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Drivers of Food Choice among Lactating Women: The Case of Debrebirhan Town, North Shoa Zone, Amhara Region, Ethiopia

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ABSTRACT

While access to foods and more information on healthy eating are important, decisions to adopt health-enhancing behavior of lactating women (nutritional vulnerable group) are often constrained by socio-economic barriers, personal and food related drivers that influence food choice. Therefore, this study aimed to assess drivers of food choice, & socio-economic variables associated with drivers of food choice among lactating women in Debrebirhan Town. A survey study was conducted on 423 randomly selected lactating women. Data was collected by face to face interview and analyzed via SPSS version 20. Logistic regression analysis was used to find association b/n socio-economic variables and drivers of food choice. P-value < 0.05 was taken as statistically significant. Influences of religion, price, preparation convenience, health value and taste during food choice were responded by above half of women (92%, 84%, 83%, 66% & 56%). From multivariate analysis of binary logistic regression, influence of mood in food choice was associated to age (15-25 and 26-35 years) and estimated monthly income (≤ 3500 vs. > 3500 ETB) with AOR (95%CI) of 3.24(1.3-8.08), 3.95(1.85-8.4) and 1.83(1.03-3.24). Age (15-25 & 26-35 years) was associated to choosing of foods for weight management with AOR (95%CI) of 2.64(1.12-6.22) and 3.52(1.66-7.43). 15-25 years' age and self-employee were linked to religion influence in food choice with AOR (95%CI) of 0.09(0.01-0.48) and 4.13(1.4-12.24). Age (15-25 & 26-35 years), education (no, primary & secondary) and being housewife were associated to choosing of foods for their health value with AOR (95%CI) of 0.26(0.12-0.6), 0.37(0.18-0.76), 0.14(0.04-0.42), 0.25(0.13-0.54), 0.33(0.17-

Keywords:

Motives, food choice, Lactating women

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0.66) and 2.5(1.23-5). Avoidance of foods for nutrient content was related to age (15-25 & 26-35 years) with AOR (95%CI) of 6.75(2.77-16.5) and 5.77(2.7-12.32). Primary education and being housewife were associated to ingredient contents of foods during selection with AOR (95%CI) of 0.29(0.14-0.6) and 2.24(1.15-4.35). Only family size (2-4 vs. >4 persons) was associated with price concern in food choice with AOR (95%CI) of 0.39(0.21-0.71). Primary & secondary education were associated to choosing of foods based on ethical value with AOR (95%CI) of 0.38(0.19-0.75) and 0.44(0.24-0.83). Being divorced, husband headed, 7-12 & 13-18 months' lactation period, 15-25 and 26-35 years' age were related to preparation convenience of foods with AOR (95%CI) of 5.94(1.13-31.33), 0.42(0.18-0.96), 3.26(1.34-7.93), 4.4(1.81-10.72), 0.16(0.05-0.47) and 0.25(0.11-0.59). From multivariate analysis of multinomial logistic regression using taste as a reference; 13-18 months' lactation period, husband, mother and father of lactating women headed were associated to choosing of foods for their smell with AOR (95%CI) of 2.92(1.45-5.87), 0.43(0.19-0.96), 0.07(0.01-0.64) and 0.12(0.02-0.76). Also, husband headed and 7-12 months' lactation period were associated to choosing of foods for their appearance with AOR (95%CI) of 0.32(0.11-0.91) and 3.5(1.46-8.38). Religion, price & preparation convenience were the key, and mood, nutrient content & ethical concern were the least drivers of food choice among women. Most women were motivated by six basic drivers of food choice. Various socio-economic variables were associated to drivers of food choice. Self-management approaches by nutrition education & promotion to change eating behaviors of women, increasing supply & price regulation towards healthy foods are recommended.

Key words: Motives, food choice, Lactating women

Introduction

Malnutrition is one of the major public health issues affecting many women in Ethiopia (WHO, 2007; FMOH, 2008; Nega, 2010; EDHS, 2011; Kiday *et al.*, 2013; EDHS, 2014; Temesgen *et al.*, 2015; Hadiya *et al.*, 2016). Different epidemiological studies indicated that nutritional inadequacy can influence the health status of individuals (Fantahun & Degu, 2004;

CSA, 2007; WHO, 2007). Women are the most crucial group to produce productive and effective human power so that they should remain in a healthy status (Thompson *et al.*, 2008). Adequate nutrition by maintaining optimal food choice throughout a woman's time and healthy lifestyle behavior is a significant consideration to improve the health of their babies as well as their own health (Bartley *et*

al., 2005; Moos *et al.*, 2008; Thompson *et al.*, 2008; Dunneram & Jeewon, 2015). Previous studies showed that several drivers influence human food choice and they included meal healthiness, mood, convenience, sensory appeal, food ingredients, price, weight control, ethical concern and religion influence (Soyer *et al.*, 2008; Asma *et al.*, 2010; Milosevic *et al.*, 2012; Suzanah *et al.*, 2013; Sushma *et al.*, 2014; Hayford *et al.*, 2015). The association between socio-economic and demographic variables, and drivers of food choice were reported by different scholars (Milosevic *et al.*, 2012; Suzanah *et al.*, 2013; Hayford *et al.*, 2015; Naughton *et al.*, 2015). Theoretically-driven and culturally grounded research on understanding the key motives of dietary behavior is increasingly important for the design of tailored interventions and approaches to behavioral change (Bowen and Hilliard, 2006). Lactating women are considered as nutritionally vulnerable group (South Africa guidelines on maternal nutrition, 2008) and subjected to nutritional stress due to their nursing process (Paula, 2006). They have additional nutritional recommendations (Inskip *et al.*, 2009). The current study was designed to explore the various determinants that interact, compete and shape the general food choice behaviour of lactating women from Debrebirhan town.

Methodology

Study Area, Design and Population

The study was conducted in Debrebirhan Town using community based, cross sectional, quantitative study with descriptive and analytical components from March 29 to June 22, 2016. All lactating women (15-49 years age) living in the town were used as source population, and randomly selected women were used as study population.

Sample size Determination and Sampling Procedures

The sample size was calculated by using the StatCALC application of Epi info™ 7.0.8.3 (2011) based on the assumption that considered an

anticipated population proportion of 50% for drivers of food choice with 95% confidence level and 5% margin of error. Before the actual data collection, pre-registration of lactating women in each kebele was done to count numbers of lactating women. In all kebeles, the households with lactating women were identified through house to house visit by *ketena leaders*. In this exercise, a total of 1087 lactating women were registered from the nine kebeles of Debrebirhan town. After house to house visit, sampling frame or complete list of lactating women was prepared for each kebele. Then the total number of sample size (423) was proportionally allocated to the number of each kebele's lactating women who were found during pre-registration. To select those proportionally allocated lactating women from each kebele, simple random sampling technique was applied. Random selections of proportionally allocated lactating women were done by using the planning application of ENA for SMART computer software program (2007).

