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Food Consumption Behaviors of Rural Households; Evidence from Bambasi district of Benishangul Gumuz Regional State, Western Ethiopia

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Abstract

Malnutrition remains one of the most persistent public health and welfare challenges in developing countries like Ethiopia. It is attributed to lack of adequate food consumption and poor balance diet. This study assesses the rural household food consumption behavior and the socioeconomic, demographic and institutional factors of food consumption behaviors of the household in Bambasi districts, Ethiopia. Data was collected from 260 sample households using a semi structured interview schedule. The food consumption pattern data was collected from the respondents by using a seven days recall period. Out of the total respondents about 12.69, 42.69 and 46.62% of sample households fell into poor, borderline and acceptable food group consumption behaviors, respectively. The food consumption behaviors of the households were affected by sex and age of the household, change in annual farm income, farm size, livestock ownership, access to extension services, access to irrigation and crop production diversity of the household. Therefore, concerned bodies' food and nutrition security intervention plan should pay due attention to household awareness creation, asset building, and resource mobilization.

Key words: Food consumption Score, Food Group, Malnutrition, Rural household

1. Introduction

Agriculture plays a significant role and is the dominant sector in Ethiopian economy which accounts for 42.7% to GDP, more than 80% of employment opportunity and 70% of export earnings [1, 2]. It`s also a source of home consumption and raw materials for industries. Even though the agriculture sector shows great improvements in terms of production and productivity, it does not feed the growing population of the country. Food consumption behaviors will be needed to adapt towards global challenges of producing efficient food sources and feeding the growing population. The anticipation study done by Paillard [3] clearly shows that the eating frequency and food consumption patterns and habits will be the major global issues for world food security due to rising population globally in 2050. Undernourishment figures confirm the seriousness of the situation. Besides, FAO [4] report showed that more than 800 million people suffer from chronic malnutrition and food insecurity due to consumption of monotonous food groups. Low level of income, climate change, conflict and civil wars, population growth and etc. are the major causes of consuming the monotonous food groups in the world.

Malnutrition remains one of the most persistent public health and welfare challenges in developing countries like Ethiopia [5, 6]. The burden of malnutrition is highest in sub-Saharan African Countries [7]. The prevalence of malnutrition is worse in rural areas. For instance, in Ethiopia, underweight and stunting among rural children was 27% and 42% compared with only 13% and 24% among urban children [8]. The persistent malnutrition is caused by multiple factors including disease, persistent food insecurity, poor dietary diversity, inadequate maternal and child feeding practices, cultural practices and awareness, and limited access to nutrition services. There has been encouraging progress in reducing malnutrition between 2004 and 2017 where the number of undernourished people was estimated at 39.7% in 2006 and 21.4% in 2017 [7]. This shows that a significant proportion of the populations are malnourished and it has not been consistent across the states and districts. This shows that malnutrition is a serious development challenge, hence should be tackled.

The nutritional wellbeing of the individual households is majorly influenced by the quality, quantity and composition of food consumption [9]. The household consumed micro and macronutrient efficiently dense foods has important values for individual and household health, cognitive mental development, productivity and income. Therefore, a study of household level

food consumption patterns is essential to understanding and projecting the demand for agricultural products, for development of well-structured strategies and policies to promote nutritional and food security. However, studies showed Ethiopia households have experienced consumption of monotonous food groups [7] which highly depend on cereal and roots & tuber food crops [10, 11]. Besides, the consumption of animal derived source foods was low which compared to other food groups. This implies that the low diversified food consumption behaviors of the households' lead to vulnerability for illness and malnutrition remains steady throughout the country especially among poor households, children and pregnant women.

The food consumption patterns, types of food group intake and the main determinant factors associated with food consumption could not due attention to address malnutrition influences in the area. Therefore, this study is mainly focused on assessing food group consumption and pattern among the rural household and the factors influencing the consumption pattern of rural households.

2. Research Methodology

2.1. Description of the Study Area

Bambasi district is one of the seven districts of Assosa zone, Benishangul Gumuz regional state. It is found 45 km far from Assosa town which is the capital city of the region. It is located in the northern parts of the region between the astronomical location of 09° 47' North latitude and 34°47' East longitude. The Woreda is bordered by Oromia regional state and Maokomo special district in the south and south west and, Asossa districts in the west and Oda Buldegelu district in the north east. In the area, cereal crops are predominantly produced. The production practices of legumes and pulse crops also the next production trends of the smallholder farmers. Likely, the district has a great potential in dairy products however the farmers have poor consumption trends of the animal derived food groups.

