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ASSESSMENT OF HOUSEHOLD FOOD INSECURITY AND UNDERNUTRITION AMONG UNDER-FIVE CHILDREN USING THE COMPOSITE INDEX OF ANTHROPOMETRIC FAILURE IN ILARO, OGUN STATE, NIGERIA

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ABSTRACT

Food insecurity and under nutrition remain significant public health concern among children under five in Nigeria which contribute to high morbidity and mortality. This study assessed household food insecurity and under nutrition among under-five children using composite index of anthropometric failure (CIAF) in Ilaro, Ogun State, Nigeria. A community-based cross-sectional design was employed involving 410 mother-child pairs selected through multistage sampling. Data were obtained using structured questionnaires, anthropometric measurements, and household food security assessments. Descriptive (frequency and percentages) and inferential (chi-square) analyses were conducted using SPSS version 27.0. The prevalence of food insecurity reached 74.6%. Among the children, there was a high prevalence of stunting at 61.2%, underweight at 34.1%, and wasting at 37.1%. Additionally, 14.9% experienced SAM/MAM. More than half (52.2%) of the children under five years exhibited at least one form of anthropometric failure, indicating widespread growth and nutritional deficits in the population. The study concludes that household food insecurity and under nutrition in Ilaro are alarmingly high, with the CIAF revealing a greater burden than conventional indices this result emphasized the urgent need for integrated interventions at the local level to improve access to food, and enhancing maternal education as means of addressing child malnutrition.

Keywords: Undernutrition, Anthropometric failure, Under-five children, Stunting, Dietary diversity, Child health outcome

INTRODUCTION

Food insecurity and undernutrition continue to be major public health problems that contribute to high rates of morbidity and mortality among under-five children in Nigeria. Millions of households continue to struggle to obtain sufficient, safe, and nutritious foods for a healthy life despite advancements in agricultural productivity and nutrition-sensitive interventions. According to the Food and Agriculture Organization et al. (2025), an estimated 673 million people, or 8.2% of the global population, were hungry in 2024, posing a threat to human survival and well-being. With almost 20% of its population roughly 307 million people struggling with hunger; Africa is the continent most affected. Poverty, poor governance, violence, environmental degradation, and climate-related shocks that threaten agricultural systems and household food access are the main causes of the continent's ongoing food crises.

In Nigeria, food insecurity as well as undernutrition continues to be a major and development issues. The nation continues to struggle with food access and utilization despite having fertile lands diverse agricultural potential. Nigeria was listed as one of the nations with a "serious" hunger scenario in the 2025 Global hunger Index, underscoring the vulnerability of the food system (Concern Worldwide & Welthungerhilfe, 2025). According to national surveys, 40% of children under five years are stunted, 8% are wasted, and 27% are underweight (Federal Ministry of Health and Social Welfare of Nigeria [FMoHSW] et al., 2024). These figures reveal both chronic and acute deficiencies in food intake, quality, and practices of care that have long-term consequences for child growth, learning ability, and overall well-being. Children who are stunted due to long-term exposure to food and nutrient deficiencies are more likely to perform poorly in school and have reduced productivity as adults, and they are at a greater risk of chronic diseases later in life (Amusa et al., 2022).

Household food insecurity can be defined as a lack of or uncertain availability of safe and sufficient food, leading to limited or inadequate access to healthy living diets. Food insecurity, therefore, is a component that is beyond a shortage of food, as a person or a family may lack the purchase or access to varied healthy food types (FAO, 2023). Food insecurity is a condition that affects an individual, a household, or an interpersonal community, resulting from a combination of economic, social, and environmental circumstances. Food insecurity, as a problem, starts with concern or apprehension regarding the availability of food, leading to a shortage or depletion or reduced quality and quantity of food (Biadgilign, 2023).

Household food insecurity in Nigeria is mostly caused by poverty, unemployment, low agricultural productivity, insecurity in farming regions, and rising food prices as a result of inflation. The persistent increase in the price of staple foods as well as the devaluation of the naira has made it increasingly difficult for many families to afford nutritious meals. Studies showed that households headed by individuals with low education, unstable incomes, or larger family sizes are especially vulnerable to food insecurity (Onime & Tamuno, 2021; Ayantoye et al., 2011).

