

## Study the Trends of Some Fertility Measures of Bangladesh

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**Abstract:** The purpose of this study is to observe the trends of some fertility measures of Bangladesh. For this, the secondary data of various Censuses of 1961, 1974, 1981 and 1991 and Islam (2003) have been used. Fertility measures such as crude birth rate (CBR) for male, female and both sexes, general fertility rate (GFR), child woman ratio (CWR), replacement index (J) and vital index (VI) have been estimated. And intercensal growth rate has also been estimated. The trends of these measures are observed in this study.

**Key words:** Fertility measure trends, various censuses

### Introduction

Bangladesh is one of the most developing countries with an accelerated population growth in the world. The population of Bangladesh has been increased from 42 million in 1941 to 129 million in 2001 (BBS, 2001). It is to be noted that Bangladesh is one of the most densely populated country containing 129.25 million citizens of which 65.84 million are males and 63.41 millions are females (BBS, 2001). It is the ninth most populous country in the world having population density 834 persons per square k.m. The population is growing at a rate of 1.47 percent per year (Mittra and Associates, 2001). The government of Bangladesh has long been trying to control its population and has introduced various programs after its independence. But the government has got a little success to control its population. It is perhaps for the lack of reliable information about the national based demographic parameters. Many researchers tried to provide the information about the demographic parameters of Bangladesh but, very few of these provided national based information. Some of these have been concentrated in the area of fertility, some are in the mortality. Thus, the national planners are undertaking their development plan and program with the limited reliable national based demographic information. Someone should make an attempt to provide reliable demographic parameters using national based data for national plan and program of the country. Keeping these points in view an attempt has been made in this study to provide some fertility measures of Bangladesh based on national data. As there is no national based complete vital registration system in Bangladesh, So, census data is the only source which can be used to provide the information of national based demographic parameters (fertility). Thus, an attempt has been made here to estimate some fertility parameters of Bangladesh using the census data of 1961, 1974, 1981 and 1991.

Therefore, the main aims and objectives of this study are:

to estimate CBR for male, female and both sexes, GFR, CWR, J, VI.

to estimate intercensal growth rate for male, female and both sexes, and

to observe their trends.

### Materials and Methods

**Data and Methodology:** To estimate CBR, J and VI, the information have been taken from Islam (2003) and various Censuses of 1961 (Nomani, 1964), 1974 (BBS, 1977), 1981 (BBS, 1984) and 1991 (BBS, 1994). Moreover, to estimate GFR, total births have been taken from Islam

(2003) and female population in the reproductive ages from given Censuses. CWR and growth rate have been calculated from the Census information.

**Estimation of Crude Birth Rate (CBR):** It is ratio of the total number of births (B) during a year to the average or mid-year population (P). It is conventionally estimated by

$$CBR = B/P \times 1000$$

It has been estimated using the inter-relation between CBR, CDR and growth rate in the present study. Thus applying the balancing equation,  $CBR = CDR + r$  [assuming the net migration rate is zero]. Estimated CBR for male, female and both sexes at the time of census years have been shown in Table 1 and depicted in Fig. 1. It is to be noted that CDR have been taken from Islam (2003).

**Estimation of General Fertility Rate (GFR):** General fertility rate is a refined measure than crude birth rate in the demographic analysis specifically in fertility analysis. It is the ratio of total births (B) during a calendar year to mid-year female population in the reproductive ages ( $P_{15-49}^f$ ). It can be mathematically expressed as

$$\text{GFR} = \frac{B}{P_{15-49}^f}$$

It is to be noted here that total births have been obtained in the estimation section of ASFRs (Islam, 2003) and female population taken from censuses.

