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Fertility levels and trend among women in Nigeria

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Abstract

Fertility levels and trend among women in Nigeria are discussed in this paper using both reported and adjusted current and life-time fertility measures. The Brass P/F ratio and Brass Relational Gompertz models were applied to obtain the adjusted ASFRs and TFRs used for the discussion from the 1991 ***Census PES, 1981/82 NFS,*** 1990, 1999 ***and*** 2003 ***NDHS data. The results of the analyses show that although fertility level in Nigeria is still high in relation to the levels in the developed and some developing countries, there are indications that it is declining, but at a very slow pace. Improved status of women and family planning services 4delivery, among others, have been recommended.***

Key words/Expression: Contraceptives, Fertility trend, Total fertility, Parity equivalent, Mean parity.

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1.0 Introduction

Human population all over the world is increasing at a very high rate. World population was put at about six billion in 1990 and about 6.314 billion in 2003. According to Population Reference Bureau PRB (2003) [15], less developed countries of the world accounted for about 80.6 percent and 81 percent of the world populations in 2001 and 2003 respectively. Among the developing regions Africa has the highest annual population growth rate of about 2.4 percent. Among the sub-regions in Africa, West Africa has the second highest growth rate of about 2.7 percent per annum. Within the West Africa sub-region Nigeria has one of the highest rates of natural increase (about 2.8 percent) per year. PRB (2003) [15] also ranked Nigeria ninth out of the 11 countries of the world with population of over 100 million.

The whole concern about rapid population growth is that it is not being matched by growth in the resources to cater for it. Rapid population growth affects the economy adversely by increasing poverty and unemployment, bringing excess pressure on social services and hence, increasing crime wave and political crises. It also increases import of food and consumer goods and hence, reduces savings and investment. That Nigeria is today classified as one of the poorest nations of the world, despite her huge natural resources is a direct consequence of rapid population growth rate.

Population change results from the interaction of three components namely; fertility, mortality and migration. The impact of migration on population change is usually considered negligible. With improved medical facilities, nutrition and environmental conditions, mortality levels in most developing countries have been drastically reduced. However, fertility levels have remained high. It is the combined effects of declining mortality and high fertility rate that has kept the rate of population growth very high in most developing countries.

According to UN (1973) [16], countries with birth rates above 30 and GRR above 2.0 are found almost exclusively in Africa, Asia and Middle South America. However, recent evidence from the U.S. Census Bureau (2002) [16] and PRB (2003) [15] indicates that Africa appears to be the only region left with some of these ugly demographic characteristics.

Some of the socio-economic and cultural factors which influence fertility level are place of residence (rural/urban), level of education, occupation, employment status, religion and ethnic nationality. These factors influence fertility through the intermediate variables (proximate determinants). The four main fertility-reducing proximate determinants, according to Bongaarts (1978) [1], are marriage, abortion, contraception and postpartum infecundability while, coital frequency, primary and secondary sterility and separation of spouses are considered secondary proximate determinants. In a society where marriage is early, universal and stable and where contraceptive use is low, fertility level is usually high.

Applying the Bongaarts extended model to the Cameroon Fertility Survey (CFS) data, Lamlenn (2000) [8] observed that fertility-inhibiting power of both marriage index and index of contraception are greater among women with secondary or higher education, living in urban areas. Furthermore, fertility inhibition within marriage exerts greater fertility depression than marriage variables. Mbamaonyeukwu (2000) [9] observed that in some developing countries including Bangledesh, Thailand, Kenya, Botswana and Zimbabwe fertility decline has been recorded following substantial increases in contraceptive use among currently married women in the childbearing range. In other words, fertility could be reduced to the desired level by improving the status of women, and by the provision and use of family planning services.

In recognition of these, many developing countries, experiencing the problem of rapid population growth, have adopted a number of measures to control their fertility levels. In 1988, the Nigerian Government inaugurated the National Population Policy (NPP). The policy is aimed at improving the quality of life of the population and achieving lower population growth rates through reduction of birth rates by voluntary fertility regulation methods. Some of the set targets of the policy are: (i) to reduce the proportion of women bearing more than four children by 50 percent by 1995 and by 80 percent by the year 2000 and (ii) to reduce the total fertility rate per woman from over six to four children by the year 2000 and the population growth rate from about 3.3 percent to 2.0 percent per year by the year 2000 among others. To achieve the set goals and targets, some of the strategies adopted are: - making family planning services easily affordable, as well as safe and culturally acceptable; mobilizing relevant agencies, both private and public, for effective service delivery and pursuing aggressive population information, education and communication programmes among others. The country has also invested a lot of resources to achieve the set targets. Some non-governmental organizations like International Planned Parenthood Federation (IPPF), Planned Parenthood Federation of Nigeria (PPFN), and the United Nations Fund for Population Activities (UNFPA) have also made a lot of contributions towards achieving these goals. The questions that follow are: what level of achievement has Nigeria made on fertility reduction? Is there enough evidence to show that fertility level is reducing or will reduce? These and other questions are what this study is set to address. The results of this study may be relevant in the assessment of the level of achievements of the set targets on fertility level and population growth rate in the National Population Policy. It may also help to assess the degree of effectiveness of the policy strategies and to determine future directions or areas of emphasis in the policy implementation. Therefore the ultimate objective of this study is to determine the levels and trend of fertility in Nigeria.

