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# A Comparative Study of the Nutritional Status of Under-Five Children of Indigenous and Non-Indigenous Parentage in Ile-Ife, Nigeria

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KEYWORDS

Nutritional Status
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## ABSTRACT

Background: Without addressing urgently under-nutrition and the potential deterioration in nutritional status due to poverty, accelerating the reduction in under-five mortality (MDG4) will be seriously challenged. A community based comparative cross-sectional study was conducted among indigenous and non-indigenous populations respectively in Ile-Ife, Nigeria with a view to compare the nutritional status of under-five children in both areas.

**Methodology:** Four hundred and two caregiver/child (199 non-indigene, 203 indigene) pairs were recruited by a simple random sampling technique. Semi-structured questionnaires and focus group discussion guide were used to collect information on nutrition-related practices of the respondents. Physical examination and anthropometric measurements of the children were taken.

**Results:** More non-indigene primary caregivers of the children had little or no education and were mostly unemployed (57.3%) compared to the indigene respondents. Prevalence of underweight and stunting were higher among the non-indigene children (20.1% vs 10.3% for underweight) and 34.7 vs 20.2% for stunting. These differences showed statistical significance for underweight and stunting (p = 0.006 and 0.001 respectively). The observed sanitation characteristics were poor in both study areas but worse in the Sabo community.

**Conclusion:** The children of the non-indigenes showed poorer nutritional status (stunting and underweight) compared to the indigenes. Improved educational levels of primary care givers, provision of potable water sources, as well as improved environmental sanitation are likely to impact positively on the nutritional status and overall health of the children.

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## INTRODUCTION

Poor nutrition remains a global epidemic contributing to more than half of all child deaths, about 5.6 million per year. More than one quarter of all children under the age of five in developing countries are underweight, many to a life-threatening degree.[1] Approximately 790 million people in the developing world subsist on diets that are deficient in energy. About 200 million children suffer from malnutrition and 2 billion people suffer from a variety of micronutrient deficiencies. The vast majority of the food-insecure, whether their malnutrition is due to deficiencies in energy or in micronutrients, live in low-income developing countries and mainly in the poorest areas of those.[2]

A report card on Nutrition noted that the proportion of children under five who are underweight has fallen only slightly since 1990 - proof, according to United Nations Children's Fund (UNICEF), that the world is failing children. UNICEF Executive Director Ann M. Veneman, speaking on her first anniversary as head of the global children's agency said the lack of progress to combat undernutrition is damaging children and nations, and that few things have more impact than nutrition on a child's ability to survive, learn

effectively and escape a life of poverty. The report charted national and regional progress towards the first Millennium Development Goal (MDG): to eradicate extreme poverty and hunger by 2015. Achieving this goal means halving the proportion of children who are underweight for their age, the most visible sign of undernutrition. But current trends show the world is still far off track.[3]

Good health is essential to the well-being of children and directly affects their educational performance. However, there is little nationwide, accurate information on the health status of non-indigenous settlers, and even less on that of their children. Many baseline indicators of the health status of this population, such as the population size, mortality and survival rates, perinatal outcomes, and chronic diseases are unknown. Non-indigenes are usually economically disadvantaged compared to indigenes, and the problem of poverty among non-indigenous settlers' families is well documented[4]. Poverty leads to poor nutrition and sanitation, which contribute to abnormally high rates of chronic illnesses and acute communicable health problems among non-indigenous children. Consequently, commonly reported health problems among non-indigenous settlers' children include: underweight, stunting and vitamin A deficiency; respiratory diseases such as tuberculosis, pneumonia, asthma, emphysema, and bronchitis occur very frequently among such population; parasitic conditions, including bacterial, protozoan, viral, and worm infections; skin infections and chronic diarrhoea[4-7]. Another commonly untreated health problem among non-indigenous settlers'children is dental caries.[6,8]

Nigeria has very high under five and infant mortality rates of 157 and 75 respectively[9], one of the highest in the world. Most of the childhood deaths are due to malaria, diarrhoea, pneumonia, measles and malnutrition. [10]

Under-nutrition is a contributing cause of one third of child deaths. Without addressing urgently under-nutrition, and the potential deterioration in nutritional status due to poverty, accelerating the reduction in under-five mortality (MDG4) will be seriously challenged.[11]

Rahman et al found mother's employment status to influence nutritional status of under-fives according to his study carried out in Bangladesh. Other main contributing factors likely to affect nutritional status of children aged 24-59 months, according to their study, were respondent's education, husband's education and occupation, household assets index and mothers' age at last birth[12]. White-Means reported that poverty amongst non-indigenous populations has been well documented[13].