Food security is more than just the availability of food; it encompasses access to a diverse and nutritious foods. Many households in rural communities rely heavily reliant on starchy staples like cassava, yam, maize, and rice, with minimal intake of proteins from animal sources, fruits, or vegetables. This faulty dietary pattern frequently results in deficiencies in essential micronutrients such as iron, zinc, vitamin A, and iodine which are essential for healthy growth and immune system function (Yusuf et al., 2025). A study from southwestern Nigeria revealed that rural households often face recurring food shortages caused by irregular incomes, poor road infrastructure, and limited market access

(Ayantoye et al., 2011). Additionally, women's limited participation in household decision-making and unequal food distribution exacerbate malnutrition risks among children.

Undernutrition manifests in the form of stunting (low height-for-age), wasting (low weight-for-height), and underweight (low weight-for-age). Stunting results from prolonged inadequate nutrition and recurrent infections which usually occur in the first 1,000 days of life. Wasting on the other hands indicates recent and severe weight loss due to illness or insufficient food, whereas underweight reflects both chronic and acute nutritional problems (WHO, 2024). These conditions are usually assessed using anthropometric measurements such length/height-for-age (stunting), weight-for-length/height (wasting) and weight-for-age (underweight). While these conventional indicators are useful but they often underestimate the overall burden of malnutrition when considered separately. A child may simultaneously experience more than one form of nutritional failure; both stunting and overweight for example, and reporting only individual indicators hides this overlap resulting to an incomplete picture of extent of nutritional deprivation.

To address this, the Composite Index of Anthropometric Failure (CIAF) was developed. The CIAF originally proposed by Svedberg (2000) and later modified by (Nandy et al., 2005) classifies children into seven (7) categories based on combinations of stunting, wasting and underweight. A child is considered to experience anthropometric failure if they fall into any of these categories except the group of those with not failure. The approach provides a more comprehensive understanding of malnutrition. Several studies have shown that the CIAF provides a more accurate assessment of undernutrition among children, enabling governments, healthcare workers, and policymakers to develop more targeted and effective interventions to combat child malnutrition (Permatari & Chadirin, 2022; Rasheed & Jeyakumar, 2018).

Previous studies in Ogun State have assessed undernutrition among under-five children using conventional anthropometric indicators such as stunting, wasting and underweight (Ogunnaike et al., 2021; Adediran et al., 2025). However, these measures may underestimate the overall burden of malnutrition, as they fail to capture children experiencing multiple anthropometric failures simultaneously.

This study assessed household food insecurity and undernutrition among under-five children using the composite index of anthropometric failure in Ilaro, Ogun State, Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted in Ilaro, a semi-urban town in Yewa South Local Government Area of Ogun State, Nigeria. Ilaro, the administrative centre of Yewaland, had a population of about 57,850 in 2006. The people are mainly Yoruba, practicing Christianity, Islam, or traditional religion. Most residents farm, trade, or engage in small-scale crafts. Staple foods include fufu, garri, and rice, typical of southwestern Nigeria.

Study Design

The study was a community-based cross-sectional study.

Study Population

The population of this study is mothers with under-five children (0-59 months) in Ilaro, Ogun State, Nigeria.

Sample Size Determination

The sample size was determined using Cochran (1977) formula:

$$n = \frac{Z^2 pq}{d^2}$$

Where

n = the desired sample size

Z = Standard deviation (SD) set at 1.96 corresponding to a 95% confidence interval (CI)

p = prevalence set at 40% (0.4) of stunting among children under five in Nigeria (NDHS 2024)

q= the population 1-P

d= the margin of error set at 5% (0.05)

$$n = \frac{1.96^2(0.4)(1-0.4)}{0.05^2}$$

$$n = \frac{1.96^2(0.4)(1-0.4)}{0.0025}$$

$$n = \frac{3.8416 \times 0.4 \times 0.6}{0.0025}$$

$$n = \frac{0.921984}{0.0025}$$

n = 369

10% was added to account for the attrition rate or non-responses, which gave a sample size of 406 and was rounded up to 410.

