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THE ENVIRONMENT OF INFANT AND CHILD  
MORTALITY: A CASE STUDY OF  
NIGERIAN VILLAGES

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Abstract: This is a report of a survey of 900 mothers under 50 years of age in two Igbo villages in Nigeria, which were identified in an earlier survey as having very high mortality. The present work was undertaken to decipher the factors responsible for the high mortality. The study found that the mothers were aware of the causes of illness and death; they spaced their births using breastfeeding and sexual taboos. Most of them gave and received advice about children's illnesses and the contents of such communication emphasized the use of modern medicines. Only a few patronized traditional healers or believed that children's death was due to recurring birth and death of a spirit-child (ogbanje). Given their positive attitudes towards modern health care, the explanation of the high mortality is neither institutional nor cultural but environmental and technological, that is, lack of clean water, toilet facilities and modern medicines. We conclude by stressing the role of environmental conditions and affordable and effective modern health care as a package in reducing death rates rapidly even without further gains in income per capita. A policy in this direction should include educational programmes on the proper use and maintenance of the facilities.

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THE ENVIRONMENT OF INFANT AND CHILD MORTALITY:  
A CASE STUDY OF NIGERIAN VILLAGES<sup>1</sup>

THE RURAL MORTALITY SITUATION IN NIGERIA

Mortality for infants, children and adults in Nigeria has been high for at least as long as records have been kept. The period since the 1930s has witnessed a decline in mortality, though current levels of mortality remain high when compared with those elsewhere in the world. The greatest decline in mortality has been in the most educationally and economically privileged sectors of the country: urban areas, especially state and federal political headquarters; the more economically developed geo-political units, and the elite groups in society, especially those households combining high education, income and occupation (Olusanya 1975, 1981; Caldwell 1979; Uche 1981). People in these groups have greater access to resources such as employment, good income, housing, potable water, and medical care which enable them to maintain good health. Even when they become ill, they have the knowledge and resources to cope with the situation. These factors all help the privileged class maintain relatively low mortality, but, since Nigeria is overwhelmingly rural (the proportion of the population living in urban areas in 1982 was estimated by the World Bank [1984] at 21 percent) the bulk of the population has not participated fully in the mortality reduction of the last 50 years. Even in the cities, neither the inhabitants of the less fashionable sections nor the members of the lower classes have experienced the same levels of improvement in mortality conditions as the upper classes. This situation is unsatisfactory and requires some explanation if realistic policies grounded in scientific knowledge are to be formulated to deal it. (Federal Ministry of National Planning 1981, pp. 275-280). The purpose of this study is to identify possible factors that account for the persistently high rural mortality in Nigeria, analyze them, and suggest possible policies. As a prelude to the search for explanations of the continuing high mortality levels, I first present a summary of the available data on rural mortality in Nigeria.

Mortality data for the early part of this century are from the 1930-32 Medical "Census" of the Northern and Southern portions of the country. These surveys were undertaken to supplement the administrative census of 1931 and the few vital registration systems then in existence. The Northern Medical "Census" covered four villages (3 in the present Kaduna State and 1 in Plateau State). These villages were located on the same latitude but different climatic zones (ranging from grasslands to semi-desert). The northern survey involved 9,491 respondents and lasted 9 months. The Southern survey covered different climatic conditions: Abeokuta (tropical rain forest in the present Ogun State), Arogbo (located in the swampy creeks of Bendel State) and the Forest and Hill country of Western Cameroon Republic (then part of Nigeria). The Southern survey included 11,023 subjects and lasted 17 months. In both surveys, everyone found in the village was examined; women also reported on their pregnancy histories and infant and child mortality experiences. Virtually free treatment for minor illnesses was given to the respondents in an attempt to increase their motivation to participate in the study (Kuczynski 1948:656).

The survey was not representative of the major population groups in the country. The dominant groups in the Eastern part were excluded, probably to avoid any unpleasanties in view of the Women's Tax Riots of 1929-30 in the area. One might question whether the selection of Abeokuta represented the western section of the country; Ibadan would have been a more representative choice. Ibadan had a larger population and a more central location within the cultural area. Of greater importance was the quality of the demographic variables. The government statisticians rated data on age and number of months pregnant as fairly reliable; rated as unreliable were number of surviving children, number of children dead either under or over one year, number of premature births, number of total pregnancies and number of miscarriages (Turner 1932; Jacob 1932). All these problems are still with us today because the underlying obstacle, illiteracy has not been eradicated. Turner (1932:9-10) noted that separation of stillbirth from infant deaths was impossible and reported "infant" mortality rates of 330 per 1,000 (Abeokuta Rural), 228 (Cameroons-Forest), 250 (Cameroons-Hill), and 233 (Arogbo). This led him to estimate the infant mortality rate (IMR) for Southern Nigeria to be about 300 per 1,000. Kuczynski's independent estimate of IMRs (excluding stillbirths) for Lagos corroborated Turner's figures. Kuczynski's estimates were IMRs of 391 per 1,000 (1898-1900), 324 per 1,000 (1910) and 288 per 1,000 (1910-1920) (Kuczynski 1948:671). The data reported for the northern villages were grossly in error due to underreporting of deaths of infants and children. The IMRs were: Kaita (18), Zangan Aya (131), Bakori (182), and Laminga (252). Gardner and Gardner (1958:750) reported that McGullough, in a nutritional survey of Katsina during 1929-1930, found an IMR of 412 per 1,000, a rather high figure by any standards. A nearby village (Kaita) could not have been healthier than Katsina. The surveys of 1930-32 did not yield any figure summarizing the overall mortality condition in the country (Kuczynski 1948:692). A secondary analysis of the data, however, gave an expectation of life at birth of 32 years for Nigeria (Ayeni 1974). Given the errors in the data noted above, the life expectancy reported should be regarded as tentative.

Another survey of rural areas was carried out between 1954 and 1958. It covered six villages in Northern Nigeria and one in Eastern Nigeria. The study villages in Northern Nigeria were Jarawaji (Borno State), Tangazi (Sokoto State), Bunga (Bauchi State), Tugun Maidubu (Niger State), Langai (Plateau), and Bero-Okuta (Kwara). Each village was situated within 50 miles of a town with 5,000 or more people and 15 miles from a main road or railway line. All permanent residents of the villages were interviewed and examined at least twice a year. In all, 594 respondents (283 males, 311 females) were studied. A seventh village, Mbanega (South-Eastern State) was included and contributed 92 respondents (42 males and 50 females). In addition to the problem of small sample size, this study excluded the Western and Eastern sections of the country, but it had greater geographical coverage of the northern states than the Medical "Census" of 1930-32. The IMRs reported for women aged between 15 and 45 years old ranged between 217 and 409 (mean was 275) in the northern villages and was 283 per 1,000 for Mbanega.

During 1965-66 the Federal Office of Statistics carried out a rural demographic sample survey to supplement the 1963 census. Without adjustment, the following crude death rates were obtained: Nigeria 20.6 per 1,000; Mid-Western State 14.2; Western 18.6; Eastern 20.4 and Northern 22.9 per 1,000 (Federal Office of Statistics, n.d.:6). Some 10 percent of the units were rejected because of nonsampling errors, for example, omissions. Adjustments were made and the following recalculated crude death rates were obtained: Nigeria, 26.9; Southern Nigeria, 23.2; Northern Nigeria, 29.6 per 1,000.

The age-specific rates by sex and regions of the country are shown in Table 1. Very high mortality in infant and childhood years is followed by relatively lower mortality between ages 5 and 40 years. Thereafter, the mortality curves pick up and rise steeply to the end yielding the familiar U-shaped curve. The infant mortality rate for the country was 178 per 1,000; this fell within the range of IMRs of between 93 and 1,000 and 259 per 1,000 reported for many African countries between 1950 and 1963-64. This must have encouraged the authors of the report to assert that their own rates were "as a whole quite reliable" (Federal Office of Statistics, n.d.:21). That assertion was not well-grounded. We have noted that 10 percent (or 27 out of 266) of the units were rejected for the calculation of death rates; for birth rates, the rejection rate was even higher: 32 percent (or 84 out of 266 units).

