

## **An Empirical Study of The Determinants of Household Food Consumption Expenditure In Gombe State**

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**ABSTRACT:** *The study is an empirical analysis of the determinants of household food consumption expenditure in Gombe state of Nigeria. The study used 2014/2015 General Household Survey data conducted by The National Bureau of Statistics of Nigeria, and a sample of 400 households was selected using multi-stage sampling technique. The result was analysed using ordinary least square regression model. Findings of the study revealed the significant impact of marital status and income of household head on food consumption expenditure. However, the study concluded that both demographic characteristics and economic factors affect household decision to consume on food in the study area. Therefore, the study recommends that there is need to provide employment opportunities among households including those with polygamous and monogamous marriages which aimed at fine-tuning their food consumption expenditure and ensuring a higher standard of living. Decision makers should also formulate policies aimed at increasing income level of workers so as to enhance their food purchasing power, reduce food insecurity and reduce poverty relative to food which ensure a higher standard of living in the study area.*

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### **I. INTRODUCTION**

Food is one of the most basic necessities of life. Every human being needs a minimum amount of it for existence and a balance diet to maintain sound health. However, where there are availability issues there is a great deal of deprivation and ignorance among the rural and even urban masses about a balanced diet. Normally this leads to various health problems, which ultimately affects the economic growth and prosperity of a country (Begum, Khan, Farooq, Begum & Irfan 2010). As noted also by McCracken & Brandt (1987) food is one of the basic human needs; hence it is at the top of Maslow's hierarchy of need. Food constitutes a key component of a number of fundamental welfare dimensions, such as food security, nutrition and health. It makes up the largest share of total household expenditure in low-income countries, accounting on average for about 50% of the households' budgets (Oteh, Agwu, Njoku & Agbai 2014).

Food consumption pattern and behavior differ across nations and cultures. In Nigeria, food consumption pattern had undergone remarkable changes over the last few years, specifically there has been an increase in the consumption of starchy foods like cassava, yams, maize and rice and some decreases in the consumption of protein based food items such as fish and meats (Oloyede, 2005). However, the nature and patterns of food expenditure reflect also the socio-economic characteristics of households. A household's relative expenditure on food is a reliable indicator of vulnerability, it describes household's capacity to cope with price increases, as well as their ability to remain productive by investing in health services, education, and other productive assets for its members. Furthermore, spending in excess of 65% of households' total expenditure on food is a clear indication of households' vulnerability which in turn forced them to choose between meeting their food and non-food needs or reduce consumption of one or both below their needs (Thirumarpan, 2013). Households have varying degrees of spending capacity which influences their spending patterns. According to Engel's law of expenditure in 1857, proportion of expenditure spent on food is inversely related to total income (Olayemi, 2004; Adeniyi, Omitoyin & Ojo, 2012).

Drescher & Roosen (2013) further opined that food is important in household expenditure because of the amount of income dedicated to food. They further submitted that, for most households spending on food is the largest expense followed by housing (rent, mortgage payments, opportunity cost or implied rent), but for richer households, it comes second after housing expenditure. Households with less income tend to spend higher percentages of income on food and this leaves less for education, housing and transportation.

In Nigeria, food consumption among the households could be said to be poor, this is evident as most households in Nigeria are not able to provide for their food consumption needs as it was estimated in 2004 that over 40% of Nigeria's population is food insecure (Fasoranti, 2011). Despite various policies, strategies and programmes on fine-tuning the food consumption pattern, the living standard is still below its potentials (Ogundari, Oluwatosin & Funilayo 2015).

Additionally, other studies that have been done on the food consumption expenditure in Nigeria and other countries of the world, to the best of our knowledge none of them was conducted in North Eastern Nigeria or even Gombe State (Fabiosa 2008; Lawal, Kolawole, Bolagum & Jami'u, 2011; Emmanuel & Ayoola 2013; Thomas, 2013; Babalola & Isito, 2014; Ndubueze-Ogaraku, Oyita & Onwukwe, 2016; Aminu, Adebajo & Mohammed, 2016; Moses, 2012; Adepoju, Ganiyu & Idowu, 2015 and Ogundari, Oluwatosin & Funmilayo, 2015). Furthermore, some studies have been conducted in Nigeria and other developing countries of the world on both socio-economic and socio-demographic factors that determine food consumption pattern but added little or no value as they failed to provide good recommendations to policy experts on how to improve the general welfare of people (Mignouna *et al.* 2015; Sdrali, 2007; Yimer, 2011; Joseph, 2012; Myrie & Robinson, 2013; Yeong-Sheng, Shamsudin, Mohammed, Abdallah, & Radam 2009; Yeong-Sheng, 2008; Rufino, 2015 and Fabiosa, 2008). Therefore, it is in the light of the above that this study intends to contribute to the literature by providing empirical information on the determinants of household food consumption expenditure in Gombe State of Nigeria.

## **II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK**

### **2.1 Concept and Types of Consumption Expenditure**

Consumption in economics is the selection, acquisition and use of goods and services for the satisfaction of wants (Thomas, 2013). Consumption may also refer to the entire pattern of living of individuals or groups of and to the non-economics as well as economic factors that influence consumer behaviour. The concept of "consumption expenditure" is very important in the sense that it idealizes the concept of price theory which measures the use of goods and services. Consumers attempt to maximize their life time utility in allocating their wealth between current consumption and future consumption (Dankwa, 1992).

Keynes (1936), defined consumption as the part of income that was not saved, thereby distinguishing between purchases that satisfy wants directly and investments that became assets in the absence of a satisfactory means of measuring the goods actually consumed, thus monetary measure of consumption has been widely accepted and used as a basis for predicting economic trend. But Friedman, M. (1972), opined that consumption represents the total quantity of goods and services bought and consumed by consumers during a period, that is, it is the expression of total consumer demand. He further said that the concept of consumption is important to the theory of income and employment. In economics, the word consumption simply means the using up of goods and services which may include the purchase of durable goods such as furniture or vehicles, as well as works of art that may increase in value over a period of time.

