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# Factor Influencing Food Expenditure Patterns Among HIV/AIDS Affected Households in Lagos State of Nigeria

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ABSTRACT

In recent years, the HIV/AIDS pandemic has become a name to reckon with in Nigeria. The fact that the illness mostly affect age group 15-49 years is tragically worrisome. The morbidity and mortality originated from this ailment predominately reduce the capacity of infected individual/s to stay economically active and thus adversely affect food production and availability for the household. Based on the aforementioned points, this study investigate the factors influencing food expenditure patterns in HIV/AIDS households in Lagos State of Nigeria. Simple random sampling was adopted to select ten Local Government Areas (LGAs) for the study while primary data was obtained from 891 respondents using convenient sampling technique. The data was analyzed by means of descriptive statistics and logistic regression. The findings suggests that female respondents (60 %) dominate the survey while majority of the participants are petty traders. The result also shows that catastrophic health expenditure was predominantly among two major ethnic groups (Hausa and Igbo). The logistic regression result indicates that difference age category, ethnic group, household members infected with HIV/AIDS, AIDS related death and remittances have negative significant impact on household food expenditure in Lagos state. Based on the findings, it is recommended that the government in her capacity should enact strategy intervention schemes that will assist affected households to maintain regular income in order to provide financial stability and support for themselves.

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## Introduction

In recent time, household food expenditure have drawn extensive attention especially in developing nations where there is a growing concern regarding food consumption. Although earliest study carried out by Engel (1857) has laid the foundation on the relationship between household food expenditure and income (Lewbel, 2006). However, contemporary studies (Mafuru, 2003; Lee & Tan, 2006; Olasunkanmi, 2012; Ebru & Meleks, 2012; Kostakis, 2013; Babalola & Isitor, 2014 & Donkoh, Alhassan & Nkegbe, 2014) have further pointed to the significance of selected socio-economic and demographic factors in determining household food expenditure. With the omission of morbidity such as HIV/AIDS in the aforementioned studies, other researchers decided to examine the nexus between Human Immuno-Deficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) and selected household's indicators within the context of food production. Their outcomes suggest that the HIV/AIDS scourge reduces food production in the sampled nations (Tibaijuka, 1997; Adeoti & Adeoti, 2008; Oyekale & Adeoti, 2010; Simwaka, Ferrer & Harris, 2011; Masinguzi, 2012; Ngambi, Baars & Kingma, 2013; Masuku, Kibirige, & Singh, 2015, among others).

In much same way, several studies have drawn global attention to the adverse impact of HIV/AIDS on food security and production. Such works include: Liere (2002), Gillespie and Kadiyala (2005), Bukusuba, Kikafunda and Whitehead, (2007), Alemu and Bezabih, (2008), Lintelo (2008), Lori, Laura and Wayne (2009), Agatha,Walingo and Othuon (2010), Ayele, Belachew, Alemseged and Biagilign (2012), Gebremichael, Hadush, Kebede, and Zegeye (2018). However, there is still scanty literatures on factors that determine food expenditure pattern among HIV/AIDS household's especially in developing countries such Sub Sahara Africa (SSA) nations, Nigeria and a state like Lagos.

Globally, nearly 36.9 million people are living with HIV/AIDS (PLWHAs) and 940,000 people have died of AIDS related illness in 2017 (See Joint United Nations Programme on HIV/AIDS, 2018; World Health Organisation, 2018). From these statistics, Nigeria accounts for 8.4 per cent of HIV/AIDS cases (3.1 million PLWHAs) and 16 per cent (150, 000) of AIDS related-death cases (UNAIDS, 2018). With this figure, alongside newly infection rate and AIDS-mortality cases of over 150,000 persons per annual. Nigeria is rank second leading nation that is troubled by the epidemic after South Africa (UNAIDS, 2018). However, recent survey conducted by Nigeria HIV/AIDS Indicator and Impact Survey (NAIIS, 2019) has shown that about one per cent of Nigerians (1.9 million people) are currently living with HIV/AIDS, which is a decline of 61.2 percent incidence rate from the 2017 statistics (3.1 million PLWHAs). While Nigeria's national HIV prevalence rate is 1.4% among adults aged 15–49 years, women aged 15–49 years are more than twice likely to be living with HIV than men (1.9% versus 0.9%.). The difference in HIV prevalence between men and women is chiefly among younger adults, with young women within age 20–24 years more than three times more likely to be living with the illness than young men in the same age category. Among children aged 0–14 years, HIV prevalence according to the new data is 0.2% (See Joint United Nations Programme on HIV/AIDS report, 2019).

HIV was first reported in Lagos State around 1986 (Nasidi & Harry, 2007; Awofala & Ogundele, 2016). Since then, HIV/AIDS has become an epidemic, exponential in scope and magnitude (Okoli, Ezekoye, Ochiabuto, Nwafor, & Ugwu, 2013). Lagos state which is the former Federal Capital of the nation is currently accommodating over 17.5 million people as at 2019 (World Population Review, 2019), and is beleaguer with HIV prevalence rate of 1.3 per cent (end of September 2019; see Nigeria National Agency for the Control of AIDS report, 2019). This figure put the state among the top 15 States with high HIV incidence in the country (NACA, 2019). Quite a number of factors have been identify to be responsible for the high prevalence rate in the metropolitan State. These includes daily migration of people from others states and nations, urbanization, cosmopolitan indigenes, large commercial activities, rising poverty rate and population growth (Lagos State AIDS Control Agency report, 2012 & Samuels, et al., 2012).

The main distressing aspect of the HIV scourge points to the fact that the most productive members of the household and nation (age group 15-49 years) are mostly infected (Iya *et al*., 2012; Zhang, Zhang, Aleong, Baker, & Fuller-Thomson, 2012 & UNAIDS, 2016). These individuals are either household head or preparing to assume the role of household head. The illness and death originated from HIV/AIDS predominately reduce the capacity of this cohorts group of people to stay economically active, likewise make food available for their household (Fox, 2012). For instance, Oxfam (2002) stress that food production and availability is reduce by sixty per cent when a member of the household is infected with HIV. This point to the fact that there is labor loss from the infected person or from those who act as caregivers to the sick individual (See Fox, 2012; Osobase, Nwakeze & Dauda, 2018).

Amidst the labour and income shock as noted above, is the rise in health care related expenses per sick member. The household tend to respond to this shock by decreasing food expenditure; reduce number of meals taken per day or skip meals, just to favour expenditures on nutritional drugs and care. In an attempt to augment the already diminishing income and food expenditure; the households still adopt other coping strategies. These include, selling of assets, buying food on credit, borrowing from relative and friends, migration to other regions in search for jobs, withdrawing children from school to serve as under-age labour, to mention only a few (Osobase, et al., 2018 & Ndukwe, et al., 2019). Also, there is the phenomenon of catastrophic health expenditures (CHE) when household health expenditure is greater that a distinct household income level, and money meant for other consumption items (e.g. shelter, education, etc.) are utilize for health upkeep. To support this view, Sharifa, Wan and Yasmin (2017) noted that CHE is any spending on health treatment that stands as a threat to households financial resources, preventing the household from maintaining the basic subsistence needs. Sometime, in the most severe case of catastrophic health spending, households may be compelled to sell their livelihood assets to secure food and medical care.

