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Enhancing Efficiency of the Nutrition Education for Utah Refugees

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ENHANCING EFFICIENCY OF THE NUTRITION EDUCATION FOR UTAH REFUGEES

by

Habiba Ali Nur

A dissertation submitted in partial fulfilment
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ABSTRACT

Enhancing Efficiency of the Nutrition Education for Utah Refugees

by

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This dissertation aims to enhance the health and quality of life of refugees through nutrition education. Nutrition education may provide refugees with the skills necessary to make healthy nutrition choices and reduce the risk of developing chronic disease. However, available nutrition education may not adequately address the cultural differences of the refugees. A scoping review was conducted to identify the current nutrition education delivery strategies. In addition to identifying the delivery strategies, the scoping review also highlighted the need for nutrition education that is tailored to the conditions of the refugees. Semi-structured phone interviews were conducted with 20 Somali refugees in Utah to identify assets and barriers to healthy eating and preferences of approaches for nutrition education. The results of the semi-structured interviews provided evidence that refugee nutrition education should consider refugees' assets and barriers for healthy eating and that refugees prefer instruction by a professional from their culture.

The Create Better Health (CBH) was adapted to be culturally relevant for Somali refugees and was used to teach 36 Somali refugees in Utah about nutrition. The lessons were delivered online in the Somali language by a Somali instructor. The impact of this program on the nutrition-related behavior of the participants was assessed by comparing pre-and post-program responses to 30 item surveys. The results of this assessment showed that culturally adapted nutrition education generally improved nutrition-related behavior and physical activity. However, although improvements were made, the level for most of the indicators did not reach their recommendation for most of the participants.

Overall, the studies completed in this dissertation indicate the need for continued culturally adopted nutrition education that recognizes and incorporates the refugees' assets and barriers for healthy eating.

(198 pages)

PUBLIC ABSTRACT

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Habiba Ali Nur

Refugees face many challenges related to obtaining and preparing adequate and culturally acceptable and desirable foods in their resettlement communities. These challenges often lead to risk of food insecurity and chronic diseases. A review of literature identified the existing delivery strategies and highlighted the need for nutrition education tailored to the refugees' conditions. This study identified some of the barriers that refugees face, including the English language, transportation, finding items in grocery stores, availability of ingredients and equipment needed for cooking, affordability of food and budgeting. It also highlighted participants' preference for having nutrition education.

To overcome these challenges, the Create Better Health (CBH) curriculum was adapted to be culturally relevant for Somali refugees in Utah. The adapted curriculum was used to teach Somali refugees in Utah about nutrition. This nutrition education was delivered online during a 2-hour session once per week for 12 weeks by a Somali professional. Pre- and post-intervention survey data demonstrated that several nutrition-related behaviors improved among the participants after receiving the intervention. Although many nutrition-related behaviors improved, most of the participants still were not meeting recommended levels of fruits and vegetables and most of the other indicators of the five domains.

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CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Background

According to the 1951 Refugee Convention, its 1967 Protocol (1) and the 1969 Organization for African Unity (OAU)[1] Convention (2), the term refugee refers to, among other things, people who are forcibly displaced from their homes into another part of the country or another country as a result of conflict and/or violence, and are unable or unwilling to return because of a well-founded fear of persecution based on race, religion, nationality, membership of a particular social group or political opinion (1). The United Nations High Commission for Refugees (UNHCR) Global Trend, 2021, indicated that the number of forcibly displaced persons was 70.8 million in 2018 and 89.3 million in 2021. Of the 89.3 million people forcibly displaced in 2021, 27.1 million were refugees, 53.2 million were internally displaced people (IDP) and 4.6 million were political asylum seekers. Of the 27.1 million refugees, 21.3 million were under the mandate of UNHCR. Eighty three percent, 17.7 million, of the refugees under the UNHCR mandate are hosted by low- and middle-income countries (3). Forty one percent of the refugee population in 2021 were children under the age of 18 and 74% were in protracted situations in which they stayed in a refugee camp for prolonged period of time.

Refugees face many challenges and need robust and sustainable solutions so that they can rebuild their lives with dignity and safety. These solutions include voluntary repatriation where the refugee returns to their own country, resettlement to a third

[1] The Organization for African Union (OAU) is currently known as the African Union (AU).

country, and local integration where the refugee seeks and attains rights similar to those enjoyed by citizens of the country in which they sought refuge (3). The UNHCR resettles thousands of refugees every year in developed countries such as the United States, Canada, Australia, and Europe. According to the UNHCR, 1.4 million refugees needed resettlement in 2021. However, only 57,500 refugees were resettled in 25 countries during 2021. Canada resettled the largest number of refugees in 2021(n=20,400) followed by the United States of America (n=13,700) (3).

There have been 3,141 refugees resettled in Utah from 2017 to 2021 (4). Though these refugees are from different countries around the world, the majority of them are from countries like Somalia, the Democratic Republic of Congo, Syria, Iraq, Vietnam, and Burma (5). There also are Afghanis and Ukrainians who arrived in 2021 and 2022 as refugees and humanitarian parolees. A vast majority of the refugees reside in Salt Lake County, but some of them also reside in Weber County, Davis County, Cache County, and Utah County (5). Though the Utah Refugees Office is the state agency responsible for Utah's overall refugee program, the International Rescue Committee (IRC) and the Catholic Community Services oversee the placement of refugees into communities.

When refugees resettle in developed countries like the United States, they face challenges, such as language barriers and experience significant change in their lifestyle as they make the transition from refugee camps to independent living in new and foreign lands (6). These challenges are exacerbated by their loss of social network. As refugees resettle in a different country, they often leave behind members of their family as well as their network of social support (7). Social networks are important because as resources are exchanged between two individuals in the community with the intention of enhancing

the well-being of the recipient. These resources could be emotional, instrumental, informational, or companionship support (8). Lack of social support is a risk factor for poor nutritional status and food insufficiency and insecurity (6). Hence, establishing social ties in the new country may be important in mitigating the risk of food insecurity.

Problem Statement

Refugees face many challenges related to obtaining and preparing nutritionally adequate and culturally acceptable and desired foods in their resettlement communities. Many are at higher risk of experiencing food insecurity due to reasons such as limited transportation, limited access to public food and medical assistance and lack of social network (9). The food environment in their new homes and communities is often vastly different then what they have previously experienced, and these differences may increase their risk for both under and over-nutrition.

To overcome the food and nutrition related challenges that refugees face as they get resettled in their new communities, they should be provided with nutrition and food education. They should be taught about the different types of food that are available to them and how to prepare them (10), the food environment facing them (i.e., how to navigate the host country's food system) (10), and how to budget their food money (11). Any teaching program should consider the food literacy skills that refugees bring with them when they are resettled.

Nutrition education would provide the refugees with the skills necessary to make healthy nutrition choices and reduce the risk of developing chronic diseases. However, the refugees in Utah are from many different countries with different languages and the nutrition education is most often conducted in the English language. Therefore, the

nutrition education is general and does not adequately address the cultural differences of the recipients. Hence, further research is needed to develop an effective nutrition education for the refugees. Increasing the effectiveness of refugee nutrition education and expanding its reach to more refugees and identifying the barriers and assets will improve the health and wellbeing of the new Americans.

LITERATURE REVIEW

Factors That Contribute to Food Insecurity

According to Gallegos, Ellies, and Wright (2008) (12), food security is defined as economic and physical access to enough nutritionally adequate, safe and culturally relevant food by all people for an active healthy lifestyle. Food security is a different concept than hunger. Hunger reflects to a personal, physical, sensation of discomfort, while food insecurity reflects to a lack of available financial resources for food at household level. Food insecurity has four dimensions, namely, food availability, food access, food utilization, and stability of these dimensions over time (13). To address food insecurity among the refugees, the cultural dimensions of food and dietary change that occur when considering the dimensions of food insecurity should be incorporated (14).

There are different levels of food insecurity high, marginal, low, and very low food security. Financial obligations between families undertaking resettlement and those remaining in the country of origin compete with food, household, and education expenses, further increasing the risk of food insecurity in refugee households.

The risk of household food insecurity among refugees is linked with the trauma of resettlement and the challenges of recent arrival in a new home country. The household food insecurity among immigrants is also linked to low socioeconomic status (SES) and general economic and social disparities (15, 16). Food insecurity was indicated in 53% of West African refugee households with at least one child under five years of age living in the US (17). In terms of food insecurity risk factors, poor economic conditions such as income below poverty level and low educational attainment are positively associated with food insecurity (18, 19, 20). Single-parent families, families with children, and those who have a work-limiting disability are also at risk for food insecurity (18, 20, 21). Non-US born families are more prone to food insecurity than native-born families (22, 23). Though limited in number, studies with refugee families indicate that they are more prone to food insecurity and hunger upon resettlement than non-refugee household with other similar risk factors.

Factors that contribute to the high prevalence of food insecurity among refugee groups include poverty, unemployment, low income, and low education (12, 9). Delayed welfare payments, sending money to family members who remain in the country of origin, and spending money to sponsor other family members to join them also contribute to food insecurity among refugee families. Financial obligations between families undertaking resettlement and those remaining in the country of origin compete with food, household, and education expenses, further increasing the risk of food insecurity in refugee households.

Studies have shown that low income and unemployment are powerful predictors of food insecurity among newcomers to the United States, Canada, Britain, and Australia,

(12, 24, 25, 26, 27). A study done in 2014 (28) indicates a high prevalence of household food insecurity in a purposive sample of Sudanese refugee households recently resettled at the time of study in metropolitan Atlanta. The results showed decreased consumption of several high-quality, high-cost foods by caregivers with increasing severity of household food insecurity.

Food insecurity is associated with a number of poor health conditions, including hypertension, hyperlipidemia, high cholesterol and heart disease (29), and metabolic syndrome (30, 31).

Studies also indicate that food insecurity is linked to poor social-emotional health status (32). Specifically, women who mainly manage the family food budget and food supply are more vulnerable to the negative diet related health issues. This food insecurity usually results in unhealthy diets with low intake of fruits and vegetables and high intake of meats and eggs (6). This high intake of meats and eggs may be because of the status ascribed to these foods. For example, the Somali culture considers meat as the main ingredient of a meal. Consequently, when they are experiencing financial constraints and they must make choices, they would get meat and forgo fruits and vegetables. A more recent study among Somali women refugees living in the U.S. identified food insecurity in 72% of households and linked food insecurity to decreased fruit and green leafy vegetable intake (33).

Food insecurity is a major public health concern because people who are food insecure have been found to have nutritionally inadequate diets, including a lower intake of fruits and vegetables and a less varied diet. (34, 35, 36). Studies also indicate that food insecurity is linked to poor social-emotional health status (33) specifically, women who

mainly manage the family food budget and food supply are more vulnerable to the negative outcomes of food insecurity. In women, food insecurity has been linked to overweight, as measured by body mass index (BMI). (37, 38). Refugees and immigrants living in developed countries are also at 30% – 60% higher risk of food insecurity than their native populations (6, 4, 5).

Challenges Refugees Face with Dietary Acculturation and Changes to Their Food Environment

Dietary acculturation, referred to as an adoption of new dietary patterns due to changes in lifestyle and food choices of living in a different country than one grew up in. This is a significant predictor of high calorie, fat, and sugar intake among immigrants in the US (39). Among refugees in particular, several factors such as poverty, language barriers, transportation issues, and poor familiarity with healthy foods in the US have been noted to influence dietary choices among resettled refugees (15).

Upon resettlement, refugees often have difficulties navigating large grocery stores including the use of electronic benefits such as Supplemental Nutrition Assistance Program (SNAP) (40, 41, 9, 10, 42 17). The inability to speak and understand English reduces refugees' ability to communicate with store staff and locate preferred or familiar food items (15).

Because of the low occurrence of dietary-related chronic disease pre-resettlement, many refugees have a poor understanding of the relationship between health and diet (43). In an in-depth interview study with different groups of refugees in the US, it was found that diseases, such as diabetes and high blood pressure, were new health issues for them (41). Health and nutrition education programs can be a powerful tool to reduce the

progression of chronic disease development among resettled refugees. To develop tailored nutrition education and promote health among refugees, it is important to understand where refugees shop, what types of foods they purchase, and the frequency in which they are bought. This information will be critical in addressing poor diet acculturation and high rates of chronic diseases among the ever-growing population of resettled refugees in the US. However, it is well documented that, upon resettlement, refugees increase their consumption of highly processed foods and meats (44, 45) and decrease their intake of fruits and vegetables (45). As a result of these changes in dietary habits, many resettled African refugees develop a high BMI despite having a low BMI on arrival (46). Similarly, diabetes, a risk factor for cardiovascular diseases (CVD), has also been found to be high among resettled African refugees (47).

Difficulties in accessing food outlets that stock traditional foods in their new food environment, may hinder the consumption of traditional foods (48, 49, 50). Ease of access to food outlets stocking healthy food options is important as it enables healthy food choices. Less healthy household food supplies have dietary consequences for household members (51), as this may promote or hinder healthy eating. Associations have been reported between home availability and intake of fruits and vegetables (51, 52), and fatty and unhealthy foods (51, 53). Many refugees must adapt to major changes in the food environment that existed in their home country to that available in their place of resettlement.

Some studies of refugee food habits indicate that refugees who resettle in the United States, for instance, consumed more processed and high calorie foods, such as sugar-sweetened beverages than they did in their home countries (6). Such drastic dietary

changes are often associated with increased risk for disease associated with low diet quality and /or overweight and obesity. Within the home environment, underlying demographic factors such as household income, age, household composition, and education have been associated with food availability as well as vegetable and fruit intake (54, 55).

Little is known about the home food environments of resettled African refugees. Insight into the foods available in their homes will provide a greater understanding of their home food environment and food habits, and further contribute to the development of appropriate intervention programs targeting food choices. A study done by Halliday et al., (56) examined the association between household availability and consumption of traditional African vegetables among resettled African refugees residing in Southeast Queensland, Australia. They found that traditional African vegetables are unique to the African diet and hence it is important to determine their availability in the home and consumption upon resettlement.

Nutritional Challenges and Diet Related Issues

A study conducted in 2010 (41) suggested that refugees in their early post-resettlement years continue to face nutritional challenges. It appears that resettled refugees may be becoming accustomed to poor eating habits. This was reported to lead to excessive weight gain and possibly associated chronic diseases. Additionally, nutritional deficiencies were reported to continue to affect this population. Eating habits, both preexisting and newly acquired, a lack of knowledge, and a low socio-economic status all emerged as likely contributing factors to the nutritional health of the resettled refugee

population in San Diego County. The study suggests that a history of food shortages as a refugee may be associated with overeating when food became more widely available. It also appears that becoming accustomed to an American lifestyle, including consumption of calorie-dense, nutrient-poor foods and lower levels of physical activity, is causing substantial weight gain in this population, especially among youth.

Food intake of refugees change as they resettle in developed countries (57). Research shows that refugees who lived in a refugee camp prior to arriving in the United States or any other developed country had limited access to meat and other animals' products such as dairy and eggs. With more access to these foods, they value them more. Hence the intake of meat and eggs increase as they arrive in these countries.

Other challenges that refugees face as they resettle include, but are not limited to, the fact that the type of food they can purchase and consume is influenced by their beliefs and the culture of their country of origin, and their socioeconomic status in the countries they resettled (24). Another challenge is that they have access to limited information about foods, shopping, and recipes in the countries that they resettle, which hinders their ability to purchase healthy foods (58). Also, as their SNAP benefits increase, so did their intake of meats and other animal products. Because animal products are more expensive, this can contribute to their food insecurity. On the other hand, it has been shown that the intake of fruits and vegetables is associated with food security (6). Finally, they consume highly processed and energy-dense foods which contributes to their risk for chronic diseases (59). Among the Somali refugee women, it was noted that more than half of the participants were overweight or obese, and this was associated with increased intake of meat and eggs (45).

