RELATIONSHIP BETWEEN FOOD SECURITY, NUTRITIONAL STATUS AND POVERTY ALLEVIATION COPING STRATEGIES IN LOW- INCOME HOUSEHOLDS OF FEDERAL TERTIARY INSTITUTIONS, KADUNA STATE, NIGERIA

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DECLARATION

I, declare that the work in this dissertation entitled **"Relationship Between Food Security, Nutritional Status and Poverty Alleviation Coping Strategies in Low-Income Households of Federal Tertiary Institutions, Kaduna State, Nigeria"** has been carried out by me in the Department of Vocational and Technical Education, Faculty of Education, Ahmadu Bello University, Zaria. The information derived from literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at this or any other Institution.

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CERTIFICATION

This dissertation entitled "RELATIONSHIP BETWEEN FOOD SECURITY, NUTRITIONAL STATUS AND POVERTY ALLEVIATION COPING STRATEGIES IN LOW-INCOME HOUSEHOLDS OF FEDERAL TERTIARY INSTITUTIONS, KADUNA STATE, NIGERIA" by Ivy, Ihuoma ODUNZE meets the regulations governing the award of the degree of Doctor of Philosophy degree of the Ahmadu Bello University, and approved for its contribution to knowledge and literary presentation.

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DEDICATION

This work is dedicated to my beloved father, husband and children.

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ABSTRACT

The study investigated the relationship between food security, nutritional status and poverty alleviation coping strategies of low income households of selected Federal tertiary institutions in Kaduna state, Nigeria. Specific objectives were to determine food security status in terms of food availability, accessibility, and consumption pattern; establish nutritional status using anthropometric and 24-hours recall dietary intake; determine poverty alleviation strategies used by low-income households; examine income and nutritional status of low-income households of Federal tertiary institutions of Kaduna State, Nigeria. The study used descriptive survey design with questionnaire and personal interviews to obtain data. Data obtained were analyzed using, frequency, percentage, means, Pearson Product Moments of Correlation, regression analysis and analysis of variance (ANOVA). Results showed that most household heads between ages 36–45 years (32.4%) and 46–55 years (32%) were dominant among low income households in selected Federal tertiary institutions in Kaduna State. Also, most (53.4%) respondents had between 5 and 12 adults' living together and capable of providing adequate food for their households, majority (61%) had no educational qualification beyond West African School Certificate. Most adequately available food items to the low income households in Federal tertiary institutions in Kaduna State were legumes/pulse/vegetables (69.4%), followed by fruits (mangoes, guava and others), roots and tubers/cereals (38%: yams, bread, tuwon). Cereals and cereals products (maize, sorghum and millets) were most accessible and consumed and attracted highest mean accessibility of 5.97 and mean consumption level of 4.333. Least accessed and consumed food items were meat (beef, goat meat and others) 4.09, fish and eggs that attracted least mean consumption level of 2.99 for the low income households. Data also revealed that 243(59%) of adults were healthy compared to 166 (41%) that were either acutely malnourished, moderate malnutrition or those at risk, as a consequence of their consumption pattern. Majority (64%) of the low income households of some Federal tertiary institutions in Kaduna State acquired land for agricultural activities through purchase, short-term lease or loan for agricultural production, as a preferred poverty alleviation strategy to mitigate shortfalls of income for households to be food secured. Also, significant relationship between income and nutritional status of respondent showed household members with higher income having higher nutritional status. The study therefore concluded that majority (60%) of households in selected Federal tertiary institutions in Kaduna State were food secured more on cereals/cereal products, adequate in nutritional status and adopted agricultural activities for poverty alleviation coping strategies to augment low income status and poverty conditions. Food secured household conditions would result in an improved food availability, accessibility and good nutritional status of the low income households of selected Federal tertiary Institutions in Kaduna state. The study recommended among others that, low-income households should explore proteinous sources of food like meat, fish, milk and legume crops to balance for the available cereal and cereal products. Low-income households should explore other means of generating income like poultry production, fish production, large production and purchase of grains and vegetables for sale during time of financial stress. The percentage of the respondents having good nutritional status should be encouraged to sustain their efforts, for their well-being and that of their families.

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LIST OF ABBREVIATIONS

BMI - - - -	Body Mass Index
FOADSTAT - - -	Food and Agricultural Development Statistics
FAO - - - -	Food and Agricultural Organization
FEAP - - - -	Federal Economic Advancement Programme
FOS - - - -	Federal Office of Statistics
GDP - - - -	Gross Domestic Production
IFPRI - - - -	International Food Policy Research Institutes
MUAC - - -	Mid-Upper Arm Circumference
NAFPP - - -	National Accelerated Food Production Programme
NALDA - - -	National Agricultural Land Development Authority
NDHS - - - -	National Demographic and Health Survey
NGO - - - -	Non- Governmental Organization
NPC - - - -	National Planning Committee
OFN - - - -	Operation Feed the Nation
PAPOC - - -	Poverty Alleviation Programme Development Committee
SAP - - - -	Structural Adjustment Programme
UNICEF - - -	United Nations International Children Education Fund
USAID - - -	United States Agency for International Development
USDA - - - -	United States Development Agency
UNSCN - - -	United Nation Standing Committee on Nutrition
WB - - - -	World Bank
WFP - - - -	World Food Programme

WFS - - - - World Food Summit

WHO - - - - World Health Organization

OPERATIONAL DEFINITION OF TERMS

Operational definition of terms contains list of definitions and concepts that have significant meanings or interpretations for this study.

i. **Anthropometry:** This is the physical measurement of the body muscles and fat. It is used to determine the outcome of individual's food intake. It uses height, weight or a combination of the two to determine the health status of an individual. The devices used to obtain data includes, scale, tape and a caliper.

ii. **Food Security**: The ability household has to obtain enough food that can be used to sustain everyone in the family. The food should either be through production or purchase and the body's ability to use it effectively for active and a healthy life. **Households:** These are individuals living together as a family, who are made up of father, mother and children. They could be other family members who are not biologically related but jointly carry out household activities.

iii. **Low-Income household:** Individuals who earn income that is below the approved poverty level.

iv. **Nutritional status**: Outcome of nutrients or lack of nutrients consumed by an individual. When an individual consumed sufficient nutrients, the result would be good nutritional status but where otherwise it would lead to poor nutritional status.

v. **Poverty Alleviation coping strategies:** Efforts by households to get products or income that will be used to reduce food insufficiencies.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Food is a basic human need and the major source of nutrients needed for human existence. Food is important to humans because it is a basic means of sustenance and its adequate intake is required for optimal human living. Human beings need food to grow and carry out their daily activities, and therefore need these foods in both quantity and quality for healthy and productive life. The committees on World Food Security (1996) defined food security as a situation in which people at all time have physical and economic access to sufficient, safe and nutritious food to meet their dietary need and food preferences for active healthy life. This implies that people at all levels must have enough food to eat at all times, and these foods must be safe from all contaminations, must be adequate and have varieties for a healthy life.

Omonoma and Adetokumbo (2007) observed that the concept of food security was given a general definition, but recently there has been a divergence of ideas on what food security really means. Food security is people oriented and implies a situation in which all households have both physical and economic access to adequate food for all members and where households are not at risk of losing such access. It also accounts for a substantial part of household budget (Ohwovoriole and Ochonogor, 2009). Food security as a term was developed during the l990s and focused more on just the supply of food at national level. These imply that food security assures access to food by all persons at all times to guarantee safe and nutritious food that meets their dietary needs and food preferences for active healthy life and livelihoods. Food security according to World Food Programme (2000) is a determinant factor to good health and nutritional status of people. The food we eat is digested and absorbed by our body for growth and

development. From conception through old age, adequate nutrition is essential for individual development, activity, good health and self- fulfillment.

The concept of food security has three key elements; - that is, food availability, food accessibility and food utilization. Food availability connotes the physical presence of food in sufficient quantity. Accessibility suggests sufficient purchasing power or ability to acquire sufficient quality food at all times, while utilization suggests sufficient quantity and quality of food intake. These elements embrace the supply, demand and adequacy of food at all times (Omonona *et al,* 2007). When food security is assured at the household level, such food security is regarded as "household food security. Idachaba (2004) explained that access to food by all household reveals the role family plays in food security. This implies that at food security status, majority of the populace must meet minimum nutritional standards and have assured access to food at all times (without fluctuation in food availability) in homes. It is on this premise that the researcher intends to determine the food security status, using the low income households of selected Federal tertiary institutions in Kaduna state as a test case.

Ogbonnaya (2010) stated that Nigeria is predominantly an agricultural society with approximately 70 per cent of her population engaged in agricultural production at a subsistence level. Agriculture provided 41 per cent of Nigeria's total gross domestic product (GDP) in 1999. This percentage represents a decrease of 24.7 per cent from its contribution of 65.7 per cent to the GDP in 1967. According to him, Nigeria's differing climatic conditions with agro-ecological zones allow it to produce a variety of food and cash crops. These include cassava, yam, maize, coco-yam, cowpea, sweet potato, millet, plantain, banana, rice, sorghum, and a variety of fruits

and vegetables like tomatoes, onion, okra, spinach, pumpkin leave, cabbage, lettuce, cucumber, carrot, water melon, garden eggs, and pepper. He also noted that the leading cash crops includes cocoa, citrus, cotton, groundnut (peanuts), palm oil, palm kernel, benniseed (Sesame), and rubber that were Nigeria's major export crops in the 1960s and early 1970s until petroleum surpassed them in the 1970s. President Olusegun Obasanjo's regime (1999-2009), sought to transform Nigeria's agricultural sector to make agriculture a gainful and sustainable business. The regime's policy framework encouraged specific crops production and targeted viable marketing to impact on food security. Previous efforts by governments concentrated on increased food production. President Obasanjo's regime favoured increased production as important, but must be accompanied by increased attention to storage, processing, packaging, distribution and marketing. In Nigeria there is a general impression that the citizens are food sufficient. This impression may not be true in all aspects and need to be investigated by this study.

Nutritional status is the health condition of a person which is influenced by the intake and utilization of nutrients. It can be assessed by a number of outcomes; most often in practice, it is estimated with growth in children and thinness in both children and adults (for protein and energy). Other measures are used to assess micronutrient deficiencies. The nutritional status of low income households in Federal tertiary institutions in Kaduna state will result from balanced food intake and normal utilization of nutrients occasioned by food security. Other combination of factors affecting nutritional status includes limited access to food, inadequate dietary intake and infectious disease(s). For example, the nutritional status of a child is an outcome of what the child eats as well as diseases he/she is suffering from or has suffered from over a period of time. However the nutritional status of children from ages one to five years old is measured using three indicators: underweight, stunting and wasting (WHO, 2005). For example underweight in

children result from inadequate food intake and/or poor health, while stunting and underweight results from chronic food deprivation and chronic ill health such as kwashiorkor and/or marasmus. Adult's nutritional status is measured using Body Mass Index (BMI); that is, the height, weight, percent body fat and Mid Upper Arm Circumference (MUAC).

Poor personal hygiene and environmental sanitation increases the body's susceptibility to infectious diseases thereby resulting to illnesses. As was reported by World Development Report (2008), low- income households' health status is relatively low in terms of life expectancy and other factors. Good health condition results when the people have resources to improve their education, water and sanitation, proper refuse and sewage disposal systems, health promotion and food security. Low income families are marked with poor health status all over the world. This results as they are not sufficiently and adequately food secured. Baker (2003) stated that the low- income families are those families that miss meals because they do not have enough access to food. They are families that worry about running out of food that occur close to end of the months. Low income families often lack the skill for preparing nutritious meals for consumption in their homes. The low income families also lack knowledge of proper food storage and handling methods and therefore have high risk of food borne illness (Baker, 2003).

Poverty alleviation processes seeks to reduce the level of poverty in a community or among a group of people (Asaolu and Adereti, 2006). Poverty status of low income households could gradually be alleviated when basic resources are readily available and evenly distributed among citizens. It would be alleviated by a portfolio of policies and programmes (strategies) tailored to specific aspects of identified poverty problem (Bane, 2008). Attempts from the l970s have been made to address improved agricultural production and its sector in Nigeria. Some of these strategies include National Accelerated Food Production Programme (NAFPP), Nigerian

Agricultural and Co-operative Bank in1972, Operation Feed the Nation in1976, Green Revolution in1980 and National Agriculture Land Development Authority (NALDA) in1991. In 1986, government initiated Structural Adjustment Programme.

Poverty Alleviation Programme Development Committee (PAPDC) and Structural Adjustment Programmes (SAP) were designed to alleviate poverty and provide safety nets for the poor, such as the low income families in tertiary institutions. The programmes had effect on economic growth, but lacked emphasis on development and socio-economic problems of the low income brackets of the nation. Therefore, these efforts seem not to have attained national food security or raise nutritional status or help the low income families to attain household food security. This study therefore aims to establish the extent to which food security programme of Federal Government of Nigeria has improved the low income households' livelihood in Federal tertiary institutions in Kaduna state in terms of achieving food security and improving their nutritional status.

1.2. Statement of the Problem

Nigeria, with a land mass of 923,768km^2, is endowed with vast expanse of arable land for crops and animal production, as well as fresh waters for fish breeding (Orewa and Iyambe, 2009). As much as 60.70% of Nigeria's population are involved in farming and has a Gross Domestic Production from agriculture as high as 41.5 in 2009. Nigeria may however not be producing sufficient food and nutrition for her population hence; there is the threat of hunger and poverty (Obayelu, 2010); in particular, in low income households. Household food unavailability shortly after crop harvest and over the rest of the year among low income households could result from ineffective food storage facilities that compel them to sell their produce soon after harvest at low prices (USAID, 2002). Consequently, low income households spend as much as

80% of their income on food only (Anyakoha and Mbanefo, 2002). About 50% of Nigeria's low income households are compelled to live on $1.25 (N210.0) per day (Onwuenmenyi, 2008).

Low income households have little access to adequate and nutritious food as a result of insufficient financial and material resources. Economic status of low income families affect their food intake and nutritional well-being; compelling them to struggle daily for food, always afraid of food shortage, price increases and do not have enough to meet other basic needs (Berker, 2003). Lack of access to food endangers health condition and leads to inadequate dietary intake and malnutrition (NDHS, 2003). Food containing the six key nutrients can be obtained when regular balanced meals are eaten (Alaimo, Olson and Frangilo, 2001). Meals containing the six key nutrients; especially proteins and vitamins, are skipped mostly by low income households partly because their resources cannot adequately supply the family food need, and partly because what is eaten is not enough to meet recommended daily nutrient level (Alaimo et al; 2001). This study therefore aims to establish nutritional status of the low income households in Federal Tertiary institutions in Kaduna State. Out of the world's undernourished children, 80% live in 20 countries with 295 being Nigerians under 5years (UNICEF, 2006). Adults between 15-49years in 2003 were overweight as measured by Body Mass index (BMI), while 20.5% (National), 16.6% (Rural) and 27% (Urban) were obese in Nigeria (FAO Statistics, 2008). Kaduna State had highest prevalence, not only of stunting (58%) but of wasting (13%) and underweight (38%) (Maziya-Dixon *et al*, 2004); supporting that Nigerians still live in poverty despite Federal Government's poverty alleviation programme across the country. The poverty level of Nigeria contradicts her immense wealth as oil producing and rich in such other natural resources as untapped solid minerals, agricultural, gas and human resources. This research therefore intends to determine the extent food security programme of Nigerian Government has alleviated poverty

and impacted on household food security and nutritional status of low income households in the study area. Earlier study related to food security by Oranusi, Galadima and Umoh (2006) was not comprehensive to have addressed socio-economic issues and were not consistent or conclusive; justifying this present study on relationship among food security, nutritional status and poverty alleviation strategies among low-income households of Federal Tertiary institutions of Kaduna State, Nigeria.

1.3. Objective of the study

The major objective of the study was to determine the level of food security, nutritional status, and poverty alleviation coping strategies of the low income households in Federal tertiary institutions of Kaduna State, Nigeria. The specific objectives were to:

1. determine the food security status, in terms of food availability, food accessibility and food consumption pattern and the nutritional status of the low-income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.
2. establish the anthropometric measurement and nutritional status of the low- income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.
3. evaluate the poverty alleviation coping strategies used by households and food security of the low-income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.
4. determine the environment and health status and nutritional status of the low- income families of selected Federal Tertiary Institutions in Kaduna state, Nigeria.
5. establish the relationship between food security and nutritional status of the low- income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.

6. examine the income and nutritional status of the low income households of selected Federal Tertiary Institutions in Kaduna state and its relationship to food security.

1.4. Research Questions

Research questions adopted in this study provided answers to the following questions

1. What is the food security status in terms of food availability, food accessibility and consumption pattern and nutritional status of the low-income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria?
2. What is the anthropometric measurement and nutritional status of the low-income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria?
3. What are the poverty alleviation coping strategies used by households and food security of the low- income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria?
4. To what extent does environment and health status of low-income households of selected Federal Tertiary Institutions have relationship with their nutritional status?
5. What is the relationship between food security and nutritional status of the low income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria?
6. What is the difference between income and nutritional status of low income households of selected Federal Tertiary Institutions in Kaduna State, Nigeria?

1.5. Research Hypotheses

The following null hypotheses guided the study.

1. (b). There is no significant relationship between food accessibility and nutritional status of the low- income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.

(c). There is no significant relationship between consumption pattern of food and nutritional status of the low- income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.

2. There is no significant relationship between anthropometric measurement and nutritional status of the low-income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.
3. There is no significant relationship between poverty alleviation strategies used by households and food security of low-income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.
4. There is no significant relationship between environment, health conditions and nutritional status of low income households of selected Federal Tertiary Institutions in Kaduna State, Nigeria.
5. There is no significant relationship between food security and nutritional status of the low- income households of selected Federal Tertiary Institutions in Kaduna State, Nigeria.
6. There is no significant difference between income and nutritional status of the low-income households of selected Federal Tertiary Institutions in Kaduna state, Nigeria.

1.6. Significance of the Study

Food Security is an important issue for both governments and households. It needs to be assessed to record the status of food availability, accessibility and nutritional well-being of the population in order to balance citizen's health with food requirements of the nation and households. Therefore data generated from this study will be useful for planning strategies for food availability, accessibility and nutritional status of the citizenry by the Federal Government

and Federal Ministry of Agriculture in particular, and the low-income households in the study state. Also, results obtained from the study would be of benefit to academics in the area of food security in Nigeria, as a data base for future investigations. It will benefit staff from tertiary institutions to plan individual food needs to meet required health status. The study will also be of benefit to Ministry of Agriculture, and Ministry of Health for planning national food security and nutritional status of citizens; in particular, the low-income families.

Low-income households would benefit from findings of this study as it will enlighten them on how to plan their household's food availability, accessibility and nutritional status for sustained health of family members. Families would benefit from the knowledge acquired on new skills in food production, preparation, storage, safety and sanitation to better manage their food budget and related resources. Individuals and family members will use the knowledge acquired to alleviate the cycle of poverty for their families. The relevance of nutritional status emphasis by some organizations, (Government, States, NGO's, Health Programmes, Nutritional Associations and Home Economics) is to help the low-income families acquire the knowledge, skills, attitudes and changed behaviours necessary for nutritionally sound health conditions. It will also contribute to their personal development and improvement of total family diet.

In Home Economics, food security implies food availability, food accessibility, food utilization and nutritional status of households (Anyakoha and Mbanefor, 2002). Therefore this study would be relevant to Home Economics education for curriculum development in the area of food availability, accessibility, utilization and nutritional status of homes.

It would therefore impact on members of households the importance of nutritionally adequate diets for healthy living. Generally the study will benefit the nation through

improvement of Home Economics education programme, health status of the low-income work force and impact on food security information at the national and international level.

1.7. Basic Assumptions of the Study

Assumptions of this study were the foundation for accepted knowledge in this research with statements that were regarded as true throughout the study. Assumptions of the study were that:

i. low income families in Federal tertiary institutions in Kaduna state were food secured.
ii. the low income families in Federal tertiary institutions had adequate nutritional status compared to their level of income.
iii. the poverty alleviation coping strategies in Kaduna state had helped to improve livelihood of low income households in Federal tertiary institutions in Kaduna state, Nigeria.

I.8. Delimitation of the Study

The study focused on food security, nutritional status and poverty alleviation of selected tertiary institutions in Kaduna State of Nigeria. The study was delimited to the following Federal tertiary institutions:

a. Federal Colleges of Education, Zaria.
b. College of Agriculture/DAC/ABU, Samaru, Zaria.
c. Federal Polytechnic, Kaduna.
d. Nigeria College of Aviation Technology, Zaria.
e. Nigeria Institute for Leather Technology, Zaria.
f. National Research Institute for Chemical Technology, Zaria.
g. National Institute for Transport Technology, Zaria.

The Federal tertiary institutions were chosen because wage of most of the low-income staff in these institutions are close to the minimum US $1.25 (210.00)/day expected wage (Mbanefor 1994; World Bank, 2008). Therefore, it was reasoned that if the low income households in Federal tertiary institutions are not food secured, those in lower wage bracket may not be better off.

The study was delimited to only six members in low income households, which involves the father, mother and four children of these Federal tertiary institutions. Common yard stick of low income household in this category is households whose daily income is less than $1.25 or N210.00 (64.500.00)/month. This limit identifies the group whose level of income is socially unacceptable for the time and place they live and the threshold is used by civil servants, academicians, politicians and researchers as a bench mark for poverty class. The low- income working class households were chosen because they are better organized for easy data collection than low income rural household. Also they were chosen because the threshold is used to measure civil servants generally and in particular those in institutions of higher learning. The study was therefore focused on the low-income earners in these selected Federal tertiary institutions in Kaduna state, Nigeria.

Food security status of low income families was delimited to only household food security parameters that include their food availability, accessibility and food consumption pattern. The nutritional status methods of assessment would be delimited to only the anthropometric and food frequency questionnaire method of dietary assessment.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter reviewed literature that is relevant to food security, nutritional status, and poverty alleviation under the following sub-headings.

2.1 Theoretical Framework

2.2 Conceptual frameworks of food security and nutritional status.

2.3 Definitions of food security, nutritional status and poverty alleviations.

2.4 The three elements of food security

2.5 Nutritional status of low-income household members in Nigeria.

2.6 Factors that affect household food security, nutritional status and poverty alleviation.

2.7 Low-income households

2.8 Influence of food supply on low income families

2.9 Families coping strategies adopted to alleviate poverty of low income families in Nigeria.

2.10 Empirical Studies

2.11 Summary of Reviewed Literature

2.1. Theoretical Framework

Theoretical framework is a process of identifying a core set of connectors within a topic and it shows how these fit together or related to the subject (McGroff, 2012). It involves pulling thoughts and theories that are grouped together into themes for a subject. Looking at these explanations, a single theory cannot therefore exhaust a phenomenon of food security. Use of many theories is needed for a purpose where the researcher is interested in a greater number of aspects than is covered by the concept. This is applicable to the theoretical framework of food

security. As a multi-dimensional concept, the International Famine Centre (2000) recommended that to have a holistic framework of food security, it must incorporate economics, politics, cultural and social relations. To this effect, two models and four approaches that will be for complementary analytical purposes were used in this study.

The first model; Human Right Perspective was developed by Oshaug, Eide and Eide (1992). It was borrowed from a text Food, Nutrition and Human Rights, while the approaches include; food availability approach, income-based approach, basic needs approach, and sustainable livelihood approach. The human right perspective to food security is a wide perspective that has several legal instruments of United Nations with its agencies and national legislation of some countries. It compasses a broader view of economic, social and cultural rights of people (households). This was a theoretical framework that developed based on a range of general ideas or opinions and experiences with development processes in developing and developed countries. It is an accepted theory because of its relevance in viewing food security through wider ideas particularly as a human development model and because perspective to food security.

The human rights perspective that became applicable in explaining the issue of Food Security emerged in development literature from 1941 "Four Freedom Address" by the then president of United States of America, Franklin Delano Roosevelt. The four freedoms as declared were; freedom from want, freedom from fear, freedom of speech and freedom of faith. These four freedoms which strongly influenced the Universal Declaration of Human Rights by the United Nations in 1948 included the *right to food* within the freedom from want (Bassey, 2002). It is from freedom from want that the idea or opinion of the framework is derived. This

general opinion is captured by Article 25(1) of the Universal Declaration of Human Rights (1986). It statement:

> "Everyone has the right to standard of living adequate for the health and well-being of himself and his family, including *food*, clothing, housing medical care and necessary social services and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control".

Additionally, article II of the International Covenant on Economic, Social and Cultural Rights states that:

> The state parties of the present covenant recognize the right of everyone to an adequate standard of living for himself and his family (household), including *adequate food*, clothing and housing, and to the continuous improvement of living conditions.

From these statements the right to be free from freedom of food, to be food secure is clearly understood as a Universal human right within the economic, social and cultural rights (Bassey, 2002). Therefore, food security is one of the most basic needs of human rights. To further explain and better place the human right perspective of food security, some specific assumptions were noted.

i. Availability of enough food for all can be attained.
ii. Harmful seasonal and inter-annual instability of food supplies can be reduced.
iii. Access to nutritionally adequate and safe food by all is possible (FAO, 1996; Bassey 2002)
iv. To come up with these assumptions, food security becomes conceptualized as "assess by all people at all times to enough food for an active, healthy life" (World Bank, 1986).

Adequacy of food supply means that the types of food available should be:

i. Culturally acceptable (this should fit the prevailing culture).

ii. The overall supply should potentially cover nutritional needs in terms of quantity (energy) and quality (provide all essential nutrients).

iii. Be safe (free from contaminations) and of good food quality (taste, texture etc).

The food availability approach focuses on the balance between population and food. To maintain the equilibrium, the rate of growth of food availability should not be lower than the rate of growth of population. This assumption was a reference approach until 1974 at a World Food Conference were the definition:

> "Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices"

The demand side focused on the need to reduce the rate of growth of population (fertility rate) through appropriate policies while the supply side looked at *the need to boost food production*. For such purpose, the foremost policy that is generally prescribed and implemented is to increase agricultural productivity. The World Food Summit of (1996) adopted a broader view of food security to include access to and utilization of food which involves income and outcome of food consumed by household members..

The second model is Modernization Theory which falls under the paradigm of structural-functionalism. Structural- functionalism involves a change that takes a gradual process. This is developed by increasing industrialization and accommodated by the differentiation, adaptation and integration of social institutions. Structural-functionalism involves a fundamental proposition that people in traditional society should adopt the characteristics of the western society in order to modernize their social, political and economic institutions, that is those practices that have been a set back to the society should be discarded.

Modernization is referred to as the process of transformation which takes place when a traditional or pre-modern society changes to such an extent that new forms of technological, organizational or social characteristics of advanced society appear (Coetzee, et. al., 2004). They noted that different sets of characteristics especially in regard to food acquisition can be attributed to 'traditional' rural society on the one hand, and to 'modernized' urban society on the other hand. Therefore, modernization according to them becomes a society's objective, with all attempts at bringing its own level of development to be in line with the advanced and modern accomplishments of others, such as the western society. Onyemelukwe (2005) stated that the underlying belief of modernization theory is that by changing the socio-political and cultural frameworks of the society, the route to economic development can be achieved. Modernization can then be defined as the final state in the social, political and economic development of societies

The analytical approach to food security focuses on its unit of analysis. The unit of analysis ranges from the world, to a country, a region, down to a community, a household, or a single individual. For the purpose of this study, the unit of analysis in the food availability approach focused *on household food availability* (FAO, 2001).

International Labour Organization (ILO) proposed a new model of development known as basic needs approach, with the intention of incorporating a non-economic dimension of development (ILO, 1976). Two economists Streeten (1981) and Stewart (1985) contributed to re-launch of basic needs approach. They view development as a process aiming to ensure to all the people the satisfaction of their basic needs. The fulfillment of basic needs was precondition for a "full-life", composed of material and non-material elements. Although different authors may have presented list of items to mean basic needs to them, but in most cases, it included *food*,

together with shelter and clothing (Denton, 1990). Supporting their view, other authors like Maslow (1943) in psychology and those in the human right literature, saw basic rights as those necessary for the enjoyment of all human right which, has led many authors to conclude primarily the *"human right to adequate food"* (Kent 2005). The approach focuses directly on whether people eat enough food as food is seen as the priority element of food security. This is the main approach behind the view of food security as the ability households have to satisfy adequately food consumption needs for a normal healthy life at all times.

There are different ways to assess food security coherently with this framework. The first one is the food frequency assessment, which can be realized by:

> simply asking people the number of meals eaten per day or consumption of different food items. An example is usually twenty-four-hours (24 hrs) or 1 week food intake that takes into consideration the food groups consumed regularly not necessarily the quantity of food consumed (Kent, 2005).

The second method is based on the direct observation of food consumption while the third is by weighting the food items according to their nutritional contents and aggregate them (Hoddinott and Yohannes, 2002). The individual unit of analysis is perfectly compatible with the food first approach. However, food frequency assessments are usually conducted at household level. The basic need approach draws attention to short-term food security. It tells us whether households have enough food to feed all its members in a given time.

However, the most important shift was from food availability at macro-level to income at micro-level. The approach is similar to the one traditionally used to assess poverty, while poverty was conceived as a lack of enough income necessary to buy goods that guarantee the survival of a person (Sibrian, 2008). Through household surveys providing information on income, it is theoretically possible to estimate the:

'Amount of food consumed, under the assumption that poorer households

use a larger proportion of their income to buy food'.

With respect to the unit of analysis, potentially income could be estimated for individuals. Although there are problems related to children whose food security depends also on adult's income. All surveys mentioned are conducted at household level. For all these reasons, we might reasonably state that *the household* is the unit of analysis within this approach.

The last of this approach is "sustainable livelihood approach". Sustainable livelihood approach is not just an approach to food security but is a more general approach to development and poverty. It was given in the 1980s by (Chamber, 1983). Subsequently, the approach was expanded by chambers and others (Ellis 2000; Scoones 2005). The sustainable livelihood has been applied to a variety of development issues including food security (Young *et al.*, 2001; Hussein 2002; Devereux *et al,* 2004). There are two features of sustainable livelihood framework that gave it some advantages in the analysis of food security over the other approaches. They are:

i. The long-term perspective and;
ii. The attention to the content namely the political, economic, physical, social and cultural perspective. The later focused on agricultural productivity and the rural people.

Coping strategies are included in the more general livelihood strategies, which are the combination of activities that people choose to undertake in order to achieve their livelihood goals (Hussein, 2002).

2.2. Concepts of food security and nutritional status.

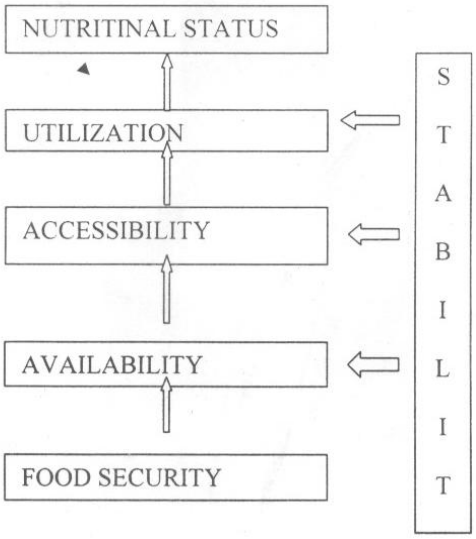
Food security is achieved if, adequate food is available and accessible for and it is satisfactorily utilized by all individuals at all times for a healthy and happy life (Herwig 2000). The objectives of food security will be realized when these elements are fulfilled.

2.2.1 Concepts of Food Security

Food security is an important element in poverty alleviation and therefore must be a top priority to government programmes and policies. Inadequate food and poor health are two factors contributing to under- nutrition in children and/or over nutrition in adult. There have been efforts made by developed and developing countries towards achieving sufficient food to meet the energy requirements of their population. Despite all these efforts, energy is not sufficient to ensure good nutrition. In addition to sufficient energy, adequate micronutrients must also be available to ensure adequate health. For example, households should ensure that they have adequate micronutrients such as vitamin A, Iron and Iodine. Iron deficiency in particular is a major cause of poor health in both adult and children (Herwig, 2000).

Food security historically refers to the overall regional, national and even global food supply and shortfalls in supply compared to requirements. Considering the insufficient food intake by some groups of household members, the term has been applied most recently at a local level (Herwig, 2000). Achieving food security from this concept according to Gross, Han-S, Hans-P and Han – Joachin (2000) require that the total availability of physical supplies of food is sufficient, that households have adequate access to those food supplies through their own production, through market or through donations; that also the utilization of those food supplies is appropriate to meet the specific dietary needs of individuals.

Figure I



Concepts of Food Security at Household Level (Gross, 2000; Herwig, 2000)

The diagram shows the elements that constitute to food security and their relationship within the concepts.

2.2.1.1 Food Availability

The first element of food security is availability. In this context, availability refers to the physical existence of food. This could be from production or on the market. The term is often confusing, since it can refer to food supplies available at both the household level and at a more aggregate level (regional or national). The term is most appropriate in reference to food supplies at the regional or national level (Riely, Mock, Cogill, Bailey and Kennefick, 1999). At the national level, Reily and coworkers, (1999) reiterated that food availability is a function of the combination of domestic food stocks, commercial food imports, food aid, and domestic production as well as the underlying determinants of each of these factors.

2.2.1.2 Food Access

Reily *et al.,* (1999), and Christiansen, (1995) stated that access is ensured when all households and all individuals within the households have sufficient resources to obtain appropriate foods for a nutritious diet. According to them, it is dependent on the level of household resources, for example, capital (income), labour, knowledge and prices. On the other hand, adequate access can be achieved without households being self-sufficient in food production. The important thing is the ability they have to generate income, which together with their own production can be used to meet food needs. Food access is also a function of the physical, social, and political environment which determines how effective households are able to utilize their resources to meet their food security objectives (Reily *et al.,* 1999). For example, when there is a drastic change in condition such as drought or social conflict, these conditions may affect or disrupt production strategies and threaten the food access of affected households. This also can lead to loss of productive assets such as livestock and may have severe implication for future productive potential of households, and, therefore their long- tem food security (Reily, *et al.*, 1999).

2.2.1.3 Food Utilization

Food security at individual level requires the consideration of the biological utilization of food. Biological utilization refers to the human body to take food and translate it into either energy that is used to undertake daily activities or is stored in liver as glycogen. Utilization requires not only an adequate diet, but also a healthy physical environment, including safe drinking water and adequate sanitary facilities (in order to avoid disease) and an understanding of proper healthcare, food preparation, and storage processes (Herwig, 2000).

Utilization has also a socio-economic and a biological aspect. Herwig (2000) explained that if sufficient and nutritious food is both available and accessible, the household would have to make decisions concerning what food is being consumed (demanded), and how the food is allocated within the household. Where there is inequality in distribution of household foods, even if the measured total access is sufficient, some household members may suffer from food deficiency. Also, the composition of food consumed could be imbalanced.

2.2.1.4. Stability in Food Security

Stability refers to the temporal dimension of nutrition security. That is, the time frame over which food security is being considered. Maxwell and Franken-Berger, (1992) found that in several literature on food security, a distinction is drawn between chronic food insecurity (the inability to meet foods on an ongoing basis), and transitory food insecurity (when there is inability to meet food needs) are of temporary nature. It is also important to distinguish between chronic food and nutrition insecurity. The former occurs when there are repeated food shortages before harvest known as seasonality or lack of caring (shortage) during harvest. The later occurs due to natural and manmade disasters. The frameworks of food security are influenced by two determinants. They are the physical and temporal determinants.

The physical determinant is regarded as the food flow. That is, the availability, accessibility and utilization of food (Christiansen, 1995). In this concept, availability is achieved when people (household) have adequate food at their disposal. Access is ensured when all households and individuals within these households have sufficient resources to obtain appropriate foods (whether through production, purchase or by donations) for a nutritious diet. While adequate utilization is ability of the human body to ingest and metabolize food. When the individuals or households have nutritious and safe diet, adequate biological and social

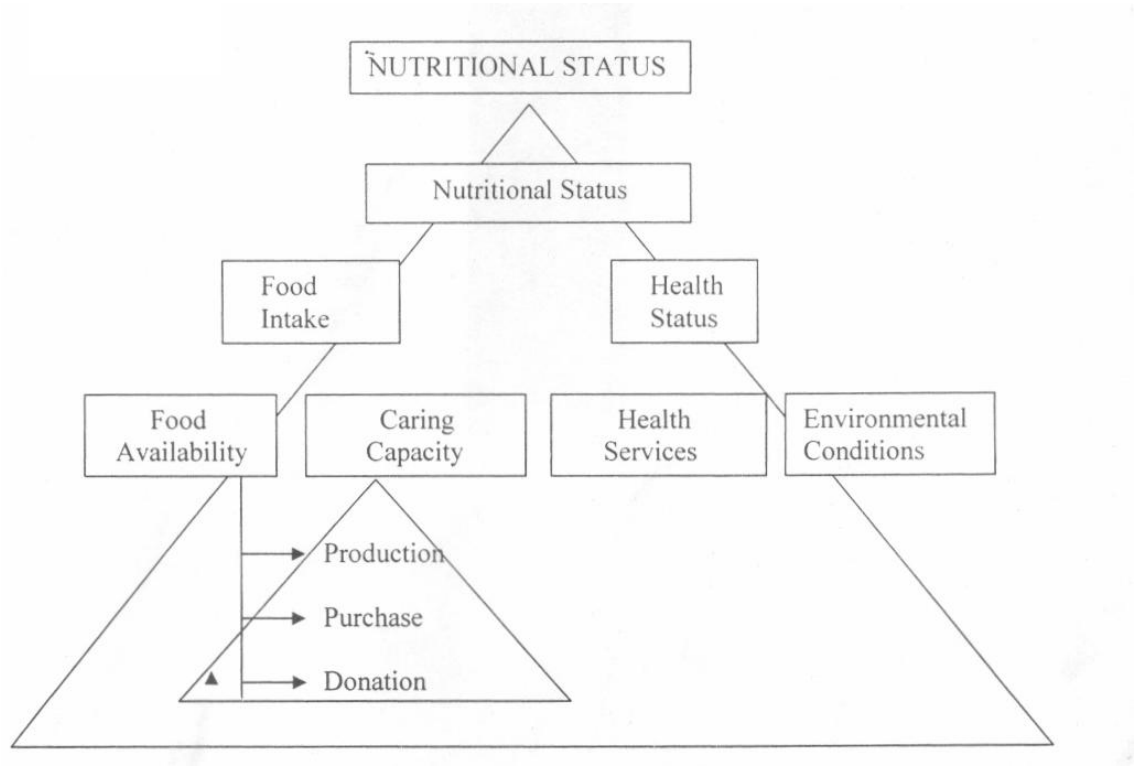
environment, and a proper healthcare to avoid diseases, adequate utilization is ensured. Herwig. (2000) stated that, the social aspect of household is important as it is a social role of keeping families and communities together in situations where there is food insecurity. This role can only be achieved when sufficient culturally adapted food is available within households and communities to meet its biological and social needs. The second determinant (temporal determinant) is referred to as stability. This affects all the three elements (Christiansen and Toflens, 1995; Chung, et.al 1997; Herwig, 2000).

2.2.2 Concept of Nutritional Status at Household Level

Nutrition is the study of the human body and the study of food and how food affects the body (FAO, 2000). Nutrition starts with eating food and drinking, and when better foods are eaten, it ends poverty which in turn leads to achieving a better quality of life (FAO, 2008). For households to be healthy, they must eat enough food to get a supply of all the key nutrients. Obayelu (2010) said that individual nutritional status depends on the interaction between food that is eaten, the overall state of health and the physical environment. The concepts of nutritional status at household level is an outcome of food intake and health status (Gross, *et al.,* 2000). According to these researchers, a reduced state of health may partly be due to very little access to health care, poor housing and environmental condition, and the health status can be worsened by malnutrition which pre- disposes individual to diseases.

There are four underlying causes of food intake and health status of households. These underlying causes are influenced by four determinants; each of the determinants has several contributing factors.

Figure 2



Concepts of nutritional status at household level Source: UNICEF (2000).

From the diagram for example, area of causes and effects of food availability, are shown with arrows below, while the larger lined triangle shows the entire relationships.

There are four determinants (factors) that influence the nutritional status of low income families at household level. These factors are: the manifestation level, the immediate causes, underlying causes and the basic causes. At the manifestation level, malnutrition results when households lack adequate diet due to under nutrition. The immediate causes affect individual, underlying causes relate to families and the basic causes are related to the community and nation. As a result, the wider the population whose nutritional status is affected (Calder and Jackson, 2000).

2.2.2.1. Immediate determinant of nutritional status of low-income at household level

The immediate determinants of nutritional status manifest themselves at individual level of human being. They are the dietary intake and health status of individuals.

a. Dietary Intake of Household Members

The dietary intake of household members must be adequate in quantity and quality. Smith and Haddad (2000) advised that for easy absorption by the human body, nutrients must be consumed in appropriate combinations. For example, nutrients such as carbohydrate, protein, fat and micro-nutrients need to be consumed in combination with other nutrients for easy absorption. This can only be feasible if at household level, decisions are made on what food is put on the table. For example, food demands by members, and who is to eat the foods (intra-household distribution) determines composition of meals for individuals. Foster, (1992) added that habits (food taboos) and knowledge (food preparation, processing, and child feeding practices) influences food composition and biological utilization of the food. Therefore nutritious dietary intake of households should be based on knowledge, skill and decision of the household on balanced food.

b. Health Status of Household Members

Foster, (1992) in Herwig, (2000) stated that there are strong synergetic and energetic relationships between health and nutritional status of households. For example, a sick person may not have appetite for food, could eat poor diet, have poor digestion and may use reserved nutrients to fight infection. Consequently, poorly nourished persons will definitely have weakened immune system and are more prone to infections to exacerbate increased potential for and severity of malnutrition.

2.2.2.2. Underlying Determinants of Nutritional Status of Low-Income at Household Level

The immediate determinants of nutritional status are influenced and closely related to four underlying factors manifesting themselves at household level. The determinants are: availability and access of food at household level, adequate care for mothers and children, proper healthy environment, as well as access to health services (Smith *et al.*, 2000).

a. Food Availability and Access of Household Members

Food production, income for food purchase and donations are resources necessary to gain access to food. Availability of food at household level is determined by own food production, market supply that originates from combination of domestic food stocks, commercial food imports, food aids and domestic food production. Household level access refers to physical and economic access to food that are socially and culturally acceptable, and of sufficient quality and quantity (UNICEF, 2006).

Food security at household level is determined by many factors other than agricultural production; such as, local prices of food and other goods, income, transport and infrastructure. Moreover, household food security is not in itself sufficient to assure that nutritional needs of every child and adult living in particular household will be met. This is because, within each household, decisions are made as to quantity and quality of food allocated to each household member and a complex range of factors influence this decision. For instance income, gender, education, autonomy and health status of household member can influence household decisions. In addition, diet of individual members, such as children, pregnant and lactating mothers may be deficient, though their caloric intakes are high even when the household is food secure (Obayelu, 2010).

b. Caring Capacity of Household Members

Care has been defined as the provision in household and community, which includes time, attention, support and skills to meet physical, mental and social needs of nutritionally vulnerable groups. Care can he provided within families and communities or by external institutions. Caring capacity is the ability to use human, economic and organizational resources for the benefit of households. It therefore involves issues of education, knowledge, culture, time and control over resources, including income. This involves provision in households and communities of their time, attention, and support to meet physical, mental, and social needs of growing children and other household members (Haddad, 2000).

