

# Drivers of food choices among households in Kersa District, Eastern Ethiopia

**Nega Assefa** (✉ [negaassefa@yahoo.com](mailto:negaassefa@yahoo.com))

Haramaya University College of Health and Medical Sciences <https://orcid.org/0000-0003-0341-2329>

**Abebe Tolera**

Haramaya University College of Health and Medical Sciences

**Yadeta Dessie**

Haramaya University College of Health and Medical Sciences

**Aklilu Abraham**

Haramaya University College of Health and Medical Sciences

**Lemma Demissie**

Haramaya University College of Health and Medical Sciences

**Kedir Teji**

Haramaya University College of Health and Medical Sciences

**Isabel Madzorera**

Harvard University T H Chan School of Public Health

**Chelsey R Canavan**

Harvard University T H Chan School of Public Health

**Wafaie Fawzi**

Harvard University T H Chan School of Public Health

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## Research article

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# Abstract

**Introduction:** Most individuals in low and middle income countries do not meet nutritional requirements. This can be at least partially attributed to poor diet quality, which is impacted by both external and personal food environment factors. Personal food choice factors among socio-economically disadvantaged groups of Ethiopia are not well researched.

**Objective:** This study aimed to assess food choice factors in eastern Ethiopia.

**Methods:** A cross-sectional quantitative study was conducted among 1196 households in Kersa, Eastern Ethiopia with women age 18-49 years. Confirmatory factor analysis models were used to estimate factors that influence food choice. Cronbach's alpha for internal reliability coefficients were tested.

**Results:** A majority of respondents were employed in agricultural work and a quarter of the families were poor. Women were primarily responsible for household food procurement. Factors that play a role in food choice included food price, convenience, quality, household preference, household food production and market advertisement.

**Conclusion:** Improving nutritional knowledge and diversifying food availability may help to improve food choices and dietary intake in this rural part of eastern Ethiopia.

## Introduction

Dietary intake and health status are interdependent (1–4). Literature shows that household and individual welfare depends on appropriate and adequate (quantity, quality, safety, socio-cultural acceptability) nutritional intake (5–7). However, globally, poor diet quality contributes to all forms of malnutrition including undernutrition, micronutrient deficiencies, overweight and obesity, and diet-related chronic diseases, with women and children in low and middle income countries (LMICs) most affected (8, 9). Most people in LMICs do not meet estimated energy requirements (2, 10) and child undernutrition and adult obesity often coexist (11). In Ethiopia, the prevalence of malnutrition is high with 38% of children under five years of age having stunted growth, with a higher prevalence among rural children (12). In addition, up to 23.3% of Ethiopian adults are affected by malnutrition with 10.8% and 12.5% overweight and underweight, respectively (13).

The food environment is increasingly recognized as a key driver of dietary intake and nutrition outcomes, including in LMICs (14). The food environment includes the physical, economic and socio-cultural context (i.e. food prices, vendors, marketing, culture, and quality) that determines what foods are accessible to a population, with effects on nutrition and health outcomes (15–19)(15, 29).

The food environment includes personal factors that influence dietary intake and quality (21), such as food preferences and desirability, nutrition beliefs, knowledge, and purchasing power (20) (23, 32–34). Food choice is important determinant of dietary intake and behavior (7, 22). Food choice involves aspects

of eating behaviors including what, how, when, and with whom people consume food, and these factors indirectly affect nutrition and morbidity (23–29). People have different food preferences and use different criteria to make daily food choices (30). Understanding food choices and preferences is especially important for socio-economically disadvantaged groups whose dietary quality is often inconsistent with dietary recommendations (35).

The role of food choice in determining dietary intake are variable across populations and regions due to cultural diversity and socio-economic differences (29, 30, 36). There is a lack of research on food choice and preferences among the Ethiopian population, particularly in the eastern region. This study aimed to assess food choice and preference factors that influence personal and household food choices in semi-urban areas in eastern Hararghe of Kersa Woreda in eastern Ethiopia.

## **Methods**

### **Study Design And Setting**

A cross-sectional, quantitative household survey was conducted in Kersa woreda in eastern Ethiopia from September 1–30, 2019. Kersa woreda has 24 kebeles, three of which are urban and 21 that are rural. The 2007 national census reported a total population for this district of 170,816, of which 46.9% were women, and 6.67% were urban dwellers (37). Khat, fruits, coffee and vegetables are important cash crops grown in the local community.

