Research article Available online www.ijsrr.org ISSN: 2279–0543

International Journal of Scientific Research and Reviews

Study of Fertility Parameters of Rural Women fromWestern Maharashtra

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ABSTRACT:

Fertility and mortality are fundamental determinants of population Growth in order to understand the changes in the genetic structure of a population.Fertility plays a vital role in the study of population dynamics and thereby its analysis is of great potential in the field of demography. Fertility not only affects the size of population but also affects the age and sex structure of the population.This study highlight on various fertility related aspects of women in reproductive age from rural Western Maharashtra.

Seven villages of Palustaluka of Sangli district of Maharashtra were selected randomly satisfying criteria of population <5000 as per census 2011. Data, from females of age 15 to 49 years, related to demographic and fertility parameters were collected by visiting house to house.

The fertility data revealed the smaller Crude Birth Rate (CBR) of 9.4 per one thousand population. The General Fertility Rate (GFR) indicated 34.6 births per year per one thousand women of childbearing age.Child women ratio (CWR) determined for different denominators showed 231.3 to 317.9 children of age less than 5 years to 1000 women of child bearing age.

The future of entire society depends on family formation and hence studies of human behavior in relation to fertility are useful in understanding the social changes.

KEY WORDS: Census, Fertility, Crude birth rate, Child women ratio, ASFR, Education differential

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INTRODUCTION:

Vital registration and census are the two major sources of demographic data. Though fertility and mortality are fundamental determinants of population growth in order to understand the changes in the genetic structure of a population,[1]the system of registration of births and deaths is quite old in India, the reporting is, by and large, incomplete and inaccurate. Some of the reasons for this state of affairs are illiteracy and ignorance of the masses, the apathy and lack of motivation on the part of people to register vital events, the inadequacy of the registration machinery and lack of interest on the part of the registration personnel. One more inappropriate count of these events is that, these events are reported as well as counted where they take place**.** The censuses in India have little direct use as sources of fertility data. Hence, it is necessary to depend on the fragmentary data supplied by National sample surveys, the Sample Registration Scheme, and other adhoc surveys.[2]

The term 'Fertility' is generally used to indicate the actual reproductive performance of a woman or group of women. It plays a vital role in the study of population dynamics and thereby its analysis is of great potential in the field of demography. Fertility not only affects the size of population but also affects the age and sex structure of the upcoming population.[3]Crude birth rate (CBR) gives us first hand idea about fertility situation prevailing in the entire population. Age specific fertility rate(ASFR) tell us which age group of females is showing changes in birth rates, which are relatively static. From Age specific marital fertility rate (ASMFR), we can fairly accurately estimate the number of live births in the population. Total fertility rate (TFR) is the most preferred statistics in population projections all over the world. It captures all the information contained in ASFR of the population and also gives a close to real life picture of average number of children born to women who just left the reproductive period.[4] This study highlight dynamics of various fertility aspects of the study cohort.

MATERIAL AND METHODS:

Female population with age 15 to 49 years from randomly selected seven villages from study area i.e. Palustaluka of Sangli district of Maharashtra were included in the study.

Data on these females with age 15 to 49 years related to their fertility parameters was collected using the pro-forma developed specifically for this purpose; by visiting house to house. For study of population including births and deaths the period designated was 1st July 2015 to 30th June 2016. The mid-year population was updated on 1st January 2016 deleting deaths and female marriages and adding births and male marriages that occurred up to 31st December 2015. Data collection on birth and death related aspects were terminated on 30th June 2016. The data was

summarized into following rates, ratios and some relevant parameters using MS_EXEL & SPSS version 20.