Schorfheide (2010) considered consumption expenditure as the amount that household spend on purchasing goods and services for consumption. He equally submitted that consumption expenditure is by far the most significant of all basic types of expenditure that causes product to occur and thus income to be earned. He also gave the view that in any economy in which people have free choice, the total volume of personal consumption expenditure is determined primarily by the amount of disposable income that people receive.

**Autonomous Consumption Expenditure:** Keynes (1936) defined autonomous consumption as that part of consumption spending that is independent from the level of income and reflects the influence of the non-income determinants on consumption expenditure. Autonomous consumption is also a part of consumer spending that is not influenced by the level of income (Rode, 2012). However, autonomous consumption according to Keynes changes when any of the non-income determinants of consumption changes. These are factors includes: consumer confidence, interest rates, expectations, wealth, income distribution, access to credit and health.

Autonomous consumption can also be regarded as consumption that is financed from sources other than income, for example inheritances, past savings, gifts or credit. A change in any of these variables will cause a change in the autonomous consumption expenditure and consequently consumption spending increases. It is also popular to regard autonomous consumption as that level of consumption that will prevail if income is zero (John & Mankiw, 1989).

**Induced Consumption Expenditure:** Induce consumption is a consumption expenditure that depends on income or production (especially disposable income, national income, or even gross domestic product). That is, changes in income induce changes in consumption. Induced consumption captures the fundamental psychological law put forth by John Maynard Keynes. It is measured by the marginal propensity to consume (MPC) and is reflected by the positive slope of consumption line. The alternative to induced consumption is autonomous consumption, which does not depend on income (Mhlongo & Daniel 2013)

According to Njimated, (2006) Consumption expenditures are induced because people are prone to spend the income they have. If they have more income, then they are inclined (that is, induced) to spend more. If they have less income, then they spend less. Mhlongo & Daniel (2013) induced consumption simply means that income is the most important factor affecting consumption expenditures. Other factors are important, but income is at the top of the list. People cannot buy if they have no income.

### **2.3 Theories of Consumption Expenditure**

This section will provide the different competing theories of consumption expenditure by different scholars, these theories includes: Keynes's absolute income hypothesis, Duesenberry's relative income hypothesis, Modigliani and Brumberg's life-cycle hypothesis and Friedman's permanent income hypothesis.

#### **2.3.1 Absolute Income Hypothesis**

The absolute income hypothesis is a theory of consumption proposed by a British economist John Maynard Keynes (1883-1946), and has been refined extensively during the 1960s and 1970s, notably by American economist James Tobin (1918-2002). The traditional theory of consumption that first explained the consumption behaviour of households before the modern theories was the Keynesian Psychological Law which states that "Men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not as much as increase in their income" (Keynes, 1936).

The Keynesian theory states that consumption depends on income, and the marginal propensity to consume (MPC) out of current income is high. Keynes was also of the view that average propensity to consume (APC) and marginal propensity to consume (MPC) decreases as income level increases. Keynes's basic model of consumption was that current consumption expenditures are determined mainly by current disposable income. The Keynesian consumption function is usually written in linear form:  $C_t = a + bY_t$ . The coefficient  $b$ , which Keynes called the "marginal propensity to consume" or MPC,  $C_t$  is the consumption, as an autonomous consumption and  $Y_t$  is the level of income, (Dornbusch, & Leslie 1989).

Duesenberry (1946) in his relative income hypothesis rejected the fundamental assumption of consumption theory of Keynes. He challenged the assumption of the independence of individual's consumption and postulated interdependence in consumption behaviour. He posited that consumption behaviour is not independent but interdependent on the behaviour of every other individual. He explained that people do not only derive satisfaction from consumption but also from how the consumption compares with that of others (Ahuja, 2013). However, the seminal study made by Kuznets (1946) a Nobel prize winner was a turning point in the development of the consumption function literature, because his study made use of long-run time series (Thomas, 1989). Kuznets showed that except for the Depression years, the APC in the U.S. over the period 1869–1938 fluctuated narrowly between 0.84 and 0.89. In other words, APC was approximately mean-reverted, such that even if income increased a lot, consumption kept almost a stable fraction of income; so consumption was a proportion rather than a function of income (Baykara & Telatar, 1992).

#### **2.3.3 Life-Cycle Income Hypothesis**

This hypothesis was designed developed by Franco Modigliani (1954) an Italian Economist and Brumberg (1980) to reconcile the discrepancy between cross-sectional findings and the findings of time-series analysis. In addition, the model was meant to capture the effect of liquid assets on consumption. Unlike the Keynesian consumption theory that is entirely based on the current income of the individuals, the concept of LCH assumes that all individuals consume a constant percentage of present value of their life income. The life-cycle theory assumes that individuals or families try to maximize the utility deriving from their entire life-cycle consumption. Therefore consumption must be continuous, even if income through the life-cycle is discontinuous; and saving is primarily done to finance consumption during the retirement period (Kankaanranta, 2006).

To them consumption pattern of individuals is greatly influenced by savings and assets accumulation over an individual's life (Balami, 2006). Modigliani and Brumberg's model emphasized how saving could be used to transfer purchasing power from one phase of life to another. In early life, labor income is usually low relative to later working years. Income typically peaks in the last part of the working life, then drops at retirement. Consumers who wish to smooth consumption would prefer to borrow during the early low-income years, repay those loans and build up wealth during the high-income years, then spend off the accrued savings during retirement (Parker, 2010).

### **2.4 Review of Empirical Literature**

This section will discuss the different empirical studies that have been conducted on the household food consumption expenditure in Nigeria, other developing countries and developed nations of world.

