

Perception and practice of ‘healthy’ diet in relation to noncommunicable diseases among the urban and rural people in northern Ethiopia: a community-based qualitative study

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ABSTRACT

Dietary habits are related to the risks of noncommunicable diseases (NCDs), such as cardiovascular disease and diabetes, of which burdens are increasing in low-income countries including Ethiopia. Although several epidemiological studies of NCD risk factors were conducted in Ethiopia, qualitative studies on people’s dietary habit in relation to NCDs have not been conducted yet. This study aims to describe people’s perception and practice of ‘healthy’ diet, and barriers to practice ‘healthy’ diet, paying attention to the dynamics between the perception and practice. We conducted 16 key informant interviews and eight focus group discussions in an urban and a rural areas in northern Ethiopia between November 2014 and January 2016. Audio-records in local language were transcribed word-for-word, and translated into English. English text data were analyzed qualitatively, through constant comparative analysis following the principles of the grounded theory. Three themes have emerged: (1) dietary habit perceived as ‘good’ or ‘bad’ for health; (2) reasons for continuing current ‘unhealthy’ dietary habit; and (3) current dietary habit perceived as ‘traditional.’ People’s practice was mostly consistent with their perception, while they sometimes practiced contrary to the perception because of personal preference and physical or financial obstacles. People were often indifferent of health implications of their habitual dietary practice, such as drinking a lot of sweet coffee. We showed dynamics between perception and practice of ‘healthy’ diet among people in northern Ethiopia. It is needed to increase awareness of NCDs both among the urban and rural people and to improve the social environment for removing the obstacles.

Keywords: noncommunicable diseases, Northern Ethiopia, dietary habit, habitual practice, qualitative study

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INTRODUCTION

Noncommunicable diseases (NCDs) are globally recognized threats and additional burdens on health in developing countries.^{1,2)} Dietary habits are related to the risks of NCDs, such as cardiovascular disease and diabetes. Taking too much dietary energy, salt, and animal fat increases risks of obesity, hypertension, and atherosclerosis, while having adequate amounts of vegetables and fruits decreases such risks.^{3,4)} Each person's dietary habit is likely to be influenced by various matters, including availability and affordability of food such as meat, fish, vegetables and fruits, lifestyle and work conditions, family habit, social pressure from friends and colleagues, cultural beliefs and traditional customs, personal preference, and lack of nutritional knowledge. Therefore, it is needed to investigate people's dietary habit and their background factors in order to reduce risks of NCDs.

Ethiopia is the second most populous country in Africa, with over 102 million population and 2.5% of annual population growth rate in 2016.⁵⁾ Although the country experienced strong economic development with 10.5% of average growth rate per year between 2006 and 2016, gross national income per capita was still 660 US dollars and about 30% of the population lived under extreme poverty in 2016.^{5,6)} Life expectancy at birth was 62.8 years for men and 66.8 years for women, under 5-year mortality rate was 61.3 per 1000 live births, maternal mortality ratio was 353 per 100,000 live births, and about 40% of under 5-year children were stunted, or undernourished, in 2015.⁷⁾ Infectious diseases are still prevalent and major causes of child deaths included acute respiratory infections and diarrhea.

However, the burden of NCDs is also increasing in Ethiopia. NCDs were estimated to account for 30% of total deaths.⁸⁾ The estimated age-standardized death rates of all NCDs in Ethiopia were 556.1 per 100 000 population in men and 404.2 in women, and over 60% of NCD related deaths occurred among those under 70 years old.⁸⁾ Prevalence of overweight was estimated to be increasing, while many people are still undernourished.⁹⁾ Despite the increasing burden of NCDs, health systems and public health policies have been mostly focused on controlling infectious diseases, undernutrition and micronutrient deficiency. Practical interventions for NCD control and prevention have not yet fully started, although Ministry of Health developed a national strategic action plan in 2014,¹⁰⁾ in collaboration with the World Health Organization (WHO), academic institutes, regional health bureaus, and other stakeholders.

Population based NCD risk factor surveys have been conducted several times in Ethiopia.¹¹⁻¹⁴⁾ The most recent nationwide survey following the standard procedure of WHO¹⁵⁾ reported that the prevalence of low fruit/vegetable intake [> 5 servings per day] as 97.1%, low physical activities [<600 metabolic equivalents (METs) per week] as 13.6% (urban 21.8%, rural 11.6%), overweight [body mass index ≥ 25 kg/m²] as 6.4% (urban 12.7%, rural 3.4%), hypertension [systolic/diastolic blood pressure $\geq 140/90$ mmHg or on medication] as 16.5%, and raised fasting blood glucose [≥ 110 mg/dL] as 5.9% (urban 7.2%, rural 5.6 %).¹⁴⁾ However, these epidemiological studies were in short of identifying possible reasons of practicing such risky behavior.

