Research paper

Determinants of Households Food Consumption Expenditure in South-Western Ethiopia

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ABSTRACT

Background: Most of poor communities in developing countries live disproportionally in rural areas where agriculture is the main 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. Thus this study was designed to analyze food consumption expenditure of households in South-West Ethiopia.

Methodology: 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 and secondary data were collected by reviewing different documents. Descriptive statistics and multiple linear regression econometric models were used for analyzing the data.

Results: 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.

Conclusions: 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.

Keywords: Food Consumption Expenditure, Multiple Linear regression, Southwestern, Ethiopia.

1. Background

Most of poor communities in developing countries live disproportionally in rural areas and they are directly or indirectly depend on small scale agriculture, that are incompletely integrated into markets, for their food, income and livelihoods [1]. 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 [2]. 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 [3]. Ethiopia is the lowest income countries in the world with an average per capita income and still suffering from persistent and widespread poverty and food insecurity [4]. More importantly, poverty is disproportionately affecting people in the rural areas of the country where about 80.5% of the rural population is relied on agriculture for their livelihoods [5, 6].

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 and consumed by consumers during a period, that is, it is the expression of total consumer demand [7] 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 [8]. Food consumption plays an important role in the economic growth and development of both developed and developing nations. It has a considerable impact on the circular flows of income in the economy, meaning that, it has a significant effect on the economic activities of a country.

Consumption behavior of a particular product is a deciding factor for eating, drinking and food choices and it helps to understanding why, when, where, and how people consume certain foods or diets [9]. 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 [10]. In another way food consumption behavior in Ethiopia is tidily associated with cultural taboos and religious practices [11] and the country has a high rate of stunting and great lack of dietary diversity intake [12]. The household food, nutrition and health have related with the consumption decisions of households [13]. Similarly different scholars

used consumption to measure wellbeing of households in Ethiopia [5, 14]. Thus the consumption expenditure on different food items is generally used as a main yardstick for measuring the standard of living in developing nations and well-being of households like Ethiopia.

Statement of the problem

Different authors have studied the major factors that affect the people's food consumption such as socio-economic and demographic factors. The study found that income, family size, saving or investment lifestyle, education and environment were important determinants of consumption level [15]. According to the Engel's law, food expenditure increases as income and household size increase, but the food budget share declines as income rises (15). Hence, it is argued that low-income households spend a larger share of their income on food, compared to higher-income households. The study conducted in Greece showed that demographic and socioeconomic traits such as income, gender, age, and marital status, place of residence and status of employment have an important impact on household expenditures on food [16]. Furthermore, the household behavior of expenditures on food is directly related to the household size and income. In Ethiopia a study conduct in Addis Ababa city and Debremarkos town found that household income and family size as main determinants of the household consumption behavior [17] other authors [18; 19; 20], have discussed factors of food consumption in urban Ethiopia.

So far, the literature has identified a variety of economic and socio-demographic determinants that are potential factors of food consumption. However, Ethiopia studies on determinants of food consumption expenditure are rare and especially there is no evidence shows such studies have been conducted in rural area including Southwest Ethiopia. Most of studies were focused on rural household food security without taking into account the decision of household's expenditure on food. Thus there may lack of researched evidences about the households food expenditure. For this reason this study was conducted to fill the research and knowledge gap by focusing on the rural farm household of Southwest Ethiopia.

Objective of the study

The objective of this study was to analyze the dietary intake pattern and factors affecting food consumption expenditure of households in, South-West Ethiopia.

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Significance of the study

The findings on rural household food expenditure play 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 influence 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 rural farm households.

2. Method and Materials

Description of the study area

The research was conducted in Southwest of Ethiopia specifically Yayu and Gomma District. Yayu is located about 582 Km while Gomma located at 395 km west of Addis Ababa. The Districts agro-ecology is lowland and highland. Yayu mean annual temperature is about 20°C and the mean annual rainfall is 1724 mm per year. The District has a total population of 57,938 (27,969 males and 29,969 females). While Gomma mean annual temperature is about 18°C and the mean annual rainfall is 2100 mm per year. The District has a total population of 350,882, (172,888 are men and 177,994 are women). Coffee-based agriculture is the main livelihood source of the districts households   [21; 22].