- **Age of the Household Head**

Many studies were conducted on food consumption that captured age of household head as one of the independent variables. For instance, Lawal, Kolawole, Bolagum, & Jami'u (2011) conducted a study on determinants of food demand among rural households in Oyo state, where they used total food expenditure as dependent variable and prices of food class, age of household head, household's size, sex of the household head, household's income, educational status and main occupation of the households as the independent variables. In addition, the study used primary data sourced through the use of questionnaire as a major instrument for data collection. Furthermore, the study selected one hundred and twenty (120) households using multi-stage sampling technique. Descriptive statistics and Almost Ideals Demand System (AIDS) were used in the analysis of data. The result indicates the positive significant relationship between the age of the household head and the household monthly food expenditure. The study also indicates that apart from prices of goods, there are many other factors such as age that determine the consumption of various food items by the rural households in the study area.

Similarly, Mignouna *et al.* (2015) analyzed the determinants of household food consumption expenditure in yam-growing areas of Nigeria and Ghana. In this study, the objective was to investigate which of the traditional determinants significantly explain household food consumption expenditure using standard regression techniques. The authors used total food consumption expenditure as dependent variable, while gender, age of household head, educational level, marital status, main occupation, total household income, household size, land property status, farm size, membership of formal and informal institutions, southern guinea savanna and derived savanna as an independent variables in their study. The study uses the cross-sectional data obtained from one thousand four hundred (1400) yam producing households of Nigeria and Ghana. The analysis of data was done using the standard ordinary least square (OLS) and quantile regression (QR) models for total food consumption expenditure. Results indicate that age is one of the important determinants of household food consumption expenditure in the study area.

More so, Yeong-Sheng (2008) investigates the household expenditure on food at home in Malaysia. In the analysis, food expenditure at home was taken as dependent variable. And independent variables were accepted as the stone price index, non-food expenditure, per capita income, expenditure on food away from home, household size, age of household below 24 years old, age of household between 25 and 55 years old, Malay, Chinese, Indian, employment, urban and gender. The study used the household data of the Household Expenditure Survey 2004/2005 obtained from the Department of Statistics, Malaysia. This study utilized the first stage of multi-stage budgeting framework in estimating food demand system in Malaysia. In addition, the study employed working-lesser functional form in line with ordinary least square in data analysis. The result indicates that age of household head is significant and one of main variables determines household food consumption expenditure in the study area.

- **Sex of the Household Head**

Kostakis (2014) investigates the determinants of household's food consumption in Greece which used total food expenditure as dependent variable, income of household head, gender of household head, retired, food prices, rent, number of kids as an independent variables. In this study, the objective was to illustrate the focal determinants of household expenditures on food in the study area. The study used primary data which employed questionnaire as an instrument for data collection. Furthermore, eight hundred (800) households were selected using stratified random sampling technique. In addition, the study used multiple ordinary least squares regression and logit model, while for performing the analysis STATA 12 statistical packages was used. The study indicates that sex of the household head is significant and one of the demographic and behavioral characteristics that determine the food expenditures across households in Greece.

- **Household Size**

Emmanuel & Ayoola (2013) examined the heterogeneity in rural household food demand and its determinants in Ondo State, Nigeria. The study used primary data which was sourced through the use of questionnaire as major instrument for data collection. Three-stage random sampling technique was used to select the sample of one hundred and twenty one (121) households in the study area. Thus, descriptive statistics of mean, standard deviation, frequency and percentage as well as Quadratic Almost Ideal System model were employed in the analysis of data. Findings from this study have shown that household size is positive and significant impact on food consumption among rural households in the study area. Arising from this, the study suggests that policy directed at increasing both farm income and non-farm income should be given paramount attention to increase expenditure and hence demand for food in the rural communities and make them food secured.

In addition, Adepoju, Ganiyu & Idowu (2015) conducted a study on socio-economic determinants of urban consumption of food away from home in Lagos state, Nigeria. In this study, the objective is to examine the determinants of consumption of food away from home (FAFH) in the urban sector. The authors considered

total expenditure on food away from home as dependent variable, while age, sex, marital status, household size, occupation, educational status, number of children under 6years, number of children between 7 and 13years, number of children between 14 and 17 years, number of female adult in the household, long working hours, number of working female adults, total number of visit per week, increase in income, distance to eatery outlet, easy access and household income as independents variables. The study used two stage sampling method to select 118 respondents that was used for the study. Data collected were analysed using ordinary least square model. The result revealed that household size is considered to be influence consumption of food away from home (FAFH) and is significant. Based on the rapid growing trend of consumption of food away from home consumption, this study recommends that FAFH should be taken up by approved and trusted sources putting the health and safety of the consumers into consideration and government agencies concerned with food and health safety should ensure that food served at eateries and restaurants are safe for consumption.

- **Level of Education of Household Head**

Aminu, Adebajo & Mohammed (2016) analysed the determinants of food expenditure patterns among households in Oshodi-Isole local government area of Lagos State, Nigeria. The authors considered household monthly food expenditure as dependent variable, while age of household head, sex of household head, education of household head, household size, household income, occupation of household head, tribe of household head and religion of household head as independent variables. Primary data used for this study was collected with the aid of one hundred and twenty well-structured questionnaires using simple random sampling technique with households being the unit of analysis. Data were analysed using descriptive statistics and ordinary least square (OLS) regression analysis. The study revealed that educational level is positive and significant at 1%, and is of the determinants of household monthly expenditure on food. It is thus recommended that training should be organized through workshops and seminars on how the household head can increase their income base through self-employment programmes so as to reduce dependence on governments.