Various qualitative studies have been conducted in Ethiopia to explore people's belief, attitude and behavior with regard to issues such as HIV/AIDS and child health.^{16,17)} However, no qualitative studies have ever explored people's perception and experiences in relation to NCDs, while such studies have been conducted in other countries.¹⁸⁻²¹⁾

We conducted a comprehensive NCD risk factor study in Tigray province in northern Ethiopia. The study was composed of: (1) a cross sectional epidemiological survey of NCD risk factors following the WHO standard procedure;¹⁵⁾ and (2) a qualitative study to explore people's perception and experience in relation to NCDs. The qualitative study targeted both urban and rural residents and explored how they perceived 'healthy' and 'unhealthy' diet and why they did not

practice the perceived 'healthy' diet. This article aims to describe findings of the qualitative study, focusing on the dynamics between people's perception and practice regarding 'healthy' and 'unhealthy' diet in relation to NCDs.

METHODS

Study design and targets

This study was conducted in Mekelle city and Kilte Awlaleo district of Tigray province, located in the northern part of Ethiopia. Total population of the province was about 3.4 million, of which 19% resided in urban areas.²²⁾ Most people in the province were ethnic Tigray and Ethiopian Orthodox Christians, while less than 5% of the population were Muslims. Muslims mostly resided in urban areas, while rural residents were predominantly Christians. Mekelle is the provincial capital city, located around 780 km north of Addis Ababa, with an elevation of about 2,000 meters above the sea level. Estimated population was about 320,000 in 2014, of which 5.5% were public employees.²³⁾ Kilte Awlaleo is a rural area located about 50 km north of Mekelle. Estimated population was about 120,000 in 2014, and most of the residents were farmers.

We conducted key informant interviews and focus group discussions to obtain the qualitative data. We purposively selected participants from both the urban (Mekelle city) and rural (Kilte Awlaleo district) areas. We selected 16 key informants who were expected to be knowledgeable about people's perspective and lifestyle, including religious leaders, community health nurses, pharmacy owners, and small business owners. The characteristics of the key informants are shown in Table 1.

We conducted eight focus group discussions, including four male groups (urban and rural) and four female groups (urban and rural). Each group was composed of six participants, and a total of 48 participants were recruited. Urban participants were selected from public offices including sub-city administration offices, schools, and a hospital. They were grouped by gender and types of work (clerical work or physical labor). Rural participants were selected with the help of community leaders and health workers. The recruited rural males were all farmers and females were all housewives. They were grouped by gender and age (18–39 years, or 40–64 years). Finally, the following eight groups were formed: (1) urban male clerical workers; (2) urban female clerical workers; (3) urban male laborers; (4) urban female laborers; (5) rural young men; (6) rural young women; (7) rural old men; and (8) rural old women.

Data collection

We prepared a semi-structured interview guide for the first 12 key informant interviews. The main topics were: (a) daily food and drink; (b) perception of healthy food; (c) practice of having healthy food; and (d) barriers of having healthy food. Following the 12 key informant interviews, we developed a focus group discussion guide. Incorporating the preliminary findings of the key informant interviews, we added the following topics: (e) difference in food habit among family members; (f) fasts; and (g) dietary decision making in a family.

Key informant interviews and focus group discussions were conducted between November 2014 and January 2016. Key informant interviews were conducted either in informants' work places or at home. Each informant was first asked about the topics in the guide, followed by inductive probing based on the generated ideas. Each interview lasted about 60 to 90 minutes. Focus group discussions of urban groups were conducted in participants' work places and those of rural groups were conducted in a local health center. It took about 90 to 120 minutes for

Table 1 Characteristics of key informants

Occupation	Residence	Gender	Age (years)	Level of education (Length of formal education)
Religious leader (Muslim)	Urban	Male	36	College diploma (13 years)
Religious leader (Orthodox Christian)	Rural	Male	40	None
Community health worker of a non-governmental organization	Urban	Female	48	Master of Public Health (18 years)
Community health nurse	Urban	Female	26	College diploma (13 years)
Community health nurse	Rural	Female	27	Bachelor's degree (15 years)
Community worker	Rural	Female	48	Primary school (6 years)
Pharmacy owner	Urban	Female	36	College diploma (13 years)
Pharmacy owner	Rural	Male	26	Bachelor's degree (15 years)
University lecturer	Urban	Male	29	Master of Science (18 years)
Construction worker	Urban	Male	31	None
Hospital porter	Urban	Female	40	Secondary school (10 years)
Tailor	Rural	Male	45	Primary school (5 years)
Farmer	Rural	Male	64	None
Coffee shop owner	Rural	Female	34	Primary school (6 years)
Street vendor	Rural	Female	36	None
Housewife	Rural	Female	55	None

each discussion. Following the preliminary analysis of the 12 interviews and eight focus group discussions, we conducted additional four key informant interviews focusing on issues requiring further clarification, such as dietary decision making in a family.

Interviews and discussions were conducted in local language, Tigrigna, facilitated by a native speaker whose gender was same as the informant or the group. The facilitators were health professionals who had previous experience of qualitative research. The facilitators were trained for two days on the interview and the discussion guide, and their feedbacks were also incorporated into the guides.