Sampling Technique

A multistage sampling technique was used to select respondents for the study. Ilaro town was purposively selected because of its accessibility, population size, and the presence of diverse communities suitable for the study objectives. The area has thirty (30) government-recognized CDAs (Community Development Associations). Ten (10) CDAs were selected using simple random sampling by balloting without replacement. Households with eligible respondents (0-59 months) were selected using convenience sampling, and respondents who met the inclusion criteria were recruited.

Ethical Clearance and Informed Consent

Ethical clearance was obtained from the ethics committee of Ogun State Ministry of Health with Reference number: NHREC/25/01/OGSHREC/23A, and written informed consent was sought from the respondents before data collection.

Method of Data Collection

A semi-structured and interview-administered questionnaire was used to collect information on socio-economic and demographic characteristics, and household food insecurity was assessed using the Household Food Insecurity Access Scale (HFIAS). Nutritional status of the under-five children was assessed using anthropometry.

Section A on the questionnaire was on the mother's socio-demographic and economic characteristics, which collected data such as gender, age, marital status, and ethnic group, religion, education level of mother and spouse, occupation, and estimated family income.

Household Food Insecurity

Household food insecurity was assessed using the Household Food Insecurity Access Scale (HFIAS) developed by Coates et al. (2007). HFIAS is a standardized tool designed to measure the degree of food insecurity (in terms of access) experienced by households during the past four weeks, 30 days. The questionnaire consists of three domains with a total of nine structured questions, which are: (1) anxiety and uncertainty about household food supply, (2) insufficient

quality (variety and preferences of the type of food), and (3) insufficient food intake and its physical consequences. The first domain encompasses questions one and two, the second domain encompasses questions three and four, and the third domain encompasses questions five through nine. Each of the question offered response options that are grouped into three (3) frequency levels - rarely, sometimes, and often which were assigned scores of 1, 2, and 3 respectively (with infrequently = 1, occasionally = 2, and frequently = 3). To calculate the Household Food Insecurity Access Scale (HFIAS) score for each respondent, the numbers assigned to their answers were summed. The total HFIAS score for an individual was obtained by adding up the coded responses from all nine (9) questions to reflect the overall level of food insecurity they experienced. The scores ranged from 0 to 27, where higher scores indicate food security and lower score indicate food insecurity. Households were then classified into four categories, according to the standard classification guide of the HFIAS indicator guide (Coates et al., 2007): food secure, mildly food insecure, moderately food insecure, or severely food insecure. A score of 0–1 indicates food security, 2-7 indicates mild food insecurity, and 8-14 indicates moderate food insecurity, while 15-27 indicates severe food insecurity.

Anthropometric Measurements

Anthropometric measurements were carried out following standard WHO procedures. Before measurement, all equipment was calibrated daily to ensure accuracy. Children's ages were verified using birth certificates, immunization cards, or caregiver recall when unavailable.

Weight Measurement

The weight of the child was measured using a calibrated digital weighing scale (to the nearest 0.1 kg). The scale was set to zero before each measurement. Infants and younger children (0-24 months) were weighed without clothing or shoes by placing them in the centre of the scale, ensuring they lay or sat still, with arms by their sides, while the older children (25-59 months) were weighed while standing erect in the centre of the scale with minimal clothing and no shoes. Two consecutive readings were taken, and the average was recorded as the final weight.

Length/Height Measurement

The recumbent length of children aged 0-24 months was measured to the nearest 0.1 cm using an infantometer. Each child was laid flat on the measuring board, with the head touching the fixed headpiece and the body aligned in the midline position. The assistant held the child's head, and the measurer gently straightened the legs, pressing the knees down to ensure full extension before sliding the footboard against the heels.

For children aged 25-59 months, standing height was measured using an improvised length board. The child stood barefoot on the flat surface of the board, with heels together, arms hanging loosely by the sides, and head positioned in the Frankfort horizontal plane. The headpiece was lowered to touch the crown of the head, and the reading was taken to the nearest 0.1 cm.

Mid-Upper Arm Circumference (MUAC)

The MUAC of each child was measured on the left arm using a non-stretchable MUAC tape. The midpoint between the tip of the acromion process (shoulder) and the olecranon process (elbow) was located and marked while the arm was bent at a right angle. The child's arm was then relaxed, and the tape was wrapped snugly (not tight) around the midpoint. The measurement was read to the nearest 0.1 cm and recorded.