Davis, Moussie, Dinning & Christaskis (1983) examined the socioeconomic determinants of food expenditure patterns among racially different low-income households in Florida, America. The study used monthly expenditure for food as dependent variable, while monthly money income of the household, household in the food stamp participation, household size, age of household head, location and educational status as independent variables. Primary data was employed which sourced through the use of interview as a major instrument for data collection. Three hundred households were selected using stratified random sampling technique. A double logarithmic functional form was used to analyze the data. Furthermore, finding of this study indicated that the general educational level of the household head registered no significant impact on household food consumption expenditures. However, the nutritional knowledge of the home maker increased the efficiency of food purchasing activities in the study area.

- **Location of Household**

Davis, Moussie, Dinning & Christaskis (1983) examined the socioeconomic determinants of food expenditure patterns among racially different low-income households in Florida, America. The study used monthly expenditure for food as dependent variable, while monthly money income of the household, household in the food stamp participation, household size, age of household head, location and educational status as independent variables. Primary data was employed which sourced through the use of interview as a major instrument for data collection. Three hundred households were selected using stratified random sampling technique. A double logarithmic functional form was used to analyze the data. Furthermore, location of household was found to exert a strong positive impact on food expenditures as it was discovered that urban household spent more than rural household on food consumption in the study area.

Myrie & Robinson (2013) examined the effects of world financial crises on food consumption spending among households in Jamaica. The authors used total food expenditure as dependent variable, while area of residence, sex of household head, household size and income level as independent variables. The study utilized data from Jamaica Survey of Living Condition 2007 and 2009. Two-stage of stratified random sampling technique was used to drawn sample size of 1,994 and 1,797 households in 2007 and 2009 respectively. However, the study employed analysis of variance (ANOVA) in the analysis of data. Furthermore, the study indicates that income level and area of residence are consistently significant determinants of food consumption in the study area. In addition, the finding indicates that location is one the factors that influencing food consumption expenditure in the study area. However, household food consumption is determined by the location of household as it was found food consumption is totally different between urban households and rural households.

- **Occupation of Household Head**

Joseph (2012) conducted a study on the socio-economic determinants of households' food expenditure in a low income township in South Africa. The authors used total food expenditure as dependent variable, while household income, household size, gender of household head, age of household head, marital status of household head, employment status of household head and education level of household head as independent variables. The study used primary data which obtained via the use of face to face interview. A random sample was used to select the sample of five hundred and eighty five (585) households in Bophelong which is the study area. Data collected were analysed using multiple regression model. The study revealed that employment status was found to exert a strong positive impact on food expenditures. However, employment status of household head is the most significant predictor of household food consumption expenditure in the study area.

- **Household Monthly Income**

Similarly, Thomas (2013) investigates the determinants of food consumption expenditure in Ekiti State, Nigeria. The objective was to analyze and evaluate the food consumption pattern of Ekiti people with respect to their income, price, family size, taste and the environment. In this study, food consumption expenditure is a dependent variable, while income, price, taste, family size, expenditure are independent variables. The study used primary data which obtained through the use of questionnaire as a major instrument for data collection. Thus, simple random sampling technique was used to select one hundred and eighty (180) households. However, Chi-square, frequency table and percentage were used to analyze the data. Furthermore, the study indicates that income is significant and tends to influence the food consumption expenditure more than other factors. It was discovered that both the higher and lower income classes tend to use the same proportions of their income for consumption purposes. However, it was recommended that since income was found to have a positive significant influence on the food consumption expenditure of people in the study area, any government policy that increase income level of workers to make them have a higher standard of living.

More so, Samuel, Hamdiya & Paul (2014) examined the food expenditure and household welfare in Ghana where they used food expenditure and welfare as dependent variables, while age of household head, sex of household head, age squared, education of household head, marriage of household head, household size, land, vehicle, durable assets, locality, coastal zone, savanna zone, regional distance and poverty status as independent variables. The objective was to investigate the determinants of household food expenditure and its effect on welfare in the study area. The study uses data from the fifth round of the Ghana Living Standards Surveys (2008). A simultaneous equations model was estimated using the two-stage least squares method in analyzing data. The findings confirm the theoretical and empirical evidences that households reduce percentage share of their food expenditure as their income increases. Also increase in the food budget share lead to a reduction in welfare.

### **III. RESEARCH METHODOLOGY**

#### **3.2 Description of the Study Area**

The Gombe State is located on the North-eastern region which is situated on the Northern Nigeria. It is one of the commercial nerves of north-eastern part which accommodates both the wealthy and poor. At the 2006 census it had a population of 2,353,000 people and total land area of 20,265km<sup>2</sup>. The state has eleven (11) local government areas which include: Akko, Balanga, Billiri, Dukku, Funakaye, Gombe, Kaltungo, Kwami, Nafada, Shongom and YamaltuDeba. Gombe State shares boundaries with Yobe State to the North, Adamawa and Taraba States to the South, Borno State to the east and Bauchi to the west. The state comprises many tribal groups which include: Tangale, Terawa, Waja, Kumo, Fulani, Bolewa, Jukun, Pero/Shonge, Tula, Cham, Lunguda, Dadiya, Banbuka, Hausa and Awak. Hausa is the commercial language amidst people. However, Gombe State is mainly populated by Fulani constituting more than half of the state population (more than 50%) other minor ethnic groups include Hausa, Bolewa, Tera, Tangale, Waja and Kanuri (Mikloda and Joshua, 2007).

The people of Gombe State are primarily farmers due to the fertile nature of their soil which allows them to produce crops such as: maize, sorghum, rice and wheat, cowpeas, groundnuts, soya beans and bambara nuts. Fruits: orange, lemon, mango, guava, pawpaw and grapes. However, irrigation agriculture is practiced during the dry season in the lowland fields, especially on river channels which are very fertile lands. Crops grown includes: Kenaf, sugar cane, sunflower and ginger. Beside their farming activities they also engage in basket weaving, pottery, blacksmithing, leather works, tailoring, knitting, carpentry, mechanical works, welding and a host of other activities. Industries in Gombe State include: Ashaka Cement PLC, Cotton Ginneries, Furniture and Block making industries, and other small scale industries. Gombe State is blessed with natural resources like Uranium, Gypsum and Limestone (Mikloda and Joshua, 2007).