In the context of African setting where families are agents of socialization, other active adult members abandon their jobs with a view to taking care of sick relatives and attending funerals ceremonies of victims who died of AIDS. Emphatically, AIDS –related death and funeral expenditures tend to deepen on household income and expenditure on basic needs. The expenditure shock deepens poverty level for already poor household, and pushes poorer household, further to extreme poverty. This view is supported by quite a number of studies carried out in selected countries in SSA. Where considerable workforce absenteeism, consistent loss of man-hours of work and communal obligations to the dead have significant impact on income, food consumption patterns and the general welfare of individuals and households with HIV member/s or have experienced AIDS related death of members (Faisal, 2007; Tham-Agyekum et al., 2011; Iya et al., 2012; Muiruri 2012; Karima, Ricardo & Bernard, 2018).

Given the above discussion, this study is aim at investigating the factors that determine food consumption expenditure in selected Local Government Areas of Lagos state, Nigeria. Essentially, the aim is to gain a deeper understanding of how selected socioeconomic and demographic profiles of HIV households influence the food expenditure in Lagos state of Nigeria. A better understanding of how these factors influences household food-spending pattern is imperative to the individuals, households, researchers and policy makers. Who are concerned in knowing what policy measures should be enact to assist household accommodating people living with HIV/AIDS.

**Theoretical Background**

Basically, two relevant works are germane to describe the relationship that exist between household food consumption expenditure and selected household profile. These theoretical studies include: the Engel law and the Grossman-Wagstaff (1986) health production theory. These theories are relevant because it relates how household food consumption expenditure is determine by income, health and other key indicators. Foremost, the Engel theory which posits that households maximize utility by directly purchasing food at a given price and income level over a period of time (Engel, 1857). In his study, Engel demonstrated that food expenditure is an increasing function of household income and size, but the share of food budget decline with income (Lewbel, 2006). Engel stressed that food expenditure is an important expenditure that occupies low income household's expenditure patterns. Therefore, a reduction in household income tends to bring about crowding out of household expenditures on other non-necessary goods.

In a like manner, Wagstaff (1986) utilizing the Grossman health production theory explain the nexus between individual consumption behaviour and health care. The study explained how individuals exert a relatively high degree of control over their health by virtue of the fact that they can influence their health-through consumption patterns, health care utilisation, and their environment. Wagstaff (1986) using the indifference curve analysis shows that people value both health and consumption but do not view being in good health as so important that it takes priority over everything else. Wagstaff in his theoretical analysis placed consumption on the vertical axis and health on the horizontal axis. The health-consumption curve shows an inverse nexus between individual health and consumption pattern. That is, the welfare contour slopes inversely, because to compensate for a reduction in health, food consumption has to increase and vice versa.

***Literature Review***

One significant impact of HIV/AIDS on household food expenditure is its initial effect on income of household that are already poor. According to Gillespie and Kadiyala (2005), a common practise among HIV affected household is reduction in food expenditure of the households. To buttress this view, Daudu, Okwu and Shaibu (2006) examines the impact of HIV/AIDS on farm families in Benue State, using 100 respondents (50 affected and 50 unaffected households). The descriptive statistics and chi-square result shows that, out-of-pocket expenditure on HIV/AIDS deplete households income, savings, quality and quantity of food consumed. As part of policy suggestion, the authors called for more educational programme among rural households in order to prevent and minimise the danger of HIV/AIDS spread among the populace.

Accordingly, Bukusuba, Kikafunda and Whitehead (2007) investigates food security status of 144 HIV/AIDS respondents (aged 15-49 years) in Eastern urban area of Ugandan. The chi-square and correlation results show that high medical costs such as catastrophic health spending increases the inability of household to secure enough food for members. Similarly, Mwakalobo's (2007) study of 119 households in Rungwe, Tanzania posits that households that have experienced AIDS mortality reduces expenditure on food when compared with other households without AIDS related death. Also, AIDS mortality of adults have the tendency of pushing household below the poverty line. In a related development, Alemu and Bezabih (2008) employs multivariate analysis to examine the impact of HIV/AIDS on food security of 1245 households in 12 rural districts in Ethiopia. In contrast to other studies, the result shows that expenditures on medical care and funeral ceremony do not significantly reduce household's food and non-food expenditures.

Ugwu (2009) utilizes descriptive statistic to study the impact of HIV/AIDS on 120 women farmers (60 infected and 60 not infected with HIV/AIDS) in Enugu state of Nigeria. The results show that the HIV illness give rise to income decline, malnutrition, food insecurity and poverty. The author noted that there is the need for a gender-based paradigm for agricultural development and rural growth in Nigeria. Similarly, in southwest Nigeria, Adeyemi (2007) using descriptive statistics examines HIV/AIDS and family support systems among 188 PLWHAs in Lagos state. The finding reveals that infected individuals spent a sizeable amount of income on health related drugs with little or no, on food consumption and other basic needs. The study recommended that PLWHAs should be empowered economically with adequate medical drugs and kits to reduce the burden of the illness on the households.

In much same way, the survey by Masuku and Sithole (2009), among 847 households in Swaziland using descriptive statistics shows that affected household substitute income meant for food consumption on non-food items such as; medical care, funerals and transportation costs. Likewise, Iya et al., (2012) examines the impact and determinants of HIV/AIDS on 120 households in Adamawa State of Nigeria using descriptive statistics and logistic regression. The result suggests that HIV/AIDS negatively affect households income in turn bring about decline in food expenditure. Furthermore, it was observed that smaller households are less likely to be poor than larger households, by implications larger households will spend more on food and other basic needs than small households (Iya et al., 2012). Equally, Laar et al. (2015) employs 1,745 respondents to investigate the negative coping strategies among affected households in the rural and urban areas of Ghana. The result using bivariate analysis demonstrated that HIV/AIDS illness causes households to skip an entire day's meal, and reduces food portion sizes. A policy focusing on helping HIV-affected households to gradually build up their asset base is suggested by the authors.

Along similar line, Poudel, et al. (2017) assesses the economic burden of HIV/AIDS on 415 PLWHA in six districts of Nepal. The regression results shows that occupation, household income, respondent's health status, residential districts etc. are key determinants of HIV/AIDS direct costs. While ethnicity, respondents health status, resident districts and sexual orientation are major determinants of household's productivity costs. In conclusion, the study calls for provision of income

generating program and social support for individuals and household affected by HIV illness. In addition, Njagi, Arsenijevic and Groot (2018) work try to understand the variations in catastrophic health expenditure (CHE), its underlying determinants and impoverishment in Sub-Saharan African countries using thirty-four (34) nations. The descriptive statistics outcome suggests that CHE was higher amongst West African countries and amongst patients receiving treatment for HIV/ART, TB, malaria and chronic illnesses. Risk factors associated with CHE includes household economic status, type of health provider, socio-demographic characteristics of household members, type of illness, social insurance schemes, geographical location and household size/composition. This work also demonstrated that CHE/impoverishment is pervasive in SSA, and the magnitude varies across and within countries and over time. The authors observes that socio-economic factors seem to drive CHE with the poor being the most affected, and these varies across countries. The study calls for intensifying health policies and financing structures in SSA, to provide equitable access to all populations especially the most poor and vulnerable. As well, there is a need to innovate and draw lessons from the 'informal' social networks/schemes as they are more effective in cushioning the financial burden (Njagi, et al., 2018). In a similar manner, Osobase, et al. (2018) investigate the impact of HIV/AIDS on household income in Lagos State of Nigeria, using a sample size of 891 respondents. The study employs descriptive statistics and logistic regression analysis for the empirical analysis. The findings indicate that asset sales, health expenditures and productivity loss variables significantly increase income decline among the sampled households. In contrary, remittance was found to significantly reduce the odd of income decline. Particularly, the study elucidated the implications of participants receiving treatment outside the LGAs of dwelling and the implications of HIV on the Lagos State economy, including Nigeria.

