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

Gesessew Kibr

Department of Food Science and Nutrition, Shambu Campus, Wollega University, Shambu, Ethiopia.

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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%
being overweight or obese (EDHS, 2011). Furthermore, the prevalence of overweight or obesity (body mass index > 25 kg/m²) 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/m²). Mid upper arm circumference was measured by using non stretchable MUAC measuring tape. Then, classification will be applied using the cutoff point MUAC < 21 cm and normal MUAC ≥21 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  |
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                      | Yes | 71  | 36.6 |
| Help me control weight                   | Yes | 47  | 24.23|
| Helps me to admire by other people       | Yes | 3   | 1.55 |
| Helps me to control weight               | Yes | 6   | 3.09 |
| Low in fat                               | Yes | 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/m²)    | Normal (BMI ≥18.5 kg/m²) |                      |
| 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)**   |
|                                        | 21                                  | 122                   | 2.1(1.21-3.62)**     |
| Avoid for nutrient                     | 30                                  | 114                   | 0.92(0.56-1.51)      |
|                                        | 62                                  | 217                   |                      |
| Mood                                   | 13                                  | 79                    | 0.53(0.28-0.99)**    |
|                                        | 79                                  | 252                   | 0.5(0.30-0.95)**     |
| 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)**    |
|                                        | 7                                   | 61                    | 3.01(1.32-6.9)**     |
| Medical reason                         | 36                                  | 157                   | 0.71(0.45-1.14)*     |
|                                        | 56                                  | 174                   | 0.65(0.40-1.06)      |
| 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)*     |
|                                        | 12                                  | 34                    | 0.81(0.33-2.86)      |
| Availability of soft drink in home     | 32                                  | 115                   | 0.46(0.25-0.86)**    |
|                                        | 60                                  | 215                   | 0.47(0.2-1.14)*      |
| Availability of fruits and vegetables  | 54                                  | 212                   | 0.8(0.5-1.28)        |
| in home                                | 38                                  | 119                   |                      |
| Availability of milk and milk products in home | 64                      | 253                   | 0.71(0.42-1.18)*     |
|                                        | 28                                  | 78                    | 2.4(0.67-8.66)*      |
| 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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