Caring practices involve child feeding practices, health seeking behaviours, support and cognitive stimulation for children, care and support for mothers during pregnancy and lactation (Haddad, 2000). For example, adequate care during pregnancy and delivery can reduce the incidence of maternal death, miscarriage, stillbirth and low birth weight among infants. Conversely, adequate feeding of young children (like initiation of breast feeding within one hour of birth, introducing exclusive breast feeding for at least six months of life, adequate and timely introduction of complementary feeding after six months while breast- feeding is on) is critical for a child's growth. Adequacy of these caring practices are determined by the caregivers control of economic resources, autonomy in decision making, and the physical and mental status of households. Decision to execute control is dependent on the caretaker's capability, relative to other household members, her knowledge, time, educational status and beliefs, to determine how children, pregnant and lactating mothers are cared for (UNICEF, 1990; Johnson 2000; Smith *et al*, 2000)).

Additionally, care-giving for children includes breastfeeding; providing security and reducing child stress; providing shelter and clothing; feeding, bathing and supervision of toilet; preventing and treating illness; showing affection; interaction and stimulation; playing and socializing; and providing a safe environment for exploration. It also includes use of resources outside the home, such as curative and preventive health facilities and prenatal care. Breastfeeding is a prime example of care, since it combines food security, caring and a healthy environment. The way in which care-giving activities are performed is an important aspect of care: the care-givers motivation, skill, physical capacity, consistency and responsiveness to the child's needs are all related to child survival, health and development.

Other important factors influencing dietary intake and nutritional status are those conditions and activities that are grouped under care. Among nutritionally vulnerable groups, attention is often focused on the low income (Smith *et al.,* 2000). In the context of improving nutritional status of the low income families therefore, it should involve facilitating optimal use of household food resources for family feeding and of parental resources to protect the family from infection and to care for a sick child or other vulnerable member of the household.

c. Health Services Available to Household Members

Availability of a functioning health service is the third underlying determinant of nutritional status at household level. Health services have a direct impact on nutritional status of household members. The indirect impact is knowledge acquired by the caretaker on health and nutrition related topics. For example, his or her knowledge of child feeding practices and hygiene, as well as preventive measures would have direct impact on the child's well-being. The poor suffer from these diseases when they have limited access to health care, or unable to pay for

needed medications and other essential services like, immunization and family planning (UNICEF, 2000). These services ordinarily are supposed to be given without money.

In addition, insufficient time and other resources to care for family members during periods of acute illness for fast recovery may not be readily available. Consequently, treatment of infections may not be prompt or adequate, thereby prolonging diseases in the body which would predispose children to increased nutritional risk. Limited supplies of drugs and understaffed health facility usually have great impact on the health and nutritional status of low income families. Mother's attitudes to healthcare and education are also factors affecting willingness to make use of available services (UNICEF. 2006).

d. Environmental Conditions of Household Members

Food-secure environment is clearly an important determinant of dietary intake. Whether this translates into good nutritional status will depend on a range of other factors. Such factors for example includes, health and sanitation, methods of food preparation, adequacy of general child care and knowledge, education and skills needed by different family members to use available human, organizational and economic resources to benefit the household and its vulnerable members in particular. A healthy environment influences household exposure to infectious diseases. The poor (low income) are affected particularly by environmental factors that increase exposure to infectious disease. For example, limited water supply, inadequate sewage disposal and general sanitation affect this group of households. Others include contaminated surface water, overcrowded and poor housing and unhygienic food preparation environment (Herwig, 2000).

2.3 Definitions of Food Security, Nutritional Status and Poverty Alleviation

2.3.1 Definitions of Food Security

Concepts of Food Security evolved during the last three decades to include not only food availability, but also economic access to food and the biological absorption of food in the body. The official concept of food security, reflecting global concerns of 1974, was on volume and stability of food supplies. The 1974 World Food Summit defined food security as: "Availability at all times of adequate world food supplies of basic foodstuffs to sustain steady expansion of food". This definition was aimed at consumption and offsetting fluctuations in production and prices. Emphasis at the conference was essentially increasing food production in food deficit countries and on creating a coordinated system of national and international grain reserves. However, this approach did not consider the vulnerable to enough food for a normal life (World Food Summit, 1996). The widely accepted definition of food security by Adedeji (1998) is; "Access by all people at all times to enough food for active healthy life". Essentially therefore, the researcher opined that food security would be seen to imply the availability of food and ability to acquire it and use it to meet food needs of all households in order to be active and live a healthy life.

In 1979, the World Food Programme Report came up with a more broadened definition of food security equating it with an assurance of supplies and a balanced supply-demand situation of staple food in the international market. (Swaminathan1999; World Food Summit, 1996). World Bank (1986) and FAO (1996) defined Food security as access by all people at all times to the food needed for an active and healthy life. The committee on World food security defined food security as a situation in which people at all times has physical and economic

access to sufficient safe and nutritious food to meet their dietary needs and food preferences for active healthy life (FAO. 1996).

A Leadership Forum held in Ota Nigeria in1989 agreed that national food security should be seen in the context of national food self-reliance and that food security means: "Adequate access by all people at national and household levels to adequate and largely domestically produced food at all times" This definition involves regular and sustainable access without dependence on commercial and foreign- exchange consuming imports or food aid detrimental to local production in Africa. In this context, according to them, food security should not hinder intra- African trade as a policy instrument, rather it should encourage and emphasis the full utilization of Africa's production food resources. The definition of food security according to NAPP (2000) is to assure enough food and foodstuffs for every person at any time, both in material and economic aspects, with increasing demand on nutritional quality, hygiene and balance so as to improve health and enable normal development and efficient work.

Khemmatath (2002) saw food security as a complex concept that involves economic, social, cultural, environmental and political aspects. In order to really understand the food situation and the causes of food insecurity, it is important according to him to understand the fundamental notion of food security. Novib, (2001) further described the definition of food security and all aspects involved as:

i. Everyone has: "That is equity; all people".
ii. At all times: "This means stability of food availability, access and utilization throughout the year and overtime, it also implies protection against risk affecting people's food security"

Access to: “This means the right an individual has to food. People are entitled to enough food. Affordability of food would depend on the purchasing power and market prices. While own production would equally depend on land rights, and others”

iii. And control over: “That is the power to take decision concerning food production distribution, consumption and others”

iv. Sufficient quantities: “Means enough food to meet daily food requirements, to have sufficient stock at household and community level to resist shock.

v. Of good quality food: “That is having varieties of nutritious, safe and culturally accepted and appropriate food”

vi. For an active and healthy life: “This involves proper consumption and a good biological utilization of food that results in an adequate nutritional status of people”. From the above definitions, food security is multidimensional and covers a wide range of areas.

As a national and worldwide issue, food security can be defined as the success of local livelihood to guarantee access to sufficient food at the household level (Devereux. 2001). Thus, food security is people oriented and it implies a situation in which all households have both physical and economic access to adequate food for all members and where household are not at risk of losing such access (Ashaml 1996). However, some countries that attended the World Food Summit in 1996 adopted and accepted the USAID definition of food security and reconfirmed it in 2002. Food Security includes at a “minimum” the ready availability of nutritionally adequate and safe foods, and an assured ability to acquire acceptable foods in socially acceptable ways. That is, without resorting to emergency food supplies, scavenging, stealing, or other coping strategies (Food security in the United States. 2008). Therefore, the definition of food security seems to simply be that food security exits when all people, at all

times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for active and healthy live.

2.3.2 Nutritional Status

Nutritional status involves the understanding of nutritional state of the body using weight, height, age or a combination of these parameters. When these parameters are used an individual can be assessed as having good or bad nutritional status. Many experts in the field have given several definitions as these parameters are used. Bender and Bender (2005) defined nutritional status as condition of the body in those respects, influenced by diet: levels of nutrients in the body and ability of those levels of nutrients to maintain normal metabolic integrity. They are assessed into two groups: adults and children. For adults, Bender *et al.,* (2005), emphasized that general adequacy is assessed by measuring weight and height; the result is expressed as body mass index (BMI) and the ratio of weight (kg) to height^2 (m). Body fat may also be estimated, by measuring skin fold thickness, and muscle diameter. Children's weight and height for age according to them are compared with standard data for adequately nourished children. The variation in circumference of the head and development of bones may also be measured.

WHO, (2008) observed that lack of access to food influences food intake and consequently impact on the health and nutritional status of households. Condition of health of a person is influenced by intake and utilization of nutrients and therefore each person need a nutritious diet for his/her well-being and good health. In the opinion of the researcher, when the body receives all nutrients it needs in appropriate amount, that person would be said to have good nutritional status. If otherwise or when diet is not properly utilized, it will result in a state of imbalance in the body.

Nutritional status is defined as the result of introduction, absorption, and utilization of nutrients. Battistini, Malarita, Poli and Pietrobelhi, (2005) interpreted the definition to mean the relationship between nutritional status and the health status of a person. They explained that the energy balance, body balance and the body composition are three entities correlated to each other. Nutrients are classed into two groups; i.e., macro-nutrient and the micro-nutrients. The macro- nutrients are protein, carbohydrate and lipids. These nutrients have energetic and structural functions, while the micro-nutrients are vitamins and minerals. Micro-nutrients do not have energetic functions but could however take part in structural functions, Water is another fundamental element of the human body with no energetic functions, but it is by far the most abundant of the constituents of the body. The percentage of body weight as water varies from 70% to 75% at birth to less than 40% in obese adult

Nutritional status is a global term that encompasses a number of specific components that are essential to ensuring adequate nutritional status. It uses specific terms to explain these components. These terms are important to consider when referring to nutritional status globally. They are given by August, Teitelbaun, Albina, Bothe, Guenter and Heitkemper, (2002) as:

Nutrition screening: Screening refers to a proactive process that is used systematically in clinical practice to identify individuals who are malnourished or who are at risk for developing malnutrition. Nutrition screening therefore identifies those individuals who subsequently should undergo a comprehensive nutritional assessment. That is, nutrition screening gives a comprehensive assessment of nutritional status of individuals.

Nutrition assessment: Nutrition assessment is a comprehensive approach to defining nutritional status that uses:

i. Medical, nutrition, and medication histories.

ii. Physical examination

iii. Anthropometric measurements, and

iv. Laboratory data.

A comprehensive nutritional assessment should provide the entire requisite information for developing a nutritional care plan.

Nutrition care plan: This refers to the documented nutrition goals and interventions prescribed for an individual using data obtained from a nutrition assessment. Nutrition care plan development involves input from multidisciplinary specialists and the plan should state nutritional goals, monitoring parameters, the most appropriate route of administration for nutritional support, method of nutritional access, anticipated duration of therapy, training and counseling methods and goals.

Specialized nutrition support (SNS): The administration of nutrients by routes prescribed in the nutrition care plan, with therapeutic intent. This includes the provision of total nutrition support and provision of therapeutic nutrients to maintain and restore health.

2.3.3 Poverty Alleviations

Poverty alleviation, according to Elumilade *et al.,* (2006) is a process which seeks to reduce the level of poverty in a community, among a group of people or countries. The reduction requires a gradual process because it might take a long time before that level can be eradicated and poverty is an issue of concern that calls for discussion at the international scope. The researcher views that poverty reduction/alleviation requires concerted global efforts to resolve, though requiring persistence, continual observation and systematic analysis to ascertain why and how poverty can be alleviated even at household level.

The United Nations Environment Programme (2011) defined poverty alleviation in a number of ways, which includes lack of material resources, poor access to healthcare and education, and the lack of rights, freedom, employment and opportunity. They stated that any change in any of these areas is also regarded as poverty alleviation. In other words, poverty alleviation could mean a substantive reduction of any negative aspects of poverty. For example, education is one aspect of poverty alleviation because it molds and educates people on how to improve their conditions in life.

Poverty alleviation could also mean those measures or attempts used to raise or intended to raise the material level of living. Melamed, Renate and Ursula, (2011) stated that poverty alleviation has been largely as a result of overall economic growth. For instance, economic growth has indirect potentials to alleviate poverty due to its simultaneous increase in employment opportunities and increased labour productivity. Increase in employment opportunity is not a guarantee that low income families have escaped poverty. Melamed, *et al.*, (2011) observed that estimate made by the international Labour Organization (ILO) shows that up to 40% of workers as poor in developing countries are not earning enough to keep their families above the $1.25(N210.00) a day poverty line as approved by World Bank. The sample of this study, fall within this level of families who are not earning enough to keep them above the $1.25(N210.00) a day poverty line. They are therefore qualified to seek for poverty alleviation.

Poverty alleviation also involves improving the living conditions of people who are largely poor households. The poor households rely more of aids in medical and other areas to better their lives because they cannot afford most of these resources.

2.4 The Three Elements of Food Security

The goal of food security is for individuals to obtain adequate food needed at all times, and utilize the food to meet the body's needs (Obamiro, Doppler & Kormawa, 2003). Therefore, the definition that food security means access by all people at all times to sufficient food for a healthy and productive life; is seen by the researcher to imply that there are three elements that constitute household food security; namely, food availability, accessibility, and utilization.

Food availability connotes the physical presence of food in large amount. This should be sufficient in quantity and quality and also provide variety. Accessibility suggests sufficient purchasing power or ability to acquire quality food at all times. Food access addresses the demand for food and is influenced by economic factors, physical infrastructure and consumer preferences, while utilization demands sufficient quantity and quality of food intake. These elements embrace the supply, demand and adequacy of food at all times (Omonona *et al.*, 2007).

2.4.1 Food Availability as an element of household food security

Food availability means having food and this entails production and storage for off seasons. It also implies availability of foods by households and supply of foods in a nation, region or locality. Food is available when there are adequate quantities of good foodstuffs so as to provide the nourishing elements and calories necessary. The sources of supply may include home production, food stocks, imports, food aids and domestic food (Omonona *et al*, 2007). Production is a means to achieving adequate food availability. However production strategies; such as a nation relying on importation of food, may not be the best way or means for ensuring food availability as this may be a costly way of procuring domestic food needs. Food availability is a function of a combination of domestic food stocks, commercial food imports, food aids and domestic food production, as well as the determinants of each of these factors. Therefore food

availability is making food supply available at both household level, regional and national level, but is most commonly applied to food supplies at regional and national level (Omonona *et al.* 2007). Total availability combines both foods available from production and from imports. Domestic production means food produced and acquired by means of physical efforts by household members. This can be from crop production, animal production, fishing, or hunting and others that are then consumed by household members. Food can be acquired by means of exchange in the form of barter or market exchange. Some food items acquired by household members are in surplus and are traded for other ones that are in shortage or not available at all, or exchanged for cash.

Cash income can be generated from economic activities like working as labourer for farms, small commerce, service activities (transport), processing and making handicrafts. The surplus of food produced or acquired may be processed for preservation so that it can be stocked for consumption during periods of shortage. For example, if household stocks dried maize for a period of one year, amount of maize at beginning of the period minus amount of maize at the end equals variation of stock. This is the amount of maize consumed during that period. With the farm household, food availability implies ensuring that sufficient food is available through own production. The Problem families' faces today are lack of adequate food storage facilities and pressing needs. When they are not able to store enough food, they end up selling produce during harvesting period and sometimes purchase from the market during hunger period (Obamiro *et al*, 2003).

Food availability viewed by policy maker is a self-sufficiency problem. The problem is meeting domestic food needs with domestic food production. As a result government food security strategies have often emphasized increasing national-level food availability through

expanded domestic food production as the key means for addressing food and nutrition insecurity problems (Kennedy and Bouis, 1993). Also, increased food availability at national or regional levels may not mean to ensure increased household-level access to food. There is that believe that starvation is the characteristic of some people not having enough food to eat, not that there is sufficient to eat. Studies in Nigeria indicated that adequate availability of food in Nigeria on a per capita basis does not necessarily translate to sufficient and adequate food for every citizen. According to Orewa *et al.* (2009), Nigeria is endowed with vast expanse of arable land for crop production and fresh waters for fish breeding. Nigeria cannot produce sufficient food crops her population requires. This therefore has made her depend on food importation to meet domestic demands. In 2008 alone, about $300 million (5.01 billion) was spent on rice importation (Orewa, *et al*., 2009), suggesting that Nigeria is facing acute food shortage. Also in some countries in Africa; Nigeria inclusive, adequate supply of food at the national level is no guarantee against hunger (Olaitan *et al.*, 2000). In order to support these findings, the World Bank (1996) observed that it is common to have 20 to 30 percent of a countries population consuming less than 80 percent of caloric requirements, though national level food availability is at or greater than 106 percent; e.g., Zimbabwe (Kennedy *et al*., 1993). Strategies to increase national and regional food availability and food production may be linked to improved food access by stimulating broad based growth in rural household incomes; that is, both farm and non-farm, and by reducing food prices (for net food buyers). Polices or intervention through dissemination of improved agricultural technologies can improve incomes or prices for low income households, thus help in reducing hunger in Nigerian households.

2.4.2 Food Accessibility as an element of household food security

Food accessibility is an important element because, even when food is in sufficient quantity, all individuals and families need to have access to food both physically and economically. All stages of food chain supply have some influence on physical accessibility, particularly transportation, storage, and marketing of these food commodities. Economic accessibility or purchasing power of household income is considered the most important factor affecting people's accessibility to healthy and nourishing foods (Obamino *et al.*, 2003). The poor (vulnerable) suffer most when there is irregular food supply due to drought, flooding, fluctuation of prices or seasonal unemployment. Therefore stability of food supply would only depend on the capacity of storage and savings made at household level, stability of market which depends on the balance between supply and demand. Others include the role of State in regulating flow of food supply and demand and capacity of government to act or react during an emergency (Khemmarath, 2001).

Research conducted in Bangladesh and Ethiopia in 1970's revealed that food accessibility were not caused by absolute declines in available food, but rather by food price inflation which depleted the purchasing power of low-income households (Sen, 1981). The role of food prices may be particularly important for producers and consumers. Food prices have strong influence on real incomes for poor consumers because a large share of their incomes (often 60-80%) is spent on food (Sarma and Ghandhi, 1990). Considering information on food production in Nigeria, food prices increase at a fast rate than what is earned. The increased rate of food prices contribute to inflationary pressures in our national economy. Inflationary pressures were worsened by Government and the nation, where salary was increased without improving the agricultural sector (Barnet and John, 1995). Sen (1981) perceived food accessibility as a means

of reducing poverty, such that when food available is not enough, one must be able to purchase it, especially the low-income household.

Food accessibility refers to the ability of household to obtain food, whether its source is home production, commercial purchases, or transfers. Abdullahi (1999) stated that pervasive poverty among the rural population in Nigeria is an indication of low agricultural productivity and relatively low incomes. In line with this, D'Silva and Bysouth (1992) saw absolute poverty as lack of access to resources required for obtaining the minimum necessities essential for the maintenance of physical efficiency. This implies that the poor farmers will have little access to food either produced or purchased. Farm families that have limited access to productive resources such as land, farm inputs and capital that is required to meet physical efficiency in food production could be food insecure. That is, resource poverty could lead to low productivity, food insufficiency, and lack of income to purchase the needed calories.

Household food security is determined by both physical access to food and adequate purchasing power. In as much as access to adequate food at the household level is needed to satisfy nutrition levels for all members; nutrition security also depends on a nonfood factor such as satisfactory health and hygiene conditions and social practices. In essence, household food security is one condition for achieving overall nutritional well-being of individuals (Sharma, 1992). Individuals have sufficient access to food when they have adequate incomes or other resources to purchase appropriate foods needed to maintain consumption of an adequate diet/nutritional level. Food access depends on the ability of households to obtain food from purchases, gathering, current production, or stocks, or through transfers from relatives' members of the community, the government or donors. Intra-household distribution of these resources is an important determinant of food security for all household members. Food access is also

influenced by the aggregate availability of food in the market, market prices, productive inputs and credit (USAID, 2002).

Access depends on the physical, social and economic factors. After food is produced, it needs to be moved from the point of production to the point of consumption. This often depends on transport systems. In many developing countries, Nigeria inclusive inefficient and ineffective transport systems retard the delivery and increase the price of food (Obayelu, 2010). Physical access to food security implies ensuring access to adequate amount of food to meet the physical needs of those who are vulnerable such as the aged, the low income, children, pregnant mothers and others through their own production or through the market (FAO, 1991). According to FAO (2000), a country needs to have an adequate supply of food, which will include the importation of food when domestic production is inadequate. This is the only condition that will make the country to have physical access to food security.

However, when a country's food supplies are below some statistical aggregate based on normal food requirements, the food needs of every person in the country cannot be satisfied even when available food is evenly distributed. In addition, if food must be physically accessible to all household it should continuously be available in the local markets where households do not produce necessary amounts of food themselves. Ensuring access also requires that food be physically accessible to households. Common obstacles to this are things like war, civil strife, poor infrastructure, inadequate logistic for food distribution and market imperfection. These problems are common or exist in regions. The researcher opined therefore that household food security can be ensured only when capability to acquire food exists. This is in support of the view that, a household is able to acquire access to food through its own production, income

generating activities (trading, wage employment), ownership of assets and transfer from sources external to it (Sen, 1981).

Households' ability to ensure Continuous access to food over time is often neglected. Food security concerns of adequacy, stability and access are often viewed from short term perspective. However, households and societies may achieve temporary food security at the cost of substantial insecurity in the future. According to Davis (2002) land, forest and other natural resources may be over exploited to ensure short-term food security. Apart from this, household also resort to a number of strategies for coping with food insecurity during food crises and famine. Such strategies include sales of assets, borrowing, and migration from rural to urban areas and over exploitation of common property resources. For some households, the consequent reductions in endowments may be temporary. Others may not recoup their lost endowments and as a result become increasingly more vulnerable and insecure.

2.4.3 Food Utilization as an element of food security

Adequate food utilization is realized when food is properly used, proper food processing and storage techniques are employed, adequate knowledge of nutrition and child care techniques exists and is applied, and adequate health and sanitation services exist (USAID, 2002). USAID defined food utilization as the proper biological use of food, requiring a diet providing sufficient energy and essential nutrients, potable water, and adequate sanitation. Effective food utilization depends in large measure on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper childcare, and illness management. Food utility involves how food is used. This can include how often meals are eaten and of what they consist. It should ensure an adequate, consistent and dependable supply of energy and nutrients through sources that are affordable and socio-culturally acceptable to them at all times.

Ultimately food security should translate to an active healthy life for every individual. For this to take place, nutritionally adequate diet should be biologically utilized so that adequate performance is maintained in growth, resistance or recovery from disease, pregnancy, lactation and or physical work (Heidhues, 2004). Hence, adequate health and care must be provided in addition to adequate food. Herein lays the problem facing poor households today.

Food insecurity has the potential to influence food intake and ultimately the health and nutritional status of households. In developing countries, over 85 percent of food consumed by poor households in rural setting is obtained from farm (Heidhues *et al.*, 2004). The importance of foods purchased from markets in meeting household food security need depends on household food income and market price. The seasonality of foods available at household level may highly influence food availability in places where little to no food preservation is practiced. This is the case with fruits and vegetables, which are highly perishable. Constraints to food utilization include loss of nutrients during processing, inadequate sanitation, improper care and storage, and cultural practices that negatively impact consumption of nutritious foods for certain household members.

In general, food utilization is typically reflected in nutritional status of an individual, the quality and quantity of dietary intake, general child care and feeding practices, along with health status and its determinants. Major determinants include poor infant care and feeding practices, along with health status and its determinants. Poor infant care and feeding practices, inadequate access to, or poor quality of health services are major determinants of poor health and nutrition. While important for its own sake as it directly influences human well-being, improved food utilization has feedback effects, through its impact on health and nutrition of a household

members, and therefore on labour productivity and household income earning potential (Hoddnott, 2006).

2.4.4 Factors that Affects Food Utilization of Low-income Families.

2.4.4.1 Health Status of Individual Member.

The health status of individual members is influenced by some of these factors:

a) Illness and Diseases: Illness and diseases results due to loss of appetite and poor nutrient absorption.

b) Poor Child Caring Practices: Children rely more on parents and care takers for good and safe nutritious food in both quantity and quality.

c) Environmental Contamination: Foods prepared under unhygienic environment can lead to outbreak of food borne illnesses, such as cholera, diarrhea, intestinal track diseases.

2.4.4.2 Health Status of Group of People. This can be influenced by:

a) Access to services, such as primary health care, education, portable water, sanitation and general environmental conditions.

b) Access to some of these services can be greater in the urban areas than the rural areas.

c) Also access to electricity, good portable water and sanitation could be greater in urban areas. Therefore all people living in these areas may have their health status been influenced by these services.

2.4.4.3 Access to water and sanitation facilities

Poor access to sanitary facilities can lead to poor health status of group of family members. When the environment is overcrowded, or there are open sewers and stagnant water around, this can lead to concentrated exposure to unhealthy waste. The exposed unhealthy waste

would attract pest and vectors, such as flies, mosquitoes, rats, cockroaches and so on. These pest and vectors contributes to spread of disease(s) and can lead to contaminated food sources (Odunze, Mohammed and Ike, 2004). Children are the most affected in this spread of disease because of their exposure to pathogens present in the environment due to their behavioural attitude to play. The likely disease that affects people of this group that is children is diarrhea (Baker, 2003; Odunze *et al.*, 2004).

2.4.4.4 HIV/AIDS Pandemic

The FAO (2001), reported that in 2000, the HIV/AIDS pandemic was estimated to have affected 36.1 million people in the world and out of this number seventy percent (25.3million) live in Sub- Saharan African. Most affected in this area are the active productive labour force and this has led to a reduction in national agricultural production. Access to food production became reduced or limited because the productive members can no longer bring in income. With the presence of HIV/AIDS in an individual body would lead or have impact on the individual's ability to utilize the food consumed.

2.5. Nutritional Status of Low-Income Households in Nigeria

Nutrition is the study of the body, food and how food affects the body (FAO, 2000). WHO (2008), reaffirmed this and stated that better nutrition is a prime entry point to ending poverty and a milestone to achieving better quality life. For families to be healthy, that family must eat enough food that will supply all the key nutrients. However an individual's nutritional status depends on interaction between foods that is eaten, overall state of that individual's health and his physical environment. Nutritional status is an element of household food security. It means access to nutritionally adequate and safe food. WHO (2008), emphasized that lack of access to food influences intake of food and this will consequently impact on health and

nutritional status of households. Most people affected are the low- income families. The low-income families just like other income-levels want to satisfy their physiological needs for food, shelter, clothing and others. They are unable to meet these needs due to their limited income.

Access to nutritionally adequate and safe foods should be the right of every individual/family. Nigerian low-income families in particular are unable to have access to adequate nutritious food because of the cost of those classes of foods against the economic capability of this group that made food items inaccessible. Ikeokwu (2008), observed that the recent escalation of food prices is making the country face worst food crises. Inability of the low-income families to have access to food would exacerbate hunger and under nutrition to support WHO (2008) and High-Level Task Force on Global Food Crises (2008), that hunger and under nutrition are the number one threat of public health, killing more people than HIV/AIDS, malaria and tuberculoses.

Nigeria like many other developing countries is struggling to keep its food production commensurate with her population growth, and under nutrition may even be increasing. Zoellick (2008), noted that Nigeria is blessed with abundant resources but with about 65% households as food insecure. According to him, an average Nigerian spends as high as 75% of their income on food. The Millennium Development Goals (MDGs) adopted nutritional status as one of the key indicators of poverty and hunger. Therefore first step in policies, programmes and processes should be on how to improve nutritional status of low income families. Improving their nutritional outcome would have a role to play in global development. Nutritional status of average Nigeria remained precarious as the country consistently recorded deficit average per-capita calorie intake. Okojie (2001), recorded that between 1980 and 2000 there were food deficits of 31 percent and 20 percent respectively.

Hunger and malnutrition have been found as the underlying causes of death of over 3.5 million children every year, a rate of more than 10,000 children every day (High-Level Task Force on the Global Food Crises, 2008). Between 26, 500-30, 000 children die each day due to poverty; as in Nigeria, about 71% of the population still lives with less than $1.25 (N210.0) a day and over I million children die annually in Africa of malaria (Kazeem 2008; Obayelu, 2010). Oranusi *et al.* (2007) showed that energy intake values for families in Zaria, Kaduna State, Nigeria were significantly lower than similar studies in Nigeria and other West African countries which could result from low fat intake. The implication would be a mild underlying malnutrition due to low body weight and height.

Nutritional status depends not only on food intakes but also on the body's ability to utilize these nutrients, which may be influenced by health factors unrelated to food intake levels. That is the ability to use food efficiently in order to live a healthy live. The researcher agrees therefore that nutritional status requires not only adequate diet, but also a healthy physical environment in order to avoid disease, or an understanding of proper health care, food preparation and storage processes.

2.5.1 Health Status and Environmental Conditions of Low-Income Families in Nigeria

Nutritional status is people's physical state outcome as a result of injection, absorption and utilization of nutrients by their bodies. Clinically, malnutrition is characterized by inadequate intake of protein, energy, and micronutrients such as vitamin and minerals, and frequent infections and disorders that result (Benson, 2008). Obayelu (2008) stated that people are malnourished if their body is unable to utilized fully the food they ate due to illnesses such as diarrhea, or consume too many calories (over nutrition), or the body does not provide adequate calories and proteins for growth and maintenance. Sickness makes a patient loose appetite and

thus unlikely to maintain their dietary intake unless they are encouraged to eat. Lack of food is the most frequently mentioned want. Hunger and malnutrition are seen as underlying causes of many diseases. They cause weakness and exhaustion, and make people more susceptible to infections. This information agreed with Benson (2008), that a group of lactating mothers in Nigeria reported that they are so weakened by hunger, which resulted to not having enough breast milk to feed their babies. This could be an onset of deprivation which if not checked may lead to malnutrition.

Malnutrition in children makes them susceptible to infectious diseases. Disease is an indicator of poor health status of low income families. Among these diseases are; diarrhea, respiratory infections, measles, worm infestations and malaria. Lack of clean water, sanitation facilities and adequate shelter are associated with these diseases and this is an underlying cause of poor health of low income families. Low-income families in Nigeria suffer lack of safe water, problems of distance from the water source, quality and quantity of water, and safety of water supply (WHO, 2006). Poor sanitation is also a problem to low-income families in Nigeria. They experience problems of defecating areas and inadequate latrines in their residential areas. Odunze, *et al.* (2004), observed that waste and rubbish are always seen littered around Zaria residential areas and environs; with the poor and dirty environment, cockroaches, rodents and flies were always seen within living area thereby affecting aesthetics of the surroundings which could also result to disease illness.

Obayelu (2008) and Benson (2008) reiterated that when the body has decreased food intake and cannot efficiently absorb nutrient, looses body nutrient stores and decreased nutritional requirement, these may contribute to deteriorating nutritional status of the individual during severe and prolonged infection. Low-income families are particularly disadvantaged

when affected by infection because of their limited access to healthcare, inability to pay for needed medications and services, such as immunization and family planning. Environmental conditions of household members play a crucial role in influencing nutritional status through health situation of members. Infectious diseases constitute one major factor contributing to child malnutrition. The interaction between nutrition and infectious diseases accounts for high morbidity and mortality rate that is associated with diarrhea, respiratory infections, measles, worm infestations and malaria When household members suffer from these infectious diseases, it may contribute to deterioration of their nutritional status because of prolonged illness in the body (Smith, 2000).

Prolonged infection in the body results to reduced food intake, losses of body nutrient stores and decreased nutritional requirements as these will consequently result to weight loss, low birth weight, protein-energy malnutrition and micronutrient deficiency diseases such as vitamin A, goiter and so on. For example, sick people usually and frequently lose appetite for food and thus are unlikely to maintain good dietary intake unless they are encouraged to do so; this is why illnesses or diseases should not be allowed to drag for a long time (Smith *et al.*, 2000). Adult morbidity is significant when infections and parasitic diseases have major role in loss of productivity through their impact on adult physical performance and activities. When there are low physical performances and activities, food security status of the household will be affected. For example intestinal parasites like schistosomiasis or bilharzias that are caused by river flukes can lead to bladder tumours and liver cirrhosis. If not diagnosed early and well treated, it can result to liver failure. In another development, the effect of human immunodeficiency virus (HIV) syndrome on people's productive capacities and ability may hinder meeting their family's food needs (Smith *et al.,* 2000).

Environmental conditions are determined mainly by the availability of safe water, sanitation and environmental safety, including shelter. Herwig (2000), noted that water and sanitation improvements, in association with hygiene behaviour change, can have significant effects on population and health by reducing a variety of disease conditions such as diarrhea, intestinal helminthes (parasitic worms), guinea worm, and skin disease. These improvements in health can, in turn lead to reduced diseases (morbidity) and death (mortality) and improved nutritional status of household members.

2.5.2 Indices of Nutritional Status of Some Group of Individuals in Low-Income Families

2.5.2.1. Anthropometric Measurement

Anthropometric measurement is the objective measurements of body muscle and fat. They are used to compare growth in children or the young, and to assess weight loss or gain in mature individuals. Weight and height are the most frequently used anthropometric measurements, and skin fold measurements of several areas of the body are taken (Mackey, 2004). Anthropometric measurements are used on the following group of people:

a) Children

Nutritional status is the ultimate outcome measure of food security. The common indicators used for collecting nutritional status of children under age five are anthropometric measurements (Delisle, 1991). Anthropometric measurements have often been used to measure children's nutritional physical state outcomes. It is the measurement of body size and total body composition. Herwig (2000) pointed out that the basic principle of anthropometry is that prolonged or severe nutrient depletion will eventually lead to retardation linear (skeletal) growth in children, loss of muscle mass and fat in children. Detecting these problems involves

measuring body dimensions such as standing height or upper-arm circumference, or total body mass (weight).

There are five commonly used anthropometric, they are:

i. **Weight-to-Height:** This is also known as wasting in children that express the weight of the child in relation to his/her height. It reveals whether a child is thin or not. This measurement does not discriminate between two children of the same weight and height, or being older than the other. The weight-to-height can always change within a short period of time (WHO, 1995).

ii. **Height-to-Age:** Height-to-Age known as stunting expresses the height of the child in relation to his age. Linear growth is a good indicator for general development. It provides information on long term changes in the environment and their nutritional consequences and also represents long term deprivation.

iii. **Weight-for-Age:** This is also called underweight that expresses the weight of a child in relation to his age. The index does not differentiate between two children of the same age and weight however it is good in measuring growth at community level or clinics (Bruce, 2003).

iv. **Mid-Upper-Arm-Circumference (MUAC):** The mid-upper-arm-circumference assesses the actual nutritional status of a child. Mid-upper-arm- circumference is quick to measure and requires simple equipment like tape. Where measuring weight and height is not feasible, MUAC is an adequate substitute. Children showing an arm circumference less than 13.5 cm are classified as being at risk, while children less than 12.5 cm at severe risk (Bruce, 2003).

v. **Body-Mass-Index (BMI)**: Is applied to adults and becomes more accepted as an important indicator for the nutritional status of adults. Body Mass Index requires the measurement of weight and height. The body mass is calculated as weight (kilograms) divided by height (meters) squared (kg/h m^2). A BMI of 18.5 - 25 indicates adequate nutrition; while BMI below 16 shows chronic energy deficiency or under nutrition (WHO, 1995).

Children are more prone to infection and their rapid growth rate is easily affected by poor nutrition. Poor nutrition results to underweight, malnutrition and stunted growth with children. Stunting results due to chronic food deprivation and chronic poor health in children and underweight in children are a reflection of overall poor health or inadequate food intake.

b) Adults

Adults as defined by World Health Organization (WHO, 1995) are those in the range of 25-60yrs. Adult anthropometrics have not been standardized in terms of reference data as they have for children. As noted in various source, there is no recommended indicator or assessment approach for adult nutritional status. Adult anthropometric assessment is used to reflect under nutrition and over-nutrition. Under nutrition is characterized by patterns of acute and chronic deficiency of energy, protein and fat including vitamins and minerals (Oranusi, *et al.,* 2007). There is little information on the nutritional status of adults. Adults body mass index (BMI), which is a ratio of body weight (in kilograms) to height squared (in meters), is used to define body weight status. Adults have traditionally been classified as overweight according to FAO (2005). They indicated that a BMI of less than 18.5 is classified as underweight. A BMI of or greater than 18.5 and less than 25 is healthy weight; overweight has a BMI at or greater than 25

and less than 30, while a BMI at or over 30 is obese. Indicators used the BMI measurements with overweight replacing thinness.

Overweight leads to obesity as this may result due to change in diet and decrease in physical activity. Reduced daily exercise due to ignorant, lack of interest, lack of space, limited gymnasium and so on, can lead to obesity. Adults eating patterns has serious effect on their nutritional status. Also, changes in dietary patterns and increase or change of lifestyle will significantly affect the nutritional status of adults. For example, reduced intake of fresh vegetables and fruits, their availability and access would affect adults' nutritional status (FAO, 200l; FAO, 2003).

2.5.2.2. Advantages of Anthropometric Methods to Nutritional Status Assessment

Baumgartner (1995) and Gibson (1990) enumerated many advantages of anthropometric method of assessing the nutritional status of both children and adults. They include;

i. Anthropometric measurements are inexpensive and non-invasive.

ii. It provides detailed information on the different components of body structure.

iii Anthropometric measurements are highly reliable for determining the nutritional status when compared with more sophisticated methodologies.

iv With anthropometric measurement, changes in body composition particular in men and women at different stages in life are reflected.

v. Equipment required for assessing the nutritional status are inexpensive, potable and durable and can be purchased or fabricated locally.

vi. A trained person irrespective of his/her educational level can perform measurement procedure.

vii. Information on nutritional status of a household is generated on past nutritional history.

viii. Anthropometric method of assessment is suitable for large sample size such as representative population samples.

ix. They are useful as they provide a simple and practical way of describing the problem in the household and community.

x Anthropometric methods are possible and best indicators for measuring constraints, such as dietary inadequacies, infections and other environmental risks on the well-being of the poorest (de Onis, 2000; Eckhardt, 2003; Saksvig, 2005).

2.5.2.3. Disadvantages of Anthropometric Method to Nutritional Status Assessment

Disadvantages of anthropometric method of assessment highlighted by Gibson (1990) and Soha (2009) are:

i. Not used to identify specific nutritional deficiencies.
ii. Cannot be used to differentiate between acute and chronic changes of individual's health status.
iii. There is problem of reference standards for adult.
iv. There could be errors in measurements with inter-observers.

2.5.3 Food Frequency Questionnaire Dietary Intake Method

Food frequency questionnaire is a method of assessing dietary intake that requires respondents to select the frequency of food and drink products consumed over a period of time (Foster, Fallaize and Gallagher, 2014). Food frequency questionnaire provide dietary information from large numbers of individuals (100 or more) and about how often certain foods or foods from given food groups, were eaten during a time of interview in the past, usually in a day by either the household or an individual. It consist of a list of foods and a selection of options rating to the frequency of consumption of each of the foods listed, for example, daily, weekly, monthly

and so on (Haraldsdoffir, Holm, Astrup, Halkjoer and Stender, 2001). The questionnaire can be self administered or be administered through a short personal interview. The food list ranges from a few questions to gather intake or selected foods and nutrients, to a comprehensive list that assesses the total diet (Hoddinoth et al., 2002).

Food frequency questionnaire can be qualitative with no information on portion, size, semi-qualitative with standardized portion size estimates or quantitative where the respondents estimate portion size. When the respondents describe their portion size, different measurements aids are used for example the use of household measures such as measuring cups that reads in grams, kilograms, pounds, ounces, liters and others. (Torheim, Barikmo, Hatloy, Qattara, Diarra et al., 2001). Information on portion size is necessary when quantitative assessment on food and nutrient intakes are required. This is necessary also because standard portion sizes greatly are simply the administration and processing of food frequency questionnaire method of assessment.

Researchers outlined advantages and disadvantages of food frequency questionnaire dietary assessments. They include:

2.5.3.1 Advantages of Food Frequency Questionnaire

i. The method makes use of a standardized list containing foods and type consumed by households or individuals.
ii. With the list of foods, it makes it possible to identify inadequate intake of any food group, so that dietary and nutrient deficiencies may be identified.
iii. Food frequency questionnaire method is useful for gathering information on groups of individuals as well as for looking at habitual intake of a range of foods.
iv. It is simpler and quicker in administration and processing.
v. It poses less burden and cost for respondents than other methods.

vi. It is generally accepted as being suitable for measuring typical diets and with the purpose of ranking individuals according to intake.

vii. Food frequency questionnaire method is suitable for large scale surveys.

viii. It can be self completed and posted (Wendy, Heather, Julie and Karen, 2003).

2.5.3.2 Disadvantages of Food Frequency Questionnaire Method of Dietary Assessment

i. Inaccuracies may result from an inadequate listing of possible foods.

ii. Errors usually occur in estimating portion size and for frequency of food consumption.

iii. Problem of over-reporting healthy foods. Healthy foods such as fruits and vegetables, protein foods and others.

iv. Food frequency questionnaire dietary method requires to be validated in relation to reference method.

v. There is no way to find out how households prepare their foods.

vi. Possibilities of households reporting over or under-estimate food quantities (Drewnowski, 2001; Wendy et al., 2003).

2.6. Factors that Affects Household Food Security

Food security and food insecurity are terms used to describe whether or not people have access to sufficient quality and quantity of food. These two are affected by factors such as poverty, health, food production, political stability, infrastructure, access to market, and natural hazards. Improved food security is important for global reduction of hunger and poverty and for economic development. One aim of the millennium Development Goal is to reduce by half the proportion of people suffering from hunger by 2015. Erstwhile, this had not been, because about 820 million people from developing countries like Africa and Southern Asian were affected by hunger (Venner *et al.,* 2000). Households' food security is classified into four categories;

namely, Food secured food insecure without hunger, food insecure with moderate hunger, and food insecure with severe hunger.

i. Food secure households are those that show no minimal evidence of food insecurity.
ii. Food insecurity without hunger is evidence in household members' concerns about adequacy of household food supply and adjustment to household food management, including reduced quality of food and increased unusual coping patterns. In this instance, little or no reduction in members' food intake is seen.
iii. Food insecurity with moderate hunger in households whose food intake for adult has been reduced to an extent that the adult has repeatedly experienced physical sensation of hunger. In most food insecure households with children, such reductions are not observed at that stage for children.
iv. Food insecurity with severe hunger results when all households with children have reduced children's food intake to an extent that the children experience hunger. For some other households this level of food insecure already has occurred at an earlier stage of severity. Adults in households with and without children have repeatedly experienced more extensive reductions in food intake (Venner *et al.,* 2000).

Food insecurity is believed to affect all household members; not necessarily the condition of any particular household members. Food insecure with hunger indicates that at least a member or members of the household are experiencing hunger due to insufficiency of household resources, not necessarily all members. For adults some households may not have experienced food insecure with hunger, except when the household is impacted by food insecurity due to inadequate resources for food. At this level, such an adult member or members are experiencing hunger (Bickel, Nord and Price, 2000).

Children in food insecure households are at significant higher risk of hunger than other children, and this risk rises sharply as the severity level of food insecurity experienced in the household rises. Food insecurity and hunger, as the term is often used, are conditions resulting from financial resource constraint. Hunger for example can occur in many situations, even when one is dieting or too busy to eat or even during fasting. Hunger in this aspect may be seen as a severe stage or level of food insecurity rather than a separate condition from the more general experience of food insecurity. In as much as this condition is associated with poverty, it is not the same thing as general inadequacy of income. Rather it is the condition of deprivation due to resource constraint in this specific area of need (Derrickson and Anderson, 1999).

