

Full Length Research Paper

Nutritional status and associated drivers of food choice among lactating women in Debre Birhan Town, North Shoa Zone, Amhara Region, Ethiopia: A community based cross-sectional study

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People's perception of food products during food choice is a very complex phenomenon that is influenced by a wide range of characteristics that an individual, groups and local communities make. This study investigated nutritional status and associated motives of food choice among lactating women from Debre Birhan Town. Anthropometric measurements and motives of food choice questionnaire were administered among 423 randomly selected women using cross-sectional study. Data was analyzed via SPSS version 20. Associated drivers of food choice to nutritional status of women were identified by logistic regression analysis, and p-value < 0.05 was taken as statistically significant. Prevalence of chronic energy deficiency was 21.7%. From multivariate logistic regression model, healthy meal eating motivation, price and mood concern were identified as most significant drivers of food choice influencing nutritional status of women with AOR (95% CI) of 2.1 (1.21-3.62), 3.01(1.32-6.9) and 0.5(0.30-0.95) respectively. Focus on supporting women's motivations to attain their good health by addressing issues of dietary behavior through nutrition education about healthy food choice is recommended. Since awareness creation is an important to inspire women, their families and communities to increase food intake, proper dietary practices and dietary diversification in order to be successful in improving the livelihood of women.

Key words: Nutritional status, motives, food choice, lactating women.

INTRODUCTION

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). Nutrition is an important factor in maintaining the health of individuals (Blaney et al., 2009). According to United Nations Child's Fund (2009), poor nutrition in women of reproductive age affects chances of woman's survive as well as her child's

health. Factors at individual, household and community levels, or a combination of these factors are contributing to poor nutrition and health status (Black et al., 2009), which is extreme public health importance in Ethiopia (WHO, 2007; Federal Ministry of Health - FMoH, 2008). According to the Ethiopian Demographic and Health Survey, 27% of Ethiopian women are too thin, with 6%

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being overweight or obese (EDHS, 2011). Furthermore, the prevalence of overweight or obesity (body mass index $> 25 \text{ kg/m}^2$) among lactating women was reported from different parts of Ethiopia (Nega, 2010; Kiday et al., 2013; Temesgen et al., 2015; Hadiya et al., 2016). According to the Federal Ministry of Health (FMOH), 17% of women were anemic and 6% of women were experiencing vitamin A deficiency (FMOH, 2008). Different epidemiological studies indicated that nutritional inadequacy can influence the health status of individuals (Fantahun and Degu, 2004; CSA, 2007; WHO, 2007). Chronic health disorders such as obesity, diabetes and cardiovascular diseases have been increasing in Ethiopia since the last two decades (Fantahun and Degu, 2004).

The pattern of nutritional disorders in the developing world is further complicated by sociological changes and nutritional transitions which are taking place due to changing of lifestyles. It is characterized by a decline in the consumption of traditional staple food and other traditional food crops with an increase in consumption of refined and processed foods which have an impact on health (Jan and Tee, 2014) and nutritional status of people (Millstone and Lang, 2008). Under nutrition is one of the major public health issues affecting many women in Ethiopia (WHO, 2007; FMOH, 2008; Nega, 2010; Ethiopia Demographic and Health Survey report - EDHS, 2011; Kiday et al., 2013; EMDHS, 2014; Temesgen et al., 2015; Hadiya et al., 2016).

There is strong evidence from published study, which demonstrate an attention for the need to consider the wide range of underlying factors during food choice to improve the livelihood of population (Dunneram and Jeewon, 2015). In Ethiopia, no studies have been conducted in understanding nutritional status and associated drivers of food choice which influence nutrition-related behavior of women. Therefore, the aim of this study was to determine nutritional status and associated drivers of food choice of women during lactation from Debre Birhan town. Focuses on lactating women would provide valuable insight into the different settings shadowing current food choice patterns of Ethiopian women during lactation. The findings of this study can be helpful for developing both relevant lactating women's food guiding and appropriate mechanisms. Understanding the prominent determinants of motives underlying the food choice of lactating women in this urban community provide a better insight to the health professionals, nutritionists, researchers and those who share the same interest. The study findings will help practitioners working in the field of maternal nutrition to optimally design low cost high impact nutrition interventions and tailor nutrition counseling messages during lactation.