Demographic data used for estimation of vital rates (including fertility) in most developing countries are derived mainly from censuses and sample surveys. Furthermore, estimates of the vital rates in most developing countries are derived by indirect techniques because of poor data quality on population. Some of these indirect techniques developed for estimation of fertility rates based on data from censuses and sample surveys are discussed in Section 2. In Section 3, these techniques are used to obtain the estimates used in discussing fertility levels and trend in Nigeria. The summary, recommendation and conclusion are contained in Section 4.

2.0 **Methodology**

The data used for this study are secondary data derived mainly from the 1991 Census Post Enumeration Survey (PES), 1981/82 Nigeria Fertility Survey (NFS) and the 1990, 1999 and 2003 Nigeria Demographic and Health Surveys (NDHS). The 2003 NDHS data were used to determine the estimates of the current level of fertility, while the others were used in combination with it to discuss fertility trend in Nigeria. The data from other sources was also used. The data used are on the number of births in the 12

months preceding the surveys (BLY) and the mean number of children ever born (MNCEB) classified by the age of mother as at the time of the survey.

For reasons earlier stated, indirect techniques were used to obtain estimates of fertility rate in Nigeria. The indirect techniques applied are the Brass P/F ratio method and the Brass Relational Gompertz model. The Brass P/F ratio method is one of the most widely used indirect methods for estimating current fertility. According to UN (1983) [17], the essence of the procedure is the adjustment of the age pattern of fertility derived from information on recent birth by the level of fertility implied by the average parity of mothers under 30 or 35 years of age.

When fertility data are reported by age of mother in the five-year conventional age groups, the Coale and Trussell variant of the original Brass model for calculating parity equivalent, $F(i)$, is given by:

$$F(i) = \phi(i-1) + a(i)f(i) + b(i)f(i+1) + c(i)\phi(7) \tag{2.1}$$

where for the i^{th} age group $i = 1,2,\cdots,7.$

$$\phi(i) = 5\sum_{j=1}^{i} f(j) \tag{2.2}$$

is the cumulated fertility up to the upper limit of the age group, $f(i)$ is the age–specific fertility rate and $a(i)$, $b(i)$ and $c(i)$ are the multipliers for deriving parity equivalent from the reported age-specific fertility rates in the 12 months preceding the survey [UN (1983) [17]]. The pattern of the ratio

$$K(i) = \frac{P(i)}{F(i)},\ i = 1,2,\cdots,7 \tag{2.3}$$

of the reported average parity, $P(i)$, to the estimated parity equivalent, $F(i)$, with age may reveal data error or fertility trends in a study data. When fertility is constant and data are free from error, $K(i)$ should not differ from unity in all age groups. However, any deviation of $K(i)$ from unity when fertility is constant is an indication of presence of error. For instance, if children ever born are increasingly omitted by older woman the ratios will tend to decrease as age increases. On the other hand when data are error-free, a recent decline in fertility tends to produce a sequence of $K(i)$ that increases with age [(UN (1983) [17]]. In practice, $K(i)$s are rarely constant or equal to unity. To obtain a reliable adjustment factor, K, UN (1983) [17] suggests the use of a simple average of $k(2)$ and $k(3)$ if they are reasonably consistent, or a weighted average of the two if they are not similar. However, if there is evidence that the population is experiencing a fertility decline affecting mainly the older women (aged 30 years and above) then $k(2)$ may be used as an adjustment factor. Kpedekpo (1982) [7] suggests that the ratio

$$K = \frac{\left[\sum_{i=1}^{4} P(i)\right]}{\left[\sum_{i=1}^{4} F(i)\right]} \tag{2.4}$$

also gives reasonably plausible results.

Furthermore, when classified by age of mother at the time of the survey the reported age-specific fertility rates, $f(i)$, refer to the unconventional age groups shifted by six months. To obtain the fertility schedule, $f(i)$, for the conventional age groups from $f(i)$ the model used is given by:

$$\left.\begin{aligned} f^{+}(i) &= [1 - w(i)]f(i) + w(i)f(i+1),\ i = 1,2,\cdots,6, \\ f^{+}(7) &= (1 - w(6))f(7) \end{aligned}\right\} \tag{2.5}$$

where, for the i^{th} age group

$$w(i) = x(i) + \frac{y(i)f(i)}{\phi(7)} + \frac{z(i)f(i+1)}{\phi(7)},\ \ i = 1,2,\cdots,6. \tag{2.6}$$

is the weight factor for estimating $f^{+}(i)$ from $f(i)$ and $x(i)$, $y(i)$ and $z(i)$ are given coefficients. Hence, the adjusted fertility schedule, $f^{*}(i)$, is given by

$$f^{*}(i) = kf^{+}(i),\ i = 1,2,\cdots,7 \tag{2.7}$$

where k is the chosen adjustment factor.