Gebremichael, Hadush, Kebede, and Zegeye (2018) investigates the determine of food insecurity, nutritional status and contextual determinants of malnutrition among HIV/AIDS patients in West Shewa Zone in Ethiopia. Institution-based cross-sectional study was conducted among HIV/AIDS patients who have been attending antiretroviral therapy at public health facilities in the region. The sample size were 512 participants, which were selected from each facilities using systematic random sampling technique. The data was collected using pretested questionnaire by trained data collectors. The study employs logistic regression analyses to determine the independent factors associated with malnutrition. The findings shows that the factors that are significantly associated with malnutrition among HIV/AIDS patients were unemployment, WHO clinical stages III/IV, CD4 count less than 350 cells, tuberculosis, duration on antiretroviral therapy and household food insecurity. The study concluded that there is high prevalence of malnutrition and household food insecurity among HIV/AIDS patients attended ART. The negative interactive effects of undernutrition, inadequate food consumption, and HIV infection demand effective cross-sectorial integrated programs and effective management of opportunistic infections like tuberculosis. Also, Ndukwe et al. (2019) investigate Out-of-Pocket (OOP) expenditure on HIV/AIDS services among PLHIV in Nigeria. A cross-sectional survey was carried out to draw a sample size of 485 PLWHIV accessing care in 26 health facilities across five states in Nigeria. A multi-stage sampling approach was adopted, and two pretested questionnaires were used for the assessment. The study employ descriptive analysis for the analysis. The findings shows that about 59.9% of the respondents were engaged in one occupational activities or the others while 50.4% of respondents were the main breadwinner of their household. The average annual personal income was N357, 516 ($2,235) and the annual household income was N586, 584 ($3,666). The proportions of household expenditure on healthcare food and transport were 23.0%, 33.5% and 13.1%, respectively. The average annual expenditure for HIV care was N84,480 ($528). The proportion of the household income used for HIV care was 14.5%. Similarly, it is observed that OOP expenditure for HIV related services among respondents in Nigeria seems to be catastrophic. Conclusively, the authors noted that there is a need for policy response toward financial protection for PLWHIV and abolishment of user-fee where it exits.

So far, from extant works revealed, most studies are rural-based, descriptive and centred on provinces outside Nigeria (Bukusuba et al, 2007; Alemu & Bezabih, 2008; Laar et al, 2015; Poudel, et al. (2017). However, studies done in Nigeria concentrated more on Northern and Eastern province of the country (Ugwu, 2009; Daudu et al., 2006; Iya et al., 2012; Ndukwe et al. (2019). With the exception of Adeyemi (2007) and Osobase, et al. (2018) that examines HIV/AIDS, household income and family supporting system in Lagos state of Nigeria. This present study swerve from previous works by using logistic regression analysis to investigate the impact of selected household's profiles on food expenditure finance in ten selected Local Government Areas (LGAs) of Lagos State, Nigeria.

## Research Methodology

### *Study Area*

The survey area is Lagos state of Nigeria. The state is made up of different multi-ethnic groups, with an estimated population of 17.5 million people; making her the second most populous in the country (See Lagos State Economics and Financial Update-report, 2013; World Population Review, 2019). Lagos state remains the commercial hub of the nation (Olusegun, 2010 & LSASA, 2009/10). The state comprises twenty (20) Local Government Areas (LGAs), as showed in the graph below.

### *Sample Technique*

The study adopted simple random sampling to select ten LGAs (See selected LGAs with stars in the graph) for the field survey. Thereafter, ten treatment centres/sites were purposively drawn from the ten selected LGAs. The treatment centres include: Ajeromi General Hospital (Ajeromi), Alimosho General Hospital (Alimosho), Police Hospital Falomo (Eti-Osa), Ikeja General Hospital (Ikeja), Ikorodu General Hospital (Ikorodu), General Hospital

(Lagos Island), Military Hospital, Yaba (Lagos Mainland), Good is Good Support Group/Lucina Hope Foundation (Mushin), Nigeria Navy Hospital (Ojo) and SWANN Support Group, Ojuelegba (Surulere). The choice of drawing ten sites is based on the financial capacity of the researchers and easy access to data from the Network of People Living With HIV/AIDS in Lagos state (NEPWHAL).

***Population, Sample Size Determination and Research Instrument***

The population comprises all PLWHAs in the various treatment Centre's in Lagos state. The Bartlett, Kotrlik and Higgins (2001) table of sample size determination and Yamane (1967) equation for sample size determination were adopted to determine the sample respondents. A sample size of 384 is appropriate for a population greater than 10, 000 (Bartlett, et al., 2001). Similarly using the Yamane (1967) sample size equation as stated below;

$$n=\frac{N}{1+N(e)}2 \qquad \text{Equation 1.1}$$

Where 'n' is the sample size, N is the total number of people living with HIV/AIDS in Lagos state. Given that, Lagos state HIV/AIDS prevalence rate is 1.3 percent according to Nigeria National Agency for the Control of AIDS (2019) and estimated population is about 17.5 million people, the number of PLWHAs is given as 227,500 people, while the 'e' in the equation is the level of precision. With 95 percent, confidence level and 0.0 5 per cent margin of error, the equation 1.2 is obtain as:

$$n=\frac{227500}{1+227500(0.05)^2}=399.996 \qquad \text{Equation 1.2.}$$

The sample size (n) is given as 399.996 approximately 400. From all indications, both sample size techniques (Bartlett, et al., 2001 table and Yamane equation) almost have the same outcomes. Following this tradition, the sample size of 384 - 399 are both accepted for the empirical analysis.

For a more robust empirical analysis and larger number of respondents, a sample size of 1500 respondents was drawn. Therefore, 150 respondents were drawn from each site using convenient sampling technique. Each household has two informants, who are within the ages of 18 - 65 years, as classified by the ILO reports (2006, 2015) as the economic active population of a country.

The data was collected by means of structured questionnaires. The instrument was structured into four sections. The section 'A' was design to obtain demographic information of the respondents. The section 'B' includes assessing the HIV/AIDS status of the respondents/household. The section 'C & D' are design to cover the household food expenditure status and the coping strategies. The closed-ended questions were mostly adopted for the survey because it provides an opportunity for a wide range of geographical area to be cover.

On ethical ground, clearance letters were obtained from the following institutions: University of Lagos, Akoka, Lagos State Health Service Commission (LSHSC), Lagos State AIDS Control Agency (LSACA) and Network of People Living With HIV/AIDS (NEPWHANs). The researchers employed 12 counsellors who assisted in the field survey. Prior to the survey, the respondents were brief about the aim of the survey and those willing to partake in the assessment were assured of utmost confidentiality of information provided. The counsellors were given stipend while respondents were served snacks for time spent in completing the questionnaire.

***Model Specification***

The works of Engel law, Wagstaff (1986) and Grossman (1972) serves as guide for formulating household food expenditure equation. These authors in their theoretical analysis established the food consumption dependency on income, and other household characteristics. This equation can be express as:

$$Q_f = Q\ (Y, HS, He,) \qquad 3.1$$

Where:
$Q_f$ = Household food expenditure;
Y= Household income;
HS= Household Size
He= Health status.