FINDINGS:

During one year follow up period, 1st July 2015 to 30 June 2016, 99 (3.46%) out of 2862 women delivered live newborns. Considering only married women (2082) this percentage in childbearing age group resulted into 4.76%. No any stillbirth or abortion was noticed during this period. Amongst 99 women delivered during one year follow up revealed more than 3/4th (84, 84.8%) were 1st or 2nd gravid. Very less number (15, 15.2%) was above 2nd gravid (Table 1). These mothers delivered 46 males and 53 females. Thus sex ratio at birth was 1152 females per 1000 males. The proportion of female newborns to first gravid mothers was high while in second gravid mothers proportion of male newborns was high. Sex ratio of newborns in second gravid mothers found less in comparison to first, third and fourth gravid mothers. Overall, sex ratio in primi-gavid (1471 females per 1000 males) was more than multi-gravid i.e. gravid greater than or equal to 2, (966 females per 1000 males)

Table 1: Gravida wise women delivered during one year follow up.

Gravida	Mothers n(%)	Gender of new born		Sex ratio at birth
		Male n(%)	Female n(%)	
1	42(42.4)	17 (37.0)	25 (47.2)	1471
2	42 (42.4)	23 (50.019)	19 (35.8)	809
3	13 (13.1)	6 (13.20)	7 (13.2)	1167
4	02 (2.1)	0	2 (3.8)	4000
Total	99	46	53	1152

Amongst 2082 married women in the reproductive age, 56 experienced stillbirths and 87 experienced abortions (Table 2). There were 136 women with no child. Amongst these 136, 81 were recently or newly married while 42 did not found to be conceived the pregnancy in longer married life. But remaining 13 women found with different combinations of stillbirth(s) and abortion(s) and did not completed the pregnancy ending with live birth (Table 3)

Table 2 : Conception parameters of women in reproductive age.

Particulars	Number (2082)	Percentage
Live Births		
0	136	6.5
1	416	20.0
2	1124	54.0
3	329	15.8
4	58	2.8
5	17	0.8
6	2	0.1
Stillbirths		
0	2026	97.4
1	48	2.3
2	7	0.3
3	1	0.0
Abortions		
0	1995	95.9
1	63	3.0
2	15	0.7
3	8	0.4
4	1	0.0

Table 3: Fertility status of women not delivered any live birth.

Stillbirths	Abortions				Total
	0	1	2	3	
0	123	1	1	0	125
1	3	1	3	0	7
2	0	2	1	0	3
3	0	0	0	1	1
Total	126	4	5	1	136

The fertility data revealed (Table 4) the smaller Crude Birth Rate (CBR) of 9.4 per 1000 population. The General Fertility Rate (GFR) indicated 34.6 births per year per one thousand women of childbearing age. Total Fertility Rate (TFR) determined for different denominators showed that on average 1.09 to 2.23 children would be born to a woman if she experienced the current fertility pattern throughout her reproductive span. The General Marital Fertility Rate (GMFR) showed 47.6 live births per 1000 married women with age 15-49 years. Gross Reproduction Rate (GRR) computed for different denominators revealed 0.58 to 1.19 newborn girls, who were the potential future mothers, born to 1000 women passing through their child bearing years. Child woman ratio (CWR) determined for different denominators showed 231.3 to 317.9 children of age less than 5 years to 1000 women of child bearing age.(Table 4)

Amongst 2862 women in the child bearing age, 780 not having any issue before and during study period of one year were unmarried, divorcee, widow or infertile. However of 99 women those delivered live newborns during period of one year, 42 mothers delivered (17 males + 25 females) for first time (Primi Gravida). Of remaining 57 mothers those (delivered second or more time

(Multigravida), 29 gave birth to male child and 28 gave birth to female child.(Table 5) Apart from 42 first time deliveries; 42 were second time; 13 were third time while 2 delivered fourth time. (Tree Diagram 1). Out of 29 mothers who delivered male child, 14 were with female child in the first delivery. However, 18 (31.6%) gave birth to female child in both first and recent deliveries. (Table 5 and Step Diagram 1) At any birth order it did not showed male sex dominating outcome.