Data Collection Method and Instrument

Primary data was collected from primary source through face-to-face interview. The data collection tool was pre-tested, structured and semi-structured questionnaire. The questionnaire was made to include questions related to socio-demographic and economic characteristics, and drivers of food choice for lactating women. The parts of the questionnaire on demographic and socio-economic questions were adopted from the Ethiopia Demographic and Health Survey report (EDHS, 2011). Questionnaire for drivers of food choice were adapted from Steptoe *et al.* (1995) and Milosevic *et al.* (2012). Three trained female data collectors who were fluent in *Amharic* language, and two supervisors were used. To ensure the quality of data, ranges of mechanisms were employed; language translation, reviewing and comments incorporation, pre-test & necessary corrections, training, site supervision, and cross-checking.

Data Analysis

Data entering, cleaning and analyzing were done by SPSS version 20 computer software program. Descriptive statistics were computed for all relevant variables. Multi-collinearity and model fitness also checked. To determine socio-demographic and economic variables associated to drivers of food choice logistic regression was used. Candidate variables were selected and transferred to multivariate analysis by using pre-set p-value of < 0.25 . From the logistic regression, adjusted odds ratios were reported to quantify the strength of associations and p-value with less than 0.05 was taken as statistically significant (Hosmer and Lemeshow, 2000).

Ethical Consideration

Ethical clearance was obtained from the College of Medicine and Health Sciences, Institutional Review Board of Hawassa University. The purpose of the study was explained to the study participants along with their full right to refuse or completely reject their participation. Written consent was taken from each respondent prior to the interview. The responses were kept confidential by coding.

Result and discussion

Socio-demographic and Economic characteristics of studied Lactating Women

A total of 423 lactating women were involved in this study with response rate of 100%. **Table 1** indicates their socio-economic and demographic characteristics. Accordingly, Most of women had 26-35 years' of age (63.8%), completed higher education (46.1%), married (81.8%), headed by husband (66.4%), government employee (40.7%), amhara, (82.3%) and practiced orthodox religion (88.7%).

Descriptive analysis of Drivers of Food Choice among studied Lactating Women

Drivers of food choice were presented in **Table 2**, and food selection based on religion, which is the most important personal driver of food choice, was mentioned by 388 (91.7%) of

respondents. It is in similar fashion with other research findings (Sabate, 2004; Asma *et al.*, 2010; Suzanah *et al.*, 2013). However, in certain populations in other countries such as Russia, Europe and Asia, religion influence not rated as the main driver in the selection of foods (Honkanen & Frewer, 2009; Izmirli and Phillips, 2011; Dyett *et al.*, 2013) respectively. This could be due to religious difference that causes fasting as well as abstaining from animal foods which can influence participants' food choice behavior.

Food price (83.9%) became the second important driver affecting food choice. It slightly contradicted with previous studies (Cassady *et al.*, 2007; Milosevic *et al.*, 2012; Sushma *et al.*, 2014; Kamphuis *et al.*, 2015). This might be due to difference in capital and family members across the households of different countries. The perceived price of selected food items for those price concerned study response of women was presented in **Tables 3**.

In similar manner with other studies (Steptoe *et al.*, 1995; Asma *et al.*, 2010; Hallstrom *et al.*, 2011; Ensaff *et al.*, 2015), the current study also found preparations convenience as the most important driver in food choice. It may be because most of the respondents held daily jobs and this increases pressure in preparation of foods. It is inconsistent with Steenhuis *et al.* (2011), Suzanah *et al.* (2013) and Woythal (2015) studies.

Health value (66.2%) of the foods noticed as important driver during food choice. Perhaps, the community tested might be accessible to various health promotions and the kind of nutrition that they would require to maintain their health. In the same way, Milosevic *et al.* (2012) study described meal healthiness in western Balkan courtiers' Health value of the foods noticed as important driver during food choice. Perhaps, the community tested might be accessible to various health promotions and the kind of nutrition that they would require to maintain their health. In the same way, Milosevic *et al.* (2012) study described meal

healthiness in western Balkan courtiers' wives. It is contradictory to the studies among Dutch, India, Netherlands and USA where the general community did choose healthy eating as one of the leading driver in food choice (Steenhuis *et al.*, 2011; Sushma *et al.*, 2014; Kamphuis *et al.*, 2015; Woythal. 2015). Consequently, different communities have their own set of values and perceptions towards the importance of health which are often translated in their food selection.

Studied lactating women ranked taste as the most important motive in their food choice which account 56%, and consistent with previous studies (Steptoe *et al.*, 1995; Eertmans *et al.*, 2005; Cassady *et al.*, 2007; Honkanen and Frewer, 2009; Pohjanheimo, 2010; Reyes *et al.*, 2013; Deliens *et al.*, 2014; Ensaff *et al.*, 2015; Kaya, 2016).

The influence of ingredients content (49.4%) during food choice was ranked sooner than the influence weight control (45.9%) as important driver and it is parallel with study of Asma *et al.* (2010). Foods that contain natural ingredients were preferred particularly. This is in line with Milosevic *et al.* (2012) study and contradicted with Sun (2008) and Sushma *et al.* (2014) studies. Similar with other findings (Asma *et al.*, 2010; Milosevic *et al.*, 2012; Suzanah *et al.*, 2013; Sushma *et al.*, 2014), this study also reported weight control and ethical concerns as important motives during food choice. The prevalence of choosing of foods for weight management was lower than study done in Sudan (Elneim, 2014). However, in Sun (2008) study, choosing foods for weight control was the least important food choice motive.

Ethical appreciation during food choice was reported in the same way with other findings (Asma *et al.*, 2010; Suzanah *et al.*, 2013). It is contrary to Sushma *et al.* (2014) study which reported ethical concern as least influencing motive during food choice.

Avoiding for nutrient content as not good was the second least influencing driver of food choice. In contrast, higher prevalence of

avoiding foods for nutrient content was reported in Ree *et al.* (2008) study. This might be due to the difference in individual's health status, attitude and knowledge. Patterns of responses were perceived for avoiding foods for nutrient contents because of their fat, carbohydrate, pungent pepper and salt contents. Among those, high fat (similar with Ree *et al.*, 2008; Touhy & Jett, 2012; Higginbottom *et al.*, 2014) and high calorie foods (similar with Ree *et al.*, 2008) items were predominantly avoided foods.

Most respondents (88%) also did not choose foods based on the driver of mood. This could suggest that study participants are less likely affected by their emotions to choose different food items. It is comparable with study in western Balkan countries wives (Milosevic *et al.*, 2012). In contrary with this, Sun (2008) in Taiwan, Asma *et al.* (2010) in Malay and Suzanah *et al.* (2013) in Sungai, Petani and Kedah, and Sushma *et al.*, 2014 in India studies reported mood as second, fourth, sixth and third important driver. Keeping alert, feeling good and coping with life were the most reasons for emotional eating. This is comparable with Laitinen *et al.* (2002) in Finland and Milosevic *et al.* (2012) in Balkan countries wives studies. Besides this, quarters of studied lactating women were influenced by six main drivers during food choice. This indicates that studied populations are driven by many underlying motives to choose different foods for consumption.

Association between Socio-demographic and Economic variables, and Drivers of Food Choice among studied Lactating Women

Furthermore, this research also provides association between socio-demographic and economic characteristics of lactating women, and drivers towards food choice which is the second broad objective of the study.

