstrual problem was considered reproductive health morbidity. In case of men, all symptoms related with STI besides sexual worries including Erectile Dysfunction, Premature Ejaculation and hydrocele was taken as reproductive morbidity. From the patients register information on reproductive health morbidity was available in only five of the ten PHCs covered in the study. Lady medical officer managed three of them while two was headed by male doctors. The analysis is present in Table 1.

Table 1

Member of reproductive morbidity reported, and service sought from among the total turnover of patients by PHC managed by male and female doctors

	PHC 1			PHC 2			PHC 3			Average of 3 PHC		
	No.	%	N	No.	%	N	No.	%	N	No.	%	N
Lady MO												
Male patients	31	3.5	892	8	0.8	932	29	2.3	1012	68	2.4	2836
Female patients	120	13.3	900	181	19.2	942	72	6.5	1095	373	12.7	2937
Total	**151**	**8.4**	**1792**	**189**	**10.1**	**1874**	**101**	**4.8**	**2107**	**441**	**7.6**	**5773**
Male MO												
Male patients	20	1.7	1142	10	0.7	1479	-	-	-	15	1.1	1311
Female patients	30	3.0	991	34	2.6	1307	-	-	-	64	2.8	2298
Total	**50**	**2.3**	**2133**	**44**	**1.6**	**2786**	**-**	**-**	**-**	**79**	**1.3**	**3609**

The above tables reveal number important findings. First, for the five PHCs where reproductive morbidity data was well maintained, the proportion of patients with reproductive health problem was very small--only 552 patients (1.05%) out of the total 9382 male and female patients who received health services from the PHCs. Second, female patients with reproductive morbidity was significantly high at the PHCs managed by a lady doctor (373 female patients) than female patients at PHCs headed by a male medical officer (64). Further, as the table shows, average number of female patients treated at PHC headed by a lady doctor was six times high (12.7 female patients) than the number of female patients (2.8 patients) treated at PHCs managed by a male doctor. Third, the performance of female medical officer even for treating male RH patients (68, mean=2.4) was better than number of male RH patients (15, mean 1.1) treated by the male doctors. The difference was though statistically not significant.

Over all thus it could be concluded that the general utilization of PHCs services does not differ by the gender of the provider. However, female patients for treating RH morbidity prefer lady doctors and hence PHCs with lady medical officer serves to a significantly more number of female patients with RH morbidity than PHCs managed by male doctors.

Community attitude towards the sex of the providers for RH services

The rapid informal survey of 100 community members (51 males and 50 females) from the 10 study villages (where Primary Health Centres) also confirmed many of the above observations. Majority of the male and female informants preferred a lady doctor for women's RH care (Table 2).

TABLE 2

Opinion of community members on sex of the doctors for women's RH care

Preference / attitude of community members	Male informants		Female informants	
	No.	%	No.	%
Preferred Sex of provider				
Only lady doctor	41	80	30	60
Could be of either sex	10	20	20	40
Total N	**51**		**50**	
Acceptance of male doctor in case of lady doctor not available				
Yes it is acceptable	38	93	21	70
Not acceptable	-	-	3	10
Depends on situation	3	7	6	20
Total N	**41**		**30**	

As the table shows men informants exhibits more 'traditional view' as 41 out of the 50 (80%) felt that only a lady doctor should provide women reproductive care. Only 10 male informants (20%) were of the view that women could get treatment from either a lady doctor or male doctor. As against this, relatively more women (20 out of 50; 40%) were open to seek RH care either from male or female doctor.

In situation when no lady doctor is available to provide RH services, most (93%) male informants felt that in such condition seeking treatment from male doctor is acceptable. Interestingly among 30 women informants who earlier had preferred RH care of women only by female doctors, fewer (21, 70%) agreed that in such situation women reproductive care could be provided by male doctor. 3 women (10%) however insisted on reproductive health care exclusively by lady doctor.

The informants were further probed about their preference for a male verse (vs.) female doctor for reproductive health care of women under certain condition or constrains like a general lady doctor doing general practice vs. a male Gynecologist or a male doctor located near by vs. a leady doctor situated a far distance or a less expensive male doctor vs. an expensive lady doctor. Their responses are given in Table 3.

TABLE 3

Preference for male/female doctor under selected conditions

Condition	Male informants N=50 (%)	Female informants N=51 (%)	Chi sq. Significance
An inexperienced lady doctor vs. experienced male doctor			
Male doctor	96.0	72.0	p >.01
Female doctor	4.0	28.0	
A lady doctor vs. male gynecologist			
Male doctor	96.0	76.0	p > .01
Female doctor	4.0	24.0	
A lady doctor lactated at 20-25 Km distance vs. male doctor in village / nearby place			
Male doctor	88.0	74.o	p < .05
Female doctor	12.0	26.0	
A lady doctor charging more fees vs. male doctor charging less fees			
Male doctor	78.0	66.0	p < .05
Female doctor	22.0	34.0	
A lady doctor difficult to get appointment vs. a male doctor always available			
Male doctor	76.0	82.0	P < .05
Female doctor	24.0	18.0	

Table shows that men clearly preferred an experienced male doctor and a male gynecologist for the treatment of women's reproductive health problem than seeking treatment from a less experienced or a general practitioner (GP) lady doctor. The difference between male and women informants opinion on this aspect differed significantly (p>.01). Many women were ready to ignore experience and specialty in favor of seeking treatment from a lady doctor.

On other constrains like availability of lady doctor at distance or her charging higher fee or difficulties in getting her appointment than male doctor does not make much difference in their preference for lady doctor. Though slightly larger number of men informants compared to women informants were ready to approve RH care of women by male doctors, the difference was statistically not significant. Thus, under these constrains both men as well as women preferred lady doctors.

The following quotes of women and male informants reflect their thinking and why they prefer lady doctor or relax this preference under certain conditions

"It is naturally better to have a lady doctor for women RH care. A woman will know the problem of other women and one can talk openly with her" - Women informant

"Talking about the gynecological problem with male doctor is okay but to get examined with him is difficult. I would feel very shy"- Woman informant

"What is the use of feeling shy in front of a doctor? After all, to get treated one has to discard shame. In any case male doctors in hospitals conduct deliveries. Is not it?" - Women informant

"Experience of the doctor matters whether it is a male or a female doctor, the treatment given is important" - Male informant

"Actually, it does not matter whether it is a male or a female doctor, the treatment given is important" - Male informant

Probing on abdomen and vaginal examination revealed that 6 women informant had already undergone PV examination by male doctor. Other who had not been examined so far by male doctor and had expressed preference for lady doctor but on a second thought said that in case of problem and non-availability of lady Gynecologist, they would accept internal examination and treatment by male doctor. Their feeling is reflected in the following quote:

It is preferable to have a lady doctor but if she is not available, a male doctor is also OK. During my 9th month pregnancy of last delivery, in absence of my lady gynecologist her husband who is also a doctor had examined me.

"Even if the saheb doctor (male doctor) does the examination, sister is always present. Is it not? To get cure from the disease we have to get internal examination done even if it is by a male doctor".

"One does feel shy and embarrassed, but one has to get examination".

During child birth the doctor saheb (male doctor) only examines. How can we refuse? It is for our benefit and saving life.

Look if a lady doctor comes we will always like her to examine us. But if lady doctor is not posted there, male doctor is available, we will let him examine. After all it is for our health.

No, I will not allow a male doctor to examine me.

Male also expressed similar view. For example, a male informant said

We do not have any inhibition in our wives/ sister being examined by a male doctor. As

you know in most of the PHCs male doctors only conduct deliveries.

If male doctor is posted at PHCs it is better as both male and female would get treatment. In case a female has problem she can be accompanied by husband and they could consult a male doctor even if it requires internal examination. Discussion with a lady doctor about male genital problems is difficult for both males and the lady doctor.

During the study the researches observed many OPD. During the observation period only at four of the study PHCs, women with reproductive health problems were reported. It was observed that generally the male doctors displayed care and concern. In case of one of the male doctors where during observation period four cases of gynecological morbidities were reported, it was observed that both doctor and woman patients were comfortable. The doctor carried out PV examination in a separate room in the presence of an ANM or public health nurse and the women willingly allowed the examination. These women had come unescorted and spontaneously reported their problem. The doctor not only prescribed medicine from the PHC but also counseled to avoid sex till the treatment was on. However, he did not ask their partners to come back for the check ups in any of the four cases. During the discussion however three MO (one male and two female MO) felt that the facilities at PHC for doing internal examinations is less that required. Some of the limitations they pointed out included proper examination room, availability of female staff, adequate gloves and running water with the facility of elbow tap at the place of examination. They felt that in such situation it is very difficult to carry out PV/ internal examination. As one of the doctor said:

"In fact, by carrying out frequent PV examinations without maintaining aseptic conditions, I am more likely to introduce infection in the patients and do more harm than good. Hence I restrict examination unless absolutely needed"

The team did not see any OPD male patient who had come with reproductive health problem in any of the study PHCs, during the observation period, irrespective of the sex of the doctor posted at those health facilities.

In general males were more open and agreeable to internal examination of their wives by male doctors if the male doctor is gynecologist, better and more creditable professional or more easily accessible. But are they equally open to be examined by lady doctors in their uro-genital morbidities? Informal discussions with male informants from 5 villages revealed that male informants were much more secretive and much less open to discuss their reproductive health issues than women informants. First, they were hesitant in discussing it, second none of them mentioned that they ever had suffered from any reproductive health problems and hence most of the discussion remained confined to their perception about uro-genital morbidity in general. The following quotes reflect their feeling.

It is good to have a male doctor at PHC because male can express their problem openly. If a lady doctor is in-charge of PHC then no doubt it will be good for women but not for males. It will be difficult for males as well as lady doctor to discuss about male reproductive problems to discuss the disease.

We will approach PHC doctor for RH problems; whether a male or female does not matter. We should go to the clinic even if the doctor is a lady.

Those who are educated will contact the doctor at the PHC even if she is a lady doctor. For them a doctor is a doctor no matter male or female.

Many however were not ready to contact a lady doctor for male RH problems. Many male informants were vocal about it

Except 2-3 persons, no one will approach a lady doctor because of shyness. We will prefer to go to a male doctor out side, if a lady doctor is posted at PHC.

Because of their desire to keep their reproductive health problems secret and lack of trust on PHC many males were not ready to seek treatment at PHC, even if a male doctor is posted at the facility as one of the informant said,

I would rather die than report my RH problems at the PHC. Whole village is likely to come to know about my "gupt rog" (STI/ impotency) and how it was acquired.

To maintain our honor, we do not seek treatment at PHC. We prefer to go to the private doctor where confidentiality will be maintained.

The PHC does not provide a good quality of services. No privacy is maintained. Even injections at our buttocks are given in presence of other patients, which is embarrassing. Who will discuss with them about the RH problem? When we go to private doctor he meets in privacy and complete confidentially is assured. We discuss our all health problem without hesitation.

Discussion and conclusion

The paper tried to assess whether the sex of doctor posted at PHC is a barrier to provision of reproductive health services to the patients of opposite sex. Though the focus was more on provision and acceptance of reproductive health services to women patient by male doctors, inhibition of male suffering from uro-genital morbidity was also briefly examined using qualitative data collected in the study.

The general utilization of PHC by all patients was slightly higher in case of PHCs managed by male doctor than PHCs managed by lady doctor. Many times, it was partly because of longer posting of the male doctors at the same PHC than the duration of the posting of lady doctors. Thus, the analysis reveals that sex of the providers for *general treatment* does not make any difference either for male or female patients. They all go to PHCs and receive the required services. However, in case of women patients with reproductive health morbidity it is not true. The PHCs with lady doctor received 4.5 times more women patients with reproductive health morbidity than PHCs with male doctors. Thus, in case of reproductive health problems, sex of the provider plays a significant role for most women as well as men. Women do not like to seek treatment from male doctors and men have equal hesitation in seeking any treatment related to their sexual or uro-genital morbidity from lady doctor. The sex of providers for sexual and reproductive treatment is a serious barrier to the patients of opposite sex. It is true for both men and women. Although men being more mobile get their treatments from male providers located else. Women do not have this advantage and often suffer.

Are women ready to go to male doctor and allow them for internal examination under several constrains such as inaccessibility of lady doctor, or she charges much higher fee than male doctor or male doctor is trained gynecologist against general practitioner lady doctor, or the male doctor is more experienced than available lady doctors? In all the above conditions most of the male are or will be willing to allow their wives to be treated by male doctors including internal examination. In such conditions, majority of women also agree for treatment by male doctors. Many in fact had undergone such examination by male doctors due to their pragmatic thinking that in situation like

this, treatment of disease by a good doctor is more important than sex of the provider. A small proportion (10-20 %) of women though still insisted for treatment by only lady doctor. In many such cases many times those women end up in depending on home treatment or by local unqualified doctors.

Paper also revealed that men in general have a lot more reservation in using PHC for their sexual and uro-genital morbidity because of being secretive in sharing their reproductive health problem even with known male doctors as they fear lack of confidentiality of medical record and that news of their reproductive health morbidity would easily spread in the community causing lose of their "honor". Concerns related to their sexual worries and sensitivity of men regarding their sexual and reproductive problems and their being secretive to the problem has been well documented.[1,2,3,4] Besides they felt strongly that men would not allow examination of their private parts by lady doctor, as it will be embracing for both doctors and patients. As other studies also suggest that in most cases men preferred to go and seek treatment from doctor where no one could recognize them or indigenous doctor who are known to treating such patients. For them seeking treatment from distant doctor is not a serious constrain as often happens in case of women patients.[5,6,7]

Thus, the paper reveals that sex of providers play significant role and both women and men equally dislike to be treated by providers of opposite sex. While women and their husband in case of urgency, seriousness of disease and economic constrains often agree to the treatment by male doctor including their internal examination, in case of men their fear that their sexual and uro-genital problems may be leaked from PHC to their community members, they discard treatment from PHC even from male providers and seek treatment from places where no one knows to them.

References

1. Kinsey, A.C., Pomeroy, W.B. and Martin, C.E. 1948 Sexual behavior in the human male. Philadelphia PA: WB Saunders pp. 804.

2. Maloney, C., Aziz, Ashraful, K.M. and Sarker, P.C. 1981. Belief and Fertility in Bangladesh (monograph) : ICDDR, Bangladesh pp. 78.

3. Hawkes, S. and Hart, G. 2003. Men's Sexual matters: Promoting reproductive health in international context. Tropical Medicines and International Health, 5(7):a 37-a44.

4. Hawkes, S. 1998. Why include men? Establishing sexual health clinics for men in rural Bangladesh. Health Policy and Planning, 13(2):121-130.

5. Verma, R.K. and Schensul, S.I. 2004. Male sexual health problem in Bombay: Cultural constructs that presents opportunities for HIV/AIDs risk reduction. In: Verma RK Pelto PJ, Schensul SI, Joshi A (eds.) Sexuality in the time of AID: Contemporary perspectives from community in India. New Delhi Sage Publication.

6. Hossain, S., Mohammed, I., Khan, M.E, Rahman, M. and Rob, U., R. 2014. Sexual health problems and treatment: Street-based and newspaper advertising by sexologist practitioners in Bangladesh. Ed. In: Sexuality, Gender roles, and domestic violence in South Asia, Ed. M.E. Khan, John Townsend and Pertti J Pelto New York. Population Council.

7. Piet-Pelon, N.J. Rob, U. and Khan, M.E. 1999. Eds. Men in Bangladesh, India and Pakistan: Reproductive Health Issues. New Delhi: Hindustan Publishing Corporation

PPIUCD INSERTER: AN INNOVATION, A GOOD OPTION FOR PROVIDERS TO PERFORM PPIUCD INSERTION

RENITA BHAMRAH, SHIKHA SRIVASTAVA, PRITPAL MARJARA, VIVEK SHARMA AND PAUL BLUMENTHAL

Executive Summary

This is a review article for the innovation, a dedicated postpartum intrauterine device (PPIUCD) inserter which was tested between 2013 and 2016 after receiving a Savings Lives at Births/Grand Challenges funding. For this Innovation, a Proof of Concept (POC) project was designed to assess the safety and efficacy of a dedicated PPIUCD inserter following which a Randomized Controlled Trial (RCT) was done. The dedicated PPIUCD inserter could significantly reduce unmet need for contraception, by making postpartum intrauterine device (PPIUCD) insertions easier and more accessible to women of reproductive age in need of long-acting reversible contraception (LARC). These were the main motivations for the development of the inserter.

After seeking required approvals from Drug Controller General of India (DCGI), Institutional Review Boards (IRBs) and Ethics Committees (EC), the POC study commenced in February 2015, in Safdarjung hospital in Delhi and King George Medical University in Lucknow. The enrolment of 80 participants for the POC completed in May 2015 at both above government hospitals. As part of the study, six to eight weeks follow up visit of participants was completed in July 2015. We found no safety issues, no cases of trauma or perforation and no device-related infections. Providers and participants were both satisfied. Overall study results of the POC indicated that the PPIUCD inserter performed as intended, with 80% of devices being

Renita Bhamrah, Specialist Technical Services, Shikha Srivastava, Senior Advisor Technical Services, Pritpal Marjara, Senior Country Representative, Vivek Sharma, Chief Technical Officer, Paul Blumenthal, Global Medical Director, PSI, C-445, Chittranjan Park, New Delhi – 110019. Email: psi@psi.org.in

placed within 10mm of the fundus (high fundal placement, a proposed predictor of expulsion). Of the 80 participants who completed the study, retention of PPIUCD was noted in 76 %, removal in 6 %, complete expulsion occurred in 8% and partial expulsion in 10%. We had 100% follow up and there were no unrecognized expulsions. After this, an RCT was conducted in five centers when EC approvals were in place. The participants were enrolled from September 2015 to July 2016 and 6-8 week follow up completed by September 2016. Overall, RCT study results of 500 participants (250 each in Arm A Kelly's forceps and Arm B PPIUCD Inserter) documented no clinically or statistically significant differences in high fundal placement (72.9% in the forceps group and 75.8% in the dedicated PPIUCD inserter group within ≤10 mm of the fundus) or complete expulsion rates between groups (5.5% in the forceps group and 8.0% the dedicated PPIUCD inserter group, a difference that was shown to be statistically "non-inferior"). There were also no cases of trauma or infection in either group. We achieved 98% follow up of the participants.

Background

During the postpartum period, women are often highly motivated to initiate contraception, particularly with a postpartum IUCD (PPIUCD). PPIUCD is a low-cost family planning method that does not interfere with breastfeeding, can be non-hormonal, and is convenient for both women and their health care providers. Use of the IUCD as postpartum contraception is associated with less discomfort and fewer side effects than interval insertions (>6 weeks postpartum or post-abortion) and allows women to obtain safe, long-acting, highly effective, easily reversible contraception while already within the hospital.

Post-placental and immediate postpartum IUCD insertions within 48 hours post-delivery also eliminate the need to visit hospital separately for delayed postpartum (within 6 weeks) or interval IUCD insertion.[1] However, there has been no uniform insertion approach specifically for the post-placental or immediate postpartum period and, as a result, PPIUCD insertions are currently performed using forceps or manually (inserting the hand to the fundus).[2] Forceps or manual insertion approaches represent a "workaround" that is not really designed for insertion.

Using forceps and manual insertion requires manipulation of the IUCD both inside and outside of package, which is inconvenient, and could increase infection rate. Conventional IUCD strings are also often too short to be routinely visible at follow up.

PSI in partnership with the Stanford Program for International Reproductive Education and Services (SPIRES) and Pregna International Limited developed a Post-Partum IUD inserter that would:

1) Avoid hand manipulation/ or instrumentation for IUCD insertion
2) Have longer IUCD strings, ensuring that the strings are visible in the cervix at follow-up
3) Useful for both post-placental and Immediate post- partum insertions
4) Possibly increase demand for PPIUCDs due to the enabling effect that a convenient, device would convey to providers, clients and family planning programs.

Importantly, insertion with the investigational PPIUCD inserter requires no special instruments and the insertion technique is intuitive and easy to learn. Historically, fundal placement of the IUCD in the post-partum uterus is thought to

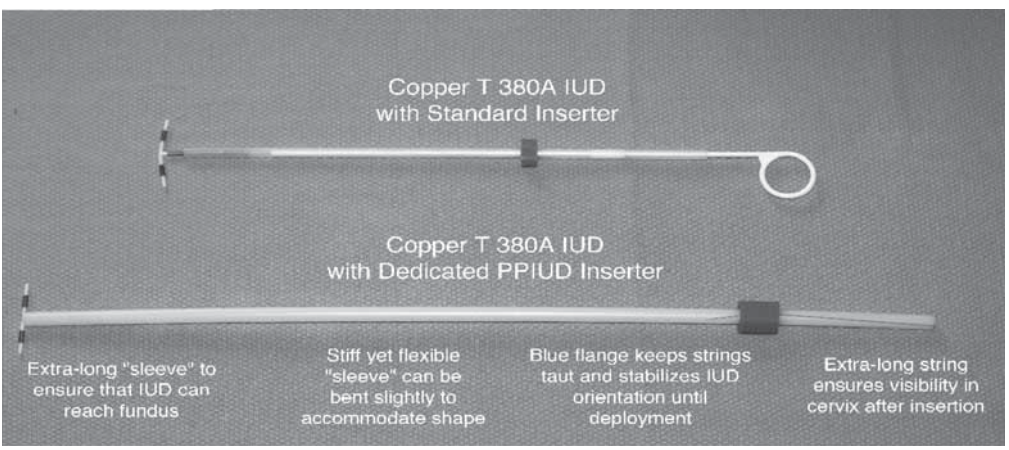
minimize the risk of expulsion.[3] Most investigators have emphasized that high fundal placement can reduce expulsion rates.

Also, in the past, PPIUCD expulsion rates were thought to be dependent on the timing of the insertion and skill of the provider in ensuring that the IUCD is placed as high as possible in the fundus. One comparative study conducted by El Beltagy et al.[3] of the insertion of the Cu T 380 IUCD and Cu 375 IUCD in early postpartum period suggested that there is a relationship between the incidence of PPIUCD expulsion and the IUCD-endometrial distance of the uterine fundus measured by ultrasound with 10mm as a cut-off point. However, recent research indicates that timing with respect to the delivery is not as important as previously thought.[4,5]

The investigational PPIUCD inserter is designed in such a manner that the length of the inserter is long enough to provide easy access and maneuverability to place the IUCD close to the fundus, thus minimizing the chances for expulsion. A non-inferiority, single-blinded randomized controlled trial to compare PPIUCD insertion using PPIUCD inserter with modified Kelly's forceps was set up for this purpose. The modified Kelly's is an instrument modified by the Indian Institute of Technology (IIT) Kharagpur and made of metal which lightweight surgical alloy, non-staining, corrosion free, non-rusting and able to withstand temperature of autoclaving. The ends of the prongs of the tip are smooth and non-piercing.

Model

The dedicated PPIUCD inserter was developed using the same silastic material as used for interval inserters and length of inserter tube was decided after assessing fundo cervical length in the post placental uterus. The PPIUCD inserter was designed to provide the necessary length of the inserter tube (related to the fundo cervical length), string length and the materials to provide the best balance of stiffness and flexibility.



Initially, the inserter was designed with no markings on the inserter tube to indicate uterine length, nor the blue guard/ flange to hold the threads in place during insertion. The inserter was modified and markings for measuring fundo-cervical length were introduced and a flange was developed to fix the threads and stabilize the position of the IUCD at the tip of the inserter. A black indicator strip was also added on the inserter tube below the guard—which indicates the horizontal position of the IUCD to guide correct placement/orientation of IUCD during insertion.

This new inserter with the markings, flange and black indicator strip was used for the POC study and subsequently for the RCT study without any further modification.

Objectives

Proof of Concept

The primary objective of the study is to determine the safety, acceptability (provider satisfaction, consumer comfort) and feasibility of PPIUCD inserters.

The secondary objective is to determine client satisfaction and IUCD retention.

Randomized Control Trial

The primary objective of the study is to assess comparative retention rates between the Kelly's forceps (Arm A) and PPIUCD inserter (Arm B).

The secondary objective is to establish the comparative results related to fundal placement, removal rates, and complications at follow up between the PPIUCD inserter and Kelly's forceps. Other parameters such a client and provider acceptability, ease of use and learning curves was also assessed.

Project expected outcomes

Primary outcome

- **Ability to successfully place PPIUCD at the fundus**

  In the vast majority of the acceptors, the PPIUCD could be placed fundally, as determined by an Ultrasonography (USG) examination immediately after insertion.

- **Evidence of uterine perforation/trauma immediately after the insertion**

  No case of perforation or trauma has been reported. USG which was done to check for fundal placement also confirmed that there is no perforation/ trauma.

- **Provider's assessment of ease of insertion – immediately after insertion**

  Providers were administered a "Physician Satisfaction Questionnaire" for their experience with PPIUCD insertion. They were administered this questionnaire immediately after they performed a PPIUCD insertion to assess their level of satisfaction, ease of insertion, reinsertions, if any, and location of IUCD on USG.

- **Participants pain perception at insertion**

  Participant pain perception immediately after PPIUCD insertion was assessed by assessing pain status before and after insertion. Administering "Participant Satisfaction Questionnaire".

Secondary Outcomes

- **Participant's overall satisfaction**

  A participant satisfaction questionnaire was designed to capture participant satisfaction, pain experienced, counselling provided, experience at hospital and whether or not they would recommend PPIUCD insertion to a friend/relative. This questionnaire was administered immediately after insertion and explained by the counsellor to the participant who was then asked to mark the answer as per her satisfaction.