Nutritional Indices

The anthropometric data obtained (weight, height/length, and age) were used to compute the nutritional indices of weight-for-age, height-for-age, weight-for-height, and MUAC-for-age using the WHO Anthro software (version 3.2.2) based on the 2006 WHO Child Growth Standards. Z-scores were used to classify the level of malnutrition for each index. Severity categories were defined as Severe malnutrition: Z-score < −3.0 SD; Moderate malnutrition: Z-score ≥ −3.0 and < −2.0 SD; Mild malnutrition: Z-score ≥ −2.0 and < −1.0 SD; Normal (no malnutrition): Z-score ≥ −1.0 and ≤ +1.0 SD; overnutrition: Z-score > +2.0 SD (overweight/tall depending on index) and obesity (WHZ): WHZ ≥ +3.0 SD

Composite Index of Anthropometric Failure (CIAF)

To provide a comprehensive measure of undernutrition, the Composite Index of Anthropometric Failure (CIAF) was calculated following the model by Svedberg and modified by Nandy & Svedberg (2012). The CIAF identifies children with any form of anthropometric failure, single or multiple, across conventional indices. Children were classified into seven mutually exclusive groups:

A: No failure (WAZ ≥ –2 SD, HAZ ≥ –2 SD, WHZ ≥ –2 SD)
B: Wasting only (WHZ <- 2 SD, but normal HAZ and WHZ)
C: Wasting and underweight (WHZ and WAZ <- 2 SD, but HAZ normal)
D: Wasting, underweight, and stunting (WHZ, WAZ, and HAZ <- 2 SD)
E: Underweight and stunting (WAZ and HAZ <- 2 SD but WHZ normal)
F: Stunting only (HAZ <- 2 SD, but normal WAZ and WHZ)
Y: Underweight only (WAZ <- 2 SD, but normal HAZ and WHZ)

Children in categories B-Y were identified as having anthropometric failure, while those in category A were classified as having no failure. The CIAF prevalence was calculated as the proportion of children in groups B-Y out of the total sample, providing a single, aggregate estimate of undernutrition.

Statistical Analysis

The statistical product and service solutions (SPSS version 27.0) was used to analyse data. The data analysis involved descriptive statistics, which include frequency, percentage, mean, and standard deviation, as well as inferential statistics (Chi-square) to estimate the relationship between two categorical variables.

RESULTS AND DISCUSSION

Results

Table 1 shows the socio-demographic and economic characteristics of the respondents. More than half (60%) of the children were males, and close to two-thirds (30%) of them were below 12 months. The majority of the mothers (94.6%) were married and lived in monogamous (92.7%) and nuclear (92.9%) family settings. The population was predominantly Yoruba (92.2%) and mainly Christian (65.9%).

Most mothers (43.4%) had completed secondary education, while only a few had no formal schooling (3.4%). Similarly, about half (45.6%) of the fathers had secondary education. The dominant occupation among mothers was trading (72.7%), while fathers were mainly traders (44.6%) or private employees (28.8%). Family income was generally low, with over three-quarters (76.8%) earning below ₦70,000 per month.

Table 1: Socio-Demographic and Economic Characteristics of the Respondents

Variable	Frequency (n=410)	Percentage (%)
Child's gender		
Male	246	60.0
Female	164	40.0
Child's age (Months)		
0-6	121	29.5
6-12	123	30.0
12-23	76	18.5
24-48	50	12.2
49-59	40	9.8
Child's birth-order		
First	170	41.5
Second to fourth	224	54.6
Above fourth	16	3.9
Religion		
Christian	270	65.9
Islam	139	33.9
Traditional	1	0.2
Ethnic group		
Yoruba	378	92.2
Igbo	27	6.6
Hausa	5	1.2
Mother's marital status		
Single	21	5.1
Married	388	94.6
Divorced	1	0.2
Family type		
Monogamy	380	92.7
Polygamy	30	7.3
Household size		
3	163	39.8
4-6	240	58.5
7-10	7	1.7
Family type		
Nuclear	381	92.9
Extended	29	7.1
Mother's educational level		
No formal education	14	3.4
Primary school	81	19.8
SSCE	178	43.4
ND/HND	122	29.8
Post graduate	15	3.7