Having sufficient quality food availability for household consumption depends on several factors. Production of food by households is one way of ensuring food sufficiency and a way of indicating that there is food within the home and at all times. Producing food to have varieties in homes and in the field requires access to resources such as, land, rain, knowledge, skills, tools, labour and others. Good roads and transport to markets are necessary for buying and selling food and other essential.

Food security is affected by complexity of factors. These factors inc1ude

i. Poverty.
ii. High food prices.
iii. Natural disaster (such as, flood, pest infestation etc).
iv. Gender inequality.
v. Inadequate education.
vi. Poor health.
vii. Unstable social and political environment that preclude sustainable economic growth.

viii. War and civil strife.

ix. Natural resource constraints.

x. Absence of good governance (IFPRI, 2002).

All these factors in one way or the other affect either insufficient natural food availability or insufficient access to food by households and individuals. Other factors include inaccessibility to market due to poor infrastructure and barriers in penetrating market caused by limited resource base, lack of information, lack or inadequate support institutions and poor polices in place. Poor infrastructure limits markets to which farm households can profitably take their produce, by increasing cost of transportation, hence stand as a barrier to penetrate (WPRI). The researcher in this study will compare findings as they relate to factors of low income households' food security.

2.6.1 Poverty level in Nigeria

Poverty is the chief cause of food insecurity that result when there is persistent lack of economic opportunity either to produce adequate food or to exchange labour for income to purchase adequate food. Some countries experience this type of poverty when there is unequal distribution of economic opportunity and benefits due to political exploitation or poor economic policies. Poor people lack access to sufficient resources to produce or buy quality food. Poverty affects the poor who may not have large farms, have access to more effective farming techniques, and/or be able to afford fertilizers and labour- saving equipment. These boost food production and lack of them may limit food production. The poor usually cannot grow enough food for themselves, let alone generating income by selling excess to others. Without economic resources, and political voice, poor farmers maybe forced onto less productive land which will further increase environmental deterioration. Poverty is a global issue and need to be discussed

globally in order to ensure that all people have sufficient food. Poverty describes the inability to attain a minimal standard of living. According to Ajiborisha (2001); in Emmanuel (2005), poverty is seen as the inability of a household to adequately satisfy basic needs of food, clothing, shelter, education, healthcare and others. The researcher therefore infers that household poverty is a process as well as a state of deprivation (Berdegne and Escobar, 2002), such that resolving poverty must involve resolving the processes leading to it.

Poverty is a problem that has pervaded African countries and Nigeria in particular. It is estimated that over two third of Nigerians live in poverty (Olaitan, Alli & Onyemachi, 2000). These people are unable to access enough resources for acquisition of basic things needed in life and this manifests in form of hunger, malnutrition, food insecurity and destitution among others. The World Food Summit secured international commitment in 1990, to reduce the number of undernourished people by half by the year 2015. Five years ago, increased number of people remains food insecure with about 800 million by 2000 (World Development report, 2000). A poor nation may increase its food production, national food self-sufficiency and economic growth to lift itself upward in the poverty ladder, but sections of its populace may remain food insecure because of other factors that affect their access to food (Akanji, 2002). Nigeria is one of the leading countries in Africa but is classified as food insecure due to high levels of poverty, low income earnings, inadequate nutrient intake, high rate of post harvest losses and so on. Uko-Aviomoh (2005) opined that if Nigeria is to be classified as food secured nation, Nigerians need economic access not mere physical availability in the market place. This implies that Nigerians need to see food, touch food and take physical possession through economic access. Nigerians should strive to raise per capita income levels and reduce poverty levels because these are the root cause of food insecurity in the nation. For food security to exist the majority must meet

minimum nutritional standards and that at all times, there must not be undesirable fluctuation in food security.

Information released by Federal Office of Statistics, National Census Survey (2004) highlighted the trends in poverty level in Nigeria from 1980-2000 as showed in table below:

Table 2.1: Poverty Level In Nigeria From 1980-2000

Year	**Poverty level (in percent)**	**Estimated Total Population (million)**	**Population under poverty (million)**
1980	28.1	65	17.7
1985	46.3	75	34.7
1992	42.7	91.5	39.2
1996	65.6	102.3	67.1
2000	75.8	112	79.2

Source: FAS, (2004).

The table showed a downward turn from 1980 to 2000, which indicates that if poverty is not checked, food security in Nigeria, will certainly get worse.

Food insecurity is synonymous with not knowing where the next meal the next day is going to come from. This was why Olayemi (1998) believed that there is a strong interrelationship between food insecurity and poverty. Survey carried out by FOS (2004), showed that poverty incidence in Nigeria increased from 65.5% in 1996 to 78.3% of the same year. Poverty reduction can be achieved if poverty status in Nigeria is determined. Bandabla (2005) stated that a credible measure of poverty and its determinants can be a powerful instrument for focusing the attention of policy makers on the living condition of the poor.

2.6.2 Influence of high food prices on low-income households

High food prices affect the poor most. FAO researched and examined that the impact of high food prices affect household welfare. Among the poor, it is the household, who are landless, whose income is low and the female-headed households that are most vulnerable to shape rises in basic food prices. The vulnerable (poor) suffer food insecurity most. The relative impact is not uniform all depends on a number of factors. The important thing is to what extend does households produce for their own consumption compared with what they buy in the marketplace (FAO, 2008). Their food security is dynamic and is influenced by myriads of factors. They live in a changing world that needs to be adopted by them if they must survive. A study by Adegbenga (2009) stated that the vulnerable struggles constantly in order to meet their daily needs. He made us to know that their daily needs are more than just food. Other vital non-food needs include shelter, clothing and health and these also compete with food needs. High food prices affect the poor most. FAO researched and examined that the impact of high food prices affect household welfare. Among the poor, it is the households who are landless, and female-headed households that are most vulnerable to sharp rises in basic food prices.

Household in this sense is defined as a net food buyer when the value of food staples it produces is less than the value of food staples it consumes (FAO, 2008). According to the FAO data from nine developing countries, about three quarters (3/4) of rural households are net food buyers. Poor households are regarded as net food buyers because they stand to lose from an increase in the price of food staple and this also depends in part on dietary patterns. This is not applicable to households that spend a large proportion of their income on imported foods such as wheat. This category is likely to surfer a decline in overall welfare. In contrast, households with land and those that derive some income from the production and sale of some staple foods that

are also traded internationally could benefit from the world food prices. What could stand as a problem may be high fuel price for transportation and farm inputs such as fertilizer etc (FAO, 2008).

A household may move from net buyer to net seller if there is an improvement in the change of mere production of food staples for home consumer to traded international staple foods. The ability to change also depends on the relative prices, access to land; resources and services needed to facilitate change. For example, access to market, lack of infrastructure and transportation, poor market information, inadequate and poorly enforced grades and standards and poor farmer organization for bulk marketing. Increase in household food prices vary among locations within countries or state. A study conducted still by FAO (2008), showed that the poorest households are hit hard by rising food prices in both urban and rural areas. This in one way affects their real income which at the same time harms both their current ability to cover basic needs and their prospects of escaping poverty. This situation may force households to sell their assets in other to offset or reduce their livelihood base on the number of meals they consume, or to reduce expenditure on essential non food items. For example, healthcare, education and others. The only thing that alleviates the situation is when a country or state have large share of their diet in local based staple foods such as sorghum, millet, rice, maize and so on as is applicable to these selected areas of study. If the price of these local staples also increases as demand for them grows, rising food prices would have a much stronger impact. Staple food prices also vary by gender. Female-headed households suffer more in welfare more than male headed households. The rural and female - headed households face considerable higher welfare loses in all countries including Nigeria. At the national level, female- headed households are more vulnerable to food price shock for two reasons. They tend to spend more on foods than

male- headed households hence they are hit harder by higher food prices. They face a variety of gender-specific obstacles that limit their ability to produce more food, thus to benefit from an increase in food prices. Among these constraints or obstacles are differences in access to inputs and services particularly land and credit (WHO, 2008).

2.6.3 Poor Human Resource Constraints on household food security

A poor human resource constraint is another important factor that hinges on food security. Rural roads and storage facilities are essential public goods that can help households to access goods from the market or sell their produce to generate income. Access to transportation and social service infrastructure is much lower for the poorest households of both the rural and urban population. Good infrastructure is essential for food security to ensure low food prices and efficient markets that can respond to changes in demand. Infrastructure reduces the costs of transporting produce and inputs (such as fertilizer), and food storage. It allows information transfer between producers and markets, and gives farmers access to new technologies (Ojo, 1991). Accessibility to market due to poor infrastructure and barriers in penetrating the market are caused by their limited resource base, lack of information, lack of or inadequate support institutions and poor policy in place. Poor infrastructure limits the markets which farm households can profitably take their produce by increasing the cost of transportation, hence stand as a barrier to penetration market (IFPRI, 2002).

2.6.4 Gender Inequality on household food security

Gender inequality, being the most profound, cut across other forms of inequality. Inequality generally manifest at varying levels of lack or poverty food insecurity (hunger) and so on. Gender inequality reinforces the structural dimension of poverty which has also been a concern in the measurement of poverty. Household's food insecurity is identified to be prevalent

among the vulnerable groups, children, women and the elderly (Okojie, 2002). The central role women play as producers of food, managers of natural resources, income earners and caretakers of household food security and nutrition have become increasingly recognized. Efforts have been directed towards eliminating the inequalities and constraints affecting women's productive role).

Women play vital role in providing food and nutrition for their families through their roles as food producers, processors, traders and income earners. Yet women's lower social and economic status limits their access to education, training, land ownership, decision making and credit and consequently their ability to improve their access to and use of food. Food and nutrition can be enhanced by improving women's knowledge of nutrition and food safety and prevention of illnesses. Increasing women's involvement in decision making and their access to land and credit will in turn improve food security as they invest in fertilizers and better seeds, labour-saving tools, irrigation and land care (FAO, 2010). Gender issues also affect the nutritional status of household members. Given the many task that women oversea, they are often overworked and unable to cope effectively with many activities expected of them. This in itself can put their health at risk. To reduce women burden, task must be distributed more equally among households.

In food crisis situation, women and girls are more likely to reduce their food intake as a coping strategy in favour of other household members (husband and boys). This situation can result to under nutrition among women and girls. Men and boys are traditionally favoured thereby are fed better than women and girls. In most cases, women faced constraints in accessing humanitarian services, including food, as a result of insecurity, cultural discrimination and limited mobility. While women remain the main caretakers of children and other dependants, with a household, women take additional activities to support household food security especially

in situations where male-heads of households are absent (Inter-Agency Standing Committee, 2005; The Sphere Project, 2004).

Women lack access to healthcare, education, land, property right, extension service and credit. For household to have impact of food security, a more equal distribution of existing resources and rights between men and women, as well as the provision of adequate education and training security on the household and individual level. The IFPRI (2007) noted that policies and cultural practices are things that marginalized people on the basis of gender, age, class, religion, ethnicities, race, and agro ecological logical contributes to food insecurity. In most countries and in Nigeria gender discrimination negatively affect production, household income, asset accumulation, food security and nutrition. Yet women play an enormous role in crop and livestock production throughout the world. If women are treated equally and given the same access to physical and human resources, this would help in an increase to production. This is important because women tend to devote a greater share of the resources they got for household food security and child nutrition. Also if there is an improvement in female education and women overall social status relative to that of men, child malnutrition will reduce significantly.

2.6.5 Poor Health effects on household food security

Hunger, poverty and disease are interlinked, with each contributing to the occurrence of the other two. Hunger reduces natural defenses against most diseases, and is the main risk factor for illness worldwide (UN; 2006). People living in poverty often cannot produce or buy enough food to eat and so are more susceptible to disease; and when sick they are less able to work or produce food. The United Nation Standing Committee on Nutrition (UNSCN) concluded that nutrition is an essential foundation for poverty alleviation, and also for meeting Millennium Development Goals (MDGs) related to improved education, gender equality, child mortality,

maternal health and disease (UNSCN 2004). Diseases such as malaria, HIV/AIDS, tuberculosis and infection continue to plague the African continent. This has not been sufficiently addressed. This kept on reducing the man-hours available to agriculture and household food acquisition. It also increases the burden of household in acquiring food (IFPRI, 2002).

In Nigeria and sub-Sahara Africa, AIDS is the leading cause of adult mortality and morbidity. According to FAO, it was estimated that by 2020, AIDS will claim the lives of 20 percent or more of people working in agriculture in many countries. Rosegrant (2005) noted that more than two thirds of the total population of 25 countries in Africa (which Nigeria is one of them) most affected resides in rural areas. This in effect will affect agricultural production as well as farm and domestic labour supplies. Lack of resources also makes it difficult for HIV affected households to supplement their diet through the purchase of more nutritious and varied foods. Inaction and poor health infrastructure to tackle HIV/AIDS has had devastating impact on food security since HIV/AIDS affects the most productive age group.

An inadequate dietary intake and disease lead to malnutrition which is often called hidden hunger afflicts more than 20 billion people with a devastating impact on health centers (IFPRI, 2007). In their research, IFPRI, (2007) observed that changing lifestyles of people are also creating new health problems including the appearance of hunger and obesity in the same household. They advise that resources such as food and water- safety issues affecting the poor need a lot more attention as food supply chains becomes more extended and; as access to safe drinking water remains a main public health issue for the poor. This is important as poor sanitation, health facilities and water source contribute significantly to malnutrition by increasing the burden of illnesses. It was also noted that more than I billion people lack access to safe

drinking water thereby increasing their exposure to bacteria and parasites (UN Task Force on Hunger, 2005).

2.6.6 Inadequate Education effect on household food security

Many other factors also affect food security. Factors such as access and rights to land, education, social exclusion all have big impacts on food security. Poor governance and corruption can affect hunger levels by disempowering vulnerable groups (such as women and children), and seriously undermine any policies in place.

2.7. Low-Income Households

Too many Nigerian workers need help feeding their families. For many workers, especially those with few skills and minimal education, wages are simply inadequate to keep the family out of poverty. Low-income households should not go hungry, and usually need not: they typically are eligible for government assistance in terms of food security, which provide a safety net for families which cannot earn enough to feed. In addition, states and the Federal Government have the opportunity to make changes that will enable more working families to receive the assistance they need, so no such families would go hungry. Low income is defined as 80 percent of the annual gross median income (Gregory and Pamela, 20050. Median household income in Nigeria should be eleven (11,200) thousand, that is 80% of N 18, this means a household is considered low income if its median income is N11, 000.00. Low income is as defined based on the share of income an average person or family devotes to food, clothing and shelter. Very low food security in a household means that at times during the year, food intake of one or more household members are reduced and normal eating patterns disrupted because the household lacks sufficient money and other resources (Mark, 2007).

Low income households globally and in Nigeria as a whole are struggling to meet the needs of the family members. They are always forced to make impossible choices among food, housing, health care and child care. The Federal government has been making promises to improve the welfare package of her staff. Each government that set in would want to make an impact with promises unfulfilled for many families. Majority of the low income households are parents who seek to balance work and family life, yet the entire households are more financially vulnerable than those in higher income families. They may have one parent who work as a permanent staff and the other parent as a part time worker. The low income households with at least one full time worker earn less than the middle income families. They are likely to receive fewer fringe benefits than the middle income families (Mark, 2007).

2.7.1 Characteristics of Low-Income Families

Low-income families are those parents whose income falls below the official poverty line. The low income families are parents with at least four children.. Researches carried out by USDA confirmed that low-income households with very low food security included disproportionately large shares of men ages 19-64 living alone, household headed by a labourer and households with adult members who were unemployed or elderly or disabled. Another study conducted in 1996 titled "Hardships in America: The Real Story of Working Families: (1996) revealed that forty - one percent of low-income families worried about affording or not having enough food, have food shortage, struggled to pay other bills, pay unexpected medical bills, or keep their children in good schools (Gregory and Nichols. 2005).

Low-income households select less expensive foods. They face higher food prices due to areas where they live, the type of market where they shop. Food prices in urban and rural areas where majority of the low income families live are higher than sub-urban areas Gregory and

Loprest, 2004). They noted that more than a quarter of full time heads of low income families are secondary school certificates. These family heads are significantly less likely to have any post secondary education than middle income family heads (Gregory et.al, 2004).

Poor health is more prevalent among workers in low income. Poor health may be limiting hours of work for these family heads particularly for those who are part time workers. Also they are likely to have children or a child in poor health (Gregory *et al.*. 2005). Low-income families are more of those from minority groups or non catchment areas. These groups of people may be native born and even living in the same area. Gregory and Pamela (2005) noted that low income family heads who are on full time work are single parents living alone. Also made up in this group who are married but living with other adults. In their research, they noted also that most low-income family heads working moderate hours are single parents. Most low-income families have two or more children than high or middle income families. This finding of Gregory, *et al.*, (2001) is due to calculation of income relative to the poverty threshold that takes into account the number of children in the family.

2.7.2 Job Characteristics of Low-income Families

Jobs held by heads of low-income families offer fewer benefits and have less regular hours of work. The proportion of vacation leave and sick leave among low-income families is smaller compared to middle or high income workers. For nursing mothers, their work schedule can reflect the quality or desirability of a job, especially in connection to ease of arranging childcare (Golden, 2005).

2.7.3. Difficulties that Confront Low-Income Families

There is no doubt that low income families experience difficulties in term of food and housing. A research carried out in 2002 on food and housing insecurity among high, middle and low- income families showed the incidence of food and housing insecurity for low income families (Golden, 2005; Ross, 2002). A family is "Food Insecure" if it reports cutting or skipping meals due to lack of money. Worrying that food would run out before it got money or to buy more, or running out of food and not having money to get more at any point in the prior 12 months. Similarly, a family is "housing insecure" if it reports there was a time in the prior 12 months when it was unable to pay rent utility bills in full due lack of money (Ross, 2002). Low income families experienced hardships relating to health and health care system. Before the introduction of health insurance scheme to government workers in Nigeria by former Head .of State Olusegun Obasanjo there was discrepancies. The high income workers were sent out of the country for medical care. Money was made available for this purpose. The low-income were not enjoying these privileges. Children in low-income households fare worse than children in higher-income household. For example, Vandivere, (2004) observed that among school-age children and adolescents, those living in low-income families with income below 200 percent of the poverty level are less likely to be highly engaged in school activities and more likely to exhibit levels of emotional and behavioural problems than children of high income families. Also, a greater proportion of low income children are in fair or poor health. Their children are likely to live in stressful home environments and with parents reporting symptoms of poor mental health (Golden, 2005).

2.7.4 Income Sources of Low-Income Families

The low-income families get most of their earnings from monthly earnings (Chase, 2003). Given to what they earn, most low- income families benefit from grants or loans either from their employee or any financial institution like banks. Others benefit from cooperatives within their work environment. Outside Nigeria, low income families benefit from several assistance programmes. For example, in United States of America, government public assistance programmes have their targets for the low income working families and their children with food stamps. Other programs include, women, infants and children nutrition programmes. Supplemental security income disability benefits housing programmes, public health insurance programmes and so on (Acs and Nicholas, 2005). The poorest are eligible to these programmes.

2.7.5 Expenditure Pattern of Low-Income Families

Generally speaking, income alone cannot fully capture the economic circumstances of low- income families considering their situations alongside their expenses. How much of their income goes toward meeting basic needs, and what is their spending pattern like? In essence, the income of the low- income families cannot fully meet their needs (Ross, 2005). It is well understood that low- income families are poor, and it is difficult to see how they can meet their basic expenses. Some families too have expenses that are more than average, for example, families in major urban areas like Abuja, Lagos, Portharcourt, and Kano and so on will likely have higher housing expenses than those in less developed areas.

2.8. Influence of Food Supply on Low-Income Families

Food security has been defined severally by many scholars, NGO's, organizations and so on. Anderson (1990) still affirmed the definition as the "access by all people at all times to enough food for an active, healthy life'. This means that every individual in any society is

entitled to have enough food that would sustain him in order to be useful to himself, his family and society throughout life. It also implied that at a minimum according to Anderson, food security should include:

i. The availability of nutritionally adequate and safe foods (that is the food available should contain all the essential nutrients and be prepared in a hygienic environment).
ii. The ability to acquire food in socially acceptable ways. This also means that food should be acquired properly not through struggling and stealing.

Lack of access to nutritionally adequate diet in a household can occur when there is chronic food insecurity that results to persistent insufficient food supplies to low income families. The insufficiency of food supply can lead to inadequate nutrition for all members of the family. When there is a temporal decline in access to adequate food due to instability in household food production as a result of low inputs, threat caused by water crisis (insufficiency and excess) low income family's food supply would also be affected. Hamilton *et al.*, (1997) reiterates that when the food supply or ability to acquire food becomes limited or uncertain, households are considered 'food insecure". Birch and Watcher (2008) reported that households who have very low food security are those their food intake were reduced and their eating patterns were disrupted at times during the year because they lack money and other resources for food. Hunger is known as the uneasy or painful sensation caused by lack of food. When a family is marked with food insecurity, that family or household members become anxious about their food supplies and begin to make adjustments in the type and amount of food purchased.

When households begin to skip meals or cut down on the amount of food they consumed, food insecurity with hunger occurs. This is, at a mild level of food insecurity with hunger. But at moderate level of hunger, adult household members experience hunger. At most severe level of

hunger, children are most affected (Birch and Wachter, 2008). Food insecurity occurs when the household food supplies of nutritious and non- nutritious food declines. The nutritious foods are those of vegetables and fruits, beef, fish and whole wheat food products, legumes and so on. While the non-nutritious are beverages, cookies, chips, foods high in chocolate flavouring, cereals, starch, tubers and so on (Kaiser *et al.*, 2003). For example, study by Lucia *et al.*, (2004) found that limited supply of foods in the household is corrected with lower child intake of those foods. They also found out that the number of different vegetables available in the household was significantly correlated with pre- school children daily intake of vegetables. Based on their findings, they suggested that though parents may attempt to shield young children from hunger, pre-school children food patterns are affected by changes in the food supply. These changes may have important implications not only for current health status but for the children to develop a long- term good eating habit. Therefore role modeling and repeated exposure to new foods is necessary to help children develop a preference of those foods. The only problem that may reduce opportunities to learn to enjoy a variety of foods would be when there are limited household supplies of fruits and vegetables.

Food price has great influence on food supply and demand of low income families. When prices are low, farmers have less revenue from their produce. If prices drop too low, farmers farming may not sell at all and could be discouraged from farming. This indicates that lower prices represent increase in the purchasing power of the consumer. Lowering the price of some common staple foods like wheat, maize, cassava, rice and so on, is equivalent to raising the income of all those that purchase this food. Similarly, raising the prices of these foods is equivalent to lowering the income of those who purchase them. This implies that at low food prices, consumers can afford more food. Government in this instance has role to play in order to

satisfy the needs of both producers and consumers. One way of doing this is to stabilize food price by ensuring farmers income from produce and sale at Government determined price (FAO, 2003).

Lack of access to nutritionally adequate diet in a household can take various forms. This for example occurs when there is chronic food insecurity that results to persistent insufficient food supplies to low- income families. Insufficiency of food supply can lead to inadequate nutrition for all members of the family. Another form is when there is temporary decline in access to adequate food because of instability in food production, food prices and income. For example drought can be a cause of this form. Global warming has effect on changing patterns of soil moisture which could turn parts of the most productive farmland into acidity (Agricultural zones with low available soil moisture for sustainable crop production). For example, from 1981 there had been an annual yield loss of about N815billion for major cereal crops in the world resulting from increased daily air temperatures and reduced rainfall amounts (FAO, 2003). Therefore, drought could result in moisture insufficiency, crop failure and yield reduction. Also climate change could result in surplus rain water over a period that erstwhile had little rainfall. This could compel insecticide and fungicides sprays on the crops over a longer period that could leave active ingredients of the agro-chemical in the seeds to poison the produce for safe consumption by humans. In all these the low income earners would be disadvantaged and global warming could therefore most adversely affect food supply of the low- income families.

2.9. Strategies Adopted to Alleviate Household Food Insecurity in Nigeria

In Nigeria, various strategies have been evolved to minimize the problems of food insecurity among households in Nigeria. Babatunde *et al.,* (2007) reiterated the effort made by World Food Summit of (1996) by channeling resources towards programmes at eradicating food

insecurity and poverty by various international organizations and government of developing countries.

2.9.1 Family's strategies for household food security adopted in Nigeria include:

There are several strategies adopted for agricultural development in Nigeria in the past 30 years. These strategies have not been consistent due to various changes in government and trends in government revenues.

Strategies adopted after the civil war were:

i. Green Revolution from 1976-1979.
ii. Operation feed the nation from 1979-1983.

These strategies were embarked on immediately after the war due to large increase in revenues from oil exports. The Federal Government embarked on massive intervention in agricultural production. During this period, many agricultural development institutions, special programmes and projects were launched. Also, the Nigerian Agricultural Bank was established and special Agricultural credit scheme was launched to ensure a free flow of credit to the agricultural sector. There was the implementation of National Accelerated Food Production Programme, the Integrated Agricultural Development Projects; National Seed Services and the Re-Organization of the Commodity Boards. Also, the Federal Government took over the procurement and distribution of fertilizers, launched ambitions input subsidy schemes and guaranteed minimum price schemes of grains (Ukeje, 2004).

Structural Adjustment Programmes (SAP) came up in 1986. The objective of SAP was to reverse the trend in agricultural production and increase the availability of food to the Nigerian at reasonable price and increase farm incomes and agricultural materials to industries. From 1993-1997 was the period when removal of fertilizer subsidy and the re-introduction of fertilizer later

came up. The importation of day old chicks and parent stock were banned and later un-banned. Increased funding was provided for research institutes and universities of agriculture. Food security programme was launched in 2001. The programme includes the modernization of agricultural production, processing, storage and distribution. To further ensure food security, the Federal Government of Nigeria embarked on Presidential Initiatives on rice, cassava and vegetable oil production, processing and export. The initiatives were aimed at producing about 15 million tons of milled rice by 2007 (Ukeje, 2004).

The Agriculture Nutrition Advantage Project (NAAP) in Nigeria is a programme designed to device an effective mechanism for promoting strong linkages among agriculture and nutrition. Agenda was for the improvement of household food security and a reduction in malnutrition on a substantial basis (Amuwah, *et al.,* 2005). In other part of the world there are national strategies adopted, for example in Brazil, the Federal Organic Law on Food and Nutritional Security (LOSAN) implements the national system of food and nutrition security which brings a number of polices that aims at combating hunger. Others include polices designed to support family agriculture, improve access to food and water for those in need to feed the nation in rural areas (Olivier. 2009). World Food Security Organization had adopted several strategies in improving household food security. Nigeria is not left alone in these principles and policies in order to help its citizenry. The situation of' a nations' citizenry not having adequate food to sustain its large population is an issue that need to be addressed promptly. Food is essential to all human beings for survival. In essence a country or nation that does not have enough food so that her people can make choices is said to be food insecure. In other world, a nation should increase access to food so that the hungry would get enough to meet their nutritional needs. Nigeria saw the need for food just as other countries and adopted principles

and polices to alleviate food insecurity in the country. This need took an important dimension because the basic nutrients in diets are all necessary for proper functioning of the body. The level of food consumption and nutrition in tropical Africa are known to be generally low. There are increasing rates of population growth, war conflicts and drought coupled with reduction of annual increases in food production in tropical Africa (Ukpore, 2004). With these problems, tropical African is not able to feed her increasing population. They need enough food to relief hunger as well as build and maintain healthy bodies in order to attain a better living condition (Ahwovoriele and Ochonogor, 2009).

Household food security becomes a threat where there are no local food production resources available for family members to lay hands on, couple with inadequate food assistance to help low- income working families' food at retail markets. That is, social, institutional and economic factors within a community or household can contribute or influence the quality and quantity of available food and their affordability (USDA. 2002). Other factors such as inadequate transportation system, inadequate market information and seasonal crops can also affect food security in low-income households. National Planning Commission (NPC) (2002) observed that major problem low-income workings families are facing in Nigeria are inadequate food storage facilities. These groups of people are not able to store their crops due to poor storage facility. Crops such as maize, millet, sorghum and legumes are most affected. According to them, losses due to poor storage are estimated in the range of 25% to 30% for root crops, while fruits and vegetables are put at 50% to 70%.

2.10 Empirical Studies

A study by Obamino, *et al.,* (2003) on food security, identified three major factors affecting food security. They are food availability, accessibility and utilization/nutritional status.

The major objective of study is Pillar of food security in rural areas of Nigeria". The specific objectives were: to identify food secured and food insecure households using basic calorie required approach: and to determine if one farm household belongs to either food secured or food insecure, They used multistage (sampling in stages) stratified random sampling procedure to obtain a sample size of 150 households. This procedure involved four stages. At the first stage, Ogun State was randomly selected out of the 36 states in Nigeria. At the second stage, proportionality factor of 25 was introduced to derive the number of study villages in the state. At the third stage a household list in the selected villages was obtained from the agricultural development project. Proportionality factor was also used to select the number of respondent households from each village such that the number of respondent households from each village will be proportional to the number of household in the village. The formula used was:

P = n/N

Where,

P = the number of households to be sampled from a village.

n = the number of households in the village.

N = the sum of the number of households in all the 32 villages selected

* = total number of desired households to be selected for the study

Findings indicated that food security was more than the issue of production alone. That the 3 pillars; availability, accessibility and utilization were required to achieve success in terms of food security. This study will adopt the multistage random sampling to select Kaduna State as one of the 36 States in Nigeria. The study will use purposive sampling technique to select institutions in the States. Household lists from the selected institutions will be used. The number of respondent's households from each institution will be selected using simple random selection

(table) such that the number of respondent's household from each institution will be proportional to the number of households in the departments. Obamino's study is similar to the present study in the area of assessing the three pillars of food security which is an aspect of the study. Their study is also a comparative study between food secured and insecure households using basic caloric requirement, while the present study is focused on the relationship between food security, nutritional study and poverty alleviation among low-income households of tertiary institutions.

Omonona, and Adetokumbo (2007), analyzed food security situation among Nigerian urban households: using Lagos state as the study area. The objectives of their research were to determine the food security situation among urban households in Nigeria; and, to determine the food security incidence among urban areas of Lagos state. The researchers used two groups of factors to determine food security in Nigeria. The factors included the supply side factor and the demand side factors. The supply side factor considered food availability which determined the physical access of food at national household and intra- household levels. While the demand side factor determines the degree of access of countries, households and individuals to available food. This factor determined the economic access to food. They employed the use of structured questionnaire to collect their data. A proportionate method of analysis was used to select the number of household in each locality. Tables and percentages were used to classify the socio-economic characteristics of household members. The percentages were used to represent the proportion of food secure and food insecure household populations while, the tables were used to represent all information about respondents, food insecurity incidence and the different results analysis. They also used food security index to classified food secure and food insecure households. Findings showed food insecurity incidences in the following situations:

i. Socio-economic characteristics of household.

ii. Higher when household heads were within the range of 6l-70yrs.

iii. Higher in female headed households than male headed households

iv. Decreased with increase in level of education.

v. Relatively low for those engaged in professional occupation and higher for traders.

vi. Increased in household size.

vii. Decline as income increased for low income group.

Viii Increase in dependency ratio.

All the methods used in Omonona *et al.*, (2007) study were adequate. This present study adopted almost all and in addition used reference standard to compare the anthropometric measurement for children and adults' body mass index. Random selection was used to select the number of household.

In another study titled "Strategies for enhancing food security among low - income household in Ebony State by Igba (2009), had a population of 400 home makers who were mainly low - income households. The objectives of the study were: to determine ways- the households, government and Home Economist Extension Services would adopt in order to enhance food security among low-income households. A multistage sampling technique was adopted to select the sample size. A disproportionate stratified sampling technique was employed in the first stage to select household. The second stage adopted purposive sampling technique while random sampling was used to select household for the study. The instrument used was questionnaire. For data analysis the study used mean, standard deviation, frequency and percentages. Student's t-test was used to test null hypotheses at $P>0.05$ level of significance. The instrument and sampling techniques used were appropriate. Findings of the research indicated that strategies such as: home gardening, nutrition education at household level, provision of good

road network in rural areas, provision of electricity and water supply among others were what households, governments, and home economist extension services should do to enhance food security in Ebony state. The present study is similar to the present study in design, sampling techniques, instrument and statistical tools adopted. Igba used low-income families in the village whereas this present study used federal tertiary institutions for her study.

Towards improving food availability among low-income household is another study conducted in Ebony state Igba (2009). The study focused on food availability among low-income household in Ebony state. Specifically the study aimed at finding out how much food is available in the area, what might militate against the availability of food and how to improve or enhance food availability. Low- income households were the focus. The study used 400 home makers as its sample size and they were randomly selected. The study also adopted the use of questionnaire for data collection. The households were randomly selected. Mean and t-test were also used to test the null hypotheses. The study revealed that home gardening, nutrition education at household level, provision of good road network in rural areas, provision of electricity, water and other were strategies that can enhance food security among low income household. This present work has similar approaches and would adopt some of the findings from his study to suggest improvements in terms of recommendations for poverty alleviation strategy.

Factor influencing food security status of rural farming households in North Central Nigeria was a study carried out by Babatunde, *et al.*, (2007). The study used a three stage random sampling technique to obtain a sample of 94 farm households and a cross sectional data in 2005. The 94 farm households were from four Local Government Areas in Kwara state. A survey research design method was used to gather general information about household's characteristics, food consumption and expenditure and non- food consumption and expenditure.

Two stages of analysis were carried out. The first stage was food security index. This was used to determine the food security status of each household based on the food security line using the recommended daily calorie required approach. In the second stage, the study adopted logic regression model to estimate the food security status of households as a function of set of independent determinants. That is, a household whose daily per capita calorie intake was up to 2260Kcal was regarded as food secure and those below 2260 Kcal were regarded as food insecure households.

The results showed that the model (Logic regression) predicted the food security status of farm households with 86.3% accurate. The model was also adequate in explaining the determinants of' the food security status of farm households. The present study adopted random sampling technique to select household members and survey research method was used to collect information from household members. The study did not use logic regression model and food security index to determine food security status of households. The study employed descriptive methods of analysis to obtain it results.

A study on assessment of nutritional status of school age children in public and private primary schools in Zaria metropolis was carried out by Chielo (2011). The objectives of the study were: to investigate the feeding habits of school age children from public and private schools. It was also to examine through anthropometric measurements, the nutritional status of school age children, and to compare the nutritional status of the population using WHO reference standard. The research involved 62 pupils from public and 62 pupils from private schools. A purposive sampling technique was used to select the sample size. Anthropometric questionnaire and anthropometric indicators and twenty-four hours dietary recall questionnaire were used in data selection. Frequencies and percentage tables were used to analyze the data.

Findings showed that pupils from private primary schools were well fed, taller and heavier than the public primary school pupils. Findings indicated that their anthropometric measurements compared favourably with WHO reference standard, indicating that pupils from private primary schools in Zaria had good nutritional status. There were also clear differences between the private and public primary schools pupils in Zaria in terms of their feeding habits and nutritional status. Chielo's study is relatively similar with the present study except that it focused more on primary school pupils. The present study adopted the use of anthropometric measurements to establish household's nutritional status of both children and adults.

Maziya- Dixon et al (2001-2003) carried out a survey on Nigerian food consumption and nutrition in all the 36 states and Federal Capital Territory Abuja. The study used survey design to determine nature and extent of food security, food and nutrient intakes through questionnaire: anthropometric and biochemical parameters were collected and used to determine the nutritional status of women and children in rural and urban populations in Nigeria. Random sampling was used to select twelve states representing one third of the states in Nigeria. The survey study selected a total of 6480 households; 72 Local Government Areas, 216 enumeration areas, and 30 households from each enumeration areas. A sub- sample of 1080 pregnant women was also selected. The questionnaire had several sections which included; demographic information of households, socio- economic characteristics of households, food security status, 24-hr dietary recall, health status and care, anthropometry and biochemical measurements.

Findings showed that, staple foods and non- staple foods were available all around; severe food insecurity was found in over 40% of all households in the zones across the country; there were differences in the pattern of food consumption; nationally, about 42% of children in the study were stunted, 10% were wasted, while 25% were underweight. The present study

adopted some of Maxiya-Dizson, *et al.*, (2001-2003); such as survey design, random sampling method, twenty-four hours recall and anthropometric measurements to obtain data. However the study did not use biochemical parameter to assess households. Also their results were used to compare the results obtained in this study and to suggest ways low-income families would adopt in order to help in improving their livelihood hence their nutritional status.

Ike (2008) carried out a case study of the nutritional status of children of low income families in Samara village and Ahmadu Bello University Zaria using 310 pre-school children from low income staff families. A purposive sampling method was used to select 145 under five children who were sampled from 170 Intermediate and Junior Staff families that had children below 5years old. The instrument for data collection was a questionnaire that consisted of the child's bio-data, anthropometric measurement that records the height, weight, head and arm, and chest circumferences. Other measurements were dietary recall chart and space for recording clinical signs observed on each child. Percentages were used to analyze the personal data and dietary history of the respondents, while percentile ranking was used to compare the anthropometric samples and graphs were used to show the relationship while observations were used to tabulate nutrition and clinical signs of these children. Finding indicated that the nutritional status of children with parents in Ahmadu Bello University Staff quarters compared favourably using the world standard with those families outside the university environment. The present study is also being carried out in institutions of higher learning using parameters such as anthropometric and 24 hours recall dietary intake to determine nutritional status of households as influenced by the national food security programme. In addition, the present study would be able to provide information on food security in households and impetus for further studies of food security in Home Management.

2.11 Summary of Reviewed Literature

The chapter reviewed literatures that were related to relationship between food security, nutritional status and poverty alleviations of low-income households with specific examples from Federal tertiary institutions of Kaduna State, Nigeria. There view briefly discussed the; theoretical and conceptual frameworks of food security, the three elements of food security at household level, nutritional status of low-income household members in Nigeria, factors that affect household food security, nutritional status and poverty alleviations, the low-income households, influence of food supply on low-income, national strategies adopted by low-income household families in Nigeria and the empirical studies on food security, nutritional status and poverty alleviation of low-income households.

The review asserted that the most important shift was from food availability at macro-level to income at micro-level. However, relationships between micro-level relationship availability and income of low-income earners; in particular at the selected Federal tertiary institutions had not been evaluated. This present study therefore attempted to fill the gap of information on the link between income and food availability of low income earner households in selected Federal tertiary institutions in Kaduna state.

Also, the review showed that importance of food access is the individual's ability to generate income; which together with their own production can be used to meet food needs. It therefore failed to link income of low-income earners to their potential for engaging in other production activities to mitigate food access limitations that were addressed in the current study.

The review confirmed that food utilization requires not only adequate diet, but also a healthy physical environment; including safe drinking water and adequate sanitary facilities, understanding of proper healthcare, food preparation and storage processes. All these would

result into a healthy populace. However, the reviewed related literature fell short of evaluating utilization of any particular type of food required by households. This study therefore provided information on the body use of food consumed by households in terms of their nutritional status and the health status against their income.

The above missing gaps called for this study by the researcher to further assess the relationship between food security, nutritional status and poverty alleviation coping strategies adopted in effort to improve the low-income households living conditions.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter involved research design and methodologies employed for investigating the relationship between food security, nutritional status and poverty alleviations among low income households in Federal Tertiary Institutions of Kaduna state. The chapter was discussed under the following sub-headings.

3.1 Research Design

3.2 Population for the Study

3.3 Sample Size and Sampling Procedure

3.4 Instrument for Data Collection

3.4.1 Validity of the Instrument

3.4.2 Pilot Study

3.4.3 Reliability of the Instrument

3.5 Procedure for Data Collection

3.6 Techniques for Data Analysis

3.1. Research Design

Research design is a plan or blue prints of the research adopted to gather data in order to answer the research questions (Ajayi, 2000). A descriptive survey design was used to obtain data in this study. Descriptive survey method is suitable to the study because it involves a systematic collection of data or information from a population or a sample of the population through the use of questionnaire, interview as recommended by (Afolabi, 1993; Ajayi and Bello, 2000). Therefore descriptive research approach was adopted by the researcher to collect data because it involves collection and analysis of large data and information through questionnaire and interviews.

3.2. Population for the Study

Population for the study consists of individuals being studied in an inference procedure and can be large in size (Taylor, 2014). Population for the study however consists of low-income families in seven (7) Federal Tertiary Institutions in Kaduna State shown in Table 3.1. Total population of the household was 1552

Table 3.1: Population of the study area

S/NO	Institutions	Male	Female	Population *
1.	College of Agriculture Samaru, A.B.U., Zaria	320	10	336
2.	Chemical and Leather Technology (CHELTEC), Zaria	164	2	166
3.	Federal College of Education Kongo (FCE) Zaria	261	7	268
4.	Federal Polytechnic, Kaduna	297	12	309
5.	Nigeria College of Aviation Technology, Zaria	192	6	198
6.	National Institute for Transport Technology (NITT), Zaria	86	4	90
7.	National Research Institute for Chemical Technology (NARICT)	178	7	185
	Total	1480	54	1552

* Source

3.3. Sample Size and Sampling Procedure.

The sample size was 232 households using multistage sampling technique. This study used multistage stratified random sampling for a population of 1552 to select sample size of 232 households.

At first stage, Kaduna State was purposively selected out of the 36 states in Nigeria. Sampath (2005) recommended multistage sampling method for selection of sample size. He stated that with multistage sampling technique, the researcher can breakdown his groups and sub groups into smaller groups until he reaches desired size to work with as the target area for the researcher was Federal tertiary institution. Also multistage sampling method has no restrictions on how a researcher divides the population into groups but allows a large number of possibilities for conveniences. Obamino, *et a.*, (2003), and lgba (2009), used this method in their studies of food security and nutritional status respectively. These are related to the present study.

At the second stage, purposive sampling technique was used to select seven institutions; namely, Federal College of Education Zaria, Samaru College of Agriculture, Ahmadu Bello University, Zaria, Federal Polytechnic, Kaduna, Nigeria College of Aviation Zaria, National Institute for Transport Technology (NITT), Zaria, and National Research Institute for Chemical Technology, Zaria. The institutions were chosen because they are federally sponsored; hence salary structure for staff member across them was uniform. This uniformity in salary scale homogenizes the institutions for purposes of data handling and accuracy of interpretations. Nwogu (2006) stated that purposive sampling technique could be used when specific elements that satisfy pre-determined selected criteria are to be used. These selected criteria were usually the researcher's judgment which is representative of chosen population. Based on this, low income households in the institutions were selected using multistage sampling technique and based on interest and willingness of respondents to take part in the exercise as recommended (Eckhardt *et al.*, 2003).

In the third stage, the number of respondents' households from each institution was selected using proportionality sampling of method of 15% to select, 50, 25, 40, 46, 29, 14, 28

household heads respectively giving a total of 232 households for the study (Ajayi *et al.*, 2000). These households were also selected based on their income level. Selected sample size data were 219 household heads and 510 other family members to make up the number of six members from a family for the anthropometric data collection which gave a total of 729 households (Omobude Idiado and Konwea, 2009). The sample area which includes the low-income households in the selected institutions in Kaduna State of Nigeria was sampled from each department/programme of the institutions.