### 3.4 Type and Source of Data

The study utilized secondary data. The study used 2014/2015 General Household Survey data which was conducted by National Bureau of Statistics (NBS) of Nigeria between the periods of 2014 to 2015.

### 3.5 Sample Size and Sampling Technique

The 2014/2015 General Household Survey covered thirty six states and Federal Capital Territory (FCT) Abuja, and it provided detailed information on households' food consumption as well as on their socioeconomic and demographic characteristics. In the survey, 500 enumeration areas (EAs) that cut across urban and rural areas were canvassed. But for the purpose of this study, Gombe state was selected from these thirty six states using purposive sampling technique. However, five local government areas were randomly selected in Gombe state to collect data during General Household Survey. Furthermore, the survey adopts probability sampling in the form of multi-stage sampling technique to select four hundred (400) households from these five local government areas such as: Akko local government where one hundred (100) households were selected, sixty (60) households from Balanga local government area, eighty (80) households from Billiri local government area, one hundred (100) households from Gombe local government area and sixty (60) households from Kwami local government area.

### 3.6 Variables Measurement

Just like any econometric model, the model adopted by this study comprises of both the dependent and independent variables. To conform to the literature, the variables captured in the model specified for this study are measured as follows:

#### 3.6.1 Dependent Variable

The dependent variable used in the study is the total monthly expenditure for food consumption by households in the study area in line with Aminu, Adebajo and Mohammed (2016).

#### 3.6.2 Independent Variables

- i. Age: This will be measured by age of household head in years in line with the study of Babalola and Isitor (2014).
- ii. Sex: This will be measured by sex of household head (1=male, 0=otherwise) following the work of Yimer (2011).
- iii. Number of Wives: This will be measured by number of wife in the households (1=monogamous, 0=otherwise).
- iv. Household size: This will be measured by number of people in the household in line with Adepoju, Ganiyu and Idowu (2015).
- v. Level of Education: This would be measured by the highest level of education attained by household head (1=tertiary, 2=secondary, 3=primary, 0=none) in line with Moses (2012).

### 3.7 Model Specification

Based on the literature reviewed, the appropriate model considers to fit this study is that of Aminu, Adebajo & Mouhammed (2016), Babalola & Isitor (2014) and Adepoju, Ganiyu & Idowu (2015). However, the model was applied with slight modification. Thus, the model is as follows:

$$TFE = \beta_0 + \beta_1 AHH + \beta_2 SHH + \beta_3 NOW + \beta_4 HHZ + \beta_5 LEH + \beta_6 LHH + \beta_7 OHH + \beta_8 HMI + \varepsilon \text{-----(1)}$$

Where:

TFE = Total food expenditure

$\beta_0$  = Constant parameter

$\beta_1 \text{ --- } \beta_{10}$  = Regression coefficient of the independent variables

### 3.8 Method of Data Analysis

To analyze the data however, three hypotheses were tested to examine the determinants of household food consumption expenditure in Gombe State. Nevertheless, the descriptive statistic tool that is simple percentage was used to interpret the demographic characteristics and economic factors of the household head. So also, the data have been analyzed and computed using appropriate economic theory with the help of Eviews version 9. Furthermore, to test the hypotheses, the ordinary least squared (OLS) in the form of multiple regression model was adopted to regress total food expenditure as dependent variable on other set of independent variables. It is a form of regression model that is used when dependent variable is quantitative and

the independent variables are of any type, as it's the case in this research. It is normally used to test the relationship between the dependent variable on one or more other variables (Gujarati, 2004).

### **3.9 Diagnostic Tests**

#### **3.9.1 Multicollinearity Test**

Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated. In this situation the coefficient estimates may change erratically in response to small changes in the model or the data (Studenmund, 2001). However, multicollinearity refers to the situation where there is either an exact or approximately exact linear relationship among some or all explanatory variables of a regression model (Yaffee, 2002a). Multicollinearity exists when the independent variables are highly correlated, so there is the need to check for these problems as part of the data screening process.

Multicollinearity test will be performed to find out if the independent variables included in the estimation are not correlated. This will be detected using the variance inflation factor or matrix. However, most econometric software packages have some of these tests incorporated in them and able to detect multicollinearity problem.

#### **3.9.2 Heteroscedasticity Test**

Heteroscedasticity occurs when the variance of the disturbance term is not the same for all observations (Yaffee, 2002b). Very often what causes heteroscedasticity may be due to the fact that some important variables are omitted from the model. Heteroscedasticity is primarily common in cross sectional data, we generally deal with members of a population at a given point in time. The presence of heteroscedasticity will be detected by performing Breusch/Cook-Weisberg test.

Heteroscedasticity test is conducted to check whether the variability of error terms is constant or not. The presence of heteroscedasticity signifies that the variation of the residuals or error term is not constant which would affect inferences in respect of beta coefficient, coefficient of determination (R<sup>2</sup>), t-statistics and F-statistics of the study (Gujarati, 2004). Test of heteroscedasticity ensures that the regression fits all the values of the independent variables and this is possible only if the residuals do not vary with independent variable and therefore are random in nature (Oyeniyi, 2012).

#### **3.9.3 Normality Test**

A normality test is a statistical process used to determine if a sample or any group of data fits a standard normal distribution. A normality test can be prepared mathematically or graphically (Studenmund, 2001). In other words, normality tests are used to determine if a data set is well-modeled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed. More precisely, the tests are a form of model selection and can be interpreted several ways depending on one's interpretations of probability (Roodman, 2009).