The Brass $\frac{P}{F}$ ratio method assumes that: (a) the reported age-specific fertility rates are approximately correct in age structure, although not necessarily in the overall level, (b) the average parity reported for the younger women (those under 30 or 35 years) is accurate and (c) fertility patterns have been constant overtime [Kpedekpo (1982) [[7], UN (1983) [17]]. The $\frac{P}{F}$ ratio procedure is useful for estimating current fertility and as a diagnostic tool for the evaluation of the quality of data from a survey. However, estimates from the procedure for the early age groups (particularly for the age group 15-20) are highly sensitive to departure from the underlying model assumptions.

The Brass Relational Gompertz model is also designed for the evaluation and adjustment of fertility estimates obtained from retrospective reports of birth histories. In this method, the Gompertz model is fitted to the fertility rates reported by age of mother and hence, obtain an estimate of total fertility. The Gompertz function used to represent the cumulative fertility of a population is given by:

$$\frac{\phi(x)}{F} = A^{B^{x}},\ 0 \prec A \prec 1,\ \ 0 \prec B \prec 1 \tag{2.8}$$

where; $\phi(x)$ is the cumulated age-specific fertility rates up to age x, F is the total fertility and A and B are constants for a particular set of rates. The linear form of Equation (2.8), which is easier to work with, is given by

$$y(x) = a + bx \tag{2.9}$$

where,

$$y(x) = -\log_e\left[-\log_e\left(\frac{\phi(x)}{F}\right)\right] \tag{2.10}$$

$$a = \log_e\left[-\log_e A\right] \text{ and } b = \log_e B$$

When fertility data are reported by age of mother in the five-year conventional age groups, an alternative fitting procedure which circumvents the unknown F and yields better results, according to Brass (1981) [2] is one which regresses $y(x)$ on chosen standard values, yx), and obtains estimates of **a** and b from:

$$z(i) - e(i) = \alpha + \beta g(i),\ \ i = 1,2,\cdots,7 \tag{2.11}$$

or

$$z(x) - e(x) = \alpha + \beta g(x),\ \ x = 20,25,30,\cdots,50 \tag{2.12}$$

where

$$z(i) = -\log_e\left[-\log_e\left(\frac{P(i)}{P(i+1)}\right)\right] \tag{2.13}$$

$$z(x) = -\log_e\left[-\log_e\left(\frac{\phi(x)}{\phi(x+5)}\right)\right] \tag{2.14}$$

and the values of $e(i)$, $g(i)$, $e(x)$, and $g(x)$ are based on the chosen standard fertility schedule and are tabulated. The parameters α and β are constants that reflect, respectively, the measures of location and degree of spread or concentration of the schedule [UN (1983) [17], Brass (1981) [2]].

The model assumes that mean parities for younger women are correctly reported. Therefore, the application of the method may be badly distorted if mean parities begin to be understated at ages as low as 25 years. The estimate of the total fertility (F) is less vulnerable to chance and erratic errors in the measures at under 25 than the traditional $\frac{P}{F}$ ratio. The Brass Relational Gompertz model also separates

the contributions which the current fertility and parity components are making to distortions [Brass (1981) [2]].

3.0 Fertility levels and trend in Nigeria

Fertility level in Nigeria as well as its variation over the years are discussed in this Section using both reported and adjusted measures. The fertility measures include Age-Specific Fertility Rate (ASFR), Total Fertility Rate (TFR), General Fertility Rate (GFR), Crude Birth Rate (CBR) and Mean Number of Children Ever Born (MNCEB) or Mean Parity. The adjusted ASFRs were derived from the reported rates using the P/F ratio method while the adjusted TFR were derived using both the Brass P/F ratio and Brass Relational Gompertz (BRG) models. The unstandardized CBR and GFR are based on the adjusted ASFRs and the age-sex distribution of the household populations while the corresponding standardized rates are based on the adjusted ASFRs with the 1999 NDHS age-sex population distribution as the standard. Section 3.1 discusses the current level of fertility in Nigeria while the fertility trend is presented in Section 3.2.

3.1. Fertility levels in Nigeria

The details of the applications of the Brass P/F ratio and Brass Relational Gompertz models to obtain fertility estimates from the 2003 NDHS data are shown in Appendix A. As Appendix A(a) shows, the P/F ratios for the second and third age groups ($k(2)$ and $k(3)$) are reasonably close. Therefore, a simple average of the two was used as the adjustment factor. The ASFR and TFR (both reported and adjusted) as well as other fertility estimates for Nigeria and some selected countries of the world are shown in Table 3.1 while the graphs of ASFRs are shown in Figure 1. The 2002 estimates of ASFR for Nigeria and some developing countries shown in Table 3.1 are extracted from the U.S Census Bureau (2002) [18] while the 2003 estimates of CBR shown under are from PRB (2003) [15].