**Research question:** Have the children of the non-indigenous settlers attained a nutritional status comparable to that of the children of the indigenous dwellers in Ile-Ife?

**Null hypothesis:** There is no difference in the nutritional status of the under-five children of indigenes and non-indigenes in Ile-Ife.

**Alternate hypothesis:** The children of non indigenes have a significantly different nutritional status from that of the indigenes.

## Justification

Previous and recent surveys in Nigeria have shown that wide disparities exist in the nutritional status of under-five children in Northern and Southern Nigeria with the northern region having poorer indices. The current prevalence rates for underweight by region has been given as North-central - 20%; north-east - 35%; north-west 35% while for south west is 13%[9]. The study sought to find out whether the non-indigenous settlers' children have achieved a nutritional status similar to that of their indigenous counterparts or still reflect the north-south gradient. The non-indigene population under study has remained unintegrated in their new community having conjugated in a geographic location and retained their traditions and cultural practices.

## Materials and Methods

### Background to study area

The study location was Ile-Ife in Ife Central Local Government (ICLG), Osun State, South-western Nigeria. The population of ICLG according to the 2006 national census was 167,254.

Hausa settlements in Yorubaland, popularly known as Sabo, are small geographic areas where Hausa people conjugate together to create a distinctive socio-political quarter to foster their cultural heritage and economic interests in the midst of a different ethnic group, while at the same time owing some informal obligations to the Yoruba. The rise of ubiquitous Hausa settlements in some major Yoruba cities is mostly attributed to the inter-ethnic or long distance trading networks that developed over time in West Africa. In the early period of the last century, a stream of Hausa settlers began to settle in major Yoruba cities, as a result of their desire to retain their traditional customs and their "different" norms, they preferred to own their own space in foreign towns under the rulership of a Sarkin Hausawa[14]. The population of Sabo in ICLG is estimated at 7,328. Most of the married women are housewives, some of whom are in Purdah and a few engage in petty trading in their houses. The men are mainly traders with many of them trading in kolanuts. Their solid and liquid wastes are usually disposed of by open dumping method and pit latrines respectively and wells are their main source of domestic water supply. There are no well delineated streets in Sabo, Ile-Ife except for the major road (Ilesa Road) that passes through the area.

The Obalufon area is located within ICLG and it is adjacent to the Sabo Community. The area is bounded in the north by Eleyele, in the south by Iremo road, in the North by Sabo and in the west by Lagere. The area comprises five main streets namely Ilara, Ayibiowu, London, Onireke and Catholic Mission. Estimated (from Enumeration Area maps) population of Obalufon area is similar to that of Sabo (i.e. about 7,300). The residents are predominantly Yoruba speaking, many of whom are Ile-Ife Indigenes. The adults are also mostly traders. Main water source for domestic use is the well and waste disposal methods are as for Sabo.

### Study Design and Study Population

This is a comparative cross-sectional study. The study population comprised under-five children (0-59 months) and their caregivers in the Sabo area of Ile-Ife (the non-indigenous population) and similar group amongst the indigenous Yoruba population living in the Obalufon area, both in Ile-Ife. A sample size of approximately 200 subjects per group was calculated using the standard formula for comparing proportions[15]. Underweight prevalence rates of 32% (being the average prevalence for Northern Nigeria) and 19% (for South-west Nigeria) were used in the calculation. Subsequently, 199 non-indigene and 203 indigene caregiver/child pairs were recruited into the study.

**Eligibility Criteria:** Children aged 0-59 months whose primary caregivers had been residing in study location for at least 12 months were eligible for recruitment into the study.