Figure 1: LGA in Lagos State
Source: https://www.google.com.ng/#q=Map+of+Lagos+state

Following extant studies such as: Dunne and Edkins (2008), Galino and Vera-Hernandez (2008), Huffman (2010), Ebru and Melek, (2012), Sekhampu (2012), Donkoh *et al*. (2014) and Osobase (2017), the socioeconomic and demographic variable (sDV) is include into equation 3.1. Therefore equation 3.1 is re-stated as:

$$Q_f = Q\ (Y, HS, He, sDV) \qquad 3.2$$

The socioeconomic and demographic variable (sDV) is decompose into the following variables:

Duration of living with HIV/AIDS (DHA), participant gender (Ge), age, marital status (MS), ethnic group (EG), occupation (OCC), household head (HH), Non-household income (remittance from friends and relatives; NI), sales of household assets (SA), support from the government (SFG), number of infected member in the household ($NH_P$), and AIDS related death (ADE).

Let $Q_f$ = $FDexp_{it}$, HS=HSize and 'He' capture household health expenditure. Modifying equation 3.2, the new model is represented as:

$$\begin{aligned} FDexp_{it} = {} & \phi_0 + \phi_1 Y_{it} + \phi_2 HSize_{it} + \phi_3 He_{it} + \phi_4 Ge_{it} \\ & + \phi_5 Age_{it} + \phi_6 MS_{it} + \phi_7 EG_{it} + \phi_8 HH_{it} \\ & + \phi_9 OCC_{it} + \phi_{10} DHA_{it} + \phi_{11} NH_{it} + \phi_{12} ADE_{it} \\ & + \phi_{13} NI_{it} + \phi_{14} SA_{it} + \phi_{15} SFG_{it} + ... + \varepsilon t \qquad 3.3. \end{aligned}$$

Where: $\varepsilon_t$ is the error term

While 'i' represent household one at time 't' period. The other variables have been previously defined.

***Measurement of Variables***

The household food expenditure ($FDex_{ipt}$) variable captures the aggregate amount spent on food by members of the household. The variable is divided into two parts; before and after a household member was infected with HIV/AIDS. When food expenditure before the HIV incidence is higher than after the incidence, it is negative outcome and this takes the value one (1), otherwise a dummy variable that takes zero. Also, the household income is stated as the sum of all earning by member/s of the household excluding remittances. The household size (Hsize) capture the total number of people dwelling in the household. It is measured as: 1-2, 3-4, 5-6, 7-8, 9 and above.

The health care expenditures ($H_{eit}$) variable has been explicitly stress by Steinberg *et al*. (2002), Whiteside *et al*. (2006), Smit (2007) and Iya, et al (2012). It captures the aggregate amount spent on HIV/AIDS related drugs and service. The respondent gender, age, marital status, ethnic group and occupation are included in the model to investigate which sub-group are most vulnerable to food expenditure decline. The duration of HIV/AIDS ($DHA_{it}$) capture the number of years the respondent has been living with HIV or AIDS. The sex of household head (Sex) is indicate as one for female and zero for male respondent (See Iya *et al*., 2012

The non-household income (Remittance; $NI_{it}$) was emphasize by Naidu and Harris (2006) and Joyce *et al*. (2008). It is define as the monetary value of gifts and aids received from relatives and friends. It takes the value 1, if household do not receive remittance and zero otherwise. The assets holding (AS) capture all forms of assets sold due to health care cost (Oni *et al*., 2001 & Natalia, et al, 2014). This takes the value 1, if household sell assets and otherwise zero. The government support (SFG) variable capture the various forms of support rendered to infected individual and household by the government. It takes the value one if support is not received, otherwise zero. Lastly, the number of infected household member (NH) takes the value one, if more than one person is infected otherwise zero if only the respondent is infected.

***Method of Data Analysis***

The data was analyzed using SPSS 20.0 software. While the binary Logistic Regression Technique (LRT) is employ to predict the odd of food expenditure decline among affected household in Lagos state. The logistic regression function usually takes the value of one (1) with a probability of success 'ψ' or otherwise zero (0) with a probability of failure as 1 – ψ (Hosmer & Lemeshow, 2000). Using the food expenditure model in equation 3.3, the estimated equation is given as:

$$\text{Odds} = \frac{\psi i}{1 - \psi i} = \frac{R}{N} \qquad 3.4$$

R= Household food expenditure will reduce due to HIV/AIDS illness

N= Household food expenditure will not due to HIV/AIDS illness.

Therefore, equations 3.3 and 3.4 can be specified as:

$$\begin{aligned} \text{Odds} = \frac{\psi_i}{1 - \psi_i} = {} & \phi_0 + \phi_1 Y_{it} + \phi_2 HSize_{it} + \phi_3 He_{it} + \phi_4 Ge_{it} \\ & + \phi_5 Age_{it} + \phi_6 MS_{it} + \phi_7 EG_{it} \\ & + \phi_8 HH_{it} + \phi_9 OCC_{it} + \phi_{10} DHA_{it} + \phi_{11} NH_{it} \\ & + \phi_{12} ADE_{it} + \phi_{13} NI_{it} + \phi_{14} SA_{it} \\ & + \phi_{15} SFG_{it} + \varepsilon t \qquad 3.5. \end{aligned}$$

The LRT is justified because it is very robust and proves to be an effective tool of estimating predicted variable from the probabilities of dichotomous and demographic variables.

***Data Presentation and Results***

The results in Figure 1, Table 1 and Table 2 depicts the descriptive/summary statistics of the data collected in the field survey. One key merits of using summary statistics is that it helps us to present data in a manner that can be easily visualize by people. Recall that some of the variables employed in the empirical analyses include; age groups (Age), health expenditure (HE), food expenditure (FDEXP), house size (HSize), household income (Y), duration of living with HIV/AIDS (DHA), remittances (NI), AIDS related death (ADE) and occupation of household head (OCC). From the outcome (Table 1), it is observe that only 891 questionnaires were valid from the 1500 questionnaires administered. This represent 59.4% response rate. The average/mean of the variables are age (37 years), household monthly income (N50011.6=$133.4), food expenditure (N45984.9=$123), health spending ((N2424.76=$6.57), and non-household

income, i.e. remittances (N5668=$15.11). In addition, the average of the other variables are household size (4.917 or 5 person per household), duration living with HIV/AIDS (5.59 or approximately 6 years), AIDS death (0.42) and occupational group (3.56). Based on the coded data, it is observe that most households have not lost any member to AIDS related death (0.42), likewise the occupational distribution indicate that most respondents fall under the unemployed category (3.56 percent).

In the same vein, it is notice that the household income (Y) has the highest standard Deviation while food expenditure (FDEXP) has the most variance of 9125476. Concerning Skewness, the following variables (Age and FDEXP) are negatively skew. The kurtosis statistics suggest that all the variables have values less than three (3), hence have low peak distribution called platykurtic. The maximum values for age is 66 years, while income is N45984.9 ($400), fdexp (N90000=$240), HE (N10001.0=$26.6) and NI (N30000=$30). The maximum values for Hsize is nine (9) persons, for DHA is 11 years, while AIDS-related death is 2 persons and occupation is 8 i.e others jobs. So far, the following variables (marital status, educational attainment, remittances, support from government, head of household, asset sale etc) were not included in the summary statistics because they have binary values.