### **Sampling Procedures**

We randomly selected 12 kebeles for the study (10 rural kebeles and two urban) by agro-ecological zone proportional to size. Within each selected kebele, approximately 100 households meeting the inclusion criteria were randomly selected from the Kersa HDSS database (total of 1,196 households). Eligibility criteria for this study included households in the selected study areas with women 18–49 years of age.

A questionnaire adapted from the Ethiopia Demographic and Health Survey (EDHS), UNICEF, and WHO standard tools was used to collect data. Data collection included socio-demographic characteristics, food choice, preferences, cooking practices, expenditures on foods, and child feeding knowledge. The survey questionnaire was pre-tested and feedback was used to make modifications to the study tool. Data was collected by trained research assistants using electronic tablets. Routine data checks were conducted each day by supervisors and investigators.

### **Analysis**

Data was entered into Epidata 3.0 version and analyzed using Stata version 14.2. We describe demographic characteristics, and food purchasing and cooking practices using descriptive summary measures such as frequencies, percentages, means, standard deviations, median and interquartile range (IQR). The main variable of interest was food choice, defined as importance (on a five point scale) of the

following factors when making food choices: food price, convenience, availability, household food production, food quality; and marketing/advertisement.

Confirmatory factor analysis (principal factor analysis, PCA) models were estimated for factors that influenced food choice. Prior to performing PCA, the sampling adequacy of the data for factor analysis was assessed using Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. Additionally, Cronbach's alpha for internal reliability coefficients were conducted to assess internal consistence reliability. Inter-correlations between the dimensions were constructed and all correlation coefficients were significant and below 0.80, thus (severe) multicollinearity was not a concern in the present data. This analysis resulted in seven food choice motives that accounted for 75.81% of the variance, with eigen values 5.31 after factor loading. Missing data were less than 5% and pairwise deletion was used as the method for treating missing values.

### **Ethical Considerations**

The study protocol was approved by Institutional Health Research Ethics Review Committee (IHRERC) of Haramaya University, College of Health and Medical Science (CHAMS) and the Institutional Review Board of the Harvard T.H. Chan School of Public Health. Written informed consent was obtained from study participants.

## **Results**

We analyzed data for 1163 women enrolled in the study. 33 women (2.8%) were excluded from the analysis because of missing data. Table 1 shows the demographic characteristics of the study population. The median age of the respondents was 30 years (IQR 5). The majority of women (53.6%) were unable to read and write, and more than two thirds (67.8%) were working as a full time employee. In a typical work day, respondents engaged in a median of eight hours of work per day for income generation. The majority (95.27%) of respondents were Muslim, and 3.53% were Orthodox Christian.

Table 1

Socio-demographic characteristics of the respondents in Kersa Woreda, eastern Ethiopia, 2019

<b>Variables</b>	<b>Category</b>	<b>Frequency</b>	<b>Percent (%)</b>
Relationship to the head of the household	Head of the household	144	12.38
	Spouse	1,007	86.59
	Other relatives	12	1.02
	Total	1163	100.00
Highest level of school completed by respondents	Unable to write and write	623	53.57
	Can read and write	102	8.77
	Grade 1–10	369	31.37
	Grade 11–12	3	3.9
	Diploma and above	66	5.86
	Total	1163	100.00
Marital status	Married	1,130	97.16
	Living with a partner, but not married	28	2.41
	Widowed	3	0.26
	Divorced	2	0.17
	Total	1163	100.00
Occupation/professional category	No job	8	0.69
	Professional/manager	69	5.93
	Sales and services	53	4.48
	Daily laborer	8	0.69
	Agriculture	945	82.16
	Others	21	6.69
	Total	1163	100.00
Employment type	Full time	789	67.84
	Part time	89	7.65
	Seasonal	272	23.39
	Does not know	13	1.12

Variables	Category	Frequency	Percent (%)
	Total	1163	100.00
Religion	Muslim	1,108	95.27
	Orthodox	41	3.53
	Others (traditional, Protestant Catholic, Adventist, Jovian witness)	14	1.2
	Total	1163	100.00
Wealth index	Very poor	235	20.21
	Poor	336	28.89
	Middle	234	20.12
	Rich	276	23.73
	Very rich	82	7.05
	Total	1,163	100.00

There were on average 7.5 ( $\pm 8$ ) people in each household. The mean number of children less than 5 years of age and between the ages of 5–14 years in each household was 2 ( $\pm 1.6SD$ ). Nearly 95% of households owned their house and one third of the households also owned land. More than one fourth of households were poor and a fifth were from middle income families. Households spent 4001.5 birr (133.4 USD) on average for food purchases each week.