Recognizing the negative impact of increased consumption of processed, fatty and sugary foods, scholars identify the reasons for such dietary change, including high cost of fresh fruits and vegetables (60) and traditional foods (61, 15); limited time to prepare foods (60, 62); unfamiliarity with new foods (62); ready availability of processed snack and fast foods (60); and limited transportation (63). Other structural forces such as corporate pricing and marketing practices, store locations, non–living wages, unreliable public transportation, and insufficient orientation services also contribute to changing food practices.

Limited but growing research on refugee health indicates that poverty, poor access to health services, and food insecurity are common issues among different groups of refugees resettled in the US (43, 45, 15, 41). In particular, the current literature indicates that resettled refugees are at increased risk of experiencing a dual burden of malnutrition. This dual burden is attributed to the preexisting condition of micronutrient deficiencies experienced by refugees prior to resettlement, as well as a high risk for chronic diseases attributed to the excess intake of sodium, fat, and sugar upon resettlement (63) associated with food security (6). Finally, they consume highly processed and energy-dense foods which contributes to their risk for chronic diseases (64).

Nutrition Education Delivered to Refugees

There are few studies dealing with nutrition education delivered to refugees. Some of these studies focused on curriculum development or program implementation either by developing a new nutrition education program/curriculum (42, 64, 70) or by

adopting and evaluating existing tool (71, 72). Some other studies also focused on examining the impact of nutrition education interventions on nutrition-related behaviors among refugees (73, 74). Some of the nutrition education programs that target refugees were implemented within existing programs, such as Supplemental Nutrition Assistance Program Education (SNAP-Ed), 4-H programs, and English as a Second Language (ESL) classes. For instance, a study culturally adopted an existing i-Cook 4-H curriculum with lessons scheduled at the same time as ESL lessons (42, 72).

In Utah, paraprofessionals from the Utah State University (USU) Create Better Health (CBH) (SNAP-Ed) and Extension Food Nutrition Education Program (EFNEP) programs provide nutrition education to refugees in limited settings and have shown success in partnering with community organizations such as ESL providers (33). In 2015, USU, along with the Department of Workforces and Salt Lake Community College, implemented the Utah Refugee Education and Training Center (URETC) in South Salt Lake. The URETC has primarily focused on job training, youth development and entrepreneurship but also has potential to be an ideal location for providing nutrition education and other health outreach activities to this unique population.

Study Objectives

The main objective of the study is to improve the health and quality of life for refugee families through effective nutrition education. Specific project objectives include:

1. Identify what strategies are currently being used to deliver nutrition education to refugees. This will be accomplished by conducting a scoping review on the topic.

2. Identify barriers and assets for refugee food gatekeepers in Utah that influence their current nutrition behaviors as well as their preferences for receiving nutrition education. This will be accomplished by conducting semi-structured individual interviews with Somali refugees living in Utah in 2020.
3. Adapt the CBH curriculum to be culturally relevant for Somali refugees living in Utah and use the adapted curriculum to teach Somali refugees in Utah about nutrition. The impact of the program on the nutrition-related knowledge and behavior of the participants will be assessed by a pre- and post-program survey.

Somali Food and Culture

Somalia is in Eastern Africa and is part of the Horn of Africa. It gained independence in 1960 but has since faced political instability and a civil war that severely impacted its development. Consequently, it suffers from poverty, limited access to education, and low literacy rates (65). The Somali society is predominantly Muslim, with Islamic teachings guiding various aspects of daily life (66; 67). The Quran influences nutrition-related practices, including family meal structure, food preparation, and food choices. Halal food, which adheres to Islamic dietary Laws, is essential to Somali Muslims, and they often seek out stores that offer halal options (68). Traditional Somali foods include rice, bananas, goat meat, camel meat, and beef (69). Somalis Also consume pasta, anjera (a thin fermented bread), malawah, mufo, jabati (Somali bread), corn, sorghum, and beans. Pork is not consumed due to religious restrictions. Somali immigrants and refugees often struggle to find familiar and preferred foods in their resettlement communities. Many perceive American food as less safe and healthy than the foods they are accustomed to

eating in Somalia due to a distrust in the way that food in America is grown, produced, and packaged. For example, many Somalian's avoid canned and other packaged foods because they fear that these foods may contain pork or pork products. (68). Somali families prefer to eat at home to ensure halal food and to maintain traditional and healthy eating habits, especially with their children who are highly influenced by American culture. Understanding Somali culture and religious practices is essential for promoting nutrition education and healthy eating habits.

Literature Review Conclusion

When refugees resettle in developed countries like US, they face many challenges including language barrier and significant change in their lifestyle. These challenges hinder their ability to obtain and prepare culturally acceptable foods in their resettled communities. Refugees are at risk of experiencing food insecurity due to factors, such as limited transportation, limited access to public food, lack of social network, poverty, unemployment, low income, and low education. Food insecurity usually results in nutritionally inadequate diets, including a lower intake of fruits and vegetables and a less varied diet. It is associated with a number of poor health conditions, including hypertension, hyperlipidemia, high cholesterol, and heart disease. Research indicates that food insecurity is linked to poor social-emotional health status.

Refugees also face challenges with diet acculturation. They experience issues navigating large grocery stores including accessing social service programs. Finally, refugees face challenges with their food environment, such as difficulties accessing food outlets that stock traditional foods in their new food environment. Research has shown

that refugees who resettle in the US consumed more processed and high calorie foods, such as sugar-sweetened beverages than they did in their home countries. Such drastic dietary changes are often associated with low diet quality and/or overweight and obesity.

To overcome the food and nutrition related challenges that refugees face as they get resettled, they should be provided with nutrition and food education tailored to their specific conditions by considering the barriers they face and the assets they have. Nutrition education would provide the refugees with the skills necessary to make healthy nutrition choices and reduce the risk of developing chronic diseases. This literature review supports the need for providing the refugees with culturally adapted nutrition education.

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CHAPTER 2

A SCOPING REVIEW AND ASSESSING THE EVIDENCE FOR NUTRITION EDUCATION DELIVERY STRATEGIES FOR REFUGEES IN HIGH INCOME COUNTRIES[2]

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Abstract

Upon resettlement, refugees face many challenges, including limited knowledge of available food and food insecurity that increase their risk to diet-related diseases. Nutrition education may help them better navigate the challenges of their new food environments and help them live healthier lives. This review assesses the evidence on nutrition education delivery strategies and outcomes among refugees in the United States and other high-income countries using Levac review guidelines. Multiple electronic databases were searched using combinations of the following terms (nutrition, food, cooking, gardening) and (education, workshop, curriculum, class, literacy, program) and refugee. The quality of the peer-reviewed papers was assessed using the Medical Education Research Study Quality Instrument (MERSQI) scoring method. A total of 1930 studies were identified, 17 met the inclusion criteria. The mean MERSQI score of the peer reviewed studies was 9.02 (SD = 3.3, range = 1 - 14). The key nutrition education delivery strategies included conducting a needs assessment, providing client-centered education, collaborative approach in program design, and hands-on activities such as cooking and store visits. Literacy level, cultural, and language barriers are common challenges to nutrition education delivery. Because there is limited evidence regarding the efficacy of programs regarding change in refugees' nutrition knowledge and diet-related behaviors, future research should include rigorously designed studies and the development and implementation of standardized assessment and training tools. The adoption of a context-specific and flexible model is important for effective nutrition education delivery among the refugee population.

Key Words: nutrition education, refugees, scoping review, diet, high income countries

Statement of Significance: This study provides evidence of nutrition education practices among refugee population and highlights areas of effective practices and needed research.

Introduction

Refugees are individuals who have been forcibly displaced from their homes into a different country as a result of conflict and/or violence, and are unable or unwilling to return due to fear of persecution based on race, religion, nationality, membership of a particular social group or political opinion (1,2). The number of people who are forcibly displaced worldwide grew substantially from 41 million in 2010 to 79.5 million in 2019 (3). Resettlement is one of the durable solutions that the United Nations High Commission for Refugees (UNHCR) seeks. In 2019, only 107,800 out of more than 1.4 million refugees were resettled into 26 countries (3). Canada resettled the largest number of refugees, followed by the United States (3). Between 2003 and 2020, US, Canada, Australia, Sweden, United Kingdom, Norway, and Germany were the top 7 countries to resettle the largest number of refugees from (3).

Refugees face many challenges upon resettling in their new environments; this includes learning a new language, new systems for work, education, and healthcare (4,5). Refugees often struggle to adapt to the new food landscape involving unfamiliar food choices, more structured and technology-based food system. Frequently, refugees adopt food habits that are consistent with the culture of their new community, even though the new habits may promote low-quality diets and rarely include traditional foods (4). For example, refugees consumed more processed and high calories foods, such as sugar-sweetened beverages upon resettlement in the US than they did in their home countries (6,7). Such drastic dietary changes are often associated with increased risk for chronic diseases including obesity, hypertension, type 2 diabetes, and cardiovascular disease (8,9,10). Several studies indicated that the prevalence and the odds of chronic diseases

are higher among refugee adults than the population of the host country (11). One study about South-Asian refugees found that as the refugees resettled in the US, they experienced significant changes in their food habits, food choices, and environment which contributed to higher risk of poor health (12).

Also, refugees living in high-income countries are at higher risk of food insecurity than native populations, and thus at higher risk of chronic diseases (7,13-15). Factors that contribute to high prevalence of food insecurity include poverty, unemployment, low income, and low education (16,17). Other circumstances that compound these risks include ineligibility for federal aids and other financial obligations. This include the desire to send money to support family members who remain in the country of origin or sponsor other family members to join them in the host country (18). These financial obligations significantly reduce the budget for food, household bills, and education expenses, further increasing the risk of food insecurity in refugee households (18).

Food insecurity is often accompanied by unhealthy diets. Previous studies have indicated a low intake of fruits and vegetables (6,7) and higher intake than recommended for meats and eggs (6,15) among Somali refugees after resettlement in the U.S. Similarly, meat consumption increased after resettlement in the U.S. among refugees from Montagnard (12) and Cambodia (19). The paradox of high intakes of meat and eggs in the presence of food insecurity may be explained by the high status attached to consumption of meats and eggs by some African refugees (6,20,21). Refugees in refugee camps often have limited access to meat and eggs, and as a result, upon resettlement refugees often prioritize purchasing meat and eggs, even when their food budget is inadequate (6).

Providing refugees with nutrition education may help them better navigate the challenges of their new food environments, improve food insecurity through nutrition-related behavior, and ultimately help them live healthier lives. Given that uniqueness of refugees' nutritional needs, it is important to understand how to best address and tailor nutrition education programs to meet their needs. Hence, the need for a scoping review to assess the delivery of nutrition education among adult refugee populations in the US and other high-income countries. The objective of this review is to i) assess current strategies used in nutrition education programs targeting adult refugees and ii) identify gaps for potential future research and practice in serving resettled refugee population in the US and worldwide.

Methods

A scoping review of published articles on the topic of nutrition education delivered to adult refugees that were resettled in high income countries was conducted based on Levac scoping review methodology (22), which includes five steps as described below.

Identifying the research questions

Research questions included the following: 1) What nutrition education is being delivered to adult refugees who have resettled in high income countries including the US? 2) How is nutrition education being delivered to refugees in high income countries? The search included different modes of nutrition education being delivered to refugees,

including classes, workshops, or online modules on topics of nutrition, food, cooking, or gardening.

Identifying relevant studies

The research team involved in the extraction of data consisted of four members, two Ph.D. faculty members who are registered dietitians, one researcher with a Ph.D. and one with an M.S. Other members of the author team reviewed the research methods and contributed to writing and revision of the paper. A comprehensive literature search was independently conducted by two members of the research team (HN, AA) and with the help of a research librarian. The following databases: 1) Academic Search Ultimate, 2) Agricola, 3) CAB Direct, 4) Education Source, 5) Eric, 6) Medline, 7) Psych Info, 8) PubMed, 9) Science Direct, and 10) Scopus were searched using the following keyword combinations: (*nutrition or food or cooking or gardening*) and (*education or workshop or curriculum or class or literacy or program*) and *refugee*. Only peer-reviewed articles were included in the search and a backward search of relevant references from selected articles was later conducted.

Study selection

The research team included peer-reviewed articles published between 1980 and 2020, on the topic of nutrition education for adult refugees that were resettled in high income countries. The year 1980 was chosen as the start time because the passage of The Refugee Act of 1980 resulted in the admission of a large number of refugees into the US (23). At this time, the Act standardized resettlement services for all refugees admitted

into the US. There were few articles and no reviews regarding refugee nutrition education prior to 1980. In addition, studies were excluded if they were focused on issues not related to adult or family nutrition education or refugees resettled in countries other than high income countries. Also, studies that were related to health issues or child nutrition and those that did not meet the specific selection criteria were excluded. The search terms identified 1,909 articles.

Articles were found in Academic Search Ultimate (334), Agricola (50), CAB Direct (357), Education Source (62), Eric (34), Medline (194) Psych info (71), PubMed (266), Science Direct (147), and Scopus (394). An additional 21 articles were identified from references and unpublished dissertations. Of the 1,930 articles identified, 1,785 were screened based on title or abstract after 145 duplicates were removed (**Figure**). Of the 1,785 articles, 636 articles were excluded because they focused on issues that were not related to adult or family nutrition education and 879 articles were excluded because they focused on refugees resettled in countries other than high income countries. Finally, 226 articles were excluded because they relate to health issues or child nutrition education. Of this group, 37 studies primarily focused on issues related to trauma and mental health, 31 focused on maternal health and reproduction, 48 were on child nutrition and health education, 25 focused on dental and oral health, 40 on health promotion and physical activity, and 45 on diseases and vitamin and mineral deficiencies.

After excluding the studies mentioned above, the remaining 44 articles were assessed for eligibility and reviewed in detail. Two researchers (HN and AA) independently read the full text of the 44 articles and agreed to exclude 21 articles not meeting the specific selection criteria as described above. Of the remaining twenty-three

articles, 6 were excluded because they were non-peer reviewed. Seventeen peer-reviewed studies were selected for inclusion.

Quality appraisal

The Medical Education Research Study Quality Instrument (MERSQI) was used to assess the quality of the 17 peer-reviewed articles. This tool was chosen because there is currently no tool that assesses methodological quality of studies on program curriculum content development and implementation. The validated MERSQI tool seems most appropriate as it assesses educational scholarship and research. Each peer-review article was independently assessed by two researchers (HN and AA) and differences in quality appraisal were discussed until agreed upon.

The MERSQI consists of six domains: study design, sampling, type of data, the validity of evaluation instrument, data analysis, and outcome. Each of these domains has a maximum score of 3. Five domains have a minimum score of 1. Hence, MERSQI scores can range from 5 to 18 (24).

Charting, collating, summarizing, and reporting the results

Data from the full text of all selected articles were independently extracted in duplicate (HN and AA). Discrepancies in details of data extracted were discussed until a resolution was agreed upon. The final data were synthesized and interpreted by one member of the research team (AA) and verified by another member of the research team (HN). The two senior researchers (HW and MA) oversaw and provided feedback throughout all processes involved in conducting the study.

The main findings are organized into two categories based on whether studies primarily focused on i) the impact of nutrition education interventions in changing nutrition-related behaviors among refugees (25-30) or ii) focused on curriculum development or program implementation (20,21,31-39). However, there are few studies in the curriculum development category that also reported nutrition outcomes (20,21,31,32,35). Further, an overall summary of different features of nutrition education programs is provided.