#### **3.9.4 Serial Correlation Test**

Serial correlation also known as 'auto correlation' is where error terms in a time series transfer from one period to another. In other words, when error terms from different (usually adjacent) time periods (or cross-section observations) are correlated, we say that the error term is serially correlated. Serial correlation occurs in time-series studies when the errors associated with a given time period carry over into future time periods (Perez-Truglia, 2009).

#### **3.9.5 Functional Misspecification Test**

A functional form misspecification generally means that the model does not account for some important nonlinearity. In other words omitting important variable is also model misspecification. Generally functional form misspecification causes bias in the remaining parameter estimators (Arrelano & bond, 1991). If inappropriate functional form is used, a correct explanatory variable may well appear to be insignificant or to have unexpected sign and the consequences of an incorrect functional forms for interpretation and forecasting can be severe (Studenmund, 2001).

#### **3.10A Priori Expectation**

It is expected that there is a strong relationship between total income and the proportion expenditure spent on food. Therefore, as household's income change, the percentage of income spent on necessities such as food will also change. However, income is also expected to be a major determinant of household food consumption expenditure which is in line with the theories of consumption.



#### IV. DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

##### 4.1 Introduction

This chapter deals with the presentation and the interpretation of the empirical results of the analysis of the determinants of household food consumption expenditure in Gombe state. The chapter is sliced into four sections including this introduction. Section two focuses on descriptive analysis. Section three is centered on presentation and interpretations of inferential results and diagnostic tests. Discussion of findings is presented in section four which is the final section.

##### 4.2 Descriptive Analysis and Interpretation of the Data

This section presents the descriptive statistics in order to make easy understanding of the variables under study. Table 4.1 presents the results of the descriptive statistics as follows:

**Table 1:** Descriptive Analysis

Variables	Respondents Opinion	Frequency	Percentage
Age	Less than 25	40	10
	25 – 35	130	32
	36 – 45	99	25
	Above 45 years	131	33
	<b>TOTAL</b>	<b>400</b>	<b>100</b>
Gender	Male	301	75
	Female	99	25
	<b>TOTAL</b>	<b>400</b>	<b>100</b>
Educational Level	No Education	80	20
	Primary	35	9
	Secondary	137	34
	Tertiary	148	37
	<b>TOTAL</b>	<b>400</b>	<b>100</b>
Number of Wives	Monogamous	219	55
	Polygamous	181	45
	<b>TOTAL</b>	<b>400</b>	<b>100</b>
Location	Rural	300	75
	Urban	100	25
	<b>TOTAL</b>	<b>400</b>	<b>100</b>
Occupation	Salary earner	182	45
	Others	218	55
	<b>TOTAL</b>	<b>400</b>	<b>100</b>
Household Size	Less than 6	183	46
	6 – 11	127	31
	More than 11	90	23
	<b>TOTAL</b>	<b>400</b>	<b>100</b>
Household Income	Less than ₦20,000	118	30
	₦20,000 – ₦40,000	166	41
	More than ₦40,000	116	29
	<b>TOTAL</b>	<b>400</b>	<b>100</b>
Food Consumption	Less than ₦20,000	239	60
	₦20,000 – ₦40,000	140	35
	More than ₦40,000	21	5
	<b>TOTAL</b>	<b>400</b>	<b>100</b>

**Source:** Generated by the Author from the National Bureau of Statistics of Nigeria

From table 1, the results indicated that out of four hundred respondents, 25 of them equivalent to 10% fall into the age bracket of less than 25 years. One hundred and thirty (130) respondents (32%) are in the age range of 25-35. Ninety nine (99) other respondents, constituting about 25% are between the ages of 36 and 45. Also, about one hundred and thirty one (131) equivalent to 33% of the respondents which are above 45 years. This shows that larger parts of the household heads are elderly people. Moreover, as can be seen from Table 4.1, 301 respondents (75%) are males and the remaining respondents constituting about 25% are females. Nevertheless, 148 respondents constituting 37% acquired tertiary education either in the form of PhD, masters, first degree, OND, HND or NCE. One hundred and thirty seven (34%) obtained 'O' level results while only 35 respondents about 9% obtained primary school leaving certificate. 20% that is, 80 respondents have not opportunity of going school. This implies that majority of the household head have acquired higher level of education which is tertiary education.

However, two hundred and nineteen (219) households (55%) are practicing monogamous marriage, while 181 remaining households reckoning 45% are practicing polygamous marriage. Furthermore, the result reveals that majority of the respondents in this study are locating in the rural areas. As can be seen where 300 respondents (75%) are from rural areas and the remaining 100 constituting about 25% are from urban area. More so, 182 of the household heads reckoning 45% are salary earners, while 218 household heads are engaged in other occupations like business, farming and the rest.

More so, from Table 4.1, the results indicated that out of four hundred households, 183 of them equivalent to 46% fall into the size bracket of less than 6 people. One hundred and twenty seven (127) households (31%) are in the size range of 6-11 people. Ninety (90) remaining households reckoning about 23% have above 11 people in their households. This implies that majority of the households are having few members in the study area. Furthermore, one hundred and eighteen households reckoning 30% are receiving income of less than 20,000 naira, while one hundred and sixty six household heads reckoning 41% are in the income range of 20,000-40,000 naira. And also, one hundred and sixteen household heads reckoning 29% are receiving income of more than 40,000 naira. This means that majority of the household heads are fall in the income range of 20,000-40,000 naira which is the average income in the study area. Finally, two hundred and thirty nine reckoning 60% are spending less than 20,000 naira on food, while one hundred and forty households reckoning 35% whose fall in the spending range of 20,000-40,000 naira on food. And also, the remaining twenty one households reckoning 5% are spending more than 40,000 naira on food. This implies that majority of the households are spending less than 20,000 naira on food in the study area.