2.2. Sample size and sampling techniques

The present study comes from the farm household survey of Bambasi district of Assosa Zone. The survey covered five kebeles of Bambasi district. The selection of household was based on a proportional sample to size of a multistage random sampling procedure. Interviews were conducted to capture wider and detailed information of the rural household of the study area. The

information includes household demographic, socioeconomic status, agricultural production and consumption of farm food products. However, the food consumption pattern data was captured through seven days recalling period of the smallholder farmers. The major source of the food consumption pattern data was collected from the mothers or the caregivers of household members. The data collector who has an experience was selected and trained intensively. The enumerators were carefully trained on concepts of data and collection mechanism in a theoretical and practical manner. This study applied a simplified formula provided [12] to determine the required sample size at 95% confidence interval, and tolerable margin of error at 0.05.

$$n = \frac{Z^2 pqN}{e^2(N-1) + Z^2 pq}$$

Where n= the minimum number of sample size within the range of acceptable error margin.

N= the total number of households in the four selected RKAs

Z= confidence interval (95%) and which is 1.96

e= acceptable error of margin

p= proportion of sampled population

q= estimation of the proportion of the population to be sampled

Then, to determine each kebeles sample size using the probability proportional to sample size method, is computed as follows. Therefore, 260 farm households were interviewed to obtain the intended information on their consumption behaviors.

Table 1. Number of sample households for the study

Sr.No.	Name of kebeles	Household size	Sample size
1	Womba	303	60
2	Dabus	170	40
3	Sonka	141	30
4	Mender -46	330	65
5	Mender – 49	380	65
Total sample		1,324	260

2.3. Method of data collection

The data was collected from primary and secondary data sources. The primary data was collected from the rural households using a semi structured interview schedule, key informant interviews and focus group discussions. The interview schedule was prepared in English language and translated to local language (Amharic) to obtain pertinent information on rural household food

consumption behavior and socioeconomic and demographic characteristics in the district. The schedule was pre-tested and essential amendments and modifications also made following the feedback obtained from the pre-testing received feedback. Likely primary data, secondary data also gathered from government reports, academic journal articles, books and other different sources.

2.4. Data analysis

The data entry and analyzing were deployed using a statistical package for social science (SPSS Version-20) software program. One-way ANOVA analysis was used to determine the association between the independent and dependent variables. The chi-square test was applied to determine the relationship between the food consumption score (FCS) and the discrete variable. The data were reported through mean, frequency and standard deviation. Some data presented in the tables and figures. The FCS was calculated based on the world food program (WFP) [13] guideline. FCS is an appropriate method to capture the level of the smallholder farmers food consumption habit. The type of food groups consumed by the household was captured by the seven days recalling period through food frequency questionnaires which contains all sixteen food groups of the FAO food balance sheets [14]. Then, these food groups are reduced to eight food groups to capture the households` food consumption pattern [13]. In the study area, the rural household food consumption pattern was categorized based on WFP guideline of FCS to show the adequate food consumption behavior of the respondents. FCS was constructed by multiplying the food group consumption frequency by its weight and summing up the values over the eight food groups. In the calculation of FCS, the weights of the food groups ranging from 0.5 to 4 according to their nutritional density and also the value of FCS ranges “0” to “112” [13]. Therefore, the food consumption behavior of the respondents was classified into three levels, namely poor, borderline and adequate food consumption score.

Category one: if the value of FCS less than or equal to 21.0 is categorized as **poor** consumption behavior;

Category two: if the values range from 21.5 to 35 is categorized as **borderline** food Consumption behavior

Category three; if the value more than 35 categorized as **adequate** food consumption behavior. All the calculation steps to obtaining the FCS values were following necessary steps of the WFP food Consumption score guideline [13].