**Sampling Technique** Simple random sampling technique was employed. House numbering was carried out in each of the study areas by the researcher with the help of the research assistants. There were 187 houses in the non-indigenous community and 364 houses in the indigenous community under study.

In both study locations, household listing was done and eligible participants were selected by simple random sampling yielding 199 participants for the non-indigene group and 203 for the indigenes.

### Research Instruments

The Nigeria Demographic and Health Survey (NDHS) 2003 questionnaire was used to draw up relevant questions (as a semi-structured questionnaire) that were used to assess the sociodemographic characteristics and the

nutritional status of the study subjects[16]. Questions were drawn up in English language and subsequently translated into Hausa and Yoruba languages (with appropriate back translation) to ensure retention of original meanings.

The questionnaires were interviewer-administered. Six final year medical students of the Obafemi Awolowo University, Ile-Ife who had past experience in data collection were employed and adequately trained by the investigator for the purpose of this study. They comprised 4 females and 2 males. Experienced local guides (Yoruba and Hausa) were also employed to facilitate overcoming of language barriers. The researcher closely monitored and supervised the data collection.

A pretest was done in a different location Garage Olode (administratively under Ife South LGA). This location has a large population of Hausa and Yoruba residents.

Focus group discussions (FGDs) were conducted amongst care givers prior to questionnaire administration. The experience was used to improve the content of the questionnaire make it more relevant to the local context. There were four FGD sessions in all one each for fathers and mothers of study subjects in both study populations. 8-10 participants were selected for each FGD. FGD participants were purposively selected and were mothers/fathers who had at least one child aged 0 to 59 months. For the non-indigenous community, the local guides helped in inviting available eligible participants (convenience sampling). For the non-indigenous community, the researcher recruited eligible participants available in the study area. The FGDs were moderated by experienced research assistants (from the Social Sciences Faculty of the Obafemi Awolowo University, Ile-Ife) who are vast in the respective languages of the study participants (Hausa and Yoruba). There was a note taker at each FGD, all of which were audiotaped and subsequently transcribed verbatim. FGD participants were subsequently excluded from the quantitative aspect of the study.

General physical examination and anthropometric measurements were done on the children. Standardized weighing scales, measuring tapes, a locally designed stadiometer and an infantometer (UNICEF rollameter) were used to obtain the anthropometric measurements of the study subjects.

## DATA ANALYSIS

**Quantitative data analysis:** The information collected from the semi-structured questionnaires was input into the computer and analyzed using SPSS version 16.0. Univariate analyses were done to generate frequencies of variables e.g. of background characteristics of respondents, etc. Bivariate analyses were employed to describe associations between 2 variables e.g. Chi square test was used to compare proportions for categorical variables and independent samples t-test was used for continuous variables. Binary logistic regression was used to examine factors influencing nutritional status. P was significant at $<0.05$ for all analysis. The nutritional status of the children was determined using weight-for-age, weight for height and height for age; and the percentage of the population with weight more than two standard deviations below the expected from the international growth reference for a child's age and sex were deemed to be malnourished. Z-scores for the anthropometric measurements were generated using EPINUT (an Epi-info software package).

**Qualitative data analysis:** The focus group discussions were analyzed using content analysis.

### Ethical considerations

Ethical approval was sought and gotten from the Obafemi Awolowo University Teaching Hospitals Complex Ethical Review Committee. Informed consent (verbal) was obtained from all participants used in the study.

## RESULTS

Four hundred and two primary caregiver/child pairs were recruited; of these, 199 (49.5%) were non-indigenes while 203 (50.5%) were indigenes. The age of the respondents ranged between 15 and 64 years,

with a mean (SD) of 29 (7) years. There were more Muslims among the non-indigenes compared with the indigenous respondents.

More than half (57.3%) of the non-indigenous respondents were unemployed while most (78.8%) of the indigenous respondents were self-employed. Educational level of both groups of respondents differed significantly with 168 (82.8%) of the indigenous respondents having at least secondary education while none of the non indigenous respondents attained higher than secondary education and nearly half of them, 97 (48.7%) had only primary education. The mean income of both groups of respondents showed a statistically significant difference ($p<0.001$) with the indigenous respondents earning more on the average than their counterparts.