**Table 1**. Descriptive/Summary Statistics* (N375=$1)

| | Age | Y | FDEXP | HE | NI | HSIZE | DHA | ADE | Occu |
|---|---|---|---|---|---|---|---|---|---|
| N | 891 | 891 | 891 | 891 | 891 | 891 | 891 | 891 | 891 |
| Mean | 37.3934 | 50011.6 | 45984.9 | 2424.76 | 5668.0 | 4.9175 | 5.59 | .42 | 3.56 |
| Std. Deviation | 8.62821 | 45863.81 | 30208.4 | 2945.33 | 8998.3 | 1.885 | 3.07 | .707 | 2.016 |
| Variance | 74.446 | 2103489 | 9125476 | 8675019 | 809703 | 3.554 | 9.45 | .500 | 4.064 |
| Skewness | -.065 | 1.197 | -.027 | 1.253 | 1.713 | .181 | .361 | 1.38 | .562 |
| Kurtosis | -.180 | -.094 | -1.318 | .386 | 1.612 | -.479 | -.997 | .392 | -.588 |
| Range | 46.00 | 140000 | 90000.00 | 10001.0 | 30000.00 | 7.50 | 10.00 | 2 | 7 |
| Minimum | 20.50 | 10000 | .00 | .00 | .00 | 1.50 | 1.00 | 0 | 1 |
| Maximum | 66.50 | 150000 | 90000.00 | 10001.0 | 30000.00 | 9.00 | 11.00 | 2 | 8 |

*Source: Author computation 2019.

**Table 2.** Selected Characteristics and Mean Income/Food Expenditure of PLWHAs

| Characteristics | No | % | MI | MFE | MPCFE | MP | CE |
|---|---|---|---|---|---|---|---|
| Gender | | | | | | | |
| Female | 581 | 65.2 | 45456.5 | 45102.3 | 9183.0 | 9255.2 | 14.2 |
| Male | 310 | 34.8 | 58548.8 | 47635.5 | 9676.9 | 11893.9 | 15.97 |
| Age | | | | | | | |
| 18-23 | 66 | 7.4 | 60455.0 | 49991.4 | 10350.2 | 12516.6 | 28.91 |
| 24-29 | 109 | 12.2 | 47661.0 | 47607.2 | 9033.6 | 9043.8 | 18.17 |
| 30-35 | 153 | 17.2 | 47484.1 | 49041.6 | 9653.9 | 9347.3 | 16.99 |
| 36-41 | 287 | 32.2 | 50244.3 | 43300.2 | 9331.9 | 10828.5 | 13.34 |
| 42-47 | 182 | 20.4 | 47967.4 | 46311.8 | 9853.6 | 10205.8 | 10.64 |
| 48 and above | 94 | 10.59 | 51321.9 | 48947.4 | 8766.9 | 10522.8 | 15.22 |
| Marital status | | | | | | | |
| Unmarried | 337 | 37.8 | 49852.1 | 46163.8 | 9051.7 | 9774.9 | 15.44 |
| Married | 373 | 41.9 | 54209.5 | 47872.8 | 9770.0 | 11063.2 | 14.37 |
| Divorced/Separate | 93 | 10.4 | 39193.9 | 44024.8 | 9783.3 | 8709.8 | 15.84 |
| Widowed | 88 | 9.9 | 44261.8 | 39369.9 | 8376.6 | 9417.4 | 12.57 |
| Educational Level | | | | | | | |
| Illiterate | 82 | 9.2 | 65244.3 | 48650.9 | 9539.4 | 12793.0 | 20.49 |
| Primary | 110 | 12.3 | 39091.3 | 48987.5 | 9797.5 | 7818.3 | 18.24 |
| Junior Sec School | 84 | 9.09 | 40298.0 | 45706.8 | 9724.8 | 8574.0 | 12.15 |
| Senior Sec School | 357 | 40.1 | 51625.1 | 43900.9 | 9146.0 | 10755.2 | 13.82 |
| More than Sec | 258 | 29 | 50756.3 | 46831.7 | 9366.3 | 10151.3 | 13.41 |
| Ethnic Groups | | | | | | | |
| Yoruba's | 419 | 47 | 53508.7 | 46686 | 9527.8 | 10987.4 | 19.3 |
| Igbos | 296 | 33.2 | 49459.8 | 44568 | 9095.5 | 10093.8 | 23.5 |
| Hausa's | 91 | 10.2 | 45220 | 43839 | 8767.8 | 9025.95 | 32 |
| Others | 85 | 9.6 | 39823.9 | 49758 | 9951.6 | 7964.8 | 17.2 |
| Occupations | | | | | | | |
| Government workers | 139 | 15.6 | 59568.7 | 51574.1 | 10667.9 | 12321.6 | 20.06 |
| Petty Traders | 224 | 25.1 | 41786.1 | 42088.6 | 8470.5 | 8409.7 | 12.89 |
| Family Business | 100 | 11.2 | 45650.4 | 47692.8 | 9703.5 | 9287.9 | 10.66 |
| Private Employees | 130 | 14.6 | 44308.1 | 47449.8 | 9767.9 | 9121.2 | 17.9 |
| Farmers | 25 | 2.8 | 46600.4 | 59996.4 | 10380 | 8062.3 | 14.18 |
| Students | 76 | 8.5 | 47171.5 | 49138.0 | 9919.1 | 9522.1 | 12.57 |
| Others | 55 | 6.2 | 48727.7 | 32723.5 | 6249.2 | 9305.5 | 10.72 |
| Unemployed | 142 | 15.9 | 64542.7 | 45098.4 | 9637.2 | 13792.4 | 15.37 |

MI: Mean Income (N), MFE: Mean Food Expenditure (N), MPFCE: Mean Per Capita Food Expenditure, MP: Mean PCI (N), CE: Catastrophic Effect, Source: Author computation 2019.

