Regional Levels and Differentials of Fertility in Osun State, Nigeria.

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ABSTRACT

This paper examines the levels, patterns, and differentials of fertility in Osun State, Nigeria. Current as well as retrospective data are used in this analysis. Indirect techniques (the P/F ratio method) are used in estimating fertility levels for each of the five regions and for the entire state. It was found that fertility was fairly constant in the State in the recent past and the peak fertility generally occurs in the 25 – 29 years age group. Estimates of the total fertility rates range between 5.9 and 6.6 by method of estimation while that of the entire state is 6.2. There seem to be no significantly wide differences between the levels of fertility in the different regions.

(Keywords: fertility levels, P/F ratio, peak fertility, reproduction, reproductive rates, TFR)

INTRODUCTION

Nigeria is one of the most populous countries and has one of the most rapidly growing populations in Africa. The rate of population growth is currently put at about 2.8 percent per year. The 2000 Nigerian Demographic and Health Survey (NDHS) reported a total fertility rate (TFR) of about 5.8 children per woman (NBS, 2000). Although fertility reduction is speculated in some quarters, there is no empirical evidence of fertility decline. It is equally not clear whether the rapid population growth is the result of the decline in mortality levels accompanied by constant fertility or a tendency to over-estimate fertility levels.

Current and accurate estimates of fertility levels remain evasive due to absence of an adequate vital registration system. Population census exercises in the country have been characterized with controversies and are often inconclusive. Available estimates of fertility are based on the results of sample surveys with attendant inadequacies.

Osun State, located in the Southwestern part of the country is one of the relatively new states carved out of the former Oyo State. The influx of people into the state following its creation is likely to affect the fertility behavior of the people. The impact of this influx as well as that of the changing socio-economic milieu on the demographic profile of the state is yet to be fully assessed. It is in this regard that the state government embarked upon a fertility survey in 1992, with the view of shedding some light on the fertility patterns, levels, and differentials in the state.

This paper presents the result of an analysis of the fertility levels and differentials in the five regions (Ife, Ikirun, Ilesa, Iwo, and Ede/Osogbo) of Osun State. Indirect techniques of fertility estimation are explored for this purpose.

DATA

The data used for the analysis are obtained from the 1992 Osun State Fertility Survey. In this state-wide exercise, 3,234 women of child bearing age (15–49 years) were interviewed and retrospective information on the number of children ever born and the number of live births during the year preceding the survey were collected.

As with most retrospective information on the number children ever born, the data suffers from reporting errors. Age misreporting is likely to distort reported parity of women and vice versa, since women with more children than average for their age may be reported as older than their true age. The resulting bias is likely to affect estimates of the level of fertility (Kabir and Howlader 1981).

Other types of reporting errors that may possibly affect the quality of the data include: under-reporting of mean parities due to memory lapse, omission of births especially for older cohorts, lack of strict adherence to the reference period and omission of children who have died. Obviously, these different types of reporting errors do not act independently of each other; neither are their individual effects easily isolated. These possible defects notwithstanding, the data collected from the survey after necessary corrections, provide a basis for examining fertility levels and differentials.

METHODOLOGY

Current fertility is conventionally estimated using the direct method. Under this method, the TFR is estimated on the basis of the number of live births reported to have occurred to the ever married women classified by conventional five-year age groups during the twelve months preceding the survey date. Estimates obtained using this method is very likely to be under-estimates of the actual levels of fertility. This is largely due to reporting errors. If fertility has not been changing in the recent past, such lower values of TFR would possibly result from under-reporting of recent births as well as omission of a substantial number of dead children in the survey.

In recent years, many indirect techniques have been developed to provide improved fertility estimates on the basis of reported parity distribution in conjunction with the latest year's birth. One of these techniques used in the analysis presented in this paper is described in the remaining part of this section.

The P/F Ratio method: Brass (1968) suggested a method for combining information from questions about recent and retrospective fertility. In this procedure, the current fertility level is determined by the mean parities of fairly young women in their twenties. The method is known as P/F ratio method.

The P/F ratio is given as:

$$P(i) / F(i) \qquad \textbf{(1)}$$

Where,
P(i) are the average parity of women in age-group I.

F(i) are the average parity equivalents.

These ratios provide valuable information about the consistency of the reports of life time and recent fertility, thereby providing some indications of the magnitude and nature of any errors present in the reported information. For perfect agreement between the current and retrospective levels of fertility, the value of P(i)/F(i) should be in the neighborhood of 1.02 (Hill, 1980).