The Nigerian Fertility Survey 1981-82 is yet another source of data for the mortality situation in rural Nigeria. The data in Table 2 show that the IMR for 1976-80 was 86 per 1,000 and that the childhood mortality rate was 78 per 1,000. The figures shown in Table 2 seem low and therefore paint a very optimistic picture of the mortality condition in the country. If the 1965-66 figure of 178 per 1,000 is accepted, then IMR dropped by 52 percent in 15 years in rural Nigeria to 86 per 1,000 in 1976-80. This can be put differently. According to the 1965-66 survey "nearly 40 percent of all children who are born will die before the age of 15 years" (Federal Office of Statistics, n.d.:22). Life tables derived from the NFS show that the percentage has dwindled to 20 for the same age group. This is not inconsistent with 15 percent dying before age 5 (Table 2) because most of the deaths contributing to the 20 percent will occur before age 10 and especially within the first five years of life.

The disturbing aspect is that a pilot study in September 1982 using a national representative sample of 226 households found higher figures for mortality under 5 years of age. The survey used the National Consumer Survey, an existing sampling frame. The 19 states in the country were grouped into 4 zones and a state was selected with equal probability within each zone. The completion rate was high. For the four states, 85 percent of the 160 urban households and 92 percent of the 66 rural households completed the questionnaires. The results in Table 3 show that a little over one-third of the children die before their fifth birthday. This is inexplicably high and more than double the figures obtained by the Nigerian Fertility Survey. One might raise questions about the sample size in comparison with the national population size, but it should be borne in mind that a smaller size makes for effective supervision. Nonetheless, the main

question for us is how representative is this small sample especially when subdivided either by states, rural-urban residence, educational attainment, religion, income or occupation? For example, the rates for Cross River State are low for unclear reasons. Also, assigning 29 percent of the households surveyed to the section having 80 percent of the nation's population is indefensible. All this is probably a defect inherent in the use of an existing frame which may have the short-comings noted here. The major point is that the disparity between the figure by the National Population Bureau for 1976-80 and the Federal Office of Statistics for 1977-82 casts doubt on both. To have faith in any of the figures requires that the two independent measurements of the same phenomenon should yield similar results. To accept the figures by the Federal Office of Statistics might imply that mortality has remained unchanged since the 1930s. This conclusion is untenable. However, acceptance of the figures furnished by the National Population Bureau is indicative of a precipitous mortality decline in the past decade, and this is difficult to explain. The conflicting mortality data reported by these two federal government agencies suggest the need for caution in using them to draw firm conclusions.

To summarize, rural mortality has remained high in Nigeria since the early part of the century. Before 1930, the IMR was clearly above 300 per 1,000. Between 1930 and 1960, the IMR ranged between 250-300 per 1,000. By mid-1960 the IMR was 178 per 1,000 and the crude death rate 27 per 1,000. The figure from the Fertility Survey showed that IMR has declined further to 86 per 1,000 in rural Nigeria by 1980. In terms of life expectancies, the expectation of life at birth rose from 32 in 1931 to 37 in 1965-66 to 51 in 1976-80 (Olusanya 1981; Uche 1984), a gain of less than 6 months per year. The latest estimates by the World Bank put the indicators for Nigeria in 1982 as follows: CDR 16 per 1,000; IMR 109 per 1,000; childhood mortality rate (aged 1-4) 20 per 1,000 and life expectancies at birth 48 years for males and 52 years for females (World Bank 1984:245, 262). The World Bank data are not superior to those preceding them, since the Bank depends ultimately on figures supplied by national governments either directly or indirectly through U.N. agencies. If one must choose between the World Bank's estimates and those of the Nigeria Fertility Survey, the higher figures supplied by the World Bank should be preferred because of the unnecessary optimism and complacency the lower figures might engender. And, in matters dealing with health, if it turns out that more provisions have been made for fewer people no harm has been done. It may well imply that the quality of service provided for the smaller population is up-graded automatically.

#### ALTERNATIVE EXPLANATIONS OF CURRENT HIGH LEVELS OF MORTALITY<sup>2</sup>

Several hypotheses can be advanced to account for the continued high levels of mortality in rural areas of Nigeria. These include:

1. rural residents fear or distrust modern medicines and so continue to use traditional remedies;
2. rural residents are breastfeeding their children for shorter periods; and
3. rural residents lack modern health environments.

Health environment encompasses many variables; but, in this study, we will be concerned with the availability of water, basic sanitation, and health services and their use. We will, in this connection, examine also the issue of attitudes and how they affect the use of modern health care.

The distrust and fear of modern medicine is, in general, no longer a factor in rural Nigeria. The achievement of modern medicine in healing patients and the successful activities of governments and other agencies in eradicating communicable diseases have led to an acceptance of modern health care (Schram 1971). In the last forty years, various governments have consistently spent huge sums of money in the health sector. During the 1946-55 Plan, the colonial government allocated 10 percent of the projected capital expenditure of the health sector. The First National Development Plan 1962-68, planned and executed by the post-independence government, devoted 2.5 percent of the total capital expenditure to public health facilities (Okediji 1975:275-76). Subsequent Plans have not deviated much from this proportion of the capital expenditure devoted to health. During the Third Plan 1975-80, all governments spent N606.4 million, about US\$969 million (or about 2 percent of total capital expenditure), in this area. The Fourth Plan 1981-85 planned for N3,043.9 million, about US\$5,477 million (or 4.3 percent of total capital expenditure), for the health sector (Federal Ministry of National Planning 1981, pp. 273, 280). Any antipathy the citizens might have towards modern medicine is related less to its potential effectiveness than to the organizational aspects of the health delivery system, that is, the unending shortage of drugs, the abrasive conduct of some staff, and the fact that going to a hospital usually involves loss of a full day's work. The latter situation frequently arises because the average medical doctor working in public rural or urban health facility carries a back-breaking case load. Problems of payoffs and other unreceipted and unofficial payments have been noted and remain unsolved (Schram 1971:404).

It might also be argued that infant and child mortality is still high in the rural areas because rural residents continue to use indigenous remedies. There are cases in which indigenous treatments are superior to the western counterparts, but the problematic areas are situations in which modern medicine is clearly superior. For most rural residents, the reasons for the continued patronage of traditional remedies are primarily economic or locational. The doctor-patient ratio in 1979 in Nigeria was 1:12,550, but most of the doctors are concentrated in the urban areas. According to the Fourth National Development Plan 1981-85, "the urban centres have more than 90 percent of the registered medical practitioners yet just 20 percent of the population resides in the few cities" (Federal Ministry of National Planning 1981, p. 275). On this basis, the doctor-patient ratio in rural Nigeria in 1979 was 1:100,461 while for urban Nigeria it was 1:2,789. The indigenous doctor, on the other hand, is ubiquitous and is usually a fellow villager or resides in a neighbouring village. Also, unlike the western-trained doctor who specializes in a few diseases, the indigenous doctor claims expertise in all manner of illnesses. Thus, the indigenous doctor does not refer patients to another doctor and thereby increase the total cost of the treatment. Finally, the indigenous doctor, unlike the government doctor, can accept payment terms that suit the patient's economic

position and may, therefore, appear cheaper in the short-run if not in the long-run. Consequently, indigenous doctors are patronized as a viable alternative because the western-trained doctors are not available, are expensive, or have payment conditions that the patient cannot cope with. It is, therefore, not unlikely that faulty diagnosis and wrong prescriptions do lead to greater mortality. These errors are not committed exclusively by indigenous doctors but may occur more frequently with people who have not undergone the systematic and rigorous training of medical schools.

The second possible explanation for the maintenance of high infant and child mortality rates is shortened breastfeeding periods. Short (1984:40-41) has summarized recent research results on the role of breastfeeding on the health of the baby. Not only does breast milk provide adequately for the needs of the child until s/he is six months old without the necessity for food supplements, but, more important, the breast milk provides antibodies for the baby's that "play a vital role in preventing gastrointestinal infections (the main cause of infant mortality). No formula milk, however it is cunningly contrived, can replace this tailor-made immunological protection afforded by the breast milk" (Short 1984:41). Thus, lack of breastfeeding or shortened periods of breastfeeding could indeed contribute to high rates of infant and child mortality. The evidence indicates that this is not occurring in Nigeria, however. The Federal Office of Statistics survey of the health of Nigerians in 1982 showed that 100 percent of rural mothers were breastfeeding their children at ages 0-11 months and 91 percent continued to do so when the babies were 12-23 months old. Ten percent of these mothers were still breastfeeding after the children had reached the age of two years. The percentages for the urban sample were 61, 26 and 5 for ages 0-11 months, 12-23 months, and 24 months and over respectively (Federal Office of Statistics 1983:24-30). More relevant for future childrearing practices is the fact that the rural women preferred breast milk to artificial milk overwhelmingly; 87.5 percent of the women aged under 20 years, 93.5 percent of those between 20 and 29, and 89.5 percent of the 30 to 39 age group preferred breast milk to artificial milk. The proportions in the city sample were 54.8, 85.2, and 85.7 percent for the respective age groups. In the Nigeria Fertility Survey, 1981-82, the mean duration of breastfeeding was found to be 16.6 months. Also, 75 percent of the women breastfed their next to the last child for 12 months or more (World Fertility Survey 1984:17). We cannot, therefore, explain high levels of infant and child mortality in rural Nigeria by reference to shortened periods of breastfeeding. Indeed, levels of infant and child mortality have been high since the turn of the century when artificial milk was unknown to Nigerians.