Results

Study characteristics

The 17 studies that met the inclusion criteria are shown in Tables 1 and 2. Table 1 presents the summary of articles on nutrition education that focused on outcomes among refugees. Table 2 contains articles on nutrition education curriculum or program development, implementation, and evaluation. A few articles in the curriculum development category that reported nutrition outcomes were also featured in Table 1 to reflect their impact on nutrition outcome components. With regards to study design/type, these peer-reviewed studies include evaluation studies (studies that assessed intervention fidelity, feasibility, comprehensibility, utilization of resources or program, etc. using qualitative or other approaches (n=11) (20,21,31-39), randomized control trials (RCT) (n=2) (25,27) and fully pre-post studies (n=4) (26,28-30) or was an evaluation study but also have a pre-post component for nutrition outcome piece (20,21). Twelve studies (70.5%) were conducted in the US and five (29.4%) were from Europe and Canada. The included studies represent findings from refugees across 17 different countries. Only five

studies reported using a theory-based approach; theories used include the social cognitive theory (SCT) (21,25), social learning theory (33), health belief theory (26), and theory of planned behavior (TPB) (27).

Study quality

Using MERSQI, the quality of the 17 peer-reviewed articles ranged between 1 and 14 (Table 1) with a mean MERSQI score of 9.02 (SD = 3.3). This indicated moderate overall study quality. The six studies (35%) with MERSQI scores greater than the mean included two randomized controlled trials (25,27), three pre-post study designs (21,26,28), and one evaluation study (37). The eleven studies (65%) with MERSQI scores lower than the mean included nine evaluation studies (20,31-36,38,39) and two pre-post studies (29,30). Most studies with a MERSQI score lower than the mean had lower scores for the following reasons: internal structure and content of evaluation tools (poor validation of evaluation tool), type of data (objective vs subjective), relationship with other variables, and study design.

Studies that focused on outcomes among participants

Six studies primarily examined the impact of nutrition education interventions on nutrition-related behaviors among refugees. The refugees included in these studies were from Bhutan, Karenna, Nepal, Cambodia, Burma, Iraq, Iran, Somalia, Burundi, Congo, Sudan, Central African Republic, Eritrea, Armenia, and former Yugoslavia. Objectives of these studies included helping refugees learn to navigate new food environments (29,30),

improving healthy eating by focusing on food purchasing (25,26), and increasing food safety knowledge or behavior (27,28).

Outcome assessment tools varied greatly across the studies. These included dietary interviews to assess changes in dietary intake and practice (29), structured interview, educators' observation, oral matching quiz (30) to assess change in knowledge or intention to change behavior. Others included direct observation and weighing of food (26), Automated Self-Administered 24-hour Recall (ASA24) (25). A food safety behavior questionnaire (27) and questions on food handling knowledge (28) were used in studies on food safety.

Positive impact of nutrition education was reported for dietary quality/intake (25,29), cooking oil use (26), food safety knowledge or practices (27,28), knowledge and new skills in preparing American foods (30).

Studies on curriculum or program development, implementation, and evaluation

Eleven studies focused mainly on curriculum development or program implementation (20,21,31-39). These studies included refugees from Burma, Cambodia, Somalia, Burundi, Congo, Sudan, Eritrea, Philippines, Syria, and Liberia. Among these studies, some developed or evaluated a new program/curriculum (21,31-33,35,38,39) and others adapted an existing curriculum and evaluated its use (20,34,36,37). In addition, community-based participatory research (CBPR) approach was used to i) develop and evaluate a nutrition education program/curriculum (21,31,33,34,38) (one included educators' training (38)) and ii) adapt and evaluate an existing tool (36,37). In other studies, curriculum was developed/evaluated in a non-participatory manner. For example,

two studies developed a nutrition education resource (e.g., nutrition information curriculum) in that way (32,39). Further, one study focused on service providers' training and evaluation of the implemented program (35). Another study focused mainly on fidelity of the implementation of an intervention developed using CBPR (33).

Among studies that reported evidence of behavior change, changes were reported on participants' adaptation to the new foodscape, food security status, nutrition knowledge and behaviors (31), reduced intake of unhealthy foods (35). Another study found that participants were more likely to exercise regularly, and to have improved health-related quality of life through interviews (21). In contrast, one study found that a nutrition resource developed to inform point-of-purchase decisions while grocery shopping, did not inform participants of food choices and did not influence purchases (32). In this study, participants reported they preferred relying on family and friends as key nutrition resources (32). The last study collected food purchase data but did not report an actual change in the behavior outcome assessed because of the follow-up food purchase receipts was not collected from study participants. This did not allow for comparison between food purchases before and after nutrition classes (20).

Data collection tools used to assess the nutrition outcome components include, food purchase receipt (20), focus groups (35), observation and interviews (21,32), oral questionnaires, interviews, observations, administrative data, and field notes (31).

Key features of nutrition education programs or curriculum targeting refugees

The reviewed articles discussed some features of nutrition education programs or curriculum for refugees including 1) Needs assessment, 2) Collaborative efforts in the

development, implementation, and evaluation process, 3) Client-tailored approach, 4) Diverse intervention content and delivery method, 5) Educators' training, and 6) Adapting existing curriculum and program partnerships.

Needs assessments. Nutrition resources development started with identifying nutrition needs of the target population which helped define the objectives of the resource or program developed (20,31,36-39). Needs assessments were done by obtaining information from program advisors (39), trained research staff (37) or through interviews and discussions with local refugee community members (38). Other studies used information from issues identified from the literature, preliminary nutrition education or pilot study conducted among the target population (20,31).

Collaborative efforts in the development, implementation, and evaluation process. Many studies (n=12) included collaborative efforts from the academic and local refugee community in an intervention or curriculum development, implementation or evaluation (21,25-27,30,31,33,34,36-39). However, the collaborative approach used differ across studies. For example, community engagement/participatory approach was used in program/curriculum development and implementation processes with revisions made based on feedback received from the refugee community (21,25,34,38) or with feedback from just the extension agents and faculty (27). Another study limited feedback for curriculum revision to the program advisor while evaluation of curriculum and nutrition education sessions (utility and comprehensibility) were done by both participants and program advisor (after pilot study) (39). However, 2 studies did not report how feedback from the refugee community was adopted in curriculum revisions (30,33). In terms of program implementation, studies reported using a multidisciplinary team (including a

dietitian, interpreter, chef, and dietitian intern) (26), translators, settlement workers (31), the researchers and multilingual community aided (37) to implement the curriculum or conduct a dietary intervention.

These studies found that collaborative efforts were effective in initiating conversations on nutrition-related issues among refugees (34), maximizing limited resources to address the need of the target population (20), enhancing social networks (31), and providing a platform for local and cultural sensitivity to study procedures (33) and nutrition education (39). Other benefits of collaboration and community engagement include successful enrollment, study completion, and sustained improvement in dietary quality among adults (25), making programs socio-culturally acceptable to the target population (21).

Client-tailored approach. Different client-tailored approaches were used in the included studies and factors considered in the intervention design included cultural sensitivity, food literacy level, health and mental status, and level of English language proficiency of participants (21,31,32,34). To address language barriers, some studies used interpreters (21,26,30,31), pictures, taste tests, and cooking demonstrations (20,26,31). Others included help from refugee children to teach their parents in their native languages using English language training materials (28), using older children as translators (29). Two studies used simple word and sentence structure to convey messages at participants' literacy levels (31,39). Foods and meals that were familiar to participants were used to develop resources that were more culturally appropriate and sensitive (39). Another study addressed participants' preference for cooking demonstrations using foods like pizza and burgers rather than participants' traditional recipes (this preference was influenced by

their children's request) (31). Available cooking utensils also influenced foods chosen for cooking demonstrations.

Diverse intervention content and delivery method. Nutrition education intervention strategies included store visits (31), lessons, workshops, and training (21,26,28,35,38). Nutrition education resources used included flipcharts (20,35), cooking/recipe demonstrations (20,26,27,30,31,34), and pamphlets/handouts (31). Nutrition education classes lasted between 30 minutes to three hours per visit/class for the duration of two to six months (2-64 sessions/classes). Also, one study included informal interactive discussion sessions (31).

Three studies considered location of intervention delivery by using a venue that made participants feel safe and relaxed (29,30,34). One study used a participatory approach where participants were actively involved in the behavior change role coupled with hands-on practice and group exchange ideas and experiences (26). Another study developed a pocket-size and washable market guide (32).

Educators' training. Two studies incorporated educator training (25,35). The five stages of change model (pre-contemplation, contemplation, preparation, action, and maintenance) were used to train educators in one study (35). The other included a community-based approach orientation, protecting human research participant training, SCT behavior change principles, motivational interviewing principles, family-focused communication, nutrition principles, mastery of intervention guide content, and training on delivery of the intervention (25).

Adapting existing curriculum and program partnerships. Some of the nutrition education programs that target refugees took place within existing programs like the Supplemental Nutrition Assistance Program-Education (SNAP-Ed), 4-H program, and English as Second Language (ESL). For example, one study incorporated Supplemental Nutrition Assistance Program-Education (SNAP-Ed) with ESL classes at refugees' worksites and reported improved program accessibility to refugees (20). Another study adapted a diabetes education tool used among Cambodian refugees from Burma (34). A study culturally adapted an existing i-Cook 4-H curriculum (an out-of-school program for 9-10-year-old youths and their main adult food preparer) with lesson schedules at the same time with ESL lessons (37).

Discussion

This scoping review aimed to systematically examine the range and characteristics of evidence available on nutrition education interventions targeted towards refugee populations. The available evidence demonstrates that nutrition education interventions exist among refugees but there is limited evidence regarding its impact on refugees' nutrition knowledge and diet-related behaviors. Furthermore, various approaches were utilized in education resource or program development, implementation, and evaluation. Also, there is variation in intervention strategies and duration. This indicates that there is currently limited guidance on how to design or evaluate nutrition education programs among refugees which makes it difficult to study effectiveness of such programs.

There are several reports on curriculum development, implementation, and evaluation studies published in the last 6 years (n=11). This is an indication of a continued research effort to address needs of refugees. Many of the studies on curriculum development, implementation, and evaluation focused on process evaluation (assessment on feasibility, acceptance, utilization, etc.) rather than outcome evaluation. This indicates that most of the resources and strategies used in nutrition education among refugees are in early phases of development. The lack of outcome evaluation may also be due to different complex factors e.g., cultural and language diversity that undermine research approaches used among this population. As a result, frequent adaptation of approaches to suit a specific target population is warranted. While curriculum/program development, implementation, and evaluation are essential parts in the process of ensuring an effective learning process, more outcome-focused studies are needed to determine short-term and long-term impacts of these curricula. The lack of rigorously designed studies like RCT and natural experimental study designs (specifically study designs that will not leave out a potential intervention beneficiary such as a cross-over, delayed start, and multi-arm RCT design) calls for more research measuring changes in nutrition behavior as endpoint evaluations for nutrition education interventions among refugees. These will provide up-to-date evidence of the impact of these types of interventions.

The range of topics included in these studies is relevant to the challenges that refugees face. Previous research has shown that refugees encounter food and nutrition-related problems that include difficulty in navigating new food environments, understanding new food ways (40,41), poor food purchases and diet quality (47), food

insecurity (16,19,32,41,43) etc. This shows that the available evidence is within refugees' area of nutrition priorities.

Although a wide range of topics was targeted, a lack of a standard measurement tool for similar outcomes of measure was noted. Moreover, two studies reported barriers in the choice of assessment tool due to cultural and language barriers among the target population and that there was no validated tool for measuring food safety (27) and dietary purchase behavior (20) among this population. Another study reported using an oral matching quiz assessment because of limited literacy and English proficiency level of study participants (30). This indicates that certain factors (like those mentioned above) may influence the type of tool used in measuring outcomes among this population. Factors such as diversity in culture and demographics may make the validation or standardization of tools difficult. However, there was a mix between the use of subjective (e.g., self-report food behavior, oral matching assessment) and objective measure (e.g., use of food purchase receipt, direct observation) for outcomes. Considering that it might be difficult to validate tools among subgroups within this population, using objective approaches to measure nutrition outcomes may be a more realistic method of assessment among this population. Objective measures are known to have higher fidelity and be less extraneous than subjective measures (44). Considering that the impact of any intervention effort cannot be appropriately quantified without a relevant outcome and measurement tool, a tool or approach that is culturally appropriate and relevant for this population is needed. Future research should look at identifying appropriate outcomes of measure for nutrition education interventions by comparing the use of objective and subjective measures of outcomes among this population. Further, community-wide nutrition

education programs (like EFNEP and SNAP-Ed) that already have standardized outcome measures may want to consider culturally appropriate modification to existing measures. Despite variations in methods of curriculum development and assessment, several factors contributed to attaining feasibility and acceptability among participants/providers. These included:

i) Begin with a needs assessment: Needs assessments are an important stage of a nutrition education program planning process as it helps to differentiate instruction to accommodate varying needs of the target population.

ii) Offer a client-centered approach: Refugee populations are groups of individuals, each with unique needs. Refugees face many barriers to obtaining nutrition education including language, cultural differences, food security, etc. (19,45,46). To effectively reach refugees, approaches that address their unique needs are paramount. The included studies used strategies that remove barriers to effective communication, alleviate safety concerns, build trust, adapt available resources, and address cultural values and identity of clients.

iii) Iterative and collaborative approach: The development process of nutrition education resources or intervention in the included studies comprise multiple cycles of feedback-based revisions from community members or team of researchers. This collaborative approach most effectively built trust and fostered feelings of shared responsibility and power. Also, partnerships between programs and settings that offer potential resources to meet the needs of refugees (e.g., worksite, food assistance programs, ESL, etc.) is beneficial.

iv) Hands-on and participatory approaches: Engaging participants in nutrition-related activities to reinforce knowledge and behavior builds skills. Activities may include cooking demonstrations (20,26,27,30,34) and grocery store visits (20,34). No studies compared use of specific strategies within the above-listed approaches. Hence, more research with rigorous study designs is needed to provide a better understanding of impacts of different strategies and approaches on nutrition education outcomes.

One challenge with addressing the nutrition education needs of this population is ethnic, cultural, and religious diversity among groups of refugees as well as other unique characteristics such as food literacy, and English language proficiency level. This may influence curriculum delivery methods or the choice of evaluation tools. Varied diet customs based on religion, origin, culture, and experience were mentioned as issues that interfered with curriculum delivery (20,30). Other issues included language barriers and low literacy levels (20,21).

While these challenges can be present in any population of learners, providing nutrition education to refugees is unique in that many languages may be spoken. Furthermore, in addition to lacking English literacy skills, some participants are not able to read or write in their native language. Hence, the adaptation of existing resources or development of original culturally and literarily appropriate resources are needed to meet the diverse needs of refugees. Some of these studies were able to find solutions that could address these challenges e.g., using participant's children as translators or instructors to delivery information in participant's native language (28,29). Furthermore, lessons were planned to accommodate the cultural sensitiveness with educators taking time to build trust among clients and involve them in planning (20). Another study provided

opportunities for participants to interact with people from other cultures (21). More research that uses approaches that target different refugee subgroups is needed. Although there are many strengths of this review, limitations also exist. There is wide heterogeneity in the design, methodology, and reporting in the included studies, which limit comparison across studies. Also, few studies had measurable outcomes which limit quantification of impact across all studies. The researchers acknowledge that some relevant unpublished work done on nutrition education among this population might have been omitted because only published articles were included. Despite these limitations, the strengths of this study include using multiple databases that give a wider range of articles and involving two researchers to conduct the literature search and study assessment for quality control. Furthermore, included studies focused on nutrition education among refugee communities in high income countries, which increases the generalizability of the findings to all refugee populations in high income countries.

Our scoping review identified the need for adopting a context-specific and flexible model for delivering nutrition education among refugee populations. Also, it highlights areas that require further research and provides guidance/recommendations for program managers who are examining ways to develop effective resources that target refugee communities for improved nutrition-related behaviors. **Table 3** outlines 11 key recommendations for research and practice regarding nutrition education among refugees informed by analysis of the existing evidence base. More studies are needed to provide stronger evidence to guide decision-makers in prioritizing refugees' health in research policies.