Nearly all the indigenes, 191 of them (94.1%) had spent their entire lives in Ile-Ife. However, more than half of non-indigenes were born in and had been living in Ile-Ife all their lives (see table 1).

One hundred and two (51.3%) and 84 (41.4%) of the children of non-indigenous and indigenous respondents respectively were boys. Their ages ranged from 1 to 59 months with the non indigene group having a mean of 27 ±17 months and the indigene group, 24 ±15 months (table 2).

Prevalence of stunting amongst the non-indigenous children was 34.7% (69) and 20.2% (41) in the indigenous group and this difference is statistically significant ($p = 0.001$). Overall prevalence of stunting among the children was 27.4%. There was no statistically significant difference ($p=0.76$) in wasting with prevalence in the non-indigenous population of 7.5% and 8.4% in the non- indigenous population. Overall prevalence of wasting in study population was 8%.

Forty (20.1%) of the non-indigenous children and 21 (10.3%) of the indigenes' children were underweight, a difference that proved to be statistically significant ($p = 0.006$). see table 3.

As shown in table 4, the prevalence of stunting in the 12 35 months age group shows a statistically significant difference ($p = 0.001$) with the non-indigenous group having a higher rate of stunting within that age group (38.3%), compared to 18.1% in the non-indigenes.

In the 12-35 months age group, 25.5% non-indigenes were underweight compared to11.4%of the indigenous children; a difference which proved to be statistically significant ($p = 0.010$). Nutritional status within the other age groups did not show any statistically significant difference (Table 5).

Figure 1: shows the main source of food for the index children. The two groups being compared varied significantly with respect to the main source of their children's food. Most 143 - (71.9%) of the non indigenes' children were fed mainly home-made food compared to only 93 (45.8%) of their counterparts. More indigenes, 92 (45.3%) gave both home-made and foods prepared by food vendors regularly to their children in contrast to only 40 (20.1%) of the non indigenes ($p < 0.001$). Most (33 out of 37) of the children under 6 months were still being exclusively breastfed. These comprised 16 of the 19 children less than 6 months of age in the non-indigenous group and 17 of the 18 similar children in the comparison group.

## FGD findings

Respondents from both groups correctly stated that good/nutritious food, clean water, proper hygiene like cutting of finger nails, brushing of teeth; and prompt treatment of illness are important for child health. They also expressed similar opinion the relationship between food and a child's mental development, all agreeing that good nutrition is a significant contributor to academic performance. Some of their responses were as follows: "good food improves school performance" and "a child that is not well fed will be dull in school".

**Table 1: Sociodemographic characteristics of respondents**

| Variables | Status | | Total | |
|---|---|---|---|---|
| | Non indigene n =199 (%) | Indigene n =203 (%) | n =402 (%) | Statistical indices |
| **Age(years)** | | | | |
| ≤ 19 | 7 (3.5) | 5 (2.5) | 12 (3.0) | $\chi^2 = 4.640$ |
| 20 – 29 | 114 (57.3) | 97 (47.8) | 211 (52.5) | df = 3 |
| 30 – 39 | 64 (32.2) | 82 (40.4) | 146 (36.3) | p = 0.200 |
| 40 and above | 14 (7.0) | 19 (9.3) | 33 (8.2) | |
| **Educational level** | | | | |
| None | 23 (11.6) | 2 (1.0) | 25 (6.2) | $\chi^2 = 127.398$* |
| Primary | 97 (48.7) | 32 (15.8) | 129 (32.1) | df = 4 |
| Secondary | 70 (35.2) | 137 (67.5) | 207 (51.5) | p<0.001* |
| Post-secondary | 0 (0.0) | 31 (15.3) | 31 (7.7) | |
| Koranic school | 9 (4.5) | 1 (0.5) | 10 (2.5) | |
| **Monthly income range** | | | | |
| <5000 | 75 (37.7) | 50 (24.6) | 125 (31.1) | $\bar{x}_1 = 8,866.33$ |
| 5000-10000 | 69 (34.7) | 74 (36.5) | 143 (35.6) | $\bar{x}_2 = 12,856.78$ |
| 10001-25000 | 51 (25.6) | 57 (28.1) | 108 (26.9) | t = 0.378;df=400 |
| >25000 | 4 (2.0) | 22 (10.8) | 26 (6.4) | p<0.001* |
| **Respondent's Ife stay duration (years)** | | | | |
| = 5 | 27 (13.6) | 4 (2.0) | 31 (7.7) | $\chi^2 = 73.092$ |
| 6-10 | 28 (14.1) | 1 (0.5) | 29 (7.2) | df = 3 |
| >10, not whole life | 28 (14.1) | 7 (3.4) | 35 (8.7) | p<0.001* |
| Entire life | 116 (58.3) | 191 (94.1) | 307 (76.4) | |