Table 2: Socio-Demographic and Economic Characteristics of the Respondents Cont'd

Variable	Frequency (N=410)	Percentage (%)
Spouse Educational level		
No formal education	14	3.4
Primary school	52	12.7
SSCE	187	45.6
ND/HND	133	32.4
Post graduate	24	5.9
Occupation		
Civil servant	29	7.1
Trader	298	72.7
Retiree	1	0.2
Student	1	0.2
Employee of private organization	47	11.5
Self-employed	34	8.3
Spouse occupation		
Civil servant	105	25.6

Variable	Frequency (N=410)	Percentage (%)
Trader	183	44.6
Retiree	1	2.0
Employee of private organization	118	28.8
Self employed	3	6.1
Number of children		
1	7	1.7
2	215	52.4
3-5	184	44.9
6 and above	4	0.9
Estimated family monthly income (N)		
<70, 000	315	76.8
71,000 -100,000	80	19.4
101,000-150,000	13	3.2
151,000-200,000	1	0.2
201,000 and above	2	0.4

The result of household food insecurity, as presented in Figure 1, showed that only 25.5% of households were food secure, while the remaining 74.6% experienced some level of food insecurity. Among these, 26.3 % were mildly food insecure, 32.4% were moderately food insecure, and 15.9% were severely food insecure.

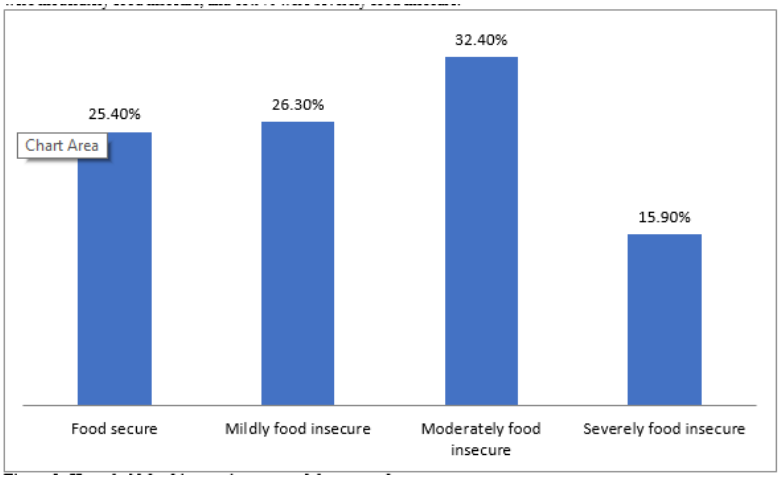

Figure 1: Household Food Insecurity Status of the Respondents

Table 3 presents the conventional nutritional status of under-five children. Length/Height-for-age indicated that only 27.15 were normal, while 61.2% were stunted (20.7% mild, 16.6% moderate, and 23.9% severe) and 11.7% were tall for age. Weight-for-age results showed 59.3% normal, 34.1% underweight (13.4% mild, 14.1% moderate, 6.6% severe), and 6.6% overweight. For weight-for-length/height, 36.6% were normal, while 37.1% were underweight (21.25 mild, 7.6% moderate, 8.3% severe), and 19.8%, 6.6% were overweight and obese, respectively. Based on MUAC-for-age, 85.1% of the children were normal, while 14.9% were undernourished (11.5% moderate, 3.4% severe).

Under nutrition was most pronounced among infants aged 0-6 months and 7-12 months. In these groups, stunting ranged from 55-60%, wasting from 30-35%, and underweight from 30-35%. By gender, boys were more affected than girls across nearly all indices. 53.7% of boys, compared with 50% of girls, had at least one form of malnutrition.