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Statement of authors' contributions to the manuscript

All authors contributed to this paper. MA and HW designed and oversaw the study; AA and HN did the literature search, data processing, and results interpretation. MS, CW, and MJ contributed to results formatting. All authors contributed to the writing and substantive review of the manuscript. All authors have seen and approved this manuscript.

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Table 1: Summary of the characteristics of nutrition outcome-focused studies on nutrition education among refugees in high income countries

Author & Publication Date	Study Objectives	Study Participants	Main Outcome of Measure	Study Design	Sample Size	Intervention/Program Strategy	Length and Frequency	Major Findings	Study Quality
Ip and Betts (1986) (29)	To familiarize participants with readily available foods	Adults and children refugees from Cambodia	Incorporating American foods into the traditional Cambodian dishes	Pre and post	5-25 participants per session	Food demonstration. Demonstration was based on request (include menu planning, food purchase, food preparation and nutrition information), using recipe that were similar to Cambodian dishes	Weekly one-hour presentations for 4 months	The class participants had begun to incorporate some of the typical American foods into their traditional Cambodian dishes. Eggs, milk, stew-type dishes, and orange juice were the most common additions.	6.5
Laverentz, et al. (1999) (30)	To break down cultural barriers in order	Adult Nuer refugee women from Sudan	Increase American food knowledge and home management	Pre and post	30	First conduct a needs assessment using focus group, discussion. Develop nutrition education program (home management how to add American cooking recipes). Include cooking lessons adjusted to accommodate cooking utensil owned	8 weeks, 4 weeks of instruction and 4 weeks of assessment and evaluation	Increased knowledge and new skills in preparing American foods, while incorporating traditional techniques.	8
Kruseman, et al (2003) (26)	To assess the feasibility and appropriateness of a participatory dietary counselling to reduce oil consumption compared to one-on-one counselling	Adult asylum seekers and refugees who have been diagnosed with obesity, type 2 diabetes, or dyslipidemia) from the Former Yugoslavia.	Change in oil use and cooking techniques	Pre and post	32	Cooking event and discussion. Three workshops. i) cooking practice by participants while under observation, ingredients provided and group tasting, and discussion were conducted. ii) a discussion on cooking techniques and how to reduce oil used for cooking with demonstration from trained cook. iii) participants cooked the same dish they cooked during the first workshop using the ideas from the second workshop and compare the taste to that of the first workshop.	3, 3 hours dietetic workshops	Average reduction of oil per recipe was 58%, or 35 ml (95% CI: 15 - 55). The application of oil-sparing techniques increased nine-fold.	14

Trapp (2010) (35)*	To assess the outcome of nutrition training program among service providers and its impact on refugee nutrition outcomes	Immigrants and refugees from 7 Asian and African countries.	Program outcome; improved nutrition, outreach activities and collaboration	Pre-post	200 organizations or 453 individual service providers.	Utilize a dialogue-base outreach approach using visually based nutrition flipchart, outreach training manual, food wheel poster and topical handouts translated in 15 languages.	16, 45 minutes sessions.	The program materials, particularly flipcharts, impacted behavior change among participants	9
Ratnapradipa ,et al (2011) (28)	To examine increases in food handling knowledge	Adult refugees from Eastern Europe	Change in food handling knowledge	Pre and post	32	Food handling education. Food handling education conducted by participants' children in their native language using English training material or English by a certified English instructor. Using poster, video, handout and questioning	Single 90 minutes session	A significant increase in knowledge of personal hygiene and hand washing occurred in both groups from pre- to post-test (for the study group, PHHW pre-test scores were 35%, while post-test scores were 80% (z = -3.219, p = .001). For the control group, pretest scores were 54.4%, posttest scores were 64.7% (z= -2.646, p = .008)	10.5
Wieland, et al (2012) (21)*	Develop and evaluate a physical activity and nutrition intervention with and for immigrant and refugee women	Adult refugee women from Somalia and Cambodia, Hispanic immigrants and non-immigrant African Americans	Change in physical activity and nutrition behavior	Pre and post	45	Focus groups informed program content and revealed principles for designing the exercise and nutrition classes. A 6-week program with two 90-minute classes per week was conducted among refugee and immigrants and African American women.	6 weeks, 2 times per week, 60 minutes exercise and 30 minutes of nutrition education each time	Higher health-related quality of life (p=<0.001) and self-efficacy for diet (p=0.36) and exercise (p=0.10). High acceptability	10.5
Gold, et al (2014) (27)	To evaluate the effectiveness of a food safety discussion map as an educational method to increase knowledge and	Adult refugees and immigrants from 19 different countries	Change in food safety behavior and knowledge	RCT	73	Food safety map discussion and cooking class. Hands-on activities and visual demonstrations with verbal feedback for modifications and implementation were integrated into the educational tool. One map discussion and two cooking sessions were held. A	Single 2-hour session for discussion map, 2 session of about 2-hours for cooking class	The cooking and the map class significantly increased participant's knowledge of safely cooking large meat (χ^2 [df =2, n=66] = 40.87; p<.001; V^*=.79) and correctly refrigerating cooked food (χ2 [df=2,	13

	promote positive changes in food safety behaviors					peer-reviewed script and structured activities with concepts covered in the map activity was used. Included the researchers, community members and Extension agents		n=66] = 24.87; p<.001; V*= .58) No difference in behavior intention among experimental group	
Mannion, et al (2014) (32)*	To assess the acceptability of a food shopping resource guide (*The Market Guide)*	Adult refugee women from Sudan	Usage of guide and dietary and shopping assessment	Qualitative research design	8 women	Received Market Guide. Portable, washable, pictorial food shopping resource was developed by a nurse-nutritionist that could help	Single 45 minutes session.	*The Market Guide* fell short of informing food choices and purchases.	9
Gunnell, et al (2015) (20)*	To evaluate the integration of SNAP-Ed into ESL classes and testing the feasibility of using food purchase to evaluating nutrition program	Adult refugee women from 17 different countries.	Changes in food purchases	Pre and post	98	Nutrition lessons at work-site training center. Certified ESL teachers assisted NEAs in teaching nutrition concepts. Lessons were based on 2005 USDA Dietary Guidelines using objectives of SNAP-Ed curriculum for adults and youth, healthy eating and budgeting concepts. Healthy Living Flipchart.	12 weeks of 1 hour session each	By integrating SNAP-Ed into ESL a hard-to-reach eligible population was reached. Of the 59 participants whose receipts were collected, 93 percent used SNAP funds and 15% used WIC funds, 92% purchased food from supermarkets, 59% purchased food from ethnic food stores.	9
Wieland, et al (2018) (25)	To evaluate a healthy eating and physical activity intervention for immigrant families	Adult refugees from Somalia and Sudan and Hispanic immigrants	Improvement in healthy eating index scores. Change in physical activity	RCT	151 persons (44 families)	Provide a family-based healthy eating and physical activity intervention developed using community-based participatory approach. Perform assessment at baseline, and at 6, 12, and 24 months after intervention initiation.	12 visits. Each 60-90 minutes up to 12 follow up phone call within the second 6 months.	At 12 months, significant improvement occurred in Healthy Eating Index scores for adults in the intervention group compared with controls (change, +8.6 vs -4.4; p<.01) and persisted at 24 months (+7.4 from baseline; p<.01).	14

Henderson and Sander (2019) (31)*	i) To give newcomers skills needed to eat healthy in the Canadian context. ii) To help them find a healthy balance between familiar foods from home countries and Canadian foods. iii) To provide an environment where familiar and traditional food practices are shared and encouraged	Adult women and men refugees from Burma, Congo, Philippines, and Syria	program's impacts on participants' knowledge, attitudes and food security status	Qualitative research design	22 main participants and two case workers and one volunteer.	Evidence-based newcomer health promotion program was developed through community involvement. Action research strategy which includes cycles of community consultation throughout program delivery and evaluation was used.	8-week program	Impact of the program included changes in attitudes, knowledge, and behaviors, indicated by i) healthy adaptation to the Canadian foodscape, ii) enhanced nutrition knowledge and behavior, iii) marginal improvements to food security for some participants, iv) additional benefits such as cross-cultural understanding and enhanced social networks.	7

*Primarily curriculum development, implementation, and evaluation studies

EWS Eat Walk Sleep; FGD=Focus group discussion; FHP=Family health promotion; N/A=Not applicable; NEA=Nutrition Education Assistants; NR=Not reported; PHHW=Personal hygiene and hand washing; RCT=Randomized controlled trial; SNAP-Ed=Supplemental nutrition assistance program education; USDA=United States Department of Agriculture; WIC= Supplemental Nutrition Program for Women, Infants, and Children

Table 2: Summary of the characteristics on nutrition education curriculum or program development, implementation, and evaluation studies among refugees in high income countries

Author & Publication Date	Study Objectives	Study Participants	Study Type	Sample Size	Intervention/Program Strategy	Length and Frequency	Major Findings	Study Quality
Trapp (2010) (35)	To assess the outcome of nutrition training program among service providers and its impact on refugee nutrition outcomes	Immigrants and refugees from 7 Asian and African countries.	Process evaluation with focus groups and participants observation	200 organizations or 453 individual service providers.	Utilize a dialogue-base outreach approach using visually based nutrition flipchart, outreach training manual, food wheel poster and topical handouts translated in 15 languages.	16, 45 minutes sessions	The program materials, particularly flipcharts, helped service providers to initiate nutrition outreach	9
Wieland, et al (2012) (21)	To develop and evaluate a socio-culturally responsive fitness program using a CBPR approach	Adult refugee women from Somalia and Cambodia, Hispanic immigrants, and non-immigrant African Americans	Program development with focus group	45	Exercise and nutrition classes. A 6- week program with two 90-minute classes per week was conducted among refugee and immigrants and African American women.	6 weeks, 2 times per week, 60 minutes exercise and 30 minutes of nutrition education each time	High acceptability of the program among refugees	10.5
Haley et al (2014) (34)	To evaluate the adaptation of a nutrition education curriculum (*Eat, Walk, Sleep healthy living tool*) using a CBPR approach	Newly arrived adult refugees from Burma	Curriculum development/adaptation with focus group	20	No intervention per se but a discussion for evaluating the adapted curriculum. Review of curriculum content with community advisory representative, translation, visual presentation, graphics and photographs	3, 1.5 to 2 hours sessions	The CBPR approach was effective in bringing health prevention dialogue among newly arrived Burma refugees. Refugees identified community health workers as effective medium for delivering nutrition education.	7.5
Mannion, et al (2014) (32)	To assess the acceptability of a food shopping resource guide (*The Market Guide)*	Adult refugee women from Sudan	Curriculum development	8 women	Received Market Guide. Portable, washable, pictorial food shopping resource was developed by a nurse-nutritionist that could help	Single 45 minutes session.	*The Market Guide* was of limited use to the participants in informing food choices and purchases. They relied on family and friends for information about food choices and purchases.	9

Gunnell, et al (2015) (20)	To evaluate the integration of a nutrition education program (*SNAP-Ed*) into *ESL* classes and testing the feasibility of using food purchase to evaluating nutrition program	Adult refugee women from 17 different countries.	Program development/adaptation	98	Nutrition lessons at work-site training center. Certified *ESL* teachers assisted NEAs in teaching nutrition concepts. Lessons were based on 2005 USDA Dietary Guidelines using objectives of *SNAP-Ed* curriculum for adults and youth, healthy eating, and budgeting concepts. Healthy Living Flipchart.	12 weeks, 1 hour session	The integration of *SNAP-Ed* into *ESL* classes at a worksite-training center allowed a hard-to-reach eligible population to be reached	9
Wieland, et al. (2016) (38)	To develop a nutrition education manual using CBPR and train the users	Adult and adolescent refugees from Somalia and Sudan and Hispanic immigrant.	Curriculum development	127	Work groups of community members and health scientists developed an intervention manual with 12 content modules that were based on social-learning theory. Family health promoters from participating communities were trained to deliver the intervention through 12 home visits during the first 6 months and up to 12 phone calls during the second 6 months.	250 hours of training, 64 sessions	The CBPR approach was effective to improve physical activity and dietary quality among immigrant and refugee families	8.5
Bronars, et al (2017) (33)	To describe fidelity of CBPR guided-intervention to improve physical activity and dietary quality	Refugee families from Somalia and Sudan and immigrant Hispanic families	Process evaluation with observation and feedback	160	Family mentoring and education sessions. Used trained Family Health Promoters (FHP) and standard curriculum. FHP monitored family progress through phone-call, protocol deviation recorded by FHP	Working group met biweekly to develop the intervention. 13 home visit, each 30-90 minute. 12 phone calls every 2 weeks over 6 months	The longitudinal community co-creations of fidelity mechanics and measures provided an important platform for local and cultural sensitivity to study procedures	1

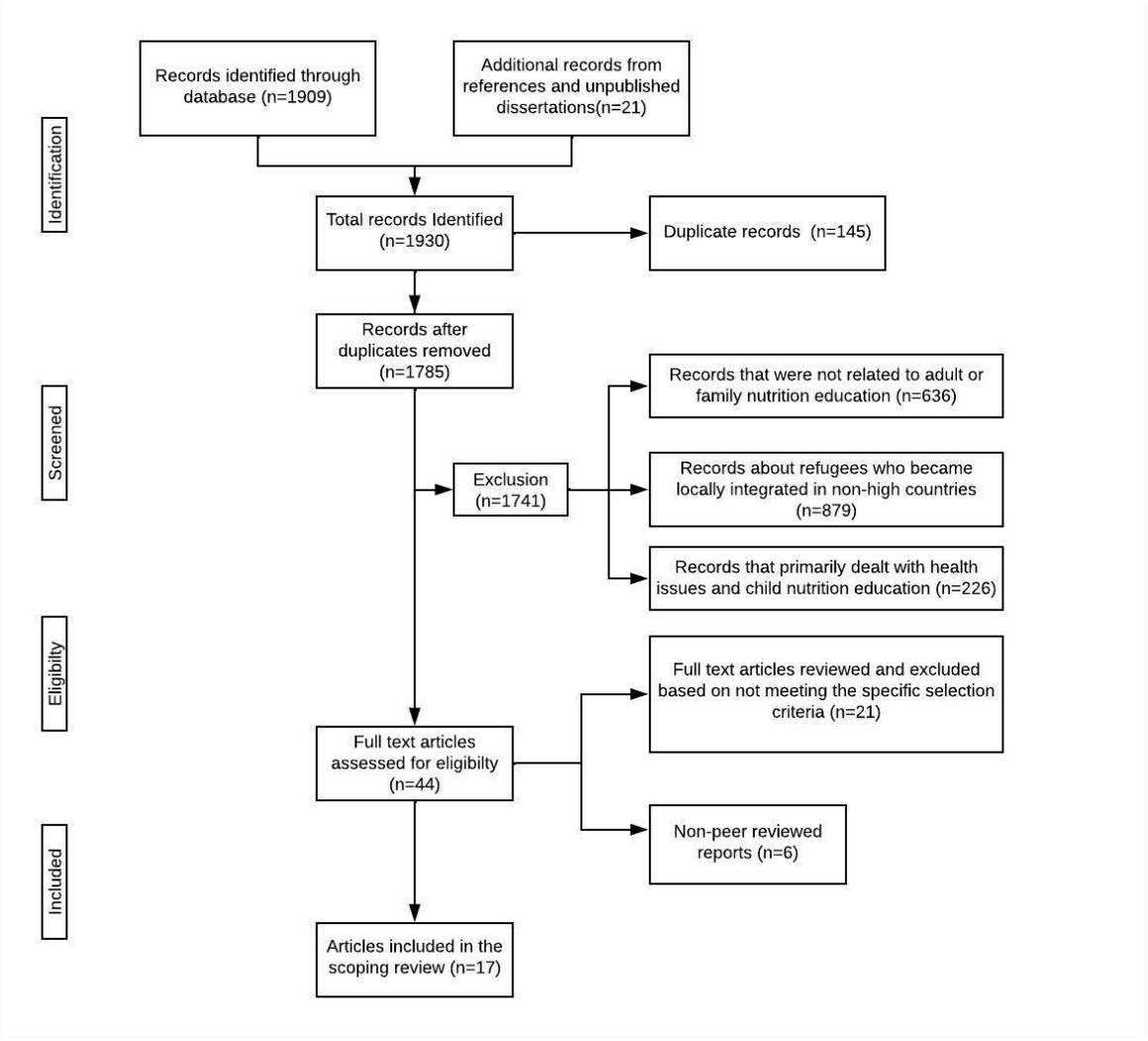
Terragni, et al (2018) (39)	To develop and evaluate a nutrition education resources (*Healthy Start*) for use among introduction program advisors	Adult women and women refugees from Somalia, Eritrea, and Syria.	Curriculum development	200	Used the intervention mapping framework to design the program: developed easy-to-use curriculum for advisors (in Norwegian language), pilot test the curriculum with advisors being observed by researchers. after which the advisors were interviewed by the research to evaluate the teaching sessions, with a suitability assessment	Pilot testing 3 times Each session lasted an ordinary school day (8:30 - 14:00)	The material was suitable for the heterogeneity of participants and was easy to use. Participants found the message of the pictures and slides to be clear and informative	6.5
Henderson and Sander, (2019) (31)	To develop, implement and assess impacts of a newcomer food and nutrition program (*Growing Root*)	Adult women and men refugees from Burma, Congo, Philippines, and Syria	Program development and impact evaluation	22 main participants and two case workers and one volunteer.	Nutrition education program. Nutrition education topics covered were healthy eating, food packages, grocery store tour and cooking	8-week program	The program helped participants adjust to their new food environment without sacrificing healthy food traditions.	7
McElrone, et al (2020) (36)	To adapt an existing cooking curriculum to address food security and refuges' unique acculturation using CBPR approach	Adult female refugees from Burundi and Congo	Curriculum development	18	No intervention. Adapting existing curriculum to the Burundian and Congolese cultures.	8, 1-hour long sessions	The cultural adaptation process resulted in 17 major categories of curriculum adaptation and the application of all five cultural adaptation strategies in the various curriculum adaptations.	6
McElrone, et al (2020) (37)	To test the feasibility and acceptability of implementing and evaluating (*Pika Pamoja ((Cook Together)*) using CBPR approach	Adult female refugees from Burundi and Congo	Program implementation	10	Cooking curriculum implementation. Eight-session cooking curriculum for Burundian and Congolese refugee families culturally adopted from the evidence based i-Cook 4-H curriculum	8 weeks, 2 hours sessions	The *Pika Pamoja* was feasible to implement and was accepted by the target population.	13.5