Coale and Demeny (UN, 1967) developed a method for estimating the period total fertility rate on the basis of the average parities of the women for whom information is more reliable and more recent, namely:

$$TFR = P_3^2 / P_2 \qquad \textbf{(2)}$$

Where,
P_3 is the mean parity of women aged 25 – 29 years.

P_2 is the mean parity of women aged 20 – 24 years.

Brass (1971) suggested another formula to estimate total fertility, namely:

$$TFR=P_2(P_4/P_3)^4 \qquad \textbf{(3)}$$

Where,
P_4 is the mean parity of the women aged 30 – 34 years.

The average parity equivalents F(i) are estimated by interpolation using the formula (UN, 1983):

$$F(i)\phi\,(i-1) + 0.392\,f(i+1), \quad i = 1,2,3,\ldots,6$$
$$F(7) = \phi\,(6) + 0.392\,f(6) + 2.608\,f(7). \qquad \textbf{(4)}$$

Where,

F(i) are the period fertility rates,
F(t) are the periods fertility rates.
Φ(i) are the cumulated fertility values.

$$\phi(i) = 5\sum_{j=0}^{i} f(j) \qquad \textbf{(5)}$$

A fertility schedule for conventional five-year age groups $f^{+}(i)$ are estimated using the formula:

$$f^{+}(i) = (1 + w(i-1)f(i) + w(i)f(i+1) \quad , i=1,2,3,\ldots,6$$
$$f^{+}(7) = (1 - w(6)f(7) \quad \textbf{(6)}$$

Where,
f(i) and $f^{+}(i)$ are respectively, the unadjusted and adjusted age-specific fertility rates.

W(i) are the weighting factors given as:

$$W(i)=x(i)+y(i)f(i)/\phi(7)+z(i)f(i+1)/\phi(7) \quad \textbf{(7)}$$

The values of x(i), y(i) and z(i) are derived constants whose values are tabulate below (Table 1).

Table 1: Age Group Fertility Coefficients.

Age groups	Index (i)	Coefficients		
		x(i)	y(i)	z(i)
15 – 19	1	0.031	2.287	0.114
20 – 24	2	0.068	0.999	-0.233
25 – 29	3	0.094	1.219	-0.977
30 – 34	4	0.120	1.139	-1.531
35 – 39	5	0.162	1.739	-3.592
40 – 44	6	0.270	3.454	-21.497

The period fertility schedule is adjusted using the formula:

$$f^{*}(i) = Kf^{+}(i) \quad \textbf{(8)}$$

Where,
f*(i) are the adjusted period fertility rates.

K is an appropriate weighting factor obtained from the P/F ratios.

In this analysis, K is taken as the weighted average of P(2)/F(2) and P(3)/F(3) with the number of women in the age groups 20 – 24 and 25 – 29 respectively as weights.

The total fertility rate is given as:

$$TFR = 5\sum_{j=1}^{7} f^{*}(i) \quad \textbf{(9)}$$

RESULTS

The pattern of the P/F ratios for each of the regions and for the entire state reveal extreme poor quality of the data, as evidenced most glaringly in the grossly under-reported mean parities (Tables 2 to 7).

Generally, the P/F ratios through erratic, fall off with age and are relatively lower in the 45-49 years age group. If fertility has been constant in recent years before the survey, low P/F ratios at the older ages would mean that women in these age groups have under-reported the number of children ever born.

The P/F ratios for the younger age group (15-19) are much higher than 1 indicating that the recent fertility reports are suspiciously low presumably due to time reference or age reporting errors or both. The fact that the P/F ratios over 15 – 19 years is neither increasing nor decreasing alludes to fairly constant fertility in the recent past.

The tables show that recent fertility reports may be highest among women aged 25 – 29 in Ile-Ife and Ikirun regions, 40 – 44 in Ilesa and Oshogbo/Ede regions and the entire state and 30 – 34 in Iwo region.

On the whole, fertility is at its peak in Osun State among women aged 25 – 29 years. On the basis of reported births and Brass method, the TFR for the state range between 6.2 and 6.7 (Table 7). No wide differences in the estimated fertility were recorded between regions.

The analysis shows that on the basis of reported births and Brass method, fertility is highest in Iwo region. Theoretical considerations however indicate that the Brass method is likely to yield better estimates of period fertility.