METHODOLOGY

Study area, design and population

A community based cross sectional study with both descriptive and

analytical components was conducted from March to June, 2016 in Debre Birhan Town in 9 kebeles with a total population of 102,500. The source of population for this study was all lactating women living in Debre Birhan town. Study population was all lactating women (15-49 years age) who were randomly selected from source population.

Sample size determination and sampling procedures

Stat CALC application of Epi info™ 7.0.8.3 (2011) was used to calculate the sample size. In each kebele, pre-registration of lactating women was done to count numbers of lactating women before the actual data collection. Households with lactating women were identified through house to house visit, and a total of 1087 lactating women were registered. After house to house visit, complete list of lactating women was prepared for each kebele, and proportionate allocation to size was applied. To select those proportionally allocated lactating women from each kebele, simple random sampling technique was done. Planning application of Essential Nutrition Action ENA for SMART computer software program (2007) was used for random selections of proportionally allocated lactating women.

Data collection method and instrument

Primary source was used to collect primary data using face-to-face interview. Data on socio-demographic characteristics and motives of food choice was collected using pre-tested, structured and semi-structured questionnaire. Questionnaire for drivers of food choice were adapted from Steptoe et al. (1995) and Milosevic et al. (2012). Socio-demographic questionnaire were adopted from Ethiopia Demographic and Health Survey report (EDHS, 2011). Anthropometric measurements (weight, height and mid upper arm circumference (MUAC) were taken from lactating women. Triplicate measurements of weight, height, and mid upper arm circumference) were taken at the same day from each study subject using calibrated equipment and standardized techniques. To avoid variability among the data collectors, all the anthropometric measurements were taken by the principal investigator. Furthermore, removing of shoes, heavy clothes were done for weight and height measurements. Body mass index (BMI) was calculated by dividing the weight in kilogram to the height in meter squared (kg/m^2). Mid upper arm circumference was measured by using non stretchable MUAC measuring tape. Then, classification will be applied using the cutoff point MUAC $< 21 \text{ cm}$ and normal MUAC $\geq 21 \text{ cm}$ (Bruce, 2001).

Three trained female data collectors and two supervisors were used. To address major areas bias that can be introduced during data collection process, the following actions were considered critically. First, the English version of the questionnaire was translated into local language (*Amarigna*) and then translated back to English by other professionals who did not see the English version questionnaire to ensure consistency. The questionnaire was reviewed by senior researchers, and comments were incorporated in support of internal validity. Then the questionnaire was prepared and pre-tested in 5% of the total sample size (22) in a nearby kebele Chacha Town. The pre-test was done before the actual data collection and necessary corrections were taken. Then final version questionnaire was developed and used for data collection. Three days training was prepared by principal investigator and given for data collectors on interviewing techniques such as how to gather required information, procedures of data collection techniques and the whole contents of the questionnaire.

Data analysis

Data entering, cleaning and analysis were done by SPSS version 20 computer software program. Descriptive statistics were computed for all relevant variables. Multi-co linearity and model fitness were also checked. To determine motives of food choice associated with nutritional status, logistic regression was used with bivariate and multivariate analysis. The nutritional status of women as a dependent variable was classified into BMI < 18.5 and BMI ≥ 18.5 kg/m². 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.

Ethical consideration

Ethical clearance was obtained from the College of Medicine and Health Sciences, Institutional Review Board of Hawassa University. The objective of the study was clarified to North Shoa Zone Health and Debre Birhan Town Administrative Health Care Officials for their permission and support. 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. The responses were kept confidential by coding.