Table 3: Nutritional Status based on Conventional (Single) Anthropometric Index

Categories	Age 0-59 months					Gender		
	0-6 months F (%)	6-12 months F (%)	12-23 months F (%)	24-48 months F (%)	49-59 months F (%)	Boys F (%)	Girls F (%)	Total F(%)
Length/Height-for-age								
Mildly stunted	18 (14.9)	28 (22.8)	15 (19.7)	10 (20.0)	14 (35.0)	53 (21.5)	32 (19.5)	85 (20.7)
Moderately stunted	19 (15.7)	24 (19.5)	12 (15.8)	8 (16.0)	5 (12.5)	41 (16.7)	27 (16.5)	68 (16.6)
Severely stunted	36 (29.8)	33 (26.8)	15 (19.7)	7 (14.0)	7 (17.5)	63 (25.6)	35 (21.3)	98 (23.9)
Normal	28 (23.1)	24 (19.5)	26 (34.2)	21 (42.0)	12 (30.0)	59 (24.0)	52 (31.7)	111 (27.1)

Categories	Age 0-59 months					Gender		
	0-6 months F (%)	6-12 months F (%)	12-23 months F (%)	24-48 months F (%)	49-59 months F (%)	Boys F (%)	Girls F (%)	Total F(%)
Tall	20 (16.5)	14 (11.4)	8 (10.5)	4 (8.0)	2 (5.0)	30 (12.20	18 (11.0)	48 (11.7)
Weight-for-age								
Mildly underweight	13 (10.7)	13 (10.6)	16 (21.1)	7 (14.0)	6 (15.0)	35 (14.2)	20 (12.2)	55 (13.4)
Moderately underweight	20 (16.5)	17 (13.8)	11 (14.5)	6 (12.0)	4 (10.0)	33 (13.40	25 (15.2)	58 (14.1)
Severely underweight	6 (5.0)	10 (8.1)	5 (6.6)	3 (6.0)	3 (7.5)	18 (7.3	9 (5.5)	27 (6.6)
Normal weight	70 (57.9)	76 (61.8)	38 (50.0)	33 (66.0)	26 (65.0)	141 (57.3)	102 (62.2)	243 (59.3)
Overweight	12 (9.9)	7 (5.7)	6 (7.9)	1 (2.0)	1 (2.5)	19 (7.7)	8 (4.9)	27 (6.6)
Weight-for-length/height								
Mildly wasted	25 (20.7)	21 (17.1)	21 (27.6)	11 (22.0)	9 (22.5)	53 (21.5)	34 (20.7)	87 (21.2)
Moderately wasted	8 (6.6)	12 (9.8)	4 (5.3)	4 (8.0)	3 (7.5)	17 (6.9)	14 (8.5)	31 (7.6)
Severely wasted	11 (9.1)	10 (8.1)	6 (7.9)	3 (6.0)	4 (10.0)	20 (8.1)	14 (8.5)	34 (8.3)
Normal	37 (30.6)	46 (37.4)	27 (35.5)	23 (46.0)	17 (42.5)	90 (36.6)	60 (36.6)	150 (36.6)
Overweight	23 (19.0)	29 (23.6)	14 (18.4)	9 (18.0)	6 (15.0)	46 (18.7)	35 (21.3)	81 (19.8)
Obese	17 (14.0)	5 (4.1)	4 (5.3)	0 (0.0)	1 (2.5)	20 (8.1)	7 (4.3)	27 (6.6)
MUAC-for-age								
Moderate acute malnutrition (MAM)	17 (14.0)	13 (10.6)	9 (11.8)	4 (8.0)	4 (10.0)	30 (12.2)	17 (10.4)	47 (11.5)
Severe acute malnutrition (SAM)	10 (8.3)	2 (1.6)	1 (1.3)	1 (2.0)	0 (0.0)	12 (4.9)	2 (1.2)	14 (3.4)
Normal	94 (77.7)	108 (87.8)	66 (86.8)	45 (90.0)	36 (90.0)	204 (82.9)	145 (88.4)	349 (85.1)

Using the composite index of anthropometric failure, 52.2% of the children had at least one form of anthropometric failure, while 47.8% had none. The largest single category was stunting only (26.6%), followed by stunting + underweight (9.0%), and wasting only (5.9%). Other groups included wasting + stunting + underweight (4.4%), wasting + underweight (4.9%), and underweight only (1.5%). Boys (53.7%) experienced higher anthropometric failure than girls (50.0%).