Table 4 : Fertility Indices

Sr.No.	Fertility Indices	Present study
1	CBR/1000population	9.4
2	GFR/1000 women	34.6
3	TFR1 (all women in reproductive age)	1.09
	TFR2 (married, divorcee and widow women)	2.21
	TFR3 (married women only)	2.23
4	GMFR/1000 married women	47.6
5	GRR1 (all women in reproductive age)	0.58
	GRR2 (married, divorcee and widow women)	1.18
	GRR3 (married women only)	1.19
6	CWR1 (all women in reproductive age)	231.3
	CWR2 (married, divorcee and widow women)	296.1
	CWR3 (married women only)	317.9

Table 5: Previous and latest fertility outcomes

Status of fertility outcome	Fertility outcome during one year			
	No. Issue	Male	Female	Total
No issue	940	17	25	982
Male	975	15	10	1000
Female	846	14	18	878
MMF	1	0	0	1
MM	1	0	0	1
Total	2763	46	53	2862

Step Diagram 1: Birth order wise outcome of 99 deliveries.

Birth Order	Primi Gravida		Multi Gravida																	
	First(n=42)		Second(n=42)				Third(n=13)						Fourth(n=2)							
1	M 17	F 25	M 22		F 20		M 3		F 10		M 0		F 2							
2			M 13	F 9	M 10	F 10	M 1		F 2		M 6	F 4		M 0	F 2					
3							M 1	F 0	M 1	F 1	M 2	F 4	M 1	F 3		M 0	F 2			
4																	M 1	F 1		

Table 6: Age-Specific fertility rates.

Age Group	Women (Married) (1)	Women (Married+ Divorce+ Widow) (2)	Women (Married+ Divorce+ Widow + Unmarried) (3)	Births	ASFR For (1) Per 1000 (ASMFR)	ASFR For (2) Per 1000	ASFR For (3) Per 1000	SRS Report 2014 Per 1000	SRS Report 2015 Per 1000	ASFR-Census of India 2011
15-19	50	50	390	8	0.160	0.160	0.0205	0.029	0.012	0.031
20-24	271	274	484	47	0.173	0.172	0.0971	0.196	0.192	0.197
25-29	396	398	455	29	0.073	0.0729	0.0637	0.154	0.165	0.153
30-34	403	422	434	10	0.025	0.025	0.023	0.084	0 .085	0.07
35-39	330	365	369	3	0.0091	0.00821	0.0081	0.029	0.029	0.026
40-44	335	379	379	1	0.00298	0.0026	0.00264	0.012	0.012	0.009
45-49	297	348	351	1	0.0034	0.0029	0.0028	0.004	0.004	0.003
Total	2082	2236	2862	99	0.44692	0.4418	0.218016	0.508	0.499	0.489

ASFR determined by column (1), (2) and (3) of Table 6 revealed rising fertility trend up to 25 years age after which it showed declining ASFR with increasing age with exception of the ending child bearing age. Though this trend with all three denominators is same, ASFR(3) found very small up to age 25 years as compared to ASFR(1) and ASFR(2).(Table 6)

ASFR determined by (1) and (2) for age 15-19 years is very high as compared to that determined by (3). However ASFR (3) is similar to SRS 2014 and 2015. ASFR (1) and ASFR (2) for age 20-24 years is similar to SRS 2014 and 2015. But ASFR (3) is smaller than others for same age. ASFR (1), (2) and (3) for age above 25 years is smaller than the respective ASFRs observed by SRS 2014 and 2015.

Table 7: Distribution of women (Divorced, Widow, Married) by age and number of children ever born.

Age (in years)	Number of children ever born							Total	Average
	0	1	2	3	4	5	6		
<20	17	24	9	0	0	0	0	50	0.84
20-24	32	133	102	6	1	0	0	274	1.31
25-29	28	109	221	34	5	1	0	398	1.70
30-34	10	79	268	57	7	1	1	422	1.95
35-39	11	43	233	66	8	4	0	365	2.07
40-44	7	38	218	97	16	2	1	379	2.22
45-49	4	30	167	107	30	10	0	348	2.45
Total	109	456	1218	367	67	18	2	2236	1.95

Table 8: Distribution of women (Married) by age and number of children ever born.