### 4.3 Inferential Statistics

This section deals with the presentation and the interpretation of the results of the determinants of household food consumption expenditure in the study area.

**Table 2:** Results of the Determinants of Household Food Consumption Expenditure

Dependent Variable: Food Consumption Expenditure	
Independent Variables	
Age	0.359 (1.242)***
Income	0.448 (20.163)***
Gender	-0.005 (-0.188)
Household size	0.024 (9.501)***
Educational level	0.014 (1.228) **
Location	0.023 (1.002) **
Number of Wives	-0.060 (-2.396)**
Occupation	0.002 (0.103)***
Constant	5.085 (23.008)***
R <sup>2</sup>	0.821
F value	223.781***

Significant at (\*\*\*) 1% (\*\*5%) (\*10%)

**Source:** Author's computation using Eviews version 9, extracted from appendix I

Based on the results in table 2, only two set of independent variables (i.e gender of household head and number of wives in the household) have negative impact on the dependent variable, while the other set of six independent variables (i.e age of household head, household monthly income, household size, educational level of household head, location and occupation of household head) have positive influence on the same dependent variable. As shown by the parameters in the table 4.2 above, the results of some of the explanatory variables such as age, monthly income, household size and occupation were relatively high and significant at 1% level; whereas number of wives household, educational level and location were significant at 5% level. Furthermore, gender was found to be not significant at any level.

Specifically, age coefficient is 0.359(1.242) indicating a positive and significant relationship between age of household head and monthly food consumption i.e., the older household heads spend more on food than the younger ones. This could be because the older household heads are more aware of the importance of quality food and cautious of their diet and therefore eat high quality and expensive food. Moreover, income coefficient of 0.448(20.163) indicates that there is positive and significant relationship between monthly income and monthly food consumption at 1% level. This implies that, when the income level of the household head increases, the household purchasing power increases, as such, more money will be available for food items in the household. In other words, the expenditure on food will increase by 44kobo for every ₦1 increase in income of the household heads. This implies that the food expenditure elasticity was 0.44 (less than unity) as expected and consistent with Engel's analysis for necessities such as food.

Furthermore, gender coefficient is -0.005(-0.188), negative and insignificant. This indicates that there is negative relationship between gender of household head and monthly food consumption. However, household size coefficient 0.024(9.501) has a positive and statistically significant impact on monthly food expenditure at 1% level. Thus, larger households spend more money on food than those households with smaller size. More so, educational level coefficient of 0.014(1.228) indicates that there is positive and significant relationship between level of education and food consumption expenditure at 5% level i.e., households where the head has more education, spend more on food than their less educated counterparts. The educational attainment might be a good proxy for the knowledge required to ensure efficiency in food purchasing.

Nevertheless, location coefficient is 0.023(1.002) indicating a positive and significant relationship between location and monthly food consumption expenditure i.e., urban households spend more than rural households on food consumption. Moreover, number of wives coefficient of -0.059(-2.396) indicates that there is negative relationship between number of wives in the household and monthly food consumption expenditure i.e., households with polygamous marriage spend relatively less on food than their counterparts with monogamous marriage. Household with more than one wife might benefit from efficiencies in food purchasing brought by joint decision making. But the relationship is significant even at 5% level; as such there is significant relationship between number of wives and monthly food consumption. Finally, the coefficient of occupation is 0.002(0.103), this indicates a positive relationship between occupation and monthly food consumption i.e., households with occupation spend more than their counterparts on food consumption. And the relationship is significant even at 1% level; as such there is significant relationship between occupation and food consumption expenditure.

However, from the result of the Table 4.2, the coefficient of determination  $R^2$  is 0.82, this indicates that approximately 82% of the variations in a dependent variable (food consumption) are explained jointly by the independent variables (age, gender, income, household size, educational level, location, number of wives and occupation). This indicates that 18% of the variations in food consumption are explained by some variables not controlled in the model. This implies that a unit change in all the independent variables could bring about 82% changes in the dependent variable (food consumption).

Furthermore, F value is 223.78 and significant at 1% level, indicating that the model is adequate and significant. Therefore, based on the above, we reject all the three null hypotheses stated in chapter one which are: firstly, demographic characteristics do not have significant impact on household food consumption pattern in Gombe State. Secondly, economic factors do not have significant impact on household food consumption pattern in Gombe State and lastly there is no households' responsiveness to food consumption with changes in income in Gombe State. And therefore accept all three the alternative hypotheses respectively: firstly, demographic characteristics have significant impact on household food consumption pattern in Gombe State. Secondly, economic factors have significant impact on household food consumption pattern in Gombe State and lastly there is households' responsiveness to food consumption with changes in income in Gombe State.

#### **4.3.2 Diagnostic Tests**

This section deals with the presentation and the interpretation of the results of diagnostic tests of the data collected.

**Table 3: Results of the Diagnostic Tests**

Tests	Test Statistic	P-value
Normality	50074.79	5.3963
Serial Correlation	2.389148	0.0684
Heteroskedasticity	0.876269	0.5365
Functional Misspecification	1.429594	0.1536
Multicollinearity		
Variables	Variance Inflation Factor	
Age	2.264173	
Income	2.151048	
Gender	1.305315	
Household Size	2.597857	
Education	1.100986	
Location	1.087065	
Number of Wives	1.780403	
Occupation	1.091094	

Source: Author's computation using Eviews version 9, extracted from appendix II-IV

Table 3 presents the results of diagnostic tests for normality inform of Jarque-Bera, serial correlation in form of Breusch-Godfrey Serial Correlation LM Test, heteroscedasticity inform of Breusch-Pagan-Godfrey, functional misspecification in form of Ramsey RESET Test and multicollinearity. The results revealed that the model has passed all the tests conducted. Thus, the results indicate the absence of any problem.