EWS=Eat Walk Sleep; CBPR=Community-based Participatory Research; FGD=Focus group discussion; FHP=Family health promotion; N/A=Not applicable; NEA=Nutrition Education Assistants; NR=Not reported; PHHW=Personal hygiene and hand washing; RCT=Randomized controlled trial; SNAP-Ed=Supplemental nutrition assistance program education; USDA=United States Department of Agriculture; WIC= Supplemental Nutrition Program for Women, Infants, and Children

Table 3. Suggested recommendations for future nutrition research and practice

	Recommendations for Research on Strategies of Nutrition Education among Refugees
1	More studies that meet criteria for rigorous study design and scientific reporting and will allow for easy comparability across studies are needed
2	Future studies that determine feasibility of validating outcomes of measure tools among this population
3	Assess other research needs among this population such as impact of immigration policies on food access, access, and utilization of the food system e.g., charitable food system, food environment, food safety, healthy eating habits, health care system, transportation, and language skills and how those areas of need affect nutrition behavior.
4	Consideration for segmentation targeting research (research targeting different subgroups) within the refugee community
5	Conducting a cost-benefit analysis of such segmentation targeting research
	Recommendations for Practice on Nutrition Education among Refugees
1	Comprehensive training for educators which may include community engagement orientation, motivational interviewing principles, family-focused communication, English as Second language teachers training, and competency.
2	Use of approaches that include need-based and hands-on participatory methods
3	Identify strategies to address cultural and language barriers in nutrition education
4	Adaptation of existing tools or programs to address nutrition needs of various subgroups within this population. For example, incorporating nutrition classes for refugees in ESL classes and development of assessment tool that is well suited for this population in EFNEP or SNAP-Ed programs
5	Need to consider settings where educational activities take place during program design to address the concern for safety when education process is taking place
6	Inclusion of clients in all phases of nutrition education processes to build trust and enhance honest response for quality program evaluation

Figure 2-1. Flowchart of the Article Selection Process



CHAPTER 3

BARRIERS AND ASSETS THAT INFLUENCE NUTRITION BEHAVIORS AND PREFERENCES FOR RECEIVING NUTRITION EDUCATION OF SOMALI REFUGEES

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Abstract

Background: Refugees have nutrition-related needs that are different from other populations in their host country, due to prior trauma, cultural values, beliefs, diversity, and language. To effectively address their nutritional needs for optimal health outcomes, it is important to understand barriers but also assets, such as gardening and cooking skills, and network of social support. Nutrition education should be tailored to the needs, skills, and preferences of refugee audiences.

Objectives: This study examines i) barriers and assets that influence nutrition behaviors and ii) preferences for nutrition education among Somali refugees in Utah.

Design, setting, and participants: Semi-structured phone interviews were conducted with 20 Somali refugees (19 females, and 1 male) in Utah who self-identified as food gatekeepers for their family and had lived in Utah for < 5 years. Interview questions were revised after review by an expert panel. Questions assessed barriers and assets for healthy eating and preferences of approaches for nutrition education. Interviews were conducted in Somali.

Measurable Outcome/Analysis: Audio recordings of interviews were translated to English, transcribed and uploaded into NVivo for storage and organization. A multi-step process by two independent researchers was used to code and analyze the data, and to identify codes and themes.

Results: Barriers for healthy eating included: 1) availability of ingredients and equipment needed for cooking; 2) accessibility of food, transportation, finding items in grocery stores, language barriers; 3) affordability of food and budgeting. Assets included enjoyment of cooking, including children in food preparation, and social support. Preferences for nutrition education included group education with a Somali instructor from a professional background. Content of interest included food safety, cooking American foods, and child nutrition.

Conclusion: Identifying and addressing specific assets and barriers and using an educator from the target culture may improve the effectiveness of nutrition education targeted to Somali refugee populations.

Introduction

From 1975 to 2021, the United States (US) received 3,466,988 refugees identified by the UN High Commission for Refugees (UNHCR)[1]. There has been a significant increase in African refugees in the US in recent years, with the majority coming from Somalia[2]. Approximately 60,000 refugees live in Utah, many of whom are Somalian[3]. A vast majority of the Somali refugees reside in Salt Lake County, but some of them also reside in Weber County, Davis County, Cache County, and Utah County[3]. Refugees face many barriers yet have many strengths that influence their nutritional behavior. Refugees face nutritional challenges in their first few years of post-resettlement, which could be addressed with nutrition education. This nutrition education should be individualized to meet needs. Educators should seek input from refugees regarding their preferences for nutrition education and delivery method.

Refugees face many nutritional challenges related to obtaining, preparing, and accessing appropriate and desired foods in their resettled communities. These challenges can be associated with language barriers or literacy level[4] and can be exacerbated by other socio-economic factors including low income and lack of transportation access[5,6,7]. Refugees also lack access to food outlets that stock traditional[8,9,10] and healthy food options, which hinders healthy food choices and promotes unhealthy eating[11]. Lastly, refugees often have difficulties accessing information about foods, shopping, and recipes in their host country[12].

Besides these challenges, refugees have many strengths that can positively influence their nutrition behaviors. Refugees typically come to the US with previous knowledge about

farming, gardening, and cooking skills that can be used to support optimal health[13]. Refugee populations have substantial support from their community, family, relationships within their groups that promote healthy food traditions. They learn through relatives, friends, or other community members who explain where to purchase ethnic foods, spices, and ingredients[13]. Most refugees are used to cooking meals from scratch and prefer to use fresh fruits and vegetables, plant-based foods and limited red meats[14,15].

To overcome the food and nutrition related challenges that refugees face as they get resettled, and to develop an effective nutrition education for the refugees, it is important to understand what barriers and strengths exist. In addition, it is critical to understand how refugees prefer nutrition education to be delivered to meet US Dietary Guidelines for a well-balanced diet. Any nutrition program targeting refugees including nutrition education programs and intervention programs should consider these strengths that the refugees have.

Nutrition education is one approach for improving nutrition knowledge, skill, literacy and for promoting self-efficacy among diverse audiences such as low-income adults, college students, immigrants, and refugees[16,17,18]. To improve nutritional outcomes for refugees, nutrition education should be individualized and built on the values, beliefs, and existing practices of the refugees rather than traditional nutrition education models[19,20]. This would alleviate the common issues the refugees face.

Limited but growing research on refugee health indicates that poverty, poor access to health services, and food insecurity are common issues among refugees resettled in the US[21,22,4,23]. Resettled refugees are at an increased risk of experiencing a dual burden of malnutrition. The dual burden is attributed to the preexisting condition of micronutrient

deficiencies experienced by refugees prior to resettlement, as well as a high risk for chronic diseases attributed to the excess intake of sodium, fat, and sugar upon resettlement[24] associated with food security[10].

In recent years, more studies have showcased the programming of nutrition education interventions among refugees. Few studies have shown the impact of these interventions in changing nutrition-related behaviors among refugees, such as learning how to navigate new food environments[25,26], healthy food purchases[19,27], and food safety knowledge and practices[28,29]. Although these previous nutrition education studies showed positive impacts of nutrition education interventions among the refugee population, a study that interviewed nutrition educators across the US identified some gaps in the delivery of nutrition education among refugees[30]. These gaps include lack of engagement in learning activities such as cooking demonstration and innovating strategies to address language barriers and fostering a safe learning environment.

Refugees are among the populations that are at risk of health disparities which are often addressed using community-based approaches to education programs and other services that address disparities in health and nutrition outcomes[31,28,27]. A recent scoping review identified collaborations between researchers and refugee communities in nutrition education programming. This included involvement of refugee community members in identifying their nutrition needs and in providing feedback in the development of nutrition education curriculum/resources[32]. However, most of the studied nutrition education programs came short of incorporating the educational preferences of the refugees into the curriculum[33,34,35]. Furthermore, the perception and preference of

refugees in how a relevant nutrition education service should be delivered to meet their unique cultural needs is limited in the literature.

The current study solicited input from refugee community members to understand their preferences and desires in nutrition education and its delivery. The objective of this study was to identify barriers and assets of Somali refugees in Utah that influence their current nutrition behaviors as well as their preferences for receiving nutrition education.

Methods

Theoretical Framework

The two theoretical frameworks helped to guide this study were the Liamputtong's nutritional determinants of health and the bidirectional theory of acculturation. The Liamputtong's nutritional determinants of health explains how the individual's dietary choices are influenced by socioeconomic and cultural factors, which are themselves influenced by food availability, accessibility, and affordability[36]. We used this theory to identify the barriers to healthy eating among Somali refugees in Utah.

The bidirectional theory of acculturation allows us to recognize that refugees are co-creators of food culture; they do not only adapt to, but they also shape the new culture which they inhabit, altering how they grow, cook, and consume food in the new community[37]. This theory was used to explore the assets that the Somali refugees in Utah possess and their access to healthy foods that influence their nutritional behavior.

Study Design

Semi structured phone interviews were conducted with Somali refugees in Utah who were food gatekeepers (someone who acquires and prepares food for the family). The study was approved by Utah State University Institutional (USU) Review Board (IRB) office of research. The IRB protocol number is 12384.

Participants and Recruitment

Participants were recruited through word of mouth within Utah Somali community from Cache and Salt Lake counties in Utah, from April to May 2020. The Utah Refugee Education Center (URETC), the Catholic Community Services (CCS), and the leaders of the Somali refugee community assisted to recruit 20 adult members of the Somali community aged 18 years and older. The participants were food gate keepers for their families and lived in Utah for less than five years.

A letter of information which explained the voluntary nature of participation was shared, read, and discussed with the refugees. The recruitment materials were written in English and Somali languages, at a reading level appropriate for low literacy audiences. This material also contained the contact information of the researcher. With the help of community leaders and URETC, the concept of and the consent for the interview was explained to the participants. Due to COVID-19, there was no physical contact after the recruitment. Anybody who was interested in the research contacted the researcher via telephone or text message. The name, contact information, and years in the US of the potential participant were then added to a list collected by the researcher. Of the list of interested participants, 35 met the inclusion criteria of which 20 were selected to

participate in the interview. The researcher then contacted the participants and provided them with the details regarding interview date and time.

Instrument

The interview questions were initially developed by the research team and revised with feedback from expert panel of nutrition education professionals (comprised of Utah State University faculty members, Supplemental Nutrition Assistance Program Education (SNAP-Ed) and Expanded Food and Nutrition Education Program (EFNEP) directors) and the Somali community leaders (for cultural acceptability). The interview questions were designed to assess barriers (such as limited time for food preparation), assets (such as cooking skills), and preferences of approaches for nutrition education. Appendix D contains the interview questions that were administered to the participants.

Data Collection

Data were collected through phone interviews in Somali and its dialects by a researcher (HN) in May and June 2021. After completion, participants were mailed a $25 Walmart gift card to thank them for their time. The interviews were audio recorded and transcribed verbatim. Interviews were conducted until saturation was reached and no new themes emerged.

Data Analysis

A multi-step process was used to analyze data and identify themes and patterns. First, the interviewer, who is the graduate student, asked questions in Somali and translated the responses of the open-ended interview questions into English. Then, the interviews were

transcribed and uploaded into NVivo (Version 12 PLUS; QSR International Pty Ltd., 2018) for storage and organization. The transcripts were reviewed for accuracy by two researchers (HN, AA). Next, the two researchers collaboratively developed codes for analysis using the study objectives as a guide. Multiple meetings were held to resolve differences in code lists. Three transcripts were coded and then reviewed together, with revisions made to the code list and definitions. The remaining transcripts were coded independently with weekly meetings to discuss progress, assess consistency, and highlight discrepancies in coding. The two researchers reviewed the codes and recalibrated from time to time as needed with the help of the rest of the research team. This process was continued until all data were coded. After coding was finalized, codes were organized as themes. Then the transcripts were reviewed to select representative quotes for each theme. Upon completion of the coding process, a descriptive statistical analysis of the demographic information was conducted using SPSS (Version 26.0; IBM Corporation, 2019).

Results

Social Demographics

The socio-demographic data are summarized in Table 1. Participants were between the ages of 27-60 years old with a mean age of 40.9 (SD=9.8) years. Of the 20 participants 19 were female and 1 was male. The average household size is 5.7 (SD=3.5).

Table 3-1. Demographic Characteristics of Participants

Characteristics	
Participants (n)	20
Age in years (mean ± SD)	40.9 ± 9.7
Range	27-60
Marital status	
Married (n)	8
Single (n)	12
Highest level of education in years (mean ± SD)	9.3 ± 4.7
No Schooling (n)	14
Some Schooling (n)	6
People who share food together (mean ± SD)	5.7 ± 3.5
Children ≤ 5 years (mean ± SD)	0.95 ± 1.1
People of age 6 – 17 (mean ± SD)	2.7 ± 2.0
People of age ≥ 18 (mean ± SD)	2.1 ± 1.1
Employment	
Employed (n)	12
Unemployed (n)	8
Length of time in refugee camp in years (mean ± SD)	9.1 ± 7.0
Length of time in the US (mean ± SD)	4.2 ± 1.1
Length of time in Utah (mean ± SD)	4.2 ± 1.1
SNAP funds	
Receiving SNAP (n)	17
Non receiving SNAP (n)	3
WIC Benefit	
Receiving WIC benefit (n)	12
Not receiving WIC Benefit (n)	8

The thematic analysis of the participant responses identified three main themes.