Socio-demographic and economic variables, and personal related drivers of food choice

Table 1: Socio-demographic and economic characteristics of studied Lactating Women (n=423) in Debrebirhan Town from March 29 to June 22, 2016

Variables	Frequency	Percent
Age groups		
Mean maternal age in years	28.79±(4.97) ¹	
15-25 years	109	25.8
26-35 years	270	63.8
36-49 years	44	10.4
Educational status of lactating women		
No formal	30	7.1
Primary (1-8 grade)	97	22.9
Secondary (9-12 grade)	101	23.9
College and above qualified	195	46.1
Current marital status		
Single	46	10.9
Divorced	27	6.4
Widowed	7	0.9
Married	346	81.8
Head of household		
Lactating woman	71	16.78
Husband	281	66.4
Mother of lactating woman	16	3.8
Father of lactating woman	17	4.0
Both wife and husband	38	9.0
Occupation of lactating women		
Daily laborer	4	0.9
Student	6	1.4
Housewife	125	29.6
Merchant	69	16.3
Self-employee	47	11.1
Government employee	172	40.7
Ethnicity		
Amhara	348	82.3
Other (oromo, Tigre, SNNP, etc)	75	17.7
Religion		
Orthodox	375	88.7
Other (Muslim, protestant, catholic, etc)	48	11.3
Husband educational status (married)		
No formal	14	3.3
Primary (1-8 grade)	30	7.1
Secondary (9-12 grade)	55	13
College and above	247	58.4
Family size		
	4.39±1.4 ¹	
2-4 persons	240	56.7
≥5 persons	183	43.3
Length of lactation period		
≤6 months	115	27.2
7-12 months	118	27.9
13-18 months	88	20.8
≥19 months	102	24.1
Monthly income in ETB		
≤3500	215	50.2
>3500	208	49.8

Note: - 1=Mean ± Standard deviation, ETB=Ethiopian Birr

Table 2: Drivers of Food Choice among studied Lactating Women (n=423) in Debrebirhan Town from March 29 to June 22, 2016.

Drivers of food choice	Frequency	Percent	95% CI
Personal related drivers			
Mood			
Yes	92	22	18-25.3
Helps me cope with stress	20	21.74	
Helps me cope with life	2	2.17	
Helps me relax	11	11.96	
Keeping me alert	35	38.04	
Cheering me up	2	2.17	
Helps me feel good	22	23.91	
No	331	78	74.7-82
Weight control			
Yes	194	45.9	41.6-50.4
Low in carbohydrate	71	36.6	
Help me to control weight	47	24.23	
Helps me to admire by other	3	1.55	
Helps me have attractive weight	6	3.09	
Low in fat	67	34.54	
No	229	54.1	49.6-59.4
Influenced by religion			
Yes	388	91.7	89.1-94.3
No	35	8.3	5.7-10.9
Food related drivers			
Healthy value of meal			
Yes	280	66.2	61.5-71.7
Vitamin / mineral	128	45.71	
Keeping me healthy	77	27.5	
Reduce adverse risk	15	5.36	
High in protein	43	15.36	
Good for skin, teeth, hair & nail	2	0.71	
Recommended by physician	15	5.36	
No	143	33.8	28.3-38.5
Avoiding foods for nutrient content			
Yes	144	34	29.5-39.2
High in fat	75	52.08	
High in CHO	49	34.03	
High in CHO and fat	4	2.78	
High in salt	7	4.86	
Pungent pepper containing foods	9	6.25	
No	279	66	60.8-70.4
Ingredient content			
Yes	209	49.1	46.3-52.5
Natural ingredients	134	64.1	
Artificial ingredients	75	35.9	
No	214	50.6	45.1-55.2
Price concern			
Yes	355	83.9	80-87.5
No	68	16.1	12.5-6-20
Preparation convenience			
Yes	352	83.2	79.7-86.5
No	71	16.8	13.5-20.3
Sensory appeal			
Smell	118	27.9	23.4-32.2
Appearance	65	15.4	12.1-19.1
Texture	3	0.7	0.1-1.7
Taste	237	56.03	51.3-60.6
Ethical concern			
Yes	164	38.8	34.3-43.8
Comes from politically I approved countries	9	5.49	
Has clearly marked origin country	21	12.8	
Has packed environmentally friendly	14	8.54	
From our country	45	27.44	

Has certificate by government	75	45.73	
No	259	61.2	56.2-65.7
Combined responses of main drivers of food choice			
Two	7	1.7	0.5-2.8
Three	28	6.6	4.3-9.2
Four	68	16.1	13-19.6
Five	81	19.1	15.4-22.7
Six	104	24.6	20.8-28.4
Seven	80	18.9	15.4-22.7
Eight	41	9.7	7.1-12.5
Nine	13	3.1	1.7-5
Ten	1	.2	0.0-0.7

Table 3: Selected foods items and perceived price among studied Lactating Women who were price conscious (n=355) in Debrebirhan Town from March 29 to June 22, 2016

Items (Kg)	Perceived price											
	Expensive				Cheap				Accessible		Not bought	
	Frequency	Percent	ETB	Mean±SD	Frequency	Percent	ETB	Mean±SD	Frequency	Percent	Frequency	Percent
Maize	130	36.62	5-20	8.77±3.02	196	55.21	5-12	7.65±1.55	-	-	29	8.17
Sorghum	166	46.76	6-10	8.20±1.38	185	52.11	4-11	5.80±1.71	-	-	4	1.13
Red pepper	325	91.55	50-180	89.40±34.21	29	8.17	55-80	61.90±6.33	-	-	1	0.28
Onion	222	62.54	6-10	11.84±1.67	133	37.46	8-12	10.10±0.89	-	-	-	-
Papaya	236	66.48	13-24	15.21±1.77	8	2.25	14-15	14.50±0.54	-	-	111	31.28
Bean	266	74.93	10-18	14.54±1.58	88	24.79	9-16	12.81±1.33	-	-	1	0.28
Rice	299	84.23	12-35	16.35±2.15	49	13.8	14-18	15.61±1.10	-	-	7	1.97
Oat	292	82.25	15-35	28.85±5.37	17	4.79	8-25	15±6.364	-	-	46	12.96
Carrot	136	38.31	4-12	7.82±2.00	200	56.34	3-10	5.77±2.06	19	5.35	-	-
Potato	57	16.06	5-10	6.96±1.68	285	80.28	3-10	4.56±0.90	13	3.66	-	-
Garlic	351	98.87	40-70	49.33±5.40	2	0.56	45-48	46.5±2.12	-	-	2	0.56
Cattle meat	352	99.15	120-200	157.9±19.70	-	-	-	-	-	-	3	0.85
Pea	252	70.99	11-26	15.97±4.08	102	28.73	9-15	12.76±1.28	-	-	1	0.28
Lentil	350	98.59	35-59	51.73±3.72	-	-	-	-	-	-	5	1.41
Wheat	266	74.93	8-15	10.19±1.06	89	25.07	8-13	9.96±0.80	-	-	-	-
Teff	353	99.44	13-20	16.63±0.99	2	0.56	13-17	15±2.83	-	-	-	-
Perceived price												
Items	Expensive				Cheap				Accessible		Not bought	
	Frequency	Percent	ETB	Mean±SD	Frequency	Percent	ETB	Mean±SD	Frequency	Percent	Frequency	Percent
Sweet potato	98	27.61	4-10	7.94±2.02	243	68.45	3-10	4.68±0.97	4	1.13	10	2.82
Banana	219	61.69	10-17	14±1.33	113	31.83	10-16	11.77±1.49	-	-	23	6.48
Tomato	236	66.48	10-18	14.17±0.99	115	32.39	5-16	9.76±2.47	-	-	4	1.13
Avocado	272	76.62	12-18	13.93±1.09	5	1.41	13-14	13.8±0.45	-	-	78	21.97
Sugar	294	82.82	15-40	21.12±5.32	61	17.18	15-20	18.31±1.64	-	-	-	-
Chickpea	236	66.48	10-22	15.92±3.22	111	31.27	9-16	12.51±1.15	-	-	8	2.25
Butter	341	96.06	96-200	154.49±14.48	-	-	-	-	-	-	14	3.94
Salt packed/unpacked	62	17.46	4-10	5.14±0.92	293	82.54	3-10	5.12±0.07	-	-	-	-
Items in L									-	-	-	-
Oil	348	98.03	18-72	37.20±17.05	7	1.97	24-46	30.29±10.74	-	-	-	-
Milk	274	77.18	10-15	12.43±0.99	63	17.75	10-14	11.29±1.04	-	-	18	5.07
Items in 1 piece									-	-	-	-
Egg	242	68.17	3-4	3.06±0.23	111	31.27	2-3	2.91±0.25	-	-	2	0.56
Cabbage	126	35.49	5-10	8.91±1.43	213	60	4-10	5.78±1.65	16	4.51	-	-
Items in one handgrip of palm												
Kale	97	27.32	4-10	6.81±2.30	225	63.38	3-10	4.62±1.13	33	9.3	-	-
Lettuce	98	27.61	4-10	7.76±2.35	226	63.66	3-10	4.83±1.09	17	4.79	14	3.94