A possible explanation for the high rates of infant and child mortality in rural Nigeria is the lack of healthy environments. By this I mean the lack of such things as reasonably good housing, potable water, waste disposal facilities, nutrition, and health care delivery systems. We will examine most of these in this study. It is postulated that the absence of most of these aspects of the modern health environment is responsible for the continuing high level of infant and child mortality in rural Nigeria. It is also claimed that the provision of one or the other of these elements in an uncoordinated fashion is not sufficient to cross the threshold from

high to low mortality. Governments in Nigeria have always provided some of these facilities for the population at large. Their efforts, however, have been only partially successful not only because of the enormity of the task but also because of the philosophy of the development process. Development is elite-oriented and urban-based, and declines in mortality reflect these facts. Some rural areas have benefited from projects such as roads, electricity, good water, hospitals, and secondary schools, but most have not had significant and permanent changes that would result in a reduction of premature deaths. Orubuloye and Caldwell (1975) showed that the availability of health facilities in a rapidly urbanizing rural settlement reduced mortality there as compared with a neighbouring village without them. The mortality level of this settlement was, however, still high compared with that of the upper income sections of the state's capital city.

Hobcraft and his associates (1984) have demonstrated that the important socioeconomic determinants of low infant and child mortality in African households are the mother's educational attainment, husband's occupation and educational level. High levels of achievement on these attributes seem to assure attainment of low mortality rates for the children in these households because these couples are able to command the resources, medical, nutritional and environmental, to assure good health or to deal with ill health. High levels of achievement in these variables clearly mark these households as the elites of their society. Such levels of socioeconomic status are beyond the prospects of most Nigerian rural dwellers in this century. If we want to reduce mortality in rural Nigeria, it is necessary to identify a minimum combination of factors and performance thresholds that would result in rapid mortality decline in Nigeria's hinterland and to implement a program incorporating that information.

Research should focus on the specific causes of high infant and child mortality and the ways to reduce it. To this point, mortality research in Nigeria has been an appendage of fertility or family planning research, with little social scientific inputs. Possible exceptions might be Orubuloye and Caldwell (1975); however, their investigations focused on establishment of rates or a search for differentials and their plausible explanations. The research being reported here drew its inspiration from a fertility and family planning research but it is an attempt to apply sociological insights to the phenomenon of high rural mortality. Of the three plausible explanations for the high rural mortality in Nigeria two were dismissed: 1) distrust of modern medicines leading to continued use of traditional medicines either alone or in combination with imported remedies and 2) shortened periods of breastfeeding. The third alternative, the environmental perspective, which includes the physical aspects of housing, water, and toilet systems, is, then, the focus of this study.

Since community beliefs shape attitudes and influence behavior, an added dimension of this study is an analysis of attitudes about infant and child mortality, adaptation to environment, quality of life and level of mortality experienced.

## CASES OF TWO SETTLEMENTS IN EASTERN NIGERIA

The study areas are the settlements of Ebe and Lokpaukwu in Anambra and Imo States of Eastern Nigeria respectively. The two settlements lie within the same climatic zone, that is, at the borderline separating the tropical rain forest of Southern states and the savannah grassland of the Northern states of Nigeria. These villages were selected on the basis of their very high infant mortality and crude death rates, as evidenced from retrospective reports of female respondents in a national Knowledge, Attitude, and Practice of Family Planning (KAP) study carried out in 1972. Details about the larger study have been discussed elsewhere (Ascadi, Igun and Johnson 1972).

Eastern Nigeria is a region of high mortality. Ecoma estimated a childhood mortality rate of 200 per 1,000 during 1956-61 (cited in Ekanem 1972:110) and Nicol reported an IMR of 269 per 1,000 live births in 1959 for a village in Ogaja Province of Eastern Nigeria (Nicol 1959:21). Olusanya (1974:67), using the 1963 age distribution and stable populations, reported a Crude Death Rate (CDR) of 20.7 per 1,000 for Eastern Nigeria. Olusanya (1975:270 and 1981:419) reported life expectancies for Eastern Nigeria as 32 years (1931) and 42 years (1963). The data in Table 4 show that life expectancy at birth for the region reached 52 years during 1976-80. Using retrospective data from the 1972 KAP survey of East Central State (split later to Anambra and Imo States), I obtained a rural CDR of 21 per 1,000 and a IMR of 158 per 1,000. The average figures for a state, however, might obscure much intrastate variability. The highest IMR recorded for the rural areas was 381 per 1,000 and the highest CDR was 41 per 1,000. The villages chosen for study had the highest IMR and CDR in 1972 among all the rural areas of the Eastern States covered by the survey. Ebe had an IMR of 275 and a CDR of 41 while Lokpaukwu's figures were 381 and 35 respectively. It may be that mortality conditions have improved in the past few years as the regional data of Table 2 from the Nigeria Fertility Survey show, though all the figures are too low, especially those for the Southwestern region. Nevertheless, everyone has not shared in the reported improvement or participated equally. Taking the high mortality of the study villages as generally reliable, the following research questions were addressed:

1. What are the attitudes and reactions of couples to children's illness and infant deaths and how do they explain these deaths?
2. How knowledgeable are couples of the causes of infant deaths and what traditional and modern medical treatment and general care are used to prevent deaths?
3. How prevalent is the belief in ogbanie (that is, the traditional belief that the same child is being constantly born to a given woman only to die soon and then repeating the cycle) and what traditional mechanisms are available to terminate the cycle of births and deaths?
4. What are the patterns of marital behavior following the death of an infant or child?

## Methodology

This study used the interview technique. Because of the lack of any reliable system of addresses in the rural areas and the prohibitive cost of

preparing a list of households and sampling from it, we opted for a different strategy. For demographic surveys, the United Nations Economic Commission for Africa (UNECA) (1974:7) recommends cluster sampling, that is, complete coverage of area units systematically selected from a list arranged geographically. In this procedure there is no sampling of dwellings or households within area units. The UNECA also recommends area units of 200-400 persons but never more than 1,000 persons for the estimation of vital events.

Our interest was not in the estimation of vital events, important though these are. We agree with the Commission (1974:36) that a strict definition of "household" in Africa is problematic but that the concept serves as an aid to the enumerator to decide which persons should go together in the same questionnaire. The definition of "household" employed in gathering the data here was the same as that used by the Federal Office of Statistics. The Office defines a private household as comprising "one or more persons often living in (the whole or part of) a separate housing unit and providing himself/themselves with food and other essentials of living from a common budget" (Federal Office of Statistics 1983:5).

We had originally planned to interview respondents from 1,500 households. In examining the data for Eastern Nigeria by the Rural Demographic Sample Survey of 1965-66 (Federal Office of Statistics 1968:22), however, we found a total 1,716 households in both villages. Because the level of the inflation of the 1963 population figures at village levels was unknown and also because it might be easier to get the cooperation of the traditional authorities if we included the entire settlement without the necessity of explaining why one subvillage was taken and not the other, we decided to survey, as far as possible, all the households in each settlement. Therefore, we modified the recommendations of the Economic Commission for Africa because of the special interests of our study which center around the environmental aspects of mortality as opposed to the estimation of vital rates.