Data analysis

All interviews and discussions were audio-recorded. Written notes of interviews and discussions were taken as well. Audio-records were transcribed word-for-word in Tigrigna, and then translated into English.

The first author listened the audio-records, read both Tigrigna and English transcriptions and field notes repeatedly for familiarization. An initial round of line-by-line open-coding was conducted by assigning descriptive labels using NVivo 10 (QSR International, Australia). Then, the emergent codes were discussed among other authors until they were agreed upon by all members. The codes were grouped into categories based on their similarities and differences, through constant comparison²⁴⁾ following the principle of the grounded theory,²⁵⁻²⁷⁾ and then themes had emerged inductively.

Methodological rigor was maintained through several strategies. Firstly, we collected qualitative data from different sources, including key informant interviews and focus group discussions, using common topic guide. Data collectors were experienced health professionals who were native speakers of the participants' language. Secondly, we conducted additional four key informant interviews for clarifications and further explanations of ideas obtained the first 12 key informant interviews and eight focus group discussions. Thirdly, the identified codes and categories were discussed thoroughly by the study team members until all members agreed on the codes and categories. Professional backgrounds of study team members were diverse, including public health, medical anthropology, epidemiology, health care management, and clinical medicine.

Ethical approval and consent to participate

This study was reviewed and approved by the Bioethics Review Committee of Nagoya University School of Medicine, Japan (approval No. 2014-0107), and Mekelle University College of Health Sciences, Ethiopia. All participants were informed of the objectives of the study, and their rights to stop participating at any time and to skip questions or topics they were uncomfortable to discuss. Written informed consents were obtained from all participants. Participants with no education provided fingerprints on the consent sheets after receiving sufficient verbal explanation. Names and other identifiers were redacted during the transcription process, and the text data were analyzed anonymously.

RESULTS

The following three themes emerged: (1) dietary habit perceived as 'good' or 'bad' for health; (2) reasons for continuing current 'unhealthy' dietary habit; and (3) current dietary habit perceived as 'traditional.'

(1) Dietary habit perceived as 'good' or 'bad' for health

Dietary habit perceived as 'good' for health

'Balanced diet' was perceived as good for health, which implied that having a variety of food, a small portion of meal, or regular meals. Participants thought that having 'balanced diet' would make them stay healthy and live longer, keep them physically strong, help them prevent diseases, and improve their school performance. Having fruits and vegetables was considered to be 'good' for health. Rural participants valued having 'mixed cereals,' implying to have various kinds of cereals.

"When we say balanced diet...it does not mean to fill your stomach with one type of food

but with all types of food. [.....] It is good for your body if it is a mixture of all types of food and if you eat a normal amount.” [Rural young woman]

“The amount of food we consume affects our health: either excess or inadequate consumption of food can make us ill.” [Urban male religious leader]

“If a sufficient amount of vegetables is not taken, it would cause physical and mental problems. [.....] We can’t run and jump. [.....] We will have less capacity to learn and to understand.” [Rural young woman]

Rural participants noted that taking extra salt was useful for treating anemia and intestinal parasitic infestation. They mentioned that they would add extra salt to raw vegetables for removing pathogens such as giardia. They also emphasized that it was important to take an ‘adequate’ amount of (iodized) salt for preventing goiter. Phrases such as “salt is medicine,” “salt prevents goiter,” and “salt prevents intestinal parasites” were frequently reported by rural participants.

Rural participants perceived that butter was good for health. They believed that their ancestors were stronger and lived longer than they, because of the higher consumption of butter by their ancestors. It was also noted that they added extra oil to their meals to obtain energy and to prevent diseases during cold seasons.

“Anyone who has dem wahdi (anemia) should take extra salt to supplement blood.” [Rural young man]

“Previously, we were using ganfure (non-iodized salt block) but now there is what we call... ‘iodized salt’. It is useful for us, it is a medicine which prevents intestinal parasites and other diseases.” [Rural old woman]

“We have never seen anyone who eats butter, meat, eggs and milk gets sick. Our ancestors had them more often than we currently have, and as a result, they were very strong, healthy, and lived as long as 100 years.” [Rural old woman]

Dietary habit perceived as ‘bad’ for health

Excessive intakes of salt, sugar, oil and fat were perceived as causes of diseases such as diabetes, hypertension, heart diseases, gastritis and intestinal parasitic infestation. Urban participants expressed that it was a bad habit to have fatty meat during holidays. Urban male clerical workers reported that promotion of iodized salt caused over consumption of salt in their community.

“(Taking too much oil) would cause cough and gastritis. ...It is bad, (having) excess oil is bad, it would cause gastric irritation.” [Rural old woman]

“One problem is...promoting health benefits of iodized salt to prevent goiter among pregnant women and others, and it caused overconsumption of salt. Iodized salt use is promoted frequently by radio, leaflets and other media, then people take too much salt.” [Urban male clerical worker]

Urban participants perceived that genetically modified food and unhygienic food caused various diseases. They perceived that, unlike the old days, consumption of such genetically modified food was increasing in the community. Most rural participants perceived that unhygienic food

and drinks caused chronic diseases.