On the basis of this method, the regions can be ranked according to their fertility levels as follows: Iwo, Oshogbo/Ede, Ilesa, Ikirun, and Ife.

Table 2: Current Fertility and P/F Ratios: Ife.

Age Group	Reported Mean Parity, P(i)	Reported ASFR f(i)	Cumulated Fertility ϕ(i)	Estimated Parity Equivalent, F(i)	P/F Ratio P(i)/F(i)	Fertility Rate for Conventional Age Groups, $f^+(i)$	Adjusted Fertility Rate, $f^*(i) = Kf^+(i)$
15 - 19	0.5172	0.1034	0.5170	0.2212	2.3382	0.1250	0.1107
20 – 24	1.2875	0.3000	2.0170	1.3775	0.9347	0.3112	0.2757
25 – 29	2.5119	0.3214	3.6240	2.9932	0.8392	0.3192	0.2827
30 – 34	3.8095	0.2698	4.9730	4.4818	0.8500	0.2599	0.2827
35 – 39	4.7200	0.1600	5.7730	5.4616	0.8642	0.1545	0.1369
40 – 44	5.2308	0.1026	6.2860	6.0031	0.8713	0.0945	0.0837
45 – 49	5.5330	0.0667	6.6195	6.5416	0.8459	0.0596	0.0528
Total		1.3239				1.3239	1.1727
TFR		6.6195				8.6195	5.8635

Source: 1992 Osun State Fertility Survey

Table 3: Current Fertility and P/F Ratios: Ikirun.

Age Group	Reported Mean Parity, P(i)	Reported ASFR f(i)	Cumulated Fertility ϕ(i)	Estimated Parity Equivalent, F(i)	P/F Ratio P(i)/F(i)	Fertility Rate for Conventional Age Groups, $f^+(i)$	Adjusted Fertility Rate, $f^*(i) = Kf^+(i)$
15 - 19	0.4922	0.1016	0.5080	0.2175	2.2630	0.1226	0.1080
20 – 24	1.2881	0.2966	2.9910	1.3635	0.9447	0.3075	0.2710
25 – 29	2.4173	0.3150	3.5660	2.9396	0.8223	0.3142	0.2769
30 – 34	3.8261	0.2826	4.9790	4.4599	0.8579	0.2739	0.2414
35 – 39	5.4921	0.1746	5.8520	5.5326	0.9927	0.1659	0.1462
40 – 44	5.0508	0.0847	6.2755	5.9626	0.8471	0.0740	0.0652
45 – 49	5.2826	0.0870	6.7105	6.6086	0.7994	0.0840	0.0740
Total		1.3421				1.3421	1.1827
TFR		6.7105				6.7105	5.9135

Source: 1992 Osun State Fertility Survey

Table 4: Current Fertility and P/F Ratios: Ilesa.

Age Group	Reported Mean Parity, P(i)	Reported ASFR f(i)	Cumulated Fertility ϕ(i)	Estimated Parity Equivalent, F(i)	P/F Ratio P(i)/F(i)	Fertility Rate for Conventional Age Groups, $f^+(i)$	Adjusted Fertility Rate, $f^*(i) = Kf^+(i)$
15 - 19	0.5309	0.0988	0.4940	0.2105	2.5221	0.1189	0.1101
20 – 24	1.3467	0.2933	1.9605	1.3369	1.0073	0.3044	0.2818
25 – 29	2.4500	0.3125	3.5230	2.8836	0.8496	0.3137	0.2905
30 – 34	3.6949	0.3051	4.0485	4.5082	0.8196	0.2932	0.2715
35 – 39	5.6809	0.1489	5.7930	5.4959	0.8517	0.1436	0.1330
40 – 44	5.0000	0.1053	6.3195	6.1134	0.8179	0.0975	0.0903
45 – 49	5.3448	0.0345	6.4920	6.4520	0.8284	0.0272	0.0252
Total		1.2984				1.2984	1.2024
TFR		6.4925				6.4925	6.0120

Source: 1992 Osun State Fertility Survey

Table 5: Current Fertility and P/F Ratios: Iwo.