After discarding those questionnaires that were of poor quality, we had a total of 996 households in which interviews were successfully conducted, 487 in Ebe and 509 in Lokpaukwu. In Ebe the work of one interviewer was rejected and at Lokpaukwu one section of a village was inaccessible because of the terrain and the rains. The shortfall of the observed number of households, that is, 996 from the expected number of 1,716 in the settlements, is attributable to factors in addition to poor questionnaire quality. First, the amount of inflation in the 1963 census data of the settlements is unknown. Second, the settlements were inside the war zone during the civil war of 1967-70. The households on which we have useable information are all we could find in the villages, excluding those for which we rejected the questionnaires on quality grounds.

The questionnaires were translated into the standard Igbo language. The communities speak slightly different Igbo dialects but the standard Igbo is well understood. The translation was done by a certified teacher (Nigeria's National Certificate in Education) who specialised in Igbo and English. This was reviewed and further adapted to local usages at the pretesting

stage in each study location. Either Igbo or English, depending on the respondent's facility, was used for the data collection. No difficulty was encountered in using the local language in demographic research. The interviews were conducted in teams of two people, usually a male and a female. The females interviewed mothers (defined as those women, under 50 years of age, who have at any time been pregnant or given birth) while male interviewers handled male respondents. They teamed up with the household preferred to be interviewed together. The interviewers were predominantly teachers and student-teachers based in the communities studied. Field work was done in Ebe during August/September 1978 and in Lokpaukwu during March/April 1979.

Data collected included information on socio-demographic characteristics, quality of the environment (housing, water supply, etc.), attitudes towards illness and death, use of health care services, and the belief in ogbanje.

Two schedules were drawn up: one for the heads of households, usually males, and the other for mothers.

The results presented below are from interviews with mothers unless otherwise indicated.

#### The Characteristics of Settlements

The mean household size for the two settlements combined is 5.8 (median size is 5). The usual marriage type is monogamous. Of the 996 households, 756 were single monogamous couples. The number of monogamous couples rises to 792 or 80 percent if we include two or more monogamous couples living together. Polygamous couples (one or more) totaled 102 or about 10 percent of households. In 82 percent of the households, we find only a couple and their children. In 92 percent of the households, we find one or two generations; about 8 percent of the households contain three or more generations. These results are consistent with the Nigeria Fertility Survey 1981-82 findings (see Table 5e).

The two settlements have generally similar environmental conditions. Lokpaukwu is about 20 kilometers from Okigwe (the local government headquarters) on the Okigwe-Enugu road. It has had a rural health clinic for three years but the general hospital is located at Okigwe. A Federal Government Basic Health Project was being established at the time of the survey at Lokpanta, a distance of about 8 kilometres on the Lokpaukwu-Enugu road. Ebe is 24 kilometres from Enugu (the state capital) and lies off the Ngwo-Nsukka road. Both general and specialized modern medical care are available at Enugu. Buildings for a rural health clinic were ready at Ebe but were awaiting commissioning at the time of the study.

Drinking water for Lokpaukwu villagers is from a highly polluted stream while Ebe has had pipe-borne water since 1966. Ebe's high mortality demonstrates that clean water alone is not enough to achieve low mortality. In both communities, rain water is available for half the year. Modern toilet facilities are absent. The bush or river constitutes the disposal channel for human waste for 79 percent of the households. Another 20 percent of the households have pit latrines.

Rural households do not appear crowded. The mean number of rooms per rural household is 4.3 (median is 4) and these are used, as we have noted earlier, by about 6 people on the average.

The main building in each household is usually where the head of the household lives. A monogamous couple will live there with the children. In polygamous households, the head of the household either lives there alone or with the youngest or favored wife. The characteristics of the main building in the compound are a rough indicator of the economic attainment of the household. Sixty-nine percent of the main buildings are roofed with corrugated iron sheets while 30 percent have roofs made with thatch or raffia palm leaves. Thatched roofs help to cool the dwelling units during the dry and hot season between October and March but between April and September, the period of rains, they make the buildings damp and, therefore, promote cold-related illnesses. The remaining one percent of the main buildings have asbestos tiles for roofing. Most, if not all, of the main buildings roofed with iron sheets or asbestos tiles have ceilings of asbestos boards. This is common practice in Nigeria. (The cancer-causing aspect of asbestos materials has not entered the domain of public discussion or policy in Nigeria.) Sixty-one percent of the main buildings have mud walls while 39 percent have walls made with cement blocks or burnt bricks. Finally, the main buildings have an average number of 6.8 windows (median is 6) of various sizes; however, 168 (17 percent) of these buildings have no windows at all.

How do we put these data concerning the settlements in perspective? There are some data at state or national levels and these are shown alongside our survey results in Tables 5a-5e. In terms of number of persons per household, these villages lag behind their state averages but are similar to the national average. Toilet facilities are deplorable all over the country but in these villages only a fifth of the households have pit latrines, the first step in the desired movement towards flush toilets. The villages have a slight advantage in the source of water supply since Ebe has had pipe borne water since 1966.

### The Characteristics of Respondents<sup>3</sup>

The survey was restricted to mothers (as previously defined) because it was felt that they were the most relevant persons to discuss intelligently issues relating to children's illness, death, and general welfare. There were 929 mothers involved and, for 860 of them who were between 15 and 49 years of age, the mean age was 33.7 years (median 33 years). Of these women, 84 percent were currently married, 13 percent were widowed, 1 percent were single and the rest were separated, divorced or not stated. In all, the proportion that was ever married was 98 percent. As a group these 929 women had a mean of 4.3 (median 4) pregnancies each, an average of 3.5 surviving children each, and had lost less than a child (0.6) each on average. Table 6 includes these data by age of mothers; it also demonstrates that the older women have had more live births and more survivors.

Two observations are relevant here. First is the comparison of our data with those of the Nigerian Fertility Survey (NFS) 1981-82 in the categories age 30 and above. The numbers of children ever born on this survey are comparable to the numbers on our survey except at the oldest age when it falls short by one birth. We can conclude that our results are reasonable when compared with the older ages of the Nigeria Fertility Survey data. The difference at ages 45 and older may reflect undercounting in the rural survey. Second, a comparison of the columns "percentage of children dead" in the rural survey and in the Nigeria Fertility Survey shows that the percentages for the two villages are lower than those of the NFS before age 30 and become similar after that age except in one case where the NFS percentage is clearly higher.

Table 7 shows the mean number of children lost by mothers who lost any children at all. Before age 30, mothers lost one child on the average and women older than 30 lost two children. With undercounting at the older ages, the number of children lost was certainly more.

#### Attitudes and Behaviours towards Children's Illness and Death

The acceptance of the germ theory of disease was an important factor in the elimination of major diseases in Europe during the 19th century especially after 1850 (Preston 1980:244). Further reduction of mortality in rural and urban areas of Nigeria requires the acceptance of this fact also. This has not fully occurred in our study areas, and the data in Table 8 bear this out. Our respondents were asked to identify the causes of infant and children's illnesses from the following list: germs; poisons from enemies; actions of witches; activities of dead relatives and spirits; curses from one's elders' eating of food tabooed in the area; all the factors enumerated above combined; none of the factors; others; and no response or no knowledge. Respondents could pick as many of the items as they chose. Table 8 shows the mutually exclusive categories yielded by the responses. Two major groups emerged. Sixteen percent (150 of 329) of the respondents who picked germs or viruses in the air, water or food. These are the term theorists. The other major group combined the germ perspective with one or more of the traditional explanations of the causes of diseases. This group numbered 727 or 78 percent of the population studied. This second group belongs to both worlds (African and Western) and attempts to make the best of both in the interest of the well-being of their children. Espousing simultaneously the germ and traditional theories of disease causation might be seen as a contradiction. We have no basis to suggest any contradiction, ambivalence or dissonance on the part of the mothers we studied. For these villagers, living in an environment of high mortality and limited health care, use of any available treatment that might be beneficial poses no psychological problems. The core traditionalists who subscribe exclusively to traditional explanations and those who advocate neither traditional nor western conceptions total less than 6 percent.

In spite of their abstract views about disease causation in infants and children, our respondents leaned more towards the germ perspective when they gave people advice or when they took action on the occasion of their children's ill-health. In giving advice, 30 percent recommended the use of

modern facilities and/or medicines and 36 percent did so when they took action on the occasion of illness in their own children. Twenty-nine percent of our respondents claimed to have received similar advice from others during such situations.