RESULTS

	Outcome	POC (n=80)	RCT (n=492 in total; Arm A & B=246) *	Interpretation
	Primary outcomes			
1	Ability to successfully place PPIUCD at the Fundus	In 81% of cases, PPIUCD was placed at the fundus at a distance of ≤10 mm.	In 72.69% of Arm A & 75.8 % of Arm B cases, PPIUCD was placed at the fundus at a distance of ≤10mm. No statistically significant difference between two arms	1-The number of participants in POC was 80 while in RCT it was 500. This may be the reason that in RCT there were less number of cases in which PPIUCD was placed close to the fundus in comparison to the POC study. 2- The providers were naïve in both the studies it could also be due to precision/ skill of the provider performing insertion. There is an interesting finding in POC. Only one provider did 39% of the total study insertions and skill of that provider improved with each insertion In the RCT the provider who did the maximum number of insertion contributed only 7.6% of total insertions; it was divided in to insertion done through Kelly's forceps and PPIUCD inserter This may be one of the reasons of decline in fundal placement result in RCT
2	Evidence of uterine perforation/trauma immediately after the insertion	No case of perforation/trauma	No case of perforation/trauma	
3	Providers' assessment of ease of insertion-immediately after Insertion	93% of providers found insertion to be easy	85.8% of providers found insertion to be easy with Arm A while 80.5 % of providers found insertion to be easy with inserter. No statistically difference between two arms	1. This is a subjective parameter of assessment and could vary from case to case as per Providers' interpretation
4	Participants pain perception before and after insertion	Pain was no different pre- and post-insertion in 74% of participants; 9% of participants had an increase in pain while 17% had decrease in pain	Pain was no different pre-and post-insertion in 85.3% cases of Arm A & 85.1% of Arm B ; 6.9% of participants had increase in pain in both arms. While 7.7 % of Arm A & 8.5 % of Arm B 8% had decrease in pain. No statistically signi-ficant difference between groups	This was also a subjective parameter and threshold of pain varies from participant to participant

	Outcome	POC (n=80)	RCT (n=492 in total; Arm A & B=246) *	Interpretation
	Secondary Outcomes			
5	Clinical outcome at first follow up			
a.	Retention	61 (76.3%)	201(81.7%) retained in Arm A &175 (71.1%) in Arm B	Comparable
b.	Expulsion of the PPIUCD	14 (17.5%)	25 in arm A (10.1%); 45 in Arm B (18.2%)	Comparable
c.	Removal of the PPIUCD[2]	5 (6.2%)	14 in Arm A (5.7 %) & 22 in Arm B (8.9%)	Comparable
d.	Lost to follow up[3]	0 (0 %)	6 in Arm A (2.4) & 4 in Arm B (1.6%)	RCT had few Loss To Follow Up (LTFU) cases compare to POC which had no LTFU cases. It may be due to large sample size
6	Adverse event	7 (8.8%)	27 in Arm A (10.9 %) & 33 in Arm B (13.4 %)	It may be due to large sample size but the difference is not statistically significant
7	Serious adverse event	2 (2.5%)	2 in Arm A (.01 %) & 5 in Arm B (0.2%)	Comparable
8	Participant overall satisfaction	99 % of participants were satisfied with provider and experience at hospital	98 % of participants were satisfied with the provider and experience at Hospital in both arms	Comparable

Lessons Learned

1. When such elaborate studies are planned in India, particularly with new devices, we need to budget time for regulatory approvals. India is known for having a very challenging environment for regulatory approvals.
2. If follow up of participants is required in the study, recruitment should maximize the likelihood of client follow up.
3. Contraception in India is a family decision so involvement of family member/s can minimize the chances of withdrawal.
4. Research coordinators should be appointed at each study site for better documentation, communication and coordination.
5. The presence of a dedicated and trained counsellor for the study helped expedite recruitment.
6. Active involvement of the providers and investigators-maintained study momentum.
7. Ultrasonography machine should have been provided at each site for study prospective to avoid delay in performing USG post-insertion.
8. To avoid bias while performing USG post-insertion, the same provider should not do both the insertion and USG, and the person performing the USG should be blinded to study group assignment.
9. An USG protocol should be developed for a better understanding of USG procedures and uniformity across all the study sites.
10. The longer threads of the PPIUD inserter means that it is more likely to be visible at a follow up visit (this indicating that the IUD is located in the uterus) but must also be managed aggressively meaning that the woman must have the threads trimmed right at the cervical at the time of insertion, have them checked and trimmed before she resumes intercourse or at any time she can feel the strings at the entrance to the vagina.
11. Our research shows that the "10 Minute" window for insertion is completely unimportant and the IUD should be inserted at any time after the birth as long as the woman is still in the delivery room up to 48 hours.[6,7,8]

Conclusion

The dedicated PPIUCD inserter appears to be safe and effectively delivers the IUCD to the fundus with no cases of perforation or trauma. Fundal placement of the IUCD with the inserter was found to be comparable to that observed with the modified Kelly's forceps, as determined by an Ultrasonography immediately after insertion. Provider and participants both were administered "Satisfaction Questionnaires". Retention, expulsion and removal rates of PPIUCD inserter and Kelly's forceps are comparable. There were very few lost to follow up cases in this study.

The inserter is easy to use, comes in one sterile package, which simplifies the overall insertion process and was appreciated by providers. Participant overall satisfaction was 98% with provider and experience at the hospital.

The retention rates and complete expulsion rates of IUCD with the dedicated PPIUCD inserter are also within the range of experiences reported from a variety of centers around the world, and the longer threads make it more likely that the location of the IUD can be verified at follow-up without the need for additional tests such as ultrasound or x-ray. The PPIUCD inserter can add to the basket of choice for clients as well

as for providers. PPIUCD inserter is non-inferior to Modified Kelly's forceps. This method may be particularly beneficial in low resource setting where availability of forceps may be a limitation and providing it sterile would further add to the cost.

References

1. ICH – GCP guidelines, WMA – Declaration of Helsinki, Ethical Guidelines for Biomedical Research on Human Subjects published by Indian Council of Medical Research, New Delhi. GOI PPIUD reference manual.

2. Innovative Solutions to Prevent Infant/ Maternal Deaths. (http://savinglivesatbirth.net/news/13/07/31/press-release-round-3-award-nominees-announced)

3. El Beltagy, N.S., Darwish, E.A., Kasem, M.S. and Hefila, N.M. 2010. Comparative study conducted between intrauterine device (Cu T380 IUD) and multiload 375 IUD insertion in early postpartum period

4. Singh, S., Das, V., Agarwal, A., Dewan, R., Mittal, P., Bhamrah, R., Lerma, K. and Blumenthal, P.D. 2016. A dedicated postpartum intrauterine device inserter: Pilot experience and proof of concept. Global Health: Science and Practice, Mar 21;4(1):132-40.

5. Blumenthal, P.D., Chakraborty, N.M., Prager, S., Gupta, P., Lerma, K. and Vwalika, B. 2016. Programmatic experience of post-partum IUD use in Zambia: an observational study on continuation and satisfaction. The European Journal of Contraception & Reproductive Health Care. Sep 2;21(5):356-60.

6. Burke, Eva, Léa Dakouo, Marie, Glish, Laura, Moon, P. and Blumenthal, P.D. 2018. Helping postpartum women in Mali achieve their fertility intentions: Perspectives from introduction of the dedicated postpartum IUD inserter. Global Health: Science and Practice Advance Access articles, September GHSP-D-18-00138.

7. Goldthwaite, Lisa M., Cahill, Erica P., Voedisch, Amy J. and Blumenthal, P.D. 2018. Postpartum intrauterine devices: Clinical and programmatic review. American Journal of Obstetrics & Gynaecology, Sep; 219:235-241.

8. Lerma, K., Singh, S., Bhamrah, R. and Blumenthal, P.D. Does the time between delivery and insertion of the IUD have clinical significance in the provision of postpartum IUDs? The Society of Family Planning; https://www.contraceptionjournal.org/article/S0010-7824(17)30231-7/fulltext

EFFECT OF SEX COMPOSITION OF LIVING CHILDREN ON CONTRACEPTIVE USE: A COMPARATIVE STUDY OF HARYANA AND KERALA STATE OF INDIA

DEEPAK GOPAL AND HARIHAR SAHOO

Introduction

Son preference affects the female mortality and fertility. Use of contraception is directly associated with son preference. A study conducted on Bangladeshi women revealed that compared with women having only a daughter, women with only a son were 1.4 times more likely to be using contraception.[1] The son preference is widespread in South Asia and is manifested in excess female mortality during early life, imbalanced sex ratios and large gender gaps in education. The couple do not use contraception until they have desired number of sons and due to the son preference huge female foetus has been aborted.[2] Due to sex selective abortion number of 'missing women' (deficit of women)* in China to be 44 million and in India 37 million, and so on, with a total that easily exceed 100 million globally.[2]

Sex composition of the living children plays an important role not only in the use of contraception but also in the use of different methods of contraception. Arnold et.al.[3] found that contraceptive use is affected by sex composition of the surviving children in the family. Sex composition of the living children is determined by several biological and

** The term "missing women" indicates a shortfall in the number of women relative to the expected number of women in a region or country. It is most often measured through male-to-female sex ratios, and is theorized to be caused by sex-selective abortions, female infanticide, and inadequate healthcare and nutrition for female children Source: https://en.wikipedia.org/wiki/Missing_women*

Deepak Gopal, Research Scholar, Email: gopalgdeepak@gmail.com, Harihar Sahoo, Assistant Professor, International Institute for Population Sciences, Govandi Station Road, Deonar, Mumbai-400088. Email: hariharsahoo@gmail.com

external factors i.e., sex-selective abortion, son preference and so on. However, among all the factors -son preference plays a key role in determining the desired sex composition of the living children because sex-selective abortion is a reflection of son preference. The term son preference refers to the attitude that sons are more important and more valuable than daughters.[4] Preference for son has come from the agricultural economy of the past but it is surprising that this preference still exists in countries, which have progressed from an agricultural to an industrial economy. Son preference is continuing in the world mainly in many developing and low-income countries since past. Using World Fertility Survey data,[5] found that 71% women preferred a boy in Pakistan and 60% wanted their next child to be a boy in Bangladesh. Retherford and Roy,[6] conclude that, in India, the population who prefer for male births, large proportion of them go to abort the female foetus. Son preference is found to be high in western and northern states of India as compared to the rest. Mothers with illiterate husbands were nearly 10 times more likely to prefer a son than those married to highly educated husbands.[7] High prevalence of son preference over daughter is because of many reasons but due to their social, symbolic, and economic value sons are highly desired.[8] Estimates show that a 'first-born son' may provide economic advantage through reduction in total children born and also from an adult son's labour supply contribution to his parents' household.[9] Gender biases in health and education spending occur predominately in poor, rural households which are highly dependent on agriculture. Biases in household spending on health and education correspond to observed biases in age-specific mortality and enrolment.[10]

There is evidence that in India son preference is stronger in the northern states.[5,11] The empirical evidence from India suggests that son preference has two pronounced and predictable family-level effects on the sex composition of children ever born. First is that smaller families have a significantly higher proportion of sons than larger families, and second socially and economically disadvantaged couples and couples from the northern region of India not only want but also attain a higher proportion of sons, if the effects of family size are controlled.[4] Son preference has strong and influential effect on contraceptive use and fertility behaviour.[8] The same result found that contraceptive use, abortion, fertility and child spacing are affected by the sex composition of surviving children in the family.[3] The sex of surviving children was strongly correlated with subsequent fertility and contraceptive behaviour.[12]

Khan and Khanum[1] found that sex composition of surviving children is significantly associated with the current use of contraception after adjusting for the confounding factors. Women with only a son were 1.4 times more likely to be using contraception (95% CI: 1.11-1.69) than women with only daughter. Women with only sons desire fewer children and are more likely to use contraception. As the number of living son increases, contraceptive use also increases.[13] Because of sex preference contraceptive use decreases by 24% and the total fertility rate increases by more than 6%. Sex preference is an important barrier to the increase of contraceptive use and the decline in the fertility in the Nepal.[14] Contraception use is not common among young women in Nepal. It is, however, more likely among women with sons (79%) and less likely among women with daughters, demonstrating that son preference continues to affect contraception use among the next generation of mothers in Nepal.[15] A study carried out in Egypt shows that there is a significantly positive effects on the contraceptive use among women having one or more sons in 1979

which remained constant till 1990.[16]

Need for the study

There are different socio-economic and demographic factors that affect contraceptive use. Sex composition of living children is one of the demographic factors which is more likely to affect the contraceptive use. Therefore, it is important to understand the association between sex composition of living children and use of contraception with respect to different background characteristic of the respondents. In this study, two states of India namely Kerala and Haryana have been considered for the analysis. These two states are though economically better off but they are not the same in terms of sex ratio. Therefore, there is a need to understand a comparative analysis of contraceptive use between these two states and to find out the underlying factors behind the use of contraception in both the states. With this broad background, the specific objectives of the study are as follows:

1. To study the prevalence of contraceptive use by methods and by sex composition of living children in Haryana and Kerala.
2. To find out the effect of sex composition of living children in Haryana and Kerala.

Data and methods

Data for this study have been drawn from District Level Household and Facility Survey (DLHS) 4 which was conducted during 2012-13. The Ministry of Health and Family Welfare (MoHFW), Government of India had designated the International Institute for Population Sciences (IIPS), Mumbai to be the nodal agency for conducting the survey. Three rounds of District Level Household and Facility Surveys (DLHS) have been undertaken in the past (Round- I in 1998-99, Round-II in 2002-04, and Round-III in 2007-08) with the main objective to provide reproductive and child health database at the district level in India. A multi-stage, stratified, probability proportional to size sample with replacement has been adopted in DLHS-4. The First Stage Unit (FSU) for urban areas is the National Sample Survey Office (NSSO) Urban Frame Survey (UFS) blocks and Ultimate Stage Sampling Unit (USU) is the household. UFS blocks in each district were stratified into million-class cities and non-million class cities and allocation of the sample was proportional to relative sizes. DLHS-4 used three separate questionnaires. First one was for ever-married women, second one was for household and third one was for the village. The ever-married women's questionnaire contained information on women's characteristics, maternal care, immunization and child care, contraception and fertility preferences, reproductive health including knowledge about HIV and AIDS.

Few questions were selected from ever married women questionnaire (i.e., sex composition of living children and current contraceptive use) and the household questionnaire. Univariate, bivariate and multivariate analysis have been carried out to fulfil the objectives of this study. Univariate and bivariate analysis has been used to see the prevalence of contraception for both the States. Two maps have been prepared using a Geographic Information System (GIS) software, to see the district wise variation in the prevalence of contraception in Kerala and Haryana. Differentials in use of contraception by sex composition of living children have been shown with the help of bivariate analysis. Binary logistic regression analysis has been carried out to see the effect of sex composition of living children on the use of contraception.

In the analysis, to examine the effect

of sex composition of living children on current contraceptive use, use of contraception has been considered as dependent or response variable (user has been categorized as 1 and non-user as 0). A set of predictor variables have been considered for the analysis,i.e., age of respondent, level of education, caste, place of residence, having Below Poverty Line (BPL) card, religion, number of living sons.

Results

Prevalence of contraception use

The prevalence of contraceptive use in Haryana and Kerala is presented in Table 1. The result reveals that substantially higher proportion of women in Kerala (nearly two-third) use contraception than Haryana. Three methods of contraception namely tubectomy (female sterilisation), condom and IUD are being used on a large scale as compared to all other methods among the women of both of the states. These three methods constitute 48 per cent in Haryana and 57 per cent in Kerala. Female sterilization is a major method of contraception in both the states. There are 35.2 per cent women using female sterilization in Haryana while 42.5 per cent in Kerala. Condom is the second major method of contraceptive use in both the states. Approximately same percentage of women i.e. 10.5 and 9.5 per cent use condom in both the states, Haryana and Kerala respectively. IUD users are 2.5 per cent in Haryana and 4.6 in Kerala. Withdrawal method has a significant percentage in Kerala. In Kerala, 3.3 percentage of women use withdrawal method while in Haryana, it is just 0.6 percentage points. The use of Injectable is 0.2 and 0.3 in Haryana and Kerala, respectively which is a negligible. Others category of contraception has 1.4 per cent in Haryana while in Kerala it has just 0.1 per cent. One per cent among all users of Haryana use daily pill while only 0.7 per cent in Kerala.

Table 1

Percent of currently married women using different methods of contraceptive in Haryana and Kerala, 2012-13

Methods of Contraception	Haryana		Kerala	
	Percent	N	Percent	N
No use	45.8	11941	35.9	4364
Female-Sterilization	35.2	9105	42.5	4936
Male-sterilization	1.0	254	0.8	103
IUD	2.5	651	4.6	596
Daily-pills	1.0	276	0.7	89
Weekly-pills	0.9	230	0.5	75
Injectable	0.2	47	0.3	43
Condom	10.1	2731	9.5	1216
Female-condom	0.3	66	0.6	77
Rhythm	1.2	306	1.2	151
Withdrawal	0.6	163	3.3	395
Other	1.4	346	0.1	12
Total	**100.0**	**26116**	**100.0**	**12057**

Source: Computed from DLHS 4 individual data file

Variation in Contraceptive use by sex composition of living children

Table 2 reveals that for each sex composition of living children the percentage of contraception use among currently married women is higher in Kerala than that of Haryana except the sex composition of two sons. There are 11 per cent women having no living children are using contraception in Haryana as compared to 19 per cent in Kerala. Contraception use among women with one child is 39 per cent in Haryana while for the same category of women 52 per cent are using contraception in Kerala. In Haryana the percentage of those users who have two children is 61 per cent whereas in Kerala their percentage is 81.5.

Here we can see that, an increase of 5 percentage points in the use of contraception from two to three living children in Haryana but there is no increase in Kerala. Those users who have one son, their percentage is 42 in Haryana while 54 in Kerala but for the one daughter percentage of user is less in both of the Haryana and Kerala as compared to

users who have one son. The percentages of users having one daughter are 32 and 50 in Haryana and Kerala, respectively. One other interesting thing we see that the percentage of contraceptive use among women having two sons is higher in Haryana (67%) than that of Kerala (52%) but for the women having two daughters it is reverse, a huge difference in use of contraception can be seen among the women of Haryana and Kerala. Those who have only two daughters and using contraception their percentage is just 38 per cent in Haryana and 80 per cent in Kerala. For the sex composition of one son and one daughter we see that there are more women using contraception in Kerala than Haryana and their percentages are 82 and 61, respectively. Those women who have three sons, more women of such category are using contraception in Kerala (82%) than Haryana (71%) but difference is not as higher as women having three daughters. There are 77 per cent women using contraception who have three daughters in Kerala whereas in Haryana their percentage is just 34. Here we can see that despite the total number of living children is three in both of the states there is a difference in the use of contraception according to the sex composition of those living children. Those women who have one son and two daughters among those 62 per cent women are using contraception in Haryana while for the same category of women there are 84 per cent are using contraception in Kerala. But when this sex composition changes to two sons and one daughter the respective use of contraception becomes 70 and 80 in Haryana and Kerala, respectively. The difference between contraception users is high in the sex compositions of two daughters, and three daughters. We can see from Table 2 that those users who have only daughters or more number of daughters than sons their percentage is very less in Haryana than Kerala.

Table 2

Percent of currently married women using any contraception by sex composition of living children in Haryana and Kerala, 2012-13

Sex Composition of Living Children	Haryana		Kerala	
	Per cent	N	Per cent	N
No Living Child	11.3	2167	19.3	1610
One Living Child	38.7	4694	52.5	3889
1 Son	41.9	3135	54.1	2377
1 Daughter	32.3	1559	50.1	1512
Two Living Children	61.0	10085	81.5	5159
1 Son & 1 Daughter	60.5	5772	82.2	2849
2 Sons	67.1	3514	54.1	1327
2 Daughters	37.7	799	80.3	983
Three Living Children	66.2	5869	81.5	1113
1 Son 2 Daughters	62.5	2293	83.7	420
2 Sons 1 Daughter	70.5	2712	80.5	432
3 Sons	71.4	652	82.2	129
3 Daughters	34.3	212	77.1	132

Source: Computed from DLHS 4 individual data file

It can be seen from Table 3 that the prevalence of contraception varies widely in Haryana and Kerala by sex composition of living children. It clearly indicates that one of the reasons behind the use of any contraception in both states is the number and the sex of the living children, but its extent is not same in both the States. As the number of living children increases the percentage of the user is also increasing but the amount of this increase is different for different sex composition and also different in both the Haryana and Kerala. Not only percentage of the user but also the type of method varies among women according to the sex of the child they have in both of the States. It can be seen from the table that three major methods of contraception namely female sterilization, condom and IUD are common in both of the states. Use of withdrawal method has also had a significant percentage in Kerala but in Haryana it is negligible.

Table 3

Per cent of currently married women using different methods contraception by sex composition of living children in Haryana and Kerala, 2012-13

Sex Composition of Living Children	Not Using	Female Sterilization	Male Sterilization	IUD	Pill	Injectable	Condom	Rhythm	Withdrawal	Other
Haryana										
No Living Child	88.7	2.9	0.2	0.0	0.6	0.1	4.8	0.5	0.3	1.9
One Living Child	61.3	9.9	0.4	3.6	2.8	0.3	17.7	1.5	0.9	1.7
1 Son	58.2	12.1	0.5	4.4	3.0	0.3	17.7	1.5	0.8	1.7
1Daughter	67.7	5.5	0.1	2.1	2.4	0.4	17.7	1.4	1.1	1.7
Two Living Children	39.0	38.7	1.0	3.1	2.3	0.2	12.2	1.4	0.6	1.5
1Son & 1 Daughter	39.5	35.5	1.0	3.6	2.7	0.2	13.5	1.6	0.8	1.6
2Sons	32.9	50.2	1.3	2.7	1.6	0.1	8.7	0.9	0.3	1.3
2Daughters	62.4	10.5	0.2	1.7	2.5	0.3	17.7	2.0	1.0	1.7
Three Living Children	33.8	51.7	1.5	2.0	1.5	0.1	6.9	1.0	0.5	1.1
1Son 2 Daughters	37.5	41.8	2.0	3.3	2.5	0.1	9.5	1.2	0.7	1.4
2Sons 1 Daughter	29.5	60.1	1.3	1.3	0.7	0.1	5.3	0.7	0.3	0.8
3Sons	28.7	63.6	0.8	0.7	1.1	0.0	3.2	0.6	0.1	1.2
3Daughters	65.7	14.1	0.0	0.8	2.9	1.3	11.0	2.8	1.1	0.4
	Kerala									
No Living Child	80.7	3.6	0.2	0.8	2.2	0.2	9.4	0.9	2.0	0.1
One Living Child	47.5	12.3	1.3	10.5	2.0	0.8	17.0	2.1	6.5	0.1
1 Son	45.9	12.7	1.7	11.9	2.0	0.8	16.8	2.0	6.1	0.2
1Daughter	49.9	11.7	0.6	8.4	2.0	0.8	17.3	2.3	7.1	0.0
Two Living Children	18.5	67.1	0.8	2.4	0.7	0.1	7.4	0.8	2.1	0.1
1Son & 1 Daughter	17.8	67.6	1.1	2.5	0.6	0.2	7.1	0.9	2.1	0.1
2Sons	19.2	65.1	0.6	1.9	1.1	0.0	9.0	0.8	2.3	0.0
2Daughters	19.7	68.3	0.3	2.5	0.4	0.0	6.2	0.8	1.7	0.1
Three Living Children	18.5	75.9	0.1	1.2	0.3	0.0	2.5	0.6	0.7	0.1
1Son 2 Daughters	16.3	79.4	0.2	0.9	0.0	0.0	2.1	0.6	0.5	0.0
2Sons 1 Daughter	19.5	72.5	0.2	1.9	0.6	0.0	3.3	0.8	1.1	0.2
3Sons	17.8	79.4	0.0	0.0	0.0	0.0	1.1	0.6	1.2	0.0
3Daughters	22.9	72.2	0.0	1.4	0.7	0.0	2.8	0.0	0.0	0.0

Source: Computed from DLHS 4 individual data file

In both Haryana and Kerala, the percentage of women using female sterilization is 30.5 and 52.9 respectively. The prevalence of condom use is higher in Haryana (11.2%) than that of Kerala (7.8%). The prevalence of IUD in Kerala is 3.6% which is slightly higher than Haryana (2.3%). After these three major methods of contraception rest of the methods constitute very negligible proportion. On an average for each sex composition of living children 0.9 per cent men are using male sterilization in Haryana while in Kerala their percentage is 0.85. Similarly, pill users are 2.3 per cent in Haryana while in Kerala just 1 per cent. About 0.3 per cent women are using injectables in Haryana while in Kerala this percentage in 0.2 only. The natural method of contraception is important in both the states over the injectable and few other methods. On an average 1.3 per cent in Haryana and 1 per cent in Kerala use the Rhythm method. Percentage of withdrawal method user is 0.7 in Haryana while in Kerala it is 2.6 per cent. Only 1.4 per cent women of Haryana and 0.1 per cent of Kerala are use other method of contraception.

Differentials in Contraceptive use in Haryana and Kerala

Table 4 reveals that in Haryana 38.7 per cent Hindu and 18.0 % Muslim women who have one child are using contraception while in Kerala it is 51.8 and 42.7 %, respectively. In the other category of religion, 51.0 per cent women in Haryana and 65.2 per cent women in Kerala are using contraception. About 61.8 per cent currently married Hindu women and 33.1 per cent currently married Muslim women with two children are using contraception in Haryana, whereas in Kerala 83.8 per cent Hindu and 70 per cent Muslim women are using contraception. In the other category of religion, 60.9 per cent in Haryana and 86.4 per cent in Kerala are using contraception. In Haryana, 67.3 per cent currently married Hindu women with three living children are using contraception while in Kerala it is 87 per cent. For the same category of children, 35.0 per cent Muslim women in Haryana and 72.6 per cent in Kerala are using contraception. 71.8 per cent others in Haryana and 93.5 per cent others in Kerala are using contraception. It can be seen from the Table 4 that as educational level of women increases contraceptive use also increases. Women who reside in urban areas are more likely to use contraception than their rural counterparts. As the age of respondent increases, percentage use of contraception increases in both of the states.

Table 4

Percent of Currently Married women using any contraception by number of living Children and background characteristics in Haryana and Kerala, 2012-13

Background Characteristics	Haryana						Kerala					
	1 Child		2 Children		3 Children		1 Child		2 Children		3 Children	
	User	N	User	N	User	N	User	N	User	N	User	N
Caste												
SC & ST	33.0	1309	54.4	2701	63.8	2260	61.2	422	84.0	553	88.3	119
OBC	38.2	1248	62.1	2829	68.4	1658	43.0	1935	78.8	2811	78.2	730
Other	42.7	2137	64.4	4555	67.1	1950	62.5	1530	85.0	1794	87.4	264
Religion												
Hindu	38.7	4328	61.8	9389	67.3	5489	51.8	2226	83.8	3158	87.0	425
Muslim	18.0	136	33.1	258	35.0	225	42.7	854	70.0	1072	72.6	516

Background Characteristics	Haryana						Kerala					
	1 Child		2 Children		3 Children		1 Child		2 Children		3 Children	
	User	N	User	N	User	N	User	N	User	N	User	N
Other	51.0	230	60.9	438	71.8	154	65.2	807	86.4	928	93.5	172
Education												
Illiterate & Primary	33.2	1420	60.9	4103	66.6	3670	26.5	347	70.5	395	74.8	158
Secondary	37.8	1349	62.5	3316	66.0	1637	43.5	1039	82.5	2654	82.1	684
Higher	43.7	1925	59.4	2666	63.7	562	60.1	2501	82.3	2109	84.1	271
Residence												
Rural	35.6	2583	62.5	5678	67.7	3559	52.9	1903	80.9	2619	83.0	504
Urban	43.4	2111	58.8	4407	63.4	2310	52.1	1986	82.1	2540	80.2	609
BPL												
Yes	35.5	654	61.4	1422	70.2	1382	47.5	1004	84.0	1593	83.3	374
No	39.3	4040	61.0	8663	64.9	4487	54.6	2872	80.3	3566	80.6	738
Current Age of women												
below 30	34.9	3338	53.9	4089	54.9	1520	45.3	1713	70.5	911	70.7	142
Above 30	48.5	1356	66.0	5996	70.2	4349	58.5	2176	83.8	4248	83.1	971
No. of living Son/s												
Zero	32.3	1559	37.7	799	34.3	212	50.1	1512	80.3	983	77.1	132
One	41.9	3135	60.5	5772	62.5	2293	54.1	2377	82.2	2849	83.7	420
Two	-	-	67.1	3514	70.5	2712	-	-	80.8	1327	80.5	432
Three & more	-	-	-	-	71.4	652	-	-	-	-	82.2	129

Source: Computed from DLHS 4 individual data file

Among those women who have one daughter, 32.3 per cent in Haryana and 50.1 per cent in Kerala are using contraception while among those women who have one son 41.9 per cent in Haryana and 54.1 per cent in Kerala are using contraception. Among those women who having two children and both of them are girls, 37.7 per cent in Haryana and 80.3 per cent in Kerala are using contraception. 60.5 per cent women in Haryana and 82.2 per cent in Kerala are using contraception who have one son and one daughter. Those women who have two children and both of them are sons among those 67.1 per cent in Haryana and 80.8 per cent in Kerala are using contraception. Among those women who have three children, and all are daughters out of them 34.3 per cent women are using contraception in Haryana and 77.1 per cent in Kerala respectively. Among those who have one son out of four children out of them, 62.5 per cent in Haryana and 83.7 per cent in Kerala are using contraception. Among those women who have two sons, 70.5 per cent in Haryana and 80.5 per cent in Kerala are using contraception. Women having three and more sons among those women 71.4 per cent in Haryana and 82.2 per cent In Kerala is using contraception.