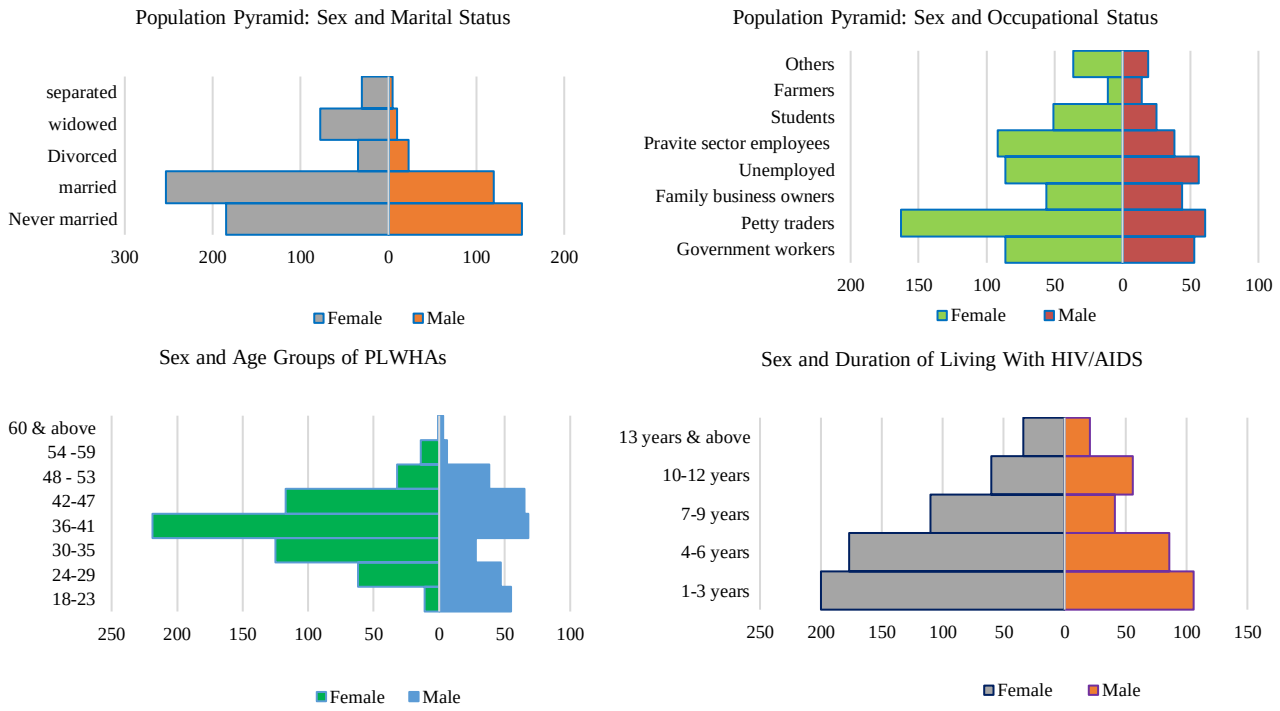


**Figure 2.** Selected Indicators of PLWHA in Lagos State (Source: Author computation 2019)

The descriptive statistic in Figure 2 and Table 2 shows that most of the respondents are female, married, within 36–41 years of age, petty traders and secondary school certificate holders (Figure 2 & Table 2). Accordingly, male heads consist of 76.1 % of the households while household size of 5-6 persons dominate the study.

The table 2 and 3 also shows the mean income, food expenditure, per capita food expenditure, per capita income and catastrophic health expenditure (CHE) of each socio-demographic profile of households. As noted earlier, CHE is a phenomenon where individuals pay huge amount of money (ten per cent or more) on health care from their income (See Etiaba, Onwujekwe, Torpey, Uzochukwu, & Chiegil, 2016; Sharifa, Wan & Yasmin, 2017). The report of World Health Organisation noted that when health spending is equal or greater than 40% of non-subsistence household's income, catastrophic effect is experienced (WHO, 2007).

From the result (table 2 & 3), catastrophic effect is slightly higher among the following groups: Hausa's participant (32%), ages 18-23 years (28.91%), Igbos respondents (23.5%), household that have experienced 2 or more death (22.54%) and those that have sold one asset or the others (22.79 %).

The Table 4 shows the correlation outcome among all the variables employ for the empirical analysis. The result is utilize to evaluate if there is the problem of multicollinearity in the outcome.

Multicollinearity occur if there is correlations or multiple correlations of sufficient magnitude among the explanatory variables such that the regression result is adversely affected. From the result in table 4, it is observe that there is a low degree of correlation between the explanatory variables. Thus, the result is free from the problem of multicollinearity.

***Parameters and Model Fitting Analysis for Household Food Expenditure Model***

Prior to the logistic test, the following tests: sample size ratio, Omnibus Chi-Square (X2), Hosmer and Lemeshow, Cox and Snell $R^2$ and Nagelkerke $R^2$ are carry out. The sample size ratio measures the minimum ratio of valid cases to independent variables. This is stipulate as ten (10) to one (1) for any logistic regression to be undertaken. However, the preferred ratio criterion is twenty (20) to one (1). The ratio of cases to the predictors in our outcome is 59. This satisfies the minimum requirement criteria (10 to 1) and the preferred ratio of 20 to 1 criteria.

The Omnibus Chi-Square (X2) test reveals the existence of a relationship between the dependent variable and predictors. This is based on the statistical significance of the model chi-square at step one (Reed & Wu, 2012). The Omnibus Chi-Square (X2) tests in Table 5, have probabilities values lesser than 0.05 per cent. Thus, the null hypothesis is rejected, while the alternative hypothesis, which states that there is a significance relationship between the outcomes and the predictors, is accepted.

The Hosmer and Lemeshow test is employ to indicate how adequate the model fits the data. It is expected that the probability value of the estimated parameters should be greater than 0.05. The outcome suggests that the Hosmer and Lemeshow statistics is greater than 0.05 per cent, by implication; the model adequately fits the data (Table 5).

Furthermore, the Cox and Snell $R^2$, and Nagelkerke $R^2$ explain the variation in the predicted variable being explain by the predictor variables. The Cox and Snell $R^2$ is 0.150 per cent, and the Nagelkerke $R^2$ as 0.226 per cent. The $R^2$ values are adequate since the Omnibus test of model coefficient is significant at probability value of $0.000 < 0.05$. The test statistics is a clear indication that our model passes the logistic model suitability criteria. Therefore, the socioeconomic and demographic indicators of households are useful predictors of food expenditure decline among HIV/AIDS household in Lagos State.

**Table 3.** Selected Characteristics and Mean Income/Food Expenditure of PLWHAs

| Characteristics | No | % | MI | MFE | MPCFE | MP | CE |
|---|---|---|---|---|---|---|---|
| Head of Household | | | | | | | |
| Male | 678 | 76.1 | 52153.8 | 46517.7 | 9427.2 | 10569.4 | 13.83 |
| Female | 213 | 23.9 | 43192.8 | 44289.3 | 9105.9 | 8880.5 | 17.75 |
| Household Size | | | | | | | |
| 1-2 | 76 | 8.5 | 63816.2 | 40453.0 | 26968.7 | 42544.1 | 15.52 |
| 3-4 | 308 | 34.6 | 49821.8 | 44521.1 | 12720.3 | 14234.8 | 14.32 |
| 5-6 | 332 | 37.3 | 48720.3 | 47866.4 | 8712.5 | 8867.9 | 14.9 |
| 7-8 | 137 | 13.4 | 46058.8 | 48497.9 | 6491.7 | 6165.2 | 15.56 |
| > 9 | 38 | 4.26 | 49474.1 | 43415.5 | 4823.9 | 5497.1 | 12.03 |
| Duration with HIV/AIDS | | | | | | | |
| 1-4 years | 378 | 42.3 | 46508.3 | 45310.2 | 9246.9 | 9491.5 | 16.33 |
| 5-8 years | 333 | 37.4 | 46066.5 | 47650.9 | 9724.7 | 9401.3 | 12.93 |
| 9 years and above | 180 | 20.3 | 64667.1 | 44319.8 | 9044.9 | 13197.4 | 15.04 |
| Number of PLWHA | | | | | | | |
| Only respondent (1) | 727 | 81.5 | 46396.5 | 44469.7 | 9264.5 | 9665.9 | 13.93 |
| 2 and more | 164 | 18.5 | 66037.0 | 52701.7 | 10502.5 | 13160.0 | 18.63 |
| Death due to AIDS | | | | | | | |
| None | 633 | 71.4 | 43799.7 | 44486.7 | 9078.9 | 8938.7 | 12.97 |
| 1 | 144 | 16.2 | 53299.0 | 48013.5 | 9414.4 | 10450.7 | 16.42 |
| 2 and more | 114 | 12.8 | 80351.3 | 51741.8 | 11248.2 | 17467.7 | 22.54 |
| Received Remittance | | | | | | | |
| Yes | 418 | 46.9 | 59187.1 | 50730.1 | 10568.7 | 12330.6 | 20.68 |
| No | 473 | 53.1 | 57054.3 | 26248.1 | 5249.6 | 11410.8 | 19.46 |
| Support from Government | | | | | | | |
| No | 34 | 3.8 | 32794.5 | 38819.1 | 7465.2 | 6306.6 | 15.25 |
| Yes | 857 | 96.2 | 50694.7 | 46269.2 | 9442.7 | 10345.8 | 14.72 |
| Asset sales | | | | | | | |
| No | 655 | 73.5 | 45504.2 | 45282.1 | 9056.4 | 9100.8 | 12.19 |
| Yes | 236 | 26.5 | 62521.6 | 47935.7 | 9986.6 | 13025.3 | 22.79 |

MI: Mean Income (N), MFE: Mean Food Expenditure (N), MPFCE: Mean Per Capita Food Expenditure, MP: Mean PCI (N), CE: Catastrophic Effect, Source: Author computation 2019.