Table 2. Food group and its values used for assessment of household FCS

No.	Food Items	Food Group	Weight
1	Maize, sorghum, wheat, rice, teff, millet and other foods made from cereals	Main staples (starches)	2
	Cassava, potatoes and sweet potatoes and other roots and tubers, plantains		
2	Beans, peas, groundnuts, chickpea, lentils, haricot bean, and other pulses and legumes,	Pulses	3
3	Vegetables, leafy vegetables, bamboo shoots, mushrooms	Vegetables	1
4	Fruits	Fruits	1
5	Beef, goat, poultry, pork, egg, fish, & wild meats	Meat & fish (Animal Protein)	4
6	Milk and other dairy products	Milk	4
7	Sugar and sugar products, honey	Sugar	0.5
8	Oils, fats and butter	Oil	0.5
9	Spices, tea, coffee, salt, fish powder, small amount of milk in tea	Condiment	0

Source: [13, 15]

3. Results and discussion

3.1. Household food consumption score and food consumption behavior of the household

3.1.1. Household food consumption score

Food consumption score (FCS) is calculated based on collecting different food groups through food consumption interview schedule and then reduced the number of food groups to eight food groups with respective food weight [13, 15]. The mean household food consumption score of the sample households was 42.52 with a standard deviation of 13.08. Besides, the study revealed that the household FCS score was found in the ranges between 16.0 to 75.0. Besides, based on WFP (2009) guidelines, the households were classified into three food consumption groups (i.e. acceptable, borderline and poor) according to the diversity of the diet and consumption frequency [13, 16]. Therefore, this study shows that 12.69, 42.69 and 46.62% of sample households fall into poor, borderline and acceptable food group consumption behaviors, respectively. Similarly, nearly 47% of sample households were found within adequate food consumption behavior while the remaining households were inadequate food consumption behaviors. This shows many households who lacked adequate food access to improve the wellbeing and livelihoods status of the households. The mean value of FCS of the poor food

consumption behaviors of the households was 18.37 and the adequate food consumer household of FCS was 48.28 of the sample households in the study area. Not surprising, the adequate food consumer households have higher values of FCS than the borderline and poor food consumption behaviors of the households.

3.1.2. Food group consumption of the households

Studies show that the regional consumption patterns generally rely on staple starch food and food grains. For instance, Benishangul Gumuze consistent with production potential of cereal crops such as maize, sorghum, finger millet, the population were the highest consumers of cereal crops as well as legume crops (groundnut, chickpea) [9, 10]. Therefore, the consumption behaviors of the sample household relied on cereal and poor consumption of protein-rich sources of food.

The different food groups in the food frequency questionnaire included eight categories of major food and beverages groups consumed by the households on a weekly basis. These categories of food groups are main staple (starch) food groups, animal-derived food groups, vegetables, fruits, milk and dairy products, legumes, fats/oils and sweets. Several food groups were consumed frequently in a week by the study households. According to Table 3, the daily consumption of starches, oils, vegetables and sweets food groups were found more than other food groups, while the intake of fruits, animal-derived proteins and legumes were low.

Table 3. Distribution of food groups consumed by households in a week (N=260)

Food Groups	Minimum	Maximum	Mean	Std. Deviation
Main staple (starch)	6.00	7.00	6.99	0.088
Vegetable	0.00	7.00	3.38	2.351
Fruit	0.00	7.00	0.58	1.049
Animal derived food	0.00	5.00	1.52	1.250
Pulse or legume	0.00	7.00	1.52	2.012
Dairy products	0.00	7.00	1.80	1.851
Oil and fats	0.00	7.00	4.96	2.144
Sweets and Sugar	0.00	7.00	3.29	2.068

This study shows that the main staple food group was the most frequently consumed and almost all sample households consume it at least six days per week. This shows that the mean distribution of main staple food groups consumed by the households in a week is 6.99 with the

standard deviation of 0.08. Generally, the entire sample households eat main staple (starch) food groups within seven days per week.

The mean distribution of vegetable food groups consumed by the sample household in a week was 3.38±2.35 days. This indicates that the sample households consumed vegetables less than four days per week. Also, vegetables were the third frequently consumed food groups in the study area. Besides, the least frequently food groups consumed by the sample households were fruits, that is, the sample household consumes it approximately only a day per week. This revealed that fruits and its products were rarely consumed among many of the sample households. The animal-derived foods and legume food groups were consumed two days per week by sample rural households approximately. Therefore, the current study denotes that the most frequently and the least food groups consumed by the households were the starches and fruits food groups, respectively. This research suggests most of the rural households commonly consumed staple foods, oil and fats as well as sweets.