Effect of sex composition of living children on contraceptive use in Haryana

Women having one living child

Table 5 depicts that adjusted odds ratio for contraception use among currently married women having a different number of children by some selected background variables in Haryana. The results reveal that those women who have one living child caste, religion, education, residence, the current age of respondent and number

of living sons have the significant impact on the use of contraception. Controlling the effect of other variables those women who come under the others category of caste they are 1.9 times more likely to use contraception as compared to those respondents who belong to scheduled caste. When we move to describe the association between religious affiliation and use of contraception what we see that those women who belong to the Muslim religion are 46 per cent less likely to use contraception whereas those women who belong to others religion are 1.4 times more likely to use contraception compared to those women who belongs to Hindu religion. Education has a significant impact on the use of contraception according to the following table. Those women who have completed primary, secondary and higher education; are 1.6, 1.4, and 1.7 times, respectively more likely to use contraception compared to the women who are illiterate. Those respondents who live in urban residence are 1.1 times more likely to use contraception compared to those who live in rural areas. Current age of respondent women is an important determinant of use of contraception as we see in the given table that women who have completed 25 years of age as well as who are above 35 years of age are 1.6, and 2.4 times, respectively more likely to use contraception as compared to those women who are in the age group of below 25 years of age. Son preference is a determinant in use of contraception we can see a demonstration in the given table. Those women who have one son are 1.3 times more likely to use contraception as compared to those women who have one daughter.

Table 5

Odds Ratio showing the effect of sex composition of living children and selected socio-economic characteristics on Contraceptive use in Haryana: Results from Logistic Regression Analysis

Background Variables	1 Child			2 Children			3 Children		
	Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI	
		Lower	Upper		Lower	Upper		Lower	Upper
Caste									
SC ®									
ST	0.948	0.693	1.297	0.734***	0.602	0.895	0.498***	0.388	0.639
OBC	1.161	0.971	1.388	1.329***	1.180	1.497	1.262***	1.088	1.464
Other	1.190**	1.006	1.410	1.414***	1.261	1.585	1.11033	0.956	1.289
Religion									
Hindu ®									
Muslim	0.561**	0.362	0.871	0.395***	0.300	0.520	0.295***	0.220	0.397
Other	1.462***	1.113	1.922	0.85629	0.701	1.046	1.126698	0.783	1.621
Education									
Illiterate®									
Primary	1.605***	1.269	2.031	1.563***	1.362	1.795	1.422***	1.212	1.668
Secondary	1.457***	1.208	1.757	1.243***	1.112	1.390	1.168**	1.014	1.347
Higher Sr.	1.743***	1.448	2.100	1.146**	1.013	1.297	1.122696	0.911	1.384
Residence									
Rural®									
Urban	1.135*	0.998	1.292	0.791***	0.724	0.865	0.759***	0.674	0.856
BPL									
Yes®									

Background Variables	1 Child			2 Children			3 Children		
	Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI	
		Lower	Upper		Lower	Upper		Lower	Upper
No	0.881	0.731	1.063	0.845***	0.747	0.959	0.717***	0.622	0.828
Current Age of women									
below 25 ®									
25-34	1.676***	1.456	1.930	2.035***	1.765	2.348	1.664***	1.222	2.267
35+	2.414***	1.994	2.924	2.410***	2.071	2.805	2.546***	1.865	3.477
No. of living Son/s									
Zero®									
One	1.379*	1.210	1.572	2.103***	1.800	2.460	3.061***	2.263	4.142
Two	-			2.781***	2.360	3.277	4.298***	3.174	5.820
Three	-		-	-		-	4.557***	3.242	6.407

*Note: ®: Reference Group; ***, **, *: 1%, 5%, and 10% level of significance, respectively.*

Since frequency is very less in the primary and illiterate category of education therefore I have club both the categories and make a new one which is illiterate + primary. Similarly, caste and Age group have been also merged in a single category for those who have three living children.

Source: Computed from DLHS 4 individual data file

Women having two living children

In Haryana, those who have two living children, the entire selected socio-economic and demographic variables are given in table 1.5 have the significant impact on the use of contraception. Table 1.5 depicts that woman who belongs to OBC along with women who belong to others category of caste, 1.3 and 1.4 times, respectively more likely to use contraception as compared to those women who belong to SC category. Schedule tribe women are 27 per cent less likely to use contraception as compared to those women who belong to Schedule caste. Muslim women are 61 per cent less likely to use contraception as compared to Hindu women. Similarly, to the category of women having one child similar effect of education can be seen here. Those women who have completed primary, secondary, and higher education are 1.5, 1.2, and 1.1 times, respectively more likely to use contraception as compared to those who are illiterate. Those women who are living in urban 21 per cent less likely to use contraception as compared to rural women. Women who do not have the BPL card are 16 per cent less likely to use contraception as compared to those women who have the BPL card. Women who are in age group 25-34 and 35 above they are 2.0, and 2.4 times, respectively more likely to use contraception as compared to those women who are below the 25 years of age. Those women who have one living son as well those who have two living sons are 1.8 and 2.3 times, respectively more likely to use contraception as compared to those women who have no living son.

Women having three living children

As seen in the above, women with three living children all the selected socio-economic and demographic characteristics are significantly associated with contraceptive use. It is interesting to see women of OBC are 1.2 times more likely to use contraception while women of ST category are 51 per cent less likely to use contraception as compare to the women who are in SC category. Here we can see a similar kind of trend in using contraception among Muslim women. Muslim women are 71 per cent less likely to use contraception as compared to Hindu women. Those women who completed primary and secondary level of education are 1.4, and

1.1 times, respectively more likely to use contraception as compared to illiterate. Women who reside in the urban areas are 29 per cent less likely to use contraception as compared to those women who live in urban areas. Age variable is also showing similar kind of trend as in above mentioned two categories. Women who are in 25-34 and 35 above are 1.6, and 2.5 times, respectively more likely to use contraception as compared to the women who are in the age group below 25 Years of age. Number of living sons is an important variable which affects significantly the contraception use. Here in the following table we can see that women having one, two, and three and more living sons are 3.0, 4.2, and 4.5 times more likely to use contraception as compared to those women who have no living son at all.

Effect of sex composition of living children on contraceptive use in Kerala

Women having one living child

Table 6 reveals that adjusted odds ratios for contraception use among currently married women having a different number of children by some selected background characteristics in Kerala. The results reveal that those women who have one living child caste, religion, education, residence, the current age of respondent and number of living sons have the significant impact on the use of contraception. Controlling the effect of the other variable those who come under the category of OBC and others category of caste are 59 and 20 per cent, respectively less likely to use contraception as compared to those who come under the SC category. In religion, those women who belong to others category they are 1.4 times more likely to use contraception as compared to Hindu women. Education is significantly affecting the use of contraception in Kerala also. Those women who attained the primary, secondary, and higher educational level they are 2.1, 3.5, and 6.4 times, respectively more likely to use contraception as compared to illiterate women. Those respondents who belong to the age categories of 15-34 and 35 above are 1.5 and 2.5 times, respectively more likely to use contraception as compared to those women who are below 25 years of age. Those women who have one living son they are 1.1 times more likely to use contraception as compared to those women who have only one daughter.

TABLE 6

Odds Ratio showing the effect of sex composition of living children and selected socio-economic characteristics on Contraceptive use in Kerala: Results from Logistic Regression Analysis

Background Variables	One Child			Two Children			Three Children		
	Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI	
		Lower	Upper		Lower	Upper		Lower	Upper
Caste									
SC ®									
ST	0.911	0.506	1.641	1.192	0.528	2.690	-	-	-
OBC	0.412***	0.322	0.527	0.838	0.640	1.097	0.69	0.3643	1.308
Other	0.801*	0.621	1.035	1.102	0.826	1.470	0.663	0.3259	1.3514
Religion									
Hindu ®									
Muslim	0.977	0.820	1.164	0.510***	0.430	0.605	0.443***	0.307	0.643
Other	1.487***	1.241	1.784	1.181	0.946	1.474	2.240**	1.119	4.485
Education									
Illiterate®									

Background Variables	One Child			Two Children			Three Children		
	Odds Ratio	95% CI		Odds Ratio	95% CI		Odds Ratio	95% CI	
		Lower	Upper		Lower	Upper		Lower	Upper
Primary	2.186***	1.315	3.635	3.945***	2.414	6.449	-	-	-
Secondary	3.548***	2.474	5.090	5.727***	3.769	8.702	1.883***	1.235	2.873
Higher	6.498***	4.592	9.198	5.790***	3.788	8.852	1.678**	1.001	2.814
Residence									
Rural®									
Urban	0.944	0.824	1.081	1.108	0.959	1.281	0.886	0.649	1.211
BPL									
Yes®									
No	1.130	0.963	1.327	0.756***	0.640	0.894	0.885	0.885	0.885
Current Age of women									
below 25 ®									
25-34	1.575**	1.263	1.967	2.430***	1.621	3.645	-	-	-
35+	2.582***	2.035	3.278	3.600***	2.400	5.401	1.821***	1.197	2.772
No. of living Son/s									
Zero®									
One	1.152**	1.004	1.324	1.151	0.953	1.391	1.532*	0.933	2.520
Two	-		-	1.066	0.861	1.321	1.216	0.745	1.986
Three	-		-	-		-	1.392	0.748	2.590

*Note: ®: Reference Group; ***, **, *: 1%, 5%, and 10% level of significance, respectively.*

Since frequency is very less in the primary and illiterate category of education therefore I have club both the categories and make a new one which is illiterate + primary. Similarly, caste and Age group have been also merged in a single category for those who have three living children.

Source: Computed from DLHS 4 individual data file

Women having two living children

Table 4 shows that the background characteristics i.e. religion, education, BPL and current age of respondent are significantly affecting the use of contraception of those women who have two living children. Controlling the effect of other variable women who belong to the Muslim community are 49 per cent less likely to use contraception as compared to those women who belong to Hindu religion. Excluding the reference category all three categories of educational level of women i.e. primary, secondary, and higher are 3.9, 5.7, and 5.7 times, respectively more likely to use contraception as compared to illiterate or not educated women. Those respondents who don't have BPL card they are 25 per cent less likely to use contraception as compared to those who have BPL card. Women who are in the age group 25-34 and 35 above are 2.4 and 3.6 times more likely to use contraception as compared to those who are below 25 years of age.

Women having three children

Caste, religion, education and age of respondent women are those socio economic characteristics which are significantly affecting the use of contraception according to Table 6. Women belonging to OBC and others category are 31 per cent, 34 per cent, respectively less likely to use contraception as compared to those who belongs to SC & SC category. Muslim women of Kerala are 56 per cent less likely to use contraception whereas women are from other category are 2.2 times more likely to use contraception as compared to Hindu women. Here we can see that

a new reference category illiterate & primary has been taken due to fewer frequencies in separate categories. Here we see that those women who completed secondary and higher educational level are 1.8 and 1.6 times, respectively more likely to use contraception as compared to the women who are illiterate or even completed primary education. Age has a highly significant impact on the use of contraception in Kerala. Here also we have considered women below 35 years as reference category and we see that those women who lie in the age group above 35 above are 1.8 times more likely to use contraception as compared to the women who are below 34 years of age. Those women who have three one son they are 1.5 times more likely to use contraception as compared to the women who have no living son under the per cent level of significance.

Conclusion

In this study we find that contraceptive use is more among the women of Kerala than the women of Haryana. A negligible percentage of male sterilization indicate that contraceptive use is female oriented in both the states. In spite of high literacy rate in Kerala, very few proportion of male go for vasectomy. Higher use of condom among those who have daughters in Haryana indicates a waiting time for male child but this type of trend is not observed in Kerala. Less use of contraception among those women who have only daughters and higher among those who have only sons, indicates that those women who have daughters want additional child probably son. It is found that, use of contraception in Haryana mainly is determined by caste, religion, age of women, and number of living sons they have; while religion, education of women and age of women is significantly affecting the use of contraception in Kerala. Number of living son does not affect the use of contraception among women of Kerala as significantly as in Haryana.

References

1. Khan, M.A and Khanum, P.A. 2000. Influence of son preference on contraceptive use in Bangladesh. Asia-Pacific Population Journal, 15(3):43-56.
2. Sen, A. 2003. Missing women - revisited: Reduction in female mortality has been counterbalanced by sex selective abortions. British Medical Journal, 327(7427):1297-1299.
3. Arnold, F. and Zhaoxiang, L. 1986. Sex preference, fertility, and family planning in China. Population and Development Review, 12(2):221-246.
4. Clark, S. 2000. Son preference and sex composition of children: Evidence from India. Demography, 37(1):95-108.
5. Nag, M. 1991. Sex preference in Bangladesh India and Pakistan and its effect on fertility. Demography India, 20(2):163-85.
6. Retherford, R.D and Roy, T.K. 2003. Factors affecting sex-selective abortion in India and 17 major states. International Institute for Population Sciences and Honolulu: East-West Center, National Family Health Survey Subject Reports: No. 21.
7. El-Gilany, A. and Shady, E. 2007. Determinants and causes of son preference among women delivering in Mansoura, Egypt. Eastern Mediterranean Health Journal, 13(1):119.
8. Bélanger, Danièle. 2002. Son preference in a rural village in North Vietnam. Studies in Family Planning, 33(4):321-334.
9. Rosenblum, D. 2017. Estimating the private economic benefits of sons versus daughters in India. Feminist Economics, 23(1):77-107.
10. Burgess, R. and Zhuang, J. 2000. Modernisation and son preference. Asian Development Bank, Working Paper No 20, 1-34, Central Statistical Organisation, Govt. of India, New Delhi.
11. Klaus, Daniela and Tipandjan, A. 2015. Son preference in India: Shedding light on the North-South gradient, Comparative Population Studies, 40(1):77-102.

12. Hussain, R., Fikree, F.F. and Berendes, H.W. 2000. The role of son preference in reproductive behaviour in Pakistan. Bulletin of the World Health Organization, 78(3):379-388.

13. Malhi, P. and Singh, S. 1995. Son preference and reproductive behaviour in rural Punjab. Guru Nanak Journal of Sociology, 16(2):31-40.

14. Leone, T., Matthews, Z. and Zuanna, G.D. 2003. Impact and determinants of sex preference in Nepal. International Family Planning Perspectives, 29(2), 69-75.

15. Raj, A., Vilms, R.J., McDougal, L. and Silverman, J.G. 2013. Association between having no sons and using no contraception among a nationally representative sample of young wives in Nepal. International Journal of Gynaecology and Obstetrics, 121(2):162-165.

16. Yount, K.M., Langsten, R. and Hill, K. 2000. The effect of gender preference on contraceptive use and fertility in rural Egypt. Studies in Family Planning, 31(4):290-300.

REPRODUCTIVE HEALTH PROBLEMS OF WOMEN IN MUMBAI: SLUM - NON-SLUM SCENARIO

ANJALI RADKAR

INTRODUCTION

Maharashtra is the second largest urbanized state of India, with 45.2 percent population living in urban areas. Urbanization is equated to development, but generally not without undesirable ailments like crowding, pollution and increase in slums causing strain on existing infrastructure and civic amenities. Mumbai is a metropolitan-population over 12.4 million- with significant proportion residing in slums. Considering the conditions in slums large disparities are often observed in background of slum and non-slum dwellers. Apart from economic levels, there are differences in the social and demographic characteristics, health indicators and utilization of health care services.[1] It is established that health largely depends on social and economic milieu; thus, differences are bound to be found in these two groups. Among all other health issues, Reproductive Health (RH) has its importance. Recognizing this, India has adopted the reproductive and child health programme in 1996. The package of essential RH services recommended for implementation is healthy births and intended pregnancies as also prevention and treatment of Reproductive Tract Infections (RTIs) and Sexually Transmitted Infections (STIs).[2]

RTIs include three types of infections: (1) Infections transmitted through sexual intercourse (2) Endogenous infections that women catch apart from sexual intercourse, by poor hygienic practices such as the use of unclean menstrual clothes and harmful practices such as early initiation of sexual activity among young girls, and (3) Iatrogenic infections resulting from medical procedures i.e. infections introduced in reproductive tracts by badly

Anjali Radkar, Professor, Gokhale Institute of Politics and Economics, 846, Shivajinagar, BMCC Road, Pune 411004. E-mail: anjaliradkar@yahoo.co.in

managed childbirth, IUD insertions or unsafe abortions.[3]

It is seen that in the population between 10 and 60 percent women suffer from RTIs.[4] In developing countries, research is needed on women's perceptions of RH condition in order to design better instruments to measure RTIs at the community level;[5] though, few community-based studies have been conducted to find out about RTIs, to understand levels and patterns of gynaecological problems. Bang et.al.[6,7] have carried out pioneering work on these issues in 1989 and in 1996. Some more names from India are Bhatia and Cleland,[8] Parikh et.al.,[9] Mulay,[10] Oomann[11] as also Lien and colleagues[12] from Vietnam and Nashid and Rumana[13] from Bangladesh. Sadhu et. al[14] documented reproductive morbidity of women belonging to weaker section of population in Calcutta. Although these studies were conducted on a small-scale with lesser coverage, they are important. To get information on a larger scale, an effort has been made in India for the first time to collect information on reported symptoms of RH problems of women in the National Family Health Survey–2 (NFHS–2).

Information about sensitive issues like RH problems in the general community is difficult.

However, one can confirm the information by these three ways: 1) clinical examination; 2) reporting of symptoms; and 3) laboratory testing. Among these three methods, laboratory testing is the confirmatory test and is important as it endorses the RH problem. However, the test is prohibitively expensive to be conducted at a national or state level. Parikh et.al.[9] conducted a study in the slums of Mumbai and found the gynaecological morbidity to be 73 percent. They clinically examined the women and did not find major difference between reported symptoms and clinical examination. Mulay,[10] worked on RTI related problems in Pune slums. The prevalence of RTI was 39 percent. Among the five slums studied in Pune, all the women from one slum were clinically examined to study whether there is any discrepancy between reported symptoms and clinical examination and observed no difference between the two. These two studies encourage an exercise to look into the data where, women report their RH problems.

Objectives of the study

- To understand the extent of RH problems of women in Mumbai residing in slums and those who do not reside in slums
- To understand the differentials in prevalence of RH problems in these two groups by their background and living conditions
- To search for the causes of higher prevalence of RH problems among slum women

Methods

This study uses the data from the National Family Health Survey (NFHS–2), where detailed information about various symptoms associated with reproductive health problems, apart from other maternal and child heath related issues, is collected from 89,199 women in the reproductive age group from 91,196 households across 25 states of the country.

As regards, RH problems, from ever-married women in the reproductive ages, exact symptoms recorded are -

- Any abnormal vaginal discharge
- Vaginal discharge accompanied by itching or irritation, bad odour, severe lower abdominal pain, fever or any other problem

- Symptoms of urinary tract infections
- Painful intercourse (often)
- Bleeding after intercourse (ever)

Information on last two issues listed above is collected only from currently married women. Thus, to include all the RH problems the study is focused on currently married women. The symptoms listed above pertain to RTI. Those who have reported at least one symptom have RTI.

In the NFHS–2, Maharashtra, information from the slum residents of Mumbai, the state capital, is specifically collected and presented, considering the large share of slum population there. Character of overall urban residents is represented by both, those who reside in slum areas and those who reside in non-slum areas. Therefore, it is worthwhile to explore the differentials in the health problems women in slum and non-slum face.

In Maharashtra, 5391 (2229 urban, 3162 rural) ever-married women in the reproductive ages are interviewed, out of which 4963 (2044 urban, 2919 rural) are currently married. Efforts have been made to report and analyze the data separately for slum and non-slum population. In Mumbai 682 ever-married women (636 currently married) are interviewed. Among these 636 women, 366 (57.5 percent) are slum residents and 270 (42.5 percent) are from non-slums. According to the report, 40 percent currently married women face at least one RH problem in Maharashtra. Similar percentage is much more for Mumbai (54.3 percent). Break-up shows, women in slums of Mumbai (64.6 percent), face significantly more RH problems compared to those in non-slums (40.3 percent). The gap is wide to be explored.

To explore the differentials in the RH problems by various background characteristics of women residing in slum areas and women residing outside the slum areas Chi-square test is used.

Results

Mumbai is densely populated crowded city with over 42 percent population residing in slums. Quality of environment in shanty settlements of slums affects health status of its dwellers. The factors in terms of availability of basic services such as water supply, drainage, provision and maintenance of latrines, per capita income of household, occupational characteristics and education of women determine the practices of diet, health status and overall hygiene. Apart from other health problems and infections associated with unhygienic conditions and crowding, women suffer from RH problems.

RTIs are associated with abnormal foul-smelling white discharge along with pain in lower abdomen and itching and irritation around vagina. Urinary infection is also a major complaint under RTI. Other severe symptoms include intercourse related pain and bleeding. At least one symptom is reported by 237 currently married slum and 109 non-slum women.

Table 1

Percentage of currently married women reporting at least one symptom of RTI by type of symptom and place of residence

Symptoms	Slum	Non-slum
Abdominal pain	41.3	50.2
Itching / irritation*	44.7	33.0
Bad odour	12.7	11.1
Pain or burning while urinating**	46.0	30.3
Pain during intercourse	16.0	14.7
Bleeding after intercourse	2.1	1.9
Other problems	55.7	52.3
Fever	18.2	12.0
Currently Women with at least one symptom	**237**	**109**

** Significant at 5 % level of significance*

Extent of RH problem among currently married slum women is 64.8 percent as against 40.4 percent among non-slum. Women suffering from RTI, reported 'other problems' as the highest in both slum and non-slum areas. The data does not specify 'other problems'.

Among women residing in slums pain/burning while urinating is the most reported symptom followed by white discharge along with itching/irritation around vaginal area and abdominal pain. Such a large extent of these symptoms point towards behavioural aspects and living conditions of slum dwellers. This could be attributed to unhygienic practices and lack of cleanliness. Significant difference among women who reside in slums and those who do not reside in slums is observed in reporting itching/ irritation as also the pain and burning while urinating. Pain during intercourse is reported by 16 percent slum and 15 percent non-slum women. Bleeding after intercourse– a more severe symptom– is reported by two percent of them.

Among women who reside in slums, abdominal pain is reported most followed by itching/irritation and urinary infections. In the study conducted in Pune slums, vaginal discharge is reported by 30 percent respondents and abdominal pain during intercourse by 11 percent.[10] Extent of white discharge was reported by exactly the same proportion of women in Mumbai slums while pain and burning during urination is reported by just six percent of them in the study by Parikh et.al. [9]

Number of symptoms

The symptoms of RTI are irritable and majority of the women face them in multiples. Apart from the individual symptoms, an effort has been made to compute number of symptoms women have reported, in both slum and non-slum areas.

For Mumbai average symptoms are 2.30.

Table 2

Percent distribution of number of RTI symptoms in currently married women having at least one symptom of RTI by place of residence

Number of symptoms*	Slum	Non-slum
1	30.0	43.5
2	27.0	29.6
3	22.8	17.6
4	12.2	6.5
5	5.5	1.9
6	2.1	0.0
7	0.4	0.9
All symptoms	100.0=237	100.0=108
Average symptoms	2.45	1.97

** Significant at 5 % level of significance*

Among those who suffer from RH problems, 30 percent women who reside in slums have only one symptom, compared with 43 percent in women who do not reside in slums. It means 70 percent slum women face multiple problems. As seen, the number of RH symptoms in women from non-slum areas reduces steeply after two symptoms; however, it reduces gradually in women residing in slums. Overall 22 women report five or more symptoms. Out of these 22 women, 19 are slum dwellers. Average symptoms of RTI for slum and non-slum women are 2.45 and 1.97 respectively. The extent of RH problems is more in slums as also its severity. The difference in the average number of symptoms for slum and non-slum women is statistically significant. Non-slum women suffer less from RH problems than their slum counterparts.

Background characteristics

To get an idea about the differentials in prevalence of RTI by various characteristics of women in Mumbai in slum and non-slum areas data are presented in Table 3.

TABLE 3

Percentage of currently married women reporting at least one symptom of RTI by relevant background characteristics and place of residence

Background characteristics	Slum	Non-slum
Religion		
Hindu	63.1	40.1
Muslim	70.3	50.0
Other	54.8	36.4
Caste		
S.C./S.T./Backward	63.6	48.2
Other	64.8	38.5
Standard of living		
Low	71.4	100.0
Medium	66.4	40.0
High	60.3	39.8
Education of woman		
Illiterate	67.5	48.1
Less than middle school	64.3	41.2
Middle school	64.0	48.6
High School or more	60.0	37.2
Occupation of woman		
Not working	65.1	39.4
Higher level jobs	55.6	41.7
Lower level jobs	66.7	42.9
Reads newspaper once a week	**	
No	69.8	49.1
Yes	58.0	38.0
Listens to radio every week		
No	68.4	46.6
Yes	60.5	37.4
Watches TV every week		
No	67.2	46.2
Yes	64.2	39.8
Age of woman		
15-19	70.8	50.0
20-29	66.7	42.3
30-39	65.6	42.0
40-49	53.6	36.4
Age at marriage		
Less than 15	61.0	46.2
15 to 17	66.7	46.3
18 years	62.3	40.0
19 or more	64.8	38.4
Current use of contraception		
Not using IUD or not sterilized	63.7	39.7
IUD	78.6	31.6
Female sterilization	65.0	41.9
Children ever born		
No child born	69.2	45.9
1 or more children born	64.2	39.5
Induced abortion		
No	64.2	39.3
Yes	69.6	50.0
Spontaneous abortion		
No	64.5	40.3
Yes	65.5	40.6
Incidence of stillbirth		
Yes	64.6	40.2
No	64.7	40.0
Beating in past 12 months		
No	64.2	40.2
Yes	69.2	50.0
Decision-making in obtaining healthcare		**
Respondent	61.4	33.1
Jointly with somebody	58.5	36.7
Others	70.9	57.1

** Significant at 5 % level of significance*

*** Significant at 1 % level of significance*

Prevalence of RTI is seen significantly more among Muslim women irrespective of their residence and differentials by caste are seen in non-slum areas only. Prevalence of RTI gradually lowers as standard of living improves. Educational levels do not depict any trend in prevalence of RTI, but the illiterates suffer more compared to higher educated ones. Majumder[15] also reports that RTIs are more among Muslim, illiterate women.

The prevalence of RTI is less in women who reside in slums and have higher level jobs like professionals, technical, administrative, clerical, sales or services compared with in lower level jobs like skilled or unskilled labour and household and domestic workers. No differentials are seen in non-slum areas by occupation. It is also seen that women who have exposure to any form of mass media – newspaper, radio or television – prevalence of RTI is less in both slum and non-slum areas.

Two most important demographic variables, current age of woman and age at marriage – proxy to sexual debut - do not establish any concrete relationship with prevalence of RTI in slums. However, among non-slum women prevalence of RTI goes down steadily as age and age at marriage increases. The same is observed by Majumder[15] in Mumbai. Contrary to this Nashid and Rumana,[13] found that older women report RTIs more.

Among other demographic variables children ever born show that those who don't have any children reported more problems than those who have. No child may mean younger women and prevalence of RTI goes down with age. There is also a possibility that women may not become pregnant because of an RTI. It is observed in another study in Mumbai slums that childless women experience considerably higher rates of endogenous infections.[9] On the similar lines it is seen that those experienced foetal wastage report more RH problems. The difference is more for women who have undergone induced abortion than those having experienced spontaneous abortion or stillbirth. Here is the possibility of iatrogenic infections. However, one cannot establish conclusively that in case of childlessness or foetal wastage, what is the cause and what is the effect.

Insertions of IUD and / or sterilization are two other possibilities when woman can catch infection if not handled carefully. RTIs are moderately more evident among sterilized women and those using IUDs than any other group.[9] It is seen here that women residing in non-slum areas prevalence of RTI is reported the most by sterilized women as against in slums by IUD users.

RH problems are related to sexual practices so if the status of woman is higher and if she can discuss and/or assert her views related reproductive choices or health problems then the extent and intensity of RH problems would be less. To know about the status, data on role of woman in decision making in obtaining healthcare, and whether experienced beating in past 12 months was analyzed. It is seen that the prevalence of RTI is more when women have no role in decision-making, or they face beating in both slum and non-slum areas. It is seen that 30 women experienced beating in past 12 months of which 26 reside in slums. Out of these 26 women 18 have reported RH problems.