**Estimation of Child Woman Ratio (CWR):** Child woman ratio is a kind of demographic parameters based on census. In the absence of national wide vital registration system (specially birth registration), it is very effective and significant measure in fertility analysis in the developing countries like Bangladesh. The another name of this measure is effective fertility ratio. It is the ratio of the children under age 5 years ( $P_{0-4}$ ) in a calendar year to mid-year female population in the reproductive span of life ( $P_{15-49}^f$ ). It can be expressed in symbolical notation as

$$\text{CWR} = \frac{P_{0-4}}{P_{15-49}^f}$$

**Estimation of Replacement Index (J):** In the absence of birth statistics, the replacement index is very effective and significant measure in the developing countries like Bangladesh measured from census statistics and life tables at the same year. The replacement index can be defined by the age distribution of actual female population in the childbearing ages and female life table population in the same ages for the same period, the replacement index has as its numerator, the ratio of children under age five years to females at the reproductive ages in the actual population and, as its denominator, the corresponding ratio in the stationary or life table population. Usually it is denoted by J and can be expressed in the more conventional demographic notation, that is

$$J = \frac{P_{0-4}}{P_{15-49}^f} \div \frac{L_{0-4}^f + \frac{B_m}{B_f} L_{0-4}^m}{L_{15-49}^f} \quad (\text{Shryock, Siegel and Associates, 1975})$$

where,  $P_{0-4}$  is the number of children under age 5 years,  $P_{15-49}^f$  is the female population in the reproductive ages 15 to 49 years,  $L_{0-4}^f$  is life table female population under age 5 years,  $L_{0-4}^m$  is life table male population under age 5 years,  $B_m/B_f$  is the sex ratio at birth and  $L_{15-49}^f$  is the female life table population in the childbearing ages 15 to 49 years. It should be noted here that life table female population, that is, stationary population have been taken from Islam (2003) in which eight abridged life tables have been constructed by Widowhood Method.

It is also to be mentioned here that the replacement index may be used as a substitute measure of net reproduction rate, where data are not available for the computation of the net reproduction rate.

**Estimation of Vital Index (VI):** The vital index is the ratio of the number of births to the number of deaths during a calendar year, times 100. It does indicate the extent to which the force of natality exceeds that of mortality at a given time.

**Estimation of Intercensal Growth Rate (r):** Growth of population is an important aspect of population that is most often talked about not only in the demographic circle but also by people concerned with economic growth, national planning and social welfare. It refers to the change of population size between two dates. Growth rate of a population during an intercensal period is a percentage of population or per person of population at the beginning census of the intercensal period. There are various estimating methods of population growth rate. The exponential growth rate method is suitable for our country. So, an attempt has been made to estimate the growth rate applying the exponential growth rate method. The formula is as follows:

$$p_{t_2} = p_{t_1} \exp(r(t_2 - t_1))$$

$$\text{i. e. } r = \frac{\ln\left(\frac{p_{t_2}}{p_{t_1}}\right)}{t_2 - t_1} \quad (\text{Barclay, 1958})$$

where,  $P_{t_1}$  is the initial population at time  $t_1$ ,  $P_{t_2}$  is the terminal population at time  $t_2$  and  $t_2 - t_1$  is the exact number of years between the intercensal period  $t_1$  to  $t_2$ . It is to be noted here that intercensal growth rate is assumed to be a growth rate at terminal date.

### Results and Discussion

From the table and Fig., it is observed that CBR for male and both sexes were strictly increasing during 1961 to 1974 and afterwards, started to decrease till 1991. But, CBR for female increases with passing of time up to 1981 and then, started to decrease up to 1991. The rate of increment of CBR for male during 1961-1974 was 11.55% which was faster but it decreased at a slow speed at 2.22% and at a greater speed at 14.8% during 1974-1981 and 1981 to 1991 respectively. Also, the rate of increment of CBR for female was 5.76% and 1.56% during 1961-1974 and 1974-1981 respectively but it decreased at a greater speed at 17.71% in the interval 1981 to 1991. Again, during 1961-1974 the rate of increment of CBR for both sexes was 8.53% which was faster but it decreased slowly at a speed 0.54% during 1974-1981 and decreased at a greater speed at 16.08% during 1981-1991.

GFR and CWR have been estimated for the census years 1961, 1974, 1981 and 1991 and presented in Table 1. To see the trend of them from the table, it is observed that GFR was showing increasing trend in the interval 1961 to 1974 and then started to decrease up to 1991. Again CWR was showing decreasing trend during the study period. The rate of increment of GFR during 1961-1974 was 11.17% which was faster but it decreased at a slower speed at 3.93% during 1974-1981 and it rapidly decreased at a large extent of speed at 42.73% during 1981-1991. The rate of decrement of CWR was 4.91%, 2.52% and 6.65% during the intercensal periods 1961-1974, 1974-1981 and 1981-1991 respectively.