3.2. Demographic and socioeconomic characteristics of the households

Out of 260 households in the study area, 80% were male headed and 20% were female headed households. Besides, the result of this study indicates that from the total households, about 67.65, 85.45 and 78.84% of the respondents were poor, borderline and adequate food consumption behavior status. The result of the analysis indicates that there were significant proportional differences among sex of the households and the food consumption categories of the households at less than 5% probability level. This may be the household being male headed households there is the possibility to have training opportunity, access to information and better access consuming diversified food groups. This implies that the sex of the households has significant positive influence on consumption behavior of the households in the area.

The mean age of the households was 46.46 ± 9.98 (SD) years and the range of the household ages was found between 21 to 71 years. The result of this study shows that the mean age of adequate food consumption status of the households was 46.48 (± 10.37 SD) years and the poor food consumption category of the household was 47 (±9.06 SD) years. The descriptive analysis of the study revealed that there is no statistically significant mean difference among the household food consumption behavior categories of the households. This implies that there is no

age difference between the poor, borderline and adequate food consumption status of the households in the study area.

In the study area, cultivated land is considered as one of the most important assets for households. Also, most of the households in the study area use lands for primary production sources of food and cash crops. This study result showed that the average land owned by the households was about 1.83 (± 0.96) ha. When comparison has been made among the households with respect to landholding size, adequate food consumption status of the households (1.88 ha) owned larger land than the rest of the two categories (1.31 and 1.58 ha of poor and borderline food consumption behavior, respectively). The average difference of the total landholdings for the three categories of household food consumption behaviors. The one-way ANOVA analysis of this study indicates that there was a significant mean difference in household landholding size among the three status of the household food consumption behavior at less than one present significant level. Therefore, this result showed that households with a relatively larger land size are found to be adequate food consumption behaviors by intensifying production and consumption of diversified food groups.

Likely cultivated land, livestock is one of the most important assets for smallholder farmers in the study area. The overall average livestock who owned the households was 5.81(±3.78) in the measures of the tropical livestock unit (TLU). The result in Table 4 indicates the households who have adequate food consumption behaviors have on average 5.50 livestock. The one-way ANOVA analysis shows that there is a statistically mean difference between the three categories of household food consumption status of the households at less than 5% probability level. This implies that livestock contribute for production, consumption and income sources of smallholder farmers.

On-farm production refers to a simple count of all crops produced by smallholder farmers in their farmlands and is calculated through using production diversity index [15, 17]. Therefore, the value of the crop diversity index falls between “0” and “1”. The score 1 indicates a pure monoculture production while the lower scores shows higher crop diversity (crop dominance) in the study area. The result of this study revealed that the mean score of the crop dominance for households was 0.28 which suggests that the farmers were cultivating highly diversified crops. The poor consumption behaviors of the sample households have more crop dominance values

than borderline and adequate food consumption behaviors of the households in the study area. This means the poor food consumption behavior households cultivate fewer types of crops on their farms than others. Table 4 shows that there is a statistical mean difference in crop dominance by the three food consumption categories of the households at less than 1% probability level. This implies that producing a greater type of crops will enable farmers in sustainable consuming diverse food varieties and food groups [15, 17].

Table 4. Characteristics of food consumption behavior of households

Characteristics of the household	Food consumption Behavior (FCB) status						*F* test/ chi square (x^2) test
	Poor FCB (N=33)		Borderline FCB (N=111)		Adequate FCB (N=116)		
	Mean/%	SD	Mean/ %	SD	Mean/%	SD	
Age (years)	47.00	9.06	46.27	9.90	46.48	10.37	0.68
Farm size (ha)	1.31	0.77	1.58	0.88	1.88	0.93	7.59***
Farm income (x1000 ETB)	11.45	7.82	15.35	10.43	19.27	18.48	4.522**
Non/off-farm income (x1000 ETB)	2.34	0.541	2.31	0.42	1.87	0.35	0.253
Crop diversity index	0.31	0.07	0.27	0.06	0.27	0.06	6.12***
Family size (AE)	4.46	1.57	4.50	1.81	4.43	1.66	0.44
Livestock ownership (TLU)	3.57	3.13	5.29	3.57	5.50	3.97	3.61**
Dependency ratio	1.16	0.75	0.97	0.76	0.88	0.65	2.02
Market distance	10.36	2.28	9.31	2.63	8.81	2.24	5.35***
Sex (being male)	67.65		85.45		78.44		6.138**
Educational status							
Illiterate	41.18		28.18		24.14		
Read and write	17.65		34.55		25.00		
Primary school	38.24		32.73		46.55		10.71*
Secondary & above	0.00		5.45		4.31		
Marital status							
Married	73.53		87.27		79.31		4.912
Divorced	14.71		6.36		7.76		4.912
Widowed	8.82		7.27		12.93		
Access to extension services (yes)	58.82		84.55		91.38		18.346***
Access to credit service (yes)	58.82		75.45		72.41		2.554
Access to irrigation scheme (yes)	44.12		63.64		68.97		6.138**