Living conditions

RTIs are associated with lower socio-economic conditions of the respondents.[16] However, in Mumbai the respondents are a homogeneous group among themselves in both slums and non-slums so no significant differentiation in prevalence of RTIs is observed by most of the background characteristics. Further, an attempt has been made to gauge the prevalence of RTI by living conditions.

If we wish to explore more about the higher prevalence of RTI in slums, we need to look into the surroundings in which they live, whether they have enough privacy and facilities to maintain the personal hygiene. To examine the differentials in prevalence of RTI, indicators of living conditions used are type of house, number of persons per room and water and toilet facilities.

Type of house is an important indicator of economic status of the family as there is a tendency to move from temporary structure to permanent as income of the family grows. Significant differentials in prevalence of RTI are observed in slums by type of house.

TABLE 4

Percentage of currently married women reporting at least one or no symptom of RTI by living conditions and place of residence

Living conditions	Slum	Non-slum
Type of house	*	
Permanent structure	49.3	78.7
Semi- Permanent structure	47.8	20.2
Temporary stricture	2.9	1.1
Water facility	**	**
Private	59.1	93.6
Public	40.9	6.4
Toilet facility	**	**
Private	7.2	55.0
Shared	5.5	22.0
Public	87.3	23.0
Persons per room		
1 to 3 persons	39.8	67.9
4 or more persons	60.2	32.1

** Significant at 5 % level of significance*

*** Significant at 1 % level of significance*

It is seen that those who stay in non-slum areas, only 6 percent reported not having a private water connection compared with 59 percent in women who reside in slums. The data does not provide information on whether the water they get is sufficient to maintain personal hygiene.

Toilet facility is yet another indicator of community and familial hygiene. Private toilet facility is available for more than half the non-slum women whereas these percentages are much less (just 7 percent) for slum women. It has come out clearly that those who use public toilets face RTI more than their private or shared toilets users' counterparts. Nashid and Rumana[13] also report that RTIs are more for the women who have to walk more than 10 yards for the toilet and where garbage disposal is not proper. In Mumbai slums, garbage disposal is always a major issue.

Number of persons per room gives an idea about the crowding in the house. Though, RTI is significantly more in slums than in non-slum areas, no variation by crowding in prevalence of RTI is observed in both these areas. In Mumbai acquiring a place to stay is difficult because of the high costs, therefore it is likely that as many persons stay in available small space. Thus, crowding is a common phenomenon of Mumbai and not particularly of slums or of non-slums.

DISCUSSION

It is seen in the earlier studies by Kanitkar and Radkar[16] and Parikh[9] that RTIs are related to background characteristics of women. The infections can be through sexual intercourse, endogenous or iatrogenic.

RTIs in the slums are not related to their demographic characteristics. They are also not significantly associated with the instances where there is a possibility of catching iatrogenic infections because of IUD, sterilization or abortion. In case of spontaneous abortions, unhygienic methods might be used and/or during induced abortion, there is a known possibility of infection considering the process.

Living conditions is yet another aspect, differentiating very significantly in two groups. Housing conditions of slum dwellers are certainly worse than that of non-slum dwellers. In slums more houses would come under category of *kachha* or semi-*pucca* houses, which is not the case with non-slums. However, in Mumbai, problem of housing space and thus of crowding is universal. Even in non-slum areas houses are small and crowded. Considering Mumbai, provision of civic amenities like water supply becomes responsibility of Municipal Corporation. Thus, both slum and non-slum dwellers have access to piped water within the house and if not, within the plot. However, this data set does not provide any information about whether the water

they get is sufficient to maintain personal cleanliness. In the course of discussion about living conditions, another important aspect is toilet facility. Infections are lower among those who have their own toilets, compared with those who share the toilets. Sharing toilets in slum means household is on a lower side of standard of living.

Thus, overall RTIs do relate to living conditions and thus the hygiene, which is not or rather, cannot be followed. Information about menstrual clothes is not available in the NFHS–2 that could have shed more light on hygienic status of women and thus about endogenous infections.

More RTIs in slums can also be explained in four ways -

1. RTI is a sensitive issue and its reporting might be less. Women can easily hide this information. Whether non-slum women have hidden this information and slum women have talked about it openly probably because of fewer inhibitions as all their daily chores as also their life is more open? There is also a tendency that poor report their problems in the hope of getting some help or benefits from public sector.
2. Considering the housing space and crowding, there is no enough privacy for a couple and then there is a possibility of unhygienic practices. Living conditions thus are responsible for higher incidence of RH problems. In this study, data on the bathroom facility is not available which also would have explained more about the personal hygiene.
3. Living conditions are related to economic status and economic status to nutritional status. Poor nutritional status in lower income strata can lead to lesser immunity to combat infections.
4. Another important issue, for which the NFHS-2, does not provide any data, is about unsafe sexual behaviour. Condom use is less both in slums and in non-slums. So, restricting infections using condoms is not the case with both the groups. Looking at prevalence of RTI can one say whether multi-partner sex is more among slum dwellers than among non-slum dwellers?

Thus, if anybody wants to explore on more RTIs in any specialized group, there is a strong need to have data about the sexual practices of both the partners.

Conclusion

RH problems are reported by significantly higher proportion of women in Mumbai as a whole and more so in slums than those in non-slums. This study assumes importance on the backdrop of comparatively high incidence of AIDS in Maharashtra, within it in Mumbai and within Mumbai in slums. HIV infection can be sequel of STIs, which is a sequel of RTIs.

Urinary infections and abnormal white discharge with abdominal pain and itching/irritation around vaginal area are the most common symptoms of RTI among slum women. A higher proportion of slum dwellers have multiple RH problems compared with non-slum dwellers.

Looking closely to data set it has been revealed that in Mumbai, the correlates of the reproductive problems are not as much the social characteristics, or the status of women as seen for the women in India. Here exposure to print media has turned out to be important factor to explain the prevalence of RH problems among slum women. Among non-slum women, the important predictor is role of woman in decision-making about obtaining health care in case of illness.

The associated variables in this study pertain to living conditions of slum

women and their lower immunity to various infections. The most important variable that explains higher RTIs is type of toilet facility. Those who do not own the toilet suffer more from RTIs. These are the lowermost people on the ladder of standard of living. Hygiene does have a role in explaining RTIs.

Foetal wastage is observed to be more among slum women than among non-slum women. Association of foetal wastage and RTI is more evident, in case of slum women.

However, to conclude, information about sexual behaviour is necessary. The results stress the fact that RH problems are extremely high among the slum population and thus constitute major public health problem. These have not been adequately addressed within current programs. Results express the need for greater attention to and investment in the RH needs of poor Indian women.

References

1. Institute of Health Management Pachod, Pune. 2000. Census of slums, Pune.
2. Pachauri, S. 1995. Defining reproductive health package for India: A proposed framework, South and East Asia regional working paper, No. 4, 1995, The Population Council, New Delhi.
3. Wasserheit, J. and Holms, K. 1992. Reproductive tract infections, challenges for international health, policy and research, In: Reproductive tract infections: Global impact and priorities form women's reproductive health (Eds.) Germain, A., Holmes, K., Piot, P. and Wasserheit, J., Plenum Press, New York.
4. Population Council. 1997. Population Brief, Population Council, New Delhi.
5. Tsui A.O., Wasserheit, J.N and Hagga, J.G. 1992. Reproductive health in developing countries, Expanding dimensions, Building solutions. National Academy Press, Washington D.C.1997.
6. Bang, R.A., Baitule, M., Chaudhury, Y., Sarmukaddam, S. and Tale, O. 1989. High prevalence of gynaecological diseases in rural Indian women, Lancet, 1(8629):85-88.
7. Bang, R. and Bang, A. 1996. A community study of gynaecological diseases in Indian villages: Some experiences and reflections. In: S. Zeidenstein and K. Moore (eds.), Learning about Sexuality, New York, The Population Council, pp. 223-237.
8. Bhatia, J.C and John, C. 1995. Self-reported symptoms of gynaecological morbidity and their treatment in South India. Studies in Family Planning, 26(4):203-216.
9. Parikh, I., Taskar, V., Dharap, N. and Mulgaonkar, V. 1996. Gynaecological morbidity among women in Bombay slum. Streehitakarini, Mumbai, India.
10. Mulay, S. 1999. Assessment of reproductive tract infections in slums of Pune city, unpublished report.
11. Oomman, N. 2000. A decade of research on reproductive tract infections and other gynaecological problems in India, What we know and what we don't know. In: Radhika Ramasubban and Shireen Jejeebhoy (Eds.), Women's reproductive health in India, Rawat publications, New Delhi, pp. 236-279.
12. Lien, Phah Thi, Christopher Elias, Nguyen Thi Loi, Bui Thi Chi, Nguyen Hua Phuc and Michelle Gardner. 2002. The prevalence of reproductive tract infection in Hue, Vietnam. Studies in Family Planning, 33(3):217-226.
13. Nashid, K. and Rumana, R. 2004. Environmental risk factors associated with RTI / STD symptoms among

women in the urban slums. The Journal of Developing Areas, 38(1):107-121.

14. Sadhu, S., Bhattacharya, B.N., Majumdar, P.K and Mukherjee, K.L. 2001. Reproductive morbidity among women in weaker sections in Calcutta Metropolitan Area. Demography India, 30(2):167-191.

15. Majumder, Maitrayee. 2005. An in-depth investigation into the symptomatic approach of RTI/STI disease assessment: A case of slum communities in Mumbai, Seminar paper submitted for the partial fulfillment of the Master in Population Studies, Academic year, 2004-2005, International Institute for Population Sciences, Mumbai.

16. Kanitkar, Tara and Radkar, Anjali. 2004. Self-reported symptoms of reproductive health problems of women in India. Demography India, Vol. 33(2), July–December.

INDIA'S PLAN FOR POPULATION CONTROL AND ITS IRONY OF INHERENT GENDER INEQUALITY IN FAMILY PLANNING PROGRAM

UJJWALA GUPTA

INTRODUCTION

India has a history of efforts in stabilizing the population growth. The First Five Year Development plan 1952-57 recognized the need for population stabilization which was straining our limited resources. Based on the agenda of Health and Family Welfare, the plan advocated the need of family planning through limiting the family size and spacing between children. India became first in the world to officially launch National Family Program in 1952. Population stabilization gained attention when the First National Population Policy was framed in 1976. The population census saw a spurt in growth by 483 million from 1952 to 1991 and hence attracted the attention of demographers, policy makers and program managers. Birth rate goal became urgency for India in front of world and in response to this, targeted approach by means of including new acceptors of family planning were used as a direct way to control the growing population.

The International Conference on Population and Development (ICPD), Cairo in 1994 provided a platform to debate on the views of researchers and policy makers towards improved quality of services as well as equality to women in area of family planning beyond their rhetoric accomplishments. It was noted that the entire world and not just hooked up with the patriarchal idea[1] of women having sole responsibility to curb the growing population being apathetic to the security and aspirations of women. Hempel[2] recognized the role of women not just as beneficiaries of the services but also as active change agents.

Ujjwala Gupta, Doctoral Student, Department of Development studies, Institute for Social and Economic Change, Bengaluru- 560072, Karnataka, Email- usgupta@isec.ac.in; ujjwalagupta10@gmail.com

The ICPD 1994 *Program of Action* - basis of action (paragraph 4.24). It is an important precondition of all governments to promote communication and programmatic strategies that develop understanding of joint responsibility. The Objective set in front of the world partners was –

"To promote gender equality in all spheres of life, including family and community life, encourage and enable men to take responsibility for their sexual and reproductive behavior as well as their social and family roles" (paragraph 4.25).

The conference marked a fundamental shift in the outlook of people towards measures to be taken by government in addressing gender inequalities. The conference succeeded in recognizing that quality family planning services must be integrated with counseling and access to affordable contraceptives making it target free approach.

With this, Government of India as part of its Ninth Five Year Plan (1997-2002) articulated National Population Policy, 2000 with demographic goals to be achieved by 2010. The population policy considered as medium to promote contraceptive usage and each of family planning program family planning initiatives taken by the family planning completely subsumed as part of reproductive child health program under Ministry of Health and Family Welfare. Tenth Five Year Plan (2002-2007) integrated all the vertical health programs (Family planning, maternal and child health) into health care for mother and child under National Rural Health Mission and by the next five-year plan Family planning was completely conceptualized as voluntary regulation of fertility. Twelfth Five Year Plan (2012-17), has included multiple priorities including women empowerment and men's involvement in Family Planning. This effort of the Indian government was aided by external agencies like UNFPA, USAID; they provided financial aid and supply of contraceptives to push this transformative program. UNFPA is the world's largest provider (40%) of donated contraceptives (UNFPA, 2017).

To bring down the birth rate there is a felt need of convergence of social sector and community participation including men and women rather than mere promoting for contraceptive services as a part of family planning program.[3] With this argument my paper is an attempt to assess India's planned programs and policies under Family Planning understand it from women's perspective; and to understand the reasons behind the dilution of our primary objective even after such long standing efforts. A summary of indicators has been made that also reflect family planning services as per National Family Health Survey (NFHS) 2015-16 in Table 1.

Table 1

Indicators reflecting attainment of family planning services as per NFHS- 4 (2015- 16)

Contraceptive Prevalence Rate (CPR) (%)	Unmet need of family planning (%)	Having No demand for Family Planning (%)	Demand for * Family planning * Spacing method (%)	Using at least any modern method of contraception (%) * Female sterilization * IUD/ PPIUCD * Condom	Not using any method of contraception (%)	Knowledge of contraceptives (%) * Female sterilization * IUD/ PPIUCD * Condom	Want no more children (%)
54	13	34	* 66.4 * 11.1	46.5	97.8 * 96.0 * 70.8 * 79.1	31.9	

Source: National Family Health Survey of India (2015- 16), IIPS, Mumbai, India.

According to the data, almost 32% of women do not want any more children and 47% are not using any contraceptive; however, the knowledge of contraceptives is very high (98%). Notably, there is no data for abstinence as a natural form of control. Female sterilization or tubectomy was the most commonly heard (96.0) and frequently used (36.0%) as compared with other modern methods. The survey also finds that IUD is less heard and less used. This points towards a probable reason for CPR at all India level being low (54%). It is also indicative of the fact that most of the contraceptive use is by the heavy promotion of government on female sterilization. Female sterilization during NFHS- 3 accounted for 37.4% and it has come down to only 36.0% in NFHS- 4.

This undoubtedly, draws our attention to the missing link, to go beyond socio-economic indicators, and understand the reasons for the current situation. Since inception i.e. during 1960's had been pushing small family norm to service providers as well as the beneficiaries through various incentives and disincentives at both ends. Incentives for sterilization included are in form of direct financial benefit of Rs 1600/- for female sterilization and Rs. 2500/- for male sterilization (the amount varies state to state), allotment of land plots, wage loss compensation for Intra-Uterine Contraceptive Device (IUCD) adoption. The disincentivization policy has included reduction in maternity benefits after 3 children, exclusion from contesting election, and elimination from many government-based programs. This is the "carrot and stick" policy of government; *Carrot* being reward given in form of types of incentives and *Stick* as punishment of disincentive. During 1970's the push for involuntary vasectomy i.e. male sterilization led to collapse of the government; the target population shifted to women during 1980's with the introduction of new technology of laparoscopic female sterilization. In the current Union Budget 2018, the government only allocated 4% of the budget to Family Planning from National Health Mission, reproductive and child health flexi- pool. The government's policies continue to be highly skewed and liberal in spending approximately 40% of finance in providing incentives to motivators (who are both government workers and the non-government counter parts) and women as clients for sterilization. The Financial Report of the year 2016 - 17 proves that almost 64% of the financial outlay of Family Planning program is taken away by sterilization and only 3.7% of the fund goes in utilization of other reversal methods.

Notably, the quality of family planning services is an issue where knowledge of women about their own body is lacking and many other juxtaposed issues like: 12.5% of birth interval being < 24 years, mother's nutrition, and their own confidence of child's survival also plays a significant role. Female sterilization limits the choice of women to revert in case they suffer from child loss; this curbs their reproductive rights. The demand for family planning is 66.4 % and the demand for spacing services is just 11.1 %. This narrates how the family planning program is being perceived and emphasized by government for sterilization of women. It seems that the spacing method is failing to achieve the targets, is much more complicated and requires a continued motivation from both services providers as well as community. Is that not denying women from having the number of children they wish to have? Are we not stigmatizing women for reproducing children irrespective of the religious and cultural group they belong to? The way India is going is when female sterilization has become the foundational basis of India's entire family planning program. Despite all controversies, sterilization has

remained the most common method of family planning and FP 2020 has opened doors for external funding aid including USAID, BMGF, UNFPA, Future's group International and several other private funding agencies.

Irony of sterilization is a little wonder and has been discussed quiet often.[4,5,6,7] Media is flooded with odious stories of female sterilization being performed in massive campaigns to reach the monthly targets given to health staffs and in a higher extent to improve demographic indicators. Chhattisgarh being the most recent example of the disastrous event of mass sterilization camp they reported deaths of 15 women due to careless surgeries performed by doctors in ultimate unhygienic conditions. Highly unplanned and uncoordinated campaigns scrupulously motivated by monetary incentives almost coercively push women to undergo "involuntary" sterilization. Women from low caste, scheduled tribes from poor background are the worst hit by the biased information given through the government health workers supported by NGO volunteers at community level. Apprehension and lack of trust on reversible methods as well as on health services[7] may make sterilization the best option to restrict further birth for women. External agencies - SIFPSA and USAID - played specific key roles in states like in Jharkhand, Bihar and Chhattisgarh during 2012 in conjunction with Reproductive and Child health program of government under a flagship name of "*Pariwar Swasthya Sewa Diwas*" or "*Family Health Day"*; persuaded young women through several lucrative and innovative incentives including free of cost mobility and check- up by gynecologists to undergo sterilization.

Beyond sterilization, after the London Summit in 2012, new commitments were made to accelerate the progress of family planning programs. The focus was on 179 partner poor performing countries including India. To attempt reducing birth rates there was an expansion in choices of contraception in form of contraceptive implants and injectable vaccines with partners such as Bayer Health Care's Jadelle, MSD's Implanon and Implanon NXT who guaranteed their availability at low rates. In India, the Ministry of Health and Family Welfare launched injectable contraceptives; this is DMPA and distributed as "Antara" and Centchroman - "chhaya" . This has been very affirmatively accepted by Union Ministry of Health and Family Welfare, Government of India. It strongly advocates its use in the newly bred Mission "Parivar Vikas". Promoting injectable contraceptives – which is claimed to be highly effective, safe and easy for use, and not necessarily dependent on partner's cooperation - has increased the number of choices in the basket of choices. However, the sad question is: Who are the clients for this method AND whether the method has been tried and tested to understand its efficacy and effectiveness in Indian conditions? Nonetheless, today it has been rolled out under super big banner of Government Family Planning program supported by Bill and Melinda Gates Foundation. NFHS data suggests, knowledge of injectable contraceptives in rural (66.1%) and urban (75.6%) though fairly high among married women but contrarily its use is meager and has also not raised much across the years which is reflected from NFHS-3 (0.2%) to NFHS- 4 (0.3%).

In our country where barely any medical standards of safety and hygiene are maintained, no prior check- ups and counseling done, health staffs scarcely get their trainings updated and their performance monitored in field, health as well as nutrition conditions of women as "clients" are poor and they not have role even at family decision making; can using a sub- dermal implant or a syringe

be taken lightly at such a massive scale? The effects on women who are already in a vulnerable state needs to be seriously thought of before it really gets too late and leads to another serious disaster, violating not only their reproductive rights but also posing a grave health hazard. Furthermore, contraindications and associated side effects of the contraceptive drugs are neither discussed in the counseling of health service providers nor mentioned on their package. The entire focus is on the promotion of the product.

Evidently, our National Family Planning program has become exclusively for women. The "basket of choices" which the program recurrently refers is mostly for women to adopt and only very few are for men like: male condom and Vasectomy. Whatever the reason behind these but eventually burden of the program is on women and any reduction in the indicators are hailed as victory for program and their leaders. The fertility reduction has manifested as such shown in Table 2 (from the period of NFHS 1 to NFHS 4):

Table 2

Total Fertility Rate and Age Specific Fertility Rate

	NFHS-1	NFHS-2	NFHS-3	NFHS-4
Total Fertility Rate (TFR)	3.4	2.85	2.68	2.18
Age specific fertility rate (ASFR)				
15- 19	0.116	0.107	0.090	0.051
20- 24	0.231	0.210	0.209	0.184
25- 29	0.170	0.143	0.139	0.128
30- 34	0.097	0.069	0.062	0.051
35- 39	0.044	0.028	0.025	0.017
40- 44	0.015	0.008	0.007	0.004
45- 49	0.005	0.003	0.003	0.001

Source: National Family Health Survey (1992- 93; 1998-99; 2005- 06; 2015- 16)

But, does this also mean that there is an improvement in other indicators of maternal health? Evidences from NFHS, shows that fertility both in terms of Total Fertility Rate as well as Age Specific Fertility Rate has reduced from the year 1992 to 2015. The situation is the entire country goes up and down; FP2020 has been launched with emphasis in selected states and poor performing districts have been targeted. Such targeted approaches do not have a single solution for the current over arching fertility rates, making women as targets for these programs.

After reviewing several facts, figures, dialogues, commitments and conference proceedings in my own terms, I find that the program has been highly unsuccessful and has failed to empower women to really take up a stand in choosing a method for contraception. Women must opt for contraceptive method of their need, knowing that high fertility always has a debilitating effect on mother, child and community at large. This requires proper coordinated and planned efforts, not initiating with coercion, and keeping that program gender aware rather than gender blind.

Finally, load of sexually transmitted and reproductive morbidity of women should not be ignored. NFHS- 4 data reveals "Self Reported" cases of STI is 11.1%; it is quite likely that it may be higher. As suggested by evidences from latest round of NFHS data, immunization (86.5%), family planning (17.5%), supplementary food for children (30.5%) and treatment for sick children (20.8%) were the most commonly discussed reasons for contact with the health care workers. There is no context in which reproductive morbidities find any space in discussion with family planning services. This highlights a wide gap in family planning services, where women are coercively persuaded to accept the sterilization in a mass camp without cross examining and treating them for symptoms of reproductive morbidity,[8] leading to aggravated diseased conditions for which the government

doesn't take responsibility. Ultimately, women are again the victims, for their inability to support their illness and finding themselves burdened with repeat pregnancies or other situations like reversible contraception.

Conclusion

Despite all the success that family planning program has been talking about demonstrating changes in demographic indicators, eventually they are women centric, controlled and procedured by planners. There is a felt need to enhance the quality of services not just at the point of its operation but right from the beginning of accessing felt need and being aware of their present status. There is enough room to consider in what ways this national level program that is putting its entire weight on women can truly be made a balanced gender aware plan. The need of the hour is, India needs to rethink of its population goals which seem far reaching and no doubt at the cost which is taken up by women.

References

1. Caldwell, J.C. 1996. The International Conference on Population and Development, Cairo, Is its Plan of Action important, desirable and feasible? Forum: Health Transition Review 6, 71 – 122.
2. Hempel, Margaret. 1996. Reproductive health and rights: origins of and challenges to the ICPD Agenda In: The International Conference on Population and Development, Cairo, Is its Plan of Action important, desirable and feasible; Forum: Health Transition Review 6, 73 – 85.
3. Ghosh, A. 1991. Eighth plan: Challenges and opportunities-XII. Health, maternity and child care: Key to restraining population growth. Economic and Political Weekly, 26:1017-1022.
4. Narayana, G. and Kantner, J.F. 1992. Doing the Needful: The Dilemma of India's Population Policy. Boulder, Colorado: Westview Press.
5. Ravindran, T.K. Sundari. 1993a. Users' perspectives on fertility regulation methods. Economic and Political Weekly, Nov; 13- 20.
6. Ravindran T. K. Sundari. 1993b. Women and the politics of population and development in India. Reproductive Health Matters, 1: 26-38.
7. Muttreja, P. 2017. India spends 85% of its family planning budget on sterilization of women: Report. The Pioneer. October 30.
8. Bhang, et. al. 1989. High prevalence of gynaecological diseases in rural Indian women. The Lancet, 337 (14 Jan):85- 88.

PERCEPTIONS TOWARDS MARRIAGE IN YOUNG ADULTS: A PROPOSITION FOR NEW MODEL OF MARRIAGE AS REFORMATION

SESHAGIRI RAO JOSHI AND C.VEERENDRA

Introduction

Marriage is the central phenomenon in the social world and yet a biopsychosocial model for marriage has to be developed. Marriage still remains the central tendency for human development among all societies. Eligible adults' gradual transitions into marriage and parenthood generally have greater scope for biopsychosocial model of health.[1] Many societies, no matter how modern or evolved, observe marriage to be inevitable aspect in one's lifespan. The choice to remain single or married is still open since centuries. Hence, it has become pivotal to know the current trends in the social values in marriage. Body of evidence show that marriage has benefits physical and psychological wellbeing.[1] According to a study done by Waite and Lehrer marriage and religion are two most important social institutions.[2] Sharma argues the essentiality of marriage in regard to social status in India.[3] They elaborate that marriage in India regulates sexual behavior, reproduction, nurturance, protection and consumption. Furthermore, marriage in India is not only between two individuals but two families. Arranged marriages are encouraged as it serves three purposes: primarily, it decreases chances of exogamy; secondly, from evolutionary perspective, it improves the chances of selection-effect over random selection, which might be regarded as risky. Finally, marrying is for psycho-economic security. In India marriage system is embedded in the religion, which seems to be loosening with the advent of matrimonial websites and cases of divorce. As marriage is central in one's life, it comes with many expectations from the young individuals to the families, which have been newly connected with the bond. In arranged marriages, it becomes

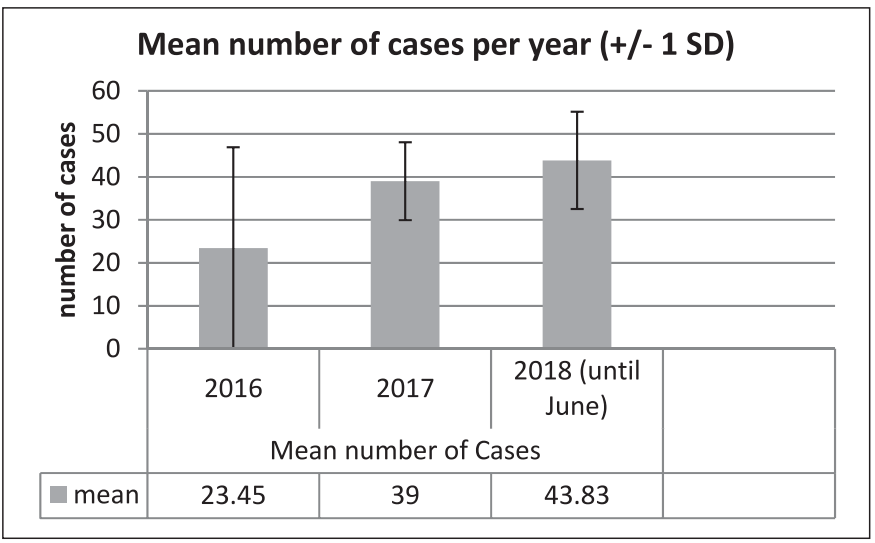
Seshagiri Rao Joshi, and C. Veerendra, Consultant, You & Me Clinic, 3-5-314, Vittalwadi, Narayanaguda, Hyderabad-500 029, Telangana. E-mail: rehabilitation.psychologist@gmail.com

stressful in the initial stages giving rise to 'shock' to the newly married couple. If this stress is not addressed early in marriage life eventually leads to psychological distress. Sharma recognizes that most of the time it is the women who are victims of the marriage, which eventually lead to mental illness in women relating to marital disharmony.[3] Carson and Jain report that globalization and modernization catalyzing the relationship difficulties in the couples.[4] Marital conflict drains away mental, physical and economic health. Marriages are vulnerable to a range of variables which can be categorized again in the above mentioned aspects i.e., economic, physical, mental and social. Premarital counseling could be one possible solution to decrease the stress that could eventually be created by the above said variables because premarital approach is fundamentally a preventive approach in that it involves people directly who would like to engage, and counseling creates a certain level of preparedness which would moderate the expectancy level in the would-be-couple.