Note: - Kg= Kilogram, L= Litre, SD=Standard deviation, ETB= Ethiopian Birr and -=no response

Table 4: Bivariate and multivariate logistic regression analysis on the association of socio-demographic and economic variables with Personal related Drivers of Food Choice (binomial outcome variables) among studied Lactating Women (n=423) in Debrebirhan Town from March 29 to June 22, 2016

Variables	Mood		Weight		Religion influence	
	COR (95%CI)	AOR (95%CI)	COR (95%CI)	AOR (95%CI)	COR (95%CI)	AOR (95%CI)
Age						
15-25 years	3.83(1.79-8.18)**	3.24(1.3-8.08)**	2.61(1.24-5.53)**	2.64(1.12-6.22)**	0.08(0.02-0.41)**	0.09(0.02-0.48)**
26-35 years	4.02(2.06-7.82)**	3.95(1.85-8.40)**	3.42(1.71-6.82)**	3.52(1.66-7.43)**	0.46(0.19-1.09)*	0.52(0.20-1.31)
36-49 years	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Educational status						
No formal	0.62(0.27-1.41)	0.46(0.17-1.24)*	0.48(0.22-1.06)*	0.46(0.19-1.12)*	1.85(0.57-5.99)	-
Primary	1.83(0.95-3.53)*	1.16(0.49-2.73)	0.91(0.56-1.49)	0.94(0.48-1.83)	1.08(0.44-2.64)	-
Secondary	1.11(0.62-1.97)	0.85(0.39-1.82)	0.71(0.44-1.15)*	0.79(0.43-1.47)	1.03(0.42-2.52)	-
College & above	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Marital status						
Single	0.59(0.29-1.2)*	0.38(0.11-1.31)*	0.42(0.22-0.8)**	0.59(0.22-1.63)	1.44(0.526-3.949)	1.69(0.30-9.51)
Divorced	0.74(0.3-1.81)	0.48(0.12-1.87)	1.33(0.59-2.99)	1.76(0.57-5.44)	0.95(0.212-4.206)	0.97(0.13-7.52)
Widowed	-	-	0.78(0.11-5.63)	0.96(0.12-7.62)	3.94(0.39-39.16)*	7.05(0.45-111.46)*
Married	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Head of family						
Lactating woman	0.85(0.36-2.01)	1.21(0.36-4.11)	0.54(0.24-1.19)*	0.52(0.19-1.45)*	5.37(0.65-44.11)*	5.50(0.48-63.12)
Husband	1.71(0.8-3.67)*	1.82(0.78-4.25)*	0.84(0.42-1.67)	0.73(0.35-1.73)	3.46(0.45-26.31)*	5.05(0.63-40.57)
Mother of woman	1.8(0.42-7.44)	3.01(0.44-20.76)	0.51(0.16-1.7)	0.65(0.14-2.98)	-	-
Father of woman	6.52(0.77-55.32)*	12.69(0.99-161.07)*	0.73(0.23-2.33)	0.53(0.12-2.38)	2.31(0.14-39.31)	2.78(0.10-74.48)
Both wife and husband	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Occupational status						
Daily laborer	-	-	2.21(0.02-21.70)	2.44(0.21-28.50)	-	-
Student	1.88(0.21-16.52)	0.95(0.08-12.15)	0.37(0.07-2.07)	0.74(0.11-5.29)	-	-
Housewife	2.39(1.30-4.4)**	2.11(0.95-4.71)*	1.04(0.65-1.65)	1.13(0.61-2.09)	1.11(0.42-2.89)	1.39(0.51-3.78)
Merchant	1.35(0.69-2.63)	1.64(0.71-3.79)*	0.72(0.41-1.26)	0.87(0.45-1.7)	2.43(0.94-6.27)*	2.32(0.85-6.30)*
Self-employee	1.10(0.53-2.29)	1.41(0.55-3.59)	0.46(0.24-0.89)**	0.55(0.25-1.21)	3.32(1.23-8.97)**	4.13(1.40-12.24)**
Government employee	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Educational status of husband						
No formal	1.72(0.37-7.91)	-	0.76(0.26-2.25)	-	0.75(0.341-7.56)	-
Primary	1.86(0.62-5.56)	-	0.76(0.36-1.63)	-	-	-
Secondary	1.29(0.61-2.72)	-	1.06(0.59-1.92)	-	0.56(0.16-1.94)	-
College and above	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Family size						
2-4 persons	1.07(0.67-1.70)	-	1.37(0.93-2.01)*	1.07(0.68-1.68)	1.16(0.57-2.34)	-
≥5 persons	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Lactation period						
≤6 months	1.1(0.58-2.11)	-	1.18(0.69-2.00)	1.07(0.59-1.91)	2.26(0.77-6.65)*	3.13(0.98-9.99)*
7-12 months	1.08(0.57-2.06)	-	1.39(0.83-2.41)*	1.22(0.69-2.14)	1.60(0.52-4.94)	2.05(0.63-6.65)*
13-18 months	0.99(0.50-1.96)	-	1.37(0.77-2.43)	1.34(0.72-2.48)	2.21(0.71-6.86)*	2.41(0.72-8.04)*
≥19 months	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Monthly income in ETB						
≤3500	1.73(1.08-2.77)**	1.83(1.03-3.24)**	1.24(0.84-1.82)	-	0.71(0.35-1.42)	-
>3500	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r