Sample size and sampling procedure

Sample selection was done employing three-stage sampling method. At the first stage, the study area was purposely selected. In the second stage, three PAs were selected using simple random sampling method. At the end, 183 respondent households were selected from the three PAs by systematic random sampling method. To determine the required sample size, this study used a simplified formula developed by [23] at 95% confidence level.

$N = \frac{N}{1+N(e)^2}$ Where

N = total population of the study kebele

e = precision level at 7.1%

n = sample size

$$\frac{2850}{1 + 2850(0.071)^2} = 182$$

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Data types, sources and data collection methods

A cross-sectional survey was conducted in rural households of the study area. In this study, both qualitative and quantitative data type were collected from both primary and secondary sources of data. 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 agriculture, trade and marketing and published documents.

Methods of data analysis

Data were analyzed using descriptive statistics and econometric model. Frequency distribution, mean, percentage and standard deviations were employed. To analyze food consumption expenditure of household multiple linear regression models was used to determine the relationship between the dependent variables and a set of explanatory variables by using SPSS version 20

The econometric model

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

$HHC = \beta o + \beta n X n + u n$

Where: HHC= total household consumption expenditure per month of a household (in Birr); βn=coefficient of the explanatory variables TLU Variance Inflation Factor (VIF); Xn = explanatory variables and   un = error term and βo = 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 variable). 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 variable: 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.

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 following table 1 all hypothesized independent variables were described with their expected effect on dependent variables. The selection of variables was informed by several authors [15; 26; 27; 28].

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

3. Result and Discussion

Description of the sampled household characteristics

The households' characteristics were described in table 2 below. A total of 182 households were involved in the analysis. The survey result showed that out of the households sampled 71.4% of households were headed by males and 28.6% by females. About 34.1% of the households had utilized credit services and 48.4% of households were participated on nutritional training. The mean of age and education level of the household head was 42.2 years and 4.7 years of schooling respectively. The mean of 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 taken to travel from home to the nearest market place was 4.15 kilometer.

Table 2:   Description of explanatory variables

Continues Variables		N	Minimum	Maximum	Mean	SD
Age		182	24	76	42.2	10.75
Education level		182	0	12	4.70	3.58
Family size		182	1	10	5.2	1.7
Land-holding size		182	0.00	8.00	3.01	1.90
Livestock		182	0	7.9	2.38	1.93
Income		182	400	51,917	4,341.60	7200
Market Distance		182	0.2	15	4.15	3.24
Dummy Variables		Frequency (N)				%
Sex of HH	Female	52				28.6
	Male	130				71.4
Credit use	No	120				63.9
	Yes	62				34.1
Nutritional	No	94				51.6
Training	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. Regarding food meals prepared in the household, consumption of staple foods rich in carbohydrates. As shown in table 3 below all households depend upon cereals to fulfill their energy need. These foods have become the sole source of energy households consumed always. This shows to what extent cereals food is consciously chosen by people in the study area. From KII is emerged that food made from maize, sorghum and teff with food from pea, bean and lentils are frequently prepared and consumed in all household. This is because the main dish which are prepared from staple crops, are not served alone, but with either stew or a sauce. Legumes and pulse are essential in household diets as a flavoring element, 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 dietary patterns are heavily dominated by starchy staples [25, 29].

The consumption of micro-nutrients rich foods in the study area was poor. Micronutrients can be obtained from vegetables, fruits, and meat and milk/milk products and are essential for women

especially during pregnancy and lactation [30]. The higher the consumption of these foods, the less likely is suffering from micronutrients deficiency. The present study revealed that the frequency of consumption of these foods was low.

The majority of household in the area consumed vegetable 61.8% rarely and 38.3% sometime. Rural food consumption is largely determined by what is produced and available. Fruit and vegetable consumption behavior of households were influenced by seasonal variation. Moreover divergent opinions were noted regarding vegetable and fruit consumption from KII and FGD. The participants stated the case as cultivated food grains are not 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 such shortage they have fulfilled their food needs with vegetables, tubers and root crops. The production of vegetables such as cabbage, kale, lettuce, carrot, beet root are the most favored species in home gardens in these seasons can overpass a critical food shortage gap and consumed on a daily bases. Fruits are eaten if and when it available. People eat lots of bananas, mangoes, avocados, guavas, or oranges, but only when they are in seasonally available. However, leaf vegetables and fruits are perceived by majority of rural community as not important part of the daily diet hence not included in the daily meals.