#### 4.4 Discussion of Findings

This study has assessed the determinants of household food consumption expenditure in Gombe state of Nigeria. To achieve the stated objectives, the study employed ordinary least squared (OLS) in the form of multiple regression models together with descriptive statistics. As for diagnostic tests; the study also applied multicollinearity test, serial correlation test, normality test, heteroscedasticity test and functional misspecification test. From the table 4.2, it is observed that age had positive and statistically significant impact on food consumption expenditure at 1% level of significance. Thus, the older household heads spend more on food than the younger ones. This finding is in line with that of Aminu, Adebajo & Mohammed (2016), Lawal, Kolawole, Bolagum, & Jami'u (2011), Mignouna *et al.* (2015), and Yeong-Sheng (2008). However, the finding disagrees with the findings of Yimer (2011) and Sdrali (2007) where they found that age was not significant and does not affect household food consumption.

Furthermore, from the result in table 2, income variable also had positive and significant impact on food consumption expenditure at 1% level. This implies that, when the income level of the household head increases, the household purchasing power increases i.e., more money will be available for food items in the household, as such the expenditure on food will increase by 44kobo for every ₦1 increase in income of the household heads. This result is supported by Aminu, Adebajo & Mohammed (2016), Thomas (2013), Yeong-Sheng, Shamsudin, Mohammed, Abdallah & Radam (2009) and Babalola & Isitor (2014). On the other hand, the finding contradicts the finding of Samuel, Hamdiya & Paul (2014) and Umeh & Benjamin (2012) whose findings found negative and significant relationship between household monthly income and food consumption expenditure. However, gender is found to be negative and no significant relationship between gender of household head and food consumption expenditure. This concurs with the finding of Joseph (2012), but disagrees with the findings of Kostakis (2014), Moses (2012), Yeong-Sheng (2008) and Myrie & Robinson (2013) as they found positive significant relationship between gender of household head and food consumption expenditure.

Furthermore, household size had a positive and significant influence on food consumption expenditure. This implies that larger households spend more money on food than those households with smaller size. This is in line with the findings of Emmanuel & Ayoola (2013), Babalola and Isitor (2014), Oladimeji, Abdulsalam, Damisa & Omokore (2015), Yeong-Sheng, Shamsudin, Mohammed, Abdallah & Radam (2009), Adepoju, Ganiyu & Idowu (2015), Dudek (2012) and Begum, Khan, Farooq, Begum & Irfan (2010). This implies that household size is an important determinant of food consumption expenditure.

Moreover, educational level had a positive and significant relationship with food consumption expenditure. This implies that households where the head has more educational level spend more on food than their less educated counterparts. This result is supported by the findings of Aminu, Adebajo & Mohammed (2016), Ndubueze-Ogaraku, Ekene & Onwukwe (2016), Mignouna *et al.* (2015) and Joseph (2012). However, only Davis, Moussie, Dinning & Christaskis (1983) found that educational level of the household head registered no significant impact on household food consumption expenditures. Furthermore, results from the table 4.2 revealed that the location variable is positive and insignificant at any level. This means that urban households spend more than their counterparts in rural areas on food consumption. This is in line with the findings of Davis, Moussie, Dinning & Christaskis (1983), Fabiosa (2008), Bozoglu, Bilgic, Yen, & Huang

(2013) and Myrie & Robinson (2013). This means that location of household is an important determinant of household food consumption.

Finding of this study also indicates that number of wives is negative and statistically significant at 5% level. This implies that households with polygamous spend relatively less on food than their counterparts with monogamy. Household with more than one wife might benefit from efficiencies in food purchasing brought by joint decision making. Finally, occupation is a positive and statistically significant consistent with those reported by Joseph (2012), Mignouna *et al.* (2015), Yimer (2011) and Kim & Saghalian (2016). This implies that occupation of household head is very important in influencing food consumption expenditure.

## V. SUMMARY, CONCLUSION AND RECOMMENDATIONS

### 5.1 Summary of Major Findings

The study investigated the determinants of household food consumption expenditure in Gombe State of Nigeria. Moreover, inferential statistical tool namely; Ordinary Least Square (OLS) in the form Multiple Regression Model was employed to specifically determine the factors influencing the food consumption expenditure in Gombe state. The findings of the study are summarized below:

- i. Age of the household head, household size, educational level and location of household has positive and significant impact on food consumption expenditure.
- ii. Number of wives has negative but significant impact on food consumption expenditure. That is households with polygamous marriage spend relatively less on food than their counterparts with monogamous.
- iii. Gender of household head has negative and no significant impact on food consumption expenditure.

### 5.2 Conclusion and Policy Implication

The purpose of this study was to examine the impacts of both demographic characteristics and economic factors on food consumption expenditure in Gombe state of Nigeria. Based on the above findings, a general conclusion has drawn which shows that both demographic characteristics and economic factors affect household decision positively to consume on food in the study area except gender of household head.

### 5.3 Recommendations

The followings are some recommendations made based on the conclusion of the study;

- i. The finding of this study revealed the significant impact of number of wives in the households in influencing food consumption expenditure, therefore there is need to provide employment opportunities among households including those with polygamous and monogamous marriage which aimed at fine-tuning food consumption expenditure and ensuring a higher standard of living. This can be achieved through establishing skills acquisitions, and given financial assistant to small and medium scale enterprises which will enable them to increase their capacity by employing more people.
- ii. Since the findings revealed that income is a major determinant of food consumption expenditure in the study area, the study therefore suggests that policy directed at increasing income level of workers should be given paramount attention so as to enhance their food purchasing power, reduce food insecurity and reduce poverty relative to food as well as making them have a higher standard of living.

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