

Determinants of households' food consumption expenditure in South-Western Ethiopia

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Abstract

Most of poor communities in developing countries live disproportionately in rural areas where agriculture is the main means of livelihood. The food expenditure is generally used as a main yardstick for measuring the standard of living in developing nations. However, previous studies do not pay attention in identifying food expenditure of rural households. This study was designed to analyze food consumption expenditure of households in rural communities of South-West Ethiopia. The study employed cross sectional data collected from 182 randomly selected households. Primary data were collected from sample households through interview schedule, focus group discussions and key informant interview while secondary data were collected by reviewing different documents. Descriptive statistics and multiple linear regression econometric models were used for analyzing the data. The study result indicates that age of household head and market distance were negatively and significantly affected household food consumption expenditure while education level of household head, livestock holding size, nutritional training and income of households has positively affected household food consumption expenditure. Significant factors are consequences for food consumption expenditure in the study area. Therefore, policy and development interventions should give emphasis to training and awareness program to equip households with appropriate nutritional knowledge and modern technologies supporting agricultural practices to increase both production and income of rural households so as to enhance household food consumption behavior in the study area.

Key words: Food, consumption expenditure, multiple linear regression, Southwestern Ethiopia

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INTRODUCTION

Most of poor communities in developing countries live disproportionately in rural areas and they are directly or indirectly dependent on smallholder agriculture, that are poorly integrated into markets, for their food, income and livelihoods (Fischer and Qaim, 2012). Though there is a growth in agricultural production most of the Sub-Saharan Africa (SSA) countries including Ethiopia have not been able to ensure food security at either national or household level (Bezu et al, 2014). The extent to which rural households are able to feed themselves depends on their own food production as well as ability to purchase food using non-farm and farm income (Baiphethi and Jacob, 2009). Ethiopia is one of the lowest income countries in the world with an average per capita income and still suffering from persistent and widespread poverty and food insecurity (Husmann, 2016). More importantly, poverty is disproportionately affecting people in the rural areas

of the country where about 80.5% of the rural population rely on agriculture for their livelihoods (Abro et al, 2014; Thomas, 2013).

Consumption is one of the economic activities to meet various needs of goods and services. It represents the total quantity of goods and services bought by consumers during a period, which is the expression of total consumer demand (Ndubueze et al, 2015) and consumption expenditure as the amount that household spends on purchasing goods and services such as clothing, food items, entertainment, health services and acquisition of assets among others (IFPRI, 2018). Food consumption plays an important role in the economic growth and development of both developed and particularly for developing nations. It has a considerable impact on the circular flows of income in the economy, having a significant effect on the economic activities of a country (Amran, 2017).

Consumption behavior of a particular product is a deciding factor for eating, drinking and food choices and it helps in understanding why, when, where, and how people consume certain foods or diets (Berhane et al, 2011). Levels and composition of food consumption are major determinants of the nutritional wellbeing of individuals, which in turn, have important implications for health, productivity, and income (Seleshe, 2014). The household food, nutrition and health have relations with the consumption decisions of households (Alem and Soderbom, 2012). Food consumption behavior in Ethiopia is tidily associated with cultural taboos and religious practices (Hoddinott et al, 2015), which might lead to lack of dietary diversity causing high rate of stunting and other nutritional complications (Atkinson, 1992). Levels and composition of food consumption can be used to measure the wellbeings of households in Ethiopia (Ajmair and Akhtar, 2012). In developing nations, the consumption expenditure on different food items can generally be used as a main yardstick for measuring the households' well-being and standard of living.

Some Researchers (Sotsha et al, 2019; Jodlowski et al, 2016; Iorlamen et al, 2014) have studied the major factors that affect the people's food consumption such as socio-economic and demographic factors. It is reported that family size, saving or investment lifestyle, education and environment were important determinants of consumption levels (Kostakis, 2014). According to the Engel's law, food expenditure increases as income and household size increase, but the food budget share declines as income rises (Kostakis, 2014). Hence, it is argued that low-income households spend a larger share of their income on food, compared to higher-income households. Although, Hone and Marisennayya (2019) found that demographic and socio-economic traits such as income, gender, age, and marital status, place of residence and status of employment have important impact on household expenditures on foods. Furthermore, the household behavior of expenditures on food is directly related to the household size and income. Studies conducted in Addis Ababa city and Debre Markos town found that household income and family size being main determinants of the household consumption behavior (Kuma, 2010; Wolle, 2020).

