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A MATHEMATICAL ANALYSIS UNDER POPULATION DYNAMICS FOR RAYA TOWN AREA DISTRICT MATHURA, UP, INDIA

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ABSTRACT

Population growth is a big challenge not in India but many developing are facing this problems which seems to be going towards uncontrolled. In the present paper, some fertility measures like Crude Birth Rate, Crude Death rate. Age Specific General Fertility Rate, Total Fertility Rate etc. are evaluated for Raya Town area district Mathura UP by a survey of 300 family in Jan 2017 to Dec 2017 and focused on which factor is responsible for high population growth and how to find control on it.

KEYWORDS: Fertility, Population, Demography, CBR, CDR, ASGFR

India is facing today with most critical problem due to high growth rate of population. The fertility rate is main reason for population growth (Mandilbeum 1974; Thompson and Lewis, 1982). In 2017 the current population of India is 1.35 billion people. 1n 2017 approximately 1.34 billion people by United Nations data. The world population was approximately **7.6** billion between 2017. Specifically, the global population stood at roughly 7.55 billion in 2016, increasing to about 7.64 billion by the end of 2017. The global population was growing at an annual rate of about 1.15% .Different demographers given different important suggestions in his many research which were very helpful in population studies future (Visaria, 1974; Bhinde and Kanitkar, 1978; Marjit and Mitra, 1996).

The population of India is growing with very fast speed and is on second place in the world after China. China and India maintained their positions as the two most populous countries, comprising roughly and of the global population, respectively (World Population Prospects 2017). The official all-India demographic data the total fertility rate of India in 2017 was 2.2 and the crude birth rate was 20.2. The Crude death rate was 6.67 (per 1000 population) and the infant mortality rate was 33. There many Government's schemes are running but due to India population is out of control. The persisting high level rate of fertility despite considerable decline in mortality rate in India considered as the main root for the continuing this high growth rate of population. From various population studies, it has been observed that the growth trend of per capita income often diverges in absolute terms, even when poorer economies may exhibit relative (or conditional) catching-up. This absolute divergence suggests that the income disparity between wealthy and impoverished countries or regions continues to widen over time. In most of the developing counties as Sudan, Etihopia, facing a big problem towards infant mortality and crude death rate due to population growth and poor economic condition (Conzo *et al.*, 2017).

The present analysis is oriented to evaluate the current information on fertility measures for an Raya Town population of Mathura has taken for the purpose and the results are based on the fertility survey of 300 samples households from 10 wards .of the Raya town Mathura. Raya is a Nagar Panchayat city of Mathura UP. In 2017, the estimated population of the Mathura urban/metropolitan area was approximately 559,000 to 574,000 people, while the broader Mathura district was home to over 2.5 million residents. Total District Population: 2,547,184 (comprising roughly 53.8% males and 46.2% females). Urban vs. Rural split: Roughly 29.7% of the district lived in urban regions, while 70.3% resided in rural areas.

Population Density: 764 people per sq. kilometre. Raya is a Nagar Panchayat city in district of Mathura, Uttar Pradesh. The Raya city is divided into 14 wards for which elections are held every 5 years. The Raya Nagar Panchayat has population of 21,344 of which 11,202 are males while 10,142 are females as per report released by Census India 2011. The total population of Raya town is 21,344 of which 11,202 are male and 10,142 are females according to census report of 2011.The female sex ratio is of 905 against 912 and 73.83% Literacy rate. The 2001 Census of India, the 14th decennial census in the country, recorded a total population of 1,028,737,436.

In the field of demography, fertility refers to the presence of births. One significant factor contributing to the global demographic shift is India's fertility trends. Probably more live births than any other occur in the nation each year. This essay presents the most recent data on fertility. For Raya Town in the Mathura district of Uttar Pradesh, metrics like CBR, ASFR, TFR, and GFR are assessed using information gathered from a fertility survey of 300 sample homes.