**Table 4.** Correlation Matrix (Multicollinearity Test)*

| Variables | Age | HE | HSize | Y | DHA | NI | ADE | HHH | NH | SFG | SA | Occu | FDEX | EG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | 1 | | | | | | | | | | | | | |
| HE | -.122 | 1 | | | | | | | | | | | | |
| HSize | -.003 | .019 | 1 | | | | | | | | | | | |
| Y | -.008 | .138** | -.069* | 1 | | | | | | | | | | |
| DHA | .255 | -.023 | .018 | .148* | 1 | | | | | | | | | |
| NI | -.069 | .196 | -.038 | .308 | .180 | 1 | | | | | | | | |
| ADE | -.116 | .178 | -.030 | .256 | .116 | .384 | 1 | | | | | | | |
| HHH | .090 | .082 | -.016 | -.083 | -.023 | .039 | .078 | 1 | | | | | | |
| NH | -.009 | .128 | .049 | .177 | .129 | .201 | .387 | -.030 | 1 | . | | | | |
| SFG | -.017 | -.047 | -.032 | .075 | .035 | .006 | .068 | -.039 | .054 | 1 | | | | |
| SA | -.141 | .200 | -.049 | .164 | .084 | .210 | .391 | .057 | .243 | .053 | 1 | | | |
| Occu | -.155 | -.076 | .043 | -.019 | -.011 | .016 | .006 | -.076 | .025 | .079 | -.002 | 1 | | |
| FDEXP | .087 | -.009 | .028 | -.008 | -.011 | -.103 | -.078 | .039 | -.066 | -.05 | -.091 | .006 | 1 | |
| EG | .019 | -.024 | .025 | -.093 | -.068 | -.104 | -.134 | -.058 | -.135 | -.04 | -.135 | -.029 | .013 | 1 |
| MS | .497 | -.001 | -.110 | -.058 | .210** | -.004 | -.038 | .230 | -.023 | -.03 | -.048 | -.143 | .040 | -.085 |

*Source: Author computation 2019.

**Table 5.** Test Statistics of Model Coefficients for Household Food Expenditure Model*

| Tests Statistics | Lagos State (LS) |
|---|---|
| Sample size ratio | 59.4 |
| Log Likelihood: | |
| Beginning Block | 824.023 |
| End Block 1 | 679.696 |
| Step 1. Model | 144.327 |
| Omnibus ($X^2$) test of model coefficients | (DF =36; PV: 0.000 < 0.05) |
| Hosmer and Lemeshow $X^2$ Test | 6.056 (DF =8; PV:.0.641>0.05) |
| Cox & Snell R Square | 0.150 |
| Nagelkerke R Square | 0.226 |

*Source: Author's computation 2019

**Table 6.** Logistic Regression of Characteristics of PLWHA on Food Expenditure Decline in Lagos State (n=891)

| Characteristics | B | Wald Stat | P-Value | Exp(B) | 95% CI |
|---|---|---|---|---|---|
| Household Income (Y) | | | | | |
| < N20,000 | Ref | | | | |
| > N20, 000 | -1.81 | 0.882 | 0.761 | 0.95 | 0.682-.32 |
| Gender (Ge) | | | | | |
| Male | Ref | | | | |
| Female | -0.29 | 1.95 | 0.16 | 0.74 | 0.49 – .13 |
| Age | | | | | |
| 18-23 | Ref | | | | |
| 24-29 | 0.784 | 3.48 | 0.06 | 2.19 | 0.96-4.99 |
| 30-35 | 0.63 | 2.39 | 0.12 | 1.87 | 0.85-4.17 |
| 36-41 | 0.14 | 0.121 | 0.73 | 1.15 | 0.53-2.48 |
| 42-47 | 1.28 | 10.78 | 0.001 | 3.60 | 1.68-7.75 |
| 48 & above | 0.88 | 4.30 | 0.038 | 2.42 | 1.05-5.59 |
| Marital Status (MS) | | | | | |
| Widowed | Ref | | | | |
| Unmarried | -0.123 | 0.107 | 0.74 | 0.884 | 0.42-1.85 |
| Married | -0.49 | 2.151 | 0.14 | 0.611 | 0.32-1.18 |
| Divorced/Separated | -0.48 | 1.45 | 0.23 | 0.616 | 0.28-1.36 |
| Ethnic Group (EG) | | | | | |
| Other ethnics | Ref | | | | |
| Yorubas | 0.526 | 2.014 | 0.16 | 1.692 | 0.82-3.49 |
| Igbos | 0.678 | 3.23 | 0.07 | 1.97 | 0.94-4.13 |
| Hausas | 0.878 | 3.91 | 0.05 | 2.406 | 1.01-5.75 |
| Household Head (HH) | | | | | |
| Female | Ref | | | | |
| Male | 0.344 | 2.28 | 0.13 | 1.411 | 0.90-2.20 |
| Occupation (OCC) | | | | | |
| Others | Ref | | | | |
| Government workers | 0.146 | 0.119 | 0.73 | 1.157 | 0.51-2.64 |
| Petty Traders | 0.004 | 0.0001 | 0.99 | 1.004 | 0.45-2.23 |
| Family Business | 0.067 | 0.02 | 0.89 | 1.069 | 0.42-2.70 |
| Unemployed | 0.09 | 0.046 | 0.83 | 1.094 | 0.82-2.48 |
| Private Sector Employ | 0.04 | 0.008 | 0.93 | 1.038 | 0.45-2.39 |
| Farmers | -0.25 | 0.231 | 0.63 | 0.782 | 0.29-2.13 |
| Students | -0.63 | 0.722 | 0.4 | 0.532 | 0.12-2.28 |
| Duration with HIV/AIDS (DHA) | | | | | |
| 9 years and above | Ref | | | | |
| 1-4 years | -0.39 | 2.67 | 0.102 | 0.674 | 0.42-1.08 |
| 5-8 years | -1.03 | 17.01 | 0.000 | 0.358 | 0.22-0.58 |
| Member with HIV/AIDS (NH) | | | | | |
| 2 & more member/s | Ref | | | | |
| Only the respondent | -0.48 | 4.37 | 0.037 | 0.616 | 0.39-0.97 |
| AIDS related death (Ade) | | | | | |
| No death | Ref | | | | |
| One death | -1.35 | 24.33 | 0.000 | 0.259 | 0.15-0.44 |
| Two or more death | -0.84 | 7.55 | 0.006 | 0.433 | 0.24-0.79 |
| Remittance (NI) | | | | | |
| Received Remittance | Ref | | | | |
| No Remittance | -.116 | 0.292 | 0.014 | 0.672 | 0.49-0.92 |
| Support from Govt (SFG) | | | | | |
| Received support | Ref | | | | |
| No support | 0.183 | 0.156 | 0.693 | 1.201 | 0.48-2.98 |
| Household size (HSize) | | | | | |
| > 9 | Ref | | | | |
| 1-2 | 1.382 | 6.303 | 0.012 | 3.983 | 1.35-11.7 |
| 3-4 | 0.684 | 1.865 | 0.172 | 1.982 | 0.74-5.29 |
| 5-6 | 0.439 | 0.77 | 0.38 | 1.551 | 0.58-4.13 |
| 7-8 | 0.515 | 0.94 | 0.332 | 1.673 | 0.59-4.7 |
| Asset sale (AS) | | | | | |
| No | Ref | | | | |
| Yes | 0.077 | 0.123 | 0.726 | 1.08 | 0.70-1.66 |
| Expenditures on drugs (He) | | | | | |
| No expenditure | Ref | | | | |
| Less than 1000 | -0.39 | -1.49 | 0.223 | 0.673 | 0.36-127 |
| N1001-1999 | -0.64 | -4.29 | 0.038 | 0.525 | 0.29-0.97 |
| N2000-N2999 | 0.035 | 0.009 | 0.925 | 1.035 | 0.50-2.13 |
| N3000 and above | -0.04 | 0.02 | 0.9 | 0.96 | 0.50-1.83 |
| Constant | 0.351 | 0.176 | 0.675 | 1.421 | |