Table 3.2: Sample Size For The Study

Institutions	* Population	Male	Female	Sample Size of Households (15%×1552)
Samaru College of Agriculture, A.B.U., Zaria	336	320	10	50
Chemical and Leather Technology, (CHELTECH), Zaria	166	164	2	25
Federal College of Education (FCE) Kongo, Zaria	268	261	7	40
Federal Polyechnic, Kaduna	309	297	12	46
Nigerian College of Aviation	198	192	6	29
National Institute for Transport Technology, Zaria	90	86	4	14
National Research Institute for Chemical Technology, Zaria	185	178	7	28
Total	* 1552	1480	54	232

*** Source,(2012)**

3.4. Instrument for Data Collection

A structured questionnaire was used to obtain data. Questions were drawn based on the objectives, research questions and null hypotheses of the study. Statements having to do with food security, nutritional status and poverty alleviation of low-income households were contained in the questionnaire.

Instrument for data collection consisted of the following:

i. **Structured questionnaire**: Structured questionnaire based on the objectives, research questions, null hypotheses and related literature were used for data collection.

ii. **Personal interview:** Personal interview was employed for data collection among low-income households who were not literate enough to respond directly to questions contained in the questionnaire and to individuals who were directly responsible in food preparations. The questionnaire was organized into sections namely;

Section A considers the personal/social information of respondents. This section was important in order to collect personal and social information of the respondents for analysis. The section contained seven questions. It contained household head age, marital status, household composition, sex of household heads, educational level, household size and estimated monthly income.

Section B asked questions on food security at household level. The section addressed issues of household food availability, accessibility and consumption pattern. The section was subdivided into two. Food availability contained two questions, food accessibility contained one question and consumption pattern of household members contained only one question. This section addressed questions contained in research question one.

Section C assesses nutritional status of household members which included the anthropometric measurements and food frequency questionnaire dietary intake. The nutritional status had questions (a- g). Research questions two and five addressed issues in this section.

Section D is on healthcare and environment. The section was used to find out the health and environmental conditions of the respondents. Research question four addresses issues in this section. The section contained two questions.

Section E is on poverty alleviation coping strategies by household in response to food security. Research questions three answered questions in this section.

Structured close- ended questionnaire was used to obtain responses for easy collation and tabulation as recommended by Fowler (1995).

iii. **Anthropometric Measurement:** Anthropometric tools used for height and weight measurements were calibrated bathroom scales; these were used to assess the body mass index (BMI) of household members. Mid-Upper-Arm-Circumference (MUAC) insertion tape and skin fold caliper were used to assess body thickness.

iv. **Food Frequency Dietary Intake:** This instrument required that the researcher obtain information from respondents on previous days food intake through food list taken daily, twice daily, thrice daily, weekly and monthly. It contained times food was consumed, food types, forms of food prepared, ingredients used, quantities of foods and sources of food for preparation.

3.4.1. Validity of Instrument

The questionnaire and interviews were validated by three experts from Home Economics Section of Vocational and Technical Education Department, Ahmadu Bello University, Zaria, to

upgrade quality of the questionnaire to aid valid data collection. In order to further validate the content, competence and professional of participating team in the field, Agricultural Economist from Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University, Zaria and a Nutritionist from Ahmadu Bello University Teaching Hospital (ABUTH), Shika - Zaria examined the items to judge their appropriateness for measurement and statistical analysis. The experts' contributions and a statistician were used to validate questions in the questionnaire after which the final draft questionnaire was produced and administered.

3.4.2. Pilot Study

Pilot study was carried out to test the instrument for the study. Twenty (20) low-income households from Federal College of Education, Kastina were used to pilot-test the instrument. Federal College of Education, Katsina was chosen because it has the same characteristics such as that with the institutions under study, which is a Federal government establishment and has the same salary scale. The set of questionnaire was administered on twenty low-income household members. Questionnaire administration and data collection lasted over a period of five days. The results obtained (No. of items - 111,

Mean - 3.145, Minimum - 3.000 Maximum -3.250, Range - 250, Maximum/Minimum - 1.083 showed that the respondent low-income households were relatively food secured in availability, but accessibility and consumption pattern were inadequate.

3.4.3. Reliability of The Instrument

Data collected from the pilot study, were statistically analyzed to get reliability co-efficient using Cronbach reliability co-efficient method. Statistical Programme for Social Science (SPSS) was used to calculate the Cronbach reliability co-efficient, alpha. A Cronbach's reliability co-efficient level of 0.98 for internal consistency was obtained

3.5. Procedure for Data Collection

A letter of introduction from the Department of Vocational and Technical Education was attached on the questionnaire introducing the researcher in order to obtain permission to administer her questionnaire to respondents. The researcher personally administered letters collected from the Head of Department of Vocational and Technical Education, Faculty of Education, Ahmadu Bello University, Zaria to the institutions concerned. In addition, a sample of the questionnaire to the institutions' administrators was attached to the letter. In the letter, the purpose of the study was indicated.

The instrument was administered to low-income respondents in Samaru College of Agriculture, DAC-ABU, Zaria-Nigeria; Institute for Leather Technology, Zaria, Federal College of Education, Zaria, and National Research Institute for Chemical Technology, Zaria, Federal Polytechnic Kaduna, Nigeria College of Aviation Technology, Zaria, National Institute for Transport Technology, Zaria and National Research Institute for Chemical Technology, Zaria. The medical personnel's were trained on how to take measurement of skin fold using caliper and mid-upper-arm circumference with insertion tapes. They were trained on how to take accurate weight and height of individuals with the use of scale and tape for body mass index. The enumerators and social workers were trained on how to interpret questions in the questionnaire to low-income household who are not literate to read and understand the contents.

Weights of the respondents were taken using a portable platform Camry scale and the weighing machine floor type model. The height was measured with a metal rule while skin fold measurements were obtained on the mid-line of the anterior (front) surface of the arm with a caliper. Mid-Upper-Arm-Circumference (MUAC) was measured using a flexible tape. Trained medical personnel used standard techniques to take measurements of skin fold and mid-upper-

arm circumference. The Body Mass Index (BMI) was calculated from the height and weight measurements using kg ÷ ht ($m^{2)}$. That is weight in (kg) ÷ height (m^2). The twenty-four-hours recall dietary intake was used to collect information on food previously consumed by household.

Completed instrument was retrieved same day after the respondents have completed their questionnaire and anthropometric measurements were taken. Completion of questionnaire and anthropometric measurements took about three months.

3.6. Procedure for Data Analysis

Descriptive statistics such as, frequencies, percentages, bar and pie chart were used to describe the socio-demographic characteristics of respondents, the anthropometric and food frequency questionnaire dietary intakes in sections A and C. This was used because they involved quantitative analysis of data; and because the data for anthropometric and food frequency questionnaire dietary intake were large.

Statistical Package for the Social Sciences (SPSS) 17^{th} version was used to test null hypotheses at $P<0.005$ level of significance. Mean and standard deviation were used to compute food security status, nutritional status and poverty alleviation strategies. A 5-point, 7-point and 4-points Likert scale measurements were used to assess food security status at household level; where; 5- very adequate, 4- adequate, 3- moderately adequate, 2- fairly adequate, and 0- not adequate for food adequacy; 7- point scale where; 7- daily, 6- twice daily, 5- thrice daily, 4- once daily, 3- twice weekly, 2- thrice weekly and 1- once a month for their food accessibility pattern and 4 point scale where; 4- most often, 3- often, 2- sometimes and 1- occasionally for consumption pattern of low-income households. The decision rules were, 3 for food adequacy; 4 for food accessibility and 2.5 for consumption pattern.

Pearson Product Moment of Correlation was used to test five hypotheses that involved two or more variables. The variables determined included:

i. Food accessibility and nutritional status.
ii. Consumption pattern of food and nutritional status.
iii. Anthropometric measurements and nutritional status
iv. Environments and health conditions and nutritional status
v. Food security and nutritional status of low-income households in the study area.
vi. Regression analysis was used to analyze the food security and poverty alleviation coping strategies of low-income households. The food security is a dependent variable and is a computed quantitative variable while poverty alleviation coping strategies (independent variable) are nominal frequency variable. Therefore to find the relationship between the two, the choice of regression analysis was used.

Analysis of variance was used to test income and nutritional status of low-income households of the institutions. The nutritional status was viewed by one factor variable and income levels of respondents were categorized into six income groups therefore appropriate to use one-way analysis of variance to determine differences in nutritional status. In comparing the two variables, Post Hoc Multiple Comparison was employed using LSD Pair Wise method in order to get the least significant difference and because it involved ANOVA.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

Detailed presentation of results and their discussion were dwelt upon in this chapter to show findings among food security, nutritional status and poverty alleviation coping strategies of low income households in Federal Tertiary Institutions, Kaduna state. Data for this study was obtained from 219 out of the 232 sampled respondents; representing 95.2% response.

The analysis is presented under the following sub headings:

4.1. Analysis of demographic factors: The first section presents frequencies and distribution of bio-data variables which includes the respondent's age, marital status, household composition, sex of household heads, educational qualification, household size, and monthly income.

4.2. Answers to research questions: The second section present answers to six research questions.

4.3. Testing of null hypotheses: Third section test and interprets results of six null hypotheses. Pearson Product Moment Correlation was used to test the first, second, fourth and fifth hypotheses, while Regression Analysis was used to test hypotheses three and four. Analysis of variance was used to test the last hypothesis. All the hypotheses were tested at 0.005 alpha level of confidence ($P<0.005$).

4.4. Discussion of Major Findings

4.5. Summary of Major Findings

4.1 Analysis of Demographic Factors Variables of Respondents

The demographic factor data was carried out in order to gather personal information on the low-income households of selected Federal Tertiary Institutions of Kaduna State. Tables 4.1.1 to 4.1.7 contained information on the respondents

Table 4.1.1: Distribution Of Households Head According To Institution Place Of Work

Institute of work	Frequency	Percent	Cumulative
DAC, ABU, ZARIA	56	25.6	56
CHELTECH ZARIA	16	7.3	72
FCE ZARIA	49	22.4	121
FED POLY KAD	52	23.7	173
AVIATION	20	9.1	193
NITT ZARIA	7	3.2	200
NARICT ZARIA	19	8.7	219
Total	219	100.0	

Table one showed the respondents' place of work. Accordingly, DAC/ ABU, Zaria 56(25.6%), Federal Polytechnic Kaduna 52 (23.7%), FCE, Zaria 49 (22.4%), National College of Aviation 20(9.1%), NARICT, Zaria 19 (8.7%) CHELTEC Zaria, 16 (7.3%); and, NITT, 7 (3.2%). This implies that DAC/ABU Zaria had the highest respondent's representation while NITT Zaria had the least respondent representation

Table 4.1.2: Distribution Of Household Heads According To Age

(CI=10)	Frequency	Percent	Cumulative Frequency
20-35yrs	51	23.3	51
36-45yrs	71	32.4	122
46-55yrs	70	32.0	192
56-65yrs	11	5.0	203
66yrs and Above	16	7.3	219
Total	219	100	

The ages of respondents in Table 4.1.2 showed that ages 36-45 years is in the age bracket of 70 (32%) followed by 46-55years with 70(32.4%), others includes 20-35 years which had 51 (23.3%) respondents, while 66years and above 16 (7.3%) and the least while 11 (5.0%) were between ages 56-60 years. This showed that respondents were largely in the age brackets of between 36 – 45 years and 46 – 55 years in the Federal Tertiary Institutions of Kaduna state. This showed that ages 36 – 45 years and ages 46 – 55 years were the majority of the low income households in the selected tertiary institutions in Kaduna state. As majority of the house heads were between ages 20 and 55, which is 87.7% of the sample. Thus, majority (32.4%) of the respondents were of child bearing age meaning they were still capable of being in the community work force

Table 4.1.3: Distribution Of Households According To Number Of Adults

Number of Adults (CI=4)	Frequency	Percent	Cumulative Frequency
1-4	102	46.6	102
5-8	79	36.1	181
9-12	25	11.4	206
Above 12	13	5.9	219
Total	219	100	

The study population of adult household composition (Table 4.1.3) revealed that 102 of them representing 46.6% had between 1 – 4 adults household members, while 79 (36.1%) had between 5-8 adult household members. Another 25 (11.4%) had 9-12 household adults, while the rest 13 (5.9%) had above 12 adults household members. That majority (53.4%) of the respondents had between 5 and 12 adults living together implies a considerably stable adult population with capability to provide adequate food for themselves as well as the rest of the family.

Table 4.1.4 Distribution Of Number of children Per Household

Number of Children (CI=4)	Frequency	Percent	Cumulative Frequency
1-4	63	28.8	63
5.8	36	16.4	99
9-12	49	22.4	148
Above 12	71	32.4	219
Total	219	100	

The number of children in household composition (Table 4.1.4) revealed that 71 (32.4%) had above 12 children per household, 63 of them representing 28.8%, had between 1-4 number of children 49(22.4%) respondent households had 9-12 children, while 36 (16.4%) households had between 5-8 children. Though a high percentage of 71.2 had large families of between 5 and 12 children a fairly corresponding percentage of adults as seen in the previous table could have implication for nutritional status of the low income household. While it is possible to secure food for the seemingly large family population of adult (as seen in Table 4.1.3) and children the quality of such food may be telling on the nutritional status of the households.

Table 4.1.5: Distribution Household Heads According To Educational Qualification

Educational Qualification	Frequency	Percent	Cumulative Frequency
Non-formal Education	15	6.8	15
Primary School not Completed	21	9.6	36
Completed Primary School	29	13.2	65
Secondary School not Completed	20	9.1	85
Completed Secondary School	134	61.3	219
Total	219	100	

Regarding educational qualification of the respondents, Table 4.1.5: showed that 135 of them; representing 61.2% respondents had completed secondary school, while 29 (13.2%) completed primary school. 21 respondents representing 9.6% attended primary school but did not complete the study. 20 (9.1%) respondents attempted secondary education without completing their study. And 15 (6.8%) had no formal education. Thus majority of the low income households in Federal tertiary institutions in Kaduna State completed their secondary school education. It is interesting to note that no one among the 219 respondents had qualification beyond School Certificate. This situation portends some limitations on the household income and by extension food security as well as nutritional status of the households, provided they do not have other sources of income.

Table 4.1.6: Distribution Of Households By According To Number of Persons

Household Size (Persons) (CI=3)	Frequency	Percent	Cumulative Frequency
1-2	10	5.0	10
3-5	70	32.0	80
6-8	78	36.0	158
9-11	38	16.0	196
11 and Above	23	11.0	219
Total	219	100	

Details in Table 4.1.6: revealed that 78(36%) had 6-8 persons in the family, 70(32%) of respondents had between 3-5 persons, as against 38 (17.0%) respondents that had between 9-11 persons family size. Also, 23 (11%) respondents had 11 persons and above as their family size, while the least 10 (5.0%) of respondents had between 1-2 persons as household size. Implying that about 71% of the low-income households had fairly large families of between 5-12 children and above as was found in Table 4.1.4.

Table 4.1.7: Distribution Of Household Heads According To Monthly Income.

Monthly Income (N)	Frequency	Percent	Cumulative Frequency
46,500-55,000	76	34.7	76
36,500-45,000	62	28.3	138
26,500-35,000	19	8.7	157
16,500-25,000	29	13.2	186
Less than 16,000	33	15.1	219
Total	219	100	

Table 4.1.7: on monthly income of the low income households showed that 76 (34.7%) of respondent household heads earn between N46, 500 and N55, 000 monthly, while 62 (28.3%) others earn between N36, 5000 and N45, 000 monthly. Also, 33 (15.1) earned less than 16,000.00/month and 29 (13.2%) earned N16, 500.00-N26, 000.00 while 19 (8.7%) of respondent household heads earn between N26, 500 and NN35, 000 monthly. That 28.3% of the respondents earn less than N26, 500 suggests that this class of low-income earners engaged in supporting poverty alleviation strategies.

4.2 ANSWERING RESEARCH QUESTIONS

The study was guided by six research questions. Data collected by respondents were analyzed as showed in tables 4.2.1 to 4.2.6.

4.2.1. RESEARCH QUESTION ONE:

What is the food security status in terms of food availability, food accessibility and consumption pattern and nutritional status among low income households of selected Federal Tertiary Institutions of Kaduna State?

Table 4.2.1a: Distribution According To Households Level Of Food Adequacy

S/No	Food Groups	Response Categories					Means of Adequacy	Decision
		Very Adequate (5)	Adequate (4)	Moderate Adequacy (3)	Fairly Adequacy (2)	Not Adequate (1)		
1	Roots, Tubers & Cereals (yams, eba, fufu, potatoes, tuwo, bread, porridge etc)	33	50	85	27	24	3.19	Agreed
2.	Legumes/Pulses/ Vegetables	152	38	11	16	2	4.47	Agreed
3.	Fats & Oils	16	11	108	63	21	2.72	Not Agreed
4.	Fruits (oranges, Banana pawpaw, garden egg, Mango, guava etc)	69	24	101	18	7	3.59	Agreed
5.	Meat /Fish/Eggs	5	15	46	30	123	1.83	Not Agreed
6.	Milk & Milk Products	12	52	47	40	68	2.54	Not Agreed
7.	Beverages	64	81	34	4	36	3.61	Agreed

Decision rule = 3 N= 219

Table 4.2.1a presented the level of Food security in terms of food adequacy of low income households in selected Federal tertiary institutions in Kaduna state. Food items of legumes, pulses and vegetables were the most adequate food item to the low income households as this attracted highest mean response of 4.47. Details in Table 4.2.1a showed that this was very adequate to 152 respondents and adequate to 38 others, moderately adequate to 11 respondents, fairly adequate to 16 others and not adequate to the rest 2 respondents. Also, fruits such as mangoes, guava were the second most adequate food items as these attracted second highest mean response of 3.59. Table 4.2.1a details showed that fruits were very adequate to 69 respondents, adequate to 24 others, moderately adequate to 101 respondents, fairly adequate to 18 and not adequate to the rest 7 respondents. Roots, tubers and cereals such as yams, tuwon, bread etc were the third in the list of adequacy of food items. These attracted the third highest mean adequacy response of 3.19 and Table 4.2.1a showed that these were very adequate to 33, adequate to 50, moderately adequate to 85, fairly adequate to 27 and not adequate to the rest 24 respondents. Meat/fish and egg food items were the least adequate to the low income households as they attracted the least mean adequacy level of 1.83. Table 4.2.1a details showed that they were very adequate to 5 respondents, adequate to 15 others, moderately adequate to 46, fairly adequate to 30 others and not adequate to majority respondents, numbering 123. Table 4.2.1a showed that the most adequate food items to the low income households in Federal tertiary institutions in Kaduna State were legumes/pulse/vegetables, followed by fruits (mangoes, guava etc), and roots/tubers/cereals (yams, bread, tuwon), The least food items to the low income households was meat/fish/eggs (beef, frozen fish etc) with 1.83 mean scores which was not adequate. The results in the table implied food security in terms of food availability (adequacy) except in meat group.

Table 4.2.1b: Distribution OF Households According To Opinion On Food Accessibility

S/No	Food Group	Pattern of Accessibility of Food Item							Mean Accessibility	Decision
		Daily	Twice Daily	Thrice Daily	Once Weekly	Twice Weekly	Thrice Weekly	Once a Month		
		(7)	(6)	(5)	(4)	(3)	(2)	(1)		
1.	Roots & Tubers	78	4	15	43	29	30	20	4.49	Agreed
2.	Cereals & Cereal Products	165	2	13	2	11	8	18	5.97	Agreed
3.	Meat & Fish	58	3	12	51	42	31	22	4.09	Agreed
4.	Milk & Milk Products/Egg	110	3	3	16	39	31	17	4.83	Agreed
5.	Vegetables & Fruits	102	32	20	40	8	9	8	5.55	Agreed
6.	Fats & Oils	126	7	6	18	5	46	11	5.22	Agreed
7.	Beverages & Water	107	6	19	31	19	20	17	5.11	Agreed
8.	Sugar & Honey	127	16	3	9	14	18	32	5.23	Agreed
9.	Other food items consumed by Households	28	19	5	17	24	8	118	2.78	Not Agreed

Decision rule = 4 N=219

Table 4.2.1b revealed the pattern of accessibility of food items by the low income household members of the selected Federal tertiary institutions in Kaduna state. Consequently it was found that Cereals and cereals products were the most accessible as these attracted the highest mean accessibility level of 5.97. Table 4.2.1b showed that 165 of the respondents daily accessed these food items, while 2 respondents accessed it twice daily. Thirteen (13) respondents' accessed cereals and cereals products thrice daily and 2 respondents accessed it once monthly. Other eleven respondent's accessed cereals twice daily and the rest 8 accessed it only once a month. The second most accessed food items to the respondents were vegetables and fruits with the second highest accessibility mean of 5.55. The third was sugar and honey with the mean accessibility level of 5.23. The least food in the pattern of accessibility was meat/fish and egg products as these attracted the least mean accessibility of 4.09. Details in the table showed that only 58 respondents accessed meat/fish daily while 3 respondents accessed it twice daily. Twelve respondents (12) accessed meat/fish thrice daily while 51 respondents accessed it once weekly. Forty two (42) respondents accessed it twice monthly, while 31 respondents accessed it thrice monthly and the rest 22 respondents accessed it once a month. This implies that the most accessible food items was cereals and cereal products while the least accessible to the low income households was meat, fish and egg product. The implication in this regard is that the food items that were easily accessible were those that were easy to purchase and store because of their low cost, while the relatively costlier ones were not accessible as the income of the household might not support their purchase with its telling effects on accessibility.

Table 4.2.1c: Distribution Of Households On Opinion On Food Consumption Pattern

S/No	Food Group	Pattern of Food Consumption				Mean	Decision
		Most Often (4)	Often (3)	Sometimes (2)	Occasionally (1)		
1.	Fruits (e.g., orange, banana)	3	44	133	39	2.05	Not Agreed
2.	Vegetables (e.g. okro, spinach)	4	82	111	22	2.31	Not Agreed
3.	Roots/tubers (e.g., sweet potatoes, yam)	7	76	103	33	2.26	Not Agreed
4.	Meat (e.g., beef, goat meat)	7	37	123	52	1.99	Not Agreed
5.	Fish (e.g. frozen fish, dry fish)	6	66	136	11	2.28	Not Agreed
6.	Grains (e.g. maize, millet)	121	71	6	21	3.33	Agreed
7.	Legumes (e.g. bean, soya bean)	27	125	55	12	2.76	Not Agreed

Decision rule = 3; N = 219

The consumption pattern or regularity of food items the by low income household respondents' displayed in Table 4.2.1c. Consequently grains (e.g. maize, millets etc) were most consumed food items by the low income households as this attracted the highest mean consumption level of 3.33. Respondent consumption pattern showed that 121 respondents consumed grains most often while 71 others consumed grains often. However, 6 respondents consumed grains sometimes, while the rest 21 respondents consumed grain food items occasionally. Legumes (e.g. beans, soya bean etc) were the second most consumed food items. Legume group of food items attracted the second highest mean consumption level of 2.76. Table

4.2.1c on consumption level showed that 27 respondents consumed legumes most often while 125 respondents consumed it often. Also, 55 respondents consumed legumes sometimes while the rest 12 respondents consumed it occasionally. On the other hand, the least consumed food items were meat (e.g. beef, goat meat etc) that attracted the least mean consumption level of 1.99. The table on consumption level showed that only 7 respondents consumed meat most often while 37 others consumed it often. However, 123 respondents consumed meat sometimes while the rest 52 respondents consumed meat food items occasionally. This showed that the most consumed food items by the low income households was grains (e.g. maize, millets etc), while the least most consumed food items was meat or meat items. The implication of this is that with heavy consumption of grains the nutritional status of the households will be slightly affected because of high intake of energy given foods.

In summary, food availability of low-income households was adequate on legumes/pulse/vegetables, beverages, fruits, roots and tubers and cereals. They were able to access cereal, vegetables/fruits, sugar and honey, fats and oil, milk and eggs, roots and tubers and finally meat and fish in that order. Similarly consumption pattern of households was dominantly grains followed by legumes, vegetables, fish, roots/tubers, and fruits. Therefore the low-income households were food secured on cereals, legumes and vegetables, but were not able to sufficiently access meat and meat products; hence their consumption pattern did not include meat.

RESEARCH QUESTIONS TWO:

WHAT IS THE ANTHROPOMETRIC MEASUREMENTS AND NUTRITIONAL STATUS AMONG LOW-INCOME HOUSEHOLDS OF SELECTED FEDERAL TERTIARY INSTITUTIONS OF KADUNA STATE, NIGERIA.

Anthropometric Indicators Of Children Above And Below Median Reference Population

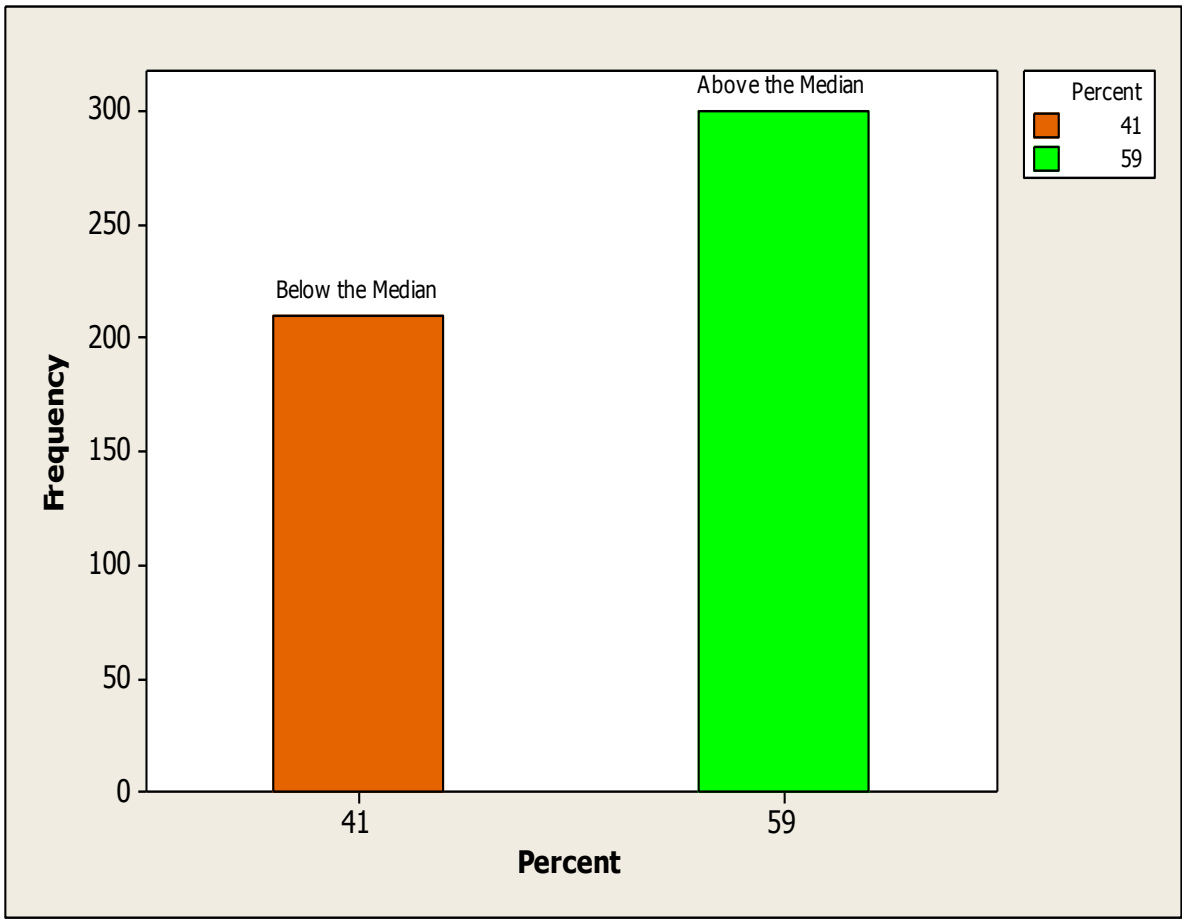


Figure 4.2.2a i: Height-For-Age Of Children Between Ages 1-17 years Among Low-Income Household In Kaduna State.

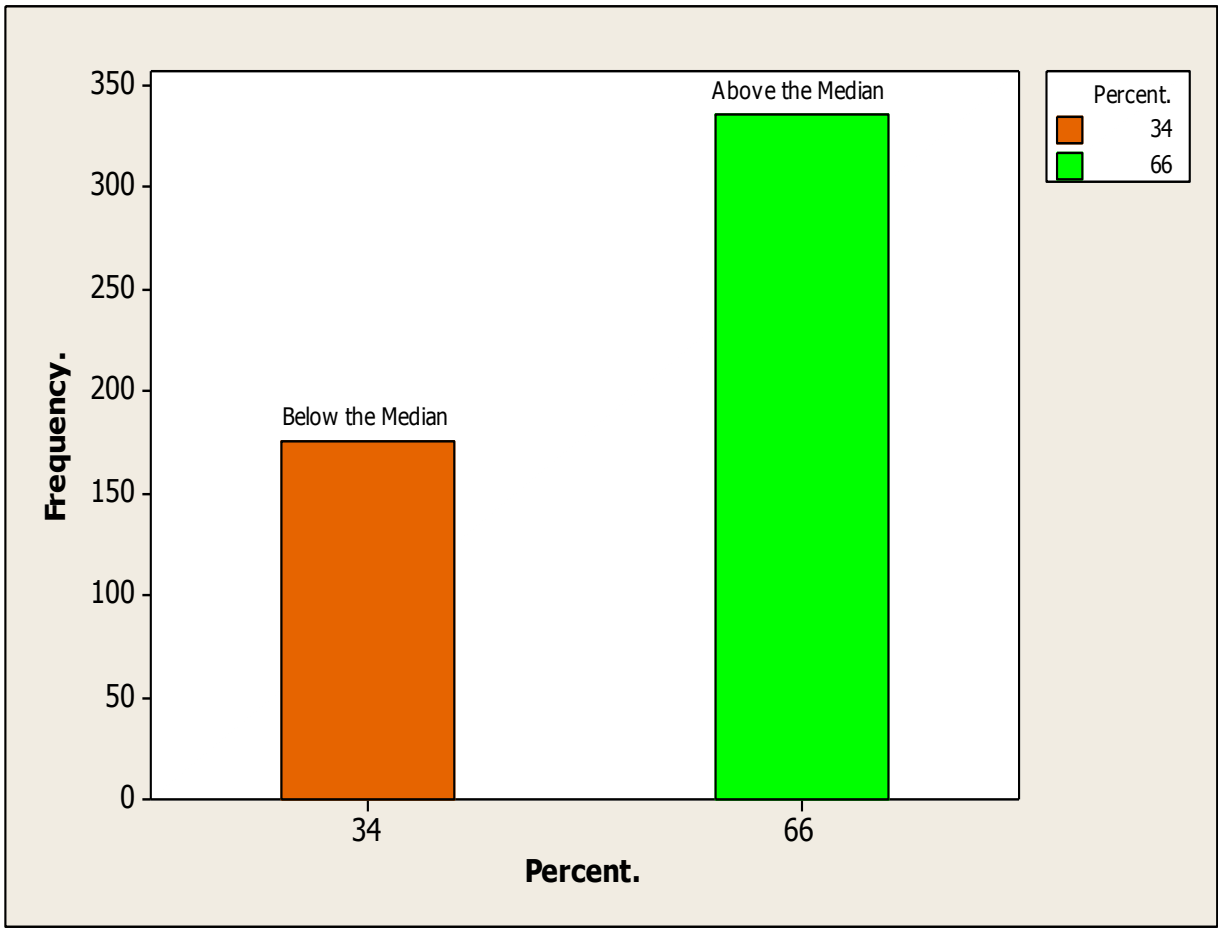


Figure 4.2.2a ii: Weight-for-Age Of Children Between Ages 1-17 years

According to Figures 4.2.2a i and ii data revealed a total of 510 children aged below 18 years in this study. A total of 300 (59.0%) have height- for- age that agrees with the reference standards, while the rest 210 (41.0%) have height- for- age that do not agree with the standard reference population. In the same vein, a total of 335(66.0%) of the children in the study have weight- for - age that agreed with the reference population, while the remaining 175(34.0%) have weight- for- age that do not agree with the reference population. The high percentage age-for- height below reference population (41%) and the relatively small for weight (34%) as could be seen in the graph could have implications for the children with poor nutritional status while those with above reference standard indicates good nutritional status.

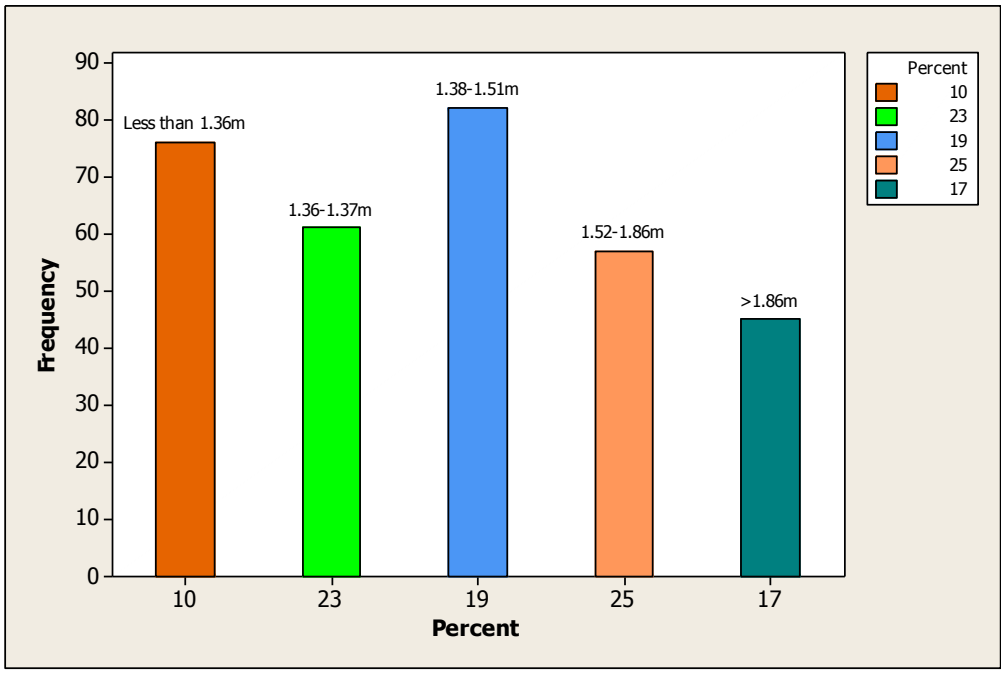


Figure: 4.2.2a iii: Adult Male Height Of Low-Income Households In Kaduna state.

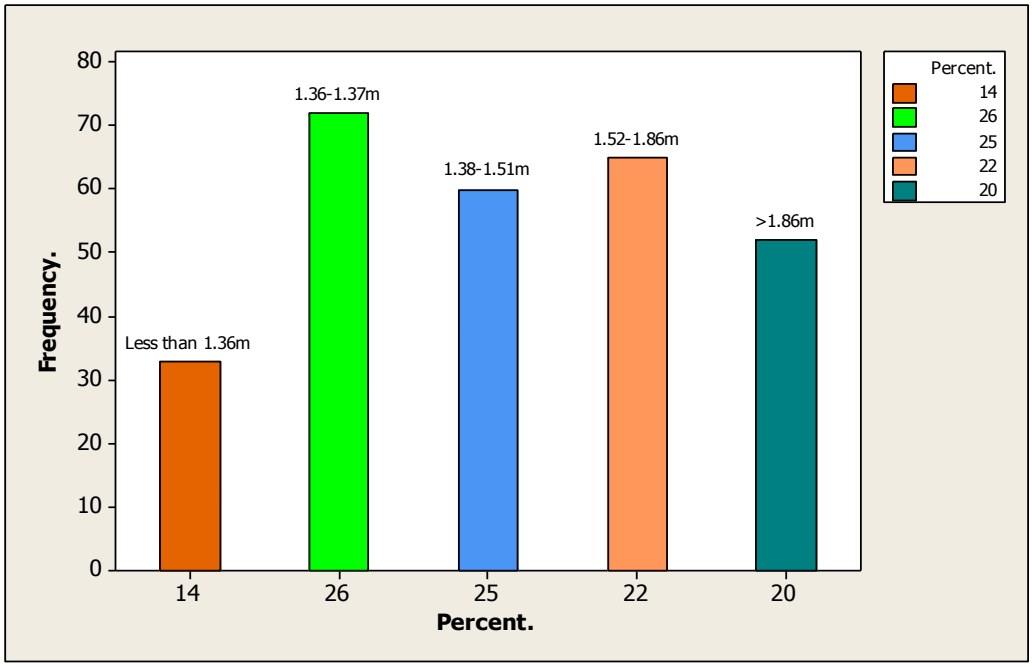


Figure 4.2.2a iv: Adult Female Height of Low-Income Households In Kaduna State

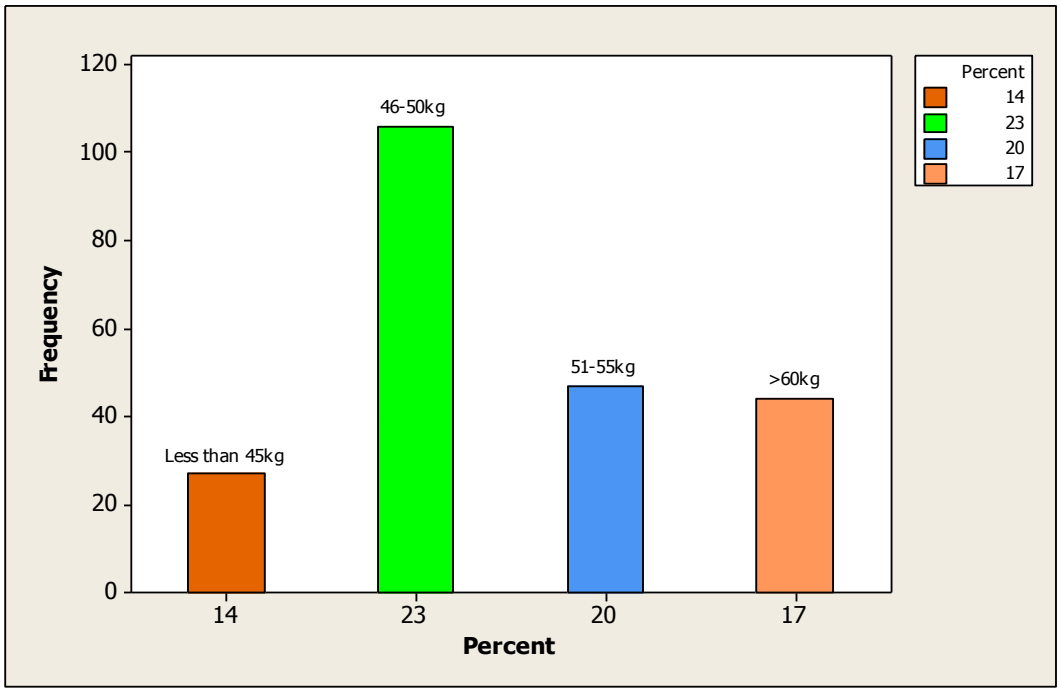


Figure 4.2.2a v: Adult Male Weight Of Low–Income Households Of Kaduna State.

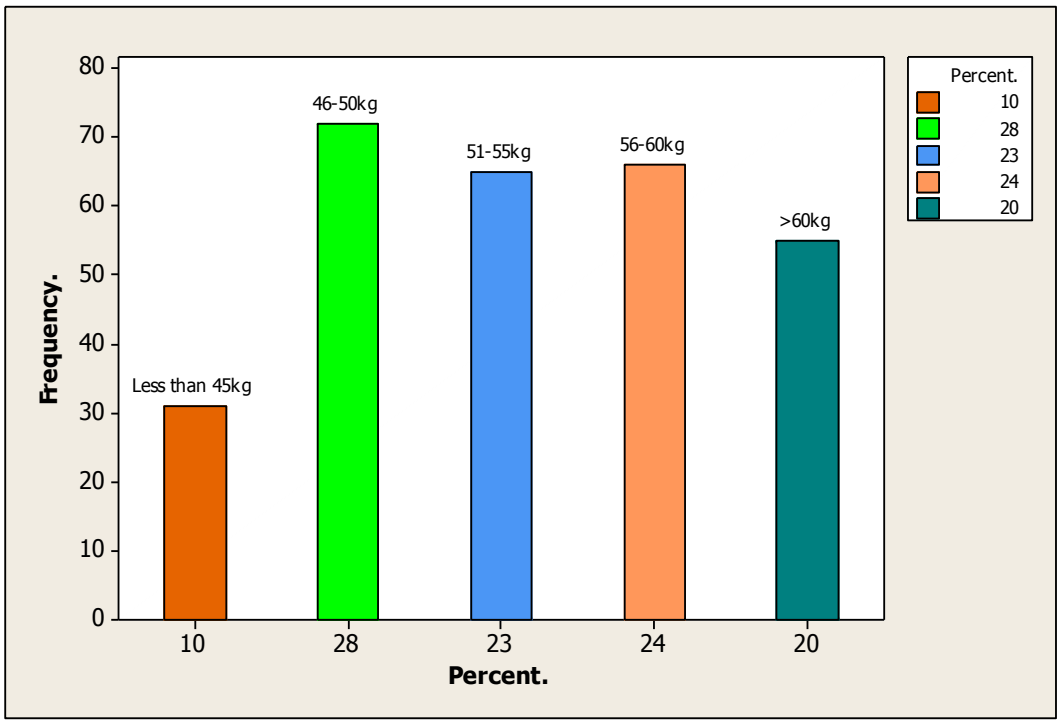


Figure 4.2.2a vi: Adult Female Weight Of Low-Income Households In Kaduna State.

Height of male adult (Figure 4.2.2a iii) respondents in the categories between 1.38-1.51m had the highest scores of 82 (25.6%) followed by less than 1.36m with 76 (23.7%), and between 1.36-1.37 with 61 (19.0%). Others includes those between 1.52-1.86m with 57 (17.7%) and above 1.86 with 45 (14%). Results from data (Figure 4.2.2a iv) revealed that in the female category those between the heights of 1.36-1.37m had the highest frequency and percent of 72 (25.5), followed by those between 1.52-1,86m with 65(23%) and between 1.38-1,51m with 60 (21.3%), while those above 1.86m and less than 1.36m had scores between 52 (18.4%) and 33 (11.7%) respectively.

Consequently, weight categories of male adult (Figure 4.2.2a v) showed that respondents between 56-60kg scored higher 56 (25%) than those between 46-50kg bracket with 50 (22.3%), while between 51-55kg had 47 (21%), above 60kg with 44 (19.6%) and less than 45kg had 27(12.1%) respectively. The female weight categories (Figure 4.2.2a vi) showed that between 46-50kg, 72 (24.9%) of them had the highest scores followed by those between 56-69kg, 66 (22.8%). Others includes those between 55-55kg 65 (22.5%), above 60kg with 55 (19%) and less than 45kg with 31 (10.8%). Implying that adult male between 56-60kg were more while the adult female category of between 46-50kg had the highest scores.