RESULTS

Socio-demographic and anthropometric 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-demographic and anthropometrics characteristics. Accordingly, about 63.8% of the respondents had 26-35 years of age, 92.9% of respondents had formal education (primary, secondary and above college), 81.8% of married and 53.9% of having work for money/payment. This study also examined estimated household income earned per month from their income generating activities. The classification was done using median of monthly income and 50.2% of the respondents earned ≤3500 Ethiopian birr per month. About 26.5, 5 and 13.5% of women had body weight ≤45 kg, height ≤145 cm and MUAC <21 cm. Prevalence of chronic energy deficiency was 21.7% with a mean value of 21.52±2.71.

Descriptive analysis of drivers influencing food choice among studied lactating women

Drivers of food choice were presented in Table 2, and food selection based on religion was mentioned by over 388 (91.7%) of respondents. According to Table 2, lactating women reported that price 355 (83.9%), preparation convenience 352 (83.2%), best friend encouragement 344(81.3%), husband encouragement

300(70.9%), meal healthiness 280 (66.2%) and daily availability of fruit and vegetable 266(62.9%) as mainly key drivers. The perceived price of selected fruit and vegetable items for those price concerned studied lactating women was presented in Table 2. Choosing foods based on taste, its ingredient content, for weight control, medical reason and based ethical value were mentioned by 237(56%), 209(49.1%), 194(45.9%), 193(45.6%), and 164(38.8%) of study respondents respectively. Among participants who were conscious for weight, 'foods low in carbohydrate and fat contents were preferred. Ethical concern during food choice signals a common area in origin, environmental acceptance, and official recognition of foods. Avoiding foods because of nutrient content was mentioned by 144(34%) of study participants. Among those, about 75(52.08%) and 49(34%) of participants avoided foods that are high in fat and carbohydrate respectively. Choosing foods for mood purpose was the least underlying motives, which accounted 92 (22%). Choosing of foods for feeling good (23.9%) and coping with life (21.7) were the most important from mood options next to keeping alert 35(38%).

Association between motives of food choice and nutritional status among studied lactating women

Health meal motivation, mood and price concern were significantly associated with nutritional status of lactating women during bivariate analysis (p<0.05) (Table 3). However, food aversion habit, choosing of foods to child benefit, ingredient content, avoiding for nutrient content, taste preference, preparation convenience, weight concern, ethical value concern, medical reason and religion influence were not significantly associated with the nutritional status of lactating women.

After adjusting for all candidate variables in multivariate analysis; health meal, price and mood concern were associated significantly with nutritional status (P<0.05) (Table 3). Accordingly, lactating women who were motivated to choose healthy meal and price concerned, normal weight was significantly higher with AOR of 2.1 (95% CI: 1.21-3.62) and 3.01(95% CI: 1.32-6.9) respectively. Compared to lactating women, who were concerned to choose food for mood purpose, normal weight was significantly lower among women who were not concerned with AOR of 0.5(95% CI: 0.30-0.95).

DISCUSSION

This study assessed the cross-sectional data on nutritional status and associated motives which influence the nutrition behavior among lactating women from Debre Birhan Town, North Shoa Zone, Amhara Region, Ethiopia. The prevalence of chronic energy deficiency (BMI <18.5 kg/m²) among the lactating women was 21.7%, which was lower than the finding of Tigray region

Table 1. Socio-demographic and anthropometric characteristics of studied women (n=423) in Debre Birhan Town from March to June 2016.

Variable	Frequency	%
Age groups		
15-25 years	109	25.8
26-35 years	270	63.8
36-49 years	44	10.4
Educational status		
No formal	30	7.1
Formal	393	92.9
Marital status		
Married	346	81.8
Other	77	18.2
Head of family		
Woman	71	16.78
Other	352	83.2
Occupation		
No having work	195	46.1
Having work	228	53.9
Family size		
2-4 persons	240	56.7
≥5 persons	183	43.3
Length of lactation period		
≤12 months	233	55.08
>13 months	190	44.92
Monthly income in Ethiopian birr		
≤3500	215	50.2
>3500	208	49.8
Weight (kg)		
≤45	112	26.5
>45	311	73.5
Height (cm)		
≤145	21	5
>145	402	95
MUAC (cm)		
<21	57	13.5
≥21	366	86.5
BMI (kg/m²)		
<18.5	92	21.7
18.5-24.99	294	69.5
≥25	37	8.8

of Ethiopia (25%) (Kiday et al., 2013) and Ethiopian Health and Nutrition Research Institute nutrition baseline

survey report 28.8% (EHNRI, 2008). Furthermore, the result was much lower than the report of Ransom and

Table 2. Food choice behaviors of studied Lactating Women (n=423) in Debre Birhan Town from March to June 2016.