* $p<0.05$ statistically significant
$\bar{x}_1$ = mean monthly income of non indigenes
$\bar{x}_2$ = mean monthly income of indigenes

**Table 2: Age and sex distribution of the index children**

| Variable | Status | | | | | |
|---|---|---|---|---|---|---|
| | Non-indigene n = 199 (%) | | | Indigene n = 203 (%) | | |
| | Male | Female | Total | Male | Female | Total |
| **Age (months)** | | | | | | |
| < 6 | 10 (5.0) | 9 (4.5) | 19 (9.5) | 5 (2.5) | 13 (6.4) | 18 (8.9) |
| 6 – 11 | 11 (5.5) | 10 (5.0) | 21 (10.5) | 10 (4.9) | 14 (6.9) | 24 (11.8) |
| 12 – 23 | 25 (12.6) | 27 (13.6) | 52 (26.2) | 26 (12.8) | 47 (23.2) | 73 (36.0) |
| 24 – 35 | 25 (12.6) | 17 (8.5) | 42 (21.1) | 18 (8.9) | 14 (6.9) | 32 (15.8) |
| 36 – 59 | 31 (15.6) | 34 (17.1) | 65 (32.7) | 25 (12.3) | 31 (15.3) | 56 (27.6) |
| $\bar{x}$±sd | | | 27±17 | | | 24±15 |

**Table 3: Prevalence of stunting, wasting and underweight among study population**

| Nutritional status | Status | | | |
|---|---|---|---|---|
| | Non indigene n = 199 (%) | Indigene n = 203 (%) | Total n = 402 (%) | Statistical indices |
| **Stunting** | | | | |
| Stunted | 69 (34.7) | 41 (20.2) | 110 (27.4) | $\chi^2 = 10.595$ |
| Not stunted | 130 (65.3) | 162 (79.8) | 292 (72.6) | df = 1 |
| | | | | p = 0.001* |
| **Wasting** | | | | |
| Wasted | 15 (7.5) | 17 (8.4) | 32 (8.0) | $\chi^2 = 0.096$ |
| Not wasted | 184 (92.5) | 186 (91.6) | 370 (92.0) | df = 1 |
| | | | | p = 0.757 |
| **Underweight** | | | | |
| Underweight | 40 (20.1) | 21 (10.3) | 61 (15.2) | $\chi^2 = 7.430$ |
| Not underweight | 159 (79.9) | 182 (89.7) | 341 (84.8) | df = 1 |
| | | | | p = 0.006 * |

* p<0.05 statistically significant

**Table 4: Nutritional status (stunting) by age of index children**

| Age/ stunting status | Status | | | |
|---|---|---|---|---|
| | Non indigene n = 199 (%) | Indigene n = 203 (%) | Total n = 402 (%) | Statistical indices |
| **0 – 11 months** | | | | $\chi^2 = 0.010$ |
| Stunted | 7 (17.5) | 7 (16.6) | 14 (17.1) | df = 1 |
| Not stunted | 33 (82.5) | 35 (83.4) | 68 (82.9) | p = 0.920 |
| **12 – 35 months** | | | | $\chi^2 = 10.122$ |
| Stunted | 36 (38.3) | 19 (18.1) | 55 (27.6) | df = 1 |
| Not stunted | 58(62.7) | 86 (71.9) | 144 (72.4) | p = 0.001* |
| **36 – 59 months** | | | | $\chi^2 = 2.345$ |
| Stunted | 26 (40.0) | 15 (26.8) | 41 (33.9) | df = 1 |
| Not stunted | 39 (60.0) | 41 (73.2) | 80 (66.1) | p = 0.126 |