Theme 1: Nutritional Knowledge, Practices, and Dietary Habits

An analysis of the foods that family members normally eat identified some important sub-themes. These sub-themes are discussed below.

Subtheme 1a: Family Food Habits

Sub subtheme 1a1: Family Meal

The thematic analysis revealed that Somali refugees normally eat three meals a day, breakfast, lunch, and dinner (see Figure 3.1 in Appendix C). For breakfast, the foods commonly eaten included (food items identified by 50 percent or more of the respondents) Somali traditional breads (Anjero, Mufo, Malawah, and Jabati), other breads (bread and pancake), meats, beans, peanut butter, and cereals (hot cereal and cold cereals). Other foods less commonly consumed (other food items identifies by less than 50% of the respondents) for breakfast included fruits and vegetables, and dairy products. The main drinks during breakfast were tea and coffee.

"For breakfast, we eat bread and eggs, anjero and beef stew, bread with peanut butter and jam, tea and milk." Participant No. 1.

"We eat for breakfast anjero (Somali thin bread), eggs, organ meat like kidneys, orange juice, bread, peanut butter sandwich, malawah, bread with tea, milk, sometimes fried potatoes. My children eat only Somali foods now." Participant 19.

For lunch, the common foods were rice, meat, and pasta with some fruits and vegetables. The less common foods for lunch included Somali traditional breads, soor (corn meal) and Beans.

"During lunch, we eat rice with goat meat and some vegetable, like tomatoes and onion cooked together, spaghetti with ground beef and vegetable souce. Jabati, and soor (corn

meal). Avocado, banana smoothie and milk. Sometimes mango or apple juice." Participant No. 10.

"For lunch we eat rice (I sometimes cook the rice and the sauce together or separately), pata with tomato sauce with meat, and sometimes soor (corn meal) with sauce and milk. The sauce for the rice or the pasta has either goat meat or beef in it. We buy the meat from the community stores that sell halal meats. With the rice, we chicken or fried fish. With pasta, we eat goat meat or beef." Participant No. 14

The common foods for dinner were beans, and non-traditional breads. The participants indicated that they also eat meat, Somali traditional bread, cereals, and dairy products which constituted the less common foods. Both the traditional and the non-traditional breads were usually eaten with vegetable sauce and some meats.

"Most of the time we eat for dinner light foods, like oatmeal, mung beans with sesame oil, milk, sometimes ambulo (dry beans with rice)." Participant No. 15.

"Peanut butter, beans with bread, oatmeal with milk, anjero." Participant No. 20.

The frequencies of these meals are shown in Table 2.

The data revealed that the Somali refugees in Utah eat mainly their traditional foods for the first few years. The most common non-traditional foods they adopted, since they arrived in the US, include breads and cereals. Most of the respondents indicated that they do not consume enough fruits and vegetables. The consumption of fruits and vegetables was taking place mainly during lunch. Fifty percent of the respondents indicated they consume fruits and vegetables during lunch and 10 percent during breakfast.

Table 3-2. Results of the thematic analysis in relation to the common foods the participants eat.

Meal	Number of Participants	Percent
Breakfast		
Other breads	17	85
Somali traditional breads	17	85
Meats	16	80
Beans and peanut butter	13	65
Cereals	12	60
Fruits and vegetables	6	30
Dairy and dairy products	3	15
Coffee and tea	3	15
Potatoes	2	10
Lunch		
Rice	20	100
Meats	20	100
Pasta	18	90
Fruits and vegetables	10	50
Somali traditional bread	7	35
Soor	7	35
Beans	2	10
Smoothies	2	10
Dinner		
Beans	12	60
Non-traditional bread	11	55
Meats	8	40
Somali traditional bread	5	25
Cereal	5	25
Dairy and dairy products	4	20
Pasta	3	15

Sub subtheme 1a2: Children's Preference for Somali versus American Foods

When asked whether their children prefer Somali food or American food, the respondents provided mixed responses. The children of the newly resettled refugee families prefer their traditional foods. Some of them, because they are too young and are not exposed to foods not prepared at home, and some of them because they just prefer traditional foods.

"*My children are very young. They only know my food and did not get access to American foods yet. They prefer more traditional foods that are less sugary*." Participant No. 10.

However, participants with children that were exposed to American foods, indicated that their children prefer American food, such as cereal, fruit drinks, chips, pizza, McDonald foods, and Kentucky Fried Chicken (KFC) foods. To satisfy the children's desire for the American foods, participants indicated that they buy some of these food items, like pizza, for their children when they can afford. Participants reported that fast foods are expensive and they buy it for their children only when they get a paycheck. Some participants make sandwiches for their children in their own way with their own ingredients.

"*They like American foods, like cereal, fruit drinks, chips, pizza, and McDonald foods. Specially, when I get the paycheck, I have to buy pizza or McDonald foods and drinks*." Participant No. 18.

"…*I bake bread and make them sandwiches*." Participant No. 13.

One participant who inhabited in a different country (not a refugee camp) prior to resettling the US indicated that her children are accustomed to the traditional food of that country.

"…*My children did not like American foods. They prepare Arabic foods because they come from Egypt. They like baked fish and chicken and eat lot of greens like maluqiya and collard green and other green beans, peas, and other vegetables*." Participant No. 15.

Subtheme 1b: Family Cooking and Eating Practices

Sub subtheme 1b1: Cooking Responsibilities

When the participants were asked about who cooks for the family, two main results emerged; women are responsible for cooking for the family, and children help the mother with the cooking. Most of the participants in this interview indicated that they are responsible for the cooking in their household. This is in line with the Somali tradition, where women are responsible for the family food including cooking and feeding the family. However, when the children grow up, specially, the girls, they sometimes take over cooking for the family.

"*I do all the cooking for my family*." Participant No. 10.

The children usually help the mother in cooking or cleaning, depending on their age. They help in the food preparation work, like cutting and peeling some vegetables and salads. The children are also getting training as they help. The husbands sometimes help in food preparations and cleaning. The refugees try to limit the burden they put on the children when it comes to helping the mother to cook the food and clean the dishes. In Somalia the children, particularly, the girls take the cooking responsibility for the family at a relatively younger age.

"…*My children mostly help me with food prep work like cutting and peeling some vegetables and salads*." Participant No. 15.

"*When my husband is off work, he helps me with the food preparation and cleaning*." Participant No. 10.

"*My children are still young though in Africa, 9 years old can cook and help the family.*

Here is different and I am scared to ask them help in cooking." Participant No. 19.

Nowadays, the kids learn a lot more about cooking than the mother teaches them, thanks to the internet. They learn new recipes from the internet.

"*My daughter cooks a lot of stuff. She is a very good cook. Besides what I taught her, she learned a lot from the YouTube*." Participant No. 6.

Sub subtheme 1b2: Family Eating Time

During mealtime, some families eat together, and some other families eat separately. Most of the respondents indicated that they eat together (at the same time) the main meal. When eating together, they may eat from the same plate or separate plates.

Family eating the main meal together is consistent with the Somali tradition where families eat at the same time during lunch, which is the main meal during the day in Somalia. They eat at different times during breakfast and dinner.

Some participants reported that they eat together as a family during lunch, sit on mat, and eat from the same plate. Other participants indicated that they eat together but in separate plates.

"*Yes, we eat together at the same time, but we did not share the same plate. Each one eats and pours on his own plate*." Participant No 15.

"*We eat separately during breakfast and dinner. We eat the lunch in the same plate. We eat on a mat on the floor. That is the two days that I don't work*." Participant No. 11.

The younger children, usually eat with the mother and from the same plate for she is feeding them.

"…*The two younger ones eat with me and eat from my plate*." Participant No. 13.

Some participants indicated that their families do not eat together at the same time. In other words, everybody eats when they want. This is mainly because of different schedules between family members.

"*No, we do not eat together most of the time. Everyone eats at a different time*." Participant No. 17.

"…*the table and I pour the food on a big plate then everyone gets his own plate*." Participant No. 20.

"…*my 16 years old son usually eats in his room*." Participant No. 12.

Sub subtheme 1b3: Cooking Desirability

Most participants indicated they enjoyed cooking for their family. Their reasons for enjoying cooking for their family varied and included health reasons, such as high blood pressure, dislike for fast foods, that it is easy for them to cook, and that it is an exercise for them. It is the Somali culture that women cook the food and provide the meals for their family.

"…*I enjoy cooking because I don't like foods from fast food places and my children don't like greasy foods. Also, I have high blood pressure, I like to cook my food*." Participant No. 15.

To highlight how they enjoy cooking for their family, some participants indicated that they even try to use the internet to learn how to cook new foods. They use the YouTube

for new foods and they use some apps to check the ingredients to see if it is halal (lawful) or haram (unlawful).

"*… I enjoy cooking and I like to cook new foods. Sometimes I watch from You Tube to learn how to cook certain foods and make foods better*." Participant 10.

"*… I have apps to check the ingredients if it is Halal or Haram. I read the labels to check if the ingredients contain gelatin*." Participant No. 8.

Regarding things that make it hard to prepare food for the family, the difficulties cited by the participants include the difficulties associated with standing up while cooking, no time for cooking because of work, hate for cooking certain food items, and cooking being hard work. The specific foods they don't enjoy cooking include fried foods, anjero, and malawah because they involve a lot of standing. However, there were some participants that indicated that they do not have any difficulties cooking because they are used to cooking from scratch every day.

"*It is a lot of work. However, lately, I was getting help from some Somali women who prepare spaghetti sauce that would last us at least a week. This makes it easy for me. I just need to cook pasta or rice and we eat it with the sauce*." Participant No. 12.

"*Sometimes I hate to cook Jabati (Somali bread) it is too much work*…" Participant No. 15.

"*Making jabati hurts my shoulders*." Participant No. 16.

"*Cooking while standing up. My feet get swollen and my back hurts*." Participant No. 7.

"*… I don't enjoy cooking anjero or malawah. My older daughter makes the malawah*." Participant No. 14.

Subtheme 1c: Factors Influencing the Decision Process About What to Feed the Family

The data revealed that the decision regarding what to feed the family each day was based on four factors: preference of family members, having diversified foods, availability of the food, and time constraint.

Sub subtheme 1c1: Preference of Family Members

Some participants indicated that they ask their family members (children or husband) what they would like to eat that day and make that for the day. They usually give the children's preference the first priority. However, they sometimes ask the husband what he would like to have for the day and go from there.

"*I will ask the children their preference and we agree together what will be cooked that day*." Participant NO. 15.

"*Sometimes I ask my husband his preferenc*e." Participant No. 10.

Sub subtheme 1c2: Having Diversified Foods

Participants stated that having the same foods every day is not good for them. Consequently, they try to diversify their daily meals by cooking today meals that are different than what they had yesterday.

"*Based on what we ate yesterday. I feed my family with a variety of foods. If we eat pasta today, tomorrow we eat something else*." Participant No. 7.

Sub subtheme 1c3: Availability of a Food Item

Other basis for the decision of what to feed the family indicated by the participants is what foods are available. They prepare the food item for which they have the ingredients.

"*It depends on the available food ingredients that I have*." Participant No. 10.

Some participants indicated that when they don't have the ingredients for the meal they want to prepare, for whatever reason, they just go ahead and order fast foods.

"*When I do not have any ingredients to prepare a home meal, I order them a pizza or McDonald foods*." Participant No. 5.

Sub subtheme 1c4: Time Constraint

Availability of time is another factor they consider. Sometimes, they run out of some of the ingredients and do not have time to buy it. To go around this time constraint, they try to buy their groceries when they have a day off from work.

"*I get all the things I need beforehand when I was working, I used to check what I am missing and buy once a week all my grocery when I was off*." Participant No. 19.

Subtheme 1d: Choosing Healthy Foods

Participants indicated they chose food for different reasons. Some choose based on what they think is healthy. Some follow healthy recipe handout from the WIC program and purchase the foods listed there.

"*When I go to the WIC program, they give me healthy recipe handouts. I buy whatever it says on there. Anything they say is good for the children, I get it*." Participant No. 13.

Similarly, they get some advice from their children's doctors regarding what is good for the children.

"*…my children's doctor told me do not give them fruit juices. Instead give them a 100% juice and all the WIC drinks like grapes and oranges are 100% juice. But the children did not like it at the beginning. Now they drink it. Before, we used all kinds of fruit drinks, I did not understand the difference between the two*." Participant No. 19.

Subtheme 1e: Foods Participants Consider Healthy or Unhealthy

When asked what type of foods they consider healthy or unhealthy, though they know more about their traditional foods, the participants indicated that they consider the following foods as healthy: fresh and frozen fruits (bananas, figs, orange, apple, papaya, watermelon, mango, avocado, grapefruits, and lemon) and vegetables (collard green, lettuce, cabbage, carrots, green pepper, tomatoes, potatoes, and spinach), fish, meats, chicken, eggs, milk, beans, lentils, nuts, olive oil, whole wheat flour, corn flour, less sugary foods, and smoothies.

Some participants indicated that they don't drink milk alone but add it in the smoothies. Some other participants indicated that using the concept of MyPlate is healthy.

"*… a plate that has all of the food groups, half of the plate is fruits and vegetables, one piece of chicken, and small amount of rice. I sometimes make fruit smoothies, lemon drinks, and eggs*." Participant No. 5.

The participants, generally, consider foods with a lot of sugar, oil, or salt as unhealthy. The specific foods they consider as unhealthy include too much meat, pasta, rice, flour,

sugar, oil, soda, bread, ice cream, McDonald foods, foods that are not halal, such as foods that have pork and pork products in it.

"*Consuming rice and spaghetti every day is not healthy. It makes you sick or gain weight if you eat all the time*." Participant No. 20.

Participants stated they will replace the consumption of too much spaghetti, rice, oil, and sugar with more fruits and vegetables.

Subtheme 1f: Reading and Understanding Food Labels

Most of the participants do not know how to read or write. Hence, most of the participants do not read food labels. However, their children help them understand what is in the package. In addition to illiteracy, some participants indicated that they don't read labels because they don't use packaged food.

"*I don't understand labels. I cannot read or write. My children tell me what is in the package and the label*." Participant No. 18.

"*I don't use packaged food*." Participant No. 19.

Other participants indicated that they look for the expiration date, whether that food item need to be refrigerated or put in the freezer, and if it contains pork or pork products.

"*I look at the expiration date*." Participant No. 7.

"*I can see what needs to go to the fridge or be frozen*." Participant No. 8.

Theme 2: Assets and Barriers to Healthy Cooking and Eating Practices

The things that make cooking for the family easy for the participants were having the ingredients and equipment needed for cooking, having transportation to get the groceries, being able to find the food item they want in the grocery store, and being able to identify the food prices. These are the sub-themes revealed by the data and are discussed below

Subtheme 2a: Availability of the Ingredients and Equipment Needed for Cooking

Sub subtheme 2a1: Ingredients

Participants indicated that they usually have all the ingredients they need to cook. When they run out of ingredients, they just buy them. However, there are times when they cannot afford to buy them because they don't have enough money, or they run out of food stamp.

"*Most of the time I have all the ingredients I need to cook what I want. When I run out of some ingredients, I just buy it."* Participant No. 1.

Sub subtheme 2a2: List of the Equipment

Participants generally indicate that they have the major equipment they need for cooking. However, there were some that indicated that they are missing some equipment. The missing equipment include a cake mixer, a pan for the cake, some of the cooking pots, a pan for anjero, a toaster, a grill, and a frying pan. Some of the equipment get ruined during the process of moving from one apartment to another.