“Previously, people used to eat locally produced organic food. But nowadays, we often eat genetically modified food. This current dietary habit brought us many diseases. In the past ‘sugar disease’ was not common, but nowadays every old person has the disease.”

[Urban male clerical worker]

“We can prevent these (chronic) diseases by taking balanced diet, hygienic food, and clean water. If we have a clean bed room, we can prevent these diseases.”

[Rural young man]

(2) Reasons for continuing perceived ‘unhealthy’ dietary habit

Prevailing personal preference of ‘tasty’ food

Meals prepared with a small amount of salt, oil or sugar were not perceived to be ‘tasty’. The participants reported that some people were reluctant to reduce the amount of salt, oil and sugar in their diet, even though they knew that having too much of them were bad for their health. Some people were motivated to change their dietary habit only when they found that they had diseases such as diabetes. For instance, urban male clerical workers reported that they usually congratulated someone whose diabetes was newly diagnosed, as they would be forced to improve their lifestyle to treat the disease. However, other participants reported that some people were reluctant to change dietary habit even after their illness was diagnosed.

“We know that (taking too much) oil may cause illnesses. Physicians advise us not to take too much oil. But, foods without oil, as well as salt, are not delicious.”

[Urban female clerical worker]

*“People add extra salt, including myself. [.....]. We like food that is well seasoned with salt. Food not flavored with salt is almost inedible for us. As the saying goes *chew zeyblu seb zeyblu* (food without salt is the same as a person with no relatives).”*

[Rural female community worker]

*“I have already been diagnosed as *dem bezhi* (hypertension) and the health personnel told me not to take salt [.....]. But foods without salt are not delicious. This is the fact.”*

[Urban male clerical worker]

Unavailability of ‘healthy’ food

Perceived ‘healthy’ foods such as fruits were too expensive to buy for some of the participants, particularly those living in the rural area. Rural participants reported that they would rather buy staple cereals than expensive fruits. Moreover, rural women mentioned that they rarely had vegetables because local markets were very far from their home and opened only once a week.

“(Fruits) are brought from other areas and they are very expensive. [.....] We prefer cereals to fruits, as cereals can serve our family for about two to three weeks. You can imagine, it is 30 birr for a single fruit.”

[Rural old man]

“People’s intake of vegetables is high in these days, but intake of fruits is low because they are expensive and also there is poor community awareness about the health importance of fruits.”

[Urban female NGO community health worker]

“We cannot buy and eat vegetables everyday, because the local market opens only once a week on Saturdays. The amount of vegetables we buy then lasts only for three to four days. We need to wait for another Saturday in order to buy them.” [Rural old woman]

Women’s responsibility on dietary decision making

Women were regarded to be responsible for their family diet both in the urban and rural areas. All female participants explained that it was their responsibility to decide what food they should buy and cook for their families. Male participants also reported the dietary decision making role of women and blamed them for preparing ‘unhealthy’ meals. Almost all male participants reported that women added extra salt, sugar and oil to the family meals. However, female participants claimed that they knew the ‘appropriate amount’ of salt, oil and sugar to add, even though they did not use any measuring devices. For example, they made sure the ‘appropriate amount’ of salt in stew by a series of adding and tasting process until they felt the stew’s taste was ‘normal’, or adequately salty.

“I quarrel with my wife. She uses a lot of oil to braise onions to the extent that the oil is visible floating on the stew. Nowadays oil is used excessively.” [Urban male clerical worker]

“(Women) in my family add a lot of salt in meals even though they know I am suffering from dem bezhi (hypertension) [.....] I have repeatedly told them to decrease the amount of salt, but they don’t.” [Rural male tailor]

“We measure it (salt) like this (demonstrating a pinch). First we add it (salt) and taste the stew. Then, if the taste is ‘normal,’ that is good; if not, we add (a pinch of salt) again.” [Rural young woman]

(3) Current dietary habit perceived as ‘traditional’

Acceptance of continuing current dietary habit

Current dietary habit was accepted as ‘traditional’ practice, the same as what their ancestors used to do, but its health implication was not recognized. *Injera*, a large sourdough flat bread made of grain, *teff*, was their staple food, and vegetables such as spinach, beans, and wheat breads were also commonly eaten. Drinking at least three cups of coffee at two or three times a day was a common practice. Traditional coffee ceremony was a means of socialization and welcoming guests. They usually added a lot of sugar in each cup of coffee.

“Since our community is rural, people do not serve tea but coffee whenever a guest visits home. Coffee is prepared at least three times a day and a lot of sugar is used as long as it is available.” [Rural female community health nurse]

“I cannot drink coffee without adding sugar, I like sugar...(laugh). I have a cup of coffee at home only when sugar is available. If I run out of sugar at home, I will not drink coffee.” [Urban female clerical worker]

Urban–rural difference in dietary habit

Urban clerical workers reported meat as the most preferred food. However, urban laborers and rural participants reported that they could afford to have meat only on holidays and special events. While urban participants did not report any significant changes in their diets, rural participants reported that, unlike their childhood days, they currently had a variety of food at

least three times a day.