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Mathura District Religion Data		
Hindu	90.72 %	2,310,776
Muslims	8.52 %	216,933
Christian	0.12 %	3,179
Sikh	0.11 %	2,872
Buddhist	0.03 %	883
Jain	0.08 %	2,056
Others	0.00 %	126
Not Stated	0.41 %	10,359

Sources" Census 2011

OBSERVATIONS AND RESULTS

Crude Birth Rate (CBR)

One crucial component in determining fertility is the crude birth rate. Birth data from the year Jan 2017 to Dec 2017 is being gathered for the sample household survey in Raya Town, Mathura. According to this study, there are 72 births (live) by a survey among 300 family with a total population of 2145. The sex ratio at birth is 93 female births for every 100 male births, out of the 72 live births recorded, 35 of which are male and 37 of which are female. The calculated CBR is 33.57 per thousand. The natural increase approximately 13.52 per thousand by growth of populations based on the total of 35 deaths recorded in 300 sample households. The growth rate, CBR, and CDR are discovered to be significantly greater than the Similar rates were typically observed for India's population, which were 19.3 and 7.3 per thousand, respectively, with a growth rate of 1.19 through 2016.Numerous population studies that are based on Muslims were shown to have a greater fertility rate than other religious groups, including Christians and Hindus, based on their fertility behavior. The Raya Town, Mathura, Uttar Pradesh, has a crude fertility index of 2.5, which may be quite high given the current survey of rural sample homes.

Age Specific Fertility Rates

Women are thought to be childbearing between the ages of 15 and 44 or 15 and 49. Compared to the crude birth rate, the age-specific fertility rate is significant since there the reproductive age group is taken into account. The age-specific fertility rates (ASFR) for women between the ages of 15 to 44 are shown in Table 1.1. 492 women in the reproductive age range of 15 to 45 years were identified in the current study of 300 sample families.

Table 1.1: ASFR

Age in years	No. of females	No. of births	ASFR per 1000
15-19	89	03	33.70
20-24	83	22	265.06
25-29	77	21	272.73
30-34	115	18	156.52
35-39	48	5	104.17
40-44	80	03	37.5
Total	**492**	**72**	**869.68**

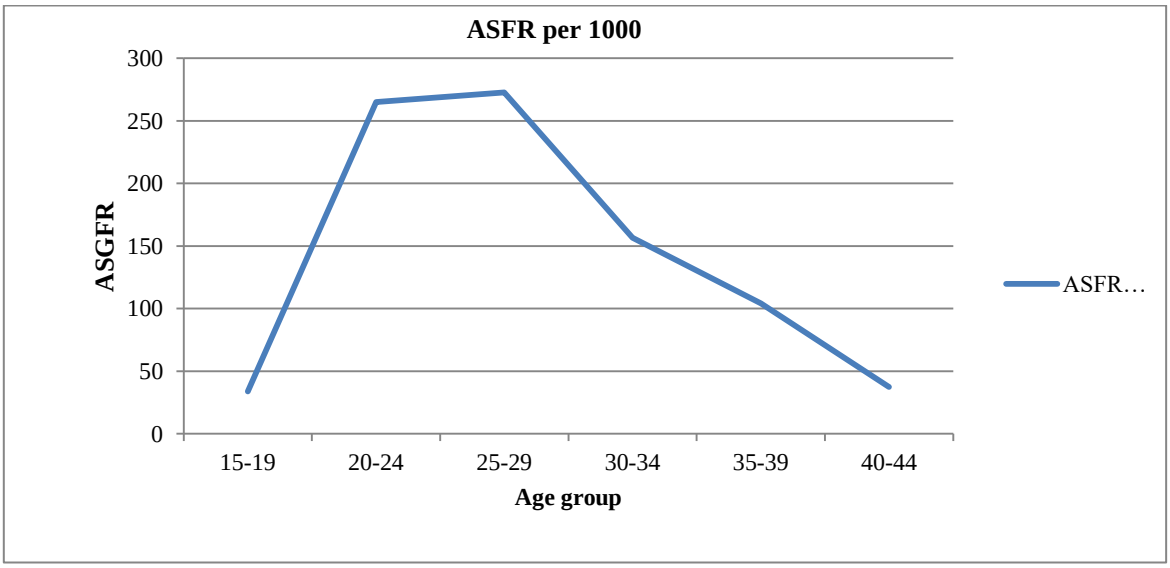

Figure 1.1: ASFR

Table 1.1 shows that the ASFR is highest for the 25–29 age range and then drops off significantly after that. Figure 1.1 displays the ASFR curve. The bell-shaped graph shows how early childbearing begins and continues until later in life. It rises with age, peaking at 272.73 in the 25–29 age range after reaching 33.70 at age 15. After that, it progressively falls.

Total Fertility Rate (TFR) and Gross Reproductive Rate (GRR):

The total fertility rate for this survey is found 4.35. So by the survey of result the Total Fertility Rates for Raya town Mathura may be desired to bear 4 childs in her reproductive life. The fertility rate in India in 2016 is 2.28 and 2.19 in 2017. In the current survey the Total Fertility Rate is obtained to be some higher is high fertility in Raya town of Mathura City UP, The gross reproductive rate (GRR) is limited to the number of female children, while total fertility encompasses both male and female population members.