On the other hand during the off season (October to April), when fresh vegetables and fruits are not available from the home gardens, few households had to buy from the market. These seasonal changes influence the availability of seasonal food crops hence may positively or negatively affect its market price. This price fluctuation causes consumers to change their food preferences often going for what is cheaper or readily available. Households with access to irrigation 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 the study of Workicho, [31].

Foods that are acquired from livestock products such as meat (88.5%), milk (55.8%) and eggs (94.5%), are consumed rarely. There were household were not at all consuming meat and dairy product in a year. Apart from households who access to dairy caw and small animals like poultry live are stock product consumed only by a limited number of households who afford to buy it. Therefore, the demand for availability of various food sources, except for cereal crops and pulses

is low which, in turn, reduces dietary energy of the household in the study area. Further, discussion held with FGD indicated that, ASF mostly consumed during religious and social ceremonies. Because of their price has risen significantly and it prevents from eating them. Households these with wealthy better-off are preferred to buy from market and nurture their family. One KII noted that, only those households who have access to enough dairy cattle's have consumed milk and milk products. Poor household never consider consuming livestock product. Some household even access to dairy caw they do not use for home consumption due to the priority given to sell such products to earn cash income to purchase staple foods. From this discussion, one can easily understand that, the food habits and the lack of nutritional knowledge results in poor consumption behavior. Hence, frequency of food intake, poor awareness on the consumption of various fruits and vegetables and inability to access livestock products signifies poor consumption behavior in the area. This study discussion is in line with the finding of [11, 32, 33, and 34]. The consumption of such foods rich in micronutrients should be encouraged in order to prevent micronutrient deficiencies and ensure safe women's health [35].

Table 3: Consumption pattern of households

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)
Vegetable	0	112(61.8)	70(38.2)	0
Meats	20(11.5)	162(88.5)	0	0
Milks	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. The mean food consumption per adult equivalence was 893.70 with

862.40SD. The food expenditure of households covers around 57-67% of total households' expenditure.

Determinants household food consumption Expenditure

Prior to the estimation of the parameters of the model, the data have been tested for multi-collinearity problem. Multi-collinearity test for the existence of serious problem of multi-collinearity among the variables is examined by the help of Variance inflation factor (VIF) and tolerance. The information showed us 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 shows that the points generally follow the normal line with no strong deviations. Thus all variable were entered the mod for more analysis. The model containing explanatory variables was significant, indicating that the model was able to distinguish between the various explanatory variables used in the model. 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 for these data the value is 1.538.

The variables assumed to have influence on food consumption expenditure were tested in the model and out of 10 variables entered into the model six of them were found to be significant while four of them were not found to be statistically significant. Two variables and four variables from significant were affects negatively and positively respectively.

Income: Income is one of the basic factors for the people to improve their diets. According to the multiple linear regression model result, income was found to have positively relationship with household consumption expenditure and significant at 1% level. The positive relation of this variable indicates that the higher income households are more likely expenditure on their diet than less income household. The increase in income will change patterns of spending. The model output result shows that a unit increases in income of household the food consumption expenditure of household increase by 0.019 Ethiopian Birr. This study results in line with the finding of Akpan, [35] and Amran, [36] noted that as consumption is usually hypothesized to be a function of disposable income it follows therefore that income determines the household level of consumption. The high income makes the household to have more choices to the various goods that will be consumed. Also supports the finding of Sekhampu, [37]; Lorlamen, [39];

Oladimeji [40] and Habu, [41] all reported that household income has direct relationship with household food consumption expenditure which is an integral part of household total expenditure