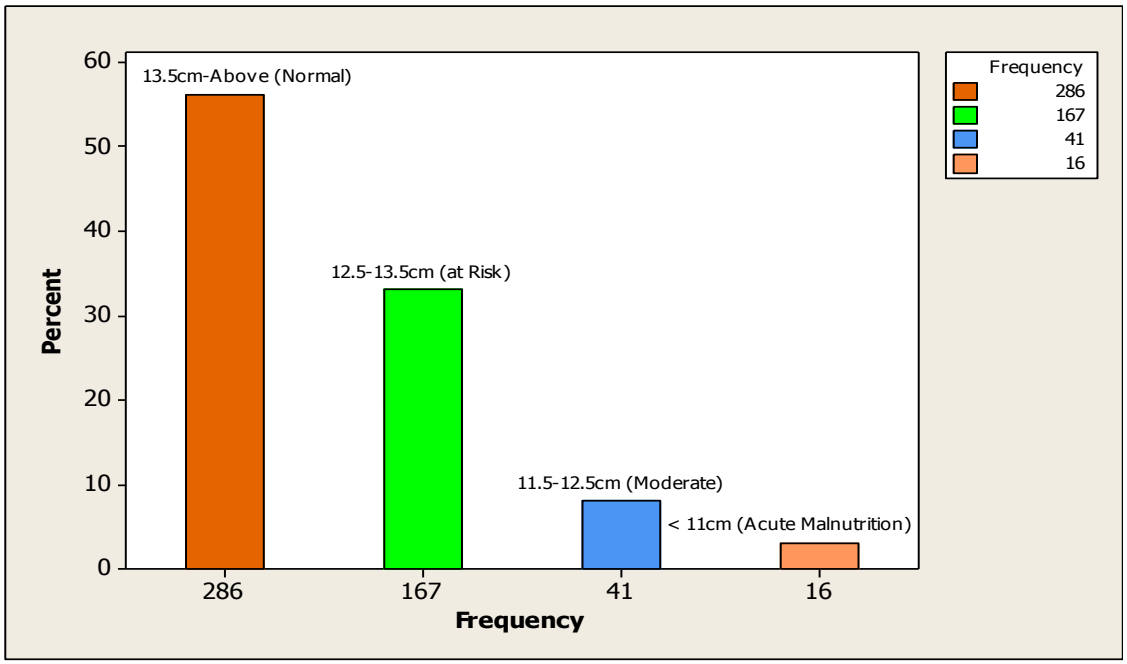


Figure 4.2.2a vii: Children's Mid-Upper-Arm Circumference Of Low-Income Household In Kaduna.

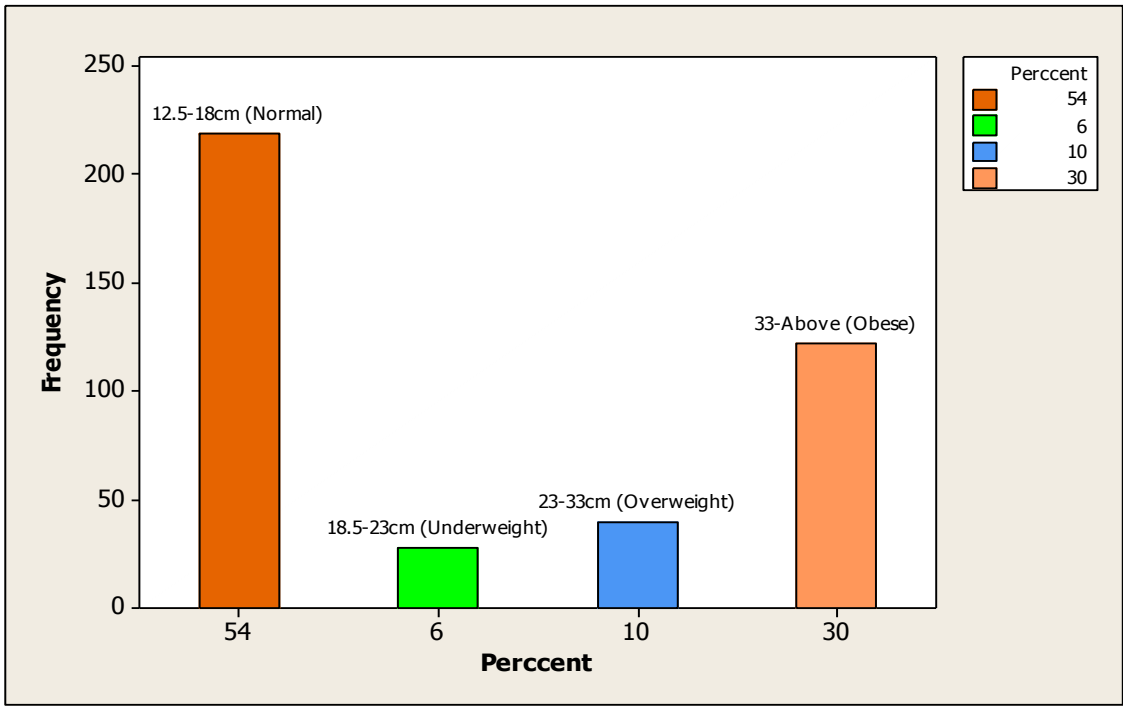


Figure 4.2.2a viii: Adult's Mid-Upper-Arm Circumference Of Low-Income Household In Kaduna State.

Data on Figures 4.2.2a vii and viii showed the indicators' levels of children and adult Mid-Upper-Arm Circumference (MUAC). The data revealed that 286(56%) of children were healthy compared to 211(44%) that ranges from at risk, moderate to acute malnutrition. Similarly, adults MUAC revealed that 219 (54%) were normal compared also to 190 (46%) who are either obese (30%), overweight (10%) or underweight (6%) indicating that majority of household members were in the healthy category. The implication of these results is that the low-income households in Selected Federal Tertiary institutions of Kaduna state are healthy.

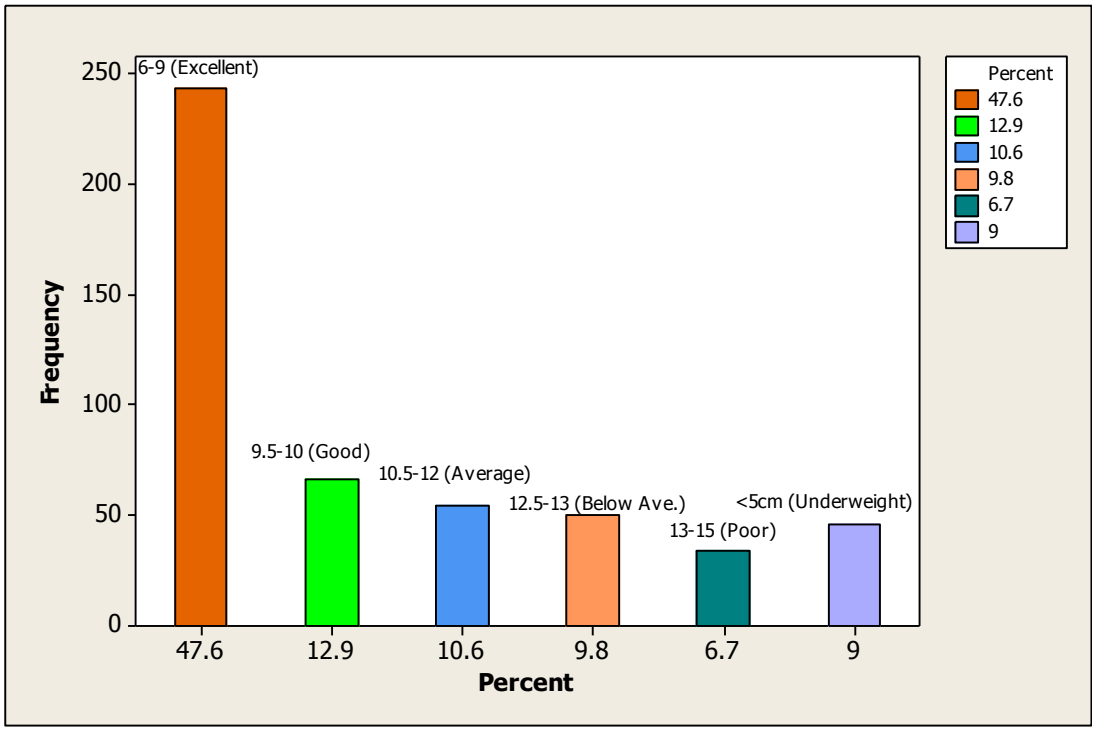


Figure 4.2.2a ix: Children Skin Fold of Low-Income Households, Kaduna State.

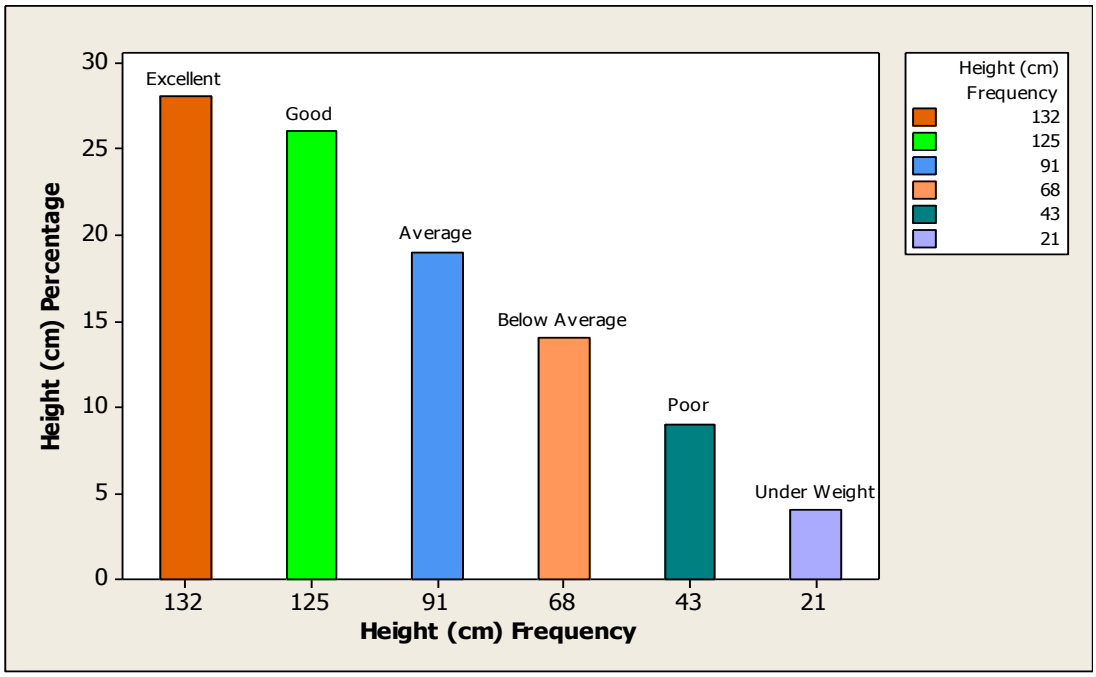


Figure 4.2.2a x: Adult Male Skin Fold Of Low-Income Household, Kaduna State.

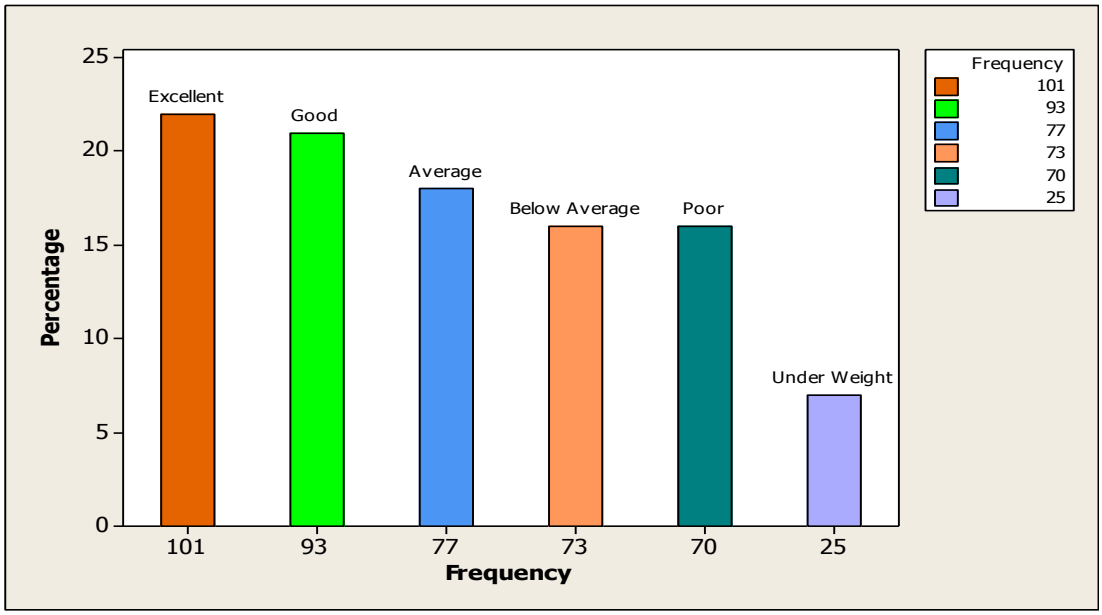


Figure 4.2.2a xi: Adult Female Skin Fold Of Low-Income Households In Kaduna State.

Figures 4.2.2a ix, x and xi showed the distributions of children, adult male and female skin fold results. Children's skin fold results revealed that 243(47.6%) were in the range of

excellent (6-9cm), while 66(12.9%) were in the good range. Data revealed also that between 54 (10.6%), 50 (9.8%), 46 (9.0) and 34 (6.7%); were in the range of average, below average, underweight and poor categories respectively. This implied that majority (61%) of these children have good health and nutrition.

Data on the adult male skin fold (Figure x) revealed that 348(73%) respondents were in the excellent, good and average range, while 132(27%) respondents were between the range of below average, poor and underweight. Implying that, 73% adult male respondents were either in the range of excellent, good or average in skin fold rating. Therefore 27% male respondents were either below average, poor or under weight. Though 73% male respondents had acceptable skin fold rating, the 27% poor skin fold suggests caution for poor health and poor nutritional status.

Data in figure 4.2.2a xi of female skin fold revealed that 271(61%) respondents had between excellent, good and average range skin fold, while 168(39%) respondents were in the below average, poor and underweight range. This suggests that about 60% respondents were within the excellent to average range. This implies that 39% adult females were disadvantaged in skin fold and need to improve on their nutritional status.

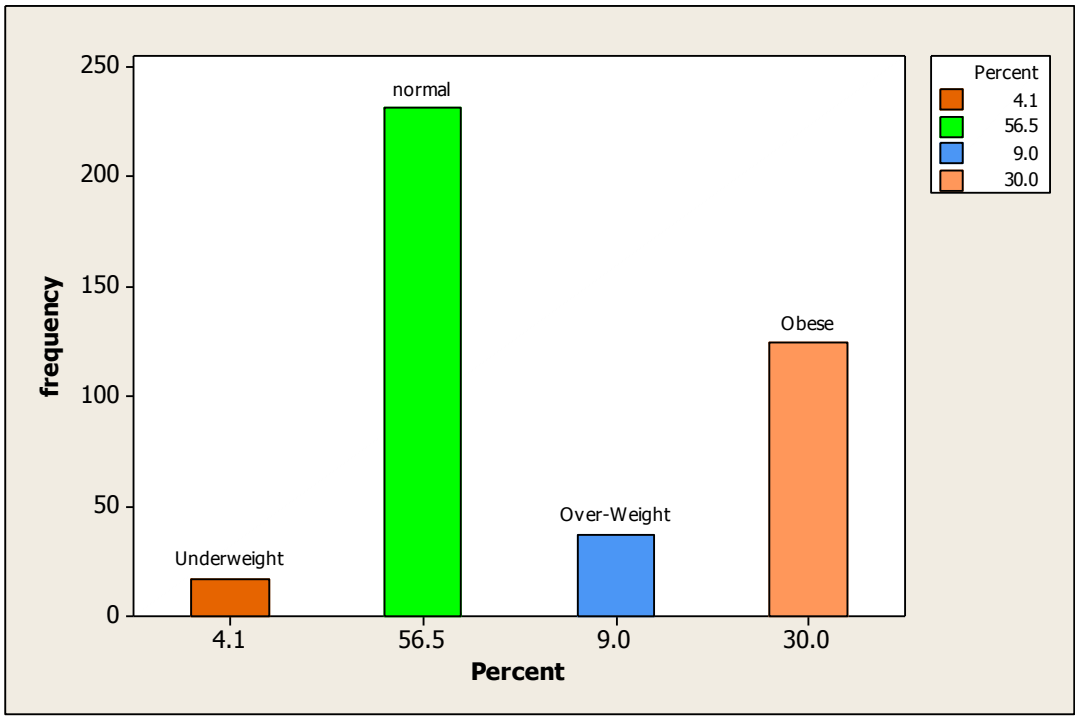


Figure 4.2.2a xii: Adult Body Mass Index (BMI) of Low-Income Households, Kaduna State

According to Figure 4.2.2a xii out of the total 409 adults respondents in this study, 231(56.5%) were normal as against 124(30%) who were obese. 37(9.0%) were overweight, while 17(4.1%) were underweight. The information in the graph implies that a little more than half of the total respondents have normal body mass index. Also, that 161(39.4%) fall in the category of overweight and obesity is a situation that suggest may be they had more than enough to eat and need to be cautioned in the over consumption of high calorie foods. The less than 5% (4.1%) that were underweight who are less than 50% implies a balance BMI measure for the respondents across board which could be regarded as a measure of acceptable nutritional status.

Eating Occasion:

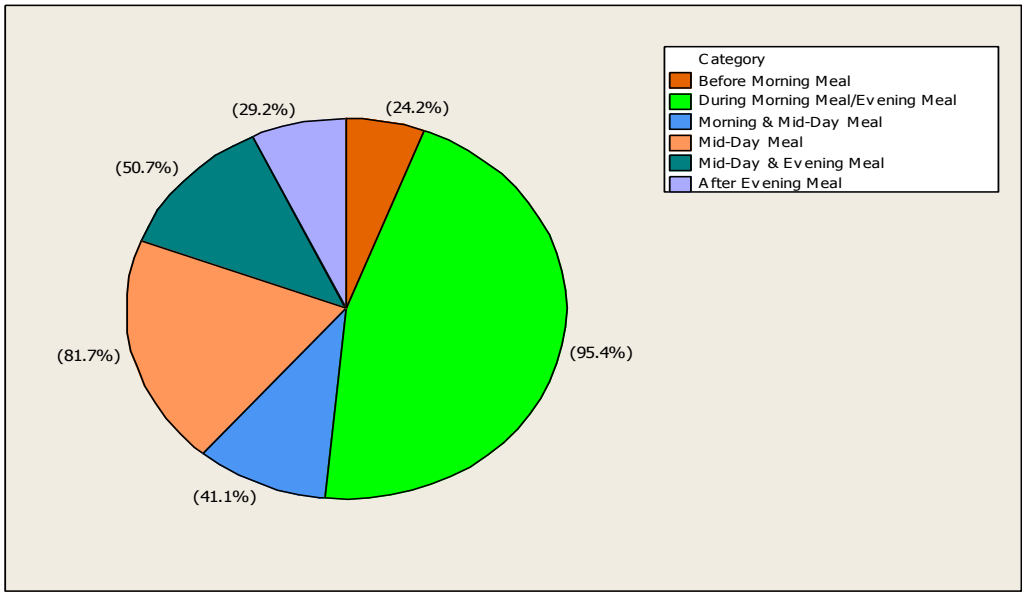


Figure 4.2.2b i: Present During Meal Time among Low-Income Households, Kaduna State

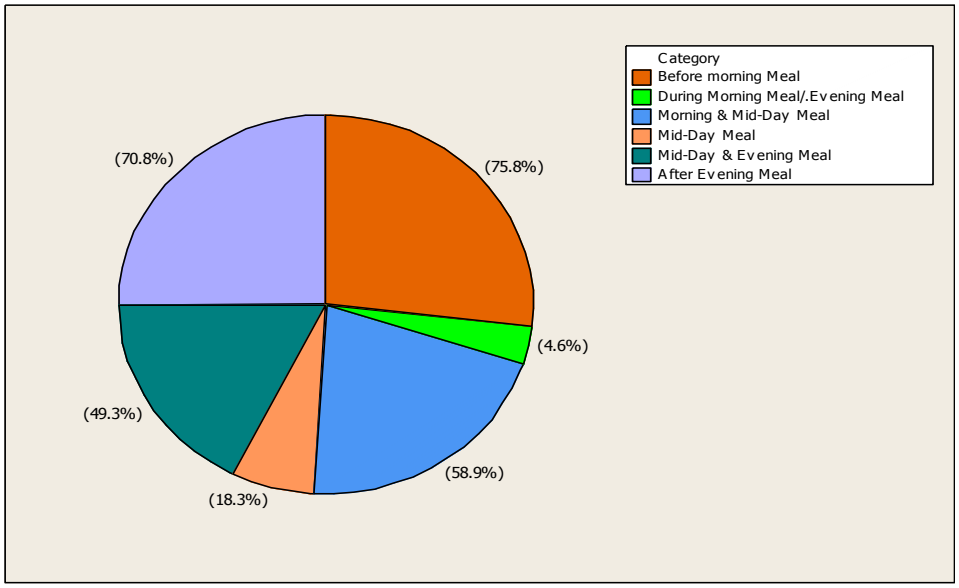


Figure 4.2.2b ii: Distribution Of Household members Absent During Meal Time.

Figures 4.2.2b i and ii revealed the eating occasion data of respondents. From the distribution, it could be seen that majority of the respondents took part in morning and evening meals. This is because 209 (95.4%) were usually present during morning meal while the rest 10 (4.6%) were not. In the same vein, a total of 209 (95.4%) were present during evening meals while the rest 10 (4.6%) were not. Implicitly, the high percentage of overweight and obese as seen in Figure 4.2.2a xii could be explained further from the high number of respondents 111(50.7%) and 90 (41.1%), who were found to engage in food between morning and mid-day meal and food between mid-day and evening meal respectively

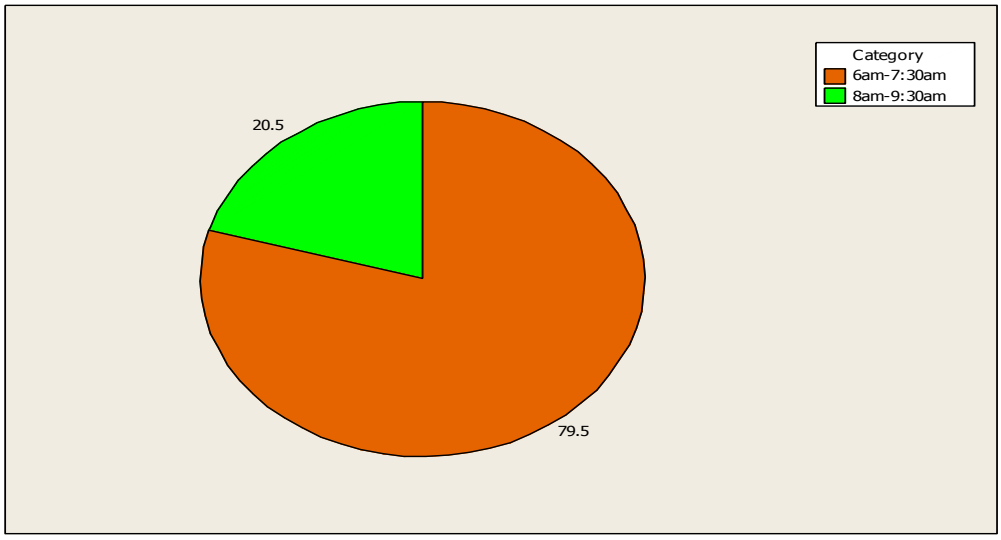


Figure 4.2.2b iii: To Time Morning Meal Was Consumed Among Low-Income Households, Kaduna State.

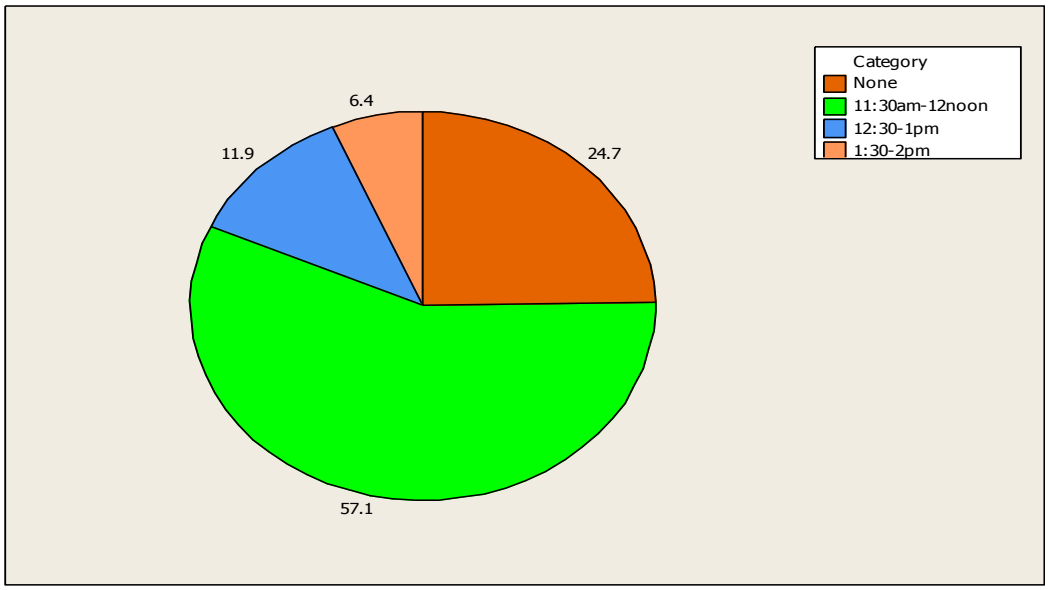


Figure 4.2.2b iv: Time Mid-Morning Snack was consumed Among Low-Income Households, Kaduna State.

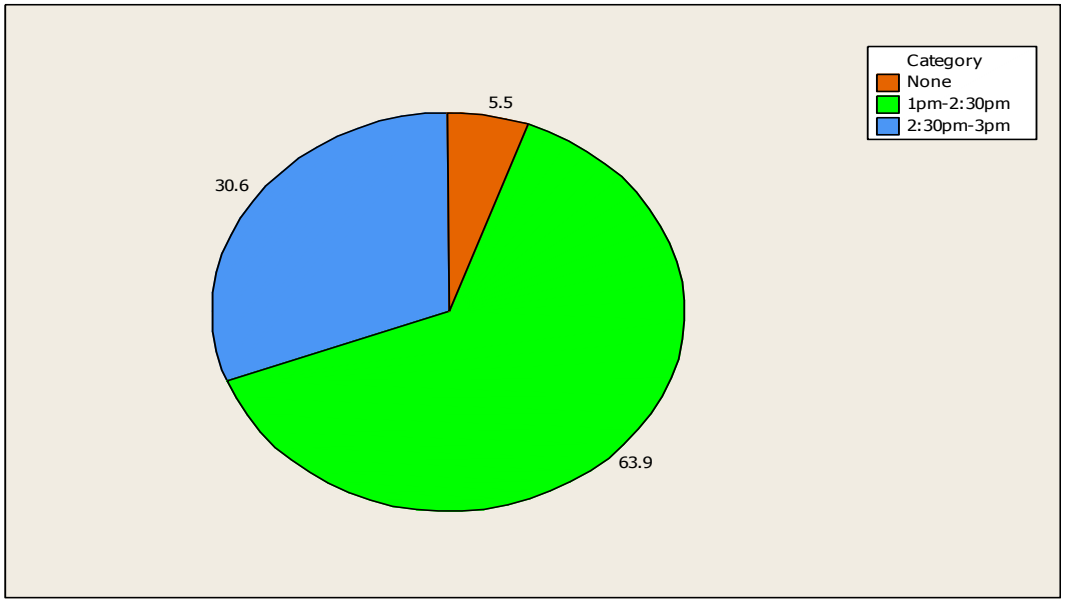


Figure 4.2.2b v: Time Lunch Was Consumed Among Low-Income Households, Kaduna State.

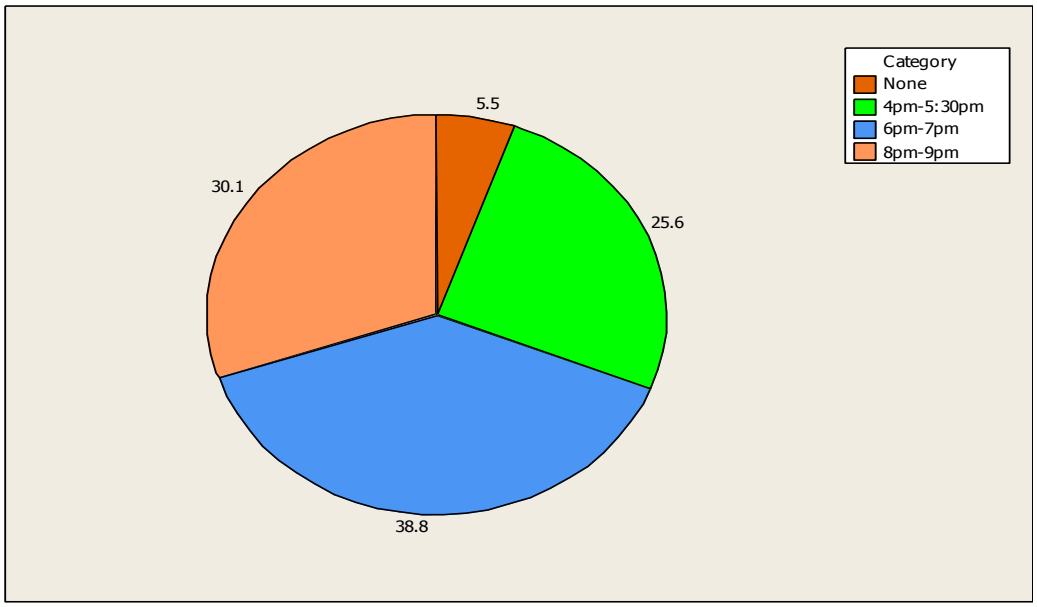


Figure 4.2.2b vi: Time Evening Meal Was Consumed Among Low-Income Households, Kaduna State.

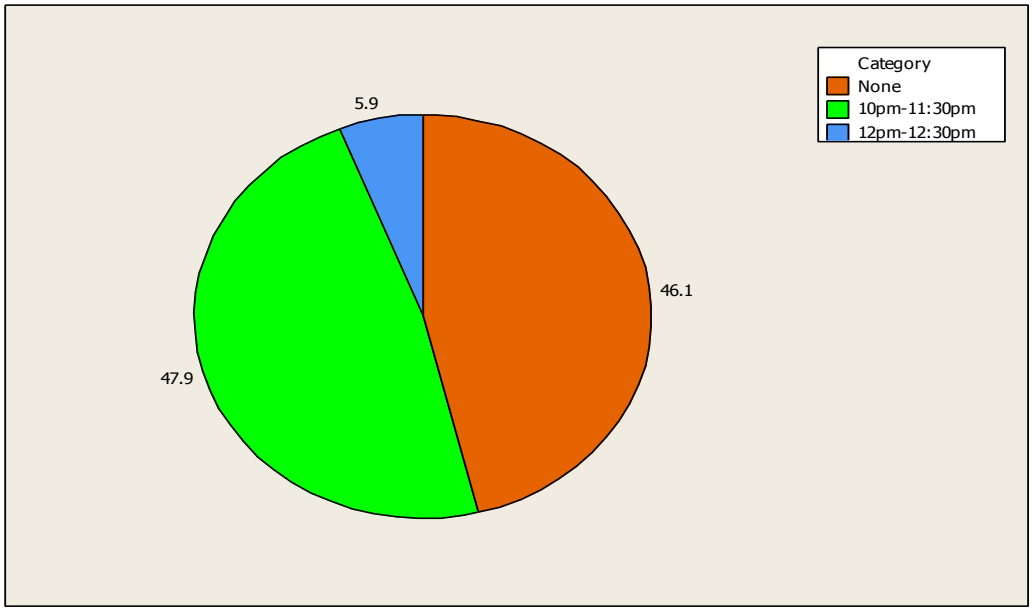


Figure 4.2.2b vii: Time after evening meal was consumed Among Low-Income Households, Kaduna State.

Figures 4.2.2b i to vii, illustrates the food frequency questionnaire dietary intake on the times various foods were consumed by households. Figure 4.2.2b iii indicated that 174(79.5%) household consumed morning meal between 6am-7am against 45(20.5%) that consumed between 8am-9.30am. Thus, majority of the low-income households had their breakfast before going to work and children taking off for school.

Data in Figure 4.2.2b iv also revealed that between 11.30am-12noon household members had mid morning meals with 125(57.1%). However some members were not accustomed to taking mid-morning meals. 26(11.9%) had their meals between 12.30pm-1pm and 16(6.4%) between 1.30pm -2pm. The implication is that high frequency rate intake of 57.1% could be because of the number of school age children and adolescents present in the family. It also implied an improved nutritional status.

Data from Figure 4.2.2b v revealed that lunch was most consumed between 1pm-2.30pm with a high frequency of 140(63.9% and 67(30.6%) were between 2.30pm-3pm. Implying that the low-income households considered lunch more important and they required it to replacing the expended energy during work hours or after school.

Figures 4.2.2b vi and vii showed the distributions of evening meal with 6-7pm having the highest score of 85(38.8%), 8-9pm and 4pm to 5.30pm having 66(30.1%) and 56(25.6%) respectively. This implied that more people had their meals between 4pm to 9pm every day. After evening meal had the highest frequency of 105(47.9%) with those that consumed food between 10pm-11.30 followed with 13(5.9%) that had their after-evening meals between 12pm-12.30pm. However 101(46.1%) did not consume any food after they had their actual evening meal, implying that those who did not eat may not be bordered because they were satisfied with their last meal.

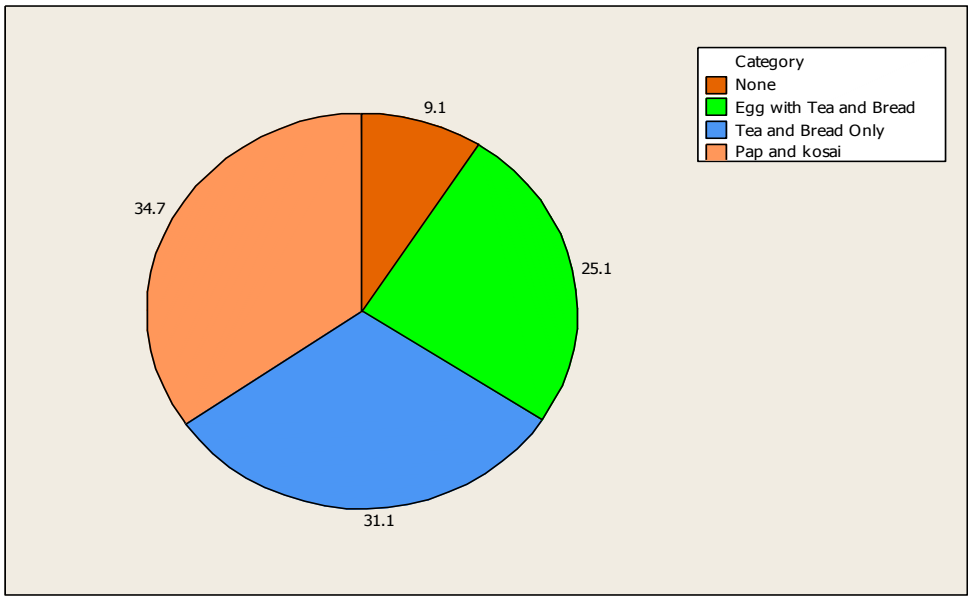


Figure 4.2.2b viii: Type Of Dishes Prepared During Breakfast By Low-Income Households, Kaduna State.

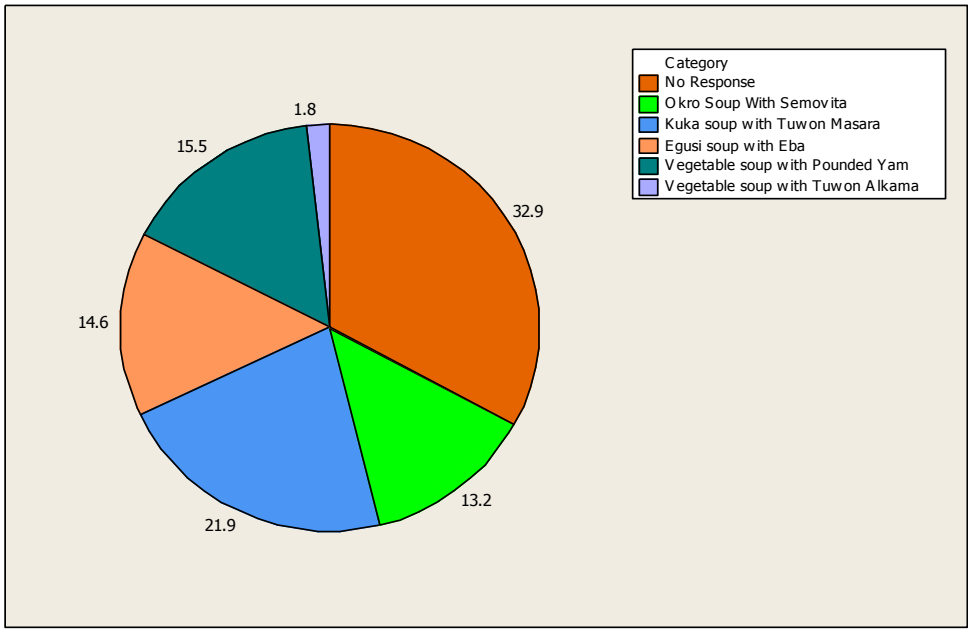


Figure 4.2.2b ix: Type Of Dishes Prepared During Lunch By Low-Income Households, Kaduna State.

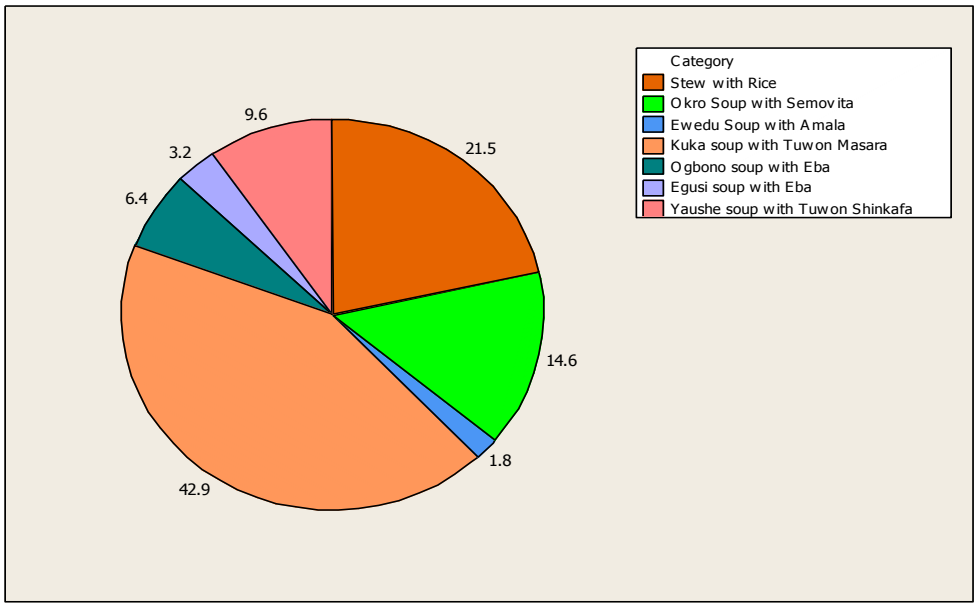


Figure 4.2.2b x: Type Of Dishes Prepared During Dinner By Low-Income Households, Kaduna State.

Types of Dishes Prepared

Figures 4.2.2b viii, ix and x showed types of dishes prepared during breakfast, lunch and dinner with an increased intake of pap and beans cake (kosai) during breakfast 34.7%, lunch with 21.9% and dinner, kuka soup with maize flour (tuwon masara) 42.9%, respectively. Considering the result, it can be concluded that the low-income families have good knowledge of food combination which adds value to their nutritional status hence, healthy living. The findings showed that most households 72(32.9%) did not participate during lunch, despite that 48(2.9%) prepared kuka soup with maize flour (tuwon masara), vegetable soup with pounded yam 34(15.5%); Egusi soup with Eba 32(14.6%), okro soup with semovita, 29(13.3%) and the least score is 4(1.8%) respectively. In the same vein, Figure 4.2.2b ix indicated households interest in kuka soup with maize flour (tuwon masara) during dinner with high intake of 94(42.9%) followed by stew with rice 47(21.5%) and okro soup with semovita 32(14.6%). Others included

taushe soup with tuwon shinkafa 21(19.6%) ogbono soup with eba, egusi soup with eba and ewedu soup with amala respectively. Considering the flow of food, implies that low-income households are involved in farming. It also suggests that they sell some of their farm produce to purchase other foods.

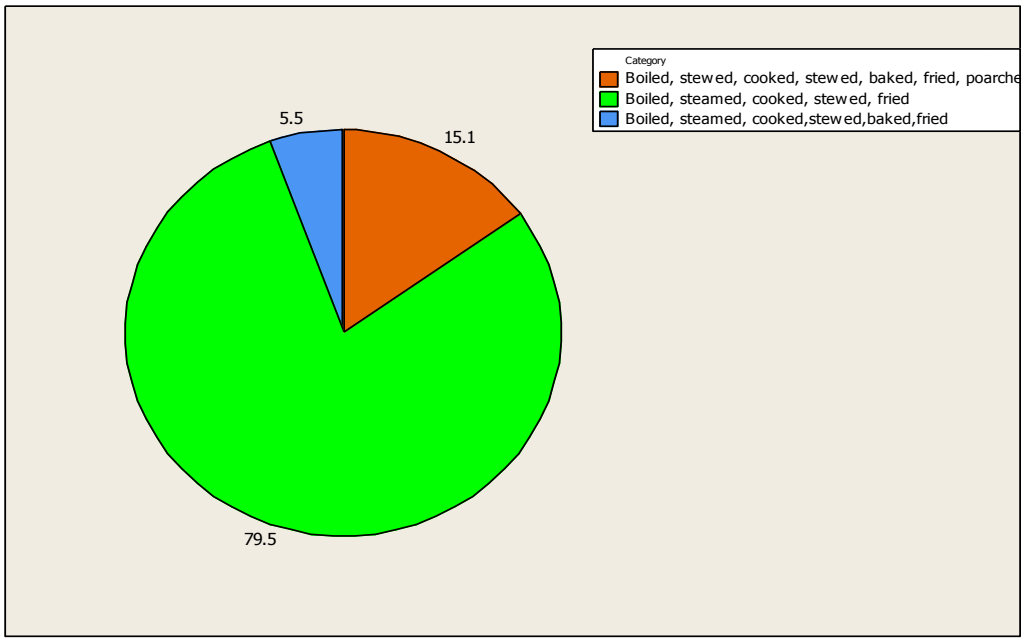


Figure 4.2.2b xi: Forms Of Dishes Used For Food Preparation During Lunch By The Low-Income Households, Kaduna State.