***, **, * indicates statistically significant at 1, 5 and 10%, respectively

The mean annual farm income of the sample households was 15,788.87 ± 10,663.75 ETB. Accordingly, the adequate food consumed households have the greater mean annual farm income (19,270.00 ETB) than the others. This result exhibits that households with relatively obtained larger amounts of annual on-farm income increases the probability of the households being poor food consumers. The results in Table 4 indicates there is a statistically significant mean annual farm income difference between poor, borderline and adequate food consumption behaviors of the households at less than five percent probability level in the study areas. This study comparable with a previous study in Ethiopia and Romania [11, 18, 19], which indicates that high household income was positive relation with better household food consumption behavior.

As it is shown in Table 4, about 58.82, 84.55 and 91.38% of the respondents of poor, borderline and adequate food consumption behaviors received any form of extension advisory services, respectively. Out of the three categories of household food consumption behaviors nearly 92% of adequate food consumer households have better access to extension than the others. The result of the study indicates that there is a significant percentage of access to extension services between the categories of household food consumption behavior at less than one percent. This implies that any form of extension services provides an opportunity for smallholder farmers to identify and analyze the production constraints and then produce nutritious diversified food crops which in turn, consume better food groups [20].

The result of this study shows that nearly 70% of sample households of adequate food consumers have access to irrigation schemes. Besides, more than 60% of the borderline consumers of households who have access to participate in an irrigation scheme in the study area. The chi square analysis result indicates that there is statistically a percentage difference between the three categories of the household food consumption behavior among access to irrigation schemes at less than 5% probability level. This could be the household who have access to irrigation schemes able to produce different food and cash crops twice a year which in turn, crops produced by using irrigation may enhance the households to be better diversified food consumption behaviors [21].

Distance to the main market has its own influence in the consumption behaviors of the sample households. Overall, the sample households far from the market on average was 9.66 kms. According to Table 4, the adequate food consumer households exist on average 8.81 kms away

from the market place which may help to purchase diversified and nutritious dense food crops and could have better food consumption behaviors in the study area. Similarly, the poor food consumer households ought to walk more distance than borderline and adequate food consumer households. This implies that market distance is negatively correlated with better food consumption behavior of the households. The finding of this study shows that there is a statistically significant mean market distance difference between the three household food consumption behaviors at less than 1%. This implies that households who are nearest to the market place might have been able to purchase improved agricultural inputs for better production of crops, sold farm products and purchased various food crops and then foster better household food consumption behavior. This result is consistent with study done by Zerfu and his colleagues in Ethiopia [22].

4. Conclusions and Recommendation

The rural household food consumption behavior is a complex process which is influenced by the dynamic nature of factors of food intakes in the area. This study did not capture such complex and dynamic nature of factors that influences the consumption behaviors of the rural households. The consumption behaviors of the households have positive or negative association with sociodemographic and economic characteristics, environmental and institutional contexts. The result of this study revealed that nearly 47% of the respondents have adequate food consumption behaviors while the remaining households have inadequate food consumption behaviors. This means more than 50% of the rural households are suffering from food insecurity and malnutrition.

This study result revealed that sex of the household, age of the household head, educational status of the household head, total annual farm income, farm size, livestock ownership, crop diversity access to extension services and access to an irrigation scheme and market distance were the most important determinant factors of rural household food consumption behavior. Therefore, local and/or national government and non-governmental organization intervention plans and strategies should focus on increasing awareness of the society, and the importance of various food groups on health and mental development of the society.

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