“If meat is there (at home) we continuously eat meat. We do not care the health consequences or digestion process of meat. After finishing meat, we eat other kind of food. [.....] Our dietary habit is traditional which we learnt from our ancestors.” [Urban male clerical worker]

“Previously, we used to eat only one type of food, only Tihilo (a traditional food made of barely flour). Now, we eat different types of food, such as vegetables, radish, wheat, eggs, chicken and milk. Majority of the people in our community can eat three or four times a day.” [Rural old man]

Fasts observed widely

Long time and frequent fasts were widely observed among Ethiopian Orthodox Christians. They observed fasts every Wednesday and Friday, in addition to six fasts lasting one to 55 days. During the fasts, they abstained any animal products, including milk, butter, cheese, eggs, and meats, and did not take any food and drink until 3:00 pm. They perceived fasts as traditional religious duties. Urban female clerical workers perceived that fasting was a good way to stay healthy as they ate only vegetables.

“During fasting, we skip breakfast and lunch; after a church program is finished at 9 o’clock (in Ethiopian calendar, or 3:00 pm), we can eat vegetarian food. We do not have milk, eggs, meat and butter during the fasting period” [Rural young woman]

“People are healthy during fasting. ...Observers of fasting are healthy because they eat plants (vegetables).” [Urban female clerical worker]

DISCUSSION

This qualitative study explored perception and practice of ‘healthy’ diet targeting urban and rural people in northern Ethiopia. As far as we know, this is the first qualitative study on dietary habit with regard to NCDs in Ethiopia. The three themes emerged from our analysis imply three patterns of perception–practice dynamics: (1) practice in consistence with perception; (2) practice contrary to perception; and (3) habitual practice of which health implications are unrecognized.

Practice in consistence with perception

People tend to adapt perceived ‘good’ dietary habit and avoid perceived ‘bad’ dietary habit. This indicates that people’s behavior would be modified, if they have positive attitude towards ‘healthy’ diet, based on their knowledge of health issues. For example, in our study, on the one hand, rural participants who had knowledge about goiter prevention had positive attitude towards iodized salt, and they intended to have extra salt as they perceived salt itself was good for health. On the other hand, some urban participants had negative attitude against iodized salt promotion, as they had knowledge that overuse of salt would increase the risk of diseases.

It is reported that people’s attitude and behavior could be modified by providing health and nutrition education.²⁸⁾ A randomized trial of nutrition education among obese adults in the United States resulted in an increased fruits and vegetables intake.²⁹⁾ A community based health education in Australia was effective for reducing salt intake.³⁰⁾ In Japan, a systematic community based campaign had succeeded to reduce salt intake among the people in several target communities.³¹⁾

However, perceived 'good' or 'bad' diet was not always consistent with scientific findings of NCD risk factors. In our study, rural people believed that salt would treat anemia and prevent intestinal parasite infestation as well. Participants also perceived that unhygienic food and drink caused any diseases including diabetes and cardiovascular diseases, similar to a report from Nepal.¹⁸⁾

In Ethiopia, as well as in other developing countries, health policies and health systems have been focused on undernutrition and infectious diseases for long time, which have been much more prevalent and life threatening than NCDs.³²⁾ For example, nutrition education programs promoted to take iodized salt to prevent goiter, which was highly prevalent in Ethiopia, but such programs never paid attention to overuse of salt.³³⁾

Perception of 'healthy' status is usually formed by local traditional values as well.³⁴⁾ For example, in sub-Saharan African countries, obesity was often valued as a symbol of wealth, but skinny persons were despised as they might have diseases such as HIV/AIDS or tuberculosis.³⁵⁾ It was observed widely in Africa and Asia to value 'traditional' food as 'healthy' diet regardless of its ingredients.^{18,36,37)} In our study, rural participants perceived that food cooked with a lot of butter was more valued and preferred as 'traditional' food. They believed that their ancestors were much healthier and lived longer than they are because of having much more 'traditional' food.

Practice contrary to perception

It is well known that people tend to continue harmful behavior, such as tobacco smoking and over drinking of alcohol, even though they know such behavior may damage their health status.³⁸⁾ People tend to seek current pleasure rather than to prepare for unknown future damage. In our study, participants continued to take salty, sweet and greasy food because they liked the taste, even though they perceived such food as 'unhealthy'. Prioritizing personal food taste to health benefit were commonly reported in other countries.^{19,39)}

People usually follow the behavior prevailing in their communities, but hardly change the behavior due to the peer pressure.^{21,40)} However, peer pressure that made it difficult to quit 'bad' dietary habit was not reported in our study. Instead, most male participants blamed their wives as they served 'unhealthy', or salty and greasy food. Both urban and rural male participants reported that they ate whatever food their wives served. Female participants agreed that they were responsible for the whole decision making process of family diet from procuring ingredients to cooking and seasoning, although they claimed that they knew the 'appropriate' amount of salt and oil.