The replacement index for the census years have been estimated and presented in Table 1. To see the trend, it is observed from the table that it was increasing trend in the intercensal period 1961-1974 and decreasing trend during 1974-1991. The rate of increment during 1961-1974 was 6.7% but the rate of decrement were 7.45% and 19.92% during the intercensal periods 1974-1981 and 1981-1991 respectively in which rate of decrement during 1981-1991 was more faster than previous period.

The vital index for the census years have been estimated and presented in Table 1. The table reveals that VI was showing increasing trend during the study period. The rate of increment during 1961-1974, 1974-1981 and 1981-1991 were 14.65%, 13.22% and 6.62% respectively in which we see that the rate of increment were gradually decreasing with the increase of time.

Table 1: Crude Birth Rate (CBR) for Male, Female and Both Sexes, General Fertility Rate (GFR), Child Woman Ratio (CWR), Replacement Index (J), Vital Index (VI) and Growth Rate (r) for Male, Female and Both Sexes of Bangladesh in the Census Years 1961, 1974, 1981 and 1991

Rates	Census Years				%Increment/Decrement (Intercensal Periods)		
	1961	1974	1981	1991	1961-1974	1974-1981	1981-1991
CBR (Male)	42.00	46.85	45.81	39.03	+11.55	-2.22	-14.8
CBR (Female)	43.75	46.27	46.99	38.67	+5.76	+1.56	-17.71
CBR (Both Sexes)	42.81	46.46	46.21	38.78	+8.53	-0.54	-16.08
GFR	206	229	220	126	+11.17	-3.93	-42.73
CWR	876	833	812	758	-4.91	-2.52	-6.65
J	2.39	2.55	2.36	1.89	+6.70	-7.45	-19.92
VI	198	227	257	274	+14.65	+13.22	+6.62
r (Male)	0.0202	0.0261	0.0274	0.0243	+29.21	+4.98	-11.31
r (Female)	0.0223	0.0260	0.0291	0.0249	+16.59	+11.92	-14.43
r (Both Sexes)	0.0212	0.0260	0.0282	0.0246	+22.64	+8.46	-12.77

Growth rates have been estimated for male, female and both sexes during the period 1951 – 1961, 1961 – 1974, 1974 – 1981 and 1981 – 1991 and presented in Table 1. These rates have been plotted in the graph paper and displayed in Fig. 2. From the Fig., it is observed that they were all increasing trends up to 1981 and then, they were decreasing up to 1991. From the table and the Fig., it is observed that growth rate curve for male, female and both sexes were increasing trend during 1961-1981 and then, they started to reduce up to 1991. The rate of increment of growth rate for male during 1961-1974 was 29.21% which was faster and the rate of increment during 1974-1981 was 4.98% which was slower but the rate of decrement of it during 1981 to 1991 was 11.31%. Also, the rate of increment of it for female during 1961-1974 was 16.59% which was faster than that of it during 1974-1981 was 11.92% but it decreased

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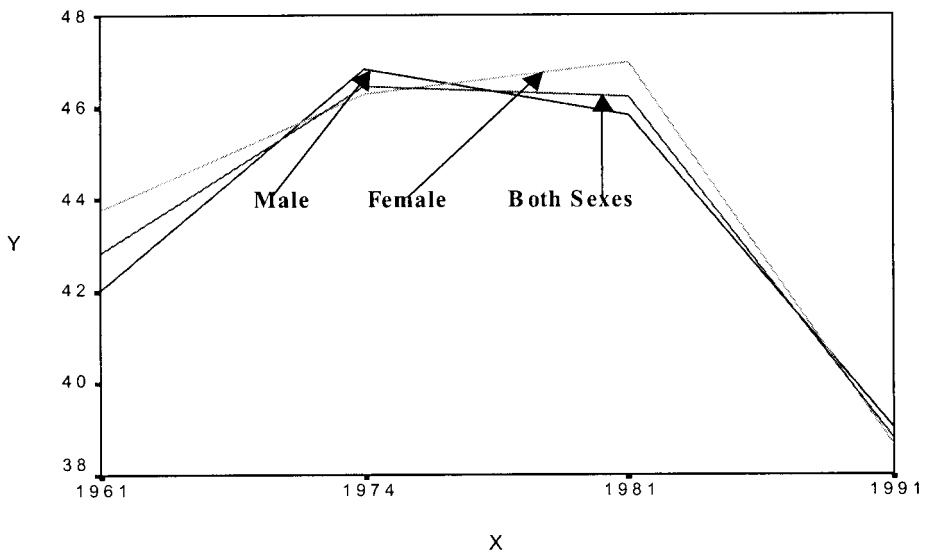