Table 3.1 shows that the reported TFR for Nigeria is about 5.7. The adjusted TFRs are about 5.6 using the Brass P/F ratio and about 5.8 using the Brass relational Gompertz model and the cumulated ASFR. Other estimates of TFR for Nigeria are 5.8 by PRB (2003) [15] and 5.5 by the U.S. Census Bureau (2002) [18]. Estimates of CBR is 39.1 per 1000 population based on the adjusted ASFR from the 2003 NDHS and 41.per 1000 by PRB (2003) [15]. The reported mean parity for mothers aged 45-49 is about 7.03 while the TFR derived from the reported mean parity using the Brass Relational Gompertz model is about 7.5 children per woman. These two figures seem too high when compared with the other estimates of TFR and have therefore been excluded from further consideration. All the other estimates of TFR for Nigeria are reasonably close. They seem to agree that TFR may be less than the value of more than six children per woman observed in the late 1980s and early 1990s.

When compared with the target figures in the 1988 Nigeria National Population Policy and the estimates some for developed and developing countries shown in Table 3.1, the fertility estimates for Nigeria indicate that fertility level is relatively high.

Table 3.1: ASFR and other fertility estimates for Nigeria and some selected countries of the World by Year

Age of Mother	**NIGERIA**			**GHANA**	**INDIA**	**U.S.**	**DENMARK**
	2003		2002	2002	2002	2002	2002
	REPORTED	**ADJUSTED**					
15 – 19	0.126	0.144	0.124	0.060	0.051	0.057	0.009
20 – 24	0.229	0.233	0.228	0.143	0.182	0.112	0.060
25 – 29	0.274	0.272	0.252	0.173	0.168	0.113	0.126

Age of Mother	**NIGERIA**			**GHANA**	**INDIA**	**U.S.**	**DENMARK**
	2003		2002	2002	2002	2002	2002
	REPORTED	**ADJUSTED**					
30 – 34	0.244	0.235	0.209	0.150	0.109	0.085	0.102

35 – 39	0.168	0.158	0.150	0.103	0.054	0.036	0.039
40 – 44	0.072	0.064	0.084	0.054	0.024	0.007	0.009
45 – 49	0.018	0.014	0.051	0.011	0.008	<0.001	0.001
TFR	5.70	5.60	5.50	3.50	3.00	2.10	1.70
TFR	5.70	5.60	5.50	3.50	3.00	2.10	1.70