### Food purchasing and cooking practices of the household

More than two-thirds of the women indicated that they are primarily responsible for food procurement, and a third indicated that siblings were responsible. Approximately 75.6% of the respondents reported that their primary source of food for the household was from own production, and 24.4% reported the local market as the primary source. Nearly 52.0% of the households spent more than three hours for food procurement per day.

Table 2 shows household cooking practice. Approximately 76.3% of respondents indicated that they were responsible for meal preparation and cooking for the household, and 67.5% spent between 1–2 hours cooking household meals. Firewood was the main source of cooking fuel used by households and over two thirds of the households prepared their meals on a stove or a fire sheltered outdoors in the compound. Vegetable oil was the main oil used for cooking, and households mainly used the boiling method (72.7%) for preparing food.

Table 2  
Cooking practices of the households in Kersa Woreda, eastern Ethiopia, 2019

Variables	Category	Frequency	Percent (%)
Respondent is responsible for cooking/meal preparation for the household	Yes	887	76.27
	No	276	23.73
	Total	1163	100.00
Hours spent cooking per day	Less than 1 hour	142	16.01
	1–2 hours	599	67.53
	3–4 hours	126	14.21
	Greater than 4 hours	20	2.25
	Total	887	100.00
Other person responsible for cooking	Head of household	234	20.12
	Sibling	82	7.05
	Mothers	830	71.37
	Other relative	17	1.46
	Total	1,163	100.00
Source of cooking fuel	Electricity	6	0.52
	Gas	9	0.77
	Charcoal	27	2.32
	Firewood and/or Crop residuals/straw grass/ animal dung	1,121	96.39
	Total	1,163	100.00
Cooking stove or fire	In the main house	333	28.63
	In a separate building	12	1.03
	Outdoors sheltered	721	61.99
	Outdoors unsheltered	97	8.34
	Total	1,163	100.00
Cooking oil/fat at home	Vegetable oil	1,067	91.75
	Palm oil	68	5.85

Variables	Category	Frequency	Percent (%)
	Others (Coconut oil, Sesame oil, olive oil, butter)	28	2.42
	Total	1,163	100.00
Method of food preparation	Frying	50	4.30
	Steaming	266	22.87
	Boiling	846	72.74
	Other	1	0.09
	Total	1,163	100.00

### Feeding Behavior of the Households

Consumption of food prepared outside the home such as street foods was low, with about 22.0% respondents consuming street foods once per week (Table 3). Over half of respondents (57.52%) reported having children in the household who attended school, however, only 2.1% reported that the children received lunch at school. Approximately 70.1% of respondents reported that most weeks their household never consumed meat (livestock, poultry, or fish) at home. Only 9.7% of the respondents reported ever seeing or hearing a print, television, or radio advertisement about food items.

Table 3

Eating behavior of the household members/respondents in Kersa Woreda, eastern Ethiopia, 2019

Variables	Category	Frequency	Percent (%)
Consumed fried food prepared at home in the past month	Never	824	70.85
	Less than once a week	282	24.25
	1–3 times per week	49	4.21
	Greater than 4 times per week	8	0.68
	Total	1,163	100.00
Consume food outside in the past month	Never	755	64.92
	Less than once a week	107	9.20
	1 time per week	253	21.75
	2–6 times per week	48	4.4
	Total	1,163	100.00
How often consume street food in the past month	Never	779	66.98
	Less than once a week	97	8.34
	1 time per week	256	22.01
	Greater than 2 times per week	31	2.67
	Total	1,163	100.00
Ever seen or heard a print, television, or radio advertisement for food items in the past week	Yes	113	9.72
	No	1,050	90.28
	Total	1,163	100.00
Food categories he/she see or hear on advertisements	Starches (Pulses/beans/peas and lentils, Nuts and Seeds)	28	24.77
	Meat/fish/poultry/beef/egg /Dairy	26	23
	Fruit	18	15.93
	Vegetable	36	31.86
	crisps, chips, French fries, Sweets cake, biscuits, candies, Sugary Beverages	5	4.42
	Total	113	100.00

## Types of foods avoided to eat

Approximately 16% of respondents said there are foods that they avoid eating or drinking. Some of these foods included fatty foods, cheese, meat (pork meat, camel meat, and birds' meat), and fish, milk (camel milk, goat milk), and alcohol containing drinks such as Farso/tella. Reasons for avoiding these foods included religious reasons (82.6%) and other personal reasons (12.2%) (including weight reduction, low income, and large family size).

## Factors Influencing Food Choice

In univariate analysis, we noted that the seven factors put to analysis are -price, convenience, availability, household preference, household production, quality, and food advertisement–were important considerations for household food choice (Table 4). On a four-point scale, the mean score for these factors were: price (3.15), convenience (3.15), availability (3.13), household preference (3.17), household production (3.17), food quality (3.19), and marketing advertisement (3.13).