The above-mentioned studies however, are focused on determinants of food consumption expenditure in urban contexts. There is lack of evidence on the issue of food consumption expenditure for rural areas particularly, in Southwest Ethiopia. It is believed that information on the rural household's food expenditure

plays an important role to monitor and explain inequalities in living standards, general welfare and food security. Hence, the finding of this study can contribute to create awareness on households' dietary intake patterns and factors influencing food expenditure, which are inputs for governments and policy makers to design appropriate programs and strategies that help to alleviate poverty and to enhance food security and to improve living standards of the rural households.

This study was, therefore, conducted with the objectives of analyzing the rural households' dietary intake pattern as well as determining factors affecting rural households' food consumption expenditure and has contributed new body of knowledge that is assumed to provide rural context evidence-based information pertinent for better planning and implementation of development interventions in the study area.

MATERIALS AND METHODS

Description of the Study Area

The research was conducted in Southwestern Ethiopia, Yayu and Gomma Districts. Yayu is located about 582 km while Gomma is 395 km west of Addis Ababa. The districts agro-ecology is lowland and highland, respectively. Yayu mean annual temperature is about 20°C and the mean annual rainfall is 1724 mm. Yayu has a total population of 57,938 (27,969 males and 29,969 females). Gomma, on the other hand, has a mean annual temperature of 18°C and a mean annual rainfall of 2100 mm. The district has a total population of 350,882, (172,888 men and 177,994 women). Coffee-based agriculture is the main livelihood source of the households in Gomma (IPMS, 2014; Tadesse et al, 2008).

Sample Size and Sampling Procedures

Sample selection was done employing three-stage sampling method. At the first stage, the study area was purposely selected based on the researcher's interest. In the second stage, three kebele's were selected using simple random sampling method. At the end, 188 respondent households were selected from the three kebele's by simple random sampling method. To determine the required sample size, this study used a simplified formula developed by (Yamane, 1967) at 95% confidence level.

$$N = \frac{N}{1 + N(e)^2}; \text{ where}$$

N = total population of the study kebele

e = precision level at 7.1%

n = sample size

$$\frac{2850}{1 + 2850(0.07)^2} = 188$$

Data Types, Sources and Collection Methods

A cross-sectional survey was conducted in rural households of the study area. In this study, both qualitative and quantitative data types were collected from both primary and secondary sources. Primary data were collected from sampled households using semi-structured questionnaire, interview guide for Focused Group Discussion (FGD) and key informant interview (KII) checklist. Secondary data were gathered from district offices of agriculture, trade and marketing and from other published documents.

Methods of Data Analysis

Data were analyzed using descriptive statistics and econometric model. To analyze the rural household dietary intake pattern, frequency distribution, mean, percentage and standard deviations were employed. Multiple linear regression model was used to determine the relationship between the dependent variables and a set of explanatory variables by using SPSS version 20.

The Economic Model

Following Wooldridge (24), the multiple linear regression model is specified as

$$HHC = \beta_0 + \beta_n X_n + u_n$$

Where: HHC= total household consumption expenditure per month of a household (in Birr); β_n =coefficient of the explanatory variables TLU

Variance Inflation Factor (VIF); X_n = explanatory variables and u_n = error term and β_0 = constant

Before running the model all the hypothesized explanatory variables were checked for the existence of multi-collinearity and normality of data distribution. To check multi-collinearity Variance Inflation Factor (VIF) and the tolerance factor were used and p-p plot was used to normality distribution. For VIF, the minimum possible value is 1.0; while value greater than 10 indicates a probably collinearity between the explanatory variable in question and the rest of the predictors in the model. VIF was estimated using the formula stated below:

$$VIF = \frac{1}{1-R^2}$$

Where: R^2 , is the multiple correlation coefficients between variable X (one of the independent variables).