"I have all the equipment I need for cooking." Participant No. 1.

"*I don't have some of the equipment such as the pan for anjero, toaster, grill,…*" Participant No. 3.

"*I have some of the equipment, but I don't have cake mixer, and pan for the cake, and some cooking pots, medium size. We are a family of five*." Participant No. 15.

Generally, the problem of lack of equipment and ingredients is worst for the newly arrived refugees. This problem subsides as they stay longer.

"*Now we are okay, but at the beginning it was very difficult to have all the basic needs for the kitchen. It took us a while to get some of the ingredients and equipment that we need for cooking.*" Participant No. 20.

Regarding specific equipment, the participants were asked if they own and use the following equipment. This equipment include oven, stove top, dish washer, refrigerator, slow cooker, pressure cooker, blender, mixer, and microwave. This equipment is not readily available in the refugee camps or the refugee's country of origin. All participants indicated that they have an oven, a stove top, refrigerator, and a blender and they use them. Some equipment, dishwasher, pressure cooker, mixer, and microwave, are owned by some of the participants and not by others.

Participants indicated that they use the oven to bake/roast foods, such as cake, chicken, pizza, meat, bread, rice, and fish.

"*Yes, I have an over and I use it to bake chicken, cookies and pizza*." Participant No. 10.

To use the dishwasher, some participants indicated that they first clean the dishes by hand and then rinse them with the dishwasher. Other participants indicated that they have

dishwashers but do not use it. They wash their dishes by hand. Among these are some that did not know how to use the dishwasher.

"*Yes, I use it sometimes. I first clean the dishes by hand and then I rinse them with the dishwasher*." Participant No. 16.

Similarly, participants indicated that they use the mixer to mix the dough for anjero, malawah, and cakes. They use the microwave to warm up food and to cook noodles. Some participants expressed concern about potential health impact of the microwave.

"*Yes, I have a mixer. I use it to make the dough for malawax, anjeero and I don't cook many cakes, but I use it for that too*." Participant No. 8.

"*Yes, and I use it but not a lot because people say if you use too much is not good might cause health issue*." Participant No. 19.

Many participants indicated that they would like to have a pressure cooker, mixer, blender, and slow cooker. These are, mainly, items that they most probably did not have in the refugee camps. There are other kitchen equipment that participants indicated they don't have and would wish they had. These include frying pan, food processor, grinder, forks, spoons, knives, and thermos.

Furthermore, the participants indicated that they don't have all the utensils that they need for cooking. The utensils that some of them indicated they are missing are spatulas, whisks, peelers, knives, forks, cooking pots, tea pot, and rubber gloves. There are other items, not related to cooking, they mentioned they are missing, such as serving plates and cereal bowls, cups, thermos, etc. Of the utensils that they have, they indicated that they know how to use them.

"…*I know how to use all the utensils I have*." Participant No. 20.

"*Yes. I need cooking utensils like serving spoons, whisks, spatulas and knives*." Participant No. 18.

Subtheme 2b: Accessibility of Food in the Grocery Stores

Sub subtheme 2b1: Transportation to Get the Grocery stores

One of the barriers that newly arrived refugees have is transportation access to get groceries for the family, specifically, how to get to the grocery stores. Participants reported that the resettlement agencies teach them how to ride the bus and tracks. Hence, they take the bus or tracks to get to the grocery stores. Some of the newly arrived participants indicated that they have neighbors or relatives who can give them ride to do big grocery shopping. Otherwise, they take the bus.

"*I get ride when I do big grocery shopping, but most of the time I ride bus when I go to the grocery*." Participant No. 15.

Some participants reported that they learn how to drive after they resettle. Fathers learn how to drive first and give the mothers ride to buy groceries. Mothers learn later and then drive themselves to the grocery stores.

"*I drive and sometimes my husband drives us and we go together*." Participant No. 13.

Sub subtheme 2b2: Finding Food Items in the Grocery Stores

Another challenge that the refugees encounter, as they resettle, is finding what they want to buy in the grocery stores. Participants reported that they seek help from neighbors who

came from the same country (Somalia), if they have any. However, participants stated that as they stay in the country longer, they learn how to find what they want. Their case workers teach them and they learn from their neighbors and other community members.

"*When I was new to this country, it was hard to find the kind of foods I wanted. But there was a neighbor from Somalia who used to help me often. Now, I don't have a problem finding the food I want*." Participant No. 1.

"…*The resettlement agency that brought me here helped me buy groceries one day and they showed me where I can ride the bus to buy my groceries*." Participant No. 7.

Some participants stated that it was difficult to find food in the grocery stories because the aisles were confusing and the food is packaged and you cannot see what is inside. Participants also indicated that this frustrated them, and they end up leaving the store without getting what they wanted.

"*It was very difficult to understand how to shop for groceries. The aisles were too confusing, and it was hard to find the items that I need. It was very difficult to locate where to find flour or oil or seasonings. In Africa everything is visible, but here everything is in a box or packages and hard to understand what is in the box*." Participant No. 10.

"…*when I was new, I got vouchers from WIC, but I could not locate the items in the store and left without getting anything from the store*." Participant No. 4.

Another barrier identified by the participants to find what they want in the grocery store was language. They indicated that they did not know how to say the item they want in English or ask the employees to help them use their WIC and/or SNAP benefits. Hence,

they called somebody from their community and asked how to say the item they wanted in English. Other times, they took a picture of the item with them, if they have that item at home.

"*When I first came here, I knew nothing and could not find anything without someone helping me. Now, I can find most of what I want. I still have difficulties using the WIC vouchers. Somebody has to help me use it. I usually go to Smith's grocery store where the employees help me use my WIC benefits. When I don't know how to say the item I am looking for, I call some Somali person and ask him/her how to say that item in English. Then I tell the store employee the item I want and they help me*." Participant No. 11.

"*…I did not know how to find the food items I wanted in the store and I could not ask because I did not know how to say these items in English. I did not even know the difference between milk in containers with blue or red lids. Now, I don't have problems buying food*." Participant No. 14.

"*…when I was new, I did not know the English names of the items I wanted. So, I used to call my friends for help or take a picture of the item with me*." Participant No. 5.

The participants reported that the barriers they face as they arrive were exacerbated by the stress of not getting help. They indicated that sometimes the caseworkers were not available and their friends from their community were not answering their calls when they needed help when they run out of groceries.

"*… It was very difficult for me when I first came. I was pregnant, and the case worker was not always available. There were days that we run out of groceries. A good example is that I did not have milk and juice for my children. Instead of juice I was giving them*

black tea. During these days, I was not driving and sometimes I called friends for help in the community, and they did not answer the phone. I don't like to remember what I have been through during my first year as a single mother who does not know the language." Participant No. 19

Subtheme 2c: Affordability of Food Prices and Budgeting SNAP

Sub subtheme 2c1: Food Prices or Costs

Some participants stated that they had difficulties understanding the price or cost of food due to being unable to read. They said that when they were picking an item from the shelf, they did not choose it based on price for they cannot read the price. They may end up picking the more expensive one. Some participants indicated that they do not know if the total cost that they are asked to pay at the counter is correct. They pull the card and give it to the cashier to pay for the food they want to purchase. Some participants indicated that they understand the price or cost of food and if a food item is on sale.

"*I don't understand. I give the card to the cashier and they get their money*." Participant No. 18.

"*Yes, I understand the prices*." Participant No. 11.

"*I know that when I use the EBT card, I don't pay tax. I also understand if a food item is on sale*." Participant No. 16.

Sub subtheme 2c2: Budgeting SNAP Funds

Some participants indicated that they no longer receive any SNAP funds.

"I don't get SNAP benefits now …." Participant No. 11.

For those who receive SNAP benefits, the amount of benefit they receive ranged from zero to 560 dollars. To make their SNAP benefits last until the next month's payment, participants indicated that they first purchase the bigger items (bulk foods), such as flour, sugar, rice, spaghetti, bottled water, oil, and meats including chicken and fish from COSTCO or SAMS CLUB.

"We buy first the bigger items from SAMS Club or COSTCO, like sugar, flour, oil, and others." Participant No. 10.

"*I used to buy the big items in bulk. I used to buy sugar, flour, and rice from COSCO and I used to buy milk and meat from the Somali grocery stores."* Participant No. 11.

Participants indicated that they purchase meat from the Somali and other ethnic grocery stores most of the time because that is where they can find halal meat.

"… I buy meat from the halal stores." Participant No. 6.

One participant indicated that they use the SNAP benefits to purchase the common items, such as milk, vegetables, fruits, bread, jam, etc.

"We use the SNAP funds to purchase the common items, such as milk, vegetables, fruits, bread, jam, etc." Participant No. 7.

Other participants indicated that the SNAP benefit is not enough to last until next month's payment and that it is difficult to budget.

"Food stamps do not last the whole month." Participant No. 13.

"It is very difficult to budget." Participant No. 18.

One participant described the dilemma of the SNAP benefit as that when a person is working, his/her income will be considered in the determination of how much SNAP benefit to give. As your income increases your SNAP benefit will be decreased. Hence, because I work, the SNAP benefit I receive is not enough and I have to compensate for it with the money I earn from work. However, because rent and utilities are increasing, I do not have enough money for food.

"… when I am working, it is not enough because they consider my income, and they don't give me enough. They increase my utilities and rent and we don't have enough money for food." Participant No. 13.

Different participants explained how they cope with the fact that the SNAP benefit is not enough. One such explanation was that they use cash for the extra groceries.

"I always use more cash for extra groceries." Participant No. 15.

Another participant indicated, to cope with the shortness of the SNAP benefit, they ask other family members and the community for help until the next payment of SNAP benefit.

"…the way we last until the next month is we ask each other in the family and the community. We ask each other for help. We only have enough money for rent and the other bills so if we run out and we need food and we don't have money, we ask each other within the family to help and if no one in the house has money, we ask the community for help until the next food stamp or check." Participant No. 9.

Regarding if and when in the month they run out of SNAP funds, most of the participants indicated that they run out of SNAP funds in the middle of the month. There were some participants that indicated they run out of SNAP funds during the last week of the month.

"*Yes, we always use first two weeks and we run out*…" Participant No. 20.

Participants explained why they run out of the SNAP funds because they work and consequently, they receive less SNAP funds. This is because the amount of the SNAP funds gets adjusted with the income.

"*Before we did not run out when I was not working. After I started working, we runout of food stamps*…" Participant No. 19.

Some participants indicated that they manage to make the SNAP funds last through the month and therefore, they do not run out.

"*No, I manage until the end of the month*." Participant No. 17.

Theme 3: Preference and Experience with Nutrition and Food or Cooking Classes

Participants revealed some of their experience including whether they attended nutrition class since they arrived in the United States. These sub-themes are discussed below.

Subtheme 3a: Attendance of Past Nutrition Classes

When asked whether they attended nutrition classes since arriving in the US, 55% of the participants indicated that they never attended a nutrition class. One reason given for non-attendance was lack of time due to work schedule and raising a family as a single parent.

"No, I did not attend any classes because I was working, and I was off during weekends and that is the only time I do grocery shopping and cleaning. I am a single mother. I have to do everything myself. My children are very young." Participant No. 19.

Forty-five percent of the participants indicated that they attended nutrition class in the US. Of these, 29% indicated that they attended some nutrition teachings offered in the DI's Humanitarian Center. 43% of the participants indicated that they attended nutrition classes offered in Utah Refugee Training Center, and 28% indicated they attended nutrition classes offered in the Cache Refugee and Immigrant Connection (CRIC) center in Logan.

"At the Humanitarian Center…." Participant No. 14.

"I attended the nutrition class in the Utah Refugee Training Center." Participant No. 15.

"I attended the one at the Somali CRIC center in Lagan." Participants 9.

When asked about what was useful about the nutrition class they attended; participants indicated that they generally learned more about healthy foods. Before they attended a nutrition class, they were not able to differentiate between healthy and not so healthy foods. For instance,

"Foods like meat, fish, eggs, beans, and vegetables have benefits to the body. Before food was food. Now, we know why we need to eat meat and vegetables, that is good for the body." Participant No. 2.

"Before, I did not know which foods are which. I did not know which foods are healthy and which foods are not healthy. Now I eat a lot of fish and vegetables. Before, I did not

know beans were healthy and now I am eating a lot of beans and greens." Participant No. 9.

The participants also indicated that they learned the value of milk and how milk in containers with different color lids differ from each other.

"I learned about the value of milk and how the milk in the container with red lid differ from that in a container with a blue lid." Participant No. 14.

"We try in my family to drink milk two times a day since I learn from the class milk is good for your bone health." Participant No. 15.

Participants learned about juices. They learned about the difference between 100% juice and sugary drinks. They also learned about frozen juices.

"We learned about healthy juices and how they differ from the ones that have a lot of sugar. Before we would just grab one kind because we did not know better. We also never used frozen juice because we did not know about it. But we found out that you can have frozen 100% fruit juice. Now we can tell which one is 100% juice and which one is sugary drinks." Participant No. 16.

The value of eating more fruits and vegetables and whole grain foods was another healthy thing participants indicated they learned.

"I learned to eat more fruits and vegetables and to consume whole wheat bread." Participant No. 20.

"I learned about the value of whole grain foods." Participant No. 14.

"Also, I did not used to eat fruits and vegetables. I learned from this class that fruits and vegetables are good for you. So, I eat them now." Participant No. 5.

Another important concept that the participants indicated they learned was the concept of MyPlate in which the plate is divided into sections of grain, vegetables, fruits, and protein, accompanied by a glass of low fat or nonfat milk or a yogurt cup. They also learned the importance of not eating the same food all the time.

"I learned how to use MyPlate and put different food groups in the plate. You need to put in the plate half fruits and vegetables, one part you put grains like bread or rice. That is why I use in my family only brown and whole wheat products. The other part of the plate you put meat, eggs, beans or milk products." Participant No. 15.

"The other useful thing I learned, and I practice in my family is before I used to cook two bags of spaghetti for my family and now, I just cook one and fill the plate with some vegetables and some meat." Participant No. 2.

"… you don't have to eat the same foods all the time. It is good to alternate." Participant No. 16.

Regarding what they did not like about the nutrition classes they attended, some of the participants indicated that there was nothing they did not like about the classes they attended.

"There is nothing about the nutrition class that I did not like." Participant Nos. 16

One participant expressed concern about reducing the amount of rice and spaghetti they consume.

"…. I did not like when they taught us in class to reduce the amount of rice and spaghetti because we eat a lot of rice and spaghetti." Participant No. 9.

Subtheme 3b: Preferred Topics to Include in a Nutrition and Food or Cooking Class

The analysis of the data revealed interest in attending nutrition class and the topics to be included as a sub-sub-theme. Other sub-sub-themes identified include preferred class time, location and preferred number of attendees in the class. These sub-sub-themes are discussed below.

Sub subtheme 3b1: Interest in Attending Nutrition Classes

All participants indicated an interest in attending a class about nutrition and food in the future.

"*Yes, I would like to attend the food and nutrition class*." Participant No. 10.

Regarding the topics that participants would like to be included in the class, participants gave a wide range of responses. Some indicated that they would like that any nutrition or food related topic that is deemed beneficial be included in the class.

"*I would like that you add in the class anything we can benefit from*." Participant No. 9.

"*I am open to any topic related to nutrition education. There is not a particular topic I prefer to learn, but I am open to learn more knowledge about nutrition, like nutrients that build bones*." Participant No. 20.

"*I like all kinds of topics about nutrition education*." Participant No. 17.

One participant indicated interest in teaching in the future whatever she learns from this class to those who did not get the opportunity to attend this class.

"*Whatever topics they have to teach me. In the future, I would like to teach other people who did get the opportunity to take the class*." Participant No. 16.

Other participants indicated that they would like to learn more about food safety and cooking methods.