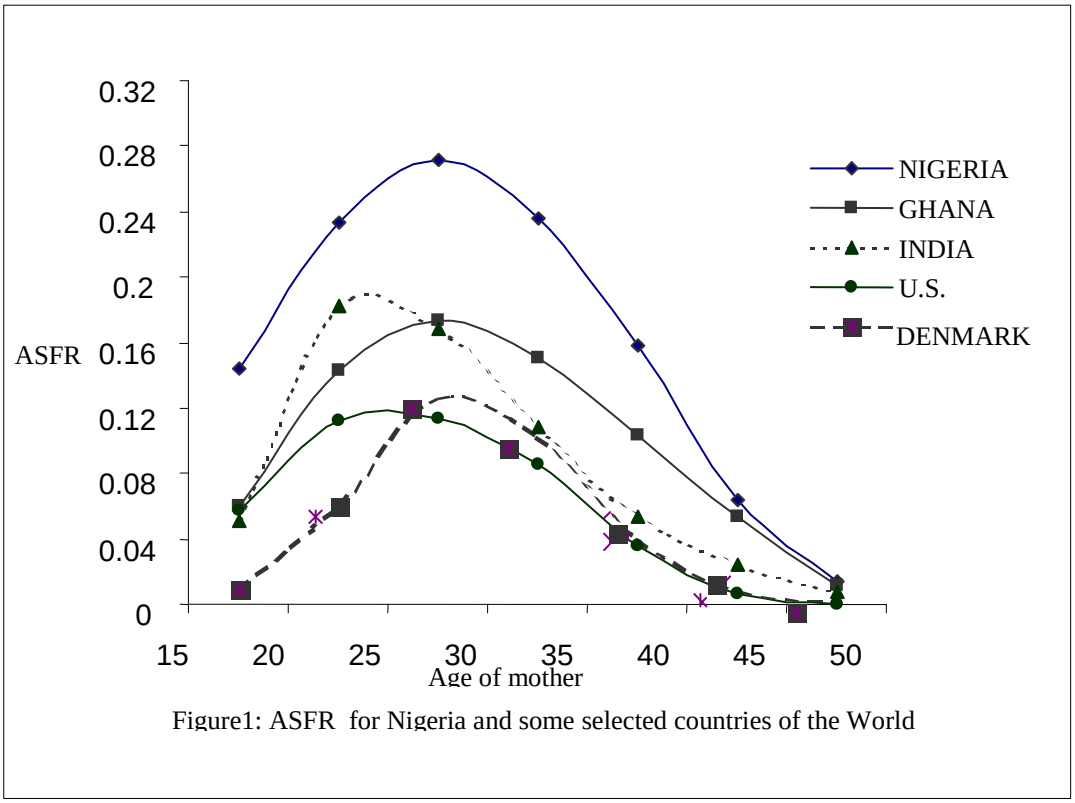

Figure1: ASFR for Nigeria and some selected countries of the World

The ASFR, also shown in Table 3.1 and Figure 1, is at almost every age group, higher for Nigeria than other countries shown, with a peak in the 25–29 age group. Thus, on the average, a Nigerian woman in the reproductive age range is, at almost every age group contributing more to TFR than her counterparts from other developed and developing countries.

3.2 Fertility trend in Nigeria

Estimates of Crude Birth Rate (CBR per 1000 population) for Nigeria from different sources prior to 1980 are given in Table 3.2. As Table 3.2 shows, although the sources are different, the estimates of the CBR for Nigeria are clearly above 49 per 1000 prior to 1980, but with a noticeable declining trend.

Table 3.2: Estimates of CBR (per 1000) for Nigeria

Source	***Period***	***CBR***
Prenceton Group	1952 – 1953	43 – 66
Economic Commission for Africa	1952 – 1953	53 – 57
United Nations	1950 – 1954	48.7
	1955 – 1959	50.1
	1960 - 1964	63.7

Source	*Period*	*CBR*
Rural Demographic Sample Survey	1965 – 1966	50.2
IPPF	1970	50.0
FFEP – KAP Survey	1971 – 1973	49.2
Okonjo, C.	1971	54.0
Olusanya	1972	53.4
Economic Commission for Africa	1975	49.7
U.S. Bureau of Census	1979	49.5

Source: Ebigbola, J.A. (1979) [3] p.3.

The reported mean number of children ever born (MNCEB) or mean parity for Nigeria by age of mother at the time of the survey are shown in Table 3.3 while their corresponding graphs are shown in Figure 2.

Table 3.3: Reported MNCEB for Nigeria by age of mother at time of survey.

Age of Mother	*1981/82 NFS*	*1990 NDHS*	*1991 PES*	*1999 NDHS*	*2003 NDHS*
15 – 19	0.35	0.30	0.30	0.25	0.26
20 – 24	1.79	1.40	1.20	1.12	1.18
25 – 29	3.21	3.00	2.50	2.51	2.74
30 – 34	4.32	4.60	3.60	3.94	4.35
35 – 39	5.07	5.50	4.40	5.24	5.93
40 – 44	5.13	6.30	5.00	5.95	6.62
45 – 49	5.84	6.80	5.50	6.33	7.03
ALL	3.07	3.30	2.50	2.85	3.09

As Table 3.3 and Figure 2 show, for the women aged 15 – 29, mean parities show a decreasing trend from the 1981/82 NFS to the 2003 NDHS. However, for the women aged 30 - 49 years, there appears to be no clear evidence of fertility decline. It has been acknowledged widely that mean parities for the latter group often suffer from errors of misreporting.

The values of the P/F ratios, $k(i)$, for Nigeria shown in Appendix B, increased with age of mother in almost all the surveys except the 1981/82 NFS and 1991 PES. When data is free from errors, this pattern of variation of $k(i)$ with age, according to UN(1983) [17], is a sign of recent fertility decline. The adjusted ASFR and other fertility estimates for Nigeria are shown in Table 3.4 while the graphs of the adjusted ASFR are shown in Figure 3. Table 3.4 shows that estimates of TFR using the P/F ratio decreased from about 6.6 in the 1981/82 NFS to about 5.6 in the 2003 NDHS. The corresponding figures using the Brass Relational Gompertz model and the cumulated ASFRs are about 6.0 in 1981/82 and 5.8 in 2003. The standardized estimates of CBR and GFR also followed the same downward trend. Table 3.4 and Figure 3 also show that in almost all age groups, except 35 – 39, adjusted ASFRs appear to have declined from the 1981/82 NFS to the 2003 NDHS. The peak of the distribution of the ASFRs lies within the age range 20 – 29 for all except the 1991 PES and 2003 NDHS.