On the other hand, tolerance (TOL) is an inverse of VIF. A small tolerance value indicates that the variable under consideration is almost a perfect linear combination of other independent variables in the equation and that it should not be added to the regression equation.

Study variables

Dependent variables: Households' food consumption expenditure was measured by total money expended on food items. All food consumed from own production, purchase and gift were considered and changed to Ethiopian Birr.

Table 1. List of variables and their expected direction of effect on food expenditure

Variables	Type	Unit	Expected sign
Dependent Variable			
Household Food Consumption Expenditure	Continues	Birr (Ethiopian Local Currency)	
Independent Variable			
Sex (household head)	Dummy	1 male, 0 female	Negative
Age (household head)	Continuous	Years	Negative
Education level	Continuous	Schooling years	Positive
Household size	Continuous	AE	Positive
Land holding size	Continuous	Hectare	Positive
Livestock owned	Continuous	TLU	Positive
Income of household	Continuous	Birr	Positive
Market distance	Continuous	km	Negative
Credit use	Dummy	1 user, 0 non user	Positive
Nutritional Training	Dummy	1yes, 0 not received	Positive

Independent variables: The factors hypothesized to affect the food consumption expenditures were age of household head, education level of household head,

household size, and household land holding size, livestock holding size, income of household, market distance from residences of respondents, credit use

and receiving nutritional training (Table 1). In the above Table, all hypothesized independent variables were described with their expected effect on dependent variables. The selection of variables was informed by several authors (Donkoh et al, 2014; Habib, 2016 Meng et al, 2012).

RESULTS AND DISCUSSIONS

Description of the sampled households

A total of 182 households were involved in the analysis. The households' characteristics (Table 2) showed that out of the households sampled 71.4% of them were headed by males and 28.6% by females.

About 34.1% of the households had experiences of using credit services and 48.4% participated on nutritional training. The mean of age and education level of the household heads were 42.2 years of age and 4.7 years of schooling, respectively. The mean family size was 5.2. The average land and livestock holding of the households is 3.01 hectare and 2.38 TLU, respectively. The average monthly income of household was 4,341.60 ETB and the average distance from home to the nearest market place was 4.15 km.

Table 2. Description of explanatory variables

Continues Variables	Minimum	Maximum	Mean	SD
Age	24	76	42.2	10.75
Education level	0	12	4.70	3.58
Family size	1	10	5.2	1.7
Land-holding size	0.00	8.00	3.01	1.90
Livestock	0	7.9	2.38	1.93
Income	400	51,917	4,341.60	7200
Market Distance	0.2	15	4.15	3.24

Dummy Variables	Frequency (n=188)	%
Sex of HH		
Female	52	28.6
Male	130	71.4
Credit use		
No	120	63.9
Yes	62	34.1
Nutritional Training		
No	94	51.6
Yes	88	48.4

Source: own survey.

Dietary intake patterns of households

The type of meal that is consumed in any rural households largely depends on the economic status and cultural preferences of people (Arimond, 2011). Meals types mainly prepared and consumed as staples are rich in carbohydrates. As shown in Table 3 below, all households depend upon cereals to fulfill their energy needs. These foods have become the sole source of energy households often consumed. This shows the extent to which cereal-based foods are consciously chosen by people in the study area. The KII also showed that food made from maize, sorghum and teff together with side dishes from pea, bean and lentils are frequently consumed among all households. Legumes and pulse are essential in household diets as side and flavoring components, but also as a complementary provider of micronutrients. Pulses/legumes are rich source of plant proteins and have many health benefits that households get from production or purchase. The findings are in concordance with a study done in Nepal, Bangladesh

and Mozambique, where dietary patterns are heavily dominated by starchy staples (Arimond et al., 2011; Bhandari et al., 2016).