***Logistic Regression Result for Food Expenditure Model***

The Table 6 presents the multivariate logistic regression result for determinants of household food expenditure finance among households in Lagos State of Nigeria. In logistic regression, the Wald statistics is the same as the T-Statistic in ordinary least square regression. Also, only the 'B' i.e Odd ratio (OR) or Exp (B) are discuss.

As indicated in the result, food expenditure decline was significantly higher in households with age group 42-47 years old (OR: 3.60, 95% CI: 1.676-7.745) when compare with other sub-group. Looking at the Odd ratio (OR: 2.406, 95% CI: 1.01-5.75) of ethnicity variable, it can be infer that household from Hausas speaking group are more likely to encounter food expenditure decline than other ethnic groups. Similarly, respondents who were infected 5-8 years ago (OR: 0.358, 95% CI: 0.22-0.58), have significantly higher food expenditure decline than those infected 9 years and above. The outcome suggests that the odd of food spending decline is higher among participants with infection rate of 1-5 years. While household with one infected member ($p<0.05$) are less likely to face food expenditure decline (OR: 0.358, 95% CI: 0.22-0.58) than household with two or more PLWHAs. Likewise, AIDS-related death is observe to significantly predicts household food expenditure decline. Households who have experienced AIDS-related death were more likely to face food expenditure decline (OR: 0.259, 95% CI: 0.15-0.44), when compare with those who have not.

In like manner, households with two or more AIDS-death cases (OR: 0.433, 95% CI: 0.24-0.78) were more likely to face the burden of food expenditure decline when compare to households with a single death case. Interestingly, the odd of food expenditure decline is high among households that received remittances as against those who do not (OR: 0.672, 95% CI: 0.49-0.922). Furthermore, small households (1-2 person/s) are more likely to encounter food expenditure decrease than large household of nine persons and above (OR: 3.983, 95% CI: 1.35-11.7). There was statistical significant trend ($p<0.05$), demonstrating that those who spend N1001-N1999.00K on health care were less likely to face food expenditure decline than those who do not incur any health-related cost. It is apparently in the result (Table 6) that neither household income, gender, marital status, household head, occupations, remittances, support from government, nor asset sale were associated with food expenditure decline.

**Discussion of Result**

The empirical finding (Table 6) has shown that household income does not significantly predict food expenditure decline among PLWHA in Lagos state. This is contrarily to extant studies (Booysen & Bachmann, 2003; Mikael, 2004; Kadiyala, 2005, Ayele, et al, 2012 & Shyamala, 2015) that have observed a significant relationship between income and food spending of household. The age group variable has indicated that certain age group (42-47 years; 48 years and above) were found to encounter greater food expenditure decline. This outcome supports the works of Zhang et al (2012), Kalimang'asi, Majula and Florent (2014), that AIDS pandemic is eroding the most productive member of the population thereby causing loss of labour, income and reduction in financial resources for household consumption. Among the ethnic groups, the Hausas speaking individuals were most likely to be vulnerable to food expenditure decline. This outcome might be attributed to some of the respondents little or no basic levels of education and their involvement in low-income occupational and trading activities.

Further outcome indicates that those infected for the periods 5-8 years are less likely to experience food expenditure decline when compare to those infected 9 years and above. This is an indication that time of infected play a keys role in the consumption patterns of households. The finding is similar to the outcomes of Booysen et al., (2004), Naidu and Harris (2005) and Zhang et al., (2012) that found HIV respondents more significantly better-off with higher per capita income than AIDS participants. Still, households with a single person infected are less likely to encounter food expenditure decline as against those with two or more PLWHA. The singular explanation for this outcome, point to the fact that the higher the number of infected household member/s, the greater the odd of food consumption decline especially when the household head is affected or deceased. The results also suggests that there will be lesser food expenditure burden in household where two or more AIDS-related death cases are observed compare to home where AIDS-death is not recorded. This finding is contrary to previous works (Gertler, Martinez, Levine, & Bertozzi, 2003; Mwakalobo, 2007), that perceived higher financial burden and declining food consumption spending in households that have encountered AIDS-related death as against those who have not.

In the result, remittances insignificantly predict food-spending decline. Though, the outcome demonstrated that household that received remittances will faced more decline in food expenditure compared to those who do not received. One reason for this result might be that those who do not receive remittances are economical and financial stable than those who receive. Additionally, the finding indicates that small household's size (1-2) tend to face greater challenge of food expenditure decline than large households. This outcome does not support the work of Iya, et al. (2012), who opined that larger households are more likely to be poorer than smaller ones, as they spend more on food and other basic needs. Additionally, the outcome of health expenditures suggests that certain group of participants (Individuals who pay N1001-N1999) will face lesser burden of food expenditure decline than those who do incur out-of-pocket expenditure on health care. This finding is absurd and contrary to the studies of Masuku and Sithole (2009) and Laar et al. (2015) who associate the illness with a number of health care related expenditures which adversely affect households income in turn food spending.

So far, the finding from this study only reflect certain household characteristics in selected LGAs of Lagos state. However, there is still much work to be done in the area of socioeconomic and demographic characteristics of PLWHAs on food expenditure pattern globally especially in SSA nations where the epidemic is higher.

## Conclusion and Recommendations

This study examines the factors influencing food expenditure patterns among HIV/AIDS households in Lagos State of Nigeria. The empirical analysis was done using some selected household characteristics such as household income, gender, age, marital status, ethnic group, sex of household head, occupation of participants, duration of living with HIV/AIDS, household member infected, AIDS-related death, remittances from relative, government support, household size, asset sale and HIV/AIDS health spending on food consumption expenditure were empirically analyzed. From the result, it is observed that some age groups (24-29, 42-47, 48 & above), duration of the illness (5-8 years), member infected with HIV, death due to AIDS related illness, household size (1-2), and HIV/AIDS related expenditures exert significant impact on household food expenditure decline. However, household income variable reduces the odd of food expenditure decline but does not exert significant impact on food expenditure. This phenomenon might be attributed to the autonomous component of consumption likewise remittances which insignificantly affected food expenditure.

Based on the finding of this study, it is therefore suggested that the government in her capacity should enact strategy interventions schemes that will assist affected households to maintain regular income in order to provide financial stability and support in improving daily nutritional diet of PLWHA. Lastly, it is observed that more PLWHA contacted the illness within the last three year of the study. This by implication implies that new infection rate might increase. Therefore, it is advocated that more HIV/AIDS awareness and campaign programmes that goes beyond Family Life and Health Education curriculum (FLHE) should be carried out by the government and her agency in every sector/sphere of the nation.

## Appreciation

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## Consent Statement

It must be noted that every analysis carry out in this study are the view and opinion of the authors on the subject matter.

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