Table 4  
Persons linear correlation matrix between food choice factors, eastern Ethiopia, 2019

Construct	1	2	3	4	5	6	7
1 Price	1.0000						
2 Convenience	0.8168	1.0000					
3 Availability	0.6955	0.7833	1.0000				
4 Household preference	0.6919	0.7653	0.7738	1.0000			
5 Food quality	0.6118	0.6900	0.6615	0.7825	1.0000		
6 Household production	0.5621	0.6207	0.6354	0.6825	0.7620	1.0000	
7 Market advertisement	0.1238	0.1134	0.1004	0.1331	0.1161	0.0779	1.0000
All correlations are statistically significant at $p < 0.001$ (two-tailed).							
Bartlett test of sphericity Chi-square = 7884.403 df (21), Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO = 0.907)							

Confirmatory factor analysis (PCA) was conducted for drivers of food choice. Prior to PCA, a correlation matrix was constructed for the seven factors that showed significant correlations at  $p < 0.001$  (Table 4). The simple seven-factor model in which each item of the food choice questions loaded on a single factor provided a good fit for the data ( $n = 1163$ ),  $df = 14$ ,  $p < 0.001$ ;  $\chi^2_{ms}(14)757.728$  at  $p < 0.001$ . Principal components analysis indicated one component with Eigen values exceeding one that accounted for 75.8% of the variability (Table 5). The results of PCA and reliability analyses indicated that food choice motives contained seven factors after rotating factor loading as noted in Table 6. Accordingly we found

correlation between food choice and price, convenience, availability, household preference, household production, quality and food advertisement.

Table 5

Principal component factor analysis result for factors involved in food choice, eastern Ethiopia, 2019.

Construct		Eigenvalue	Difference	Proportion	Cumulative
1	Factor 1	5.30702	4.70986	0.7581	0.7581
2	Factor 2	0.59716	0.25775	0.0853	0.8435
3	Factor 3	0.33940	0.04135	0.0485	0.8919
4	Factor 4	0.29805	0.12196	0.0426	0.9345
5	Factor 5	0.17609	0.01866	0.0252	0.9597
6	Factor 6	0.15743	0.03258	0.0225	0.9822
7	Factor 7	0.12486	0.00000	0.0178	1.0000

Only factor 1 has eigenvalue of greater than 1 with 75.81% variability between the seven items that have been analyzed. LR test: independent vs. saturated:  $\chi^2(21) = 7891.21$  Prob >  $\chi^2 = 0.0000$

Table 6

Rotated factor loadings (pattern matrix) and unique variances sorted for factors involved in food choice, eastern Ethiopia, 2019.

Construct		Factor1	Uniqueness
1	Price	0.9133	0.1659
2	Convenience	0.9071	0.1772
3	Availability	0.8875	0.2124
4	Household preference	0.8794	0.2267
5	Food quality	0.8663	0.2496
6	Household production	0.8254	0.3187
7	Market advertisement	0.8108	0.3426

## Discussion

This study indicated that price, convenience, availability, household preference, household food production, food quality, and advertisement are important drivers of food choice. This is similar with other

studies findings in Ethiopia (38–40). Food choice factors are variable across populations and regions due to cultural diversity and socio-economic differences (29, 30, 36).

Respondents in this study rated food price to be the most important factor affecting food choice, aligned with other study findings. Price is an important factor in food choice, especially for low-income consumers (41–43). A study in Addis Ababa, Ethiopia showed that consumption of ultra-processed foods increases with income and decreases with increasing price (39). Higher costs can adversely affect the purchase volume of foods (44–46) and some studies have shown that price changes had more effect on food choices than health and/or environment logos and labels (47, 48).

Convenience was also rated to be important in household food choice decisions in our study population. This is aligned with other studies (32, 49) that have found convenience can often be more important than price. Research from Ethiopia has shown that low income families in particular tend to make food choice based on location and convenience (39) and preparation convenience(38) in addition to price. The various convenience food products such as highly processed food items, moderately processed food items, and single components have been found to have a significant impact on food choice (50). A study among pastoralists in Ethiopia showed monotonous food consumption with poor food choice decisions. (40)

The present study also showed the importance of availability of a wide variety of healthy and safe foods in food choice. This finding is similar with previous studies in Addis Ababa (39) and among pastoralists in Ethiopia (40). In New Zealand, some consumers prefer locally available foods and are unwilling to purchase non-locally produced food at any price (51). In contrast, a study in Italy showed that origin and freshness were the most preferred attributes that consumers took into account for purchases (52).