Age (in years)	Number of children ever born							Total	Average
	0	1	2	3	4	5	6		
<20	17	24	9	0	0	0	0	50	0.84
20-24	32	131	101	6	1	0	0	271	1.31
25-29	28	109	219	34	5	1	0	396	1.70
30-34	6	74	258	56	7	1	1	403	1.98
35-39	10	33	215	62	6	4	0	330	2.10
40-44	11	30	194	85	16	2	1	335	2.27
45-49	5	25	143	95	22	7	0	297	2.42
Total	109	426	1139	338	57	15	2	2082	1.94

Above tables (Table 7 and 8) depicts information on the number of children ever born to women of 15-49 years age. The cross classification of age of woman and number of children born, made it possible to compute the average number of children ever born per woman. The average number of children ever born observed in both tables shows steady increase as age of woman advances. Also these both tables shows that about 50% of women belonging to age less than 25 years were having at least one child, while more than 55% of women belonging to age more than 25 years were having at least 2 children with exception of age 45 to 49 years in which there were about 50% women with two children.

Education differential in fertility:

Amongst 50 married women with age below 20 years nobody found illiterate. In further age groups there were illiterate women. Around 1/3rd of women of each age group were educated up to secondary level. Proportion of women having good education (S.S.C. and above) found increasing upto 30 years age after which the proportion was declined (Table 9). Education has shown curvilinear correlation with fertility for all ages (Table 10). For each age group fertility increased up to lower secondary education level and further the fertility decline as education level increased. This proved the higher the education level, the lower is the fertility. It was observed that fertility started declining when level of education of women of all ages was at secondary level with exception of women in age 25 to 29 years.

Table 9: Age wise Education of women in child bearing age (15 to 49yrs)

Age	Education								Total
	Illiterate	Lower Primary (1st to 6th)	Primary (7th)	Lower Secondary (8th & 9th)	SSC + 11th	HSC+ Lower Graduate	Diploma/ Graduate/Professional Graduate	Post Graduate	
<20yrs	0	5	5	9	17	8	6	0	50
20-24yrs	10	21	18	32	83	56	43	8	271
25-29yrs	10	20	31	30	139	74	64	28	396
30-34yrs	15	33	41	41	140	66	48	19	403
35-39yrs	18	27	47	32	124	45	35	2	330
40-44yrs	24	30	49	44	118	31	28	11	335
45-49yrs	32	41	48	27	96	21	24	8	297
Total	109	177	239	215	717	301	248	76	2082

Table 10: Average number of Children ever born alive per married women by age and educational attainment.

Age	Illiterate	Lower Primary (1st to 6th)	Primary (7th)	Lower Secondary (8th & 9th)	SSC + 11th	HSC+ Lower Graduate	Diploma/ Graduate/ Professional Grad	Post Graduate	Total
<20yrs	0.00	0.50	2.00	1.00	0.75	0.67	1.00	0.00	0.83
20-24yrs	1.40	1.31	1.39	1.48	1.38	1.32	1.05	1.00	1.31
25-29yrs	1.57	1.82	2.00	1.82	1.88	1.70	1.39	1.12	1.71
30-34yrs	1.87	2.15	2.10	2.23	1.99	1.99	1.60	1.42	1.96
35-39yrs	1.96	2.15	1.94	2.32	2.12	2.00	2.14	1.50	2.08
40-44yrs	2.26	1.97	2.40	2.33	2.20	2.38	2.23	1.80	2.24
45-49yrs	2.32	2.36	2.57	2.54	2.44	2.56	2.33	2.67	2.45

DISCUSSION:

Sex ratio at birth of 1152 females per 1000 males is very high than national figure 900 of 2013-15[4]. This may be because of publicity as well as control of district administration in relation to

female feticide practices since long back of data collection period. Also people were afraid of sex determination, because of the punishment associated with this so called crime.