Drivers	Frequency	%
Avoiding food as not good to child		
Yes	292	69.03
No	131	30.97
Healthy value of meal		
Yes	280	66.2
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 and nail	2	0.71
Recommended by physician	15	5.36
No	143	33.8
Avoiding for nutrient content		
Yes	144	34
High in fat	75	52.08
High in carbohydrate	49	34.03
High in carbohydrate and fat	4	2.78
High in salt	7	4.86
Pungent pepper containing foods	9	6.25
No	279	66
Natural content		
Yes	209	49.1
No	214	50.6
Price concern		
Yes	355	83.9
No	68	16.1
Taste		
Yes	237	56
No	186	44
Preparation convenience		
Yes	352	83.2
No	71	16.8
Mood		
Yes	92	22
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

Table 2. Cont'd

Weight control		
Yes	194	45.9
Low in carbohydrate	71	36.6
Help me to control weight	47	24.23
Helps me to admire by other people	3	1.55
Helps me have attractive weight	6	3.09
Low in fat	67	34.54
No	229	54.1
Influenced by religion		
Yes	388	91.7
No	35	8.3
Health concern (medical reason)		
Yes	193	45.6
No	230	54.4
Their worry about health		
Gastric disease	112	
Heart case	21	
Diabetes	24	
Kidney	6	
Allergy	7	
Blood pressure	11	
Cancer	12	
Best friend encouragement		
Yes	344	81.3
No	79	18.7
Husband encouragement		
Yes	300	86.7
No	46	13.3
Availability of fruits and vegetables in home		
Yes	266	62.9
No	157	37.1
Availability of soft drink in home		
Yes	147	34.8
No	276	65.2
Availability of milk and milk products in home		
Yes	317	74.9
No	106	25.1
Advertisement		
Yes	134	31.68
No	289	68.32
Nutrition books, journals and magazines		
Yes	95	22.46
No	328	77.54

Table 3. Bivariate and multivariate logistic regression analysis on the association of drivers of food choice and nutritional status among studied women (n=423) in Debre Birhan Town from March to June 2016.

Variable	Nutritional status		COR (CI)	AOR (CI)
	Undernourished (BMI <18.5 kg/m ²)	Normal (BMI ≥18.5 kg/m ²)		
Avoiding food as not good to child	59	233	0.96(0.58-1.61)	
	35	96		
Healthy meal	71	209	1.97(1.156-3.37)**	2.1(1.21-3.62)**
	21	122		
Avoid for nutrient	30	114	0.92(0.56-1.51)	
	62	217		
Mood	13	79	0.53(0.28-0.99)**	0.5(0.30-0.95)**
	79	252		
Taste	50	187	0.92(0.58-1.46)	
	42	144		
Natural content	164	167	0.79(0.5-1.26)	
	51	41		
Preparation convenience	73	279	0.72(0.4-1.29)	
	19	52		
Price	85	270	2.74(1.21-6.22)**	3.01(1.32-6.9)**
	7	61		
Medical reason	36	157	0.71(0.45-1.14)*	0.65(0.40-1.06)
	56	174		
Weight	40	154	0.88(0.56-1.41)	
	52	177		
Religion influence	87	301	1.73(0.65-4.6)	
	5	30		
Friend encouragement	72	272	0.78(0.44-1.38)	
	20	59		
Husband encouragement	44	256	0.49(0.23-1.02)*	0.81(0.33-2.86)
	12	34		
Availability of soft drink in home	32	115	0.46(0.25-0.86)**	0.47(0.2-1.14)*
	60	215		
Availability of fruits and vegetables in home	54	212	0.8(0.5-1.28)	
	38	119		
Availability of milk and milk products in home	64	253	0.71(0.42-1.18)*	2.4(0.67-8.66)*
	28	78		
Advertisement	30	104	1.1(0.65-1.73)	
	62	227		
Nutrition books, journals and magazines	22	73	1.11(0.64-1.92)	
	70	258		