Fig. 1: Crude Birth Rate (CBR) for Male, Female and Both Sexes of Bangladesh in the Census Years 1961, 1974, 1981 and 1991. X: Census Years and Y: Crude Birth Rate

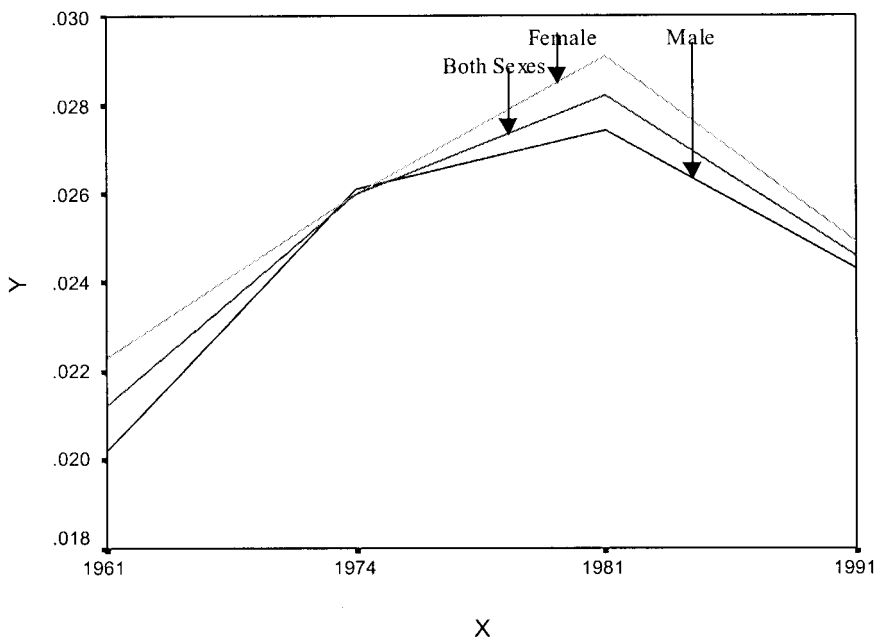


Fig. 2: Growth Rate (r) for Male, Female and Both Sexes of Bangladesh in the Census Years 1961, 1974, 1981 and 1991. X: Census Years and Y: Growth Rate

at a greater speed at 14.43% during 1981-1991. Again, during 1961-1974 the rate of increment of growth rate for both sexes was 22.64% which was faster than that of it during 1974-1981 was 8.46% which was slower, it rapidly started to decrease at a speed at 12.77% in the interval 1981 to 1991.

**Conclusion**

In this study, fertility measures such as CBR, GFR, CWR, J, VI of Bangladesh have been estimated. It is observed that all the measures of fertility in this study were increasing trend during the intercensal period 1961-1974 excepting

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CWR. But, all the measures of fertility are decreasing during 1974-1981 excepting CBR for female and VI. And all the measures of fertility were decreasing during 1981-1991 excepting VI. In fact, VI was increasing trend during the study period. It is also seen that growth rate for male, female and both sexes were increasing trend during 1961-1981 but decreasing trend during 1981-1991. Hope this study will be helpful to the Government planners as well as the Non-government organizations, researchers and academicians to provide sound basis for comprehending any future plan of action for the socio-economic development and health care programs in the country.

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