The women's ideas about causes of death were tapped with two questions: an open-ended question on what respondents thought "kills children" and a structured question on observed symptoms of illness that preceded the death of the last child. Their descriptions of symptoms (Tables 10a & 10b) confirm the role of infectious diseases (high and low grade fevers and jaundice), respiratory diseases (cough and difficulty in breathing) and digestive diseases (vomiting and frequent stools) in causing death in children. The broad distribution of these diseases is consistent with the level of Nigeria's socioeconomic development (Omran 1971; Preston 1976) and tallies with Nigerian hospital data (Hunpono-Wusu 1976). The rank order of the symptoms noticed remained generally the same whether the child had survived or died.

We also explored our respondents' perceptions about whether the levels of infant and child mortality were rising, were declining, or were about the same at present compared with when they were growing up. Of the 920 women respondents, 71 percent claimed that fewer children lived to adulthood these days; only 9 percent felt that a higher proportion attained adulthood. Seven percent felt there was no change and 13 percent did not know. In Table 11 responses by age are cross-classified showing that the proportion claiming higher mortality rose to more than four-fifths. Those women who maintained that infant and child mortality had increased attributed it mainly to factors such as fate, destiny, or the current prevalence of greater wickedness, greed, striving and worry (295 respondents). Only 173 respondents blamed the increase on environmental issues, such as more diseases, poor medical facilities, lack of good child care, or nutrition, etc. About half of the women did not give any reason to support their contention of higher mortality of children.

That overall mortality in Nigeria has been declining at least for a generation is beyond dispute (Uche 1982; WFS 1984); however not all communities have shared equally in that progress. In an earlier study which covered settlements in the four Eastern States, including these two towns, 41 percent of the 1,839 currently married women felt that children now have more chance to survive to adulthood than before; 37 percent held that children have less chance; 5 percent were of the opinion that children then and now have the same chance; and 17 percent had no opinion (Uche and Ekanem 1982:113). This larger survey was carried out about three years after the end of the Nigerian Civil War in which Eastern Nigeria, especially the states of Anambra and Imo, bore the brunt of the hostilities. It is plausible that our respondents had the events of the Civil War (July 1967 to January 1970) in mind when they were answering the questions posed to them in July/August 1972 and December 1972/January 1973. Nine years after the war and seven years after the larger study, 71 percent of the respondents to our 1979 survey emphatically claimed that child mortality had not declined, at least in their communities. Pending further work on this aspect of the survey, we can only surmise that their response is the consequence of the

effect of the war and the continuing high mortality within the area of their experience (at the household, extended family and community levels) and that there may be a measure of misperception by our respondents.

### Coping Mechanisms After a Death

Mothers living in an environment of high infant and child mortality must develop some adaptive responses to deal with their situation. Some possible responses are blaming their predicament on a higher authority over whom they have no sanctions or accepting high mortality as one of life's vicissitudes over which they have no control. Mothers with this response were most likely to use beliefs and actions, such as believing in ogbanje and dealing with the phenomenon according to local lore. An alternative response might be to try to reduce high mortality through the use of modern health care and improved nutrition and sanitation. Or they may attempt to replace dead children by becoming pregnant as soon as possible after the loss of a child, thus, reducing birth intervals. These possibilities are examined below.

At the philosophical level, the Igbo explain the continued loss of children by one woman as the continued reincarnation of the same child. The child is termed "ogbanje" or "nwa ume omumu" ("repeater"), that is, the same child is making repeated appearances. Basden explains:

There is an element of uncertainty about a child's life and death. Its death may, perhaps, be no more than a misadventure and, at its next incarnation, it may be more fortunate. On the other hand, all doubt disappears when two or more children of the same mother die one after the other. The first two of such children are given an ordinary burial. Should a third, and subsequent ones, die, then it is taken as clear evidence that the child cannot, or will not, live in this present world. It is either unlucky or obstinate. When such a child dies, the corpse is marked, and petition made that it may not return. On the birth of a subsequent child, search is made for traces of the marks.

The night on which the infant corpse is removed, the mother is led from the house in order that, should the child's spirit return, it will not find her (1938:282-283).

Breaking the cycle of birth and early death does not have to wait until the child dies. Once the child is suspected to be ogbanje, probably because his strange behavior patterns or falling ill frequently, some action is taken. Specialist doctors are consulted to prevent the child from carrying out his plans and to disengage him from the fellow spirit-children that have died earlier and might then be urging him to follow suit. Uchendu (1966:102) also has noted this phenomenon. Other Nigerian ethnic communities, for example the Yorubas of Western Nigeria, have similar beliefs.

We hypothesized that if mothers in our study believed that ogbanje exist, they were likely to be more accepting of the high infant and child mortality and would seek traditional ways to deal with the problem. They might also treat ogbanje children differently from other children if only to placate them to stay. When we asked mothers about the existence of ogbanje,

92 (10%) out of 920 women responded that they believed in it. Nine women claimed that they had experienced the deaths of children under 5 years of age who were ogbanje, and only 5 women affirmed that they have living ogbanje children in their households. It was observed during the interviews that these women felt some reluctance and uneasiness with this section of the questionnaire. One can only speculate about the reasons for their difficulty in discussing ogbanje, especially as it pertained to them. It is a topic that can be further studied not with the survey method but by the anthropological method: ethnographic fieldwork and participant observation. Caldwell, Reddy and Caldwell (1983) recently called attention to the relevance of anthropological methodology to demographic research not only in India but elsewhere.

The respondents were, however, more willing to discuss the phenomenon at a more impersonal level. When asked whether ogbanje children in their households or living elsewhere but known to them behaved differently from non-ogbanje children, about a third of the women expressed an opinion. Two hundred forty-seven (or 26.9%) of the women affirmed that there was no difference between the two types of children. Only 69 (or 7.5%) claimed that ogbanje behaved differently. On more specific items of behavior (crying, fighting with other children, hot tempers, stealing, cursing, frequent loss of money while on errands, insomnia, soliloquy, love of isolation or playfulness), the overwhelming response from those women who had an opinion was that there was no difference between ogbanje and "normal" children. When asked about differential treatment of the children in matters of rewards or positive sanctions (such as, breastfeeding, other food items, clothing, gifts, general care, love or even scolding, appointments with indigenous doctors or western-trained doctors and specialists), our respondents maintained the two types of children were treated equally. They did not seem to be using the ogbanje phenomenon as an explanation or a coping mechanism for the high infant and child mortality that they were experiencing.

In contrast, Tables 12 to 16 explore other ways of coping with high mortality. More than a third of the respondents introduced additional nutrition before their youngest children were 6 months old (Table 12). This practice of feeding the child additional nutrients before six months of age might be unhealthy for the baby and reduces the contraceptive effect of breastfeeding (Short 1984; Millman 1985). Two-thirds of the respondents weaned their youngest children between 12 and 18 months after birth (Table 13). Though almost half felt that a woman should resume sexual relations with her husband within a year after terminating a pregnancy, over four-fifths of the respondents regarded two years as the healthy birth interval (Tables 14 and 15). Their opinion on birth intervals remained unchanged even if the woman lost her child subsequently. Those who had lost children claimed to have observed the desired two-year birth intervals (Table 16).

The data presented in Tables 12-16 are consistent with those from other studies. In the Nigerian Fertility Survey, the mean duration for breastfeeding was 16.6 months (World Fertility Survey 1984:17). A Survey of the health of Nigerians found that for rural women the median expected

period of breastfeeding children was 10-19 months category (Federal Office of Statistics 1983:30). The mean length of breastfeeding of our respondent's youngest child was 17.1 months; median 18 months. The median number of months before our respondents supplemented the breastfeeding of their youngest child with solid food was six months (24 weeks) while the data from the Nigerian Fertility Survey reported that "40.1 percent and 63.1 percent of the women started giving their penultimate children supplementary food before they were three and five months respectively" (World Fertility Survey 1984:17). The Nigerian Survey did not separate the women by rural/urban residence. The overwhelming opinion by our respondents that the healthy birth interval is 2 years is similar to the result from the World Fertility Survey. In that study, it was found that the average birth interval between the last but one and the last child was 26.3 months (World Fertility Survey 1984:17). Our data also suggest that even after our respondents have lost their children, they waited for the normal birth interval before having another child (Table 16). In short, our data confirmed that our respondents were not using early weaning or resumption of early sexual activity as replacement strategies to cope with the high mortality among their children.