Considering the overall social status of women in Ethiopia,⁴¹⁾ women were unlikely to be the real decision makers of family diet, but simply adapting tastes which their family preferred, or cooking traditionally accepted food in the community. Nevertheless, it should be noted that both male and female participants acknowledged that women were fully responsible for decision making of family diet in our study, contrary to the findings in many other countries.^{42,43)}

Rural participants claimed that 'healthy' food such as meat, vegetables and fruits were not only expensive but also unavailable as there were no shops and markets in their neighborhood. Although the rural participants were mostly farmers, they did not grow vegetables and fruits due to lack of irrigation. Such financial and physical obstacles to have 'healthy' food were often reported in developing countries, as well as in poor communities of other countries.^{44,45)}

Habitual practice of which health implication are unrecognized

In many societies, people value the dietary habit maintained for long time as their cultural tradition, and accept the 'traditional' diet without recognizing its health implication. In addition, having sweetened beverages are often unnoticed as taking extra dietary energy, while such habit

is quite often integrated into the social life.

In our study, drinking coffee with a lot of sugar was common practice among the participants as a tool of socialization and welcoming guests. Similarly, people had very sweet coffee and tea for three or four times a day in countries in the Middle East and Asia.^{46,47)} Taking sweet beverages was quite often habitual practice and deeply integrated into social life, thus very difficult to reduce the amount, even if people notice the overuse of sugar.

Long term and frequent fasts are practiced among the Ethiopian Orthodox Christians as a religious obligation. Previous studies reported health implications of such cultural/religious dietary practice, including fasts of Coptic and Greek Orthodox Christians and Ramadan fasts of Muslims.⁴⁸⁻⁵¹⁾ However, health implication of fasts of Ethiopian Orthodox Christians has not been much studied. Even though people observe similar fasts, health implication may differ according to the preexisting health conditions and socio-economic status. Further studies are needed to find health implication of fasts, both among urban and rural population in Ethiopia.

Practical implication of the study findings

Our study showed the dynamics between perception and practice regarding diet. Successful health education should target to change behavior, rather than simply providing knowledge. Our study implied that three types of intervention should be planned for reducing risks of NCDs in the target area. First, encourage people to have scientifically sound perception of 'healthy' diet and to practice in consistent with the perception. People should be educated regarding diet and NCDs, including the causes and consequences of NCDs, and appropriate amount of salt, oil, and sugar. Health workers need to be trained for providing proper health education regarding NCD prevention. Second, remove the obstacles of practicing 'healthy' diet. It would be difficult to change preferred taste of each individual in short time, thus a long-term community-wide campaign to have 'healthy' diet is required. Women, as family diet decision makers, should be educated for alternative way of cooking. Food distribution mechanisms also need to be improved. Third, make people notice that their habitual practice may have health implication. Although it would be difficult to change habit deeply rooted in their culture in a short time, noticing the health implication would be the first step of the behavioral change.

Strengths and limitations

Strength of our study was that we conducted a qualitative study about NCDs for the first time in northern Ethiopia, both in urban and rural areas, using local language by researchers familiar with local culture. Since the qualitative study is a part of the comprehensive study including an epidemiological study, findings of these studies are expected to complement each other for better understanding of NCDs in the target area.

Limitation of the study was that it was conducted in a limited area, thus the findings might not show the overall situation in Ethiopia. However, since we conducted interviews while analyzing preceding interview data that enabled us to have further information on the identified themes, our findings were likely to reflect overall situation in the target area. Another limitation was that we did not directly observe the participants' actual dietary practice at home. However, the practice which participants told did not contradict the practice usually observed in the target area, where some of the authors lived in or originated from.

CONCLUSIONS

We showed dynamics between perception and practice of 'healthy' diet among people in the

urban and rural areas in northern Ethiopia. People's practice was often consistent with their perception, while they sometimes behaved against their perception because of personal preference and physical or financial obstacles. People were often indifferent of health implication of their habitual dietary practice. NCDs, infectious diseases and micronutrient deficiencies were not distinguished by them. It is needed to increase awareness of NCDs both among the urban and rural people and to improve the social environment for removing the obstacles.

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CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors.