Table 4: Nutritional Status based on Composite Index of Anthropometric (Failure) CIAF

Categories	Age 0-59 months					Gender		
	0-6 months F (%)	6-12 months F (%)	12-23 months F (%)	24-48 months F (%)	49-59 months F (%)	Boys F (%)	Girls F (%)	Total F (%)
Nutritional status based on composite index of anthropometric failure								
No failure (A)	51 (42.1)	54 (43.9)	41 (53.9)	29 (58.0)	21 (52.5)	114 (46.3)	82 (50.0)	196 (47.8)
Wasting only (B)	7 (5.8)	9 (7.3)	2 (2.6)	3 (6.0)	3 (7.5)	14 (5.70)	10 (6.1)	24 (5.9)
Wasting and underweight (C)	6 (5.0)	2 (1.6)	7 (9.2)	2 (4.0)	3 (7.5)	12 (4.9)	8 (4.9)	20 (4.9)
Wasting, underweight and stunting (D)	4 (3.3)	11 (8.9)	1 (1.3)	2 (4.0)	0 (0.0)	9 (3.7)	9 (5.5)	18 (4.4)
Stunting and underweight (E)	13 (10.7)	10 (8.1)	7 (9.2)	4 (8.0)	3 (7.5)	25 (10.2)	12 (7.3)	37 (9.0)
Stunting only (F)	38 (31.4)	36 (29.3)	18 (23.7)	9 (18.00	8 (20.0)	70 (28.5)	39 (23.8)	109 (26.6)
Underweight only (Y)	2 (1.7)	1 (0.8)	0 (0.0)	1 (2.0)	2 (5.0)	2 (0.8)	4 (2.4)	6 (1.5)
Anthropometric failure (B+C+D+E+F+Y)	70 (57.9)	69 (56.1)	35 (46.1)	20 (42.0)	19 (47.5)	132(53.7)	82 (50.0)	214 (52.2)

There was a significant association between CIAF and mothers' educational level ($\chi^2 = 45.17$, $p = 0.006$), fathers' educational level ($\chi^2 = 36.45$, $p = 0.050$), and fathers' occupation ($\chi^2 = 43.08$, $p = 0.010$). No significant relationship was observed with mothers' occupation ($p = 0.718$) and family monthly income ($p = 0.955$).

Table 5: Association between Socio-Economic Characteristics of the Respondents and Composite Index of Anthropometric Failure

Socio-economic characteristics	CIAF		
	$\chi 2$	Df	P-value
Mother's educational level	45.166	24	0.006*
Husband's educational level	36.454	24	0.050*
Occupation	25.140	30	0.718
Husband's occupation	43.083	24	0.010*
Family month income	18.235	30	0.955

Discussion

This study assessed household food security, nutritional status, and the composite index of anthropometric failure among under-five children in Ilaro, Ogun State. Most of the children were males, and the majority of the households practiced Christianity. The ethnic distribution showed that the Yoruba dominated, though other ethnic groups were represented, reflecting the influence of urbanization and the cultural diversity within the area.

Household income level shows that a large proportion of respondents got money below the Nigerian minimum wage (₦70,000) per month. This finding aligns with a previous study (Sanusi et al., 2019), which identified a significant relationship between low socioeconomic status and household food insecurity. Similarly, a study by Onime and Tamuno (2021) confirms that families with lower incomes are more vulnerable to experiencing food insecurity. Most of the respondents in this study attained at least secondary education. Limited educational attainment can restrict one's access to a well-paying job which increases the risk of food insecurity. Studies reported that higher education levels improve job prospects and income stability, thereby, enhancing food security and living conditions (Muhammad & Sidique, 2019; Yahaya et al., 2024).

The study revealed a high prevalence of food insecurity (74.6%). This result is somewhat lower than the 88.5% reported by Adeyanju and Fadupin (2024) and 87.2% by Otekunrin et al. (2021), but however exceeds the 64% reported by Yahaya et al. (2024) in a study conducted in Ibadan. Moreover, Sanusi et al. (2006) reported a prevalence of 70%, while Oderinde et al. (2023) found 93.2% and 68.3% prevalence of food insecurity in rural and urban Ibadan respectively. These high rates of food insecurity are consistent to the FAO's global report, which showed that Africa bears the greatest burden of food insecurity and hunger (FAO et al., 2025).