Respondents in our study stated that household preferences also play an important role in food choice. Importantly, the present data clearly support previous research where personal attributes like former personal food experiences, visual appeal, health, and cooking skills influences food choice and eating behaviors (43, 46, 49, 50, 53, 54). Social and other external influences also play a role in decision making about what to eat (32, 43, 55). Several studies indicated that traditions stemming from one's childhood and the social aspect of acknowledging other family members' taste preferences (what is acceptable and what is preferred) influence healthier food choices (56, 57).

Respondents in our study rated household food production to be important in household food choices. A review by Aschemann-Witzel and et.al (58) indicated that the role of home production is an important factor in food choice. Low income families have been shown to prefer household produced foods for cost saving (59, 60). Local knowledges on food preparation may also influence a preference for home grown foods (61).

Likewise, in this study food quality attributes like cleanliness or healthiness, freshness and function of energy density appear to be important in household food choice. This finding is in agreement with several other studies (32, 46, 49, 62, 63). Some consumers also consider quality factors such as the absence of

foreign materials, packaging, and aroma (64). Increased interest in health and quality stands in stark contrast to a perceived unwillingness to pay higher prices (65)(50).

Despite there being only a small segment of households exposed to food advertisement, respondents rated marketing and advertising to play important role in household food choice. This finding is similar with a study in Ethiopia that found a range of influencers such as ever-present media advertisements, and rapid changes in the food environment (66). This is also supported by research from Europe where strong links have been identified between obesity levels and childhood media exposure (67–69). Sensory and brand-related product expectations in the mind of the consumer like packaging color, type of packaging, brand name/popularity, visual impact, and reading packaging information plays a key role in capturing the attention of the shopper (63, 70, 71).

In this study women in the households were primarily responsible for food procurement and cooking. This finding is consistent with previous studies that found that mothers and females in the households were mainly responsible for food procurement and preparation, and therefore they have an important role in food choices (72–75). Previous studies, in Ethiopia (76) as well as in South Africa, (75), and India (77) also showed that status in the households is associated with food procurement, and food distribution within the households. In households headed by men, the food choice is mainly determined by household head. Women are mostly responsible for household food purchase and cooking in most African countries (78). In this study most households primarily obtained food from their own production, and a smaller percentage was mainly reliant on purchases from local markets. Similarly reports in sub-Saharan African countries indicate that crop production is the major source of energy, contributing 60% of food availability (79).

A study in 17 sub-Saharan African countries indicated that household food availability was affected by household size (79). In our study household size was large ( $7.5 \pm 8SD$ ). Similar studies in the Ethiopian Somali region and Kwara State, Nigeria indicated family size has a significantly negative effect on food security of the household (80, 81).

## **Limitations And Strengths Of The Study**

This study has several limitations. We do not have food expenditure and dietary intake data, and therefore are unable to assess whether food choice factors translate into dietary intake patterns. However, this study also has strengths: we collected data from women respondents who are primarily responsible for food preparation for the family. The study provides an in-depth analysis on food choices and the factors influencing them among households in Ethiopia.

## **Conclusions**

We found that women are primarily responsible for food shopping and cooking practices for their households. This study revealed that households consider various factors in making food choices. To

effect dietary intake, food programs should include a focus on personal factors like knowledge about healthy diet and food preparation skills, as well as external factors such as crop and market diversity, and affordability of healthy foods.

## Declarations

## List Of Acronyms

CHAMS: College of Health and Medical Sciences

EDHS: Ethiopian Demographic and Health Survey

HDSS: Health and Demographic Surveillance Site

IHRERC: Institutional Health Research Ethics Review Committee

IQR: Inter-Quartile Range

LMICs: Low and Middle Income Countries

PCA: Principal Component Analysis

SD: Standard Deviation

UNICEF: United Nations Children's Fund

USD: United States Dollar

WHO: World Health Organization

## Declarations

*Ethics approval and consent to participate:* indicated in the method section

*Consent for publication:* no identified personal data is included in this analysis, hence no obligation for consent for publication.

*Availability of data and material:* data will be available upon request to the first author

*Competing interests:* none

*Funding:* funding for data collection and compilation has been secured by the joint endeavor between Haramaya University and Harvard School of Public Health

*Authors' contributions:* NA and WF conceived the idea, developed the proposal and lead the study. AT, AA and LD participated in data generation and data analysis. NA, WF, AT, AA, YD, KT, LD, IM, and CC

participated in write up of the manuscript and editorials.

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