You & Me is a counselling center in Hyderabad, Telangana. The services provided by the Center for marital counseling in 2016 were 247 and increased to 390 in 2017 and cases registered until June 2018 are 263. Figure 1 depicts the mean number of cases with +/- 1 SD.

Figure 1

Graph depicting cases per year in the clinic



The concern over the increasing number of cases reported to the center was recognized and it was decided to conduct current study, which tries to understand the attitudes and perceptions among university students. The study has been planned to be conducted in two phases. This paper presents the report of phase-1 of the two fold study. The goal of the study is to observe whether the population accepts transparency in the marriage process. To meet this objective the center developed six item checklist that it has identified as the "dispute contributing factors" during the interview with the cases within three years. The objectives of the present study: a) is to develop a detailed scale categorized into three areas:

a. attitude towards marriage; b. attitude towards acceptance for transparency in marriage process; c. attitude towards reformation in policy pertaining to marriage law.

'You&Me' consultation services propose a 'new-model' of marriage process for stable and sustainable future in married life. The proposal sites two advantages firstly, with transparency there would be informed consent in accepting the spouse and child rearing practices would be predictable as the parents would understand their strengths and weaknesses and they would choose the best fit in planning their child's future.

The Matrix of the New-Model recommends a 'fact-based-approach' towards marriage, in that both spouses are strongly encouraged to divulge their current status as per economic and employment security. Secondly, personality assessments to estimate the ego-strength, resilience to stress and general stability in life; finally, recommendations in reformations in policies to encourage 'New-Model Approach'.

Tools and Methods

The present work intends to demonstrate the perceptions of marriage in the young adulthood using a six item Likert-type scale. The extension of opinion ranged *from* 'strong disagreement '*to* 'strong agreement'. The study has been conducted in two phases: In the first phase, we developed a checklist consisting of six items, which targets the major aspects of misunderstandings between the couples. The six items checklist was found to be highly reliable with Cronbach's alpha to be .84. (6 items, α=.84). The data is primary and has been collected from University students who are pursuing graduation (225 females and 63 males). The age range is from 18-22.

As mentioned above the items in the above checklist were taken after careful review of 'major concerns' in the cases reported since last two years. It is interesting to note that even though the statements are clear and unambiguous there is a majority of sample which was unsure/ indecisive (neutral) in both the genders.

Table 1

Item responses on the basis of agreement vs. disagreement between males and females

	Females		Males		t	Df	Cohen's d
	(M)	(SD)	(M)	(SD)			
Strongly Disagree	21.47	16.86	10.47	4.92	4.30*	56	0.57
Disagree	39.14	15.87	10.5	3.77	12.24*	55	1.61
Neutral	61.51	22.34	12.34	3.65	14.96*	51	2.03
Agreement	66.82	20.7	14.5	4.45	17.26*	54	2.28
Strongly Agree	27.54	19.43	10.86	5.72	5.75*	58	0.75

*=p<0.05; Cohen's d: 0.1 small effect; 0.5 medium effect; 0.9 large effect

Table 1 depicts the overall disagreement to the statements vs. Agreement between two groups (male and female participants. There is significant difference between two groups with independent t test at .05 (p<0.05) with medium to large size effect.

Figure 2

Graph depicting the mean difference among the responses between males and females (SD=strongly disagree; D=disagree; N=neutral (can't say); A=agree; SA=strongly agree)

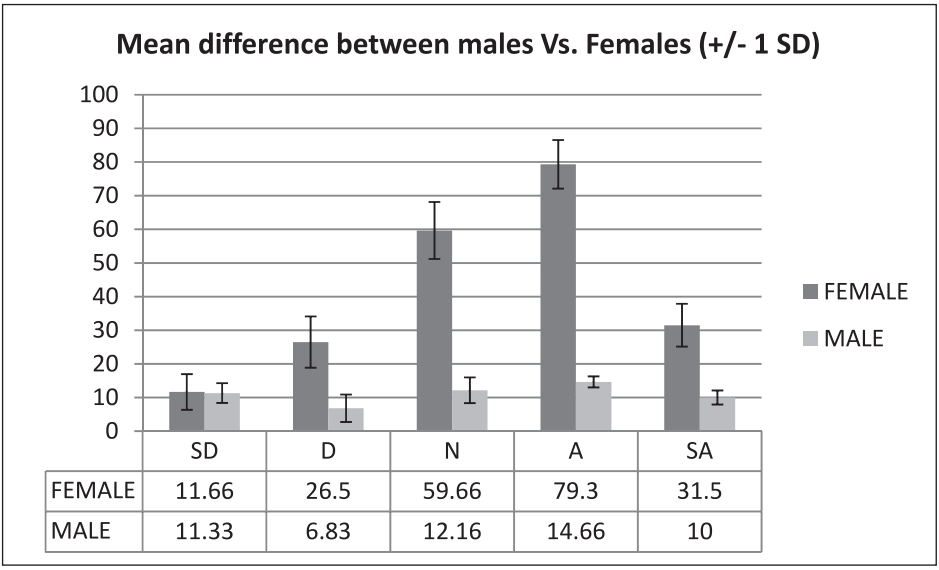


Table 2

Independent T-test for the difference in the means between males and females among the items a-f

Items	Females		Males		Df	T-test at 95% confidence interval
Do you think that the following will help in marriage process?	**Mean**	**SD**	**Mean**	**SD**		
a) Physical health reports like potency and fertility, HIV ,STDs, chronic ailments	0.168	0.08	0.184	0.10	8	0.79 (p>0.05)
b) Mental health reports like schizophrenia, paranoia, psychosis or intellectual disability	0.172	0.02	0.184	0.12	4	0.83 (p>0.05)
c) Financial statements like assets and liabilities	0.174	0.05	0.184	0.14	5	0.89 (p>0.05)
d) Legal/police inquiry on the family involved in any cases	0.178	0.05	0.186	0.11	5	0.89 (p>0.05)
e) Educational qualification of the bride and bridegroom from recognized university	0.17	0.08	0.186	0.14	7	0.81 (p>0.05)
f) Job status from HR of the company	0.176	0.06	0.186	0.13	6	0.88 (p>0.05)

Table 2 depicts no significant difference between males and females across the responses for items (a)-(f)

Table 2

Response in percentages for the item (a) between males and females

a) Physical health reports like potency and fertility, HIV ,STDs, chronic ailments					
	SD	**D**	**N**	**A**	**SA**
FEMALES	9%	9%	27%	31%	16%
MALES	27%	8%	9%	23%	17%

The scale asked whether disclosure of physical health reports like potency and fertility, HIV, STDs, and other chronic ailments would help in making a decision to marry (Table 2). The results show that 18% of females and 35% of males disagree to the statement and 47% females and 40% of males agree to the statement. Disagreement in males to the statement indicates the perception of disease conditions between genders. Gender differences influence the policies on how males and females respond to health policy system.[5] In most of the cases males are vulnerable to diseases than females and it is pronounced in patriarchic societies where women are left to support household and men are to go out and earn. Furthermore, disease condition is treated as weakness in such societies and there would be resistance even for medical intervention due to ostracism. Social stereotype of masculinity impress that males generally to be 'active' 'aggressive' and assume leadership.[6] This throws males to disadvantage to the indexed situation. Infertility, for instance, implies a sign of failure and can cause anxiety, loss of self-esteem, shame, and depression. Infertility diagnosis is a shock for most as they would not perceive themselves as infertile.[7] According to Masomi[7] 80% of marital conflicts and 50-60% divorce cases are filed due to infertility in Iran. Ganguly and Unisa studied the case of infertility according to age of first marriage and religious groups and report that according to National Family Health Survey-3 (2005-06) the overall infertility rate is 2.35%.[8] The law nevertheless provides provisions if there is any violation of information under The Hindu Marriage Act, 1955, Section (12)(c), which asserts marriage to be void if there is willful concealment of such information.

Mental health, according to World Health Organization (WHO), is a state of well-being where an individual realizes his/her abilities, can cope with normal stressors of life, can work productively and fruitfully, and is able to contribute to her/his community. This makes the second item (b) in the scale vital for e.g., Wilson and Oswald on the basis of body of evidence, argue that married people have an advantage of mental health over unmarried people.[1] The item in the scale asks whether disclosure of mental health history would help in making decision in marriage (Table 3). The results showed 18% disagreement vs. 46% agreement in females and 32% vs. 38% disagreement and agreement in males respectively. The disagreement (females=18% and males=32%) to the idea of reporting mental health status prior to marriage might be consistent with the description of Alpha bias, which occur due to social conditioning and power structure in the societies.[9] They define that Alpha bias observes male and female are different and opposite and Beta bias ignores the sex differences. Besides social stereotypy, the results question the awareness about mental health and its consequences among young people towards advantages of such information before marriage. The Hindu Marriage Act, 1955, Section 13(1) (iii) guides that marriage to be void if there is willful concealment of such information amounting to fraud supporting the idea of disclosure of mental health history by the both the parties before solemnizing marriage.

Table 2

Response in percentages to item (b) between males and females

b) Mental health reports like schizophrenia, paranoia, psychosis or intellectual disability					
	SD	**D**	**N**	**A**	**SA**
FEMALES	5%	13%	28%	34%	12%
MALES	19%	13%	16%	19%	19%

Marriage consummations over wrong information have increased in recent years (National Commission for Women (NCW)10 NCW reports the victims, mostly women from India, are harassed in foreign countries.[10] Daily Newspapers cites cases where prospective brides are lured with false information and then travel to foreign countries where they are harassed or Non-residential Indians marry in India and go incommunicado in foreign countries and leave their wives with in-laws who in turn harass in various ways. The most troubling trend, however, appears to be the easy dissolution of such marriages by the foreign courts even though their solemnization took place in India as per the Indian laws.[10] Complicated visa procedures by foreign Missions in India to deserted women to enable them to contest the proceedings filed by NRI / PIO husband in a foreign land add to the distress of the individual. The results for the items in Table 3 show that 15% of females vs. 27% of males disagree for the item c and 40% females and 34% of males agree for the statement. For item d the 22% females and 36% males disagree and 48% females and 34% males agree. For item e 14% females and 19% disagree and 58% females and 46% males agree and for item f 13% females and 24% females disagree and 52% females 39% males agree to the statements. The results seem to be indicating that males are showing more resistance to divulge information than females. The reasons might be social stereotype of community pressures or patriarchal power structure, which could lead to insecurity in the male subjects. The higher rate of agreement in females is not surprising as they are victims of the indexed situation.

Table 2

Response in percentages to item (c), (d), (e), (f) between males and females

c) Financial statements like assets and liabilities					
	SD	**D**	**N**	**A**	**SA**
FEMALES	3%	12%	32%	35%	10%
MALES	16%	11%	25%	22%	13%
d) Legal/police inquiry on the family involved in any cases					
	SD	**D**	**N**	**A**	**SA**
FEMALES	5%	17%	23%	36%	12%
MALES	14%	22%	19%	23%	11%
e) Educational qualification of the bride and bridegroom from recognized university					
	SD	**D**	**N**	**A**	**SA**
FEMALES	3%	11%	22%	41%	17%
MALES	16%	3%	20%	27%	19%
f) Job status from HR of the company					
	SD	**D**	**N**	**A**	**SA**
FEMALES	5%	8%	28%	36%	16%
MALES	16%	8%	25%	23%	16%

Conclusion

The present study presents the attitude towards transparency in marriage and suspects that there is poor awareness in the young people about the importance of information as mostly rely on their parents' choice to marry than select their own partners. Secondly, social stereotypy and conformity might also play a role in the results. Finally, risk of alienation from their community might also be the cause between male-female disparities.

Females on the other hand seem to be supporting the transparency model as it would give them power to choose. However, this paper could not explain a large amount of sample to be neutral on the issue. Data from married couples' attitude towards the above discussed items might have helped to interpret the results more clearly. This guides to further study this phenomenon in detail in the phase-2. Phase-2 of the present study categorizes into three areas: a. attitude towards marriage; b. attitude towards acceptance for transparency in marriage process; c. attitude towards reformation in policy pertaining to marriage law. Phase-2 is expected to bring clarity in this phenomenon. Importantly, these results directs further studies into the nature of divorce cases in India, whether they are due to opportunity to make a choice or are there any other contributing factors? Secondly, it also paves way to study the attitude of arranged and love marriages in India. Finally, a study is required to understand the role of matrimonial agencies in dissemination of information about the partners who are going to get married.[11]

References

1. Wilson, C.M and Oswald, A.J. 2005. How does marriage affect physical and psychological health? A Survey of the Longitudinal Evidence. IZA Discussion Paper No. 1619. Available at SSRN: https://ssrn.com/abstract=735205. Retrieved on 12.07.18

2. Linda, J.W and Evelyn, L.L. 2003. The benefits from marriage and religion in the United States: A comparative analysis. Population and Development Review, 29(2):255-275 retrieved on 14.08.18.

3. Sharma, I., Pandit, B., Pathak, A. and Sharma, R. 2013. Hinduism, marriage and mental illness. Indian Journal of Psychiatry, 55(Suppl 2):S243–S249, doi: 10.4103/0019-5545.105544 retrieved on 17.06.18.

4. Carson, D.K, Jain, S. and Ramirez, S. 2009. Counseling and family therapy in India: Evolving professions in a rapidly developing nation. International Journal of Advances in Counselling, 31:45–56, DOI 10.1007/s10447-008-9067-8 retrieved on 17.08.18.

5. Vlassoff, C. 2007. Gender differences in determinants and consequences of health and illness. Journal of Health, Population, and Nutrition, 25(1):47–61. PMID: 17615903, retrieved on 21.08.18.

6. Verma, R.K and Mahendra, V.S. 2004. Construction of masculinity in India: A gender and sexual health perspective. The Journal of Family Welfare, (Spl.50):71-78, retrieved on 17.08.18.

7. Zahra, Seyedeh, Khani, Masoumi, Somayeh, Kazemi, Farideh, Kalhori, Fatemeh, Ebrahimi, Reyhaneh et al. 2017. Effect of marital relationship enrichment programme on marital satisfaction, marital intimacy and sexual satisfaction of infertile couples. International Journal of Fertility & Sterility, 11(3):197–204. retrieved on 21.08.18.

8. Ganguly, S. and Unisa, S. 2010. Trends of infertility and childlessness in India: Findings from NFHS data, facts, views & vision in Obstetrics & Gynaecology, 2(2):131–138. retrieved on 21.08.18.

9. Malhotra, S. and Shah, R. 2015. Women and mental health in India: An overview. Indian Journal of Psychiatry, 57(Suppl 2): S205–S211. PMID: 26330636. retrieved on 21.08.18.

10. National Commission for Women. Issues Relating to NRI marriages, 2011; http://ncw.nic.in/pdfReports/Background_Note_Seminar_Issues_Relating_to_NRI_Marriages.pdf Retrieved: 21.08.2018

11. Chinmayi, A. and Singh, S. 2015. Online Intermediaries in India. NOC Online Intermediaries Case Studies Series. 2015; Available at SSRN: https://ssrn.com/abstract=2566952. retrieved on 21.08.18

TWO DECADES OF FERTILITY TRANSITION IN INDIA, 1990-2010

AALOK RANJAN CHAURASIA

Introduction

The National Population Policy 2000 calls for increasing the proportion of 1st and 2nd order births to women at least 20 years of age to reduce fertility and stabilise population growth to a level consistent with the requirements of sustainable economic growth, social development and environmental protection.[1] The promotion of "two-child family" and "delayed child bearing" or birth planning constitute the two dimensions of fertility transition. Fertility decreases when couples limit the number of children they want. Fertility also decreases when entry into marital union is delayed and spacing between births is increased. Birth limitation has a direct impact on completed fertility but birth planning does not, although it has implications for population growth. It is well-known that population continues to grow even after achieving replacement fertility because of in-built momentum for growth attributed to young population age structure.[2-4] The effect of population momentum can only be minimised by either lowering the completed fertility further or increasing the mean child-bearing age. Theoretically, completed fertility can be decreased to a level at which birth rate equals death rate which implies that many couples would have only one child.[5] The second option is birth planning - increasing the age at marriage and spacing between births. The importance of population momentum may be judged from the fact that future population growth in India will largely be the result of population momentum.[6,7]

Birth planning has implications for the health and survival of mothers and children too.[8-13] It is one of the most cost-effective, high-yield interventions to improve the survival of children and

Aalok Ranjan Chaurasia, Professor, MLC Foundation and 'Shyam' Institute, Bhopal - 462003, Madhya Pradesh

health of mothers.[14-17] The length of the preceding birth interval is a major determinant of infant and early childhood mortality.[18] Birth planning also contributes to lowering the demand for 'bonus' children and thus contributes to promoting birth limitation. High infant and child mortality also keeps the replacement fertility high.[19]

The foregoing discussions suggest that fertility transition should be analysed in terms of transition in birth planning and transition in birth limitation. Fertility transition, however, is commonly analysed in terms of total fertility rate (*TFR*) which, being a completed fertility measure is biased towards birth limitation. *TFR* is also influenced by tempo effects or timing of births.[20] A couple may deliver two births within two years of marriage and stop child bearing. Another couple delivers first birth after three years of marriage and manage a spacing of three years between first and second birth and then stops child bearing. In both cases, *TFR* is 2 but the implications of the reproductive behaviour of the first couple are radically different from that of the second couple.

In this paper, we follow the two-dimensional approach to analyse fertility transition in India during 1991-2011 on the basis of a numerator-based fertility transition index.[28-32] This approach is argued to be more sensitive to short-term changes in individual fertility than completed fertility measures.[33,34] It is based on the concept of 'undesired' fertility. Live births to women younger than 20 years of age and 3rd and higher order births may be termed as "undesired" births in the context of National Population Policy 2000. A decrease in the proportion of 'undesired' births, therefore, is, therefore, taken as an indication of fertility transition.

Fertility Transition Index

The fertility transition index (*f*) used in the present analysis is based on the distribution of live births by the age of the mother and the order of the birth. [36], [37] Let B_{ij} denote the number of births of order j to women aged i in a year. Then the total number of births in a year, B, is equal to

$$B = \sum_i \sum_j B_{ij} = \sum_{i<20} \sum_{j<3} B_{ij} + \sum_{i<20} \sum_{j\geq 3} B_{ij} + \sum_{i\geq 20} \sum_{j<3} B_{ij} + \sum_{i\geq 20} \sum_{j\geq 3} B_{ij}$$

Dividing both sides by total number of births B, we get

$$1 = b_{i\exists 20,\, j<3} + b_{i<20} + b_{j\exists 3} - b_{i<20,\, j\exists 3}$$

or

$$b_{i\exists 20,\, j<3} = 1 - (b_{i<20} + b_{j\exists 3} - b_{i<20,\, j\exists 3})$$

where

$b_{i\exists 20,\, j<3}$ = proportion of births to women aged 20-49 years and birth order<3.

$b_{i<20}$ = proportion of births to women below 20 years of age irrespective of the order of birth.

$b_{j\exists 3}$ = proportion of 3rd and higher order births irrespective of the age of women.

$b_{i<20,\, j\exists 3}$ = proportion of 3rd and higher order births to women below 20 years of age.

Assuming that $b_{i<20,\, j\exists 3}$ is small in comparison to $b_{i<20}$ and $b_{j\exists 3}$, then the fertility transition index, *f*, may be defined as

$$f = 1 - (b_{i<20} + b_{j\exists 3}).$$

When $f=1$, all births in a year are 1st and 2nd order births to women aged at least 20 years. When $f=0$, there is no 1st and 2nd order birth to women at least 20 years of age. Moreover, *f* can be negative when all births are 3rd and higher order births to women less than 20 years of age. However, as *f* increases, $b_{i<20,\, j\exists 3}$ becomes less and less important. When $f = 1$, both $b_{i<20}$ and $b_{j\exists 3}$ and hence $b_{i<20,\, j\exists 3} = 0$. For all practical purposes, therefore, *f* ranges between 0 and 1. The index captures the transition in birth planning in terms of the change in the proportion of births to women below 20 years of age and the

transition in birth limitation in terms of the change in the proportion of 3rd and higher order births. The progression from 2nd to 3rd birth is a crucial component of fertility change and the decrease in completed fertility is reflected in the decrease in the proportion of 3rd and higher order births.[38,30,40,41] On the other hand, the higher the age at first birth, the lower the fertility and a decreasing proportion of births to women aged younger than 20 years is a reflection of the rising age at first birth.[42] Based on the index *f*, fertility can be classified at a very early stage of transition if $f<0.50$; at an early stage of transition if $0.50\#f<0.60$; at the middle stage of transition if $0.60\#f<0.70$; at advanced stage of transition if $0.70\#f<0.80$; and at very advanced stage of transition if $f\exists 0.80$. The value of *f* depends upon both proportion of births to women below 20 years of age and proportion of 3rd and higher order births.

The change in the index *f* is the result of the change in $b_{i<20}$ and the change in $b_{j\exists 3}$. The change in the index, *f*, between 1990 and 2010 can be decomposed as:

$$f_{2010} - f_{1990} = (f_{2010} - f_{2000}) + (f_{2000} - f_{1990})$$

Now

$$f_{2010} - f_{2000} = (b_{i<20,2000} - b_{i<20,2010}) + (b_{j\geq 3,2000} - b_{j\geq 3,2010})$$

$$f_{2000} - f_{1990} = (b_{i<20,1990} - b_{i<20,2000}) + (b_{j\geq 3,1990} - b_{j\geq 3,2000})$$

Substituting, we get

$$f_{2010} - f_{1990} = (b_{i<20,2000} - b_{i<20,2010}) + (b_{i<20,1990} - b_{i<20,2000}) + (b_{j\geq 3,2000} - b_{j\geq 3,2010}) + (b_{j\geq 3,1990} - b_{j\geq 3,2000})$$

Data

The analysis is based on the number of live births classified by the age of the mother and the order of the birth reported during one year prior to India's 1991, 2001 and 2011 population census and, therefore, refers to the year 1990, 2000 and 2010 respectively. Data available through the population census in India are associated with errors of under-enumeration and age mis-reporting. The post enumeration survey carried out after the 2011 population census has indicated that the inconsistency between census enumeration and post enumeration survey is generally low.[25] Live births reported at the population census and their classification by* age of the mother at the time of the birth and the order of the birth appear to be fairly accurate when compared with the data from India's Sample Registration System. According to the Sample Registration System, fertility of women aged 15-19 years accounted for around 6.8 per cent of the cumulative fertility whereas the proportion of 3rd and higher order births accounted for around 27.6 per cent of the live births in the year 2011.[43] The corresponding proportions based on the 2011 census are 6.4 per cent and 31.6 per cent respectively. The data available through the population census are also associated with the error of missing birth order and missing age of the mother. These errors were adjusted for by applying the methods protocol of the human fertility database.[44]

Fertility Transition in India

The index *f* in India increased from 0.418 in 1990 to 0.469 in 2000 and 0.619 in 2011 as the result of the decrease in both proportion of births to women below 20 years of age and proportion of 3rd and higher order births (Table 1). The decrease in the proportion of births to women below 20 years of age was confined largely to the period 1990-2000 whereas the decrease in the proportion of 3rd and higher order births was quite rapid during 2000-2010 compared to 1990-2000. The index *f* decreased in different population

**Author's Note: Here, we are using the proportionate distribution of births by age of mother and order of birth. At the national level, this distribution is nearly the same for the data available from the population census and the data available from SRS. This implies that the proportionate distribution of births reported in the census is nearly the same as the proportionate distribution of births reported in SRS. Since we are using the proportionate distribution, the underreporting of births is not much relevant so long as the proportionate distribution of unreported births is same as the proportionate distribution of reported births*

sub-groups also but the proportion of births to women below 20 years of age increased, instead decreased, during 2000-2010 in Scheduled Tribes, in Muslim, Christian, Jain and Buddhist religious communities and in women having at least middle level education. On the other hand, the proportion of 3rd and higher order births increased, instead decreased, during 1990-2000 in Scheduled Castes, Scheduled Tribes and illiterate population. Similarly, the index *f* decreased in all states/Union Territories but the proportion of births to women below 20 years of age increased, instead decreased, during 2000-2010 in 20 states/Union Territories whereas the proportion of 3rd and higher order births increased, instead decreased, during 1990-2000 in three states – Chhattisgarh, Bihar and Uttar Pradesh (Table 2). There are 10 states/Union Territories where the proportion of births to women below 20 years of age increased in 2010 compared to 1990 whereas the proportion of 3rd and higher order births decreased in all states/ Union Territories during 1990-2010.**

Although the index *f* decreased in all states/Union Territories during 1990-2010, yet the decrease has been uneven. The inter-state/Union Territory dispersion in the index *f* increased during 1900-2000 indicating σ-divergence across states/Union Territories in the proportion of desired births but decreased during 2000-2010 indicating σ-convergence in fertility transition. On the other hand, the decrease in the index *f* during 1990-2010 as well as during 1990-2000 and 2000-2010 was negatively correlated with the level of the index in 1990 indicating β-convergence across states/Union Territories. β-convergence is a necessary but not the sufficient condition for σ-convergence.[45]

TABLE 1

***Author's note: The difference between the index f and TFR can be better explained by a hypothetical case in which all births are 1st and 2nd order births to women less than 20 years of age. The TFR, in this case, will be less than 2 but the fertility transition index will be zero because all births are 'undesired' births in the context of National Population Policy 2000*

Fertility transition index (*f*), proportion of births to women below 20 years of age and proportion of 3rd and higher order births in India, 1990-2010

Population		Fertility transition index (f)			Proportion of births to women below 20 years of age			Proportion of 3rd and higher order births		
		1990	2000	2010	1990	2000	2010	1990	2000	2010
Total population		0.418	0.469	0.619	0.085	0.066	0.064	0.497	0.466	0.316
Residence	Rural	0.401	0.439	0.587	0.088	0.070	0.070	0.511	0.491	0.343
	Urban	0.483	0.575	0.708	0.073	0.051	0.049	0.444	0.374	0.243
Social class	Scheduled Castes	0.398	0.414	0.587	0.096	0.075	0.071	0.506	0.510	0.342
	Scheduled Tribes	0.413	0.394	0.527	0.079	0.066	0.077	0.508	0.541	0.396
	Others	0.422	0.493	0.640	0.083	0.063	0.061	0.494	0.444	0.299
Religion	Hindu	0.428	0.482	0.634	0.086	0.067	0.064	0.486	0.450	0.302
	Muslim	0.318	0.363	0.529	0.090	0.067	0.070	0.591	0.570	0.401
	Christian	0.540	0.580	0.675	0.038	0.031	0.042	0.422	0.390	0.284
	Sikh	0.566	0.607	0.775	0.039	0.032	0.031	0.395	0.361	0.195
	Buddhist	0.407	0.525	0.684	0.083	0.053	0.064	0.510	0.422	0.252
	Jain	0.644	0.736	0.812	0.034	0.015	0.018	0.322	0.248	0.170
	Others	0.338	0.398	0.551	0.073	0.058	0.072	0.590	0.545	0.377
Mother's education	Illiterate	0.354	0.350	0.472	0.085	0.061	0.051	0.561	0.589	0.478
	Literate below primary	NA	0.461	0.558	NA	0.086	0.081	NA	0.453	0.361
	Primary below middle	0.455	0.531	0.628	0.100	0.094	0.088	0.445	0.375	0.284
	Middle below matric	0.568	0.623	0.690	0.100	0.086	0.094	0.331	0.290	0.217
	Matric below graduate	0.706	0.741	0.781	0.055	0.050	0.074	0.238	0.209	0.145
	Graduate and above	0.845	0.881	0.920	0.006	0.000	0.000	0.149	0.112	0.080