Note: **= p<0.05, * p= <0.25, - = Not applicable, 1^r= Reference, COR= Crude Odd Ratio, AOR=Adjusted Odd Ratio, ETB=Ethiopian Birr

Table 5: Bivariate and multivariate logistic regression analysis on the association of socio-demographic and economic variables with Food related Drivers of Food Choice (binomial outcome variables) among studied Lactating Women (n=423) in Debrebirhan Town from March 29 to June 22, 2016

Variables	Health value		Avoiding nutrient content		Food ingredients		Price		Ethical concern		Preparation convenience	
	COR (95%CI)	AOR (95%CI)	COR (95%CI)	AOR (95%CI)	COR (95%CI)	AOR (95%CI)	COR (95%CI)	AOR (95%CI)	COR (95%CI)	AOR (95%CI)	COR (95%CI)	AOR (95%CI)
Age												
15-25 years	0.33(0.16-0.69)**	0.26(0.12-0.6)**	5.26(2.45-11.29)*	6.75(2.77-16.5)**	1.29(0.64-2.61)	1.36(0.63-3.08)	0.72(0.27-1.93)	-	2.27(1.1-4.63)**	2.36(0.97-5.06)*	0.24(0.10-0.57)**	0.16(0.05-0.47)**
26-35 years	0.53(0.28-1.02)*	0.37(0.18-0.76)**	5.77(2.87-11.6)**	5.77(2.7-12.32)*	1.46(0.84-2.78)*	1.25(0.62-2.52)	1.14(0.48-2.72)	-	2.27(1.1-4.34)**	1.99(0.91-3.92)*	0.38(0.19-0.76)**	0.25(0.11-0.59)**
36-49 years	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Educational status												
No formal	0.25(0.09-0.69)**	0.14(0.04-0.42)**	0.97(0.44-2.15)	0.98(0.39-2.5)	0.86(0.4-1.85)	0.62(0.26-1.5)	0.83(0.29-2.3)	0.81(0.36-3.14)	1.91(0.7-4.91)*	1.96(0.71-5.44)*	1.4(0.57-3.63)	-
Primary	0.42(0.24-0.72)**	0.25(0.12-0.54)**	0.99(0.60-1.65)	0.84(0.41-1.74)	0.58(0.3-0.95)**	0.29(0.14-0.6)**	0.42(0.091)**	0.66(0.26-1.68)*	0.53(0.3-0.87)**	0.38(0.19-0.75)**	0.94(0.49-1.8)	-
Secondary	0.49(0.29-0.82)**	0.33(0.17-0.66)**	1.46(0.86-2.47)*	1.47(0.74-2.92)	1.03(0.63-1.66)	0.74(0.39-1.38)*	0.78(0.41-1.48)	1.05(0.51-2.17)	0.51(0.3-0.83)**	0.44(0.24-0.83)**	0.76(0.39-1.5)	-
College & above	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Marital status												
Single	0.52(0.07-3.7)	-	0.99(0.52-1.90)	0.61(0.18-2.02)	1.39(0.75-2.59)	0.84(0.29-2.43)	1.30(0.97-2.82)	-	1.55(0.8-3.02)*	1.77(0.83-3.76)*	2.4(1.2-4.9)**	4.2(0.32-32.07)*
Divorced	0.39(0.05-3.10)	-	2.34(0.86-6.33)*	1.4(0.35-5.65)	2.55(1.09-5.97)**	1.54(0.47-5.07)	0.92(0.31-2.77)	-	1.36(0.59-3.11)	1.43(0.6-3.4)	2.6(1.1-6.2)**	13-31.33)*
Widowed	0.59(0.07-4.85)	-	0.18(0.02-1.72)*	0.13(0.01-1.46)*	1.07(0.15-7.70)	1.41(0.16-32.76)	-	-	2.04(0.21-19.8)	2.77(0.26-29.64)	2.02(0.21-18.8)	11.64(0.81-168.14)*
Married Head of family	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Lactating woman	0.74(0.32-1.67)	-	1.92(0.83-4.45)*	2.25(0.69-7.31)*	1.51(0.8-3.32)	1.7(0.6-4.78)	-	-	1.28(0.57-2.89)	-	0.74(0.31-1.75)	0.25(0.05-1.25)*
Husband	0.75(0.37-1.50)	-	1.18(0.59-2.37)	1.24(0.57-2.7)	1.13(0.57-2.22)	1.2(0.58-2.5)	-	-	0.96(0.48-1.91)	-	0.31(0.15-0.69)**	0.42(0.18-0.96)**
Mother of woman	0.5(0.14-1.89)	-	0.65(0.14-2.1)	0.71(0.14-3.61)	2.06(0.62-6.82)*	2.56(0.55-11.95)*	-	-	1.96(0.53-7.22)	-	0.31(0.06-1.58)*	0.11(0.01-1.14)*
Father of woman	1.73(0.54-5.5)	-	3(0.75-13)*	3(0.5-18.58)*	5.8(1.4-23.41)**	5.4(0.97-3)*	-	-	0.9(0.29-2.99)	-	0.5(0.1-1.9)	0.17(0.12-1.47)*
Both(wife & husband)	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Occupational status												
Daily laborer	0.51(0.05-5)	1.64(0.15-28.25)	-	-	1.07(0.15-7.79)	1.67(0.2-13.8)	-	-	1.7(0.17-16.2)	2.67(0.25-29)	1.6(0.17-16.4)	0.9(0.1-11.48)
Student	0.31(0.04-2.68)	0.64(0.06-6.53)	1.16(0.2-6.5)	0.8(0.1-6.19)	2.15(0.38-12.02)	1.12(0.15-8.5)	1.03(0.12-9.1)	-	1.1(0.2-6.17)	1.05(0.16-7.9)	0.9(0.1-8.76)	0.85(0.1-11.8)