* p<0.05 statistically significant

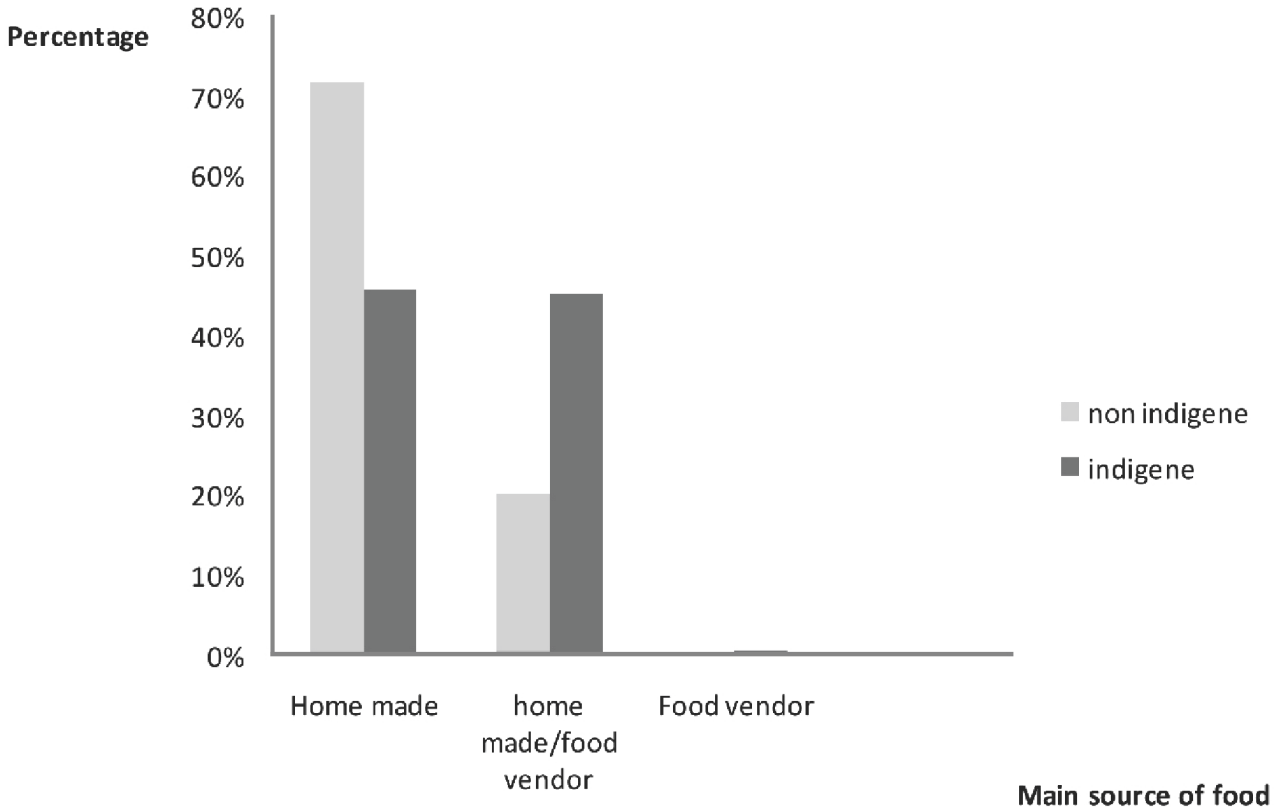
**Table 5: Nutritional status (underweight) by age of index children**