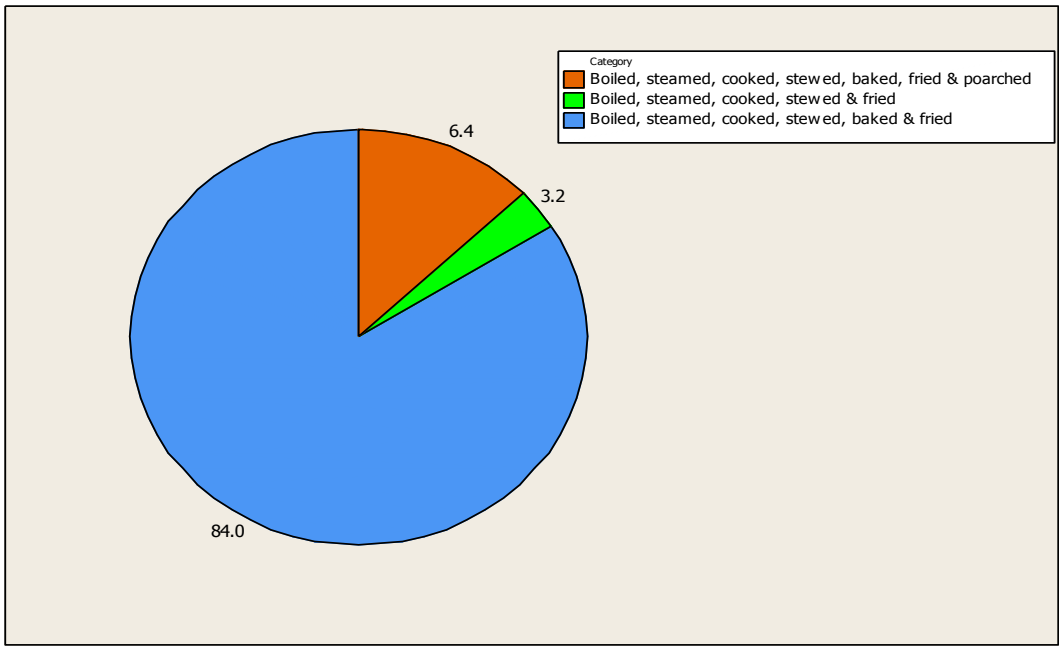


Figure 4.2.2b xii: Forms Of Dishes Used For Food Preparation During Dinner By Low-Income Households.

Forms of Dishes Used For Food Preparation

Data of Figures 4.2.2b xi and xii showed the distribution of respondents on forms of dishes employed in food preparation. Results revealed that majority of respondents employed baking, steaming, cooking, stewing and frying more in preparing lunch and dinner with 174(79.5%) and 184(84%) respectively. Implying they have the skill and knowledge of food preparation.

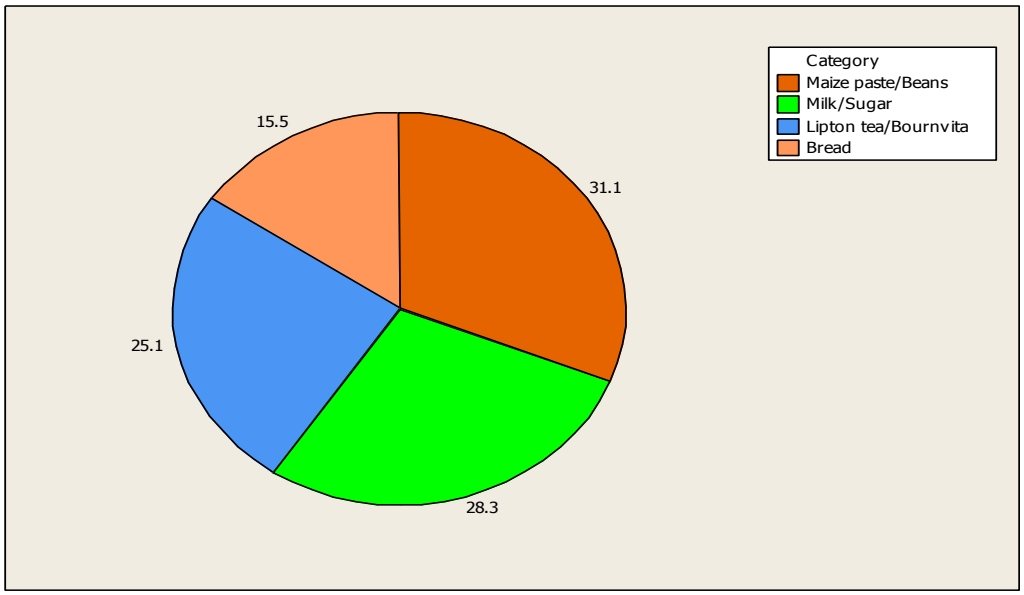


Figure 4.2.2b xiii: Ingredients Used For Food Preparation During Breakfast Among Low-Income Households, Kaduna State.

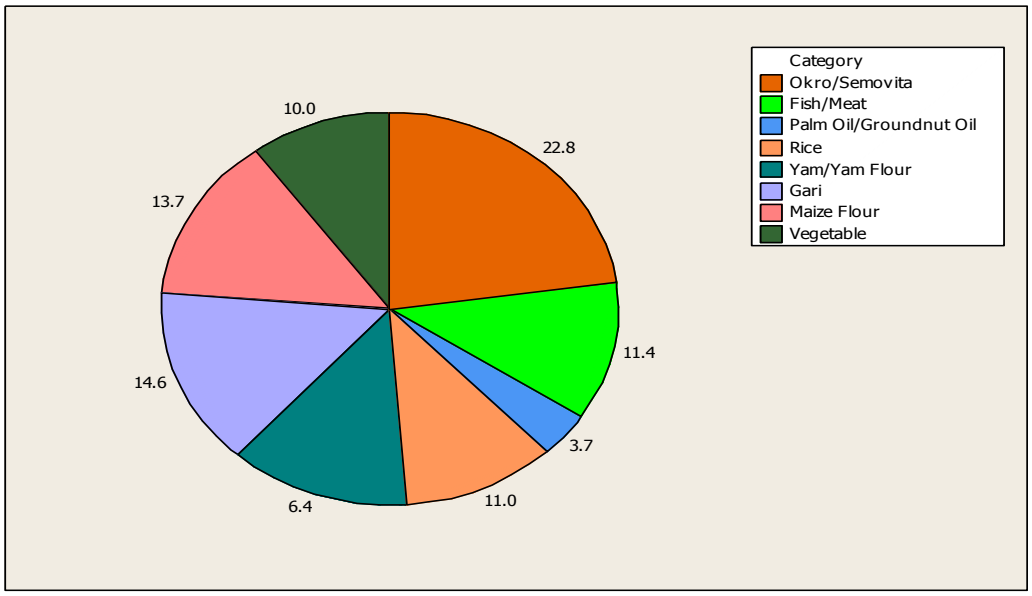


Figure 4.2.2b xiv: Ingredients Used For Food Preparation During Lunch Among Low-Income Households, Kaduna State.

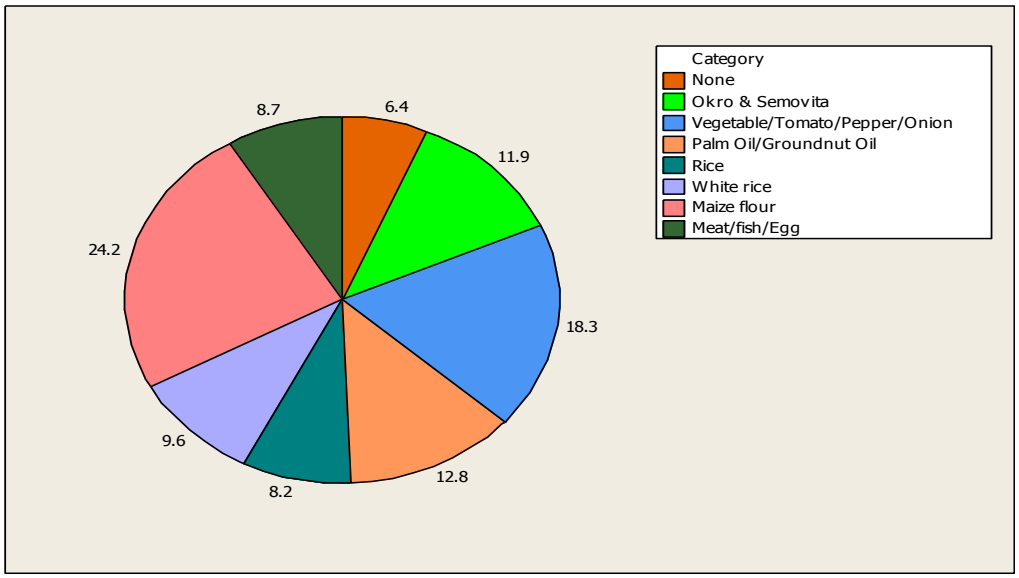


Figure 4.2.2b xv: Ingredients Used For Food Preparation Dinner Among Low-Income Households, Kaduna State.

Ingredients Used For Food Preparation

Ingredients used in food preparation are vital as they would suggest the quality of food consumed by household members. Result in Figures 4.2. 2b xiii, xiv and xv gave a breakdown of ingredients used in food preparation during breakfast, lunch and dinner. During breakfast, the low-income families used maize paste (pap) and beans cake 68(31.1%), added milk and sugar 62(28.3%) which is ideal. Others used Lipton/ tea/bornvita 55(25.1%) to take their bread for breakfast. Implying that as supported from results of Figures 4.2.2b xiii that members have good knowledge in food selection and preparation which suggests good nutritional status. During lunch (Figure 4.2.2b xiv), okro and semovita were used more as ingredients used for food preparation with 50(22.8%) followed by gari 32(14.6%) and maize flour 30 (13.7%). Other ingredients used were fish/meat 25(11.4%), rice 24(11%), vegetables 22(10%), yam/yam flour and tomato/pepper/onion 14(6.4%).each and the least score was 8 (3.7%) for palm oil/groundnut oil. Ingredient used during dinner (Figure 4.2.2b xv) indicated that household members

consumed maize flour (tuwon masara) with 53(24.2%) and vegetable/tomato/pepper/onion with 40(18.3%) to go with. Other ingredients used included palm oil/groundnut oil 28(12.8%), okro and semovita 26(11.9%); followed by white rice (tuwon shinkafa) with 21(9.6%). Meat/fish/eggs 19(8.7%) and rice 19(8.2%) which was the least. A total of 14(6.4%) respondents, however did not respond. The implication here is that a good number of households used ingredients appropriately indicating a good knowledge of nutrition.

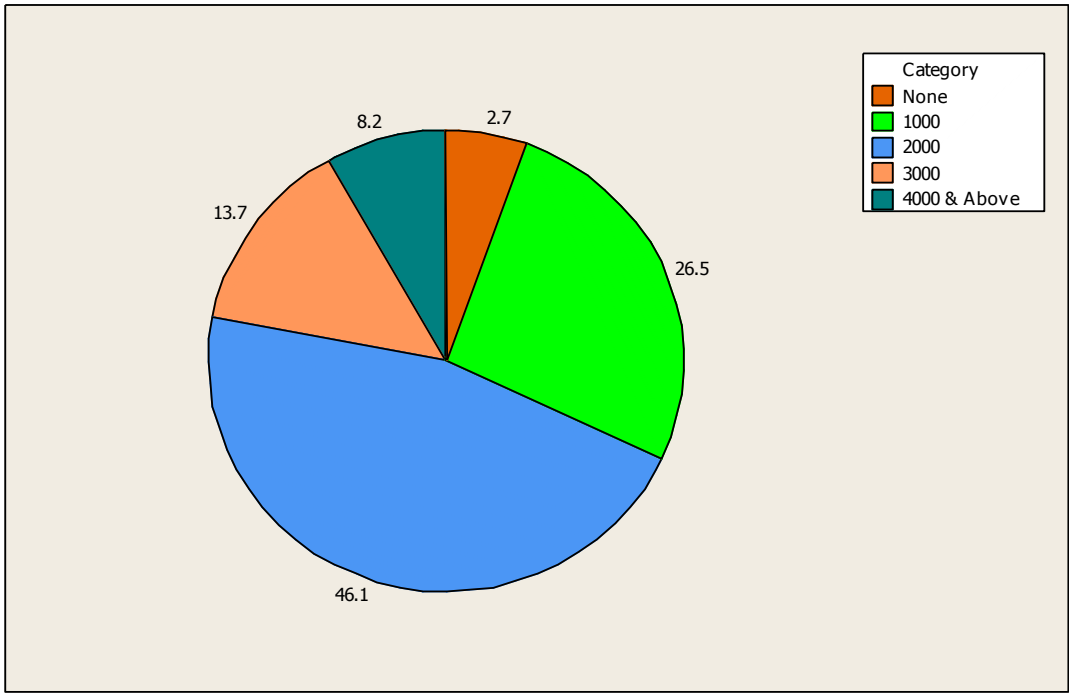


Figure 4.2.2b xvi: Quantity Of Food Used During Breakfast Among Low-Income Households, Kaduna State.

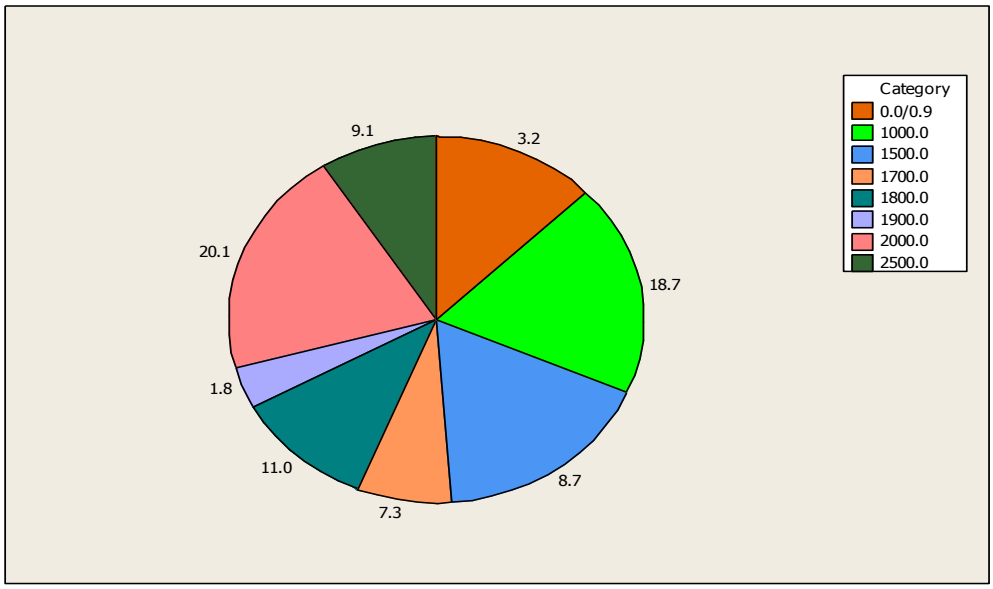


Figure 4.2.2b xvii: Quantity Of Food Used During Lunch Among Low-Income Households, Kaduna Stae.

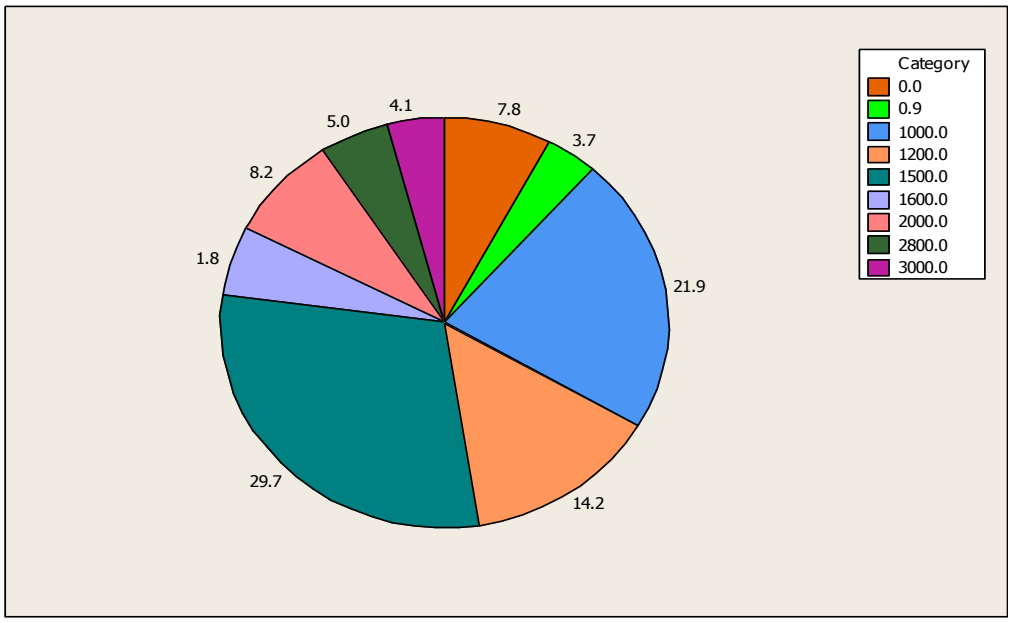


Figure 4.2.2b xviii: Quantity Of Food Used During Dinner Among Low-Income \ Households, Kaduna State.

Quantities Of Food Used

Data on Figures 4.2.2b xvi, xvii and xviii revealed the results on the quantities of food consumed during breakfast, lunch and dinner, respectively. Quantities of food used during breakfast were 101(46.1%) for 2000g (2kg), 58(26.5%) for 1000g (1kg), 30(13.7%) for 3000g (2.5kg) followed by 18(8.2%) for 4000 (4kg) and above and the least 6(2.7%) for 1500g. Six 6(2.7%) of the respondents however, did not respond. Results also revealed a high value of 44(20.1%) for 2000g (2kg), 41(18.7%) for 1000g (1kg), 24(11%) for 1800g (1.8kg), 20(9.1%) for 2500g (2.5) kg) and 19(8.7%) for both 1500g (1.5kg) and 3000g (3kg). Others used 16(7.3%) for 1700g (1.7kg) and 7(3.2%) for .900g (.9kg), 1200g (1.2kg) and 1300g (1.3kg) respectively. The least were 4(1.8%) for 1900g (1.9kg) and 4000 (4kg) and above. Quantities of food used during dinner dropped by 500g (1/2kg) compared to quantities of food intakes during breakfast and lunch. However, during dinner quantities of food intake that ranges from 65(29.7%) for 1500g (1.2kg), 48(21.9%), 31(14.2%), 18(8.2%), 11(5%), 9(4.1%) for 3000g (3kg) were consumed. Similarly, 8(3.7%) for 0.900g (.9kg) were used while 4(1.8%) for 1600g (1.6kg), 2000g (2kg) and 2600g (2.6kg) respectively. 17(7.8%) of respondents did not respond, implying that during evening meals, less food was consumed by respondents with less quantity of food used in food preparation.

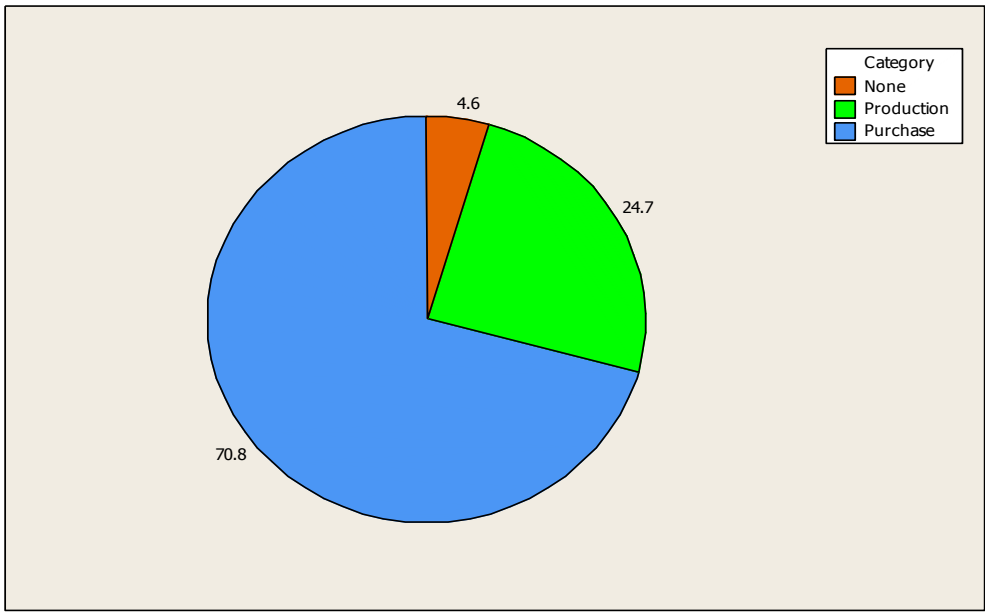


Figure 4.2.2b xix: Sources Of Food Used For Breakfast Among Low-Income Households, Kaduna State.

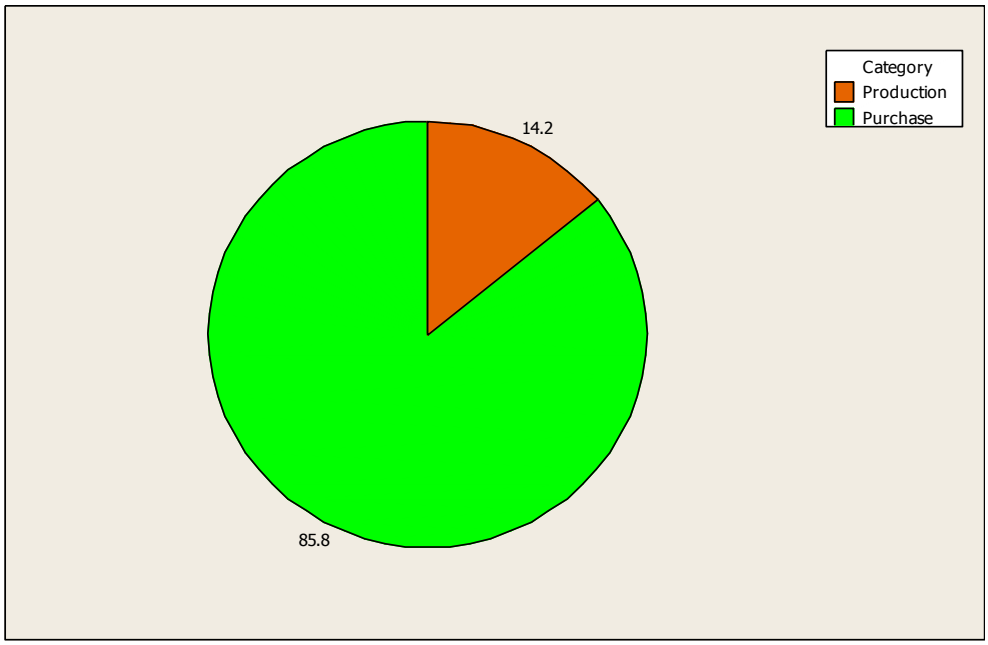


Figure 4.2.2b xx: Sources Of Food Used For Lunch Among Low-Income Households, Kaduna State.

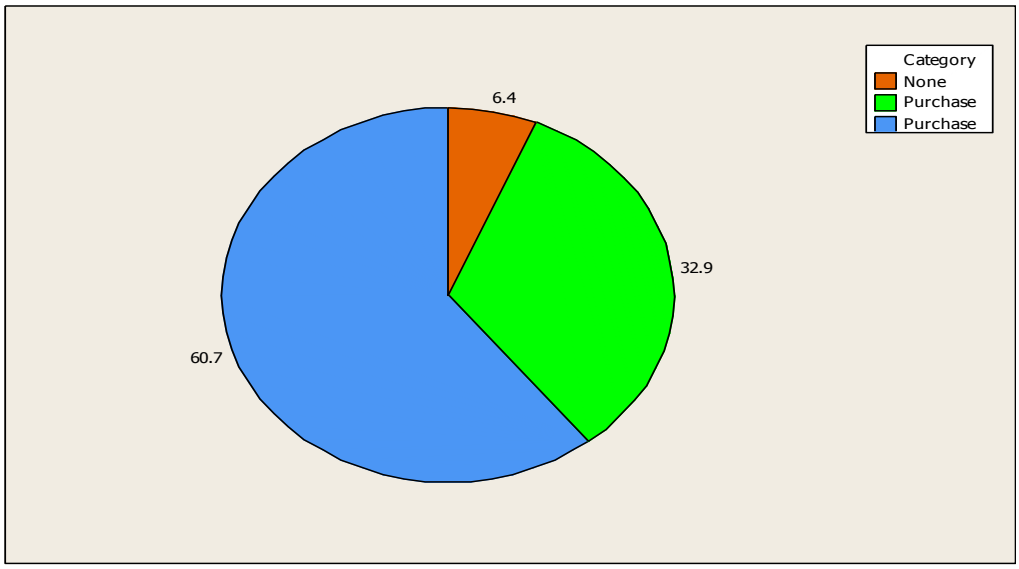


Figure 4.2.2b xxi: Sources Of Food Used For Dinner Among Low-Income Households, Kaduna State.

Sources Of Food Used

Results from figures 4.2.2b xix, xx and xxi revealed sources of food items used to prepare breakfast, lunch and dinner were largely purchased with breakfast 155(70.8%), lunch 188(85.8%) and dinner 133(60.7%) respectively. While others source of food items were through crop production with breakfast 54(24.7%), lunch 31(14.2%) and 72(32%) for dinner. The implication here is that low-income families purchased most of their foodstuff from market.

From the findings therefore, the anthropometric measurements used for the assessment indicated an excellent and good result with skin fold and mid-upper-arm circumference and the body mass index showed normal weight dominating, indicating good nutritional status. The food intakes of respondents were more of maize flour and vegetable soup (Kuka).

RESEARCH QUESTIONS THREE:

WHAT ARE THE POVERTY ALLEVIATION STRATEGIES USED AND FOOD SECURITY BETWEEN LOW-INCOME HOUSEHOLDS FEDERAL TERTIARY INSTITUTIONS OF KADUNA STATE?

Research question three presented analysis of data collected on poverty alleviation strategies adopted by low-income households. Tables 4.2.3 i to 4.2.3 ix have sub-headings in this section.

Table 4.2.3 i: Distribution of Agricultural Activities Engaged As Poverty Alleviation Coping Strategy Among Low-Income Households, Kaduna State.

Agricultural Activities	Frequency	Percent	Cumulative Frequency
NO RESP	49	22.4	49
Crop Production	139	63.4	188
Livestock Production	31	14.2	219
Total	219	100	

Table 4.2.3 i revealed that 139 (63.5%) respondents adopted crop production as agricultural activities while 31; representing 14.2% respondents, adopted livestock production and the rest 49 (22.4%) respondents did not adopt any agricultural activity as poverty alleviation strategy. The breakdown in Table 4.2.3 i implied that majority of the households engaged in crop production presumably to sustain food supply to the family thereby ensuring food security.

Table 4.2.3 ii: Distribution On The Means Of Land Acquisition for Agricultural Activities Among Low-Income Household, Kaduna State.

Means of Land Acquisition for Agricultural Activities	Frequency	Percent	Cumulative Frequency
NO RESP	66	30.1	66
Through Inheritance	12	5.5	78
Purchase	71	32.4	149
Short term lease or loan	70	32	219
Total	219	100	

Table 4.2.3 ii revealed the respondents distribution by means of land acquisition for agricultural activities, and showed that 12(5.5%) respondents acquired land through inheritance while 71 (32.4%) obtained land through purchase. Seventy (70) representing 32.0% respondents however acquired land through short-term lease or loan and the rest 66 respondents had no land or did not indicate their means of land acquisition. This implies that majority (≥ 64 %) of the low income household respondents of Federal tertiary institutions in Kaduna State acquired land for agricultural activities through purchase or, short-term lease or loan. One third of the respondents (30.1%) did not respond to this question implying their none participation in agricultural activities. Households were likely to overstretch available food items to depend on the meager income paid which in effect will affect their food security status.

Table 4.2.3 iii: Distribution Of Hectares Of Land Used By Low-Income Households, Kaduna State

Number of Hectares of Land for Agric. Activities by Respondents	Frequency	Percent	Cumulative Frequency
NO RESP	63	28.8	63
1 hectare	64	29.2	127
2 hectares	22	10.0	149
3 hectares	25	11.4	174
4 hectares	6	2.7	180
5 hectares	39	17.9	219
Total	219	100	

Table 4.2.3 iii revealed the number of hectares of land owned by respondent low income households in Federal tertiary institutions in Kaduna State for agricultural purposes. A total of 63 representing 28.8% respondents did not indicate the number of land they had or do not have for their agricultural activities. A total of 64 representing 28.8% respondents had only 1 hectare of land for agricultural activities while 22(10.0%) other respondents had 2 hectares of land. However, 25(11.4%) others had 3 hectares of land for their agricultural activities, while 6 (2.7%) respondents had 4 hectares of land. The rest 39 representing 17.9% respondents had over 4 hectares of land for their agricultural activities. That a total of 63 representing 28.8% respondents did not indicate the number of land they had or do not have for their agricultural activities implies that more than 70% of the low income households in Federal tertiary institutions in Kaduna State had at least1 hectare of land or more for their agricultural activities to ensure food security.

Table 4.2.3 iv: Distribution Of Source Of Loan For Agricultural Activities By Low-Income Households, Kaduna State.

Source of Loan	Frequency	Percent	Cumulative Frequency
None	87	39.7	87
Government	74	33.8	161
Community Bank	58	26.5	219
Total	219	100	

Table 4.2.3 iv revealed the sources of loan by respondents and showed that 87 of them; representing 39.7% respondents did not get any loan, but 74 representing 33.8% respondents received loan from government sources. Also, the rest 58 representing 26.5%respondents got loan from community banks. This showed that majority (60.3%) of the low income earner households received loans from government and community banks as source of poverty alleviation strategy.

Table 4.2.3 v: Distribution Of Financial Credit, Loan Or Grants By Low-Income Households, Kaduna State

Types of Financial Credit	Frequency	Percent	Cumulative Frequency
None	98	44.7	98
Government	77	35.2	175
Community Bank	12	5.5	187
NGO to run a business	32	14.6	219
Total	219	100	

Table 4.2.3 v showed that 98 representing 44.7% respondents did not receive any grant or financial credit, while 77 (35.2%) received such financial credit from the government. However, 12 (5.5%) respondents received loan from community banks while the rest 32 (14.6%) respondents received grants or loans from NGO to run their businesses. This implies that over 50 % of the low-income earners received financial credit or loans from Government and Non-governmental organizations. Federal government and other financial agencies involvements means they are committed in improving the livelihood of the low-income families.

Table 4.2.3 vi: Distribution Of Subsidy Enjoyed By Low-Income Households, Kaduna State.

Types of Subsidy Enjoyed	Frequency	Percent	Cumulative Frequency
None	171	78.1	171
Health care delivery scheme (Immunization, clean water, family planning etc)	35	16.0	206
Educational Scholarship or Bursary	13	5.9	219
Total	219	100	

A total of 35 of the respondents (Table 4.2. vi) representing 16.0% were on subsidy of health care delivery scheme while another 13 representing 5.9% respondents were on education scholarship. Majority numbering 171 (78.1%) of the low income earners were not in any subsidy scheme, implying they majority of the low-income households are responsible for their family health.

Table 4.2.3 vii: Distribution Of Sources Of Skill Acquisition Among Low-Income Households, Kaduna State.

Source of Skill Acquired	Frequency	Percent	Cumulative Frequency
None	120	54.8	120
Government	40	18.3	160
NGO's	26	11.9	186
Private Sector	33	15.1	219
Total	219	100	

According to Table 4.2.3 vii, 120 (54.8%) respondents had not acquired any type of skill by training while 40 (18.3%) respondents acquired skill from government source. However, 26 (11.9%) respondents received skill acquisition by training from NGO while the rest 33 (15.1%) respondents received training from private sectors. Implying that more low-income household heads had no opportunity in developing more skills that will help to improve their food security status and further reduce poverty.

Table 4.2.3 viii: Distribution Of Sale Of Farm Produce To Buy Food Among Low-Income Households, Kaduna State

Sales of Farm Produce	Frequency	Percent	Cumulative Frequency
No	91	41.6	91
Yes	128	58.4	219
Total	219	100	

A total of 128 (58.4%) of the low income earner respondents (Table 4.2.3 viii) sold their farm products to buy food stuffs, while the rest 91 (41.6%) do not. This implies that majority of the low income earner sold their farm products to buy food stuff as an alleviation strategy. This justified the result presented in Table 4.2.3 i that majority of low-income households of selected Federal tertiary institutions was involved in crop production thereby making food available to their households all year round

Table 4.2.3 ix: Distribution Of Ownership Of Backyard Garden Among Low-Income Households, Kaduna State

Do you have Backyard Garden	Frequency	Percent	Cumulative Frequency
No	20	9.1	20
Yes	199	90.9	219
Total	219	100	

Table 4.2.3 ix revealed that most low income earners numbering 199 (90.9%) had backyard garden to grow crops as alleviation strategy. Only 20 (9.1%) of the low income earner have no backyard garden. The implication here is that the low-income family's nutritional value will improve from the use of some plants such as vegetables that are grown around the house which will also reduce the cost of buying these crops from the market, hence poverty alleviation.

In summary, poverty alleviation strategies engaged by low-income households were mainly vegetable production, crop production and sale of farm produce to purchase other food stuff that was not readily available at home. They also utilized their backyard in growing vegetables which they used to improve their food security status. Therefore the low-income households in this sampled area were food secure with the agricultural activities engaged in as poverty alleviation strategies.

RESEARCH QUESTIONS FOUR: TO WHAT EXTENT DOES ENVIRONMENT AND HEALTH STATUS OF LOW-INCOME HOUSEHOLDS IN FEDERAL TERTIARY INSTITUTIONS HAVE RELATIONSHIP WITH THEIR NUTRITIONAL STATUS?

Research question was designed to enable the researcher answer questions that are related to environment and health. Tables 4.2.4 i to 4.2.4 iii showed the analysis

Table 4.2.4 i: Mean Result On Level Of Occurrence Of Common Diseases Among Low-Income Households, Kaduna State

S/No	Common Disease (Items)	How Often					Mean	Decision
		Most Often (5)	Often (4)	Sometimes (3)	Occasionally (2)	Never (1)		
1.	Malaria	21	50	82	60	6	3.12	Agreed
2.	Diarrhea	25	57	90	4	43	3.10	Agreed
3.	Measles	8	33	5	90	83	2.10	Not Agreed

Decision rule = 3. N = 219

Table 4.2.4 i showed that among common diseases associated with nutritional habit of the households in selected Federal tertiary institutions in Kaduna State. Malaria was the commonest and attracted the highest mean regularity of occurrence of 3.12. Details in Table 4.2.4 i showed that 82 respondents sometimes had malaria, 60 suffer from malaria occasionally, 50 respondents often had malaria, while 21 others most often had malaria and 6 never had malaria attack. The Table 4.2.4 i also showed that 90 respondents sometimes had diarrhea, followed by 57 of them that agreed they often had diarrhea. 43 respondents have never had diarrhea while 25 most often had diarrhea and just 4 occasionally had it. However, measles disease was the least disease

occurrence associated with the low income households as this attracted the least mean occurrence rate of 1.88. Table 4.2.4 i showed that 90 respondents occasionally suffer from measles while 83 often had it. 33 of the respondents experienced often, while 8 of them had measles most often and the least 5 sometimes had measles, this implies that malaria and diarrhea were the two most common health diseases associated with the low income households of Federal tertiary institutions in Kaduna State. The occasional occurrence of malaria and sometimes diarrhea could be associated with their environmental condition and the healthcare services available to them which will affect their nutritional status. For instance, malaria attacks human blood cells and diarrhea attacks the digestive system. Either way health of individuals will be affected particularly with children growth.

Table 4.2.4 ii: Distribution Of Immunization Profile Of Polio For Household Children Under 5 Years Among Low-Income Households, Kaduna State.

Measles Immunization for Children	Frequency	Percent	Cumulative Frequency
None	18	8.2	18
Some Immunization	21	9.6	39
All Immunization	180	82.2	219
Total	219	100	

The Table 4.2.4 ii revealed the immunization profile of polio diseases of low-income household children less than 5 years. The Table showed that 180 (82.2%) respondents allow all immunization concerning polio for their children while 21(9.6%) of them allow some immunization. By implication children in low- income households do not suffer ill-health from lack of immunization.

Table 4.2.4 iii: Distribution Of Immunization Profiles For DPT 1&2 For Children Under 5Years Of Low-Income Households, Kaduna State.

DPT 1 & 2 Immunization for Children	Frequency	Percent	Cumulative Frequency
None	39	17.8	39
Some Immunization	26	11.9	65
All Immunization	154	70.3	219
Total	219	100	

Table 4.2.4 iii showed the immunization profile for **DPT 1 & 2** diseases of low income household children less than 5 years as a result of their nutritional status. The Table 4.2.2 iii showed that 154 (70.3%) respondents allowed all immunization concerning **DPT 1 & 2** for their children and 39(17%) did not allow any DPT 1&2 for their children less than 5years, while 26 (11.9%) respondents allowed some immunization. However, Tables 4.2.2 ii to 4.2.2 iii showed that among the three diseases, measles, polio and DPT 1 & 2, measles were the one that majority 180 (82.2%) respondents of the low income households allowed all immunization for their children less than five years. This was followed by Polio for which 168 (76.7%) respondents allowed all immunization for their children. DPT 1 & 2 was the least as 154 (70.3%) respondents allowed all immunization for their children. Implying also that low- income households had immunizations for their children particularly measles which means awareness prompt to all set of people through health talk, grass root information, media and community sensitization. Therefore with most children been immunized the disease may not be prominent in this study and are likely not to have low nutritional status.

The low-income families took adequate steps in ensuring routine immunization against some communicable diseases that are likely to affect the family and community as well which also helped to enhance their good health. Therefore, a clean environment results to sustainable good health which will in turn lead to proper utilization of food intake.

RESEARCH QUESTIONS SIX: WHAT IS THE DIFFERENT BETWEEN INCOME AND NUTRITIONAL STATUS AMONG LOW-INCOME HOUSEHOLDS FEDERAL TERTIARY INSTITUTIONS OF KADUNA STATE, NIGERIA?

Table 4.2.6 i: Mean Score Monthly Income Level Of Low-Income Households, Kaduna State.

Monthly Income Level (CI=13,500) (N)	Frequency	Percent	Mean Scores of Nutritional Status	Standard Deviation
46,500-55,000	76	34.7	11.2	5.9
36,500-45,000	62	28.3	10.2	6.2
26,500-35,000	19	8.7	6.7	4.3
16,500-25,00	29	13.2	6.4	3.3
Less than 16,000	33	15.0	5.3	3.0
Total	219	100	7.1	5.7

Table 4.2.6 i revealed that between the income groups, nutritional status improved as income increased. For example, mean nutritional status of the respondents were 11.2, 10.2, 6.7, 6.4 and 5.3, for income levels of N 46,500-N55,000; N36,500-N54,000; N26,500- N35,000; N16,500- N26,000 and less than N16,000 respectively. This shows that the higher the income level (N46, 500-N55, 000), the higher the nutritional status of members (11.2) of such higher income group; implying that a higher income level (N46, 500-55,000) will benefit the low income households to improve their nutritional status. In summary, the results showed that differences occurred even in their nutritional status due to high income. Therefore, the higher the income the more a reasonable level of nutrient intake is maintained**.**

TESTING OF RESEARCH HYPOTHESES

The section tested six null hypotheses. The null hypotheses were tested at 0.05 alpha level of significance to find relationship between them. All the six null hypotheses were rejected. Tables 4.3.1b to 4.3.6 contained results of null hypotheses. Pearson Product Moment of Correlation, Regression Analysis and Analysis of Variance were statistical tools used to analyzed the data

NULL HYPOTHESIS ONE (b):

THERE IS NO SIGNIFICANT RELATIONSHIP BETWEEN FOOD ACCESSIBILITY AND NUTRITIONAL STATUS AMONG LOW-INCOME HOUSEHOLDS OF SELECTED FEDERAL TERTIARY INSTITUTIONS OF KADUNA STATE, NIGERIA

Table 4.3.1b: Pearson Product Moment Of Correlation Results On The Relationship Between Access To Food Items And Nutritional Status Of Low- Income Households, Kaduna State

Variable	N	Mean	Standard Deviation	Df	Correlation Index (r)	Sig (p)
Food Accessibility	219	31.4	6.98	217	0.67**	0.000
Nutritional Status	219	11.5	5.38			

Correlation is significant at the 0.005 level

Outcome of the Pearson Product Moment Correlation (PPMC) statistics, in the Table 4.3.1b revealed that significant relationship exists between food accessibility and the Nutritional status of low income households of Federal tertiary institutions of Kaduna state. This would be because the calculated P value of 0.000 is less than the 0.05 level of tolerance. The level of relationship between the two variables was high considering the correlation index level of 0.667 which is close to 1. This outcome implies that food accessibility of the low income households has significant relationship with their Nutritional status. Consequently, the null hypothesis which

states that there is no significant relationship between food accessibility and the Nutritional status of low income households of Federal tertiary institutions of Kaduna state was rejected

NULL HYPOTHEIS ONE (C):

THE NULL HYPOTHESIS STATES THAT THERE IS NO SIGNIFICANT RELATIONSHIP BETWEEN CONSUMPTION PATTERN OF FOOD AND NUTRITIONAL STATUS OF LOW-INCOME HOUSEHOLDS OF FEDERAL TERTIARY INSTITUTIONS OF KADUNA STATE.

Table 4.3.1c: Pearson Product Moment of Correlation Results Between Consumption Patterns Of Food And Nutritional Status Of Low-Income Households, Kaduna State

Variables	N	Mean	Standard Deviation	Df	Correlation Index (r)	Sig (p)
Consumption Pattern of Food	219	22.31	4.01			
				217	0.477**	0.000
Nutritional Status	219	11.50	5.38			

Correlation is significant at the 0.005 level

Table 4.3.1c outcome of the Pearson Product Moment Correlation (PPMC) statistics revealed significant relationship between regularity of food and Nutritional status of low income households in selected tertiary institutions, Kaduna state. This was because the calculated P value of 0.000 was less than 0.05 level of tolerance. The level of relationship between the two variables was high considering that the correlation index level was 0.477 < 0.05. This outcome implies that the regularity of food consumed had significant (P<0.05) influence on nutritional status of the low income household. The null hypothesis which states that there is no significant

relationship between Regularity of food and Nutritional status of low income households in selected tertiary institutions, Kaduna state was rejected.

NULL HYPOTHESIS TWO:

THERE IS NO SIGNIFICANT RELATIONSHIP BETWEEN ANTHROPOMETRIC MEASUREMENTS ANDNUTRITIONAL STATUS OF THE LOW-INCOME HOUSEHOLDS OF FEDERAL TERTIARY INSTITUTIONS IN KADUNA STATE, NIGERIA.