Source: Author's calculations; NA: Not available

Table 2

Fertility transition index, proportion of births to women below 20 years of age and proportion of 3rd and higher order births in states and Union Territories

State/Union Territory	Fertility transition index (f)			Proportion of births to women below 20 years of age			Proportion of 3rd and higher order births		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
Jammu and Kashmir	NA	0.407	0.540	NA	0.027	0.026	NA	0.567	0.434
Kerala	0.666	0.733	0.806	0.061	0.049	0.040	0.273	0.218	0.154
Goa	0.623	0.729	0.833	0.022	0.022	0.022	0.355	0.249	0.144
Puducherry	0.605	0.710	0.833	0.072	0.063	0.043	0.323	0.227	0.125
Tamil Nadu	0.563	0.648	0.765	0.067	0.058	0.051	0.370	0.294	0.184
Punjab	0.556	0.595	0.774	0.038	0.029	0.029	0.406	0.376	0.196
Chandigarh	0.552	0.596	0.751	0.039	0.035	0.027	0.409	0.368	0.222
Himachal Pradesh	0.512	0.616	0.765	0.058	0.029	0.032	0.429	0.354	0.203
Andaman and Nicobar Islands	0.501	0.648	0.758	0.069	0.057	0.069	0.430	0.295	0.173
Daman and Diu	0.499	0.617	0.753	0.052	0.037	0.048	0.449	0.345	0.198
Gujarat	0.499	0.539	0.663	0.043	0.041	0.055	0.458	0.420	0.282
Delhi	0.485	0.557	0.726	0.051	0.038	0.029	0.464	0.405	0.245
Maharashtra	0.474	0.572	0.674	0.078	0.056	0.067	0.449	0.371	0.259
Haryana	0.456	0.490	0.670	0.085	0.076	0.056	0.459	0.435	0.274
Karnataka	0.453	0.560	0.665	0.095	0.081	0.063	0.451	0.360	0.272
Dadra and Nagar Haveli	0.427	0.442	0.649	0.069	0.068	0.072	0.504	0.490	0.279
Orissa	0.426	0.513	0.694	0.064	0.045	0.056	0.509	0.443	0.251
Andhra Pradesh	0.424	0.572	0.709	0.152	0.144	0.090	0.424	0.284	0.201
Uttarakhand	0.419	0.469	0.676	0.052	0.036	0.038	0.528	0.495	0.286
West Bengal	0.416	0.499	0.630	0.120	0.113	0.134	0.464	0.388	0.235
Chhattisgarh	0.401	0.433	0.626	0.091	0.054	0.055	0.508	0.513	0.319

State/Union Territory	Fertility transition index (f)			Proportion of births to women below 20 years of age			Proportion of 3rd and higher order births		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
Tripura	0.396	0.537	0.674	0.089	0.094	0.128	0.515	0.369	0.199
Rajasthan	0.376	0.397	0.514	0.090	0.079	0.072	0.534	0.524	0.414
Sikkim	0.373	0.477	0.693	0.056	0.077	0.102	0.571	0.445	0.205
Madhya Pradesh	0.360	0.404	0.531	0.097	0.067	0.065	0.543	0.529	0.404
Assam	0.357	0.426	0.582	0.075	0.058	0.079	0.569	0.516	0.339
Lakshadweep	0.356	0.473	0.666	0.063	0.037	0.020	0.581	0.490	0.313
Manipur	0.351	0.482	0.674	0.037	0.027	0.045	0.612	0.491	0.281
Mizoram	0.348	0.452	0.548	0.033	0.045	0.062	0.619	0.503	0.390
Jharkhand	0.345	0.384	0.552	0.100	0.076	0.081	0.555	0.540	0.367
Bihar	0.342	0.360	0.542	0.081	0.060	0.060	0.577	0.579	0.398
Uttar Pradesh	0.331	0.349	0.560	0.069	0.043	0.049	0.599	0.608	0.391
Meghalaya	0.292	0.336	0.470	0.050	0.039	0.067	0.658	0.625	0.463
Nagaland	0.286	0.322	0.498	0.033	0.026	0.042	0.681	0.652	0.460
Arunachal Pradesh	0.276	0.374	0.536	0.089	0.054	0.060	0.635	0.572	0.404

Source: *Author's calculations*

The index *f* varies widely across districts (Table 3). The index *f* suggests that fertility was at very early stage of transition in 345 of 452 (76.3 per cent) districts in 1990 but in only 75 of 640 (11.7 per cent) districts in 2010. In 1990, there were only 9 (2 per cent) districts where fertility was at advanced or very advanced stage of transition in 1990 compared to 185 (28.9 per cent) districts in 2010. The index *f* was the lowest in the Badgam district of Jammu and Kashmir in 2010 but in Upper Subansiri district of Arunachal Pradesh in 1990 whereas it was the highest in the Pathanamthitta district of Kerala in 1990 as well as in 2010. The inter-district distribution of the index *f* in 1990 was highly skewed to the left meaning that in a large proportion of districts, the index *f* was lower than the average. However, in 2010, this distribution*** turned very close to the normal distribution. Similarly, the inter-district distribution of the index *f* turned from a leptokurtic one in 1990 to a platykurtic one in 2010 which means that the dispersion in the index across districts had increased over time.

TABLE 3

Inter-district variation in fertility transition index (*f*), 1990-2010

Fertility transition index	Year		
	1990	2000	2010
Number of districts			
Less than 0.500	345	359	75
0.500-0.600	74	132	222
0.600-0.700	24	81	158
0.700-0.800	4	13	155
0.800 and above	5	8	30
N	452	593	640
Summary measures			
Minimum	0.235	0.248	0.360
Q1	0.350	0.370	0.539
Median	0.400	0.458	0.616
Q3	0.491	0.564	0.715
Maximum	0.855	0.865	0.918
Skewness	1.184	0.624	0.151
Excess kurtosis	1.731	-0.198	-0.697

Source: Author's calculations

However, there is evidence of σ-divergence across districts during 1990-2000 but σ-convergence during 2000-2010.

Table 4 decomposes the change in the index *f* during 1990-2010 into the change in its four components. Almost three-fourth of the increase in the index *f* during 1990-2010 was due to the decrease in the proportion of 3rd and higher order births during 2000-2010. The decrease in the proportion of births to women below 20 years of age contributed to just about 1 per cent of the increase in the index *f*. Moreover, fertility transition during 1990-2010 was primarily due to the transition in the birth limitation during 2000-2010. The contribution of the transition in birth planning dimension had been small, at best, marginal. More than three-fourth of the increase in the index *f* during 1990-2010 was confined to the period 2000-2010.****

The relative contribution of the four components of the change in the index *f* is different in different population sub-groups. In the rural population, only 20 per cent of the increase in the index *f* was confined to the period 1990-2000 compared to more than 40 per cent in the urban population. In both populations, 90 per cent of the increase in the index *f* may be attributed to the transition in birth limitation. Similarly, fertility transition

****Author's note: It is not necessary that f will be high when TFR is low. The hypothetical example given above shows that a low TFR may be associated with low index f.*

*****Author's note: Birth planning and birth limitation are two distinct aspects of fertility behavior. A couple may plan the timing of births but do not limit the number of births it wants so there is only birth planning and no birth limitation. The other couple may want to keep the number of births to 2 only without any consideration to planning of the two birth so there is no planning, only limitation. Finally, a couple may plan and at the same time limit the number of births*

Table 4

Decomposition of the change in fertility transition index (*f*) in India, 1990-2010

Population	Sub-group	Change in f during 1990-2010	Proportionate (%) change attributed to							
			Change in proportion of births to women below 20 years of age during		Change in the proportion of 3rd and higher order births during		Change during the time period		Transition in	
			1990-2000	2000-2010	1990-2000	2000-2010	1990-2000	2000-2010	Birth planning	Birth limitation
Total		**0.202**	**9.4**	**1.0**	**15.3**	**74.3**	**24.8**	**75.2**	**10.4**	**89.6**
Social class	Scheduled Castes	0.189	11.1	2.1	-2.1	88.9	9.0	91.0	13.2	86.8
	Scheduled Tribes	0.114	11.4	-9.6	-28.9	127.2	-17.5	117.5	1.8	98.2
	Others	0.217	9.2	0.9	23.0	66.8	32.3	67.7	10.1	89.9
Religion	Hindu	0.206	9.2	1.5	17.5	71.8	26.7	73.3	10.7	89.3
	Muslim	0.210	11.0	-1.4	10.0	80.5	21.0	79.0	9.5	90.5
	Christian	0.134	5.2	-8.2	23.9	79.1	29.1	70.9	-3.0	103.0
	Sikh	0.208	3.4	0.5	16.3	79.8	19.7	80.3	3.8	96.2
	Buddhist	0.277	10.8	-4.0	31.8	61.4	42.6	57.4	6.9	93.1
	Jain	0.168	11.3	-1.8	44.0	46.4	55.4	44.6	9.5	90.5
	Others	0.214	7.0	-6.5	21.0	78.5	28.0	72.0	0.5	99.5
Mother's education	Illiterate	0.117	20.5	8.5	-23.9	94.9	-3.4	103.4	29.1	70.9
	Literate below middle	0.153	5.7	2.9	27.6	63.8	33.3	66.7	8.6	91.4
	Middle below matric	0.120	11.7	-6.7	34.2	60.8	45.8	54.2	5.0	95.0
	Matric below graduate	0.074	6.8	-32.4	39.2	86.5	45.9	54.1	-25.7	125.7
	Graduate and above	0.075	8.0	0.0	49.3	42.7	57.3	42.7	8.0	92.0

Source: *Author's calculations*

in most of the religious communities was confined mostly to the period 2000-2010 with the exception of Buddha and Jain communities and at least 90 per cent of the increase in the index *f* was due to transition in birth limitation. By contrast, fertility transition appeared to have reversed in the Scheduled Tribes population and in illiterate mothers during 1990-2000. Among illiterate mothers, almost 30 per cent of the increase in the index *f* was attributed to the decrease in the proportion of births to women below 20 years of age whereas this proportion increased, instead decreased, in mothers with more than matriculate but below graduate education. Fertility transition was more rapid during 1990-2000 than during 2000-2010 in mothers with at least graduate education.

The contribution of the four components of the change in the index *f* has also been different in different states/ Union Territories (Table 5). In Bihar, Dadra and Uttar Pradesh, more than 90 per cent of the increase in the index *f* during 1990-2010 was due to the decrease in the proportion of 3rd and higher order births during 2000-2010 but less than 50 per cent in Goa, Andaman and Nicobar Islands, Andhra Pradesh, Tripura and Mizoram. In Kerala, Karnataka, Andhra Pradesh, Chhattisgarh and Madhya Pradesh, at least 15 per cent of the increase in the index f was due to the decrease in the proportion of births to women below 20 years of age but in 10 states/Union territories, this proportion increased during 1990-2010 indicating reversal in transition in birth planning and, in two states/Union (The issue of quality has been discussed earlier. We are using proportionate distribution rather than absolute distribution of births by age of the mother and birth order).

TABLE 5

Decomposition of the change in fertility transition index (*f*) in states/Union Territories, 1990-2010

State/Union Territory	Change in f during 1990-2010	Proportionate (%) change attributed to							
		Change in proportion of births to women below 20 years of age during		Change in the proportion of 3rd and higher order births during		Change during the time period		Transition in	
		1990-2000	2000-2010	1990-2000	2000-2010	1990-2000	2000-2010	Birth planning	Birth limitation
Andaman and Nicobar Islands	0.257	4.67	52.53	-4.67	47.47	57.20	42.80	0.00	100.00
Andhra Pradesh	0.285	2.81	49.12	18.95	29.12	51.93	48.07	21.75	78.25
Arunachal Pradesh	0.260	13.46	24.23	-2.31	64.62	37.69	62.31	11.15	88.85
Assam	0.226	7.52	23.45	-9.29	78.32	30.97	69.03	-1.77	101.77
Bihar	0.200	10.50	-1.00	0.00	90.50	9.50	90.50	10.50	89.50
Chandigarh	0.199	2.01	20.60	4.02	73.37	22.61	77.39	6.03	93.97
Chhattisgarh	0.225	16.44	-2.22	-0.44	86.22	14.22	85.78	16.00	84.00
Dadra and Nagar Haveli	0.222	0.45	6.31	-1.80	95.05	6.76	93.24	-1.35	101.35
Daman and Diu	0.255	5.88	40.78	-4.31	57.65	46.67	53.33	1.57	98.43
Delhi	0.241	5.39	24.48	3.73	66.39	29.88	70.12	9.13	90.87
Goa	0.211	0.00	50.24	0.00	49.76	50.24	49.76	0.00	100.00
Gujarat	0.164	1.22	23.17	-8.54	84.15	24.39	75.61	-7.32	107.32
Haryana	0.214	4.21	11.21	9.35	75.23	15.42	84.58	13.55	86.45
Himachal Pradesh	0.252	11.51	29.76	-1.19	59.92	41.27	58.73	10.32	89.68
Jammu and Kashmir	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jharkhand	0.207	11.59	7.25	-2.42	83.57	18.84	81.16	9.18	90.82
Karnataka	0.211	6.64	43.13	8.53	41.71	49.76	50.24	15.17	84.83
Kerala	0.140	8.57	39.29	6.43	45.71	47.86	52.14	15.00	85.00

State/Union Territory	Change in f during 1990-2010	Proportionate (%) change attributed to							
		Change in proportion of births to women below 20 years of age during		Change in the proportion of 3rd and higher order births during		Change during the time period		Transition in	
		1990-2000	2000-2010	1990-2000	2000-2010	1990-2000	2000-2010	Birth planning	Birth limitation
Lakshadweep	0.311	8.36	29.26	5.47	56.91	37.62	62.38	13.83	86.17
Madhya Pradesh	0.171	17.54	8.19	1.17	73.10	25.73	74.27	18.71	81.29
Maharashtra	0.201	10.95	38.81	-5.47	55.72	49.75	50.25	5.47	94.53
Manipur	0.323	3.10	37.46	-5.57	65.02	40.56	59.44	-2.48	102.48
Meghalaya	0.178	6.18	18.54	-15.73	91.01	24.72	75.28	-9.55	109.55
Mizoram	0.200	-6.00	58.00	-8.50	56.50	52.00	48.00	-14.50	114.50
Nagaland	0.212	3.30	13.68	-7.55	90.57	16.98	83.02	-4.25	104.25
Orissa	0.266	7.14	24.81	-4.14	72.18	31.95	68.05	3.01	96.99
Puducherry	0.227	3.96	42.29	8.81	44.93	46.26	53.74	12.78	87.22
Punjab	0.219	4.11	13.70	0.00	82.19	17.81	82.19	4.11	95.89
Rajasthan	0.138	7.97	7.25	5.07	79.71	15.22	84.78	13.04	86.96
Sikkim	0.320	-6.56	39.38	-7.81	75.00	32.81	67.19	-14.38	114.38
Tamil Nadu	0.202	4.46	37.62	3.47	54.46	42.08	57.92	7.92	92.08
Tripura	0.277	-1.81	52.71	-12.27	61.37	50.90	49.10	-14.08	114.08
Uttar Pradesh	0.228	11.40	-3.95	-2.63	95.18	7.46	92.54	8.77	91.23
Uttarakhand	0.256	6.25	12.89	-0.78	81.64	19.14	80.86	5.47	94.53
West Bengal	0.215	3.26	35.35	-9.77	71.16	38.60	61.40	-6.51	106.51

Source: Author's calculations

Remarks: There was no population census in Jammu and Kashmir in 1991

Territories remained virtually unchanged so that transition in birth planning contributed little to fertility transition. In fact, in 20 states/Union Territories, transition in birth planning reversed during 2000-2010 as the index *f* increased instead decreased. Similarly, in 8 states/Union Territories, decrease in the proportion of 3rd and higher order births during 1990-2000 was very small and in three states, transition in birth limitation reversed during this period.

The inter-district distribution of the index *f*, proportion of births to women below 20 years of age and proportion of 3rd and higher order births in 1990, 2000 and 2010 can be compared through proportionate cumulative distribution. These distributions are depicted in figures 1 through 3 respectively. The horizontal shift to the right in the proportionate cumulative frequency curve of the index *f* indicates that the index *f* improved, in general, in all districts. This shift was relatively small during 1990-2000 indicating that fertility transition was slow during 1990-2000 but gained momentum during 2000-2010, a trend observed at national and state level also. Similarly, transition in birth planning nearly stagnated during 2000-2010 while that in birth limitation was slow during 1990-2000.

Inter-district variation in the index *f* can be decomposed into inter-district variation in $b_{i<20}$ and inter-district variation in $b_{j\exists 3}$. It can be shown that

$$var\,(f) = [var\,(b_{i<20}) + cov\,(b_{i<20}\,b_{j\exists 3})] + [var\,(b_{j\exists 3}) + cov\,(b_{i<20}\,b_{j\exists 3})]$$

where *var* stands for variance and *cov* stands for covariance. Table 6 shows that nearly all inter-district variation in the index *f* is attributed to inter-district variation in the proportion of 3rd and higher order births which means that fertility transition was driven primarily by transition in birth limitation. Moreover, the simple zero order correlation coefficient between the two dimensions of fertility transition is found to be very close to zero which shows that the inter-district variation in the proportion of births to women below 20 years of age was largely independent of the inter-district variation in the proportion of 3rd and higher order births.

TABLE 6

Decomposition of the inter-district variance in the fertility transition index *f*, 1990-2011

Particulars	Year		
	1990	2000	2010
Inter-district variance in the index *f* Var (*f*)	0.01106	0.01455	0.01200
Inter-district variance in the proportion of births to women below 20 years of age Var ($b_{i<20}$)	0.00107	0.00097	0.00069
Inter-district variance in the proportion of 3rd and higher order births Var ($b_{j\exists 3}$)	0.01021	0.01519	0.01111
Inter-district covariance between proportion of births to women below 20 years of age and proportion of 3rd and higher order births Cov (*bi<20*, *bj∃3*)	-0.00011	-0.00081	0.00010
Inter-district variance in *f* explained by inter-district variation in the proportion of births to women below 20 years of age (Per cent)	8.71	1.13	6.60
Inter-district variation in *f* explained by inter-district variation in 3rd and higher order births (Per cent)	91.29	98.87	93.40
Number of districts	452	593	640

Source: Author's calculation

Classification of Districts

The inter-district variation in the index *f* suggests that there are district-specific characteristics that influence fertility transition in the district. We have applied the segmentation or classification approach to identify characteristics of districts at different stages of fertility transition. The segmentation approach is based on a set of *if-then* logical conditions that permit splitting districts into mutually exclusive groups by the stage of fertility transition. There are different methods available for carrying out segmentation analysis. We have used the decision tree procedure and applied the classification and regression tree technique (CRT) to create a tree-based segmentation model.[46] CRT is a nonparametric recursive partitioning method.[47] It branches districts into nodes on the basis of selected explanatory variables to achieve within-cluster homogeneity. A node which cannot be split further is termed as a terminal node or 'leaf'. A leaf in which all districts are at the same stage of fertility transition is called a homogenous or "pure" node. Lack of homogeneity within a cluster is measured in terms of least-squared deviation which is computed as within-node variance.[46] The tree-growing process is continued until either the pure node is reached, or the prescribed stopping criterion is met.[48,49] CART has a number of advantages. It makes no assumption about the variables used Results of CART are also not affected by the quality of data such as presence of outliers, collinearity among the explanatory variables, heteroscedasticity, or distributional error structures that normally affect parametric procedures like regression.

In the present case, the dependent variable is the index *f* which is a scale variable. At the first stage of the segmentation analysis we used nine independent variables: 1) degree of urbanisation measured in terms of the proportion of the urban population to the population of the district; 2) proportion of Scheduled Castes population; 3) proportion of Scheduled Tribes population; 4) literacy rate measured in terms of the proportion of the population aged at least 7 years who can read and write with understanding; 5) female literacy rate measured in terms of the proportion of females aged at least 7 years who can read and write with understanding; 6) child sex ratio measured as female/male ratio of the population aged 0-6 years; 7) sex ratio of the population aged 7 years and above measured as female/male ratio of the population at least 7 years of age; 8) population engaged in non-agricultural productive activities measured as the proportion of workers other than cultivators and agricultural labourers; and 9) sex ratio of the population engaged in non-agricultural productive activities. However, in order to minimise the risk of wrong segmentation, the number of independent variables were subsequently reduced to three i.e. female literacy rate, sex ratio of the population aged 7 years and above and engagement in non-agricultural productive activities.

The segmentation analysis was carried out using the 'Tree' routine of the SPSS software and results of the analysis are presented in table 7 while the classification tree is depicted in figure 4. The 640 districts of the country in 2010 are branched into six terminal nodes or 'leaves' (clusters) in terms of the stage of fertility transition. The first cluster (node 3) comprises of 206 (32 per cent) districts which have very low female literacy rate and gender balance unfavourable to females. Fertility in these districts, on average, was at an early stage of transition (average *f*=0.552). In these districts, on average, around 39 per cent births in 2010 were 3rd and higher order births while the proportion of births to women below 20 years of age was, on average, around 6 per cent.

Table 7

Classification of districts by population characteristics and stage of fertility transition

Node	Population characteristics			District		FTI		Proportion of births to women <20 years of age		Proportion of 3rd and higher order births		Remarks
	Female literacy rate	Population sex ratio	Population engaged in non-agricultural pursuits	Number	%	Mean	SD	Mean	SD	Mean	SD	
0	All	All	All	640	100.0	0.626	0.110	0.059	0.026	0.315	0.105	
1	# 61	All	All	278	43.4	0.567	0.080	0.063	0.023	0.370	0.086	
2	> 61	All	All	362	56.6	0.671	0.108	0.057	0.028	0.272	0.100	
3	# 61	# 968	All	206	32.2	0.552	0.073	0.062	0.024	0.387	0.077	Terminal
4	# 61	> 968	All	72	11.2	0.609	0.084	0.067	0.021	0.323	0.091	Terminal
5	> 61	# 982	All	261	40.8	0.644	0.102	0.060	0.029	0.300	0.096	
6	> 61	> 982	All	101	15.8	0.740	0.090	0.049	0.024	0.211	0.081	
7	> 61	# 982	#18	129	20.2	0.613	0.091	0.065	0.027	0.323	0.090	Terminal
8	>61	# 982	>18	132	20.6	0.674	0.103	0.055	0.030	0.271	0.095	Terminal
9	> 61	> 982	# 18	50	7.8	0.704	0.074	0.052	0.025	0.244	0.069	Terminal
10	> 61	> 982	> 18	51	8.0	0.776	0.090	0.045	0.022	0.179	0.081	Terminal

Source: Author's calculations

The next cluster (node 4) comprises of districts with very low female literacy but gender balance comparatively favourable to females. There are 72 (11.2 per cent) districts in this cluster and fertility in these districts is at the middle stage of transition (average *f*=0.609). The third cluster (node 7) comprises of districts with high female literacy rate, gender balance highly unfavourable to females and low proportion of the population engaged in non-agricultural pursuits. There are 129 (20.2 per cent) districts in this cluster and fertility, in these districts, on average, is also at the middle of transition (average *f*=0.613). The fourth cluster (node 8) comprises of districts where female literacy rate is at least 61 per cent and gender balance is unfavourable to females but more than 18 per cent of the population is engaged in non-agricultural pursuits. There are 132 districts (20.6 per cent) in this cluster and fertility in districts of this cluster is also at the middle of transition (average *f*=0.674). The fifth cluster (node 9) comprises of 50 (8 per cent) districts. In these districts, female literacy rate is at least 61 per cent and gender balance is comparatively favorable to females but the proportion of the population engaged in nonagricultural pursuits is less than 18 per cent. Fertility in these districts is at the advance stage of transition (average *f*=0.704). Finally, the sixth and the last cluster (node 10) comprises of 51 (8 per cent) districts. In these districts, female literacy rate is more than 61 per cent, gender balance is favorable to females (more than 982 females per 1000 males at least 7 years of age) and more than 18 per cent of the population is engaged in non-agricultural productive activities. Fertility, in districts of this cluster, is also at an advance stage of transition (average *f*=0.776).

Table 8 shows how districts of different states/Union Territories are distributed across the six clusters identified through the segmentation analysis. Majority of districts in Jammu and Kashmir, Rajasthan, Uttar Pradesh, Bihar, Arunachal Pradesh, Jharkhand and Madhya Pradesh belong to cluster 1 (node 3) which, had the lowest fertility transition index *f*, on average. Districts of this cluster have, on average, the highest proportion of 3rd and higher order births and the highest proportion of births to women below 20 years of age. On the other hand, all districts in Kerala and almost two third districts in Tamil Nadu belong to cluster 6 (node 10) which has the highest index *f*, on average. Districts of this cluster have, on average, the lowest proportion of 3rd and higher order births and the lowest proportion of births to women below 20 years of age. Similarly, in more than half of the districts in Uttarakhand, one third districts in Chhattisgarh and almost 30 per cent districts in Tamil Nadu, fertility is at an advanced stage of transition. On the other hand, majority of the districts in Himachal Pradesh, Punjab, Haryana and Delhi belong to cluster 4 (node 8) while majority of districts in the north-eastern states belong to cluster 3 (node 7). In West Bengal and Gujarat also, majority of districts belong to cluster 4 whereas in Assam, Odisha and Maharashtra, majority of the districts belong to cluster 3. Fertility in these districts is at the middle of transition. Karnataka is the only state in the country where districts are not concentrated in a particular cluster but are distributed almost equally across the six clusters.