How did they deal with the high mortality in their daily lives? They overwhelmingly used whatever scarce modern health care was available in conjunction with the less effective traditional medicine which has a significant but dwindling clientele. When asked if they would patronize a rural modern health facility if one were established in their towns or within five miles and with affordable cost, 842 (or 90.6%) of the 929 mothers answered that they would always take their children there; 43 women (or 4.6%) were prepared to patronize both types of medical treatment from time to time; only 3 women were determined to seek remedies for their children exclusively with the traditional doctors.

### CONCLUSIONS

Nigeria has experienced reductions in mortality in the last 50 years with the life expectancy at birth rising from 32 years during 1930-32 to 51 years during 1976-80, a gain of less than 6 months per annum. These moderate gains have not been shared equally by all sections, classes, or groups in the country. One group that has consistently been short-changed is the rural population. In rural settlements, mortality, especially of infants and children, has remained high and, in some of them, the levels suggest pre-1930 conditions. Two such villages, Ebe and Lokpaukwu in Anambra and Imo States of Eastern Nigeria, were studied to unravel the determinants of the mortality levels.

Several explanations were advanced to enable us to understand the prevailing high levels of mortality. Two of these hypotheses were: 1) that rural residents distrusted modern medical care and all its paraphernalia and so continued to use traditional medicines alone or in combination with western medicines; 2) that rural residents have shortened their breastfeeding periods and thereby exposed their children to infections and premature deaths. Empirical data were adduced to reject these two positions. For example, rising public sector health allocations since 1946

would not have continued if the people had not demanded increased and better services. In this study, almost 98 percent of the respondents resorted to either an exclusive use of modern ways of dealing with children's illness or combined both the modern and the traditional modes of treatment (Table 9). Shortened periods of breastfeeding cannot be advanced as an explanation for high mortality. The mothers in our study continued to breastfeed their children for up to 18 months after birth, and they claimed that they have generally not shortened the customary two-year birth interval to replace their dead children (Tables 12 to 16). The third hypothesis stated that the factors causing high mortality have to be sought in the physical environment of the villages. The belief system of the community and its possible effects on attitudes towards illnesses and health care were also brought into the analysis.

We, therefore, examined the belief system of the villagers in terms of the causes of children's illness and death and the alleged reincarnation of spirit-children to mothers. More than one-third (36 percent) of the 929 mothers within the child-bearing age, 15-49 years, used exclusively modern approaches when their children were ill and even consulted a distant modern health care system whenever necessary. Also, in their interaction with fellow residents, they advised that the modern health system be used. About 62 percent of our respondents are within the transitional phase using both modern and traditional remedies. An insignificant minority still have exclusive faith in and used the nonscientific explanations that revolve around witches and spirits. Our respondents rejected the existence of ogbanje, the circulating spirit-children. Our conclusion, therefore, is that the persisting high mortality level in the villages studied is not attributable to the belief system.

The culprit is the physical-medical environment, that is, lack of good housing, potable water, toilet and refuse disposal facilities, and health care system. At the time of our data collection, these villages had no basic health care systems available to them. These were being put into place at the time of our study and the women almost unanimously agreed to patronize any modern health facility once established. For the moment, they made use of modern drugs whether purchased in the local patent medicine stores normally manned by nonprofessionals or in the general hospitals located more than 20 kilometres away in the towns. They also used the age-old traditional remedies to respond to and deal with their predicament.

At Lokpaukwu, ponds and streams continue to be the sources of water supply and these are usually very polluted. Potable water was available at Ebe but even there the water supply was never regular because of the vagaries of electricity supply. The case of Ebe and other examples elsewhere in Nigeria, however, illustrate that none of these amenities taken alone is sufficient to usher in a period of low mortality. What is needed is a simultaneous introduction of these conveniences of modern living if full positive impact is to be made.

We conclude by emphasizing the role of environmental conditions and affordable and effective modern health care in reducing death rates rapidly even without further gains in income per capita. Recent research on

mortality decline in Third World countries where demographic transition is at a rudimentary stage confirms this position. Pendleton and Yang (1985) found that, in these countries (32 out of the 44 are African), education and health are the dominant factors. Our contention is that life expectancy can be increased in rural Nigeria beyond the current level at the prevailing stage of development. This demands a multifaceted approach to the provision of amenities at the villages. Wells can be sunk at several locations where water levels are near the surface soil; where this is not the case, a bore-hole or two will provide enough water for a village. Villagers will only need to be told to boil the water before drinking. Pit latrines are relatively cheap and each household can provide one for itself if informed about the hazards it faces by not having any. A rural health centre manned by an experienced nurse or mid-wife with a dispensary assistant and a fair supply of most common drugs will work wonders for the health of rural dwellers. Educational programmes will also be needed to stress the importance of windows in houses. Almost 20 percent of the main buildings in our study villages had no windows. Also required will be programmes to encourage rural women to continue with breastfeeding and to integrate local ingredients that they have around them into the daily diet of the family. We are referring to vegetables, paw paw, oranges, pears, bananas, plantains, snails, cashew nuts (Lokpaukwu), a variety of beans (Ebe), etc. This public education programme will not cost much in terms of new allocations. To enhance the cooperation of all, local sources of authority and legitimation, for example, traditional rulers, village development associations, cooperatives, religious bodies and age-grade societies, should be used at all stages.

ENDNOTES

1. Revised version of paper presented at the 1985 Annual Meeting of the Population Association of America, March 28-30, Park Plaza Hotel, Boston, Mass. I gratefully acknowledge the research grant from the Ford/Rockefeller Foundations which enabled me to collect the data on which this report is based. A Hewlett Foundation's Post-Doctoral Fellowship Award from the Population Studies and Training Center, Brown University, financed my stay at the Center during which time I analyzed the data. I thank the Hewlett Foundation and Prof. Sidney Goldstein, Director, PSTC, for the support.

Professors Sidney Goldstein, Calvin Goldscheider, John Casterline and Luis Aragon read the original version of this paper and made very useful comments. Pat Caldwell discussed the paper at the Boston meeting and suggested improvements. I appreciate their assistance and absolve them from any errors that remain in the paper. I also wish to thank Donna Souza and John Coleman for their aid with the computing aspects of the work.

2. Moseley and Chen (1984) recently proposed a set of proximate determinants for the study of infant and child survival. This framework, inspired by and drawing from an existing scheme in fertility studies, uses fourteen intermediate variables to link socioeconomic characteristics of individuals and households to health conditions and outcomes.

These determinants are maternal factors (age, parity, birth interval); environmental contamination (air, food/water/fingers, skin/soil/inanimate objects, insect vectors); nutrient deficiency (calories, protein, micronutrients); injury (intentional and other injuries); and personal illness control (personal preventive measures, medical treatment).

The present analysis is focussed at the community or settlement level. A subsequent report which will explore differentials in mortality experience of households in these high mortality communities will link socioeconomic factors (education and occupation) to the proximate variables collected in our survey. The determinants collected include all the maternal factors, environmental conditions (toilets, source of water supply, housing type and room density), nutrient deficiency (weight, height and age for children under 5), and personal illness control (use of health care). It is, however, necessary to observe that our survey was executed in 1978-79 and Mosley-Chen framework was published in 1983-84.

3. Mortality differentials by sex, residence, socioeconomic attainment and geographical areas have been noted for Nigeria (Caldwell 1979; Caldwell and McDonald 1981; Okorafor 1981; Uche 1981; and Hobcraft, McDonald and Rutstein 1984). The question of differentials, as noted in #2 above, will be dealt with in another report.

Table 1  
Age-specific Death Rates by Sex and Region of Nigeria, 1965-66

Age Years	South		North		Total Rural	
	Males	Females	Males	Females	Males	Females
0-1	164.8	150.4	199.9	190.0	184.3	172.4
1-4	43.0	41.0	60.1	56.4	53.2	50.1
5-9	9.3	8.3	9.6	11.7	9.5	10.3
10-14	4.0	5.2	6.8	8.3	5.6	7.0
15-19	7.1	6.2	5.9	12.3	6.4	9.7
20-24	9.0	9.2	5.4	7.7	6.9	8.3
25-29	7.6	9.1	5.8	8.9	6.6	9.0
30-34	7.3	8.4	9.6	10.2	8.6	9.4
35-39	8.1	11.0	10.8	14.1	9.7	12.8
40-44	15.3	10.5	15.6	16.1	15.5	13.7
45-49	24.0	18.7	23.6	25.3	23.8	22.5
50-54	22.2	18.4	28.9	36.0	26.1	28.5
55-59	29.8	20.5	32.1	41.3	31.1	32.5
60-64	43.4	47.5	50.9	59.4	47.7	54.3
65-69	51.2	46.3	71.9	72.2	63.1	61.2
70-74	73.2	72.5	118.5	101.5	99.2	89.2
75+	104.0	90.6	149.0	153.8	129.9	126.9

Source: Federal Office of Statistics, n.d. Rural Demographic Sample Survey 1965-66, Lagos, p. 21.