Age Group	Reported Mean Parity, P(i)	Reported ASFR f(i)	Cumulated Fertility ϕ(i)	Estimated Parity Equivalent, F(i)	P/F Ratio P(i)/F(i)	Fertility Rate for Conventional Age Groups, f*(i)	Adjusted Fertility Rate, f*(i) = Kf*(i)
15 - 19	0.5000	0.1121	0.5605	0.2493	2.0056	0.1319	0.1289
20 – 24	1.3269	0.2692	1.9065	1.2940	1.0254	0.2835	0.2772
25 – 29	2.7653	0.3571	3.6920	2.9868	0.9258	0.3570	0.3488
30 – 34	3.7439	0.2927	5.1555	4.6325	0.8082	0.2794	0.2730
35 – 39	4.7077	0.1538	5.9245	5.6287	0.3364	0.1474	0.1440
40 – 44	4.9623	0.0943	6.3960	6.1109	0.8120	0.0865	0.0845
45 – 49	5.1190	0.0714	6.7530	6.6695	0.7675	0.0652	0.0637
Total		1.3506				1.3509	1.3199
TFR		6.7530				6.7545	5.5995

Source: 1992 Osun State Fertility Survey

Table 6: Current Fertility and P/F Ratios: Oshogbo/Ede.

Age Group	Reported Mean Parity, P(i)	Reported ASFR f(i)	Cumulated Fertility ϕ(i)	Estimated Parity Equivalent, F(i)	P/F Ratio P(i)/F(i)	Fertility Rate for Conventional Age Groups, f*(i)	Adjusted Fertility Rate, f*(i) = Kf*(i)
15 - 19	0.4980	0.0996	0.4980	0.2129	2.3391	0.1202	0.1154
20 – 24	1.3259	0.2946	1.9710	1.3118	1.0107	0.3099	0.2974
25 – 29	2.7810	0.3619	3.7805	3.0710	0.9056	0.3597	0.3452
30 – 34	4.0114	0.2957	5.2090	4.6983	0.8538	0.2722	0.2613
35 – 39	4.7194	0.1511	5.9645	5.6621	0.8335	0.1463	0.1404
40 – 44	4.0991	0.1081	6.5050	6.2699	0.8133	0.1008	0.0067
45 – 49	5.1910	0.0449	6.7295	6.6773	0.7774	0.0367	0.0352
Total		1.3459				1.3458	1.2916
TFR		6.7295				6.7290	6.4580

Source: 1992 Osun State Fertility Survey.

Table 7: Current Fertility and P/F Ratios: Osun.

Age Group	Reported Mean Parity, P(i)	Reported ASFR f(i)	Cumulated Fertility ϕ(i)	Estimated Parity Equivalent, F(i)	P/F Ratio P(i)/F(i)	Fertility Rate for Conventional Age Groups, f*(i)	Adjusted Fertility Rate, f*(i) = Kf*(i)
15 - 19	0.5038	0.1026	0.5130	0.2210	2.2796	0.1233	0.1149
20 – 24	1.3161	0.2912	1.9690	1.3320	0.9881	0.3043	0.2835
25 – 29	2.6194	0.3389	3.6635	2.9926	0.8753	0.3378	0.3148
30 – 34	3.8620	0.2866	5.0965	4.5812	0.8430	0.2748	0.2561
35 – 39	4.8462	0.1566	5.8795	5.5751	0.8698	0.1507	0.1404
40 – 44	5.0700	0.1000	6.3795	6.1179	0.8287	0.0929	0.0866
45 – 49	5.2585	0.0593	6.6760	6.6068	0.7959	0.0515	0.0480
Total		1.3352				1.3353	1.2443
TFR		6.6760				6.6765	6.2215

Source: 1992 Osun State Fertility Survey

CONCLUSION

The analysis presented here have revealed the fact that fertility cannot be said to be on the decline in Osun State in recent years. In fact, the current fertility level with TFR of around 6 is considered high. With the in-built momentum for further population growth in view of the youthful nature of the population, there is a great potential for further growth.

Given that mortality is declining, there is a need to take positive steps aimed at slowing down the rate of increase in fertility. To achieve faster fertility reduction, greater attention should be paid to interventions that will help to reinforce the role of fertility inhibiting factors in lowering fertility. Some of these inhibiting factors include; age at marriage, female education, infant and child mortality, breastfeeding practice, work participation, urbanization, contraceptive practice, and socio-economic development.

It is therefore important to have a better understanding of how fertility varies according to each of the fertility determinants. This is necessary for planning and implementing program interventions that will bring out fertility decline in the short possible time.

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SUGGESTED CITATION

Famule, F.D. 2010. "Regional Levels and Differentials of Fertility in Osun State, Nigeria". *Pacific Journal of Science and Technology*. 11(1):449-454.

Pacific Journal of Science and Technology