The consumption of micro-nutrient rich foods in the study area was poor. Micronutrients can be obtained from vegetables, fruits, and meat and milk/milk products. Micronutrients are particularly essential for children and women especially during pregnancy and lactation (Zerfu and Ayele, 2013). The higher the consumption of these foods, the less likely women and children suffer from micronutrients deficiency. The present study revealed that the frequency of consumption of micronutrient rich foods was low.

The majority 61.8% of households in the area consumed vegetable rarely and 38.3% sometimes. Rural food consumption is largely determined by what is produced and available. Fruit and vegetable consumption behavior of households were influenced by seasonal availability. Moreover, divergent

opinions were noted regarding vegetable and fruit consumption from KII and FGD. The participants also pointed out that cultivated food grains are not enough to cover the annual food demand for most of households in the study area. Some households face food shortage during the rainy season from June to September, during which time the families depend on vegetables, tubers and root crops. Vegetables such as cabbage, kale, lettuce, carrot and beet root are the most favored species in home gardens to help families overpass a critical food shortage gap. People eat lots of bananas, mangoes, avocados, guavas, or oranges, but only when they are seasonally available. However, leafy vegetables and fruits are perceived by majority of rural communities as not important part of the daily diet and hence are not included in the daily meals.

On the other hand, only few households buy fruits and vegetables from the market in the off season (October to April), as the home gardens don't dry out. These seasonal changes influence the availability of seasonal food crops hence may positively or negatively affect its market price, forcing consumers to change their food preferences often going for what is cheaper or is readily available. Households with access to irrigation water and facilities are producing vegetables during such off season and consume regularly, while households without access to irrigation had to buy vegetables and fruit from the market, which reduced their frequency of consumption. This finding confirms earlier reported (Workicho et al, 2016).

Foods that are acquired from livestock products such as meat (88.5%), milk (55.8%) and eggs (94.5%), are consumed rarely. There were households who were

not at all consuming meat and dairy product in a year. Apart from households who have access to dairy cow and small animals like poultry, livestock products are consumed only by a limited number of households who afford to buy. Therefore, the demand and availability of various food sources, except for cereal crops and pulses, is low. The cost and availability of foods in turn, reduces dietary energy for significant number of the households in the study area. Further, discussion held with FGD indicated that, animal source foods (ASF) are mostly consumed during religious and social ceremonies. Wealthy households are able and prefer to buy ASFs and nurture their family. One KII noted that, *only those households who have access to enough dairy cattle have consumed milk and milk products*. Poor households never consider consuming livestock product. Some households having access to dairy cow do not use for home consumption due to other priorities such as grain staples. From this discussion, one can easily understand that, the food habits and the lack of nutritional knowledge results in poor consumption behavior. In the study area regarding the consumption pattern, majority of the households always consume pulse food, cereal food and fruits respectively. Hence, frequency of food intake, lack of awareness on the benefits of various fruits and vegetables and inability to access livestock products signifies imbalanced consumption practices in the area. The observations of the current study are in line with the findings of Black et al, (2013) and Jebessa et al (2019). The consumption of foods rich in micronutrients should be encouraged in order to prevent micronutrient deficiencies and ensure better health of women and children (Akpan et al, 2013).

Table 3: Consumption pattern of households (n=188)

Foods	Not at all	Rarely	Sometime	Always
	n (%)	n (%)	n (%)	n (%)
Cereal food	0	0	0	182(100)
Pulse food	0	0	29(15.8)	154(84.2)
Vegetables	0	112(61.8)	70(38.2)	0
Meat	20(11.5)	162(88.5)	0	0
Milk	68(37.2)	102(55.8)	12(7.0)	0
Egg	0	172(94.5)	10(5.5)	0
Fruits	0	105(57.4)	57(31.1)	20(11.4)
Root and tubers	0	112(61.8)	70(38.2)	0

Source: Own survey

Household Food Consumption Expenditure

Households expend their income on food and non-food goods and services. The minimum monthly food consumption expenditure level is 3400 Birr and maximum 9700 Birr with mean of 5807.81 and 2711.10 SD (standard deviation). The mean food consumption per adult equivalence was 893.70 with 862.40 SD. The food expenditure of households covers around 57-67% of total households' expenditure.