Housewife	0.89(0.55-1.43)	2.51(1.23-5)**	1.23(0.75-1.99)	1.01(0.5-2.04)	1.46(0.92-2.32)*	2.24(1.15-4.35)**	1.16(0.63-2.13)	-	0.80(0.50-1.28)	1.31(0.68-2.53)	1.17(0.64-2.13)	1.15(0.56-2.34)
Merchant	0.32(0.16-0.64)**	0.57(0.26-1.26)*	0.85(0.48-1.50)	0.78(0.39-1.6)	0.93(0.53-1.62)	1.22(0.61-2.42)	0.77(0.34-1.73)	-	0.67(0.38-1.19)*	0.91(0.46-1.8)	0.47(0.19-1.19)*	0.42(0.15-1.15)*
Self employee	0.72(0.36-1.42)	1.41(0.61-3.27)	1.89(0.9-3.98)*	1.49(0.61-3.63)	0.94(0.49-1.80)	1.06(0.48-2.32)	0.9(0.37-2.21)	-	0.89(0.46-1.72)	1.19(0.53-2.66)	1.33(0.60-2.98)	0.84(0.33-2.17)
Government employee	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Husband Education												
No formal	0.71(0.22-2.33)	1.32(0.37-4.73)	3.86(0.85-17.47)*	2.83(0.59-13.65)*	0.88(0.3-2.6)	1.03(0.32-3.31)	-	-	2.62(0.71-9.64)*	3.21(0.82-12.53)*	1.04(0.22-4.87)	-
Primary	1.03(0.47-2.26)	1.27(0.52-3.1)	2.04(0.85-4.90)*	1.74(0.63-4.82)	2.02(0.92-4.41)*	2.34(0.95-5.76)*	0.15(0.02-1.14)*	0.19(0.02-1.49)*	0.94(0.44-2.01)	1.22(0.52-2.85)	1.57(0.6-4.11)	-
Secondary	0.61(0.31-1.17)*	0.67(0.32-1.39)	1.42(0.78-2.60)	1.15(0.55-2.4)	1.3(0.73-2.34)	1.13(0.58-2)	0.74(0.24-1.68)*	0.79(0.34-1.87)	1.16(0.64-2.11)	1.39(0.72-2.67)	0.91(0.38-2.18)	-
College and above	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r
Family size												
2-4 persons	0.80(0.54-1.20)	-	1.22(0.82-1.8)*	0.78(0.48-1.27)	0.75(0.51-1.11)*	0.72(0.46-1.13)*	0.55(0.32-0.92)**	0.39(0.21-0.71)*	0.92(0.62-1.37)	-	0.7(0.42-1.16)*	0.79(0.42-1.48)
≥5 persons	1 ^r	-	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	-	1 ^r	1 ^r
Lactation period												
≤6 months	1.03(0.58-1.82)	0.77(0.41-1.44)	0.77(0.44-1.35)	-	0.71(0.36-1.38)	-	0.8(0.48-1.38)	-	0.99(0.48-2.03)	-	1.43(0.59-3.47)	1.42(0.55-3.69)
7-12 months	0.99(0.56-1.75)	0.9(0.49-1.65)	0.93(0.53-1.63)	-	0.80(0.47-1.36)	-	0.84(0.41-1.75)	-	0.97(0.56-1.67)	-	2.37(1.04-5.4)**	3.26(1.34-7.93)**
13-18 months	1.32(0.73-2.4)*	1.25(0.66-2.38)	0.88(0.5-1.6)	-	0.94(0.53-1.7)	-	1.03(0.48-2.2)	-	1.14(0.6-2.06)	-	4.3(1.99-9.9)**	1-10.72)*
≥19 months	1 ^r	1 ^r	1 ^r	-	1 ^r	-	1 ^r	-	1 ^r	-	1 ^r	1 ^r
Monthly income in ETB												
≤3500	0.82(0.548-1.23)	-	1.83(1.22-2.75)**	1.38(0.84-2.26)*	1.50(1.02-2.20)**	1.42(0.89-2.26)*	0.78(0.46-1.311)	-	1.14(0.77-1.691)	-	1.99(1.17-3.39)**	1.89(0.98-4.65)
>3500	1 ^r	-	1 ^r	1 ^r	1 ^r	1 ^r	1 ^r	-	1 ^r	-	1 ^r	1 ^r

Note:**=p<0.05, *= <0.25, -= Not applicable, 1^r= Reference, COR= Crude Odd Ratio, AOR= Adjusted Odd Ratio, ETB=Ethiopian Birr

Table 6: Bivariate and multivariate analysis on the association of socio-demographic and economic variables with sensory appeal consideration among studied Lactating Women (n=420) in Debrebirhan Town from March 29 to June 22, 2016

Variables	Smell		Appearance	
	COR (95%CI)	AOR (95%CI)	COR (95%CI)	AOR (95%CI)
Age				
15-25 years	0.40(0.18-87)**	0.77(0.30-1.96)	0.75(0.26-2.18)	1.02(0.29-3.52)
26-35 years	0.56(0.28-1.13)*	0.89(0.41-1.93)	0.98(0.37-2.85)*	0.96(0.33-2.8)
36-49 years	1 ^r	1 ^r	1 ^r	1 ^r
Educational status				
No formal	0.99(0.42-2.37)	1.08(0.40-2.93)	0.67(0.21-2.13)	0.64(0.16-2.55)
Primary	0.97(0.56-1.68)*	1.37(0.64-2.95)	0.44(0.2-0.99)**	0.41(0.14-1.19)*
Secondary	0.76(0.43-1.36)	0.98(0.47-2.03)	0.78(0.39-1.52)	0.89(0.37-2.21)
College & above	1 ^r	1 ^r	1 ^r	1 ^r
Marital status				
Single	0.67(0.31-1.43)	-	0.79(0.31-2.00)	-
Divorced	0.89(0.33-2.43)	-	2.05(0.78-5.40)	-
Widowed	3.88(0.348-43.3)	-	3.80(0.23-61.90)	-
Married	1 ^r		1 ^r	
Head of family				
Lactating woman	0.52(0.21-1.30)*	0.74(0.28-1.96)	1.33(0.46-3.88)	1.97(0.62-6.24)
Husband	0.39(0.18-0.82)**	0.43(0.19-0.96)**	0.38(0.14-1.01)*	0.32(0.11-0.91)**
Mother of woman				
Mother of woman	0.07(0.01-0.55)**	0.07(0.01-0.64)**	0.31(0.054-1.76)*	0.36(0.05-2.37)
Father of woman	0.15(0.03-0.79)**	0.12(0.02-0.76)**	0.73(0.17-3.13)	0.63(0.12-3.25)
Both wife and husband	1 ^r	1 ^r	1 ^r	1 ^r
Occupational status				
Daily laborer	-	-	-	-
Student	0.40(0.04-3.70)	1.77(0.14-22.42)	0.73(0.08-6.74)	0.76(0.06-10.46)
Housewife	0.72(0.42-1.25)*	0.77(0.37-1.64)	0.97(0.52-1.81)	1.82(0.74-4.50)*
Merchant	0.70(0.37-1.31)	0.67(0.31-1.45)	0.40(0.15-1.02)*	0.46(0.15-1.38)*
Self- employee	0.72(0.35-1.51)	0.67(0.31-1.64)	0.5(0.12-1.41)*	0.45(0.13-1.53)*
Government employee	1 ^r	1 ^r	1 ^r	1 ^r
Educational status of husband				
No formal	0.88(0.26-3)	-	0.43(0.05-3.5)	-
Primary	0.92(0.44-2.46)	-	0.69(0.19-2.47)	-
Secondary	1.13(0.57-2.22)	-	1.53(0.70-3.36)	-
College and above	1 ^r		1 ^r	
Family size				
2-4 persons	0.73(0.47-1.14)*	0.70(0.42-1.19)*	0.68(0.39-1.18)*	0.60(0.31-1.14)*
≥5 persons	1 ^r	1 ^r	1 ^r	1 ^r
Lactation period				
≤6 months	1.72(0.91-3.24)*	1.02(0.29-3.52)*	1.9(0.81-4.43)*	2.24(0.87-5.77)*
7-12 months	1.29(0.67-2.5)	1.35(0.67-2.70)	2.8(1.27-6.36)**	3.5(1.46-8.38)**
13-18 months	2.86(1.48-5.53)**	2.92(1.45-5.87)**	2.1(0.83-5.3)*	2.26(0.84-6.05)*
≥19 months	1 ^r	1 ^r	1 ^r	1 ^r
Monthly income in ETB				
≤3500	0.65(0.42-1.01)*	0.65(0.39-1.1)*	0.93(0.54-1.62)	-
>3500	1 ^r	1 ^r	1 ^r	