| Age/ underweight status | Status | | Total n = 402 (%) | Statistical indices |
|---|---|---|---|---|
| | Non indigene | Indigene | | |
| **0 – 11 months** | (n=40) | (n=42) | | |
| Underweight | 2 (5.0) | 1 (2.3) | 3 (3.7) | $\chi^2 = 0.399$** |
| Not underweight | 38 (95.0) | 41 (97.7) | 79 (96.3) | df = 1 |
| | | | | p = 0.528 |
| **12 – 35 months** | (n=94) | (n=105) | | |
| Underweight | 24 (25.5) | 12 (11.4) | 36 (18.1) | $\chi^2 = 6.658$ |
| Not underweight | 70 (64.5) | 93 (88.6) | 163 (81.9) | df = 1 |
| | | | | p = 0.010* |
| **36 – 59 months** | (n=65) | (n=56) | | |
| Underweight | 14 (21.5) | 8 (14.2) | 22 (18.2) | $\chi^2 = 1.064$ |
| Not underweight | 51 (78.5) | 48 (85.8) | 99 (71.8) | df = 1 |
| | | | | p = 0.302 |

** $\chi^2$ with continuity correction

*p<0.05 statistically significant

**Figure 1**



## DISCUSSION

In respect of socio-demographic characteristics, the non-indigene primary care givers had relatively lower educational levels the indigenous counterparts with 23 (11.6%) of the non-indigenes having no form of education at all whereas only 2 (1%) of indigenes had no education; although comparing those with primary and/or secondary education yields 167 (83.9%) and 169 (83.3%) respectively. Also, none of the non-indigene respondents had post-secondary education whereas 31 (15.3%) of the indigenes had post-secondary education. This is despite the fact that many of these non-indigenes had spent most of their lives in Ile-Ife and some were even born there (116) - 58.3% of the non-indigenes had actually spent their entire lives in Ile-Ife. However, the difference in the educational level of the non-indigenes may be because the main objective of the non-indigenes' settlement in their new community was to make economic gains, especially through trading hence attaining the higher levels of education such as the post-secondary may not have been considered a priority by them.

The indigenous children had better nutritional indices (although the study revealed that the main sources of food differed significantly across the groups) which is similar to findings in other studies[4-6]. The non-indigenous children had worse nutritional indices compared with the indigenes, especially in respect of stunting and underweight (34.7% vs 20.2% and 20.1% vs 10.3% respectively). The finding from this study is also similar to that of Rahman et al who found that women who worked for cash had two-and-a-half times more probability of having healthy weighted child than among the mothers who did not work for cash.[12] Study also agrees with the finding of White-Means who found that poverty is a problem amongst non-indigenous populations as the difference in the mean average monthly income of the respondents showed statistically significant difference with the non-indigenes earning less than the indigenes.[13]

The non-indigenes reported higher rates of exclusive breastfeeding and also feeding of older children on home-made food. This is not surprising as the non-indigenous respondents were mostly housewives and so had enough time to breastfeed and cook for their children, unlike their counterparts who were mainly traders. However, 24-hour dietary recall for the index children revealed that comparable proportions amongst both groups had consumed energy-giving and protective foods but 13.3% and 1.1% of non-indigenes and indigenes respectively had consumed body-building foods.

Water and sanitation characteristics of the respondents showed that the non-indigenes depend mainly on rainwater for drinking while the indigenes relied mainly on wells. This is rather surprising as one would have expected both groups to have similar sources of potable water by virtue of the closeness of the study areas. Most of the wells in both study areas were however unsanitary in their construction.

As observed by the researcher, the living environments in both study areas were mostly unsanitary with the Hausa community being worse off as their drains were poorly constructed and their general surroundings including the drains were littered, and associated with unpleasant odour. The houses were also very close to each other (and haphazardly arranged) with no evidence of compliance with town planning lay-out.

FGD findings revealed that virtually all the primary caregivers and their spouses recognized the importance of hygiene to the maintenance of the health of their children. They especially emphasized the role of hygienic practices in food preparation.

The low educational level of the non-indigenous primary care givers, the non-integration of this group into their new community and poor environmental sanitation in their community is believed to have contributed to the persistence of the north-south gradient in respect of the nutritional status of the under-five children.

## Conclusion and recommendations

The differences that existed in the socio-demographic characteristics of the respondents is a pointer that the non-indigenous settlers have not been completely integrated into their new community as they had lower education levels than their indigenous counterparts and were mostly

unemployed.