The distribution of the type of the 1991 PES and 2003 NDHS ASFRs with peak in the age growth 25 – 29 is what UN (1973) [17] refer to as late-peak type while the distribution of the type of the other surveys with fertility rates for the age groups 20 – 25 and 25 – 29 nearly equal is referred to as a broad-peak type. These patterns, according to UN (1973) [17] and Kpedekpo (1982) [7] are closely related to age at marriage, proportion of women in each age group currently married and use of contraceptives among other factors. Thus, the distribution of ASFRs by age of mother may have shifted from broad-peak type in the other surveys to late peak type in the 2003 NDHS.

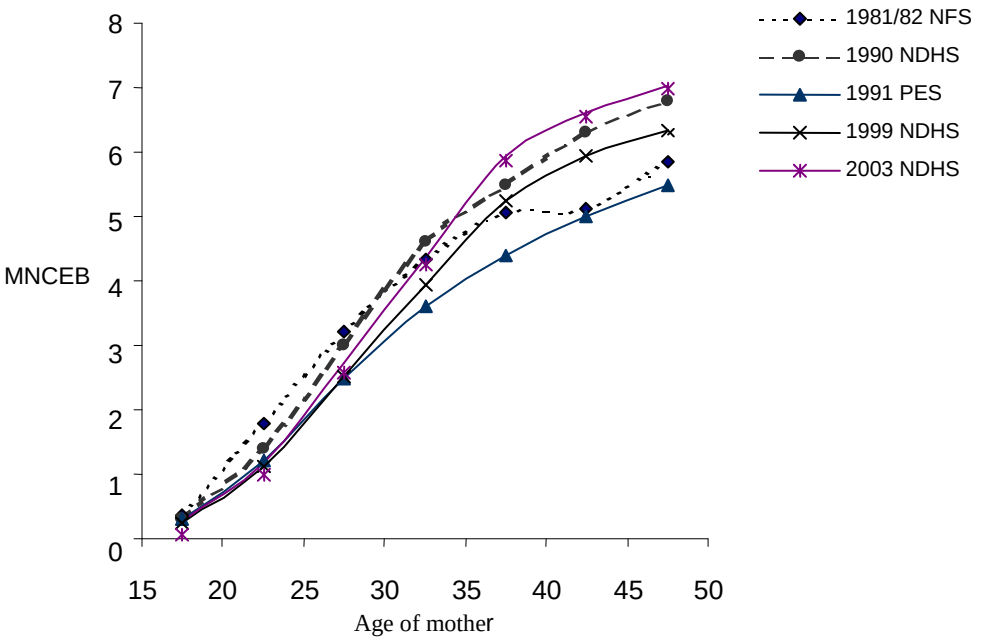

Figure 2: Reported MNCEB for Nigeria by age of mother at the time of survey

Table 3.4**: Adjusted ASFRs by age of mother of at the time of surveys and some other fertility estimates for Nigeria by Year**

Age of Mother	***1981/82 NFS***	***1990 NDHS***	***1991 PES***	***1999 NDHS***	***2003 NDHS***
15 – 19	0.209	0.170	0.117	0.130	0.144
20 – 24	0.295	0.261	0.247	0.225	0.233
25 – 29	0.282	0.262	0.280	0.240	0.272
30 – 34	0.232	0.215	0.229	0.220	0.235
35 – 39	0.149	0.154	0.177	0.132	0.158
40 – 44	0.096	0.089	0.106	0.065	0.064
45 - 49	0.054	0.058	0.087	0.016	0.014
TFR (P/F)	6.58	6.04	6.22	5.14	5.60
TFR (BRG)	5.98	5.72	2.81	4.99	5.76
GFR (UNSTD)	214.2	194.6	192.6	167.2	180.3
CBR (UNSTD)	44.7	36.3	45.7	36.5	39.1
GFR (STD)	214.0	193.5	191.1	167.2	182.8
CBR (STD)	46.7	42.2	41.7	36.5	39.9

In his study of the trends in three fertility indicators based on the 1990 and 1999 NDHS data, Oladosu (2001) [14] observed that the prospects of fertility decline in Nigeria are bright. All the fertility estimates for Nigeria in this study seem to agree that fertility level is declining, although at a very slow pace. The estimates indicate that TFR may have dropped from the values of more than six children per woman observed in the late 1980s and early 1990s but is yet to reach five children per woman. In other words, in more than one decade of conscious efforts to reduce fertility level, Nigeria has not been able to achieve a reduction of up to one child per woman.