Table 8 suggests that the regional pattern in fertility transition in India may be traced in the regional pattern in the female literacy rate, gender balance measured in terms of sex ratio of the population aged 7 years and above and engagement of the population in non-agricultural activities. Fertility is at advance stage of transition in those districts where female fertility rate is more than 61 per cent, sex ratio of the

Table 8

Distribution of districts in different states/Union Territories by different clusters (Terminal nodes)

India/State/Union Territories	Cluster (Terminal node)												Total
	Cluster 1 (3)		Cluster 2 (4)		Cluster 3 (7)		Cluster 4 (8)		Cluster 5 (9)		Cluster 6 (10)		
	N	%	N	%	N	%	N	%	N	%	N	%	
India	206	32.2	72	11.3	129	20.2	132	20.6	50	7.8	51	8.0	640
Jammu & Kashmir	17	77.3	0	0.0	1	4.5	4	18.2	0	0.0	0	0.0	22
Himachal Pradesh	0	0.0	0	0.0	2	16.7	6	50.0	4	33.3	0	0.0	12
Punjab	2	10.0	0	0.0	3	15.0	15	75.0	0	0.0	0	0.0	20
Chandigarh	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	1
Uttarakhand	0	0.0	0	0.0	2	15.4	4	30.8	7	53.8	0	0.0	13
Haryana	6	28.6	0	0.0	5	23.8	10	47.6	0	0.0	0	0.0	21
Delhi	1	11.1	0	0.0	0	0.0	8	88.9	0	0.0	0	0.0	9
Rajasthan	25	75.8	5	15.2	1	3.0	2	6.1	0	0.0	0	0.0	33
Uttar Pradesh	49	69.0	5	7.0	11	15.5	6	8.5	0	0.0	0	0.0	71
Bihar	32	84.2	2	5.3	3	7.9	1	2.6	0	0.0	0	0.0	38
Sikkim	1	25.0	0	0.0	1	25.0	2	50.0	0	0.0	0	0.0	4
Arunachal Pradesh	9	56.3	3	18.8	1	6.3	2	12.5	1	6.3	0	0.0	16
Nagaland	0	0.0	0	0.0	8	72.7	3	27.3	0	0.0	0	0.0	11
Manipur	0	0.0	0	0.0	5	55.6	0	0.0	1	11.1	3	33.3	9
Mizoram	1	12.5	0	0.0	4	50.0	1	12.5	1	12.5	1	12.5	8
Tripura	0	0.0	0	0.0	2	50.0	1	25.0	1	25.0	0	0.0	4
Meghalaya	1	14.3	0	0.0	4	57.1	0	0.0	1	14.3	1	14.3	7
Assam	6	22.2	0	0.0	12	44.4	9	33.3	0	0.0	0	0.0	27
West Bengal	5	26.3	0	0.0	6	31.6	8	42.1	0	0.0	0	0.0	19
Jharkhand	12	50.0	7	29.2	3	12.5	2	8.3	0	0.0	0	0.0	24

India/State/Union Territories	Cluster (Terminal node)												Total
	Cluster 1 (3)		Cluster 2 (4)		Cluster 3 (7)		Cluster 4 (8)		Cluster 5 (9)		Cluster 6 (10)		
	N	%	N	%	N	%	N	%	N	%	N	%	
Odisha	1	3.3	12	40.0	10	33.3	5	16.7	2	6.7	0	0.0	30
Chhattisgarh	2	11.1	9	50.0	1	5.6	0	0.0	6	33.3	0	0.0	18
Madhya Pradesh	29	58.0	5	10.0	11	22.0	4	8.0	1	2.0	0	0.0	50
Gujarat	3	11.5	1	3.8	7	26.9	12	46.2	2	7.7	1	3.8	26
Daman and Diu	0	0.0	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0	2
Dadra & Nagar Haveli	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	0	0.0	1
Maharashtra	1	2.9	1	2.9	19	54.3	8	22.9	6	17.1	0	0.0	35
Andhra Pradesh	0	0.0	15	65.2	1	4.3	2	8.7	4	17.4	1	4.3	23
Karnataka	2	6.7	6	20.0	6	20.0	7	23.3	4	13.3	5	16.7	30
Goa	0	0.0	0	0.0	0	0.0	1	50.0	0	0.0	1	50.0	2
Lakshadweep	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	1
Kerala	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	14	100.0	14
Tamil Nadu	1	3.1	0	0.0	0	0.0	2	6.3	9	28.1	20	62.5	32
Puducherry	0	0.0	0	0.0	0	0.0	1	25.0	0	0.0	3	75.0	4
Andaman & Nicobar Islands	0	0.0	0	0.0	0	0.0	3	100.0	0	0.0	0	0.0	3

Source: Author's calculations

population aged 7 years and above is more than 982 females per 1000 males and the proportion of population engaged in non-agricultural activities is more than 18 per cent. Majority of these districts are located in the southern part of the country. By contrast, fertility is at early stage of transition in those districts where female literacy rate is less than 61 per cent and the sex ratio of the population aged 7 years and above is less than 977 females per 1000 males. Majority of these districts are located in the central part of the country. The segmentation analysis thus highlights the importance of female education, gender balance and participation in non-agricultural productive activities in deciding the stage of fertility transition. The segmentation analysis confirms that fertility transition efforts in India should not be confined to the delivery of contraceptive services only. They must be broad-based and must cover the broader human development perspective of fertility transition.

Discussion

India's National Population Policy 2000 aims at maximizing the proportion of the "desired" births in the quest towards "small family" and 'zero' population growth. In this context, India's progress during the 20 years between 1990-2010 had two distinct phases. Progress in fertility transition was slow during 1990-2000 but was driven primarily by transition in birth planning whereas progress during 2000-2010 was rapid but was driven primarily by transition in birth limitation. During 1990-2000 transition in birth limitation nearly stagnated whereas transition in birth planning nearly stagnated during 2000-2010. The stagnation in transition in birth planning during 2000-2010 has implications for population growth in terms of reducing the effect of population momentum. In any case, it is however obvious that India is still to go a long way to achieve the "small family" as envisioned in the National Health Policy 2000.

The analysis also suggests that the fertility transition path followed by India during 2000-2010 has been at odds to what was envisaged in the National Population Policy 2000 and reiterated in the National Rural Health Mission and in X and XI Five-year Development Plans.[22,50] The Government of India claims that there has been a paradigm shift in the organised family planning efforts towards birth planning rather than birth limitation,[51,52] but the present analysis shows no evidence of such a shift. Fertility transition efforts in India continue to be preoccupied with birth limitation to reduce the completed fertility. Such an approach may achieve replacement fertility, but it contributes little towards the realisation of the goal of stable population by 2045. Population stabilization requires that couples limit their family to two children and, at the same time, child-bearing is delayed and births are properly spaced so that there is no decrease in the mean age of childbearing so that momentum effects on future population growth are minimised.[5,53] A focus on birth planning is also necessary in the context of reduction in infant and child mortality and improvement in the health status of women so that the demand for 'bonus' children is reduced. There was some progress in this direction during the 1990s as the proportion of births to women below 20 years of age decreased during 1990-2000 but the initiative was lost during 2000-2010. It has been estimated that adopting a 'later, longer and fewer' family planning strategy would lead India to a future population total which would be about 52 million less in 2050 than if the current birth limitation-based strategy is continued.[54]

The evidence of the stagnation or even reversal in the transition in birth planning in India during 2000-2010 is also available from other sources. According

to the sample registration system, about 29 per cent births in India in 1991 had a birth interval of at least 3 years. This proportion increased to 42.5 per cent in 2001 but decreased to 40.7 per cent in 2013. Similarly, the proportion of births having a birth interval of less than 24 months was 38.5 per cent in 1991 which decreased to 23.9 per cent in 2001 but increased to almost 30 per cent in 2013. This neglect of birth planning in fertility transition efforts is bound to cost India in the context of population stabilisation.

The analysis also shows complementarity in transition in birth planning and transition in birth limitation. This complementary indicates lack of a comprehensive, multi-dimensional approach towards fertility transition. The official family planning efforts have always been the mainstay of fertility transition activities in India, but these efforts have been marred by poor organizational efficiency and low administrative capacity.[35,55] The present analysis reiterates the oft-repeated need of going beyond family planning to accelerate and properly orient fertility transition efforts in the country. It emphasises that the threshold for hastening the pace of fertility transition should be traced in gender balance in the population, female education and participation in non-agricultural productive activities.

One reason, probably and so obviously, behind the neglect of the birth planning dimension of fertility transition efforts in India appears to be the absence of an effective system of measuring and monitoring transition in birth planning. The preoccupation with achieving replacement fertility at the policy level has resulted in a focus on birth limitation at the grassroots level. Fertility transition is the most popularly monitored in terms of TFR which is a measure of completed fertility.[+] As such, the focus of family planning efforts, in India, has always been on preventing rather than planning births. This preoccupation is reflected in monitoring the proportion of 3rd and higher births but not the proportion of births to women aged less than 20 years in the official health management information system (Monitoring fertility of adolescents has little relevance to fertility transition in the context of National Population Policy 2000).

Conclusions

The present analysis highlights the limitations of fertility transition efforts in India in the context of National Population Policy 2000. These efforts remain confined to birth limitation despite all talks of the paradigm shift at the policy level. There was evidence of transition in birth planning in the country during the 1990s but this transition either stagnated or reversed during the 2000s. The current pattern of fertility transition in India contributes little towards minimising the effect of momentum on future population growth. In 11 major states of the country, the replacement fertility has already been achieved. In these states, population will continue to increase in the coming years because of the momentum for growth built in the population and not because of high fertility. The effect of the momentum can be delayed through increasing the mean age of child bearing but there appears little initiative in this direction. Moreover, the current fertility transition pattern has limited contribution to the reduction in maternal and child mortality and improvement in maternal and child health in terms of the delay in the first birth and increase in spacing between successive births. The strategy of shifting the focus of the official family planning efforts from birth limitation to birth planning initiated during the 1990s could not be sustained primarily because

[+]*Note: It is well known that TFR is directly related to the proportion of 3rd and higher order births. This correlation has even been used to estimate TFR from the proportion of 3rd and higher order births.*

these efforts lacked the organisational efficiency and the administrative capacity necessary for such a shift. At the same time, there is a need of integrating fertility transition efforts with broader human development activities. This observation is not new but there appears to be little indication of such integration. It is well known that a certain threshold of human development is necessary for the effectiveness of fertility transition efforts in modifying the reproductive behaviour of couples in favour of planning births rather than preventing births. There, however, appears little progress in this direction. Lack of such integration, probably and so obviously, appears to be a reason why fertility transition in India remains confined to preventing births.

Figure 1

Transition in the index of fertility transition index *f* in the districts of India.

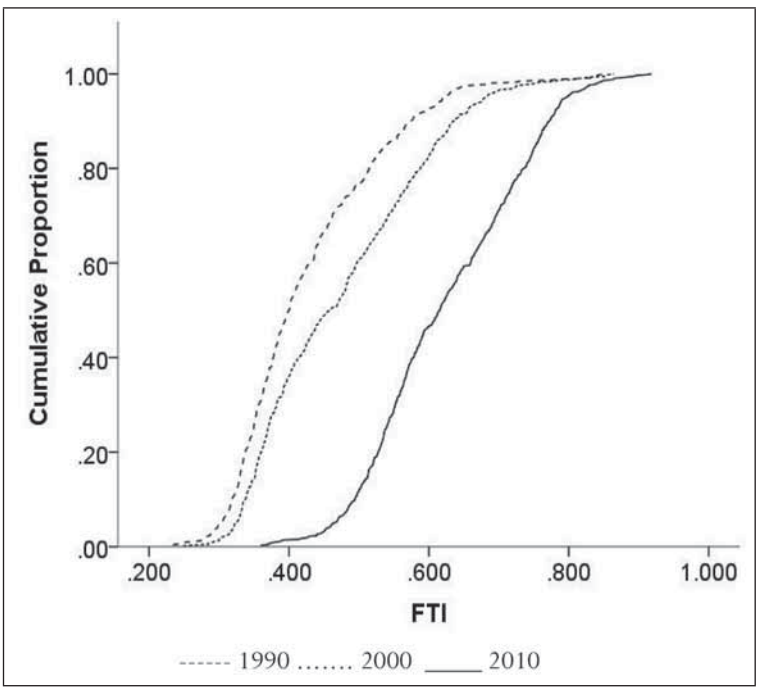


Figure 2

Transition in the proportion of births to women below 20 years of age in the districts of India

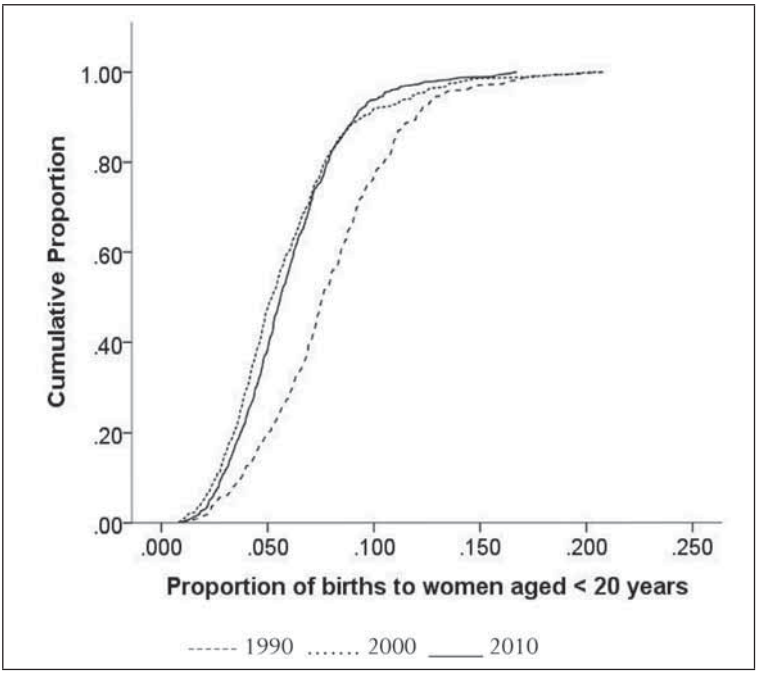


Figure 3

Transition in the proportion of 3rd and higher order births in the districts of India

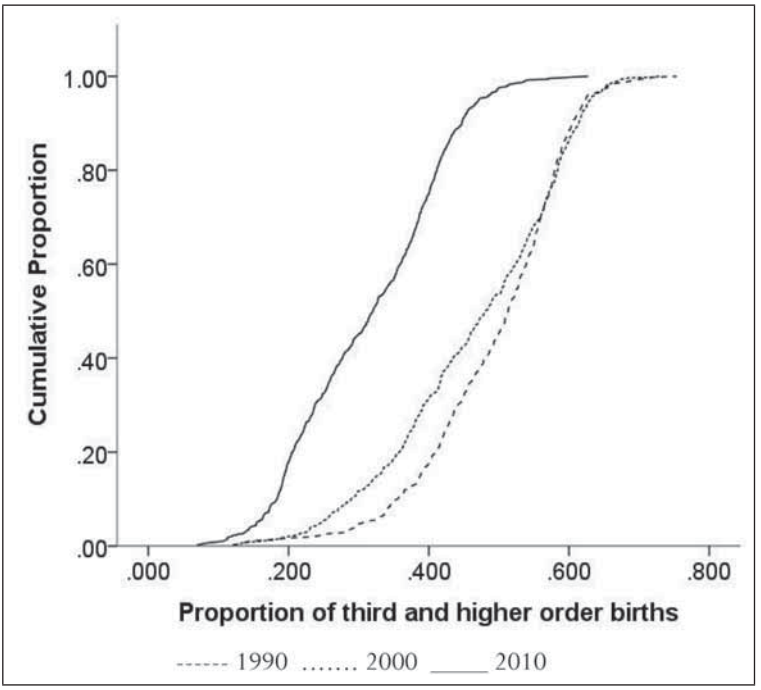
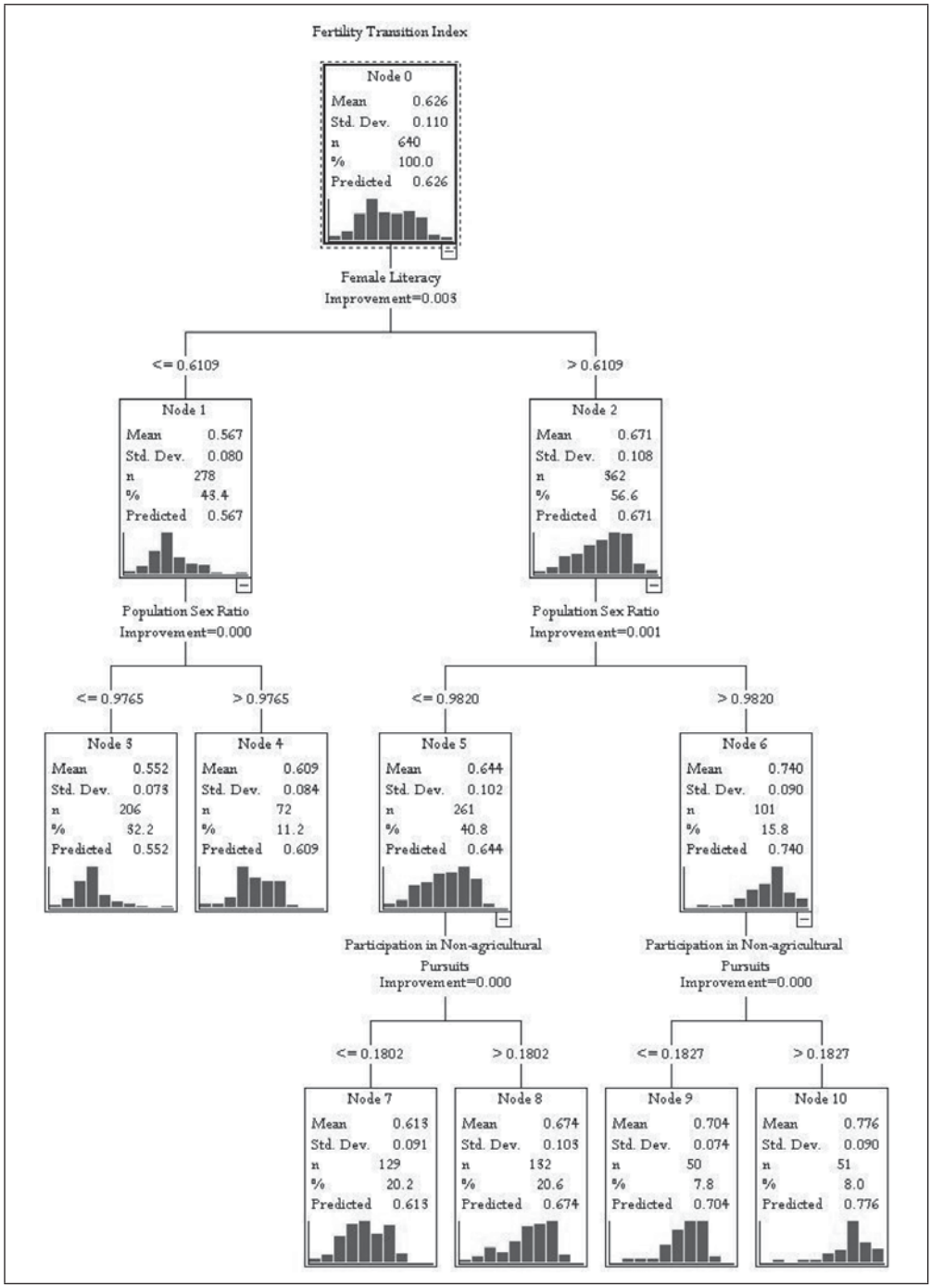


Figure 4
Classification of districts



Source: Author's calculations

References

1. Government of India. National Population Policy 2000. New Delhi, Ministry of Health and Family Welfare, 2000.
2. Frejka, T. Momentum. 1982. In: JA Ross (editor) International Encyclopedia of Population, Vol 2. New York, Free Press.
3. Keyfitz, N. 1971. On the momentum of population growth. Demography, 8(1):71-80.
4. Merrick, T.W. 1986. World population in transition. Population Bulletin, 41(2).
5. Bongaarts, J. 1994. Population policy options in the developing world. New York, The Population Council, Research Division Working Paper No. 59.
6. Chaurasia, A.R., Gulati, S.C. 2007. India: The State of Population. New Delhi, Oxford University Press, 2008.
7. Chaurasia, A.R. 2016. Demographic drivers of future population growth in India. Demography India, 44(1&2): 83-95.
8. CATALYST Consortium. Systematic literature review and meta-analyses on birth Spacing: how birth spacing relates to infant and child mortality, maternal and perinatal health, and maternal and child nutrition outcomes. Pathfinder International, 2009.
9. Conde-Agudelo, A. and Belizán, M. 2000. Maternal morbidity and mortality associated with inter-pregnancy interval: Cross sectional study. British Medical Journal, 321(7271): 1255–1259
10. Conde-Acqudelo, A., Rosas-Bermudez, A., Castano, F. and Norton, M.H. 2012. Effects of birth spacing on maternal, perinatal, infant and child health: A systematic review of causal mechanisms. Studies in Family Planning, 43(2):93-114.
11. DaVanzo, J., Razzaque, A., Rahman, M. and Hale, L. 2004. The effects of birth spacing on infant and child mortality, pregnancy outcomes, and maternal morbidity and mortality in Matlab, Bangladesh. Rand Corporation, WR-198.
12. Cleland, J.G., Sathar, Z.A. 1984. The effect of birth spacing on childhood mortality in Pakistan. Population Studies, 38(3): 401–418.
13. Hobcraft, J.N., McDonald, J.W. and Rutstein, S.O. 1985. Demographic determinants of infant and early child mortality: A comparative analysis. Population Studies, 39(3): 363–385.
14. UNDP (United Nations Development Programme). Achieving the Millennium Development Goals: Population and Reproductive Health as Critical Determinants. New York, United Nations Development Programme, 2003. Population and Development Strategies Series.
15. WHO (World Health Organization). 2005. Report of a WHO Technical Consultation on Birth Spacing. Geneva, WHO.
16. Moreland, S. and Talbird, S. 2006. Achieving the Millennium Development Goals: the contribution of fulfilling the unmet need for family planning. Futures Group/POLICY Project and USAID.
17. Smith, R., Ashford, L., Gribble, J. and Clifton, D. 2009. Family Planning Saves Lives. Population Reference Bureau.
18. Fotso, J.C, Cleland, J., Mberu, B., Mutua, M. and Elungata, P. 2013. Birth spacing and child mortality: an analysis of prospective data from Nairobi urban health and demographic surveillance system. Journal of Biosocial Science, 45(6):779-798.
19. Espenshade, T.J., Guzmann, J.C. and Westoff, C.F. 2003. The surprising global variation in replacement fertility. Population Research and Policy Review, 22(5-6):575-583.
20. Bongaarts, J. and Feeney, G. 1998. On the quantum and tempo of fertility. Population and Development Review, 24(2):271-291.
21. Government of India. 2005. National Rural Health Mission: 2005-2012. New Delhi, Ministry of Health and Family Welfare.
22. Government of India. 2013. Twelfth Five-year Plan (2012-2017) Social Sectors, Vol III. New Delhi, Planning Commission.
23. Government of India. 2018. Sample Registration System Statistical Report 2016. New Delhi, Office of the Registrar General and Census Commissioner.
24. United Nations. 2015. World Population Prospects: The 2015 Revision. Volume I: Comprehensive Tables. New York, Department of Economic and Social Affairs, Population Division, ST/ESA/SER.A/379.
25. Government of India. 2014. Census of India 2011. Report on Post Enumeration Survey.

New Delhi, Registrar General and Census Commissioner, India.

26. Government of India. 1997. Census of India, 1991: Population Projections for India and States, 1996-2016. New Delhi, Registrar General and Census Commissioner.

27. Government of India. 2007. Population Projections for India and States 2001-2026. New Delhi, Registrar General and Census Commissioner of India.

28. Ravenholt, R.T. and Frederiksen, H. 1968. Numeration analysis of fertility patterns. Public Health Report, 83(6):449-457.

29. Reynolds, J. 1972. Evaluation of family planning programme performance: A critical Review. Demography, 9(1).

30. Chidambaram, V.C. 1965. Changes resulting from family planning programme in the indices based on birth order statistics. Paper submitted to the Seminar on New Approaches in the use of Mathematical Models in Demographic Research. Mumbai, Demographic Research Centre.

31. Balasubramanian, S. 1972. An analysis of declining fertility in greater Bombay through birth order statistics. Paper presented at the All India Seminar on Family Planning Problems in India. Bombay, International Institute for Population Studies.

32. Bertrand, J.T., Magnani, R.J. and Rutenberg, N. 1994. Handbook of Indicators for Family Planning Program Evaluation. Chapel Hill, University of North Carolina at Chapel Hill, Caroline Population Center. The Evaluation Project.

33. Ryder, N.B. 1982. Progressive Fertility Analysis. Voorburg, International Statistical Institute. World Fertility Survey. Technical Bulletin No. 8.

34. Srinivasan, K. and Freymann, J. 1989. Need for reorientation of family planning programme strategies in developing countries. A case for birth-based approach. In K Srinivasan and KB Pathak (eds) Dynamics of Population and Family Welfare, Mumbai, Himalaya Publishing House, 1990.

35. Chaurasia, A.R. and Singh, R. 2014. Forty years of planned family planning efforts in India. The Journal of Family Welfare, 60(2):1-16.

36. Chaurasia, A.R. 2013. Fertility transition in India: Evidence from DLHS 200708. The Journal of Family Welfare, 59(1):12-32.

37. Chaurasia, A.R. 2013. Fertility Transition in Districts of India. Evidence from District Level Household and Facility Survey 2007-08. Paper presented at XXVII IUSSP International Population Conference, Busan. International Union for the Scientific Study of Population.

38. United Nations. 1997. Family Building and Family Planning Evaluation. New York, Department of Economic and Social Affairs, Population Division, 1997.

39. Prasartakul, P., Porapakkham, Y. and Sittitrai, W. 1987. Report on Birth Order Distribution as a Family Planning Programme Evaluation Indicator. Bangkok, Mahidol University, Institute for Population and Social Research.

40. Srinivasan, K., Saxena, P.C. and Pandey, A. 1992. Birth Order and Birth Interval Statistics. Mumbai, International Institute for Population Sciences. [Unpublished].

41. Singh, P. 2002. Trends in fertility mortality, nutrition and health indicators. Background paper prepared for the Planning Commission of India. http://planningcommission.nic.in/reports/genrep/bkpap2020/23_bg2020.pdf.

42. Sivakumar, M.N. 2000. Age at first birth and fertility of women in Kerala: A cohort analysis. Man in India, 80(3-4):237-287.

43. Government of India. 2013. Sample Registration System Statistical Report 2011. New Delhi, Ministry of Home Affairs, Office of the Registrar General.

44. Jasilioniene, A., Jdanov, D.A., Sobotka, T., Andreev, E.M., Zeman, K. and Shkolnikov, V.M. 2012. Methods Protocol for the Human Fertility Database. MPIDR.

45. Young, A.T., Higgins, M.J. and Levy, D. 2008. Sigma convergence versus beta convergence. Evidence from US county-level data. Journal of Money, Credit and Banking, 40(5): 1083-1093.

46. IBM Corporation. 2012. IBM SPSS Decision Trees. IBM Corporation.

47. Brieman, L., Friedman, J., Olshen, R.A., Stone, C.J. 2014. Classification and Regression Trees. Wadsworth.

48. Ambalavanan, N., Baibergenova, A., Carlo, W.A., Saigal, S., Scmidt, B. and Thorpe,

K.E. 2006. Early prediction of poor outcome in extremely low birth weight infants by classification tree analysis. The Journal of Pediatrics, 148(4): 438.e1-444.e1.

49. Lemon, S.C., Roy, J., Clark, M.A., Friedmann, P.D. and Rakowski, W. 2003. Classification and regression tree analysis in public health: methodological review and comparison with logistic regression. Annals of Behavioral Medicine, 26(3):171-181.

50. Government of India. 2008. Eleventh Five-Year Plan (2007-2012) Social Sector, Vol II. New Delhi, Planning Commission.

51. Pachauri, S. 2014. Priority strategies for India's family planning programme. Indian Journal of Medical Research, 140(Supplement):137-146.

52. Rao, M. 2000. Family Planning Programme. Paradigm shift in strategy. Economic and Political Weekly, 35:4317-22.

53. Ryder, N.B. 1980. Components of temporal variations in American fertility. In RW Hirons (editor) Demographic Patterns in Developed Societies. London, Taylor and Francis.

54. Mathews, Z., Padmadas, S.S., Hutter, I., McEachran, J. and Brown, J.J. 2009. Does early childbearing and a sterilization-focussed family planning programme in India fuel population growth? Demographic Research, 20(28): 693-720.

55. Chaurasia, A.R. 1985. Organizational aspects of family welfare programme in India. Indian Journal of Community Medicine, 10(3&4):181-190.