Determinants of household food consumption Expenditure

Prior to the estimation of the parameters of the model, data have been tested for multi-collinearity problem. Multi-collinearity test for the existence of serious problem of multi-collinearity among the variables was examined by the help of Variance inflation factor (VIF) and tolerance. The information showed no serious multi-collinearity problem (for all variables tolerance > 0.1 or VIF < 10). On the other hand, the normality was checked by P-P plot and showed that the points generally follow the normal line with no strong deviations. The model containing explanatory variables was significant, indicating that the model was able to distinguish between the various explanatory variables used. The regression model as a whole explained 31.0% ($R^2 = 0.310$) of the variations in all cases. The Durbin-Watson test is another measure of model adequacy, which for the current research data was 1.538.

The variables that were assumed to have influence on food consumption expenditure were tested in the model, 6 out of 10 of which were found to be significant. Two of the significantly influential variables (age and distance from market) negatively affected the food consumption expenditure.

Income: is one of the basic factors for the people to improve their diets. According to the multiple linear regression, income was found to have positive relationship with household consumption expenditure and significant at 1% level. The positive relation of this variable indicates that the high-income households are more likely to expend more on their diet than low-income households. The increase in income will change patterns of

spending. The model output result shows that a unit increases in income of households result in an increase of 0.019 Ethiopian Birr on the food consumption expenditure. The results from the current work are in line with the findings of Akpan (2013) and Amran (2017), who noted that as consumption is usually hypothesized to be a function of disposable income, which follows therefore, that income determines the households' level of consumption. Higher income makes the household to have more choices to the various goods that will be consumed (Sekhampu, 2012; Lorlamen, 2015; Oladimeji 2018; and Habu 2019).

Educational level of household head: It is obvious that education increases the knowledge and skill of the people in a society. Education has been hypothesized to have a positive relationship with household consumption. The model output also revealed that education level of household heads had a positive influence on the household food consumption expenditure at 1% significance level. As the household head acquires a higher education, the expenditure on food tends to increase. This implies that education increases knowledge of nutritional diets and proves one of the most important determinants of consumption. Educated household heads could have better understanding on the health benefits of various foods and they spent a significant amount of their budget on diet. On the other hand, education helps to form certain food habits and change others. The result of this study is in agreement with previous reports on significance of education to household food consumption expenditure (Yimer, 2011; Iorlamen et al, 2014).

Age of household head: Contrary to expectations, the age of household was found to be negatively affected at 1% significance level. This suggests that as household heads advance in age, their expenditure on food decreases. This study result is in line with the report of Sotsha (2020), that pointed out that the child support grant does not increase the household food expenditure and older household heads are likely to spend less as they become more risk averse. Rubhara (2017) also reported that as age of household head increase food expenditure decreases. But contrasting to Iorlamen et al, (2014),

who showed that changes in the age of the household head lead to differences in nutritional requirements of a household and increase in the age of the household head was positively associated with increased food expenditure.

Market distance: The multiple linear regression model indicated that distance to market has significant and negative influence on household food consumption expenditure at 10% level of significance. The negative estimated coefficients in the models, implies that households far from market centers have expended less than those closer to market. The model also revealed that, a one unit increase in market distance results in 15.509 decrease in the household consumption expenditure. The probable reason for this was that households who are close to markets had opportunity to purchase different food groups from market or shops more often than those far away. This is in congruent with the results of the study conducted by Stifel and Minten (2017), which showed a strong link between remoteness from markets and household food consumption expenditure. Moreover, Sibhatu, (2015) and

Hirvonen (2015) argued that better market access through reduced distances could contribute to better food consumption. The longer the distance to the market, the less frequently the farmers makes visits, which leads to less likelihood of them getting market information and goods/commodities (Matchaya and Chilonda , 2012).