CBR found in present study of rural population (9.4 per1000 population) is very less in comparison to CBR 22.7 and 22.4 observed in SRS 2014[5] and SRS 2015[4], respectively. GFR as per present study (34.6) is also less in comparison to 85.4 and 83.8 as per SRS 2014 and SRS 2015. The low CBR and GFR may be because the population studied in present project belongs to economically sound area (green belt). However SRS data showing high CBR and GFR may belongs to population from Empowered Action Group (EAG) states with high fertility and dense populated area.

GFR in present study indicating 34.6 births per year per thousand women of childbearing age is less than the roughly expected range of 50 to 300 births. This is also indication of declining birth rate. The present GFR is about four times of CBR which proves the statement made by Thomson and Lewis[6] that "The general fertility rate is usually four to five times as high as the crude rate in same population because the women of these ages normally constitute from one-fifth to one-fourth of the total population".

Low GMFR in present study (47.6) as compared to SRS 2014 and SRS 2015 (117.5 and 123.8) may be because of lower CBR which may be consequence of non-marriages of boys due to lesser job opportunities as per educational status and very less number of marriageable girls.

TFR2 and TFR3 are similar to TFR observed in 2009[7], SRS 2014 and SRS 2015 i.e. 2.6, 2.5 and 2.5, respectively. This measure is regarded as the best single cross sectional measure of fertility. TFR= two, implies parents are replacing themselves and the population remains static. However in the end the population with TFR at two will decline as all the mothers will not survive till the end of the reproductive period. The TFR is a hypothetical figure; it shows how many children would be born per woman if she did not died before reaching the end of the reproductive period and if she was subject to the observed specific fertility rate throughout this period.

The Fertility surveys are useful to measure the number of children ever born to a woman. This measure is based on the actual reproductive performance of a group of women and provides average number of children born per woman up to a certain age. The total fertility rate is a measure based on the fertility performance of group of women during one year. Thus the average number of children ever born per woman up to a certain age is a cohort measure as against current measures based on reproductive performance in one year.

Data on children ever born provide information about fertility trends; however, omission of children who have died is not a serious problem as that death and migration have a minor effect on the estimates.

Though the number of children ever born is computed from ever-married or currently married women, the average number of children ever born to women (Divorced, Widow and Married) and women (married) of different ages found similar. Also overall average number of children ever born to women (Divorced, Widow and Married) and women (married) irrespective of age was 1.95 and 1.94, respectively. The number of children ever born to women above 35 years ranged between 2.07 and 2.45, in both women categories. For women of 45-49 years, the average number of children ever born was 2.45 and 2.42 which may be considered as the completed family size.

Non illiteracy in women of age below 20 years indicates impact of "Education for All" policy of the government. While declining proportion of women with good education with increasing age was the result of understanding importance of better life which can be achieved only by good/quality education by women in earlier ages. The educational attainment has a very strong bearing on the number of children born. Educational attainment of women indicates her status in the society. The relationship between fertility and educational attainment of wife was negative in the sense that the higher the educational level, the lower is the family size. This revealed the education of women is a significant factor in determining fertility. Similar to ManjulPandey et al[8] the present study also revealed the great impact of education on lowering fertility occurs when education level attainment is at secondary level.

CONCLUSION:

The growth of population depends entirely on human fertility. Several social, cultural, economical and political factors are observed to be responsible for levels of fertility. However influence of these parameters varies region to region, state to state and nation to nation and hence fertility is found varying inter and intra nation. In a society in which women are educated are observed to be developed a rational and secular attitude towards childbearing and have planned families. The future of entire society depends on family formation and hence studies of human behavior in relation to fertility are useful in understanding the social changes.

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