REFERENCES

- 1) Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, *et al.* Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 2013; 380: 2197–2223.
- 2) WHO. Global status report on noncommunicable diseases 2014. 2014, WHO, Geneva.
- 3) Reddy KS, Katan MB. Diet, nutrition and the prevention of hypertension and cardiovascular diseases. *Public Health Nutr*, 2004; 7: 167–186.
- 4) World Health Organization. Healthy diet. Available at: <http://www.who.int/mediacentre/factsheets/fs394/en/> Accessed April 8, 2018.
- 5) The World Bank. World development indicators 2017. 2017, The World Bank, Washington, DC.
- 6) The World Bank. The World Bank in Ethiopia, overview. Available at: <http://www.worldbank.org/en/country/ethiopia/overview> Accessed April 9, 2018.
- 7) World Health Organization (WHO). Global health observatory, data repository. Available at: <http://apps.who.int/gho/data/node.main> Accessed April 9, 2018.
- 8) World Health Organization (WHO). Noncommunicable diseases country profiles 2014. 2014, WHO, Geneva.
- 9) Tebekaw Y, Teller C, Colón-Ramos U. The burden of underweight and overweight among women in Addis Ababa, Ethiopia. *BMC Public Health*, 2014; 14: 1126. doi:10.1186/1471-2458-14-1126
- 10) Ministry of Health, Federal Democratic Republic of Ethiopia. National strategic action plan (NASAP) for prevention and control of non-communicable diseases in Ethiopia 2014–2016. 2014, Ministry of Health, Federal Democratic Republic of Ethiopia; Addis Ababa.
- 11) Alemseged F, Haileamlak A, Tegegn A, Tessema F, Woldemichael K, Asefa M, *et al.* Risk factors for chronic non-communicable diseases at gilgel gibe field research center, southwest ethiopia: population based study. *Ethiop J Health Sci*, 2012; 22: 19–28.
- 12) Zikru, AB, Gebru, HB, Kahsay AB. Prevalence and determinants of hypertension among adult population in Mekelle city, northern Ethiopia. *Int J Innov Pharm Sci Res*, 2014; 2: 653–668.

- 13) Abebe SM, Berhane Y, Worku A, Getachew A. Prevalence and associated factors of hypertension: a cross-sectional community based study in northwest Ethiopia. *PLoS One*, 2015; 10: e0125210. doi:10.1371/journal.pone.0125210
- 14) Ethiopian Public Health Institute, Federal Ministry of Health, WHO. Ethiopia STEPS report on risk factors for chronic non-communicable diseases and prevalence of selected NCDs. 2016, Ethiopian Public Health Institute, Addis Ababa.
- 15) WHO. STEPwise approach to surveillance (STEPS). Available at: <http://www.who.int/ncds/surveillance/steps/en/> Accessed February 4, 2018.
- 16) Yalew E. A qualitative study of community perceptions about childhood diarrhea and its management in Assosa district, west Ethiopia. *BMC Public Health*, 2014; 14: 975. doi:10.1186/1471-2458-14-975
- 17) Asgary R, Antony S, Grigoryan Z, Aronson J. Community perception, misconception, and discord regarding prevention and treatment of infection with human immunodeficiency virus in Addis Ababa, Ethiopia. *Am J Trop Med Hyg*, 2014;90: 153–159.
- 18) Oli N, Vaidya A, Subedi M, Krettek A. Experiences and perceptions about cause and prevention of cardiovascular disease among people with cardiometabolic conditions: findings of in-depth interviews from a peri-urban Nepalese community. *Glob Health Action*, 2014; 7: 1. doi:10.3402/gha.v7.24023
- 19) Farahmand M, Amiri P, Tehrani FR, Momenan AA, Mirmiran P, Azizi F. What are the main barriers to healthy eating among families?: a qualitative exploration of perceptions and experiences of Tehranian men. *Appetite*. 2015; 89: 291–297.
- 20) Metta E, Bailey A, Kessy F, Geubbels E, Hutter I, Haisma H. In a situation of rescuing life: meanings given to diabetes symptoms and care-seeking practices among adults in southeastern Tanzania: a qualitative inquiry. *BMC Public Health*. 2015; 15: 224. doi:10.1186/s12889-015-1504-0
- 21) Zhang Y, Ma D, Cui R, Hilawe EH, Chiang C, Hirakawa Y, *et al.* Facilitators and barriers of adopting healthy lifestyle in rural China: a qualitative analysis through social capital perspectives. *Nagoya J Med Sci*, 2016; 78: 163–173.
- 22) Federal Democratic Republic of Ethiopia Population Census Commission. Summary and statistical report of the 2007 population and housing census: population size by age and sex. 2008, Federal Democratic Republic of Ethiopia, Addis Ababa.
- 23) Federal Democratic Republic of Ethiopia Central Statistical Agency. Statistical report on the 2014 urban employment unemployment survey. 2014, Federal Democratic Republic of Ethiopia, Addis Ababa.
- 24) Boeije H. A purposeful approach to the constant comparative method in the analysis of qualitative interviews. *Qual Quant*, 2002; 36: 391–409.
- 25) Corbin JM, Strauss A. Grounded theory research: procedures, canons, and evaluative criteria. *Qual Sociol*. 1990; 13: 3–21.
- 26) Glaser BG. Conceptualization: on theory and theorizing using grounded theory. *Int J Qual Methods*. 2002; 1: 23–38.
- 27) Moser A, Korstjens I. Series: Practical guidance to qualitative research. Part 3: Sampling, data collection and analysis. *Eur J Gen Pract*, 2018; 24: 9–18.
- 28) WHO. Health education: theoretical concepts, effective strategies and core competencies: a foundation document to guide capacity development of health educators. 2012, WHO Regional Office for the Eastern Mediterranean, Cairo.
- 29) Wagner MG, Rhee Y, Honrath K, Blodgett EH, Terbizan D. Nutrition education effective in increasing fruit and vegetable consumption among overweight and obese adults. *Appetite*, 2016; 100: 94–101.
- 30) Land M, Wu JHY, Selwyn A, Crino M, Woodward M, Chalmers J, *et al.* Effects of a community-based salt reduction program in a regional Australian population. *BMC Public Health*, 2016; 16: 388. doi:10.1186/s12889-016-3064-3
- 31) Nakagawa H, Miura K. Salt reduction in a population for the prevention of hypertension. *Environ Health Prev Med*, 2004; 9: 123–129.
- 32) Maher D, Ford N, Unwin N. Priorities for developing countries in the global response to non-communicable diseases. *Global Health*. 2012; 8: 14. doi:10.1186/1744-8603-8-14
- 33) Government of the Federal Democratic Republic of Ethiopia. National nutrition programme, June 2013–June 2015. 2013, Federal Democratic Republic of Ethiopia, Addis Ababa.
- 34) Langdon EJ, Wiik FB. Anthropology, health and illness: an introduction to the concept of culture applied to the health sciences. *Rev Lat Am Enfermagem*, 2010; 18: 459–466.
- 35) Scott A, Ejikeme CS, Clotey EN, Thomas JG. Obesity in sub-Saharan Africa: development of an ecological theoretical framework. *Health Promot Int*, 2013; 28: 4–16.
- 36) Matenge ST, van der Merwe D, de Beer H, Bosman MJ, Kruger A. Consumers' beliefs on indigenous