Table 4.3.2: Pearson Products Moment Of Correlation Results On The Relationship Between Anthropometric Measurements And Nutritional Status Of Low-Income Households, Kaduna State

Variables	N	Mean	Standard Deviation	Df	Correlation Index	Sig (p)
Anthropometric Measurement	219	46.88	4.91			
				217	0.51**	0.036
Nutritional Status	219	11.49	5.37			

Correlation is significant at the 0.05 level

Outcome of the Pearson Product Moment Correlation (PPMC) statistics in Table 4.3.2 revealed that significant relationship exists between the Anthropometric Measurements and the Nutritional status of low income households of Federal tertiary institutions of Kaduna state. This occurred because calculated P value of 0.036 was less than 0.05 level of tolerance at a correlation index r level of 0.506. The level of relationship between the two variables is somehow high considering the correlation index level of 0.506. This outcome implies that the nutritional status of low income households has significant relationship or influence on the Anthropometric

Measurement and vice versa. Consequently, the null hypothesis which states that there is no significant relationship between Anthropometric Measurements and the Nutritional status of low income households of Federal tertiary institutions of Kaduna state was rejected. Supporting that anthropometry is a good index of malnutrition.

Table 4.3.3 on regression analysis revealed significant relationship between the various poverty alleviation strategies used (independent variables) and food security (dependent variable) of the low income household respondents in selected tertiary institutions in Kaduna state. Reasons for these were that calculated regression R value of 0.688 and the calculated R value of 0.450 were above the 0.4 regression margin. Moreover, the calculated regression p (significant) value of 0.000 was less than the 0.05 alpha value of significance. Specifically, significant relationships exist between food security and type of agricultural activities, number of hectares of land for agricultural activities, availability of financial credit, acquisition of formal skill training and opportunity, sale farm produce to buy food, to grow vegetable in garden. Consequently, these showed that the various poverty alleviation strategies available had significant impact on food security of the sampled households. In summary therefore, the null hypothesis which states that 'there is no significant relationship between the various poverty elevation strategies used and food security of low income households of Federal tertiary institutions in Kaduna State was rejected.

NULL HYPOTHESIS FOUR:

THERE IS NO SIGNIFICANT RELATIONSHIP BETWEEN ENVIRONMENT AND HEALTH CONDITION AND NUTRITIONAL STATUS OF LOW-INCOME HOUSEHOLDS OF FEDERAL TERTIARY INSTITUTIONS IN KADUNA STATE, NIGERIA.

Table 4.3.4: Pearson Products Moment of Correlation Results On Environment And Nutritional Status Of Low-Income Households, Kaduna State.

Variables	N	Mean	Standard Deviation	Df	Correlation Index	Sig (p)
Environment and Health Status	219	30.01	4.56	217	0.66**	0.000
Nutritional Status	219	11.50	5.38			

Correlation is significant at the 0.005 level

Outcome of the Pearson Product Moment Correlation (PPMC) statistics (Table 4.3.4) revealed that significant relationship exists between Environmental and health condition and Nutritional status of low income households in Federal tertiary institutions, Kaduna state. This was because calculated P value of 0.000 was less than 0.05 level of tolerance at a correlation index r level of 0.664. The level of relationship between the two variables; 0.664, was considered a high correlation index level. This outcome implies that the nutritional status of the low- income household had significant relationship to the environment and health status and vice versa. Consequently, the null hypothesis which states that there is no significant relationship between Environmental and health status and the Nutritional status of low income households in Federal tertiary institutions of Kaduna state was therefore rejected.

NULL HYPOTHESIS FIVE:

THERE IS NO SIGNIFICANT RELATIONSHIP BETWEEN FOOD SECURITY AND NUTRITIONAL STATUS LOW-INCOME HOUSEHOLDS OF FEDERAL TERTIARY INSTITUTIONS, KADUNA STATE.

Table 4.3.5: Pearson Product Moment Of Correlation Result Of Food Security And Nutritional Status Among Low-Income Household

Variables	N	Mean	Standard Deviation	Df	Correlation Index	Sig (p)
Nutritional Status	219	8.98	5.72			
				217	0.71**	.001
Food Security	219	31.27	7.05			

Correlation is significant at the 0.005 level

Outcome of the Pearson Product Moment Correlation (PPMC) statistics (Table 4.3.5) revealed that significant relationship exists between Food security and the Nutritional status of low income households in selected tertiary institutions, Kaduna state. This was because the calculated P value of 0.001 was less than 0.05 level of tolerance at a correlation index r level of 0.714. The level of relationship between the two variables was high, considering the correlation index level of 0.714 which was close to 1. This outcome implies that the nutritional status of the low income household had significant relationship on food security. Therefore, the null hypothesis which states that there is no significant relationship between Food security and the Nutritional status of low income households in Federal tertiary institutions of Kaduna state, was therefore rejected.

NULL HYPOTHESIS SIX:

THERE IS NO SIGNIFICANT DIFFERENCE BETWEEN INCOME AND NUTRITIONAL STATUS OF LOW-INCOME HOUSEHOLDS OF FEDERAL TERTIARY INSTITUTIONS OF KADUNA STATE, NIGERIA.

Table 4.3.6i: Analysis Of Variance Of Statistics On Nutritional Statistics Of Low-Income Households

Variations	Sum of Squares	Df	Mean Square	F Ratio Calculated	F Critical	Sig (p)
Between Groups	1236.64	4	309.16	11.23	2.60	.00
Within Groups	5890.78	214	27.53			
Total	7127.43	218				

Table 4.3.6i: Presents analysis of variance (ANOVA) statistics on the difference among the different income levels and nutritional status of low-income households of Federal Tertiary Institutions of Kaduna State, Nigeria.

Table 4.3.6ii: Descriptive Statistics Of Mean Nutritional Status For Income-Level Of Low-Income Households, Kaduna State.

Monthly Income Level (N)	N	Mean Nutritional Status	Standard Deviation	Standard Error
46,500 – 55,000	76	11.18	5.93	.68
36,500 – 45,000	62	10.23	6.17	.78
26,500 – 35,000	19	6.68	4.28	.98
16,500 – 25,000	29	6.36	3.30	.61
Less than 16,000.00	33	5.20	3.02	.52
Total	219	8.98	5.72	.39

Tables 4.3.6ii revealed that significant differences exist in the nutritional status and the various monthly incomes of the low income households in the Federal tertiary institutions in Kaduna state. First, the calculated P value in the Analysis of variance statistics of 0.000 was less than the 0.05 alpha level of significant while the calculated F ratio value of 11.231 was higher than the 2.600 F critical value. Secondly, calculated mean of nutritional status of respondents were 5.1970, 6.3621, 6.6842, 10.2258 and 11.1842 by income levels of less than N16,000, N16,500 - N26000, N26500 – N35,000, N36,500 – N45,000, and N46,500 – N55,000 respectively. These showed that the higher the income level, the higher their nutritional status and vice versa.

Table 4.3.6iii: POST HOC MULTIPLE COMPARISM USING LSD PAIR WISE

Monthly Income (N) (I)	Monthly Income (N) (J)	Mean Difference (I-J)	Std. Error	Sig (p)
46,500-55,000	36,500-45,000	.96	.90	.287
	26,500-35,000	4.50*	1.35	.001
	16,500-25,000	4.82*	1.15	.000
	Less than 16,000	5.99*	1.09	.000
36,500-45,000	46,500-55,000	-.96	.90	.287
	26,500-35,000	3.54*	1.38	.011
	16,500-25,000	3.86*	1.18	.001
	Less than 16,000	5.03*	1.13	.000
26,500-35,000	46,500-55,000	-4.50*	1.35	.001
	36,500-45,000	-3.54*	1.38	.011
	16,500-25,000	32	1.55	.835
	Less than 16,000	1.49	1.51	.326
16,500-26,000	46,500-55,000	-4.82*	1.15	.000
	36,500-45,000	-3.86*	1.80	.001
	26,500-35,000	-32	1.55	.835
	Less than 16,000	1.17	1.34	.384
Less than 16,000	46,500-55,000	-5.998	1.09	.000
	36,500-45,000	-5.03*	1.13	.000
	26,500-35,000	-1.49	1.51	.326
	16,500-25,000	-1.17	1.34	.384

Source: Field Study, (2013)

* The mean difference is significant at the 0.05 level.

The Post Hoc multiple comparison using Least Significant Difference (LSD) pair wise method further confirmed where significant differences exist. Table 4.3.6c revealed that between income levels less than N16000 and N36500 – N45000, significant differences exist in their nutritional status, and also significant differences exist between income levels less than N16000 and N46, 5000 – N55, 000 because the calculated P value of 0.000 in each pair wise comparisons was less than the 0.005 alpha level of significant. Also, Table 4.3.6iii showed that there were no significant differences in the nutritional status of income levels less than N16,000 and N16500 – N26,000 and between less than N160000 and N26,5000 –N35000 because in each comparison calculated P values of 0.384 and 0.326 respectively were higher than 0.005 alpha value. In summary, the null hypotheses which states that there is no significant difference between income and nutritional status on the income levels of the low income households of selected Federal tertiary institutions of Kaduna State was rejected.

4.4. Discussion of Results

Data on demographic factor on ages of respondents showed that ages 36-45 years and 46-55 years brackets were dominant among the low-income families in the selected Federal tertiary institutions in Kaduna State. The data showed that among the low-income households, each family member had more than two adults in their homes and above 12 children. Meanwhile distribution of educational level of households revealed that majority of them completed their secondary school education. The information is in line with Gregory and Loprest,(2004), who observed that more than a quarter of full time heads of low income families were secondary school certificate holders and may not border to continue their educational carrier. Amaza, Umeh, Hesen and Adejobi (2006) suggested in their study that household heads with higher educational level would have a better and improved food security status for the family which may be applicable to findings from this study.

Results showed that respondents with household size of between 6-8 people and 3-5 persons had the highest number of members in their families (Table 4.1.8). The implication is that the higher the household size, the greater the responsibility in feeding and meeting other family needs (Idrisa, Gwary and Shehu, (2008); Maharjan and Chetri, 2006). However, some of the low-income households agreed that they earned between N46, 500-N55, 000 in a month, and between N36, 500-N45, and 000.00. Only few earned less than N16, 000 in a month which is below Nigerians approved minimum wage rate for Federal Government Workers. This implied that majority (N36,500-N55,000) of low-income household of the Federal Government workers actually have take home pay that is close to government approved rate and U.S. dollar of $1.25 per day. This agreed with the opinion of Onwuenmenyi, (2008) that about 50% of Nigerian workers live on less than $1.25 U.S dollar/day (210.00) that is $125/month (N64,500.00).

Outcome of the study revealed a significant relationship between food availability, food accessibility and nutritional status of the respondents. The result of findings could be as a result of available food items to the respondents, as it was discovered that majority of them supplemented what they used their salary to procure in terms of food items, from farming and home garden. This practice agrees with the position of World Food Summit (WFS), (1996) who suggested that one of the best ways to enhance nutritional status of family members; particularly in the third world countries, is to engage in the production of both staple and none staple foods through home garden and farming. Accordingly, this is one way to increase the level of access family could have to food items.

Subsequently, cereals and cereal products were the most accessible food items to low-income households (4.2.1b). The results revealed that they accessed cereal food items daily, followed by vegetables and fruits, sugar and honey, fats and oils respectively. The least accessible among these food groups were milk and milk products and eggs, roots and tubers and meat and fish. These representations in terms of accessibility of cereals and cereal products agreed with Oyebanji (2005) that cereal was among the major crop production in Nigeria with 22,729 metric tons production each year. Similarly, Igba (2009) found that low-income families in Ebony state adopted home gardening; among others, as a strategy to alleviate poverty. Another reason for this outcome may be because most low- income earners settled for food items that were considered cheap and easy to buy. This availed them opportunity to provide adequate food items for themselves (Abdullahi, 1999).

Findings on relationship between consumption pattern of food and nutritional status on how regular foods were consumed, may have contributed significantly to nutritional status of low-income households (4.2.1c). The result therefore is an indication of significant relationship

between consumption pattern and nutritional status. A possible reason for this outcome may be because of the spiral effect that regularity of food consumed may have in promoting nutritional status. For example August *et al.*, (2002) suggested that timing is important for adequate feeding and that any form of achievable nutritional status is dependent on how regular and adequate that food was consumed. According to Baker (2003) for instance, any discussion on nutritional status must take cognizance of how regular food occur and in what proportion. The outcome in this regard may have arisen from the position earlier advocated by August *et al*., (2002). This outcome can also be viewed from the position canvassed by Brown (2005) who suggested that attention must always be paid to how often and regular human meals are consumed when nutritional status is concerned.

Respondents opinion on effort towards improving their nutritional status used two parameters; namely, anthropometric and food frequency dietary intakes. Findings indicated that significant relationship exists between anthropometric measurements and nutritional status of low-income households. Accessing outcome of respondent's food intake was done through anthropometric measurements. The results revealed anthropometric analysis of children less than 18 years were above the median reference standard for height and for weight. The results also revealed that children between 12 and 17 years of age had the highest score with heights between 1.30m to 1.36m while between 26kg to 30kg had the highest weight. According to the findings on relationship between anthropometric measurements and the nutritional status, the results showed growth rate; as indicated by weight and height, may have made significant contribution to nutritional status; hence, the significant relationship between it and anthropometric measurements. The result is an indication of consumption pattern and nutritional status that could influence growth. World Health Organization (2010) provided a menu guideline which suggested

that timing is important for adequate feeding and that any indication of standard weight and height is a function of individual nutritional status which in itself is dependent on how regular and adequate the meal is taken.

Similarly, results showed the percentage distribution of adult male and female height, adult male and female weight, children Mid-Upper-Arm Circumference (MUAC), adult and children skin fold, and adult body mass index (BMI) respectively. The MUAC results showed a good nutrition for family members. Also shown were skin fold results of men having higher values of excellence and good, and women for excellent and good respectively. The body mass index (BMI) categories of underweight, normal weight, over weight and obese results revealed that underweight occurred rarely in low-income households of selected Federal tertiary institutions in Kaduna state. An interesting result was shown on the normal weight of low-income households. In contrast, some adults were seen with a relatively high rate of obesity. Despite that there was evidence of insufficient food and nutrition by this class of respondents, their food intake was predominantly over nutrition rather than under nutrition. This finding could indicate a potential for susceptibility to ailments like hypertension and diabetics; as obesity predisposes one to hypertension and diabetics (Puoane, Steyn, Bradshow, Laubscher, Fourie, Lamber and Mbananga, 2002; Vankart, 2010). In another situation, a change in dietary pattern and change of lifestyle will significantly affect the nutritional status of adults (FAO, 2001; 2003).

In order to ascertain the improvement in household food consumption, Wyshak (2000) recommended that eating occasion be used in conjunction with the number of different food groups consumed in a household. This provides a measure of the quality of diet consumed, thus serving as an important complement to the eating occasions indicator. Many household's eating occasions was more during the morning and evening meals. The results revealed also that some

respondents were not present during the time of any food before a morning meal was consumed and after the evening meal. Perhaps, most households in the study area commonly do not consume three meals per day. To some, this could be a way of rationing in the face of food shortages; in alliance with Baker (2003), that low-income households skip meals because they do not have enough access to food.

Similarly, opinion of households on time during which foods were consumed by households favoured between 6-7am during morning meal and 11.30-12 noon during mid-morning snacks. However, most households did not consume food after evening meal, perhaps many of them would have gone to sleep earlier than the eating time. These findings agree with Oranusi *et al*., (2007), that any reduction in food intake can result to a reduced amount of macronutrients; justifying significance of eating time on food intake per day for household members.

Findings from Figures 4.2.2b viii to x indicated the types of dishes prepared during breakfast; lunch and dinner were pap and bean cake (Kosai) 'kuka' soup with 'tuwon masara'. This implied that energy intake among this class of respondents was relatively well distributed (Cole, Taiwo, Nwagbara and Cole, 1997). Similarly, results on forms of dishes prepared showed that respondents indicated that during lunch and dinner, they adopted boiled, steamed, cooked, stewed and fried methods for food preparation. These were expected as the forms adopted by household members were right methods for dish preparations. The finding was contrary to that of Baker (2003) who claimed that the low-income families lack knowledge of proper food handling methods and preparation. For ingredients at breakfast, sugar had the highest percent followed by milk. Household members consumed more of 'kuka' and maize flour during lunch and during dinner. Households used up to 2000 grams of food during breakfast, 2,500grams during lunch

and another 2000grams during dinner. Households' source of food was through purchase for breakfast, lunch and dinner. This was in consonance with information in Table 4.2.3 which revealed that respondents sold most of their farm produce to purchase other food items; thus ensuring household food sufficiency. .

It was also discovered from the study that relationship exists between the various poverty alleviation strategies available and food security among the low income households of selected Federal tertiary institutions in Kaduna State (4.2.3i). It was observed that crop production was the agricultural activity they most engaged in followed by livestock production. This agreed with the findings of Alkali (1997) and Lawal (1997) who stated that agriculture has contributed immensely by helping to maintain a healthy population. That has been a source of food and nutrition for households in Nigeria. In support of this outcome, Benson (2008) position was that several intervention approaches like backyard gardening, subsistence farming, co-operative agricultural ventures are required to provide additional food that could guarantee food security and subsequently alleviate poverty that may result in malnutrition. Bane (2008) earlier reported that various poverty alleviation strategies have significant impact on food security of low income earners. This could possibly be because poverty alleviation strategies are multifaceted interventions aimed to reduce the effect of economic hardship in feeding among members of low income households.

Also, in support of this finding Davis (2002) submitted that by its very nature, poverty alleviation strategy is not only by a single method or approach, as such it is to be expected that some of the strategies will foreshadow positive impacts on food security and nutritional status of family irrespective of their socio-economic status. In addition, size of acquired land for agricultural purposes and nutritional status of households had significant relationship with

poverty alleviation strategy. Ordinarily, relationship between the two variables here should not come as a surprise because it stands to reason that the larger the size of cultivated land, the higher is the likelihood of farm yield and the more the food for the household. This position is in support of the earlier one by Food and Agricultural Organization (FAO) (2008) who reported a correlation between the volume (size) of acquired land for farming and the quantity of food produced from there. The size of land available (by acquisition) to low income earner therefore suggests the possible volume of food items that could be accessed and by extension the level of food security to be expected. Christiansen and Totlens (1995) and Ekaete (2008) had argued in favour of the high level of nutritional status where it is possible to guarantee a substantial size of acquired land for agricultural purposes particularly; food production among low-income families.

There were indications that respondents' means of land acquisition for agricultural activities were through purchase and short term lease or loan. Similarly, majority of the low-income household of selected Federal tertiary institutions in Kaduna state had only one hectare of land for agricultural activities. This agreed with Philip, Nkonya, Pender, Wale and Ayoola (2008) that one of the many constraints to sustainable agricultural production in Nigeria was land tenure insecurity. They suggested that agricultural policies in Nigeria should revisit this aspect in order to improve and encourage crop production.

The study also discovered that significant relationship exists between environmental, health condition and nutritional status of selected Federal tertiary institutions of Kaduna state. Supporting this view, Schroeder (2011) stated that health and food security are necessary to human life. The two are basic to and worth considering because they have at all times in specific context existed. For example, a lack or shortage of food can lead to health related problems such

as malnutrition and so on. Therefore good health is seen as the ability to withstand the effects of exposure to illness and injury. Also, sustainability of good health is a function of clean environment and where maintenance of clean environment is not possible because of economic implication, human health is bound to suffer. The study discovered that despite the low economic status of households that participated in this study, adequate steps were taken to ensure proper immunization of their children. This was one possible reason for the significant relationship recorded; hence Gorimani and David (1999) stated that exposing children to immunization as at when due, goes a long way to enhance their good health and maintain adequate profile. Besides, International Food Policy Research Institute (IFPRI) (2007) and Melamed *et al*., (2011) suggested that a conducive environmental health condition would be guaranteed if immunization for needy family member was given the priority it deserves. This may have been the case with respondents in this study, which may explain the significant relationship discovered between environment, health condition and nutritional status in this present study.

Respondents view on level of occurrence of common diseases among low-income households as related to their nutritional status revealed that respondents suffer from malaria and diarrhea more. This was in line with Baker (2003) and Odunze *et al.,* (2004) who showed that unhealthy environment attracts vectors and pests; such as flies, mosquitoes, rats, cockroaches and others. These pests and disease vectors contribute to spreading of diseases that can contaminate food and water sources and capable of destroying aesthetics of the environment. Among the diseases likely to be contacted include malaria and diarrhea.

Finding from results reveal that there was significant relationship between nutritional status and food security among low-income households of selected Federal tertiary institutions in Kaduna state. The findings agreed with Obamino *et al*., (2003) that any achievement in terms of

food security will need food availability, accessibility and nutritional status. The results showed that majority of low-income households were food secured. A relationship between food security and nutritional status of household exist when there is sufficiency of food at household level which results to good nutritional status. This relationship was not out of place because Idachaba (2004) explained that access to food by all household reveals the role family plays in food security. This means that, the households had access to nutritionally adequate and safe food; they had knowledge and skill to acquire, prepare and consume a nutritionally adequate diet.

The outcome of Analysis of Variance (ANOVA) revealed significant difference exists between income and nutritional status of low-income households of selected Federal tertiary institutions of Kaduna state. Nutritional status is associated with food intake which was taken to be dependent on income. Nutritional status of food intake is both an effect and a cause of income earning opportunities of individuals and household. A given level of income may of course be distributed differently by households between food and non-food items and will in turn affect the nutritional outcomes of given levels of income. The outcome of this findings and with differences in the categories of income, those of higher level income and lower household size have better accessibility to good food to subdue hunger and of good quality (Idrisa, *et al*., 2008). The findings contradicts Helen (2002), who opined that globally most people suffer from malnutrition and most of those under nourished are in low-income countries like Nigeria, no doubt about that.

Consequently, the real income of a household is an important determinant of its access to food, which in turn is a major determinant of nutritional status of its members. Food intake could taper off after a decline in level of income. However it is important that a reasonable level of calorie intake is maintained even at low levels of income if there are other means aimed at the

satisfaction of basic food needs of the poor. The Federal government development policies should therefore focus on this goal.

4.5. Summary of Major Findings

The findings were summarized based on objectives, of the study and revealed that food groups adequately available for low-income households were legumes/pulse/vegetables followed by fruits and roots/tubers/cereals. Household members had access to cereals and cereal products of all types. Most food consumed was grain or cereal and cereal products followed by legumes. Meat/fish/eggs were the least available and consumed by low-income households. Also, anthropometric measurements revealed that children's height-for-age and weight-for-age were above the median when compared with the reference standard to support that the low-income households' nutritional status were adequate with children, adults mid-upper-arm circumference and skin folds. Nutritional status of adults; using body mass index assessment, was adequate. A few of the adults recorded slight obesity.

Twenty-four-hours dietary intake analysis revealed that low-income families consumed more of carbohydrate and plant protein foods, perhaps due to their involvement in farming and/or that most of their foods were through purchase. Subsequently, the low-income households engaged in many poverty alleviation strategies; such as agricultural activities, after which they sale farm produce to buy other food items. Also, significant relationship exists between food security and poverty alleviation strategies used to improve their livelihood; such as, number of hectares of land they own, sales of farm produce to buy food and opportunity to grow vegetables in their home gardens.

Malaria and diarrhea were the two most common health diseases associated with the low-income households. Similarly, the third major disease that affects children under-five years was

measles. The low income households allowed their children to have complete immunization on polio mellitus. Also significant relationship exists between food security and nutritional status of the low-income families through interaction of food adequacy, food accessibility and consumption pattern of foods.

Further, monthly income level of low-income households had significant effect on their nutritional status, i.e., the higher the income level, the higher the nutritional status resulting from monthly income earnings. Most low-income families earning between N46, 500.00-N55, 000.00 had the highest mean in their nutritional status.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study was designed to evaluate the relationship among food security, nutritional status and poverty alleviation strategies of low-income households of Federal Tertiary Institutions in Kaduna State, Nigeria. Specific objectives of the study were to determine food security status using food availability, food accessibility and consumption pattern of low-income households, establish anthropometric measurement and their nutritional status; evaluate poverty alleviation strategies adopted; determine the environment and health conditions and examine income and how it affects their nutritional status. Survey research design was used to obtain data to the study. The population includes seven Federal tertiary institutions in Kaduna State with 1550 household heads. Multistage stratified sampling method was used to select sample size of 230 household heads. Sampling was done in stages. Purposive sampling method was used to select Kaduna State out of the 36 states in Nigeria, seven institutions and their sample sizes. Structured questionnaire, personal interview, anthropometric measurement and twenty-four-hour recall dietary intake were instruments used to collect data. Data collected were analyzed based on the objectives of the study.

Findings from data analyzed indicated that food security status of the low-income households were adequate with legumes and vegetables. Cereals and cereal products were accessed daily and they consumed grains (cereals) more often than any other food groups.

Analysis of data showed a significant relationship that existed between anthropometric measurement and nutritional status of low income households. The children's height-for-age and weight-for-age was above reference population, mid-upper-arm circumference of children and

adult indicators were of healthy category. Results of analysis also revealed that skin fold result was excellent for both children, adult male and female while the body mass index of adult were of healthy category for both male and female. Finding of food frequency dietary intake showed that the eating occasion of low-income household during morning and evening dominated with family members always present. Analysis also showed that household members consumed food between 6-7.30am during morning meal, 11.30-12noon for mid-morning and 1-2.30pm during lunch and 6-7pm during evening meals. Results on the types of food used during preparation showed that household consumed more of kuka soup and tuwon masara during lunch and dinners. Adopted acceptable forms of cooking methods (boiled, stewed, cooked, stewed and fried) were appropriate. Samples showed maize flour, okro, semovita, milk, tea, vegetables, tomatoes, onion and pepper were ingredients used more. Between 150-200g of food materials was cooked. It can therefore be concluded that the samples from 24hrs recall dietary intake and types of food consumed revealed that low-income households of Federal tertiary institutions of Kaduna State had good dietary intake which means good nutritional status.

Results of samples from poverty alleviation strategies used by low income families significantly alleviated conditions of respondents to stabilize their food security. This was shown from the strategies they adopted; such as crop production, back yard gardening, vegetable production, skill acquisition trainings and hectares of land acquired. We can therefore conclude that poverty alleviation strategies used helped to improve their food security status.

Findings from the study showed significant relationship between income and nutritional status of respondents. Household members with high income had higher nutritional status than the lower income households. It can therefore be concluded that higher income is necessary to

improve the nutritional status of low-income households of Federal tertiary institutions in Kaduna state.

5.2 Conclusion

Conclusions from findings of the study therefore, were that households in Federal tertiary institutions had adequate availability of legumes/vegetables, fruits, roots/tubers and cereals, accessed and consumed more cereals and cereals products. They however had low access and consumed little of animal protein. The low-income households were therefore food secured in legumes/vegetables, fruits and cereal. Also, the low-income households' nutritional status were adequate using anthropometric measurements of children: height-for age and weight-for age, children and adults mid-upper arm circumference and skin fold, adults body mass index assessments.

Nutritional status of low-income household's using food frequency dietary intake confirms that they consume more of carbohydrate and plant protein foods accessed through farming and/or purchase. Nutritional status and consumption pattern of low-income household members were adequate in carbohydrate and plant proteins. Also the low-income households adopted agricultural activities and sale of farm produce to alleviate poverty conditions of the households.

Malaria and diarrhea were dominant health diseases associated with the low-income households and had complete immunization for polio and Diphtheria Tetanus and Pertussis (DPT) 1 and 2. Also, food security and nutritional status of low-income households were strongly linked with their food availability, accessibility and consumption pattern. Income level of the low-income households in the range of N46, 500.00 to N55, 000.00 had the highest mean nutritional status among respondents.

Therefore, food availability, accessibility and consumption pattern of foods would impact food security and nutritional status on low-income households of Federal tertiary Institutions in Kaduna State.

5.3 Recommendations

i. Health workers and Home Economics Extension Agents should create further education/awareness on the importance of animal protein, how to access and use them along with plant protein and vegetables through workshops, cluster group discussions, posters, radio and television jingles, to improve on consumption pattern and nutritional status of low-income households.

ii. Non-governmental organizations (NGO's and CBOs), Nutritional Associations and Home Economists should advocate for improvement on food and nutrition security for maintaining adequate health status and appropriate food consumption through awareness campaign, seminars and workshops to benefit low income household workers of Federal tertiary institutions in Kaduna State and Nigeria as a whole.

iii. Federal Ministry of Education should incorporate Food security education in school curricula at tertiary institution levels in Home Management.

iv. Ministries of Agriculture in conjunction with World Food Organizations should encourage skill acquisition trainings through sponsorship to programmes in order to acquire skills on various poverty alleviation strategies to mitigate income shortfalls and improve food security status of the low-income households.

v. Federal Government States and private organizations should upgrade monthly income of low-income household workers to the range of between N46, 500.00 and N55, 000.00 to enhance their nutritional status.

vi. Parastatals in states and local Governments areas should enable soft loans and credits to facilitate Poverty alleviation strategies uptake by low-income households through cooperative societies.

5.4 Suggestions for further studies

It is suggested that future study should embrace quality and quantification of household foods consumed at individual homes. This will elicit information on nutritional quality of dietary intake to advice on appropriate nutritional quality and status of respondent sample populations.

A possible topic for this study could be:

i. Effect of Foods Consumed and Nutritional Status of Low-income Households: A Case Study of Low-income Households in Federal Tertiary Institutions'.

ii. Evaluation of nutritional quality and quantity of foods consumed in homes and nutritional status of children in urban areas of Kaduna State.

REFERENCES

Abdullahi, A. (1999). Food Policy And Food Security In Nigeria. *In Food Demand And Market Studies In The Drier Savanna Of Nigeria*. Proceedings Of A Methodology And Stakeholders Workshop. Kaduna State, Nigeria. Retrieved From http://www.foodafrica.nri.org.2009.

Adedeji, A. (1998). Protecting The Basic Defense Of The Nation, *Food Security Magazine Maiden Edition* I (1): 17.

Adegbenga, E. A. (2009*).* Food Insecurity And Coping Strategies Among Rural Households In Oyo State. Nigeria. *Journal Of Food, Agriculture And Environment, 7 (3&4):* 187- 191. Retrieved from http://www.world- food.net.2010.

Afolabi, M. (1993). *Research Techniques For Proposal. Reports. Thesis and Dissertation*, Zaria.

Ajiborsha, S.O. (2001). The Role Of Formal Institutions In Poverty Alleviation And Self Employment. Paper presented At The 1st Vocational Week Symposium Of The School Of Vocational Studies. Lagos State College Of Primary Education. In Emmanuel A.A, And Adebayo. A. A. (2005). *Gender Roles, Changing Family Functions And Intra-Household Economic Relations: Implications For Poverty Reduction And Human Development 6 (2):* 153-157.

Akanji, B.O. (2002). Globalization. Poverty And Food Security: The Linkages Of Gender Inequality And Agricultural Growth In Africa. Conceptual And Empirical Issues. *Journal For Political Theory And Research On Globalization, Development And Gender Issues.* Retrieved http://www.globilizationcija.com.

Alaimo, K. (2005). Food Insecurity In The United States: An Overview. *Journal Of Top Clinical Nutrition, 20 (40):* 28 1-298.

Alaimo, K., Olson, C. M., and Frongillo, E. A. (2001). Food Insufficiency And American School-Aged Children's Cognitive, Academic And Psychosocial Development. *Journal Of Pediatrics, 108 (1):* 44-53.

Alderman, H. (1986). *The Effect Of Food Price And Income Change On The Acquisition Of Food By Low-Income Households.* Washington D.C. International Food Policy Research Institute.

Alkali, R.A. (1997). *The World Bank And Nigerian Cornucopia Of Pandora Box?*, Kaduna: Baraka Press

Amaza, P.S., Umeh, J.C., Hesen, J. and Adejobi, A.O. (2006). *Determinants And Measurements Of Food Insecurity In Nigeria: Some Empirical Policy Guide.* Paper Presented At International Association Of Agricultural Economists' Conference. Gold Coast, Australia. August 12-26.

Amuwah, V., Maziy-Dizon, B., and Akinyele, I. (2005). *Strengthening Agriculture, Nutrition and Gender Linkages For Improvement Of Household Food Security And Reduction In Malnutrition In Nigeria.* Retrieved, http://wWW.chapter4foodutiIizationindonesia4.rnht. 2010.

Anderson, I. (2004). Urban *Farming: A Guide To Self-Help Development*. London. Intermediate Technology Publications.

Anderson, S. A. (1990). Core Indicators Of Nutritional State For Difficult-To-Sample Population. *Journal of Nutrition, 121,* 600.

Anyakoha, F. U. and Mbanefor, N. (2002). Nigerian Women And Household Nutrition Security In The New Millennium: Challenges And Enhancement Strategies. *Journal Of Nigeria Home Economics Research Association of Nigeria, 4:* 38-45.

Asharni, H. G. (1996). *The Attainment Of National And Global Food Security. F.A.O. Experience.* Abuja. Nigeria.

August, D. A., Teitelbaun, D., Albina, J., Bothe, A., Guenter, P. and Heitkemper, M. (2002). Guidelines For The Use Of Parenteral And Enteral Nutrition In Adult And Enteral. *Journal of Nutrition. 26 (1 .suppliment)* 25. A.

Babatunde, O. (2010). Poverty Alleviation In Nigeria: How Effective? Retrieved from http://www.page/povertyalleviationzaria.html 2010.

Babatunde, R.O., Omotosho, O. A. and Sholatan, O. S. (2007). Socio-Economic Characteristics And Food Security Of Farming Households In Kwara State, North-Central Nigeria. *Pakistan Journal Of Nutrition, 6:* 49-58.

Badcock, J. and Homasi, A. (1990). *Food Needs For Family Members: Suva, Fiji*: The University Of South Pacific.

Baker, S. (2003). Nutritional Status Of Low-Income Families. *Journal Of Family And Consumer Science Trend Analysis.* Retrieved from . http;//www.susan-baker@nesu.edu 2009

Bandalda, T. (2005). *Comparative Study Of Statistical Distribution And Efficiency Of Some. Poverty Estimates In Ibadan, Northeast Local Government Area, Oyo State. Nigeria.* (Unpublished M.sc Thesis). University Of Agriculture, Abeokuta.

Bane, M.I. (2008*). Poverty Reduction Strategies For The United States.*

Bassey, C. (2002). *Women & Food Security: A Study Of Vegetable Farming In Calabar Metropolis.* (Msc Thesis Dissertations Report). University of Calabar, Nigeria.

Battistini, N. C., Malaviti, M., Poli, M., & Pietrobelli, A. (2005). *Internal Journal Of Obesity, 29*: (14-18). Retrieved from http://vww.nature.corn/ijo/ 2011.

Bello, R. and Ajayi, O.O.S. (2000). *Research Methods And Statistical Analysis.* Ilorin Nigeria: Haylee Press and Publishing Company Limited.

Bender, A. E. and Bender, D. A. (2005). *Oxford Food And Nutrition Dictionary*. Pub. Oxford University Press. Retrieved from http://www.oxfordfoodandnutritiondictionary.html.2010.

Benson, T. (2008). Assessing Africa's Food And Nutrition Security Situation. *IFPRI 2020 Africa Conference Brief.*

Berdegue, J. A. and Escobar, G. (2002). Rural Diversity, Agricultural Innovation Policies And poverty Reduction. *Agricultural Research And Extension Network (AGREN) Network Paper No. 122.*

Bickel, G., Nord. M. and Price, C. (2000). *Guide To Measuring Household Food Security*. U.S Department Of Agriculture, Food And Nutrition Services. Alexandra VA.

Bogale, A. and Shimelis, A. (2009). Household Level Determinants Of Food Insecurity In Rural Areas Of Dire Dawa, Esthern Ethiopia. *African Journal Of Food And Agriculture, Nutrition And Development. 9:* (9).

Brown, J. E. (2005). *Nutrition Through The Life Cycle*. Second Ed. U.S.A.: Publisher Thomson Wadsworth

Castner, L. and Mabli. J. (2010). *Food Expenditures And Diet Quality Among Low-Income Households And Individuals*. Retr .http://.www.fns.usda.gov/org.

Chamber, R. (1883*). Rural Development: Putting The Last First*. New York: Longman

Chamber, R. (1995). Poverty and Livelihoods: Who's Reality Counts? *Journal of Environment And Urbanization, 7*, 173.

Chambers, R. and Conway, G.R. (1991). *Sustainable Rural Livelihood: Practical Concepts For The 21st Century*. Institute Of Development Studies.

Chase, L. Lindsay, P., Robert, M., Brender, L., Andrew, C., Coley, R. Pitman, L., Roff, J., and Votruba-Drzal, E. (2003). Mothers Transitions From Welfare To Work And The Well-being Of Pre-Schoolers And Adolescents. *Journal Of Science, 229(56):* 1548-1552.

Christiansen, L. and Totlens, E. (1995). *Food Security From Concept To Action-A Status Questions. K. U. Leuven And B.A.D.C.* Research Project In The Framework Of Policy. Preparing Research In The Field Of Cooperation In Development, Nr. 2, and Brussels. Belgium.

Christie, C. and Mitchell, S. (2000). *Handbook Of Medical Nutrition Therapy*: The Florida Diet Manual. FL: Florida Dietetic Association Light- House-Point.

Chung, K., Haddad, L., Ramakrishna, J. and Reilly, F. (1997). *Identifying the Food Secure: The Application Of Mixed Method Approaches In India.* International Food Policy Research Institute (IFPRI). Washington, D.C.

Coetzee, J.K, Graaff J., Hendricks F. and Woods G. (Eds). (2004). *Development: Theory And Practice.* Cape Town: Oxford Southern Africa.

Cole, T. J., Bellizzi, M.C., Flegal, K.M., Dietz, and W. H. (2010). Establishing A Standard Definition For Child Overweight And Obesity Worldwide: *International Survey. BMJ 320,*1240-1243.

Cronbach, I.I. (2003). *Improving Learning; An Evaluation Of Instructural Technology*, Bowlers Publishers, Dallas.

D'Silva, E. and Bysouth. K. (1992). *Poverty Alleviation Through Agricultural Projects*. Pub. World Bank ISBN: 0-8213-2200-1 SKU: 12200 Washington. Retrieved http://www.foodafrica.nri.org 2010.

Davis, C. G. (2002). Linkage Between Socio-Economic Characteristics, Food Expenditure Pattern And Nutrition Status Of Low-Income Households': A Critical Review. *American Journal Of Agricultural Economics, 64(5).*

de Onis, M., Frongillo, E.A. and Blossner, M. (2000). Is Malnutrition Declining? An Analysis Of Changes In Levels Of Child Malnutrition Since 1980. Bull. WHO, 78,1222-1233.

Denton, J. A. (1990). *Society And The Official World: A Re-Introduction To Sociology*. N.Y: General Hall, Dix Hills.

Derrickson, J. and Anderson. J. (1999). Face Validity Of The Core Food Security Module With Asians And Pacific Islanders. *Journal Of' Education, 32(1):*21-30.

Derrickson, J. P., Fisher. A. C., Anderson, J. E. L. and Brown, A. C. (2001). An Assessment Of Various Household Food Security Measures In Hawaii Has Implications For National Food Security Research And Monitoring. *Journal Of Nutrition. 1(31):* 57.

Devereux, S. and Maxwell S. (eds). (2001). *Food Security In Sub-Saharan Africa*. Pietermaritzberg: University of Natal Press.

Devereux, S. and Maxwell, S. (2004*). Food Security In Sub-Saharan Africa*. London: Pub. Intermediate Technology Development Group.

Drew, C., Hardman, M. I. and Hart, A. W. (1996). *Designing And Conducting Research*. Boston: Publisher, Allyn And Bacon.

Drewnowski, A. (2001). Diet Image: A New Perspective on the Food Frequency Questionnaire. Nutr. 59, 370-372.

Dwyer, F. (1998*). Dietary Assessment. In; Modern Nutrition And Health And Diseases*. (ME eds). Lippincott Philadelphia: Publisher, Williams And Williams.

Ekaete, I. (2008). A Case Study Of The Nutritional Status Of Children Of Low- Income Families In Samara Village Of Ahmadu Bello University, Zaria. *Journal of Home Economics Research, 9 (21):* 262-275.

Ellis, F. (1992). *Agricultural Policies In Developing Countries.* New York: Cambridge University Press.

Ellis, F. (2000). *Rural Livelihood And Diversity In Developing Countries. Bussiness and Economics.* Oxford University Press.

Ellis, F., Kutengulae M. and Nyasulu A. (2003). Livelihoods And Poverty Reduction In Malawi. *World Development*. 31:1495-1510.

Elurnilade, D.O., A, Asaolu, T.O. and Adereti, S.A. (2006). Appraising The Institutional Framework For Poverty Alleviation Programmes In Nigeria. *International Research Journal Of Finance And Economics, 3:* 66-77.

Emmanuel, A. A. and Adebayo, A. A. (2005). Gender Roles, Changing Family Functions And Intra-Household Economic Relations: Implications For Poverty Reduction And Human Development. *Journal Of Home Economics Research (JHER), 6(2):*153-157.

FAO, (1996). *Food Availability And Access To Food*. International Conference On Malnutrition Manual. Rome. Food And Agricultural Organization.

FAO, (2000). Food And Agricultural Organization Of The United Nations Rome: FAO.

FAO, (2001*). Food Security And Rural Livelihoods.* Retrieved http://www.fao.org/worldfoodsummit/english/fsheets/aids.ptf 2010

FAO, (2003). *World Agriculture: Towards 20 15/2030*. (ed). London: Jelle Briunsma, Earthscan.

FAO, (2008). Climate Change Adaptation And Mitigation. *Challenges And Opportunities For Food Security. Rome.* Retrieved http://www.ftp://ftp.fao.org/docrep/fao/meeting/013/k2545e.pdf.

FAO, (2009). World Bank And International Food For Agricultural Development.

Federal Office Of Statistics (FOS) (2004). Nigeria: Living Standard Survey 2003/2004. *Report Prepared By FOS In Collaboration With EU, World Bank, Department For International Studies,* Abuja. Nigeria. Pp 9-24.

Fekhardt, C. U. Adair. L.S., Caballero. B., Avila. J. Kon. I. Y., Wang. T. and Popkin. B. M. (2003). Estimating Body Fat From Anthropometric And Isotopic Dilution: A Four Country Comparison. *Journal Of Obesity Research, 11 (12):* 1553-1562.

Food And Agricultural Statistics, (2008). In Obayelu, A. E. (2010). Global Food Price Increases And Nutritional Status Of Nigerian: The Determinants, Coping Strategies, *Policy Responses And Implication. 5(2):* 67-80.

Foster, P. (1992). *The World Food Problem: Tackling The Causes Of Under Nutrition In The Third World*. U.S.A: Publisher Lynne Reiner. Boulder, Cob.

Foster, H., Falliuze, R. and Gallagher, R. (2014). Online Dietary Intake Estimation. The Food For Me Food Frequency Questionnaire. Journal of Medical Research, 6(6): e150. DOI:102196/Jmir, 3105

Fowler, F. J. (1995). *Improving Survey Questions: Design And Evaluation. Thousand Oaks*, CA: Saga.

Gibson, R. S. (1990). *Principles Of Nutritional Assessment*. U.K: Oxford University Press. Global Education, (2010). Retrieved http//www.1ao.org 2011.

Golden, O. (2005). *Assessing The New Federalism: Eight Years Later*. Washington DC: The Urban Institute Press.

Gravetter, and Forzano (2006). *Research Methods For The Behavioural Sciences*. 2nd Edition McGraw-Hill, Irwin, Boston.

Gregory, ACs and Loprest, P. (2004). Leaving Welfare: Employment And Well- Being Of Families That Left Welfare In The Post-Entitlement Era. Upjohn Institute For Employment Research. Kalamozoo MI.