Note: **= p<0.05, * p= <0.25, - = Not applicable, 1^r= Reference, COR= Crude Odd Ratio, AOR=Adjusted Odd Ratio, ETB=Ethiopian Birr

Age and estimated monthly income were associated significantly with choosing of foods for mood purpose ($p < 0.05$) (**Table 4**). Consequently, compared to lactating women aged 36-49 years, choosing of foods for mood was significantly higher among those aged 15-25 and 26-35 years with AOR of 3.24 (95%CI: 1.3-8.08) and 3.95 (95%CI: 1.85-8.40). This could suggest that higher years' aged women may not be easily affected by their emotions. Meanwhile, similar studies among Finland consumers (Pohjanheimo, 2010), Spanish adults (Jauregui and Rios, 2011) and Malay, Chinese and Indian adults (Suzanah *et al.*, 2013) had found that the younger group had a greater concern for emotional well-being through their food intake.

Compared to lactating women who had greater than 3500 ETB estimated monthly income, choosing of foods for their mood was significantly higher among those who had \leq 3500 ETB estimated monthly income with AOR of 1.83 (95%CI: 1.03-2.77). They may not have stressed and confused plan due to scarcity of resource, and develop experience of emotional eating. It is analogous with Dutch consumers' study (Hartmann *et al.*, 2016) and disagrees with studies from Dutch consumers (Steenhuis *et al.*, 2011) and Malay, Chinese and Indian adults (Suzanah *et al.*, 2013).

Age was the only variable associated significantly with choosing of foods for weight control ($p < 0.05$) (**Table 4**) which was significantly higher among those aged 15-25 and 26-35 years with AOR of 2.64 (95%CI: 1.12-6.22) and 3.52 (95%CI: 1.66-7.43). It is confirmed by Ducrot *et al.* (2015) study and contradicted with Ree *et al.* (2008) study. This might be because of these age groups may not conscious for maintaining, increasing or decreasing their current weight status.

15-25 years' age and being self-employee were the only variables that associated with religion influence during choice of foods ($p < 0.05$) (**Table 4**). In view of that, compared to lactating women aged 36-49 years, the influence of

religion during food choice was significantly lower among those aged 15-25 with AOR of 0.09 (95%CI: 0.02-0.48). This suggests that religion consciousness may in gradual progress among this age group. It is incompatible with studies conducted by Hartmann *et al.* (2013), Ducrot *et al.* (2015) and Suzanah *et al.* (2013).

The influence of religion during food choice was higher among lactating women who were self employee than government employee lactating women with AOR of 4.13 (1.40-12.24). 4.3.2($p < 0.05$) (**Table 4**). This is due to the pressure of relationships with peers and co-workers in working area which have an impact on women day to day food choice, and similarly stated by Devine *et al.* (2009).

Socio-demographic and economic variables, and food related drivers of food choice

Binary outcome variables

Age, education and being housewife were the only variables significantly associated with choosing of foods based on its healthiness ($p < 0.05$) (**Table 5**). Therefore, compared to lactating women aged 36-49 years, choosing of foods based on its healthiness was significantly lower among those aged 15-25 and 26-35 years with AOR of 0.26 (95%CI: 0.12-0.6) and 0.37 (95% CI: 0.18-0.76). A similar result was confirmed among Irish studies (Hearty *et al.*, 2007; Naughton *et al.*, 2015). This shows that the knowledge of health at an early age may not advanced and the emphasis on meal healthiness in young older adults lactating women may be a significant driver of food selection.

Compared to lactating women who had college and above educational status, choosing of foods based on its healthiness was significantly lower among those who had no, primary and secondary educational status with AOR of 0.14 (95%CI: 0.04-0.42), 0.25 (95%CI: 0.12-0.54) and 0.33 (95% CI: 0.17-0.66). It is similar with studies in Netherlands (Kamphuis *et al.*, 2007; Kamphuis *et al.*, 2015), US (Beydoun and

Wang, 2008) and Australia (Miura and Turrell, 2014). This may be due to the fact that health consciousness increases as education increases. Furthermore, housewife lactating women were highly concerned to choose foods for their health value with AOR of 2.5 (95%CI: 1.23-5). It is contrary with previous study (Hearty *et al.*, 2007) which had shown that better quality diets are associated with higher social class status. Having of sufficient time may be the possible explanation.

Age was shown statistically significant association with avoiding of foods based on nutrient content as not good ($p < 0.05$) (**Table 5**). One can hypothesize that these lower aged groups may be less aware about the nutrient to be avoided. Therefore, they may not choose foods wisely for the purpose of disease prevention, management of an existing disease, or delaying the outcome of physical dependency or weight management. It is contrary to previous reports (National Institute of Nutrition, 2002; Ree *et al.*, 2008).

Primary education and being housewife were the only variables significantly associated with choosing of foods in favor of ingredient content ($p < 0.05$) (**Table 5**). Consequently, compared to lactating women with college and above educational status, choosing of foods based on its ingredient content was significantly lower among those who had primary education with AOR of 0.29 (95%CI: 0.14-0.6). It explains as being more educated could have good awareness about the effect (either negative or positive) of food ingredients. However, this is not confirmed by a study from Malay (Asma *et al.*, 2010). Housewife lactating women had higher odd of choosing foods based on its ingredient content than government employee lactating women with AOR of 2.24 (95%CI: 1.15-4.35). It is possible that dietary discrepancies between social classes are attributable to different motivations either positive or negative (Marie-Claude, 2005; Hearty *et al.*, 2007; Nestle *et al.*, 2009).

Sure enough, household size was an important factor of price consciousness and consistent with analyses of household food expenditures in other countries (Cox and Anderson, 2004; Ricciuto *et al.*, 2006). It is in contrast with finding from Malay, Chinese and Indian (Suzanah *et al.*, 2013). The outcome may be explained as the number of people in a household will somehow have an impact on the type of food intake, eating habits and the way food is being prepared for the family be influencing money expended of food items. This also revealed in Contento *et al.* (2006) study, food choice and eating patterns are influenced by the need of others in the family about what to buy or eat ($p < 0.05$) (**Table 5**).

Primary and secondary education were the only variables that significantly associated with ethical value consideration of foods during selection with AOR of 0.38 (95%CI: 0.19-0.75) and 0.44 (95%CI: 0.24-0.83) ($p < 0.05$) (**Table 5**). One can speculate that these highly educated women may have ability to obtain ethical nutrition information, particularly from foods via their food labels during food choice. It is inconsistent with Janssen *et al.* (2016) study. This might be due to the variation in knowledge towards ethical values of foods.