- and traditional foods and acceptance of products made with cow pea leaves. *African J Agric Res*, 2012; 7: 2243–2254.
- 37) Mukherjea A, Underwood KC, Stewart AL, Ivey SL, Kanaya AM. Asian Indian views on diet and health in the United States: importance of understanding cultural and social factors to address disparities. *Fam Community Health*, 2013; 36: 311–323.
 - 38) Burton S, Hoek J, Nesbit P, Khan A. Smoking is bad, it's not cool... yet I'm still doing it: cues for tobacco consumption in a "dark" market. *J Bus Res*, 2015; 68: 2067–2074.
 - 39) Block JP, Gillman MW, Linakis SK, Goldman RE. If it tastes good, I'm drinking it: qualitative study of beverage consumption among college students. *J Adolesc Health*, 2013; 52: 702–706.
 - 40) Stead M, McDermott L, MacKintosh AM, Adamson A. Why healthy eating is bad for young people's health: identity, belonging and food. *Soc Sci Med*, 2011; 72: 1131–1139.
 - 41) Dito BB. Women's intrahousehold decision-making power and their health status: evidence from rural Ethiopia. *Fem Econ*, 2015; 21: 168–190.
 - 42) Daivadanam M, Wahlström R, Thankappan KR, Ravindran TS. Balancing expectations amidst limitations: the dynamics of food decision-making in rural Kerala. *BMC Public Health*, 2015; 15: 644. doi:10.1186/s12889-015-1880-5
 - 43) Ferzacca S, Naidoo N, Wang MC, Reddy G, van Dam RM. Sometimes they'll tell me what they want: family and inter-generational food preferences in the food decisions of Singaporean women. *Appetite*, 2013; 69: 156–167.
 - 44) Mook K, Laraia BA, Oddo VM, Jones-Smith JC. Food security status and barriers to fruit and vegetable consumption in two economically deprived communities of Oakland, California, 2013–2014. *Prev Chronic Dis*, 2016; 13: 150402.
 - 45) Townsend N, Williams J, Wickramasinghe K, Karunaratne W, Olupeliyawa A, Manoharan S, *et al.* Barriers to healthy dietary choice amongst students in Sri Lanka as perceived by school principals and staff. *Health Promot Int*, 2017; 32: 91–101.
 - 46) Yılmaz B, Acar-Tek N, Sözlü S. Turkish cultural heritage: a cup of coffee. *J Ethn Foods*, 2017; 4: 213–220.
 - 47) Ng SW, Zaghoul S, Ali H, Harrison G, Yeatts K, Sadig M, *et al.* Nutrition transition in the United Arab Emirates. *Eur J Clin Nutr*, 2011; 65: 1328–1337.
 - 48) Persynaki A, Karras S, Pichard C. Unraveling the metabolic health benefits of fasting related to religious beliefs: a narrative review. *Nutrition*, 2017; 35: 14–20.
 - 49) Lazarou C, Matalas AL. A critical review of current evidence, perspectives and research implications of diet-related traditions of the Eastern Christian Orthodox Church on dietary intakes and health consequences. *Int J Food Sci Nutr*, 2010; 61: 739–758.
 - 50) Trepanowski JF, Bloomer RJ. The impact of religious fasting on human health. *Nutr J*, 2010; 9: 57. doi:10.1186/1475-2891-9-57
 - 51) Morcos NY, Seoudi DM, Kamel I, Youssef MM. Effect of Coptic Orthodox Christian church fasting on healthy and diabetic subjects. *Int J Nutr Pharmacol Neurol Dis*, 2013; 3: 375–382.