Nutrition training: the multiple linear model analysis indicates that nutritional training has a positive association with household consumption level and significant at 5% level as it was hypothesized. The model output showed that having some training on nutrition, increases household food consumption. This implies that training improves knowledge on the individual food items and helps to make general evaluations of the diets of a household. Nutrition aspects go along with knowledge and awareness to ensure proper selection of foods for good health. Training also can inform consumers, helping them to wisely choose foods. It also provides with the relevant skills needed to prepare food well and spend more money on food items.

Table 4. Determinant of household food consumption expenditure

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	548.131	117.760		4.655	0.000***
Sex of household head	-27.487	40.947	-0.043	-0.671	0.503
Land size	2.367	9.634	0.016	0.246	0.806
Credit use	-39.190	38.253	-0.065	-1.024	0.307
Income	0.019	0.003	0.484	7.347	0.000***
Education level	11.598	5.097	0.145	2.276	0.024**
Age of household head	-3.410	1.727	-0.128	-1.975	0.050**
Market distance	-15.509	5.873	-0.176	-2.641	0.009***
Family size	-7.425	10.712	-0.044	-0.693	0.489
Nutritional Training	71.970	37.025	0.126	1.944	0.054*
Total livestock holding	19.388	9.645	0.131	2.010	0.046**
R	0.574	Estimate Std. Error		241.60	
R Square	0.330	Durbin-Watson		1.538	
Adjusted R Square	0.291	Prob > F		0.0000	

*Significant at 10%, ** Significant at 5%, *** at 1% probability levels; Source: multiple linear regression model

The result of this study is consistent with findings of Powell (2017), who revealed that lack of

nutrition information results into poor dietary eating that leads to inadequate nutrient intake.

Similarly, Nathan, (2014) and Nsele, (2008) showed that awareness encouraging people to consume healthy meals, and carrying out proper child feeding approaches.

Livestock Size: livestock size significantly ($p < 0.10$) and positively influences consumption expenditure. The multiple linear regression indicated that as the livestock size increase household consumption expenditure level increases. This implies that households owning more livestock are more likely to expend their resources on food consumption than households with smaller livestock size. Livestock possession is also closely related to production in the rural area that helps to generate income for additional food purchase (Jodlowski, 2016; Rubhara, 2020).

CONCLUSION AND RECOMMENDATIONS

The result of the regression model showed that income, education level, nutrition training and livestock size significantly and positively influenced households' food consumption expenditure. Age of the household head and distance from the nearest market on the other hand, had a negative but significant influence on the households' food consumption expenditure.

The majority of household frequently consume starchy staples while consumption of vegetables, fruits and dairy products were rare. The study also found monthly estimated household expenditure on food and farm size as the main factors influencing farm household total expenditure in the study area.

Based on these finding, it can be recommended that agricultural interventions should work for the production and consumption targeting better dietary diversity to improve nutrition. Cultivation of vegetables and fruits and consuming them can prove to be an important factor in maintaining better nutritional status. It is commanding that the government and non-governmental organizations act to improve dietary intake pattern of households. The government should properly target rural households to raise the income level and nutritional awareness for improved consumption of healthy foods. The concerned and relevant regional and federal government

agencies should look into market infrastructure for the improvement of food consumption practices of the community considered for the current study.

Abbreviations

ETB: Ethiopian Birr; FGD: Focus group discussion; KII: key informant interview; PAs: Peasant Association; SPSS: statistical package for the social science; SSA: Sub-Saharan Africa; TLU: Tropical Livestock Unit; VIF: Variance Inflation Factor, WB: World Bank; SD: standard deviation

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Authors' contributions

GMJ: comprehended the idea, collected the data, did analysis, wrote abstract, background, methodology, result discussion and Conclusion. ABB contribution to the paper overall management of the article, technical input at every step and participated in manuscript preparation. Both authors read and approved the final manuscript.

Availability of supporting data

The data sets analyzed during the current study will be made available on email request to the corresponding author.

Ethical approval and consent to participate

Ethical clearance was obtained from Jimma University College of Agriculture and Veterinary Medicine. Permission was obtained from selected districts' Agricultural and Natural Resource Offices and PAs administrations through formal requests. The consent form has been read to all participants and those agreeing to participate in this study signed one.

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