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 reveals that education level of household head has a positive influence on the household food consumption expenditure at 1% significant level. As the household head acquires a higher education, the expenditure on food tends to be increased. This implies education increases knowledge of nutritional diets and proves one of the most important determinants of consumption. Educated household heads could have better understanding on their health benefits, so they spent a significant amount of their food budget on diet. On the other hand education helps to form certain food habits and change others. It makes decision to eat and not to eat certain food because of providing knowledge of its nutrition and harmful effect.   The result of this study is agreement with many previous findings on significance of education to household food consumption expenditure [18; 38]

Age of household head: Contrary to expectation, the age of household was found to be negatively affected at 1% significant level. This suggests that as household heads advance in age, their expenditure on food decreases. This study is result is in line with Sotsha, [42] indicated 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. Also Rubhara, [43] reported that as age of household head increase food expenditure decreases. But contrasting to Sekhampu, [38] 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 result indicates 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, implying that households in far from market center have expended less than nearest to market. Further the model shows that, a one unit increase in market distance the household consumption expenditure decreases by a 15.509. The probable reason for this was that households who are nearest to markets had

opportunity to purchase different food groups from market or shops. This is in congruent with the study conducted by Stifel and Minten, [43] were shows a strong link has been found between remoteness from markets and household food consumption. Moreover, Sibhatu, [44] and Hirvonen [45] argued that better market access through reduced distances could contribute to higher high food consumption. The longer the distance to the market, the less frequently the farmer visits the market and, hence, the less likely they are to get market information and goods/commodities [46; 47] and the negatively food security is affected.

Nutrition Training: the multiple linear model analysis indicates that nutritional training has a positive correlation with household consumption level and significant at 5% level as it was hypothesized. The model output result shows that being receiving training on nutrition, increases household food consumption. This implies training improves knowledge on the individual food items and helps to make general evaluations of the diets of that household. Nutrition aspects go along with knowledge and awareness to ensure proper selection of foods for good health. Training also can gives consumer information which would help to consume food wisely. It also provides with the relevant skills needed to prepare food well and spend more money on food items. The result of this study is consistent with research findings of Powell [48] reveals that, lack of nutrition information results into poor dietary eating that instigate to inadequate nutrients intake. Similarly, Nathan, [49] and Nsele, [50] showed that awareness encouraging people to consume healthy meals, and carrying out proper child feeding approaches.

Livestock Size: livestock size influence consumption expenditure level positively and significantly at 10% significant level. The multiple linear regressions indicate as the livestock size increase household consumption expenditure level increases. This implies those households who own more livestock are more likely expend there resources of food consumption than household those own less livestock. Livestock possession is also closely related to production in the rural area that helps to generate income for additional food purchase. In line with Jodlowski, [51] and Rubhara, [42] livestock income was found statistically significance and had a positive impact on household food expenditure.

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 of the		=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% probability level, *** at 1%; Source: multiple linear regression model output

3.   Conclusion and Recommendation

The study analyzed the determinants of household food consumption behavior in Yayu Biosphere Southwest Ethiopia. Assessment of dietary pattern intakes and analyzing factors affecting food consumption expenditure of households were conducted. The dietary intake patterns of households are not suitable. The majority of household always consume starchy staple food while consumption of vegetables,   fruits and dairy products were very rarely. 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 findings therefore, the study recommends that agricultural interventions should work for the production and consumption of dietary diversity to improve nutrition are imperative. Cultivation of vegetables and fruits and consuming them can prove to be an important factor in maintaining better nutritional status. Thus it is commanding that the government and non-government organizations act to improve dietary intake pattern of households. Also, government should properly target rural households to raise the income level and training on nutritional issues so that they can improve proper consumption of food. The regional and federal government should look forward market infrastructure for the importance of food consumption status of the steady area.

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

Availability of supporting data

The data sets analyzed during the current study available from the corresponding author on reasonable request

Ethical approval and consent to participate

Ethical clearance was obtained from Jimma University College of Agriculture and Veterinary Medicine. Permission was obtained from selected District Agricultural and Natural Resource Office and PAs administrations through a formal letter. The nature of the study was fully explained to the study participants to obtain consent prior to participation in the study and any information kept confidential. The consent form has been read to me and voluntarily I agree to participate in this study.

Consent for publication

Not applicable, because there is no data contained within our manuscript from which individual participants may be identified.

Competing interests

The authors declare that they have no competing interests.

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