GRR=4.35 ×0.51=2.23

Since the current survey indicated that out of the 72 births, 37 are female, meaning that the proportion of female births is 0.51.In other words, the ratio of future mothers' gross reproductive rates is 1:2.2. The gross reproductive rate is clearly at its highest, indicating that the women in this community have a high fertility rate and that a newborn girl will replace almost two mothers.

Table1.2: Fertility measures during Jan 2017-Dec 2017

Measures of Fertility	Fertility Rates
Sex ratio	1.06
Female proportion at birth	0.51
CBR	33.57
CDR	14.45 per 1000
Natural Increase	1.9
TFR	4.35 per female
GRR	1:2.2

The below chart express the various fertility measures of Raya town of Mathura district during Jan 2017- Dec 2017.

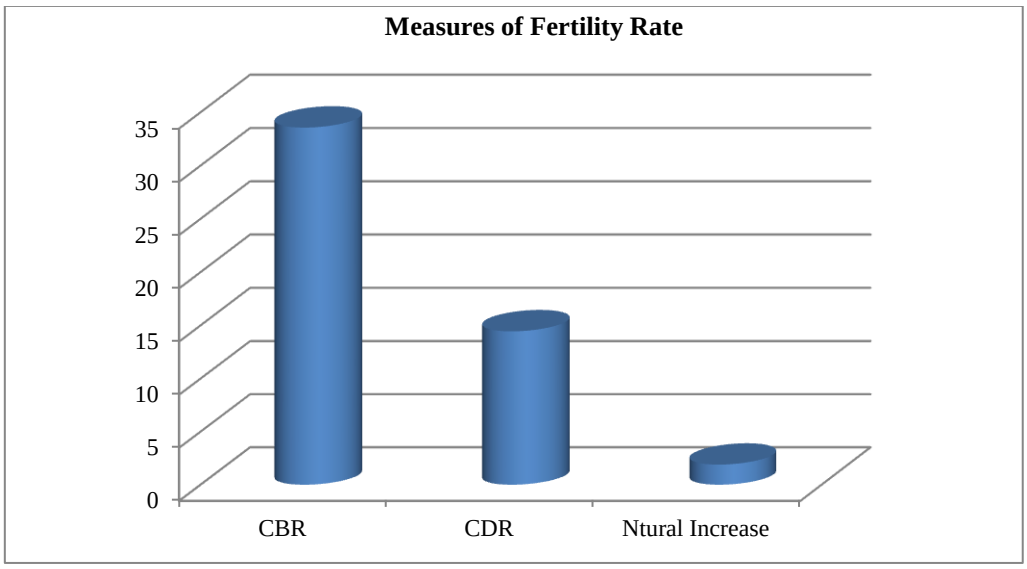

Fig: 1.2

Table 1.3: Average no. of children per women under age of women

Age (year)	Number of married women	Number of children	Children as per average women
15-19	17	9	0.53
20-24	55	72	1.31
25-29	72	152	2.1
30-34	81	231	2.85
35-39	52	143	2.75
40-44	78	281	3.60
total	**355**	**888**	

It is clear from the survey results in the table that the number of children increases with a woman's age, peaking for those between the ages of 40 and 44. The sample families have an average of 2.23 children per woman, whereas the average fertility rate for this age range is 3.6. Numerous studies have indicated that beyond the age of 35, the fertility rate of women in Raya Town, Mathura district, drops off significantly.

CONCLUSION

According to the current fertility survey, Raya Town in Mathura, Uttar Pradesh, is a study location with high fertility. In Raya town, the CBR, CDR, and natural population growth are all higher than the comparable figures for India as a whole. The current survey's findings regarding ASGFR, TFR, and GRR showed that the populations were classified as highly fertile. According to gross reproductive rates, about two mothers will eventually be replaced by new born girls.

SUGGESTIONS

It is important to understand from the present fertility survey populations, the following suggestions are

(a) Given the extremely high percentage of married women with more than two children, it is necessary to convince these women to use any family planning technique in order to prevent population growth

(b) It is evident from the current survey that only 8% of all births have been to women over 40. Therefore, using family planning methods after this age will not lower fertility, and therefore, programs under various government sachems should specifically target women under 40.

(c) Female education is a very important factors for minimising the fertility rates, that is higher education is very necessary for females.

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