Gregory, ACs and Nicholas, A. (2005). Working To Make Ends Meet*: Understanding The Income And Expenses Of American's Low- Income Families.* The Urban Institute. Low-Income Working Families. Paper 2. Washington DC.

Gregory, ACs and Pamela P. (2005).*Who Are The Low- Income Working Families*. Paper 1. Washington DC: Publisher The Urban Institute.

Gregory, ACs, Phillips, R. K. and McKenzie, D. (2001). *Playing by the Rules but Losing the Game: Americans in Low-Income Working Families. In Low-Wage Workers in the New Economy*. Washington DC: The Urban Institute Press.

Gross, R., Hans. S., Hans, P. and Hans-Joachim, A.P. (2000). *The Four Dimensions Of Food And Nutrition Security: Definitions And Concepts: Food And Nutrition Security.* Publisher DEUTSCHE WELTHUNGERHILFE.

Gross, R., Schultink, V. and Kielmann, A. A. (1999). Community Nutrition: Definition And Approaches. In: *Encyclopedia Of Human Nutrition*. London: Pub. Academic Press Ltd.

Habicht, J. P., Victoria, C. G. and Vaughan, J. (1997). Linking Evaluation Needs To Design Choices: A Frame Work Developed With Reference To Health And Nutrition. *UNICEF Staff Working Papers.* Evaluation And Research Series #EVL-97-003. Rome.

Haddad, L., Kennedy, E. and Sullivan, (1994). Choice Of Indicators For Food Security And Nutrition Monitoring. *Journal of Food Policy,(9):* 329-343.

Hamilton, W. L., Cook, J. T. and Thompson, W. W. (1997). Household Food Security In The United States. US Department Of Agriculture, Food And Consumer Service. Washington. DC.

Haraldsottir, J., Holm, L., Astrup A.V., Halkjoer J. and Stender S. (2001). Monitoring of Dietary Changes by Telephone Interviews: Results from Denmark. Public Health Nutrition: 4(6), 1287-1295.

Heidhues, F. (2004). Developing Strategies And Food And Nutrition Security In Africa: An Assessment, 2020 Discussion Paper 38. *International Food Policy Research Institutes.* Washington D.C.

Helen, H.J. (2002). Food Insecurity And The Food Stamp Programme. *American Journal Of Agricultural Economics, 84(5):* 1215 -1218 .

Herwig, H. (2000). Conceptual Frame Work Of Food And Nutrition Security. Publisher, DEUTSCHE WELTHUNGERHILFE.

High-Level Task On The Global Food Crises, (2008). Comprehensive Framework For Action. http://www.reliefweb.int/rw/RWFiles2008.nsf/FilesByFWDOCUnidFilename/EGUA-7GSPD6-full-report.pdf/#File/full-report.pdf2012.

Hoddinott, J. (1999). Operationalizing Household Food SecurityIn Development Projects: An Introduction, Technical Guide No. 1. Washington DC: *International Food Policy Research Institute.*

Hoddinott, J. and Yohannes, Y. (2002a). Dietary Diversity As A Food Security Indicator: Food Nutrition Technical Assistance. Published By FANTA.

Hoddinott, J. and Yohannes, Y. (2002b). Dietary Diversity As A Food Security Indicator. FCND Discussion Paper. Washington DC: International Food Policy Research Institute.

Hussein, K. (2002). The Relevance Of Livelihood Approaches To Food Insecurity Measurement. ELDIS/IDS.

Ibrahim, H., Uba-Eze, N. R., Oyewole, S.O. and Onuk, F. G. (2009). Food Security Among Urban Household: A Case Study Of Gwagwalada Area Council Of The Federal Capital Territory Abuja, Nigeria. *Pakistan Journal of Nutrition, 8(6):* 810-813.

Idachaba, F. S. (2004). Food Security In Nigeria: Challenges Under Democracy Dispensation. In Uko- Aviornoh, E.E. (2005). Family Education, Vocationalism And Food Security Of The Nigerian Child. *Journal Of Home Economics Research, 6 (2)*: 70-79.

Idrisa, Y.I., Gwary, M.M. and Ibrahim, A. (2008). Determinants Of Adoption Of Cassava Farming Technologies In Mubi North Local Government Area Of Adamawa State Nigeria. *Journal Of Production Agriculture And Technology, 2(2):* 26-36.

Igha, C. E. (2003). Family And Food Insecurity In Nigeria. *Journal Of Home Economics Research Association. 5 (2):* 119-125.

Ike, E. (2008). A Case Study Of The Nutritional Status Of Children Of Low Income Families In Samaru Village Of Ahmadu Bello University, Zaria. *Journal Of Home Economic Research 9:* 26-27.

Ikeokwu, N. (2008). The Global Food Crises And The Challenge To Nigeria. The Nigerian Village Square. Retrieved http://www.nigeriavillagesquare.com 2012.

Inter-Agency Standing Committee (IASC), (2005). *The Sphere*.

International Conference On Nutrition (ICN), (1992). *Caring For The Socio-Economically Deprived And Nutritionally Vulnerable. Major Issues For Nutrition Strategies*, Theme Paper#3, ICN/92/INF/7.Rome: FAO/ WHO.

International Farming Centre (2000). *Food Security: An Agent For Global And Local Change.* Cork Ireland: The International Famine Centre.

International Food Policy Research Institute (IFPRI) (2002*). Reaching Sustainable Food Security For All By 2020. Getting The Priority And Responsibilities Right.* Washington D.C.

International Food Policy Research Institute (IFPRI) (2007). *IFPRI's Strategy Toward Food And Nutrition Security: Food Policy Research, Capacity Strengthening And Policy Community.* Washington D.C. Retrieved DOI: http://wwwdx.org/l 0.2499/strate 2007.

International Food Policy Research Institute, (2007). *Characteristics And Causes Of Extreme Poverty And Hunger.* Retrieved http://www.ifpri.org/publication/world-mostdeprived.washington D.C: IFPRT 2009.

International Labour Organization, (1976). *Employment, Growth And Basic Needs: A One World Problem.* Geneva.

International Monetary Fund (IMF), (2008). IMF Reports. *Primary Commodity Prices.* http://www.imf.org/external/np/res/commod/index.asp2012.

Jacob, A. D. and Razaviel, A. (2002). *Introduction To Research In Education*, Sixth Edition. U.K: Wads worth Publishers

Johnson, B. and Christensen, I, (2000). *Educational Research: Quantitative And Qualitative. Approaches.* Boston: Publisher, Allyn And Bacon.

Kaiser, L. L., Martin. A. C., Metz, D. L., Nicholson, Y., Fuji, M. L, Lamp. C. Townsend. M. S., Crawford, P. B. and Melgar-Quinonez, H. (2004). Food Insecurity Among Low-Income California Latinos. *Journal Of California Agriculture, 58(1):* 18-23.

Kaiser, L. L., Melgar-Quinonez, H. and Townseed. M. S. (2003). Food InsecurityAnd Food Supplies In Latino Households With Young Children. *Journal Nutrition Education Behavior. 35:*53.

Katz, L. and Author, D. (1999). Changes In The Wage Structure And Earnings Inequality. *In The Handbook Of Labour Economics, 3:* 1463-1555.

Kazeem, O. (2008). Global Food Crises: Any Way Out For Nigeria? Centre Of Tri-Continental. Retrieved http://www.cent.be 2008.

Kekana, D.S. (2006). *A Socio-Economic Analysis Of Urban Agriculture: The Soshanguve Project Case Study.* University of Pretoria: Unpublished M.A. Thesis.

Kennedy, E. and Bouis, H. (1993). Agricultural Nutrition Linkages: Implications For Policy And Research. *IFPRI.* Washington D.C.

Kent, G. (2005). *Freedom from want: the human right to adequate food*. Georgetown. USA: University Press.

Khemmarath, S. (2002a) Key Concepts Of Food Security Retrieved From Khemmarath sitha@hotmail.com. NAPP-National Institute Of Agriculture Planning And Projection (2000). LAO PDR Food Security In The Period 2001-20l0.Vientians.

Khemmarath, S. (2002b). Key Concepts Of Food Security. Retrieved, khemmarathsitha@hotmail.com.

Kormawa, P. M. (2003). Pillars of Food Security In Rural Areas Of Nigeria. *Journal Of Food Africa*, Internet Forum Pp 1-6. Retrieved http://www.Obamiro@egiar.org 2008.

Landon-Lane, C. (2004). *Diversifying Rural Incomes Through Home Gardens.* Rome: FAO.

Lawal, A. A. (1997). The Economy And The State From The Pre-Colonial Times To The Present. In Osuntokun, A. And Olukoya, A. (Eds). Nigeria People And Culture Ibadan: Davidson.

Lgba, C. E. (2009). Strategies For Enhancing Food Security Among Low Income Households In Eboni State. *Journal Of home Economics Research. 10:* 193-202.

Louise, B. V. (2008). Poverty Alleviation: 21st Century Issues And Challenges.

Lucia, L. K., Martin, A. C., Metz, D. L., Nicholson, Y., Fujii, .M. L., Lamp, C., Townsend, M. S., Crawford, P.B., & Melgar-Quinonez, H.S. (2004). Food Insecurity, Prominent Among Low-Income California Agricultural Latinos. *Journal Of California Agriculture, 58 (10):* 18-23.

Mackey, C. S. (2004). Nutritional Assessment. Nutrition And Well-Being A to Z. Retrieved http://www.encyclopedia.com/topic/nutritionalassessment.aspx.2011.

Maharjan, K. L. and Chhetri, A. K. (2006). *Household Food Security In Rural Areas Of Nepal: Relationship Between Socio-Economic Characteristics And Food Security Status.* Paper Presentated At The International Association Of Agricultural Economist Conference. Gold Coast: Australia. August, 12-26.

Makinde, K.O. (2000). *Determinant Of Food Security In Bauchi Area Of Northern Guinea Savanna Of Nigeria.* Nigeria: Ph.D. Thesis. Department Of Agricultural Economics, University Of lbadan.

Mark, N. (2007). *Characteristics Of Low-Income Households With Very Low Food Security. An Analysis Of The USDA. GPRA. Food Security Indicator.* Economic Information Bulletin. Number 25.

Maslow, A. H. (1943). 'A Theory Of Human Motivation' *Psychological Review, 50: 370-396.*

Maxwell, S. and Frankenberger, T. (1992). *Household Food Security: Concepts, Indicators, And Measurements: A Technical review*. Rome: International Fund For Agricultural Development! United Nations Children Fund.

Maziya-Dison, B. Akinyele, I.O., Oguntona. L. K. Nkoe. S.. Sanusi, R. A. and Harris, E (2004). *Nigeria Food Consumption And Nutrition Survey 2001-2003.* International Institute Of Tropical Agriculture (IITA).

Mbanefor, N. (1994). Impact Of Better Life Programme Oil Palm Processing Technology On Drudgery And Income Levels Of Rural Women In Nigeria. Project Funded By The Carnegie Corporation Of New York.

McGriff, M. (2012). What Is The Meaning Of Theoretical Framework? Retrieved from http:www.com.ettow, 2013.

Melamed, C., Renate, M. H. and Ursula, G. (2011). *Jobs, Growth, And Poverty: What Do We Know, What Don't We Know, What Should We Know?* Retrieved (http://www.odi.org.uk/resources/details.asp?id=5752&title=jobs-growth-employment). London: Overseas Development Institute (ODI) 2012.

Micheal, J. K. (2006). Nutritional Status Classification Scheme Handbook. http://www.viewpublication.aspnutritionalstatus. 2009.

Molls, P. R., Ahiuwali, N. Mastro, A. M., Smicklas-Wright, H. and Handte, G.C. (2005). Nutritional Status Predicts Primary Subclasses Of T Cells and the Lymphocytes Proliferation In Healthy Older Women. *Journal Of Nutrition, 135 (11)*:2644-2650.

National Demographic Health survey (NDHS) (2003*). Nutritional Status Of Children In Nigeria. National Population Commission, Nigeria.* National Demographic And Health Survey, Calverton, Maryland.

National Institute Of Agriculture Planning And Project (2000). Lao PDR Food Security Strategy In The Period 2001-2010 Vientiane.

National Planning Commission (NPC) (2001). National Policy On Food And Nutrition In Nigeria.

Nelson, M., Ehren. B.. Bates, B., Church, S. and Boshier, T. (2007). Low- Income Diet And Nutrition Survey, Vol. 2: *Food Consumption Nutrient Intake.* London. Retrieved http://www.food.gov.uk/multimedia/pdfs/lidns-,vol. 02, 2010.

Novib, K. (2001). *Towards Food Security: Novib's Position On Food Security And Lessons Learned.* Novib. The Hague.

Nowak, S. (1981). *Introduction To Sociology The State Of Arts.* London: Spectrum Books.

Nwogu, B.G. (1991). *Educational Research Basic Issues and Methodology.* Wisdom Publishers Limited, Nigeria. 90

Nwogu, B.G. (2006). *Educationa*l *Research: Basic Issues And Methodology*. 2nd Edition. University Trust Publishers, Nsukka, Nigeria.

Obadan, M. I. (2001). Poverty Reduction Isn Nigeria: The Way Forward. CBN Economic And Financial Review, 39(4): 159-188.

Obamiro, E.O., Doppler, W., Ohamiro, E.O. Doppler, W., and Kormawa, P. M. (2003). Pillars of Food Security In Rural Areas Of Nigeria. *Journal Of Food Africa, Internet Forum* 1-6. Retrieved http://www.Obamiro@egiar.org 2008.

Obayelu, A.E. (2010). Global Food Price Increases And Nutritional Status Of Nigerian: The Determinants, Coping Strategies, Policy Responses And Implication. 5(2): 67-80.

Odunze, I.I., Mohammed, A.Z. and Ike, E. (2004). Waste Food Packaging Materials; Disposal Method: A Case Study Of A Nigerian Metropolitan City. *Journal Of Food, Agriculture And Environment; 2 (2):* 375-377. Finland: WFL Publisher.

Ogbonnaya, R. (2010). This-day. Food security-Harnessing Country's Agricultural Potentials. allAfrican.com.%20Nigreria%20Food%20Security-%.

Ohwovoriole, P. I. and Ochonogor, E.O. (2009). Implementation Of Food And Nutrition Policy For Security In Nigeria. Perception Of Homemakers In Warn Metropolis. *Journal Of Home Economics Research, 10 & 11:* 35-44.

Okeke, S. U. N. and Nwankwo, N. N. (2009). The Measures Households In Nigeria Can Adopt To Alleviate Poverty: *Journal Of Home Economics Research , l0 & 11 (100):* 75-78.

Okojie, C. E. E. (2002). *Gender And Education As Determinants Of Household Poverty In Nigeria.* World Institute For Development And Economic Research (WIDER). Department Of Economics And Statistics. University Of Benin, Nigeria. Discussion paper No. 20022137.

Okosun, I., Siwar. C. Abdul, S.I.I. and Abd, R.M. N. (2010). The Urban Poverty Alleviation In Nigeria And Attempt Towards Poverty Alleviation. *Journal Of Sustainable Development In Africa.12 (2):* 165-181.

Okoye, J.C. (2001). Towards A More Effective Sustainable Rural Development In Nigeria Via The System Approach. *Journal Of Multidiscipline Studies, 7(l):*119.

Olaitan, S.O. Alli, A., Onyernachi, and Nwachukwu, C.O. (2000). Poverty And Poverty Alleviation Initiatives In Nigeria, Nsukka: Publisher, *Nigerian Educational Research Association.*

:

Olayemi, I.K. (1998). *Food Security In Nigeria.* By Development Policy Center. Research Report No.2 Ibadan. Nigeria. Retrieved http://www.foodafrica.nri.org.2010.

Olinto, M.T.O., Victoria, C.G., Barros, F.C. and Gigante, D.P. (1994). 24-Hour Recall Overestimate The Dietary Intake Of Malnourished Children. Journal Of Nutrition, 125:880-884.

Omawale, M. J. (1984). Food Consumption And Poverty In Rural Jamaica. *Journal Of Ecology Of Food And Nutrition, 14.*

Omobunde-ldiado, S. N. and Konwea, E.P. (2009).Opinions f Nigerian Students in Tertiary 1nstitution On family Size. *Global Journal of Educational Research 8 (1&2):*39-42. Nigeria

Omonona, B. T. and Adetokunbo, A. G. (2007). An Analysis Of Food Security Situation Among Nigerian Urban Households: Evidence From Lagos State, Nigeria. *Journal Of Central European Agriculture, 8(5):* 397-406.

Onwaenmenyi, O. (2008). Impact Of FDI On Lives Of Nigerian. The Punch Newspaper, Pp 28.

Onyemelukwe, C. (2005). *The Science Of Economic Development And Growth: The theory Of Factor Proportions.* Armonk: M.E. Sharp Publishers.

Oranusi, S., Galadima, M. and Umoh, V. J. (2006). Toxicity Test And Bacteriophage Typing Of Staphylococcus Avenus Isolates From Food Contact. Surfaces and Foods Prepared By Families In Zaria, Nigeria. *African Journal Of Biotechnology, 5 (4):* 362-365.

Oshaug, A.,Eide, W. B. and Eide, A. (1992). Human Rights: A Normative Basis For Food And Nutrition-Relevant Policies. Food Policy, (6); 491-516.

Oyebanji, O. O. (2005). Food Security Situation In Nigeria. CAFSTON-Durbar Hotel Kano.

Philips, D., Nkonya, E., Pender, J., Wale, O. and Ayoola O. (2008). *Contract To Increasing Agricultural Productivity In Nigeria*. International Food Policies Research Institute. Retr.www.lfpri.org.

Pradhan, M., Sahn, D. and Younger, S. (2003). Decomposing World Health Inequality. *Journal Of Health Economics, 22 (2):*271-293.

Puoane, T., Steyn, K. Bradshaw, D., Laubscher, R., Fourie, J., Lambert, V. and Mbananga, N. (2002). Obesity In South Africa: The South African Demographic And Health Survey. *Obesity Research, 10:*1038-1048.

Quisumbing, A. L. (1995). *Women: The Key To Food Security. Food Policy Report.* Washington D.C.: IFPRI.

Reiely, F. N., Mock, B., Cogill, L. Bailey and Kennefick, F. (1999). *Food Security Indicators And Framework For Use In The Monitoring And Evaluation Of Food Programs.* IMPACT: Food Security And Nutrition Monitoring Project, Arlington, Via USA. Food and Nutrition Assistance Project (FANTA).

Reutlinger, S. and Selosky, M. (1976*). Malnutrition And poverty: Magnitude And Policy Options*, Baltimore: Pub. Johns Hopkins.

Robinson, C. H. (2000). *Normal And Therapeutic Nutrition*. London: Macmillian.

Robson, P. J. (1995). *Evaluation Of Food Photograph As A Method For Estimating Food Nutrient 1ntale In 24 hours Recalls.* Paper presentation at 2' International Conference on Dietary Assessment Methods. Boston, U.S.A.

Rosegrant, (2005). *Looking Ahead, Long-Term Prospects for Africa's Agricultural Development and Food Security*. Washington D.C.: IFPRI.

Rose-Phillips, K. (2002). Parent Work And Child Well-Being In Low-Income Families. The Assessing The New Federalism Occasional Paper 56. Washington D.C.: Urban Institute Press.

Sakswig, B. I., Gittelsohn, J., Harris, S. B., Hanley, A. J., Valente, T. W. and Zinman, B. (2005). A Pilot School-Based Healthy Eating And Physical Activity Intervention Improves Diet, Food Knowledge, And Self-Efficacy For Nature Canadian Children. *Journal Of Nutrition, 135 (10):*2392-2398).

Sampath, S. (2005). Sampling Theory And Methods. Advantages And Disadvantages Of Multi-Stage Sampling. http://www.navigation/search.com 2012.

Sanusi, R. S., Badejo, C. A. and Yusuf, B.O. (2006). Measuring Household Food Insecurity In Selected Local Government Areas Of Lagos And Ibadan. *Pakistan Journal Of Nutrition, 5:* 62-67.

Schroeder, B. (2011). Health and Food Security TC Local: Planning For Energy Decent In Tompkins Country. Retr. http://www.toclocal.org/2011/o.health-and-food-security.htm

Scoones, I. (2005). *Sustainable Rural Livelihood: A Framework For Analysis.* Institute For Development Studies. Working Paper 72, UK; Sussex.

Seidell, J. C. (2000). Obesity, Insulin Resistance And Diabetic: A world Epidemic. Britain *Journal Of Nutrition, 83 (suppl. 1):* 95-98.

Sen. A. K. (1981). *Poverty And Famines: An Essay On Entitlement And Deprivation*. Publisher: Oxford Clarendon Press.

Sharma, R. P. (1992). *Monitoring Access To Food And Household Food Security*. F.A.O. Committee On World Food Security.

Sibrian, R. (2008). Driving Food Security Information From National Household Budget Survey, FAO, Rome.

Simon, C. A. (1999) Anthropometric, Health And Demographic Indicators In Accessing Nutritional Status And Food Consumption. SD dimensions.

Smith, B. (2004). A Framework For Planning Nutrition Education Programme. Retrieved. http://www.fao.org/docrep/w3733/w37333eo3.htm2 of 29 2010.

Smith, L. and Haddad, L. (2000). *Explaining Child Malnutrition In Developing Countries.* A Cross-Country Analysis Research Report 111, Washington D.C.: IFPRI.

Smith, L. and Haddad. L. (1999). *Explaining Child Malnutrition In Developing Countries: A Cross Country Analysis*, FCND Discussion Paper No. 60. Washington. D.C.: International Food Policy Research Institute

Soha, R. (2009). Assessment Of Nutritional Status-Presentation Transcript. Retrieved http://www.slidehome.net/soharashed/assessment-of-nutritional-status.com 2011.

Spybey, T. (1992). *Social Change And Development: Modernity, Colonialism And The Development Of The West:* Cambridge: Polity Press.

Steeten, P. (1981). Basic Needs; Some Unsettled Question. *World Development, 12 (9):* 973-978.

Stewart, F. (1985). *Planning To Meet Basic Needs*; Macmillan. London.

Swedberg, R. (2002). The Medium Term Of Trade Liberalization Of OECD Countries On The Food Security Of Non-Member Countries. Paris Retr. www.fao.org/docrep/005/y4671e/y4671e05.htm. 2014.

The Financial Express. Corn (2007). Retrieved http://www.financialexpress.com/news/global-warning-eats-into-world-food-supply/2 2012.

The World Bank (2007). *Understanding Poverty*. http://en.wikipedia.org/wiki/poverty.

Torheim, L.E., Barikmo, I.E., Hatloy, A., Ouattara, F., Diarra, M., Solvoll, K. and Oshaug, A. (2001) Validation of a Quantitative Food Frequency Questionnaire for use in Western Mali. Public Health Nutrition 4(6), 1267-1277.

Tuckman, B.W. (1978). *Conducting Educational Research*. 2 (Ed). Publisher, Harcourt Bruce Jovanovich, Inc.

Ukeje, E. (2004). Modernizing Small Holder AgricultureTo Ensure Food Security And Gender Empowerment: Issues And Policy.

Uko-Aviomoh, E. E. (2002). Promotion Of Household Food Security And Integration In Nigerian Through New Product- Development. *Nigerian Journal Of Vocational Teacher Education, 3(2):* 83-90.

Uko-Aviomoh, E. E. (2005). Family Education, Vocationalism And Food Security Of The Nigerian Child. *Journal Of Home Economics Research, 6(2):*70-79.

Ukonze, J. A. and Ifeanyeze, F. O. (2008). Mechanism For Making Farmer Education Effective In Reducing Poverty Among Farmers. *Journal Of Home Economics Education, 9(21):* 331-339.

Ukpore (2001). *Fundamentals Of Consumer Education.* Judos Publishing Enterprise: Gift Prints Associates. Benin City, Nigeria.

UNDP (1990*). Human Development Report*. Oxford University Press. UK.

UNICEF, (1990). *Strategy For Improved Nutritional Nutrition Of Children And Women In Developing countries*. A UNICEF Policy Review, New York.

UNICEF, (2001). *Children And Women Right In Nigeria.* A Wake-Up Call And UNICEF 2001 National Planning Commission. Abuja.

UNICEF, (2006). Information Sheet On Nutrition. In ARPN. Journal Of Agricultural And Biological Science, 5(20), 2010.

UNICEF, (2008). Child Info-Monitoring The Situation Of Children And Women. In ARPN. *Journal Of Agricultural And Biological Sciences 5 No. 2.* 2010.

United Nation Standing Committee On Nutrition (2004). 31st Annual Report. Retrieved from http://www.parliament.uk/post2010.

United Nation World Food Programme (2002). *What Is Hunger?* http://www.wfp.org 2010.

United Nations (2006). *Biodiversitv For Food And Nutrition.* SCN News 32. United Kingdom: Lavenham Press.

United Task Force On Hunger (2005). Having Hung,It Can Be Done. Retrieved http://www.food security in developing countries, 2006.

USAID, (2002). Population Reports In Series. No. 51, Pp 9. Maryland.

USAID, (2008). *Nigeria Food Security Outlook*. Farming Early Warming [System Network]. Retrieved, http://www.fews.nets.2010.

USAIDA, (2002). Population Reports In Series Of Maryland. USDA 51 Pp 9. USAID, (2009). *Nigeria Food Security Update.* Retrieved, http://www.fes.net./foodinsecurityscale 2010.

USDA, (2002). *Strategic Plan For* FY2002-2007. Retrieved http://www.ocfo. usda.gov/ussdasp/pdf/sp2002.pdf.

Vandivere, S., Megan, G. and Kristin, A.M. (2004). Changes In Children's Well-being And Family Environments. Snapshots Of American Families, No 8. Washington D.C.: The Urban Institute Press.

Venkateswarlu, K. (2011) *Exercise For Disease Prevention And Health Promotion*. Nigeria: Publisher, Ahmadu Bello University Press Limited, Zaria Kaduna state.

Venner, S. A. S. and Seavey, D. (2006). Paradox Of OurTtimes: Hunger In A Strong Economy. Tuffs University Center On Hunger And Poverty. Medford, M. A.

Wagstaff, A. and Watanabe, N. (2000). *Socio-Economic Inequalities In Child Malnutrition In The Developing World.* Policy Research Working Paper 2434. World Bank. Washington D.C.

Wehler, C. A., Scott. R .I. and Anderson, J. J. (1992). The Community Childhood Hunger Identification Project: A Model Of Domestic Hunger-Demonstration Project In Seattle, Washington D.C. *Journal Of Nutrition Education 24:* 395-355.

Wendy, W., Heather, P., Julie A. and Karen, B. (2003). A Short Review Of Dietary Assessment Methods Used in National and Scottish Research Studies: Working Group on Monitoring Scottish Research Studies. Retrieved from http://www.cdc.gov/nchs/about/major/nhanes/datalink.htm

World Bank, (1986). *Poverty And Hunger: Issues And Options For Security In Developing Countries*. Washington D.C.

World Bank, (1993). *The East Asian Miracle: Economic Growth And Policy*. New York Oxford University Press.

World Bank, (2001). *Engendering Development Through Gender Equality In Righ*t. Resources And Voice. New York: Oxford University Press. http://www.en.wikipedia.org/wiki/poverty.

World Food Programme (WFP) (2000). *Emergency Food Security Assessment Handbook,* (2nd Ed.) Retrieved http://www.Chapter4foodutilizationindonesia4.mht 2009 pp.4.

World Food Summit (WFS), (1996). *World Food Summit Plan of Action*. FAO, Rome. 13th-17th November, 1996. Retrieved. http://www.fao.org/docrep/003/w361e/w3613e00.htm 2008.

World Food Summit, (1996). Rome Declaration On *World Food Security*.

World Health Organization, (2005). *Nutrient Requirements For People Living With HIV/AIDS.* Report Of A Technical Consultation. WHO. Geneva.

World Health Organization, (2008) *Global Database On Child Growth And Malnutrition.* World Bank. Life Expectancy At Birth: World Development Indicator.

World Health Organization, (2008). *The Global Food Crises:* Implication For The Health Of People In The WHO Regional Office For Africa. Retrieved, http://www.aspnjournals.com 2010.

World Health Organization, (2010). *Food Security*. Trade, Foreign Policy, Diplomacy And Health. Retrieved http://www.WHO%20%20Food%20Security.mht.2010.

Wyshak, G. (2000). Teenage Girls, Carbonated Beverage Consumption And Bone Fractures. *Journal Of Arch Pediatric Adoles Med. 154(6):* 610-613.

Young, H., Jaspars, S., Brown, R., Frize, J. and Khogali, H. (2001). *Food Security Assessment In Emergencies:* A Livelihoods Approach; [Humanitarian Practices Network]. ODI, Pp 36.

Zamaliah, M. M., Shamsul, A. Z. B. and Mirnalini, K. (1999). Assessment Of Dietary Intake Among University Students: 24-Hours Recall Verses Weighted Record Method. *Malaysia journal of Nutrition, 5:* 15-20.

Zeollick, R. (2008). *Food Crises.* How Prepared Is Nigeria? In Nigeria [Sunday THISDAY Newspaper]. April, 27, 2008. Pp 25.

Home and Rural Economics Programme,
Samaru College of Agriculture/DAC,
Ahmadu Bello University,
Zaria.
14th June, 2012.

The Provost,
Samaru College of Agriculture/DAC,
Ahmadu Bello University,
Zaria.

Dear Sir,

LETTER OF INTRODUCTION/PERMISSION TO CONDUCT RESEARCH IN YOUR INSTITUTION

I wish to request a letter of Introduction/Permission from your good office to enable me carry out the survey/questionnaire administration requirement for my PhD degree Dissertation. The Title of my dissertation is "Food Security, Nutritional Status and Poverty Alleviation among Low income Households in Tertiary Institutions in Kaduna State, Nigeria".

I will immensely appreciate your kind assistance in granting my request.

Thanks.

Yours faithfully,

Mrs. Ivy, I. Odunze

QUESTIONNAIRE

RELATIONSHIP BETWEEN FOOD SECURITY, NUTRITIONAL STATUS AND POVERTY ALLEVIATION COPING STRATEGIES IN LOW INCOME HOUSEHOLDS OF FEDERAL TERTIARY INSTITUTIONS, KADUNA STATE

SECTION A: Demographic/Socio-Economic Characteristics of Respondents

1. Age of household head

(a)	20 – 35	[ ]
(b)	36 – 40	[ ]
(c)	46 – 55	[ ]
(d)	56 – 65	[ ]
(e)	66 yrs and above	[ ]

2. Household Composition

(a)	Adults	[ ]
(b)	Children	[ ]

4. Educational level of Household head

(a)	Non-formal education	[ ]
(b)	Primary school not completed	[ ]
(c)	Completed primary school	[ ]
(d)	Secondary school not completed	[ ]
(e)	Completed secondary school	[ ]

6. Household size

(a)	1 – 2 persons	[ ]
(b)	3 – 5 persons	[ ]
(c)	6 – 8 persons	[ ]
(d)	9 – 11 person	[ ]
(e)	11 and above persons	[ ]

7. Estimated monthly household income (in Naira)

(a)	Less than 16,000	[ ]
(b)	16,500 – 26,000	[ ]
(c)	26,500 – 36,500	[ ]
(d)	36,500 – 46,000	[ ]
(e)	46,500 – 56,000	[ ]
(f)	56,000 and above	[ ]

SECTION B: FOOD SECURITY AT HOUSEHOLD LEVEL

A. Food Availability

1. Household monthly expenditure on food (in naira)

(a) 5,000.00 [ ]
(b) 6,000 – 10,000 [ ]
(c) 11,000 – 15,000 [ ]
(d) 16,000 – 20,000 [ ]
(e) 21,000 and above [ ]

2. How adequate are these foods provided in the home? (Tick appropriately)

Food Group					
Food items	**Very adequately**	**Adequate**	**Moderately Adequate**	**Fairly Adequate**	**Not Adequate**
Roots, Tubers & Cereals					
Yam					
Eba					
Fufu					
Amala Fish					
Pounded yam					
Sweet Potatoes					
Rice					
Tuwon Acha					
Tuwon Masara					
Tuwon Shinkafa					
Tuwon Alkama					
Ogi/Custard					
Irish Potatoes					
Porridge					
Plantain					
Bread					
Legumes/Pulses/ Vegetables					
Pepper					
Pumpkin leave					
Bitter leave					
Spinach					
Okro					
Cabbage					
Green peas/beans					
Cucumber					
Onions					
Beans					
Moi-Moi					
Kosai					
Melon					
Groundnut					
Lettuce					
Fats and Oils					
Butter					
Palm oil					

Groundnut Oil					
Vegetable Oil					
Soya Bean Oil					
Fruits					
Oranges					
Banana					
Paw – Paw					
Garden Eggs					
Mango					
Guava					
Apple					
Pineapple					
Water Melon					
Meat/Fish/Eggs					
Beef					
Goat Meat					
Pork					
Dog					
Sheep					
Chicken					
Snail					
Fresh Fish					
Frozen Fish					
Dried Fish					
Milk and Milk Products					
Evaporated Milk					
Skimmed milk					
Goat Milk					
Fresh Milk					
Powdered Milk					
Soya bean Milk					
Yoghurt					
Cheese					
Eggs					
Beverages					
Lipton tea					
Coffee					
Bonvita/Milo/Ovatine					
Cocacola/Pepsi/Fanta/ 7ups/Sprite drinks					
Maltina/Malta Guineas/Amstel Malt/Malta Gold					
Five alive/Chivita/ Fruita					

3. How often do you consume any of these foods in your home (Tick appropriately)

Variables	**Frequency**				
	Most often	**Often**	**Sometimes**	**Occasionally**	**Never**
Food Group					
Tubers/ Roots/ Cereals					
Cassava					
Plantain					
Yam					
Cocoa Yam					
Sorghum					
Millet					
Rice					
Gari					
Maize					
Wheat					
Acha					
Beans					
Milk/Milk Products					
Soya beans					
Milk (fresh)					
Yoghurt					
Cheese					
Powdered Milk					
Evaporated Milk					
Meat/Fish/Egg					
Beef					
Eggs					
Dried Fish					
Fresh Fish					
Goat Meat					
Dog					
Pork					
Chicken					
Snail					
Fruits/ Vegetables					
Apple					
Banana					
Pineapple					
Water melon					
Mango					
Guava					
Oranges					
Garden Egg					
Carrot					
Pepper					
Pumpkin or Ugu leaves					
Bitter leaves					
Apple					
Cucumber					
Lettuce					
Fats/Oils					
Palm oil					
Groundnut oil					
Vegetable oil					
Margarine					
Others					

B. FOOD ACCESSIBILITY (Tick as Appropriate)

5. How often do you have to access the following food items

Variables	**Frequency**				
Food Items	**Most often**	**Often**	**Sometimes**	**Occasionally**	**Never**
Fruits (e.g. orange banana)					
Vegetables (e.g. okra, spinach					
Roots/tubers (e.g. sweet potato, yam)					
Meat (e.g. beef, goat, meat)					
Fish (e.g. any frozen fish, dry fish)					
Grains (e.g. maize, millet)					
Legumes (e.g. bean, soya bean)					

C. Consumption Pattern

1. Identify food items consumed by household members

S/N	FOOD GROUP	TYPES OF FOOD	Daily	Twice daily	Three times a day	Once a week	Twice a week	Three times a week	Once a month
1.	Roots and Tubers	Eba, Fufu, yam flour, sweet potatoes, gari, cocoa yam, sweet potatoes, pounded yam							
2.	Cereals and cereals products	Pap, maize, tuwon masara, bread, biscuits, tuwon shinkafa, acha, tuwon acha, wheat, tuwon alkama, millet, sorghum, rice							
3.	Meat and Fish	Fresh fish, dry fish, chicken, beef, pork, frozen fish, pigeon, guinea fowl, duck, goat meat, liver, bush meat							
4.	Milk and Milk Product/Egg	Evaporated milk, powdered milk, soya milk yoghurt, fresh milk, Cheese, eggs							
5.	Vegetables and Fruits	Cabbage, ugu leave, Lettuce, Spinach, Bitter leaf, cabewa, okro, onions, pepper, tomatoe, cucumber, pawpaw, garden eggs, guava, pineapple, water melon, mango							
6.	Fat and Oil	Palm oil, groundnut oil, butter, vegetable oil, margarine							
7.	Beverages and Water	Tea, coffee, bournvita, ovaltine, milo, coca-cola drink, pepsi, fanta, maltina, malta guineas fruit juice, amstel malta, 7up sprite, water							
8.	Sugar and Honey	Granulated sugar, brown sugar, glucose powder, honey, sweetener							
9.	Others								

SECTION C: NUTRITIONAL STATUS OF HOUSEHOLD MEMBERS

1. ANTHROPOMETRIC MEASUREMENTS

Name of Institution:----------

S/N	AGE	HEIGHT (M)	WEIGHT (KG)	MID-UPPER ARM CIRC (CM)	SKIN FOLD	BODY MASS INDEX (KG/M^2)

2. TWENTY-FOUR HOURS RECALL FOOD INTAKE

a. Household Members by Age

Households members (male/female)	Adults 18-65yrs	Children 1-17 yrs

b. Eating Occasion

Are you present during the time food was consumed	Present	Not Present
Any food before a morning meal?		
Food during morning meal		
Any food between morning and midday meal		
Food during mid-day meal		
Any food between mid-day and evening meal		
Any food after the evening meal		

c. Time during which food was consumed (24 hrs recall). Tick appropriately

Time	Morning meal	Time	Mid-morning snacks	Time	Lunch	Time	Evening meal	Time	After evening meal
6am-7.30am		11.30am-12noon		1-2.30pm		4-5.30pm		10-11-30pm	
8am-9-30am		12.30-1pm		2.30-3pm		6-7-30pm		12-12.30pm	
10am-11am		1.30-2pm		3.30-4pm		8-9pm			

d. Type of dishes prepared during breakfast (Tick appropriately)

Dishes	Ingredients	Quantity (kg or g)	Source
a. Egg with tea & bread [ ]	a. Milk [ ]		a. Production [ ]
b. Tea & Bread only [ ]	b. Lipton tea [ ]		b. Purchase [ ]
c. Pap & Kosai [ ]	c. Coffee [ ]		
d. Potato chips with tea [ ]	d. Bournvita [ ]		
e. Potato chips with stew [ ]	e. Soya bean milk [ ]		
	f. Yoghurt [ ]		
a. Stew with boiled yam [ ]	a. Spinach/Ugu Leave [ ]		Production [ ]
b. Vegetable soup with Massa/Waina [ ]	b. Tomato [ ]		Purchase [ ]
c. Tea with fried yam [ ]	c. Onion [ ]		
d. Moi-moi with pap [ ]	d. Pepper [ ]		
	e. Carrot [ ]		
	f. Green beans [ ]		
	g. Fish [ ]		
	h. Meat [ ]		
	i. Milk [ ]		
	j. Sugar/Honey [ ]		
	k. Tea [ ]		

e. Type of dishes prepared during Lunch (Tick appropriately)

Dishes	Form of dish prepared	Ingredient	Quantity kg/g	Source (indicate by ticking)
a. Okro soup with Semovita [ ]	a. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.	a. Okro/kuka b. Fish/Meat c. Vegetables d. Palm oil/G/oil e. Rice		a. Production [ ] b. Purchase [ ]
b. Ewedu soup with Amala [ ]	b. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.	f. White Rice g. Beans h. Yam/Yam Flour i. Acha j. Wheat Flour		
c. Kuka soup with tuwon masara [ ]	c. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.	k. Garri l. Maize Flour m. Tomato n. Pepper/Onion o. Carrot		
d. Ogbono/okro soup with Eba [ ]	d. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.	p. Lettus q. Cabbage r. Green peas/Beans s. Crayfish t. Daddawa		
e. Egusi soup with Eba [ ]	e. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.			
f. Vegetable soup with Pounded yam [ ]	f. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.			
g. Vegetable soup with Tuwon Alkama [ ]	g. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.			
h. Taushe soup with Tuwon Shinkafa [ ]	Boiled, Steamed, Cooked Stewed, Baked			

	Fried, Poached. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached			a. Production [ ] b. Purchase [ ]
c. Stew with white rice [ ] d. Petan Acha [ ] e. Jallof Rice [ ] f. Portage Yam [ ] g. Portage Beans [ ] h. Spaghetti [ ]	Same as above	a. Okro/kuka b. Fish/Meat c. Vegetables d. Palm oil/G/oil e. Rice f. White Rice g. Beans h. Yam/Yam Flour i. Acha j. Wheat Flour k. Garri l. Maize Flour m. Tomato n. Pepper/Onion o. Carrot p. Lettus q. Cabbage r. Green peas/Beans s. Crayfish t. Daddawa		
Others				

f. Type of dishes prepared during dinner (Tick Appropriately)

Dishes	Form of dish prepared	Ingredient	Quantity	Source
a. Okro soup with Semovita [ ]	a. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.	a. Okro/kuka b. Fish/Meat c. Vegetables d. Palm oil/G/oil e. Rice		
b. Ewedu soup with Amala [ ]	b. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.	f. White Rice g. Beans h. Yam/Yam Flour i. Acha j. Wheat Flour		
c. Kuka soup with tuwon masara [ ]	c. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.	k. Garri l. Maize Flour m. Tomato n. Pepper/Onion o. Carrot		
d. Ogbono/okro soup with Eba [ ]	d. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.	p. Lettus q. Cabbage r. Green peas/Beans s. Crayfish t. Daddawa		
e. Egusi soup with Eba [ ]	e. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.			
f. Vegetable soup with Pounded yam [ ]	f. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.			
g. Vegetable soup with Tuwon Alkama [ ]	g. Boiled, Steamed, Cooked Stewed, Baked Fried, Poached.			

h. Taushe soup with Tuwon Shinkafa [ ]	h. Boiled, Steamed, Cooked Stewed, Baked			
	i. Fried, Poached. Boiled Steamed, Cooked Stewed, Baked Fried, Poached			
	j.. Fried, Poached. Boiled Steamed Cooked Baked Fried Poached			

SECTION D: HEALTH CARE AND ENVIRONMENT

1. Household member treats the following disease(s)

	Disease	**Most often.**	**Often**	**Sometimes**	**Occasionally**	**Never**
1.	Malaria					
2.	Diarrhea					
3.	Measles					

2. Immunization Profile of Children under 5 yrs

Category	**All Immunization**	**Some Immunization**	**None**
Measles			
Polio			
DPT 1 & 2			

SECCTION E: POVERTY ALLEVIATION STRATEGY BY HOUSEHOLD IN RESPONSE TO FOOD SECURIITY

Variables	**Poverty Alleviation Strategies by Households**	
a.	Which of Agricultural activities do you undertake? 1. Crop production 2. Livestock production 3. Fisheries	
b.	How do you acquire land? 1. Through inheritance 2. Purchase 3. Short Term lease or loan	
c.	How many hectares of land do you have?	
d.	Have you got any loan from 1. Government? 2. Community Banks? 3. NGO?	
e.	Have you got any financial credit, loan or grant by: a. Government? b. Community Bank? c. NGO to run a business?	
f.	Are you and your family on any subsidize: 1. Health Care Delivery System? Example (Immunization, Provision of clean water, family planning etc) 2. Education scholarship or bursary	
g.	Any formal skill acquisition training by: 1. Government 2. NGO's 3. Private Sector	
h.	Sales of farm produce to buy food	
i.	Have backyard garden	
j.	Grow vegetables	