**p<0.05, * p<0.25, AOR= Adjusted Odd Ratio, BMI= Body Mass Index, CI=Confidence Interval, COR=Crude Odd Ratio.

Elder (2003), EDHS (2006) and Nega (2010) which was about 37.5%. The expected reason could be the community tested might be accessible to various maternal health promotions, nutrition and women empowerment that they would require to maintain their nutritional status. Approximately, 13.5% of lactating women had MUAC less than 21 cm, and it was

comparable with study done from Northern Ethiopia (Kiday et al., 2013).

This study provides an analysis on the motives of food choice in relation to their nutritional status. Accordingly, the likelihood of being in the normal weight among lactating women was directly associated with strong healthy eating motivation. The strong association between

healthy meals eating motivation and nutritional status might be explained by the fact that those who had higher motivation had increased and diversified food consumption as compared to those who had no motivation. Since people's motivations towards eating a healthy diet are generally positive to obtain better quality diets which can affect their nutritional status. The finding was inconsistent with Naughton et al. (2015) study. Furthermore, price concerned lactating women were more likely to be normal in their body weight. It is comparable to the study of Epstein et al. (2007) which described the relation of cross-price elasticity with body weight. This result suggests that leaner mothers may be more likely to shift purchasing from low energy dense to high energy dense foods on the basis of price changes of low energy dense foods. Additionally, the observation also explicated as obese mothers may be less likely to either reduce purchases of high energy dense foods when their price increases or to purchase more low energy dense foods when the price of high energy dense foods increase may reduce the utility of any economic approach that uses increases in prices of less healthy foods to reduce their consumption. Other expected reasons could be the purchasing power of women may be limited to the specific food items and influenced by the purchasing frequencies of food items. Additionally, knowledge of study respondents may affect price over income, that is, using of available resource wisely to choose balanced diet may be predominated in those lactating women.

Prevalence of underweight was significantly higher among women who were concerned to stress during food choice. This could suggest that those study participants are affected by their emotions to choose different food items. Psychological stress is a common feature of life and can modify eating behaviors leading to poor quality of food consumption due to mental stress initiated by working under time pressure during peak periods. This increases the risk of poor nutritional status, and ultimately jeopardizing their health prognosis and related outcomes (Dunneram and Jeewon, 2015). Research has shown that along with easier access and availability of unhealthy foods, body weight statuses are closely associated with tension and anxiety within the workplace (Nishitani and Sakakibara, 2006). A limitation of a survey questionnaire is that one can only include and compare a limited number of attributes. This meant that other underlying motives such as familiarity, modeling, family and peer influence, food freshness, diet variety, portion size, and social media could not be included. Furthermore, cross sectional data is a limit within itself to determine cause or effect. It relatively indicates a snap shot of moment in time of the person's daily life.

Conclusion

Using anthropometric measurement, nutritional status of

lactating mothers was assessed. Accordingly, the prevalence of chronic energy deficient (BMI <18.5 kg/m²) and proportion of women whose MUAC is less than 21 cm were 21.7% and 13.5% respectively. Health meal, price and mood concern were the most important predictors (motives of food choice) of nutritional status among lactating women. Focus on supporting people's motivations to attain a healthy diet by addressing issues of dietary behavior and practice using awareness creation and nutrition education is recommended to inspire women, their families and communities about food intake, proper dietary practices and dietary diversification during lactation in order to be successful in improving the livelihood of lactating women. Other attributes of food choice which have great influence on nutritional status of women is still not understood, and required further research to assess their weight on the health of people.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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