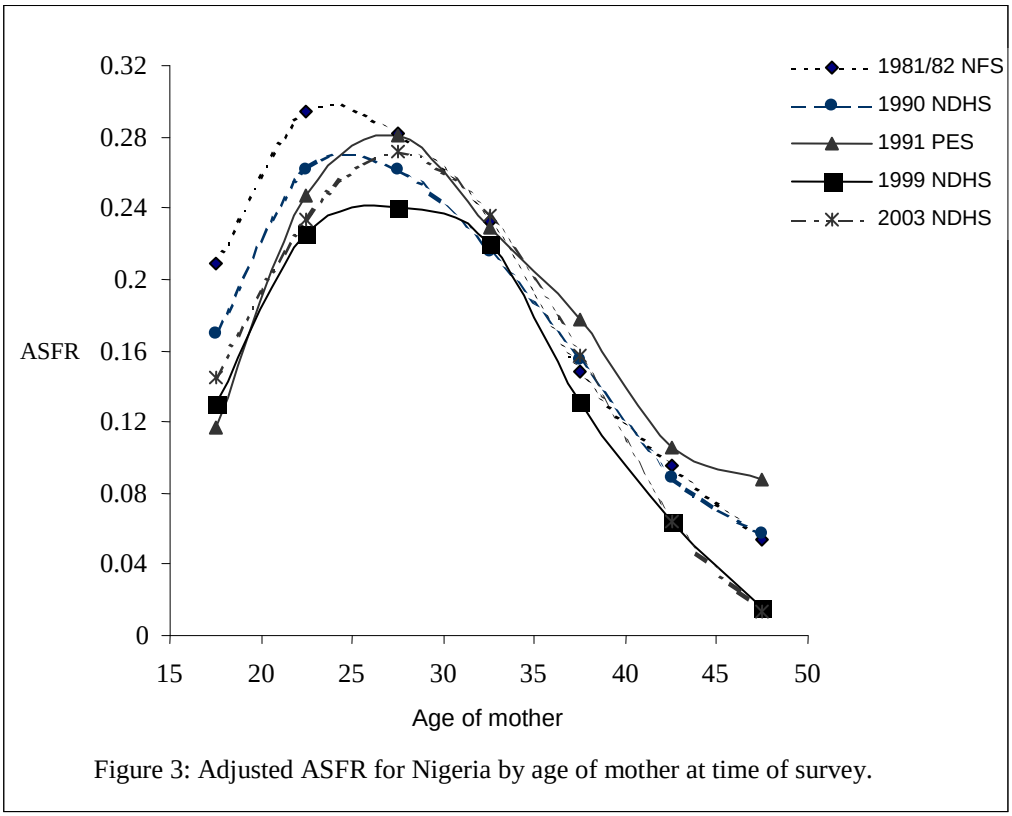

Figure 3: Adjusted ASFR for Nigeria by age of mother at time of survey.

Some of the reasons for the slow pace in fertility decline may be low status of women in the reproductive age range and high family size preferences. Available evidence from the 2003 NDHS shows that more than 41 percent of the surveyed women had no education while less than 18 percent had at least a complete secondary education. About 13.3 percent of all women and less than 13 percent of all currently married women were currently using any method of contraception. Marriage is still early, universal and stable. Median age at first birth is still low (about 19.6 years among women age 20 – 49 years at the time of the survey). In households in which women have the final say mean ideal family size was reported as at least six children. In some other developing countries with low levels of socio-economic development like Bangledesh, Thailand, Kenya, Botswana, Zimbabwe and Ghana fertility levels have declined substantially. According to Mbamaonyekwu (2000) [[9], the fertility declines in Kenya, Botswana, Zimbabwe and Bangladesh followed substantial increases in contraceptive use. In Thailand, results show that contraceptive use among currently married women aged 15 – 44 has reached about 68 percent. By the late 1980's, one in four married women in Kenya was using contraception.

4.0 Summary, Recommendation and Conclusion

The levels and trend of fertility in Nigeria have been discussed in this study using both reported and adjusted estimates. It is believed that knowledge of fertility levels and trend may be useful in the assessment of achievements in any fertility control measure and ascertain areas of emphasis in policy strategies and implementation programmes.

Adjusted estimates were derived using the P/F ratio and the Brass Relational Gompertz models. The standardized CBR and GFR were obtained by applying the population age-sex distribution to the adjusted ASFRs. The results of the analyses show that the TFR from the reported ASFR is 5.7 children per woman. Estimates of the TFR were shown to be 5.6 children using the Brass P/F ratio and 5.8 children using the Brass Relational Gompertz model and the reported ASFR from the 2003 NDHS. Estimates of the CBR and GFR based on the adjusted ASFRs from the 2003 NDHS are respectively about 39 per 1000 population and 180 per 1000 women in the childbearing range 15 – 49 years. These figures,

when compared with the target figures of the 1988 Nigeria National Population Policy and figures from developed and some developing countries indicate that the level of fertility in Nigeria is still relatively high. On the average, a Nigeria woman in the reproductive age range (15 – 49 years) is, at almost every age group, contributing much more to the TFR than her counterparts from developed and some developing countries of the world.