The non-indigene children had poorer nutritional indices in contrast to their indigenous counterparts. The occurrence of stunting and underweight was more pronounced amongst the non-indigenous children in the 24-35 months age group. Children whose primary caregivers had at least secondary education were less likely to be undernourished.

All the tiers of government in Nigeria need to take cognisance of these special populations who have their "settlements within settlements". Efforts should be made to encourage this special population group to get educated. Public schools are available in Osun state and they offer free education. This is beneficial for their children so that they can grow up to be educated adults. Opportunities for adult education specially tailored to meet the needs of this group should be created by the state government since Sabos exist in virtually all major towns in the state. Furthermore, provision of amenities like pipe-borne water to both areas will facilitate sanitation and also improve the nutritional status and overall health of the children in both areas.

## REFERENCES


1. UNICEF, The State of the World's Children. New York Times 2006 May 2. Available at http://www.unicef.org/sow06. (accessed on internet on 3rd April 2009)
2. Simon Chevassus-Agnès., Anthropometric, health and demographic indicators in assessing nutritional status and food consumption. FAO Population Programme Service. Special: Population, poverty and environment. FAO Food and Nutrition Division with the collaboration of Alain Marcoux. 1999.
3. UNICEF, Press Release. A Quarter of the World's Children Seriously Underweight. 2006 Available at http://www.unicef.org/progressforchildren/2006n4/ (accessed on 3rd April 2009)
4. Rust G. S., Health Status of Migrant Farmworkers: A literature review and commentary. American Journal of Public Health 1990; 80 (10): 1212-1217).
5. Monasta L, Andersson N, Ledogar R J, Cockroft A., Minority Health and Small Numbers Epidemiology: A Case Study of Living Conditions and the Health of Children in 5 Foreign Roma Camps in Italy. Am J Public Health 2008; 98(11):2035-41
6. Islam MM, Azad KM. Rural-urban Migration and Child Survival in Urban Bangladesh Are the Urban Migrants and Poor Disadvantaged? J Biosoc Sci. 2008; 40(1):83-96.
7. Ostan I, Kilimcioglu A A, Girginkadesler N, Ozyurt B C, Limonku M E, Ok U Z. Health Inequeties Lower Socio-economic Conditions and Higher Incidences of Intestinal Parasites. BMC Public Health. 2007; 27(7):342.
8. Asistio A., Dental Decay among Migrant Children. 2008. Available at http://www.kimatv.com/news/26012074.html (accessed on 6th July 2009 at 11:59 a.m.)
9. National Population Commission (NPC) [Nigeria] and ORC Macro. Nigeria Demographic and Health Survey 2008. Calverton, Maryland: National Population Commission and ORC Macro. 2009.
10. Oluwadare C. The Social Determinants of Routine Immunization in Ekiti State of Nigeria. Ethno-Med 2009;3 (1); 49-56.
11. UNDP/UNFPA, UNICEF and WFB., Unstable food prices and the linkage to food and nutrition security. Joint meeting of the Executive Boards, Agenda Item 2, background document, final draft, 2009 Jan; pp3-4.
12. Rahman M., Mostofa G. & Nasrin S. O.: Nutritional status among children aged 24-59 months in rural Bangladesh: An assessment measured by BMI index. *The Internet Journal of Biological Anthropology.* 2009

13. White-Means S., The poverty status of migrant farmworkers. In Peter K.S. Chi, Shelley White-Means, & Janet McClain, Research on migrant farmworkers in New York State. Ithaca, NY: State University of New York. 1991;209-223.

14. Cohen, Abne., Custom & politics in urban Africa: a study of Hausa migrants in Yoruba towns. Retrieved from "http://en.wikipedia.org/wiki/Sabo_Quarter" (accessed 19th June 2008, 2:24pm).

15. CDC, FHI, WHO. An Epidemiologic Approach to Reproductive Health. 1991 p.162.

16. National Population Commission (NPC) [Nigeria] and ORC Macro. Nigeria Demographic and Health Survey 2003. Calverton, Maryland: National Population Commission and ORC Macro. 2004.