The nutritional status of under-five children is as an important indicator of household food security (Singh et al., 2014). In our study, 61.2% of the children were stunted, 34.1% underweight, and 37.1% wasted. The rate of moderate/severe acute malnutrition was 14.9% which could be as a result of poor dietary diversity and inadequate nutrient intake among children in the study area. Compared to findings in Ibadan by Adeyanju and Fadupin (2024), where stunting was 40.5%, underweight 30.4%, and wasting 7.8%, the rates in this study are higher. This difference may be due to environmental and socioeconomic variations as Ilaro is less urbanized and may have limited access to diverse foods and health services. The result in our study agrees with that of Betebo et al. (2017), who reported higher malnutrition prevalence among children in rural areas than in the urban centres.

Stunting was highest, 55.2% for children aged 12-23 months, the period when most children are weaned onto complementary foods and family foods. It is therefore probable that poor complementary feeding practices during this critical period may predispose children to nutrient deficiencies. This observation supports that of Ajao et al. (2010), who reported 57.2% stunting among children aged 18–23 months. Other studies have recorded even higher levels of malnutrition: 43% stunting, 35% underweight, and 25% wasting (Gupta et al., 2017), and rather lower prevalence rates of 10.5%, 24.3%, and 4.1%, respectively (Razaq et al., 2024). Compared with national data on undernutrition among under-five children recorded in the Nigeria Demographic and Health Survey (NDHS) (FMoHSW et al., 2024), where the prevalence of stunting was 40%, underweight 25%, and wasting 6%, the findings in the present study are worse. The difference could be due to the locality of the study, where access to food and its affordability at household level may be more limited. Based on gender, the female children had higher percentages of undernutrition compared to males. For instance, 2.4% of girls were underweight compared to only 0.8% of the boys. This finding aligns with the study conducted by Rathi and Mayavanshi (2024), which also observed higher prevalence of malnutrition among female children. Such disparities may stem from gender-based differences within households, including care, feeding practices, and social preferences.

Furthermore, the CIAF shows that 5.9% of children were wasted only, 4.9% were both wasted and underweight, while 4.4% had wasting, underweight, and stunting together. Also, 9.0% were both stunted and underweight, 26.6% were stunted only, while 1.5% were underweight only. The overall prevalence of anthropometric failure was 52.2%. This result is higher than the 42.1% reported by Razaq et al. (2024) and the findings of Permatasari and Chadirin (2022) in Indonesia where only 2.4% of children were stunted compared to 26.6% in the present study. The high proportions of anthropometric failures in this study might be attributed to variations in food security, maternal education, and household income. Similar results were observed in Ethiopia and Tanzania with CIAF rates of 53.8% and 57.3% respectively (Fenta et al., 2021; Mohamed & Nyaruhucha, 2023). A study in India reported a CIAF of 45%, and 27.3% stunting, 7.7% wasting and 3.8% underweight. Another study reported a CIAF of 54.5% (Rathi & Mayavanshi, 2023) which is similar with the current findings.

The high CIAF prevalence underlines the complexity of malnutrition, as many children face overlapping nutritional deficiencies. Relying on a single measure like stunting or wasting alone likely underestimates the true burden. Thus, child nutrition interventions must be integrated, focusing on enhancing maternal education, promoting exclusive breastfeeding, and encouraging dietary diversity. Community-based efforts to strengthen local food systems and empower women economically would substantially help reduce food insecurity and malnutrition.

In addition, results of the Composite Index of Anthropometric Failure (CIAF) show significant variation in child undernutrition across countries. For instance, national surveys indicate that CIAF prevalence among children under five is 48.2% in India (Porwal et al., 2021) and 33.7% in Bangladesh

(Hassan et al., 2025). In a national study conducted by Akintimehi et al. (2025), 40.8% of children under five experienced at least one form of anthropometric failure. The 52.2% of anthropometric failure found in this study exceeds the Nigeria's reported national average and most African countries which call for urgent need for tailored interventions in semi-urban and rural settings like the study area.

CONCLUSION

This study observed a high proportion of food insecurity and undernutrition among under-five in Ilaro. A large proportion of the households reported some level of food insecurity, with considerable percentages of children affected by stunting, wasting, or underweight. The study also show that more than half of the children experienced anthropometric failure. These findings emphasize the urgent need for community-based nutrition programmes that will increase food availability and access, and enhanced maternal education to tackle malnutrition in the area.

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