With regards to fertility trend, almost all the estimates indicate that the level of fertility in Nigeria is declining. The TFR decreased from the value of more than six in the 1981/82 NFS to about 5.6 children in the 2003 NDHS while the CBR dropped from more than 44 per 1000 population in the 1981/82 NFS to about 39 per 1000 in the 2003 NDHS. However, the rate of decline is so low that in more than a decade of conscious efforts to reduce fertility level, Nigeria could not achieve a reduction of up to one child per woman. This slow pace of fertility decline in Nigeria may not be unconnected with the adverse demographic characteristics still prevailing in the country. Available evidence from the 2003 NDHS and other sources show that marriage is still early, universal and highly stable. The status of women and the level of contraceptive use in Nigeria, especially among the currently married women in the childbearing range are still low, while the mean ideal family size preference is still very high.

In view of these, the following recommendations are considered relevant. First, more effective and culturally appropriate means of delivering family planning services should be devised and adopted in the country. Perhaps, an opinion survey is required to achieve this. This is important, since it has been established that in some other developing countries like Nigeria with low levels of socio-economic development, substantial fertility decline has been achieved with increased contraceptive use among currently married women in the childbearing age range. It has also been shown that fertility-inhibition within marriage using contraceptive is more effective than marriage variables. Secondly, greater emphasis should be placed on improvement of the status of women in Nigeria. Women in Nigeria should be empowered socially (especially academically) and economically. With improved education up to and beyond secondary level median ages at first marriage and first birth as well as levels of contraceptive use are sure to increase substantially among currently married women.

Perhaps further studies of the correlates of ideal family size preferences are necessary to identify the factors responsible for the persistent high mean ideal family size preferences in Nigeria. This has become necessary because unless they are identified and addressed all the efforts at family planning services delivery and improved status of women may be worthless. These suggestions and others may help to check the high fertility rate and quicken the pace of fertility decline in Nigeria if considered and implemented.

Appendix A: Estimation of fertility level implied by the 2003 NDHS data by indirect techniques.

(a) Brass P/F Ratio Method.

Age of mother	*F(i)*	*ϕ(i)*	*F(i)*	*P(i)*	*P(i)/F(i) K(i)*	*W(i)*	*f^{+}(i)*	*f*(i)*
15 – 19	0.126	0.630	0.2894	0.26	0.8984	0.0866	0.1458	0.1444
20 – 24	0.229	1.775	1.2750	1.18	0.9222	0.0972	0.2358	0.2334
25 – 29	0.274	3.145	2.5986	2.74	1.0544	0.1109	0.2744	0.2717
30 – 34	0.244	4.365	3.9067	4.35	1.1135	0.1237	0.2377	0.2353
35 – 39	0.168	5.205	4.9045	5.93	1.2091	0.1679	0.1593	0.1577
40 – 44	0.072	5.565	5.4378	6.62	1.2174	0.2456	0.0643	0.0643
45 – 49	0.018	5.655	5.6339	7.03	1.2478	-	0.0136	0.0136
TFR	5.70						5.6545	5.598

(b) Brass Relational Gompertz (BRG) Model

Age of mother	*F(i)*	*X*	*ϕ(x)*	$\frac{\phi(x)}{\phi(x+5)}$	*z(x)*	*e(x)*	*z(x)-e(x)*	*g(x)*	*Ys(x)*	$\hat{Y}(x)$	$\frac{\phi(x)}{F}$	*F*
15 – 19	0.126	20	0.630	0.3549	-0.0353	1.3364	-1.3717	-1.4501	-0.7712	-0.8090	0.1059	5.95
20 – 24	0.229	25	1.775	0.5644	0.5586	1.4184	-0.8598	-0.7430	-0.0410	-0.1207	0.3236	5.49
25 – 29	0.274	30	3.145	0.7205	1.1153	1.2978	-0.1825	-0.0382	0.6294	0.5113	0.5490	5.73
30 – 34	0.244	35	4.365	0.8386	1.7371	0.9670	0.7701	0.8356	1.3897	1.2280	0.7461	5.85
35 – 39	0.168	40	5.205	0.9353	2.7047	0.4509	2.2538	2.1649	2.4736	2.2498	0.8999	5.78
40 – 44	0.072	45	5.565	0.9841	4.1334	0.0462	4.0872	4.4564	4.4984	4.1585	0.9845	5.65
45 - 49	0.018	50	5.655	-	-	-	-	s-	9.3416	8.7241	0.9998	5.66

Appendix B: P/F ratios (K(i)) for Nigeria by age of mother and year.

Age of Mother	*NFS 1981/82*	*NDHS 1990*	*PES 1991*	*NDHS 1999*	*NDHS 2003*
15 – 19	0.8739	0.8942	2.7985	0.9905	0.8984
20 – 24	1.0508	0.9423	2.1243	0.9428	0.9255
25 – 29	1.0269	1.0607	2.0428	1.0600	1.0544
30 – 34	0.9856	1.1442	1.9670	1.1052	1.1135
35 – 39	0.9150	1.1170	1.9059	1.1870	1.2091
40 – 44	0.8880	1.1570	1.9253	1.2164	1.2174
45 – 49	0.9319	1.1409	1.8740	1.2407	1.2478

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