Table 2  
Probabilities of Infant and Child Death by Five Calendar Year  
Periods and Rural Residence, Nigeria 1956-80

Rural Areas	1976-80	1971-75	1966-70	1961-65	1956-60
Infant Mortality Rate Total	0.086	0.097	0.108	0.103	0.124
Northeast Region	0.098			0.147	0.160
Northwest Region	0.080			0.090	0.146
Southeast Region	0.079			0.086	0.119
Southwest Region	0.070			0.088	0.073
Child Mortality Rate Total	0.078	0.072	0.096	0.100	0.130
Northeast Region	0.096			0.093	0.112
Northwest Region	0.095			0.114	0.147
Southeast Region	0.068			0.100	0.138
Southwest Region	0.052			0.085	0.123
Children under 5 Total	0.153	0.162	0.194	0.193	0.238

Source: Excerpted from National Population Bureau, Supplementary Tables on Infant/Child Mortality, September, 1984.

Table 3  
Death Rates of Children Under Age 5, by Rural/Urban Area  
And State of Residence of Mother

State	Urban Areas Deaths per 1,000	Rural Areas Deaths per 1,000
Borno	300	320
Kano	260	420
Lagos	190	360
Cross River	100	170
All Four States	190	340

Source: Federal Office of Statistics, 1983 The Health of Nigeria, Interim Report, Lagos, March, p. 17.

Table 4  
Life Table Functions for Southeastern Nigeria 1976-80

Age	$l_x$	$n^d x$	$n^L x$	$T_x$	$e_x$
0	100,000	7,900	94,200	5,202,913	52.0
1	92,100	6,263	351,245	5,108,633	55.5
5	85,837	2,859	422,038	4,757,388	55.4
10	82,978	1,035	412,303	4,335,350	52.3
15	81,973	1,734	405,380	3,923,047	47.9
20	80,209	2,330	395,220	3,517,667	43.9
25	77,879	2,365	383,483	3,122,447	40.1
30	75,514	2,434	371,485	2,738,964	36.3
35	73,080	2,683	358,693	2,367,479	32.4
40	70,397	3,109	344,213	2,008,786	28.5
45	67,288	3,796	326,570	1,664,573	24.7
50	63,492	4,830	305,770	1,337,623	21.1
55	58,656	6,095	277,675	1,032,253	17.1
60	52,561	6,696	240,979	754,210	14.4
65	45,865	10,942	201,970	508,145	11.1
70	34,923	11,402	146,110	306,175	8.8
75	23,521	10,772	90,675	160,065	6.8
80	12,749	7,249	45,623	69,390	5.4
85+	5,500	5,500	23,767	23,767	4.3

Source: Nigeria Fertility Survey for  ${}_1q_0$  and  ${}_4q_1$

Age specific death rate for the age group 85 years and older is taken from Olusanya (1981). Life table calculated by writer using the Brass (1968, 1975) techniques.

Table 5(a)  
Toilet Facilities in Nigeria, Anambra, and Imo States and  
Study Villages 1978-1980 (in Percentages)

Territory	Pit/ None	Pail Toilet	Water Toilet	Closet
Nigeria (Rural, 1980)	51.2	45.5	2.6	0.7
Anambra State (Rural, 1980)	49.5	50.0	0.5	0.0
Imo State (Rural, 1980)	24.4	63.8	10.0	1.8
Nigeria Fertility Survey (1981-82, Rural)	54.4+	0.8	43.5*	1.3
Ebe and Lokpaukwu (1978-79)	20.7+	78.8	0.3	0.2

Note: +Pit only

\*Includes "not stated" (2.2) and "other facilities" (41.3)

Table 5(b)  
Mean Size of Households in Nigeria, Anambra and Imo States and  
the Study Villages 1978-1980

Territory	Mean no. of Persons per Household
Nigeria (Rural Areas, 1980)	4.90
Anambra State (Rural Areas, 1980)	5.23
Imo State (Rural Areas, 1980)	4.81
NFS (Rural Areas, 1981-82)	5.98
Ebe and Lokpaukwu (1978-79)	5.81

Table 5(c)  
Household Structure in Rural Nigeria

	Household	Nigerian Fertility Survey - Rural	Ebe and Lokpaukwu
<u>Structure</u>			
	Head of Household alone	0.0	8.8
	Monogamous Couple	76.3	80.5
	Polygynous Couple	23.7	10.7
	Total Percent	100.0	100.0
<u>Family Type</u>			
	Head of Household alone	19.2	5.7
	Nuclear	56.8	81.9
	Extended	24.0	12.4
	Total Percent	100.0	100.0

Table 5(d)  
Sources of Water Supply

	Sources	Nigerian Fertility Survey - Rural	Ebe and Lokpaukwu
	Pipe-borne Water	12.2	47.5
	Well	38.4	1.3
	Stream, Pond	n.a.	49.0
	Others	47.2	0.2
	Not Stated	2.2	2.0
	Total Percent	100.0	100.0

Note: n.a. means not available

Table 5(e)  
Distribution of Households by Number of Generations

Generations	Nigerian Fertility Survey - Rural	Ebe and Lokpaukwu
One Generation	18.9	8.0
Two Generations	72.8	85.2
Three Generations	8.1	6.3
More than Three	0.2	0.5
Total Percent	100.0	100.0

Source: Federal Office of Statistics, 1983 National Integrated Survey of Households, Report of General Household Survey, June 1980-May 1981, January:30 and 48.

World Fertility Survey 1984, The Nigeria Fertility Survey 1981-82: A Summary of Findings, London, September:3

Data about Ebe and Lokpaukwu are from the writer's field work.

Table 6  
Mean Parity and Percentage of Children Dead by Age of Mother\*

Age of Mothers	Ebe/Lokpaukwu			NFS	Ebe/Lokpaukwu		NSF
	No. of Women	Total CEB**	Mean CEB	Mean CEB	Number Dead	% Dead	% Dead
15-19	27	41	1.52	0.35	3	7	14
20-24	85	209	2.46	1.79	14	7	15
25-29	164	572	3.49	3.21	62	11	15
30-34	141	681	4.83	4.32	113	17	15
35-39	138	681	4.93	5.07	80	12	18
40-44	130	673	5.18	5.13	136	20	22
45-49	138	673	4.88	5.84	135	20	24
Total	823	3,530	4.29	3.07	543	15	18

Note: \*Excludes women who have not stated their parity or age.  
\*\*CEB = Children Ever Born

Further analysis of Table 6 by the Brass technique is unwarranted for the following reason. The data are for mothers under 50 years of age and not for all women or currently married women within the child bearing ages. Therefore, we expect higher ratios for the CEBs in our data than the Brass techniques demand. This is actually the case, for example,

$$P_1/P_2 = 0.6179$$

$$P_2/p_3 = 0.7049$$

Mean age = 33.7 years

Median age = 33 years fall outside the range of values required for the application of the Brass system of indirect estimation (Brass 1975:55). For a recent pessimistic evaluation of the continued usefulness of the techniques in Africa, see Garenne (1982).

Source: World Fertility Survey, 1984 Nigeria Fertility Survey 1981-82:10-11. Data on Ebe and Lokpaukwu are from writer's fieldwork.

Table 7  
Mean Number of Children Dead by Age of Mothers  
Who Experienced a Death (Ebe and Lokpaukwu)

Age of Mothers	No. of Mothers Who Lost Children	No. of Children Lost	Average Loss
15-19	3	3	1.00
20-24	12	14	1.17
25-29	45	62	1.38
30-34	63	113	1.79
35-39	49	80	1.63
40-44	63	136	2.16
45-49	66	135	2.05
Total	301	543	1.80

Source: Field work 1978-79.