Age, divorced, husband head, lactation period (7-12 and 13-18 months) were significantly associated with preparation convenience during food choice ($p < 0.05$) (**Table 5**). As a result, compared to lactating women aged 36-49 years, lactating women aged 15-25 and 26-35 years had lower odds in choosing easily prepared foods with AOR of 0.16 (95% CI: 0.05-0.47) and 0.25(95% CI:0.11-0.59). It is coincided with previous studies (Hallstrom *et al.*, 2011; Alencar *et al.*, 2016) and contradicted to Malay, Chinese and Indian study (Suzanah *et al.*, 2013). This might be these age group may not have good efficiency to prepare foods without tiredness than lower years old.

Compared to lactating women who were married, the odd of choosing easily prepared foods was 5.94 times greater among divorced

lactating women at 95%CI of 1.13-31.33. This is comparable with Deliens *et al.* (2014) study that suggested people living alone could be more concerned in choosing of easily prepared foods. This could be explained by lacking of support from their husband which results in excessive workload and long hours working (Agarwalla *et al.*, 2014) causes tiredness (Deliens *et al.*, 2014) which affect food preparation. Lactating women from husband headed had lower odd in choosing easily prepared foods than both headed with AOR of 0.42 (95%CI: 0.18-0.96). The possible explanation could be women from both headed may work more on the outside of their home, and this had an influence on food preparation convenience as stated in United States Bureau of Census (1998). Lactating women who had 7-12 and 13-18 months' lactation period were more likely to choose easily prepared than women who had ≥ 19 months' lactation period. The possible suggestion could be absence of child caregiver in those lactating women household and they spent more time in child care and housework and it may limit the potential to choose foods (Daniels *et al.*, 2012; Ducrot *et al.*, 2015). Compared to lactating women who had ≥ 19 months' lactation period, women who had 7-12 and 13-18 months' lactation period had higher odds in choosing easily prepared foods with AOR of 3.26 (95% CI: 1.34-7.93) and 4.4(1.81-10.72). The potential explanation is that those women with low preparation skills use more easily prepared foods (Van der Horst *et al.*, 2011; Hartmann *et al.*, 2013; Ducrot *et al.*, 2015). It can hypothesize that people with high preparation skills are more likely to consider preparation as a leisurely activity, and therefore they perceive as less constraints.

Multinomial outcome variable

All candidate variables except marital status and husband education were adjusted for multivariate analysis in multinomial logistic regression. Additionally, head of family and lactation period had statistically distinguished

effect and were significantly associated with the preference of sensory appeal during food choice ($p < 0.05$) (**Table 6**). Accordingly, compared to lactating women from both headed, lactating women from husband, mother and father of lactating women headed were less likely to choose foods because of smell than taste with AOR of 0.43 (95%CI: 0.19-0.96), 0.07 (95%CI: 0.01-0.64) and 0.12 (95%CI: 0.02-0.76). Additionally, lactating women from husband headed were less likely to choose foods because of appearance than taste with AOR of 0.32 (95%CI: 0.11-0.91). This could be explained by others' behavior and precedence within the households. As food choice are not solely the domains of the individual in the family, but are also influenced by the family context. Decisions around foods at the level of the households are important determinants of food consumption (Ricciuto *et al.*, 2006). Besides, women who had ≥ 19 months' lactation period, women who had 7-12 and 13-18 months' lactation period were more likely to choose foods for its appearance and smell than taste with AOR of 3.5 (95%CI: 1.46-8.38) and 2.92 (95%CI: 1.45-5.87) respectively. This may be due to children behaviors, and women's expectation to behave as good for those breast feeding children. Since, husbands' and children's needs and preferences seem to be prioritized in most settings (Daivadanam *et al.*, 2014).

Strength and limitation of study

To the best of knowledge, this research is the first to apply method to investigate drivers of food choice and their relative importance across different socio-demographic and economic groups among lactating women in Ethiopia. Major strengths of the current study were the community based approach, random selection of the study population, the study samples were selected directly from the targeted population. The subjective nature of this approach makes it sensitive to social desirability bias, which can lessen the discriminative power of the data. Furthermore,

selection, interviewer and information bias also expected during data collection. The disadvantage of such approach is that the attributes embodied during food choice cannot be pre-specified by the researcher and may be interpreted differently by different participants. A limitation of a survey questionnaire is that one can only include and compare a limited number of attributes. Furthermore, it was difficult to establish a cause and effect relationship between the dependent variables (drivers) and the independent variables (socio-demographic and economic variables) though association was observed. The food choice questionnaires did not indicate the actual dietary behavior of the studied population.

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Conclusion and Recommendation

Influences of religion, price and preparation convenience were by far the most three important drivers for food choice among women during lactation. Nutrient contents consideration for the avoidance of foods as not good was the second least driver of food choice next to mood among lactating women. Furthermore, most of

the study participants were influenced by six main drivers of food choice. From the study area, several aspects of socio-economic variables associated mostly with the drivers of food choice of lactating women. Accordingly, age and monthly income were associated with mood concern in choosing of foods. Age was connected with choosing of foods for weight control. 15-25 years' age and self-employee were allied with religion influence during food choice. Age, education and housewife were linked with choosing of foods for their health value. Avoiding of foods for nutrient content as not good was attached only with age. Primary education and housewife were associated with choosing of foods for its ingredient content. Family size was the only factor that allied with price concern during food choice. Primary and secondary educational statuses were connected with ethical consideration. Age, being divorced, husband headed, 7-12 and 13-18 months' lactation period were related with preparation convenience of foods in selection process. Regarding to sensory influence during food choice, women from husband, mother and father of lactating women headed households were preferred taste more than smell of foods. Besides, husband headed was highly associated with taste preference than appearance of the foods. However, women who had 7-12 and 13-18 months' lactation period were more preferred appearance and smell of the foods than taste respectively.

Finally, husband education did not shown any association with drivers of food choice among lactating women. Furthermore, efforts to change choosing/eating behaviors of lactating women, nutrition education and promotion concerning self-management approaches to healthy foods are recommended by considering lactating women's self-perceived motivations & socio-demographic & economic barriers to food selection in order to be successful in improving women' livelihood.

Policy implications

Policies and interventions to enhance healthy diet and lifestyle will have an increased likelihood of success if the motives underlying food choice are incorporated. Hence, strategies targeted at lactating women, should focus on motivational changes and countering uncertain attitudes. Different strategies should take account of the differing drivers, and socio-demographic and economic variables associated with those drivers during food choice among lactating women. These strategies or interventions should support people who are motivated to eat healthily foods by addressing issues of dietary control and self-regulation.

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Availability of data and materials

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

Authors' contributions

GK developed the study, design, implementation, analysis, interpretation and writing. AM contributed to the design, implementation and writing of the finding. TB: design, implementation and co-writing. The final manuscript read and approved by all authors.

Consent for publication

Not applicable.

Competing interests

There is no competing interest between authors.

Abbreviations

AOR: Adjusted Odd Ratio

CI: Confidence Interval

COR: Crude Odd Ratio

CSA: Central Statistics Agency

EDHS: Ethiopian Demographic Health and Survey

FMOH: Federal Minister of Health

Kg: Kilogram

L: Litre

SPSS: Statistical Package for Social Science

UNICEF: United Nations Children's Fund; USA: United States of America

USAID: United States Agency for International Development

WHO: World Health Organization

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