A STUDY ON PERCEPTIONS' OF NRHM BENEFICIARIES ON RURAL HEALTH ISSUES IN KARNATAKA

D.C. NANJUNDA

Background

Health is one of the elements of human development. The Panchayath Raj Institutions (PRIs) are the Constitutional set up in India for grass root development of the rural areas. Health is one of the subjects transferred to the PRIs in India. PRIs are implementing state and centrally sponsored schemes under the direct supervision of the Health and Family Welfare Department of the state. It is found that the Government of Karnataka has given a large amount of funds and other assistance to PRIs for up-gradation of the rural health care system. Even though the funds are released in a required quantity, it is not reaching to concerned persons due to the lack of active involvement of officials and inefficiency at PRIs.[1] It is suggested that for the improvement of rural health care system, there is a need for an effective implementation of the health care programs under PRIs, controlling of corruption at the administrative level, political commitment, active involvement of public, NGO and strengthening of public-private partnerships.[2]

Decentralized system is specially meant for peoples' complete participation, increased transparency and higher degree of accountability to provide comprehensive health services at the grassroots' level. Decentralized health system will provide service to the doorsteps and hence it is very close to the people. Also decentralized health system is very cost effective in terms of both labour and material.[3] Some of the experts feels decentralization system leads to corruption, breeding interest groups, vested interest etc. Also, the local officers will be working on individual connections and will not bother about

D.C. Nanjunda, Associate Professor, Centre for the Study of Social Exclusion and Inclusive Policy, University of Mysore, Manasagangotri, Mysore - 570006, Karnataka. Email: anthroedit@ymaill.com

the larger public interest, because of this decentralized system nearly get failure, the poor performance of decentralized will happen because of these factors some time. Study so for done shows PRI system has a decent success story in providing the quality rural healthcare delivery. PRIs arrangement has a greater role in improving the quality of healthcare for the rural people.[4]

As we are aware today PRIs will act as a main body of planning, execution, and supervising the NRHM programme in the country. Bheenaveni[2] felt key to the success of the NRHM through Panchayats are: 1. Inter-sectoral convergence, 2 Community ownership steered through village level health committees at Gram Panchayat level; and 3. A strong public and private partnerships. These issues lead to have complete reorganization or reformation at various levels of the Panchayats, for the better regulation of the local medical institutions, medical awareness, strengthening health workers and effective ground level implementations etc. Expert felt accomplishment of the NRHM in achieving in its outcomes is significantly dependent on well-functioning of all the three levels of the Panchayats because of people 's active participation. Also, selection of the health workers and supervising their work can be effectively done by the Gram Panchayats so that more success from the NRHM can be expected.[5]

TABLE 1

Bird view of Rural Health care Services in Karnataka

Availability of Man power Resources in Rural Health Centers	Percentage
Sub Centers	24.6
PHCs	66.8
Resident ANM	54.2
Male Health Workers	6.9
Female Health Workers	62.5
Availability of Additional ANM's	37.5
Deficit of ANM's	53.9
24×7 Delivery Services	37.5
Trained ANM	95.9
Estimated Expenditure on Primary Health Center	83.3
Availability of Total specialists	8.9
AYSUH facility	10.0
Total Number of Primary Health Centers	250
Availability of Surgeons	10.0
Availability of General specialists	25.0
Gynaecologists	4.0
Pediatrics	25.0
Doctors in sub centers	25.0
Anesthesia	1.0
General facility	8.0

Source: NRHM Report, 2009

Selecting a PHC to seek the health care and treatment depends upon several criteria in the rural parts. Most often, there are several reasons why the beneficiary families do not visit the Primary Health Centers (PHCs) in their jurisdictions. The common causes for the low level of the choice of PHCs for health care treatment are the lack of knowledge among the beneficiary families about PHCs, lack of funds at PHCs to provide efficient service, and the repeated absence of doctors at the centers.[6] When all these factors come together, people prefer to go to the private hospitals instead of PHCs. Both the communities and NGOs lack access to relevant information on the required health services, and they are not involved in the monitoring service. Furthermore, the local government bodies responsible for the health services are not accountable to communities.[7]

The Janani Suraksha Yojana (JSY) programme seems to be carried out more frequently only in sub-centre headquarter villages when compared to remote villages. Utilization of government health services and knowledge of family planning awareness now-a-days has

increased in rural people. This might be due to improvement in the quality of primary health care services. The Government is opening sufficient number of PHCs and sub-centres in rural areas as a part of NRHM programme with good facility up gradation. Increase in awareness of health services and schemes might have contributed to the successful implementation of NRHM at Panchayaths level. Author felt after implementation of NRHM, number of trained health personnel and home deliveries has been increasing[7]. This also contributed to the success of JSY. Further, the author has found few vital factors which have been contributed to reasons for delivery at home. They are: "time of delivery, illiteracy, financial conditions of women, and family customs, transportation, and facility to the health workers". Effort is required to encourage institutional deliveries to decrease peri-natal and neo-natal mortality rate with much more packages. Also, there is a need to support the dai training programme at Panchayat level and dai would be easily reachable for conducting safe delivery in the rural areas.[8]

Objective

To study the perceptions of the NRHM beneficiaries about the functioning of Rural Health Centers in Karnataka

Methodology

To understand the performance of grass root health system in the context of the local self-governance, it is proposed to have an inquiry among the JSY beneficiaries who got treatment either from the PHCs or from CHCs. Both quantitative and qualitative techniques have been used to collect data. Data are collected from 1. Koppal, 2. Gulberga, 3. Bidar; and 4. Chamaraja Nagar districts in Karnataka. Data was collected using a structured interview methods by the field staff.

Scope of data collection

The topics included: their awareness and perception regarding the functioning of the public health institutions, and their corresponding role in serving the local health needs.

Data Analysis

Data analyzed using SPSS software.

Limitations of the study

1. Numbers of respondents are small
2. ANMs are the government employees and their response may be biased
3. Study done in the selected districts only

Implications of the Study

Important implication of our study derives from our finding on the uniqueness of the awareness and information carried out by the beneficiaries and the health providers as a part of the NRHM programme in the rural parts. Findings from this study points out specific perceptions about capabilities, decision styles and strategies, towards functioning of health institutes in delivering quality health services in rural parts and the scope for improvement.

Result and discussion

Table 2

Socio-economic Status of the 'out patients' Respondents

Variables	N=55	%
Age		
≤ 19 years	14	25.4%
20-25	10	18.8%
25-35	15	27.2%
Above 35	16	29.0%
Educational level		
Primary education	23	41.8%
High school	10	18.8%
College	15	27.2%
Illiterates	7	12.7%
Income Level (in Rs.) pm		
5,000-10,000	35	63.6%

Variables	N=55	%
10,000-20,000	15	27.2%
Above 20,000	5	9.0%
Social group		
SC	9	16.3%
ST	8	14.5%
OBC	24	43.6%
Others	14	25.4
Domicile		
Local	45	81.8%
Inter district	5	9.0%
Interstate	5	9.0%
Types of drinking water		
Tap water/hand pump	19	34.5%
River/ lake	13	23.6%
Wells	23	41.8%
Religion		
Hindu	42	76.4%
Muslim	8	14.5%
Christian	5	9.0%
Types of house		
Kachha	25	45.5%
Semi pucca	17	30.9%
Pucca	13	23.6%

Patients who got treatment either by CHCs/PHCs have different opinion about the rural health centers. It is vital in evaluating the functions of the PHCs/ CHCs under the NRHM programme in Karnataka. Around 55 OPD patients were selected from seven districts who had been treated by different rural PHIs using random sampling technique. Study shows that around 29% of them were above the age of 35 years, whereas 25% of them below the age of 19 years and about 27% of them were between 20-25 years. Regarding the education level, around 41% them had studied up to the primary education level and 27% of they had studied up to the college level. About 63% of them were earning between INR 5000/- -10000/- per month whereas 9% of them earned above INR 20,000/- per month. A high proportion of respondents were from the OBC section and other category. Next, around 34% depended on hand pump and 41% of them depended on wells for their drinking water. More than 45% of them were living in the Kuchcha type house and 23% were living in the Pucca type of house.

Table 3

Experiences of the 'patients' with the PHCs

Distance travelled by Outpatients to PHCs	N-55	%
1-2	16	26.4%
2-5	14	25.4%
5-10	19	34.5%
Above 10 KM	6	10.8%
Reasons for visiting the PHC/ CHC (other than health issues)		
Distance factors	10	18.8%
Good reputation	14	25.4%
Quality	8	14.5%
Recommended by others	5	9.0%
Has all facilities	3	5.4%
All the above	15	27.2%
Medicine dispensation to outpatients at PHCs:		
Patients received complete medicines	23	41.8%
Purchased completely from outside	11	17.4%
Partial purchase	12	21.8%
No idea	9	16.3%
Physical condition of OPD facility		
Good	15	27.2%
Not so good	19	34.6%
Excellent	16	29.0%
Bad	5	9.0%
Opinion about health staff		
Available on time	15	27.2%
Always absent	19	34.6%
Non available on time	21	40.0%
Are you satisfied with the quality of treatment at PHCs		
Yes; good	13	23.7%
No	16	29.0%
Moderate	20	36.3%
Bad	6	10.8%
Do you think health centers have all required facilities		
Not all facilities	13	23.6%
Yes ; all facilities available	18	36.8%
Decent level of facilities	24	43.6%
Are you aware of NRHM and its programme		
Yes ; we know	14	25.4%

Distance travelled by Outpatients to PHCs	N-55	%
Yes, but not fully	16	29.0%
We just heard about it	19	27.2%
No idea	6	10.9%
Money spent on medicines (in last 3 months)		
Below Rs.50/	12	21.8%
100-250	18	32.7%
Above 250	20	36.4%
No idea	5	9.0%

Distance to the health centre is vital in case of extending effective health care delivery system. Around 10% of the patients travelled more than 10 kms. to reach PHCs / CHCs, whereas 34% of them travelled around 5-10 km to reach the PHC. Reasons to visit particular CHCs / PHCs includes good reputation, free drugs, good doctors, recommendations by others, and facilities available in the centre. These three factors play an essential role in selecting the health centers to visit. PHC staff has opined 'out-patient' had received complete free medicines while 17% of them say patient had to purchase medicine from the 'outside' because of non-availability in the hospitals. More than 34% of patients shared that the OPD facility was not good in PHCs/CHCs in many rural areas. Furthermore, absenteeism (34%) was a major issue among the rural health staff. More than 36% of them felt the quality of treatment at the PHCs/CHCs was moderate and 23% them mentioned it was 'Just good'. About 36% of them felt that the health center had all the required facilities whereas 23% of them reported that health centers did not have the required facilities. More than 29% of them were aware about the NRHM programmes; however, 10% of them didn't know anything about the NRHM programme. The patients reported that they had to spend INR 200-400/- for medicines prescribed by the doctors in the last three months.

Choosing a PHC to seek health care and treatment depends upon several criteria in rural people. There were several reasons for the individual and families not to visit the Primary Health Centers coming under their jurisdiction for health care treatment. The common causes were: lack of knowledge among the beneficiaries about the PHCs; lack of infrastructure in PHCs; absence of efficient service; distance; availability of laboratory and medicines; and the repeated absence of doctors at the health centers. People prefer to go to private hospitals instead of the local PHCs/CHCS.

Most of the community members knew about the NRHM scheme through ANM, schools, PRI members, PHC staff, community radio, and the social network. They even knew the ASHA by their names. They were aware of the roles and the responsibilities (of ASHA) in JSY scheme and NRHM programme. We found more than 25-30 % women did not have any idea (not even heard about the scheme) about the NRHM scheme. The community had recommended for improvement in rural infrastructure to avoid maternal or infant mortality. It was also suggested that lady doctors be made available in every health centre. It was felt that the PHCs and CHCs were not fully equipped to handle 24x7 services. The incentives in the JSY and ASHA needs to be hiked and payment must be on time. The community members agreed on the gender-based hurdles faced by the rural women in getting good medical care. They shared that home deliveries in certain pockets are common even today. Few of the community members accused the hospital staff of biased behaviors towards people coming from rural areas. While others mentioned that absenteeism of the paramedical staff was a common problem in many PHCs. Building awareness through SHGs and school programme is desired. Reasons for not preferring institutional delivery included fear of hospitals, injections, operations, and beliefs.

TABLE 4

Details about reasons for availing private hospitals for health needs

Particulars	N-55	%
Good services	41	**56.1**
Qualified doctors	33	**45.2**
Simplified procedure	51	**69.8**
Strong faith	36	**49.3**
Govt hospitals are not good	24	**32.8**
Quality treatment	34	**46.5**
All the above	66	**90.4**

Multiple choice

In case of assessment of the communities' viewpoint, it is relevant to probe on the health care utilization pattern of the users. About 24 percent respondents use government hospitals and 27% mostly use private facilities, whereas 47% use both government and private hospitals. The reasons behind using private health care facilities were: quality treatment, simplified procedures, and qualified doctors. Few of them did not have good opinion about the government hospitals.

TABLE 5

Role of Panchayat for the effective health care services

Panchayat have the required competence to manage the local health system	N-55	
Yes; they are experienced	33	45.2
No; not skilled enough	10	13.6
No; just politics	23	31.5
No idea	7	9.5
Health matters improved due to the intervention of Gram Panchayat		
Yes; quite significant level	27	36.9
Not up to the mark	10	13.6
Not at all	10	13.6
Panchayat must use its full capacity	21	28.7
No idea	5	6.8
Improvised role of Panchayat to make local health services satisfactory		
Panchayat should make more provisions for health care	34	44.6
Should improve the functioning of PHCs/SCs	21	28.7
Provide financial support for treatment for the poor	50	68.4
Good awareness programme is must	26	35.6
Sanitation /drinking water must be improved.	14	19.1
Good transport system is must	21	28.7
All the above	46	63.0

Multiple responses

About 28% of the respondents suggested that Panchayats can be useful in resolving health problems of the community, whereas the rest were either unsure or negative. Many people feel that Panchayats did not have the required competence to manage the local health system. The responses to these two questions were consistent. The perception regarding the capacity of PRIs in improving the health system is also large (36%). Whereas, about 26% believed that panchayats did not have a role in resolving the health problems. Finally, the belief regarding the role of the Panchayat in health-related treatment and care. Some of the respondents stated the need to recognize the local health needs by the Panchayat in its effort to improve the local health system. This reproduces the prevailing positive insight on the decentralized governance in the area which otherwise could be termed as bigger anticipation of the people.[9] (RCH District Level Household Survey, 2004).

It is evident that transferring the PHIs to the administrative control under the PRIs gives a good result; when elected representatives and the PHI officers work in coordination. Understanding and sharing information between these two 'segments' is vital. In majority cases PRIs have played an important role in improving the functions of the PHIs in the state. Quality of services and supply

of medicines have increased. Moreover, absenteeism among the medical staff has decreased recently because of PRIs role. The service provided by the health providers and the paramedical staff has also improved. We found that the quality of services has improved in many PHIs today (National Population Policy Report, 2000).[10]

Conclusion

In this study, we found that policymakers, PHC users, communities, and even NGOs were not fully aware of the various problems being faced by the rural health centers. Next, access to PHCs and CHCs remain low with limited access to 'good' healthcare. There were many government schemes for the welfare of people residing in rural areas, but health centers were not fully equipped. The rural health issues are a forbidding depiction of public healthcare system in the rural Karnataka and its time the government took pioneering steps to fix loopholes in the PHI system. People living in the rural areas are very poor and depend solely on government PHIs.[11] Few rural people use private health care system because of the quality of the treatment provided, simplified procedures, and qualified doctors.

Acknowledgment

Indian Council of Medical Research (ICMR), New Delhi for funding

References

1. Guptha, D. 2009. Cost effectiveness of health and family welfare programs in India. Demography India, 27(1):23-26.
2. Bheenaveni, S. 2007. Grama Panchayats in local governance in India. Economic and Political Weekly, 23(3):45-48.
3. Rajasekhar, K.G. and Satapathy, N. 2007. The functioning of Grama Panchayats in Karnataka. In Local Governance in India: Ideas, Challenges and Strategies, Joseph TM (ed.) Concept Publishing :Company, New Delhi 122-134.
4. Pahwa, D.H. 2013. Federalism, decentralization and health care policy reform in India. Journal of Rural Issues, 8(2):56-60.
5. Rothermund, D. 2008. District and decentralized planning- Jaipur: Rawat Publications, 67-70.
6. Singh, D. 2008. Decentralization in health care issues Journal of Public Health, AJDM Journal (9.3):45-49.
7. Srinivasa, R.G. 2001. An analysis of primary health care administration in Karnataka. Punjab University Journal, 12(6):24- 28.
8. Mutharayappa, M. 2010. Functioning of Janani Suraksha Yojana in Hassan District of Karnataka. The Indian Journal of Social Work, 71(2):167-170.
9. Reproductive and Child Health, District Level Household Survey. 2004. International Institute for Population Sciences. Ministry of Health and Family Welfare (MoHFW), Government of India.
10. National Population Policy Report. 2000. Ministry of Health and Family Welfare, Government of India
11. Vaddiraju, S. and Sangeeta, K. 2011. India's public health system: Issues and challenges. Journal of Rural Development 3(2):78-82.

THE JOURNAL OF FAMILY WELFARE GUIDELINES FOR AUTHOR/S

About the Journal:

The Journal of Family Welfare is a peer reviewed journal published by the Family Planning Association of India (FPA India). The authors who contribute to the journal are from India and other countries. The biannual journal (June and December issue) proactively seeks papers about relevant and emerging issues written by or in collaboration with other authors.

Scope of the Journal:

Sexual and Reproductive Health (SRH) includes the factors that affect the physical, emotional, mental, and social well-being related to reproduction and sexuality across the life span, including engaging in same-sex and/or heterosexual behaviors. Sexual and Reproductive health is a core component of individual and community public health.

The Journal of Family Welfare invites individual papers that can be on any contemporary topics on population, Sustainable Development Goals (SDGs) especially on goal 1 (no poverty), 2 (zero hunger), 3 (good health and wellbeing) , 4 (quality education), 5 (gender equality), 6 (clean water and sanitation), 8 (decent work and economic growth), 10 (reduced inequalities), 11 (sustained cities and communities), 13 (climate action), 16 (peace, justice and strong institutions), 17 (partnerships for the goals), sexual and reproductive health and rights, family planning including HIV and AIDS. The Journal of Family Welfare will publish empirical research studies, case reports, innovative interventions and rights based programming, new methods and techniques in contraception and other public health concerns on SRH that have clear significance to the national and international readers.

The Editorial Process:

All submissions are reviewed by an editorial team. Later it will be sent for peer review. Based on these reviews, along with the editor's own assessment, papers will either be provisionally accepted, returned for further revision and re-submission, or rejected. The author/s will have to take account of peer reviewers' comments when revising for re-submission.

Authorship:

An author is defined as an individual who has participated sufficiently in the work to take public responsibility for the content. The order of authorship should be a joint decision of the co-authors, and the authors' contributions should be explained at the end of each manuscript. The Journal of Family Welfare encourages that one author be appointed by the authors as corresponding author; she/he will be responsible for communicating with the editor and co-authors about revisions at all stages of editing and final approval of the text, proofreading.

Submission of the manuscripts:

The manuscripts must be submitted to the Editor-in-Chief by email at publication@fpaindia.org. All files should be scanned for viruses and any viruses found should be removed before sending the files. The manuscript should be submitted in the form of two

separate Microsoft Word files (do not compress files or password protect them). Each author gets a complimentary copy of the journal issue in which his/her article is printed.

The manuscript must be in the following format:

- **Title Page**:

  (a) Title of the manuscript, (b) The type of manuscript, (c) Names of all authors/ contributors (with their academic degrees, designation and affiliations) and name(s) of department(s) and/ or institution(s) to which the work should be credited:, (d) Word count:, (e) key words (f) Number of images, (g) Source(s) of support in the form of grants, equipment, and/or drugs, (h) Acknowledgement: contributions that need acknowledging but do not justify authorship, technical help and financial and material support:, (i) If the manuscript was presented as part at a meeting, the organization, place, and exact date on which it was read, (j) All submissions and previous reports that might be regarded as redundant publication of the same or very similar work (Any such work should be referred to specifically, and referenced in the new paper), (k) Conflicts of interest of each author/contributor, (l) Criteria for inclusion in the authors'/contributors' list, (m) The manuscript has been read and approved by all the authors, the requirements for authorship as stated earlier in this document have been met, and each author believes that the manuscript represents honest work, if that information is not provided in another form (a scanned image of a document with signatures of all authors), (n) The name, address, e-mail, and telephone number of the corresponding author, who is responsible for communicating with the other authors about revisions and final approval of the proofs, if that information is not included on the manuscript itself.

  Name:

  Address:

  E-mail:

  Cell phone / Telephone Number:

- **Tables and Images**

  Ensure all figures and table citation in the text match the files provided. The images must be sent as attachments as jpg or png files. In certain types of case reports where images form an important part of the article, more images may be accepted at the discretion of the Editor.

Types of articles

- *Research articles*: The word count should be between 3000 - 4000 words and must have the following headings: abstract, key words, introduction (context, research problem, review of literature), methods, results, discussions, conclusion, references
- *Case Studies / report*: The word count should be up to 1500 words and should have the following headings: executive summary, introduction, body (must include the decision criteria, assumption, data analysis (analysis in appendix and summary info in body), justification or preferred outcome, conclusion and references. The discussion should be concise, restricted to the points of interest.

- *Book review*: books on Population dynamics, Sexual and reproductive health and rights, SDGs, Gynecology and Obstetrics will be reviewed by the editorial team of The Journal of Family Welfare. The editors will invite experts in the field to review books received. The review should be precise, objective, nonjudgmental, and include both positive and negative features of the book. The word count should be up to 750 words.
- *Innovation interventions or program models*: The word count should be up to 2000 words and should have the following headings: executive summary, background, model or intervention, success and lessons learnt, conclusion and references, in that order.
- *Letter to the Editor*: A letter should be brief and to the point. It should be related to articles previously published in the Journal. It should not include preliminary observations that need a later paper for validation. The word count should be up to 750 words and there can be up to five references. It can be authored by up to two authors.

References

The References must provide complete information necessary to identify and retrieve each source cited in the article: text, tables or figures. The references must be abbreviated according to the Vancouver style. For example: Chapter in a text book: Rowlands TE, Haine LS. Acute limb ischemia. In: Donnelly R, London NJM, editors. ABC of arterial and venous disease. 2nd ed. West Sussex: Blackwell Publishing; 2009. p. 123-140.

If there are many authors, the first six names should be included, followed by et al. For example: Hofmeyr GJ, Neilson JP, Alfirevic Z, Crowther CA, Gulmezoglu AM, Hodnett ED et al. A Cochrane pocketbook: Pregnancy and childbirth. Chichester, England: John Wiley & Sons; 2008.

Declaration

Each article should be accompanied with a declaration on a letterhead by all the authors that: they are the authors of the article in the order in which listed; and the article is original, has not been published, and has not been submitted for publication elsewhere.

If the author has quoted more than 500 words/a table/a figure from a published work, in the article, a copy of permission obtained from the respective copyright holder needs to be enclosed. Every accepted article is copy-edited.

Also, if applicable please supply all details required by your funding and grant-awarding bodies. Include a disclosure statement when submitting the manuscript to acknowledge the financial and non-financial interest or benefit that has arisen from the direct applications of your research.

Protection of Client's Privacy

The client's or patient's identity should not be revealed in any part of the article, including the text, tables, and illustrations. Names must be changed to maintain privacy and confidentiality.

Informed Consent:

Informed consent must be taken of the study subject beforehand for photographs and publishing the documentation. Copies of these documents must be submitted if requested by the Editorial Team of The Journal of Family Welfare.

Human Rights:

Articles with any violation of Human Rights are not published in the journal.

Copyright

The author owns the copyright of the article until the article is accepted by the Journal for publication. After the acceptance communication, the copyright of the article is owned by the Family Planning Association of India (FPA India). The Journal of Family Welfare allows for sharing and adapting the work for any purpose, provided appropriate credit is given with a link to the originally published item, a reference to the author(s) and links to their homepages, under which the article is published.

AUTHOR/S AGREEMENT FORM

Manuscript Title _____

I/we certify that I/we have participated sufficiently in contributing to the concept, design, intellectual content, literature search, clinical management and studies, data collection, data analysis, statistical analysis, manuscript preparation, manuscript editing and manuscript review of the article.

The manuscript has been read and approved by all the authors. I/we take public responsibility and all liability for it and have agreed to have my/our name(s) listed as a contributor(s). We guarantee that the entire content of this manuscript is of our creation and does not infringe the copyright of any other person(s) and/or bodies. I/ we declare that the contents of the manuscript are not copied from any works of any persons, not published and also not given for publication till date. I/ We declare that the said manuscript is our original work.

All persons who have made substantial contributions to the work reported in the manuscript, but who are not contributors, are named in the Acknowledgment and have given me/us their written permission to be named. If I/we do not include an Acknowledgment that means I/we have not received substantial contributions from non-contributors and no contributor has been omitted. In case of any dispute on this issue, we will be solely liable for the commission/omission.

Upon publication, author(s) agree that the Journal of Family Welfare is the copyright owner of the material published in the journal. The users are free to use the work, subject to proper attribution of authorship and ownership of the rights. Authors may use their material in presentations and subsequent publications they write or edit themselves, provided that the Journal of Family Welfare is referenced in writing and is acknowledged as the original publication.

Names of all authors in order in which they appear in the Article:

STATEMENT OF OWNERSHIP

Statement about the ownership and other particulars about the newspaper – THE JOURNAL OF FAMILY WELFARE – required to be published in the first issue every year after the last date of February.

Form IV/See Rule 8

1. Place of Publication	:	Family Planning Association of India.
2. Periodicity of its Publication	:	Biannual
3. Printer's Name	:	Dr. (Mrs.) Janaki Desai
Nationality	:	Indian
Address	:	Apt.-221-A Building, Twin Towers Off. L.D. Marg, Prabhadevi Mumbai 400 025.
4. Publisher's Name	:	Same as above
Nationality		
Address		
5. Name and address of individuals who own the newspaper and partners or share-holders holding more than one per cent of the capital	:	Nil

I, Dr. (Mrs.) Janaki Desai, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-
Janaki Desai
Signature of the Publisher

Date : 31.03.2017

FAMILY PLANNING ASSOCIATION OF INDIA

(Registered under the Societies Registration Act, 1860)

AIMS AND OBJECTS

To create awareness, disseminate knowledge and education, provide counselling and services where appropriate on all aspects of reproductive, child and sexual health including family planning and HIV/AIDS, with free and informed choice, gender equality and equity, the empowerment of women, male involvement, child and adolescent health, and their inter-relationships with social development and environmental concerns in order to advance basic human rights, of all men, women and youth, family and community welfare, the achievement of a balance between population, resources and the environment and the attainment of a higher quality of life for all people.

To place its considered views before government and other agencies when appropriate and assist whenever possible in the formulation of the national programme of reproductive and child health including family planning.

To formulate policies, set priorities and devise programmes in pursuance of the above objectives and to undertake or promote studies and activities for information and education, training, services, and research covering the sociological, psycho-social, economic, medical and other relevant aspects of reproductive, child and sexual health including human fertility and its regulation, methods of contraception, infertility, family life education and counselling, stabilisation of population and environmental concerns, with special reference to the needs of adolescents and young people.

To organise conferences, seminars, training courses and other meetings and events whether local, national or international, in the furtherance of the Aims and Objects and allied subjects of the Association.

To establish Branches, Projects and other types of units to expand the coverage and activities of the Association.

To foster, develop contacts and collaborate or network with other organisations engaged in similar types of work in India and abroad.

To maintain its status as a Founding Member Association of the International Planned Parenthood Federation and to be affiliated to other international bodies as may be deemed fit from time to time.

To take any or all appropriate measures to further the Aims and Objects.

OFFICE BEARERS
2015-2017

President
Mr. H.R. Umesh Aradhya

Vice Presidents
Mrs. Freny Z. Tarapore
Prof. Dr. Shrikant D. Yelegaonkar

Jt. Hon. Treasurers
Prof. (Mrs.) Poornima George
Dr. Shirish Malde

OFFICE BEARERS
2018-2020

President
Mr. H.R. Umesh Aradhya

Vice Presidents
Dr. Shirish Chunilal Malde
Dr. (Mrs) Roza Olyai
Dr. Janaki Desai

Jt. Hon. Treasurers
Mrs. Madhura Ashok Kumar
Prof. Dr. Shrikant D Yelegaonkar

FPA India
Family Planning Association of India

IPPF International Planned Parenthood Federation
South Asia Region

Printed and published by Dr. (Mrs.) Janaki Desai for the Family Planning Association of India, Bajaj Bhawan, Nariman Point, Mumbai 400 021, at Kukreja Arts, Mumbai 400 053, Mob: 98200 59089