Table 8  
Respondent's Opinion on the Causes of Infant and  
Children's Illnesses

Causes of Illnesses	Number	Percent
Germs only	150	16.1
Traditional factors only	31	3.3
A combination of above factors	727	78.3
None of the above	21	2.3
Total	929	100.0

Source: Field work 1978-79

Table 9  
 Various Sources of Assistance  
 In Dealing with Children's Illnesses

Sources of Aid	<u>Action Taken</u>		<u>Advice Received</u>		<u>Advice Given</u>	
	No.	Percent	No.	Percent	No.	Percent
Modern Medicines & Better feeding only	333	35.8	267	28.7	281	30.3
Traditional Remedies only	3	0.3	4	0.4	2	0.2
Combination of the Above	573	61.7	572	61.6	566	60.9
Neither of the above	20	2.2	86	9.3	80	8.6
Total	929	100.0	929	100.0	929	100.0

Source: Field work 1978-79

Table 10(a)  
Symptoms Respondent Observed During the Illness of  
Her Last Child that Died (Multiple Responses)

<u>Towns</u>	<u>Frequent Stools</u>	<u>Vomiting</u>	<u>Cough</u>	<u>Difficult Breathing</u>	<u>Low Fever</u>	<u>High Fever</u>	<u>Skin Eruptions</u>	<u>Convulsions</u>	<u>Body Swelling</u>	<u>Sunken Eye</u>	<u>Paralysis</u>	<u>Jaundice</u>	<u>Others</u>
Ebe	45	63	57	27	44	82	22	81	18	10	3	23	10
Lokpaukwu	<u>32</u>	<u>19</u>	<u>20</u>	<u>16</u>	<u>31</u>	<u>31</u>	<u>9</u>	<u>50</u>	<u>10</u>	<u>3</u>	<u>2</u>	<u>7</u>	<u>29</u>
TOTAL	77	82	77	43	75	113	31	131	28	13	5	30	39

Source: Field work 1978-79

Table 10(b)  
Symptoms Respondent Observed During the Latest Illness of  
a Surviving Child (Multiple Responses)

<u>Towns</u>	<u>Frequent Stools</u>	<u>Vomiting</u>	<u>Cough</u>	<u>Difficult Breathing</u>	<u>Low Fever</u>	<u>High Fever</u>	<u>Skin Eruptions</u>	<u>Convulsions</u>	<u>Body Swelling</u>	<u>Sunken Eye</u>	<u>Paralysis</u>	<u>Jaundice</u>	<u>Others</u>
Ebe	171	225	254	66	262	174	89	117	23	37	9	93	44
Lokpaukwu	<u>258</u>	<u>154</u>	<u>178</u>	<u>43</u>	<u>168</u>	<u>140</u>	<u>49</u>	<u>58</u>	<u>7</u>	<u>21</u>	<u>6</u>	<u>65</u>	<u>44</u>
TOTAL	429	379	432	109	430	314	138	175	30	58	15	158	88

Source: Field work 1978-79

Table 11  
Opinions on Whether More Children Live to Adulthood  
Nowadays Than When Respondent Was Growing Up  
by Age of Respondent

Age of Respondents	Opinion on Survival to Adulthood				Total Number
	More Live	Fewer Live	Same Live	Total Percent	
15-19	9.4	78.1	12.5	100.0	32
20-24	8.5	84.5	7.0	100.0	71
25-29	12.0	77.3	10.7	100.0	150
30-34	7.4	85.2	7.4	100.0	122
35-39	12.6	81.1	6.3	100.0	127
40-44	6.8	85.6	7.6	100.0	118
45-49	13.3	79.2	7.5	100.0	120
All Ages - No.	76	604	60		740
All Ages - %	10.3	81.6	801	100.0	

Source: Field work 1978-79

Note: The reduction in the number of respondents in the table is due to the removal of women who had no opinion on the mortality situation (116 women) and/or whose ages fell outside the category of 15-49 years (69 women).

Table 12  
Age of Respondent by Time She Introduced Additional Food  
to the Breastfeeding of Her Youngest Child

Age of Respondents	Introduction of Food Supplements			Total Percent	Total Number
	Under 6 Months	6 to 9 Months	Over 9 Months		
15-19	63.6	36.4	0.0	100.0	22
20-24	51.4	40.5	8.1	100.0	74
25-29	45.7	39.7	14.6	100.0	151
30-34	43.3	39.4	17.3	100.0	127
35-39	28.2	47.6	24.2	100.0	124
40-44	30.5	46.1	23.4	100.0	128
45-49	23.1	40.0	36.9	100.0	130
All Ages - Number	280	318	158		756
All Ages - Percent	37.0	42.1	20.9	100.0	

Source: Field work 1978-79

Table 13  
Age of Mother by Weaning Time of Her Youngest Child

Age of Mothers	Weaning Age of Youngest Child				Total Percent	Total Number
	Under 12 Months	12-18 Months	19-24 Months	Over 24 Months		
15-19	6.2	75.0	18.8	0.0	100.0	16
20-24	13.3	66.7	20.0	0.0	100.0	60
25-29	14.2	70.1	13.4	2.3	100.0	127
30-34	6.2	77.0	12.4	4.4	100.0	113
35-39	8.2	67.2	21.3	3.3	100.0	122
40-44	5.6	68.2	23.0	3.2	100.0	126
45-49	7.2	58.4	30.4	4.0	100.0	125
All Ages-Number	60	469	139	21		689
All Ages-Percent	8.7	68.1	20.2	3.0	100.0	

Source: Field work 1978-79

Table 14  
Age of Respondent by Interval Until Resumption of Sex  
After Pregnancy

Age of Mothers	Interval Until Resumption of Sex				Total Percent	Total Number
	Under 6 Montns	6-12 Months	13-24 Months	Over 24 Months		
15-19	12.0	44.0	40.0	4.0	100.0	25
20-24	21.6	47.3	29.7	1.4	100.0	74
25-29	23.6	30.7	43.6	2.1	100.0	140
30-34	16.5	38.0	42.1	3.3	100.0	121
35-39	19.7	42.4	35.4	2.4	100.0	127
40-44	22.0	31.7	41.4	4.9	100.0	123
45-49	17.8	31.8	45.7	4.7	100.0	129
All Ages-Number	147	269	299	24		739
All Ages-Percent	19.9	36.4	40.5	3.2	100.00	

Source: Field work 1978-79

Table 15  
Age of Respondent by her Opinion on Healthy Birth Intervals

Age of Respondents	Healthy Birth Intervals				Total Percent	Total Number
	One Year	Two Years	Three Years	More than Three Years		
15-19	3.1	90.6	6.3	0.0	100.0	32
20-24	4.8	89.4	6.0	0.0	100.0	83
25-29	6.9	86.2	6.9	0.0	100.0	160
30-34	3.0	82.1	13.4	1.5	100.0	134
35-39	3.8	80.8	15.4	0.0	100.0	130
40-44	4.0	75.4	19.0	1.6	100.0	126
45-49	1.5	84.3	12.7	1.5	100.0	134
All Ages-Number	32	664	97	6		799
All Ages-Percent	4.0	83.1	12.1	0.8	100.0	

Source: Field work 1978-79

Table 16  
Age of Respondent by Her Opinion on How Soon a Woman  
Should Get Pregnant After Losing a Child

<u>Age of Respondents</u>	<u>Right Time for Other Women</u>				<u>Right Time for Herself</u>			
	<u>Immediate Pregnancy</u>	<u>Normal Time</u>	<u>Total %</u>	<u>Total No.</u>	<u>Immediate Pregnancy</u>	<u>Normal Time</u>	<u>Total %</u>	<u>Total No.</u>
15-19	48.6	51.4	100.0	35	40.0	60.0	100.0	5
20-24	27.1	72.9	100.0	85	25.0	75.0	100.0	20
25-29	35.3	64.7	100.0	167	25.9	74.1	100.0	54
30-34	31.2	68.8	100.0	138	33.8	66.2	100.0	74
35-39	31.3	68.7	100.0	131	32.8	67.2	100.0	61
40-44	32.3	67.7	100.0	130	28.4	71.6	100.0	74
45-49	36.5	63.5	100.0	137	35.6	64.4	100.0	73
All Ages-No.	275	548		823	113	248		361
All Ages-%	33.4	66.4	100.0		31.3	68.7	100.0	

Source: Field work 1978-79

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