"*I would like to know more about food safety and how to use different cooking methods*." Participant No. 8.

"*I would also like to learn about food safety, cleaning hands before and after cooking or eating food*." Participant No. 15.

Participants indicated interest in learning more about healthy and unhealthy foods including how to distinguish between them and how to cook them. They also showed interest in learning how to cook American food.

"*I like to learn more about healthy foods and unhealthy foods. Also, I like to learn more light foods like healthy snacks*." Participant No. 15.

"*How to cook healthy American foods*." Participant No. 3.

Some participants indicated that they would like the class to cover the topics of food safety, nutrients in the food, and the concept of balanced diet.

"*Understanding different foods and their nutrients. Specially, how frozen foods are different than regular foods. How to properly defrost foods. I would like to understand vegetables and balanced diet*." Participant No. 8.

One participant proposed the inclusion of the topic of foods that are good or bad for the people with chronic diseases, such as diabetes and hypertension.

"*Foods that are good or bad for diabetes, cholesterol, hypertension, etc. In other words, foods that are healthy and foods that are not healthy*." Participant No. 12.

Other topics participants indicated interest in were child and adult nutrition, and some activities after class.

"*Child nutrition and adult nutrition. Like what foods are good for the children and what foods are good for the adults.*" Participant No. 11.

"*… and some activity after the class (Yoga or walking)*." Participant No. 15.

Sub subtheme 3b2: The Timing of the Class

Participants indicated that the time of the day and the day of the week they would like to attend the class depends on their work schedule and the availability of help with the children. Some participants indicated that they prefer morning hours during weekends, whereas some others indicated that they prefer morning hours or afternoons during weekends or weekdays, respectively.

"*Weekends or depends on family and work schedule*." Participant No. 20.

"*Depends on the schedule of my work. Weekday evenings or weekend in the morning*." Participant No. 18.

When asked about the things that might prevent them from attending a class about nutrition and food, participants identified several things. These included work schedule,

lack of help in babysitting, being sick or children being sick, or preparing for citizenship exam, or a combination of these.

"*Work Schedule, if I start work*" Participant No. 10.

"*I sometimes may need somebody to help me babysit while I am attending the class*." Participant No. 11.

"*If I am sick or if the children are sick. That is the only time I will not attend*." Participant No. 16.

"*Preparing for the citizen exam*." Participant No. 4.

Sub subtheme 3b3: Number of Attendees and Location of the Class

Almost all participants indicated that they would like to attend the class with a group. Some participants explained that if you attend the class with a group, you learn from each other's experiences, we ask each other questions. That way, we learn more.

"*I prefer the class to be with a group. You can socialize with the group, and you become happy. Also, you learn something that you did not know from them. We share experiences*." Participant No. 5.

"*I like the group and the community so we can benefit each other and ask each other questions. If there are more brains, you get more knowledge*." Participant No. 9.

There were few participants who asserted that they would like to be alone in the class, so they do not get distracted.

"*I prefer the class to be only me. With a group I may not be able to understand the content because the group will distract you. When you are alone, you will get a lot of attention*." Participant No. 11.

Regarding the location of the class, the majority of the participants, 80% (16 out of 20) indicated that they prefer to go to a community location for the class. The reasons they provided for this included that they would meet people to socialize with, learn from the group, and will focus better since there are no children to distract you.

"*I like the community center because I will meet people from the community, and I can socialize with them*." Participant No. 10.

"*Community location. Here you get to know people and you learn additional things from them.*" Participant No. 14.

"*I would rather take the class at the community center. Because I focus over there. At home, I cannot divide my attention between the teacher and the children*." Participant No. 5.

There were some participants,15% (3/20) who indicated that they prefer the teacher to come to their home.

"*I would like the teacher to come to my place, particularly during the winter. I have a lot of children and it is hard for me to get out of the house. That is the time I would like a teacher to come to my house. Other than that, I like attending with the group*." Participant No. 16.

Regarding the kind of teacher, the participants would like to have, few participants who feel they can understand English indicated that they would like as a teacher anyone with a degree who can teach them.

"*I want someone with a professional degree. I don't care what kind as long as they have the knowledge*." Participant No. 8.

Most of the participants asserted that they would rather have as a teacher someone from the community with a professional degree. Participants indicated that they could understand such a person and can ask questions when they need.

"*I would like the teacher to have a professional degree and be from my community because I understand more when the teacher speaks my language. Otherwise, I feel like deaf*." Participant No. 15,

In response to a question about the type of education or food-related activities participants would like included in the class, the participants indicated that they would like to see the class cover things like food safety, food labels, and healthy dishes.

"*Food labels, food safety, and healthy dishes*." Participant No. 10.

The participants further indicated that they would like to learn more cooking skills, particularly, how to cook American foods and sweets.

"*I like to learn about baking cakes, how to cook American food like pancakes, different fruits and combinations of fruits to make smoothies, Best way to cook and steam vegetables*." Participant No. 15.

"*More cooking skills. Cake decorations, sweets like donuts. Different kind of breads. Lasagna and other dishes*." Participant No. 13.

Participants also indicated that they would like the instructors provide a practical demonstration of the concepts discussed in the class.

"*A practical (hands on) demonstration of whatever is being taught*." Participant No. 12.

The participants indicated that they would like to attend a class in which they get the opportunity to cook in the class.

"*… I would like to cook in the class. When I see someone cook something, I would like to try it. If I make it bad, I can try again*." Participant No. 13.

The three most mentioned foods that the participants would like to learn how to cook were pizza, American style sandwich, and different kinds of cakes, both American and Somali. They also indicated that they would like to learn how to make bread and other sweets.

"*Pizza, sandwiches, cakes, fish and chicken dishes and vegetable dishes, ….*" Participant No. 10.

Discussion

The goal of this study was to identify barriers and assets that influence the nutrition behaviors of Somali refugees in Utah. Their preferences for the method of delivery of nutrition education was also be examined. This study adds to the limited research generated in understanding of the experiences of dietary practices and educational preferences of this population. The thematic analysis of the participant responses

identified three emergent themes: nutritional knowledge, practices, and dietary habits, assets and barriers to healthy cooking and eating practices, and preferences and experience with nutrition and food or cooking classes.

The study participants indicated that they normally eat three meals a day, breakfast, lunch, and dinner. Traditionally, lunch is the main meal and breakfast, and dinner are light. The participants in this study reported primarily consuming traditional foods. Other studies have found that immigrants and refugees often have healthy food traditions from their home countries that they want to maintain[38]. The participants also expressed that they ate mainly their traditional foods and they do not consume enough fruits and vegetables. Other refugee studies reported that the consumption of green leafy vegetables and fruits were lower among food insecure households[39]. A similar study revealed that though the participants value eating fresh produce, they indicated that it did not taste the same[38]. In a study of Somali refugees in the US, those who were food insecure ate more meat than fruits and vegetables[6]. Fruits and vegetables are mostly consumed during the main meal, lunch, and to a certain extent during breakfast.

The results of the current study revealed that the mothers do most of the food preparation and cooking for the family and the children help with the food preparation and cleaning. This finding reflected similar results from other studies[40,41]. The participants also indicated that the family eats together during lunch, particularly, when all the family members are present at home, such as weekends. However, during the weekdays, they eat together during dinner. Another study found families eating lunch together on weekends because they have flexibility in their schedules and supper during weekdays[35]. The participants identified that the family either sit together on a mat and eat from the same

plate or around the dinner table and eat in separate plates. These findings reflect traditional Somali eating practices. Desirable traditional foods or foods obtained and eaten in a culturally familiar ways are important in maintaining family and community network[35].

Regarding children's preference between American and Somali food, the analysis showed mixed results. The children of the newly resettled refugee families prefer their traditional foods. However, the participants who stayed in the US for a while indicated that their children prefer American foods, such as pizza, McDonald foods, and KFC foods. The difference is due to the exposure to American foods. The longer the children stay in the US the more exposure they get and the more they prefer American foods. Having a child at home can influence family eating through interactions with American style foods[42,43]. The examples of the American foods they provided were all from fast food restaurants. The preference between American and traditional foods is not clear cut. Most of the kids prefer one or the other, but also do not dislike and eat the other. This study is consistent with previous research where adolescents preferred both American and native foods while parents preferred only native foods[34,44,45,21,7,46].

Participants based their decision regarding what to feed the family each day on four factors: preference of family members, having diversified foods, availability of the food, and time constraint. Some studies showed that because of time constraint refugees chose to cook foods that require shorter preparation time[47]. Some other studies identified that sometimes the children bring new food ideas from the media[48], school programs, neighborhoods, and peer network[49,50,51,52] and the choice of what to cook for the family is based on that.

The participants stated that they consider fresh fruits and vegetables, beans, milk, fish, meat, chicken, and eggs as healthy foods. Some studies reported that refugees perceived healthy foods to include fruits[52], orange[53], vegetables[52,53], whole grains[54], beef[53], chicken[53], and foods with less fat and sugar[52]. This is because, traditionally, in Somalia animal products, beans, fruits and vegetables are considered healthy. Participants also consider foods with a lot of sugar, oil, salt, too much meat, pasta, rice, flour and McDonald foods as unhealthy foods. Other studies stated that refugees consider high energy foods, such as fatty foods[54], sugar, dairy products[53], soda[55], fast foods[54] as unhealthy. Normally, after resettlement, the refugees from Somalia eat a lot of spaghetti and rice, which are stable foods for them. They also put a lot of oil in their food and they consume a lot of sugar and less fruits and vegetables. A study conducted in the northeastern US noted that the intake of sugar-sweetened beverages and snacks was high among Somali refuge families and that this intake was positively associated with the number of years the families had been in the US[22]. When they stay in the US for longer period, they learn that this kind of food intake is not healthy. Most of the participants stated that they do not read and understand the food labels. Some of them do not even read or write their mother language. A study of Libyan migrants in Australia indicated that the participants recommended education in reading and interpreting food labels to improve their food habits and nutrition[23]. The Somali refugees are Muslim in faith and hence don’t eat pork and pork products. Therefore, when they look at the labels, with the help of their children, they check if the product they are purchasing contains pork or pork products. That does not mean that the children understand the nutritional content of the food item in the package.

The results of the current study revealed that things that make cooking for the family easy were availability of the ingredients and equipment needed for cooking, accessibility of food in the grocery stores and affordability of food prices and budgeting SNAP. The things that make accessibility of foods in the grocery stores challenging include inadequate transportation access**,** difficulties finding food in the grocery stores resulting from the store isles being confusing, foods being in packages so they cannot see what is inside, and language barrier. As the refugees' length of stay in the US increase, they learn how to drive, and they buy a car and drive themselves to the grocery stories. Sometimes the husband or the children learn first and drive the mother to the grocery store. It is the mother who traditionally has the responsibility to buy the groceries. Other studies reported that factors like lack of transportation access[6,56,57,58], issues navigating large grocery stores[23,7,59,55,2], and inability to speak and understand English which reduces the ability to communicate with store staff and locate preferred or familiar food items[4].

Recently resettled refugees from Somalia have difficulties understanding the price or cost of food. Other studies found similar results[6]. This is mainly because most of them don't know how to read. This is a series problem because they have limited income (including SNAP benefits) and they need to make sure that their income lasts them until the end of the month. This finding reflected similar results from other studies[35]. When they are picking the item from the shelf, they do not choose it based of price because they cannot read the price. They may end up picking the more expensive one. Similarly, when they come to the counter and the cashier tells them this is what you need to pay, they don't know if that is correct or not. They just pull the card and give it to the cashier to pay for the food they want to purchase. They don't know how much they paid.

The participants indicated that to make the SNAP benefits they receive last until the end of the month, they first purchase the bigger items from COSTCO or SAMS CLUB.

Most of the participants indicated that they would like to attend a nutrition class in the future. They would like to attend the class with a group in a community location so they can socialize and learn from each other and focus since there are no children to distract them. Participants also indicated that they would prefer to have as a teacher someone from their community with a professional degree.

Generally, in Somalia, the country of origin of the participants, there are no frozen foods and food safety is not something that people have proper knowledge about. On the other hand, the concept of nutritionally balanced food is not well understood. Hence, they indicated that they would like the topics of food safety, nutrients in the food, and the concept of balanced diet be included in the class.

Participants indicated that they would like the instructors to provide a practical demonstration of the concepts discussed in the class. They also indicated they would like to attend a class in which they get the opportunity to cook in the class. The three most mentioned foods that the participants would like to learn how to cook were pizza, American style sandwich, and different kinds of cakes, both American and Somali. They also indicated that they would like to learn how to make bread and other sweets.

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CHAPTER 4

IMPACT OF CULTURALLY ADAPTED NUTRITION EDUCATION FOR SOMALI REFUGEES IN UTAH USING CREATE BETTER HEALTH CURRICULUM ON THEIR NUTRITION-RALATED BEHAVIOR

Abstract

Objective: The objective of this study was to assess the impact of the delivery of culturally adapted Create Better Health (CBH) program on nutrition-related behavior of Somali refugees in Utah by comparing the situation before and after the delivery of the program.

Design: A survey questionnaire was administered to Somali participants before and after delivery of a 12-week nutrition education.

Setting: Refugee community nutrition education program via Zoom, which they accessed on their laptop or smart phone.

Participants: A total of 36 Somali women refugees. Twenty living in Salt Lake County and 16 living in Cache County.

Intervention: A nutrition education using a CBH curriculum that was adapted for Somali refugees was delivered via Zoom.

Outcomes: Impact of nutrition education on nutrition-related behavior.

Analysis: A Wilcoxon Signed Rank Test and descriptive statistics were performed using SPSS to assess changes in nutrition-related behavior and to

analyze the demographic data. A frequency analysis was also perform using WebNEERS.

Results: The majority of participants (50 – 94%) made improvements in nine of the 11 indicators of diet quality (P-value ranging from p<.001 to p=.008; medium to large effect size). They also made an improvement in two of the three indicators of physical activity (p<.001; medium effect size). Similarly, participants made improvement in three of four indicators of food safety (p-value ranging from p<.001 to p=.004; medium effect size). Participants made improvements in all of the nine food resource management indicators between the pre- and post-intervention periods (p<.001; medium to large effect size). Finally, the results show an improvement in all three food security indicators (p-value ranging from p=.007 to p=.028; small to large effect size).

Conclusion and Implications: The nutrition education improved selected nutrition-related behavior, and the physical activities of the participants as was evidenced by the improvements in most of the indicators of the five domains. Participants could benefit from additional nutrition- and physical activity-related education. Also, more culturally appropriate nutrition education is needed to address the needs of the refugees from different countries of origin.

Key words: nutrition education, physical activity, diet quality, food safety, food resource management, food security.

Introduction

Refugees are people who are forcibly displaced due to war, persecution, conflict, violence, or events seriously disturbing public order[1]. Globally, the number of refugees increased from 20.7 million in 2020 to 21.3 million in 2021, more than double the 10.5 million a decade ago. Between 2017 and 2021, Canada resettled the largest number of refugees, 114,400 people and US resettled 1,100 refugees[1]. Refugees from Somalia are one of the fastest growing groups in the United States (U.S)[2]. They represent forty-five percent of African refugees in the United States[3].

Approximately 60,000 refugees live in Utah. The vast majority reside in Salt Lake County and represent countries such as Somalia, the Democratic Republic of Congo, Syria, Iraq, Vietnam, the former Soviet Union, Burma, Afghanistan, and Ukraine[4]. Approximately, 10,000 of the refugees in Utah are from Somalia. Somali refugees have distinct cultural traditions and linguistic differences that distinguish them from other resettled African refugees.

Refugees are a resilient group of people who have overcome incredible hardships to arrive in the U.S. Each stage of the migration process may impact their dietary patterns and nutritional health outcomes[5,6]. Refugees' attitudes and habits in diet and physical activity vary by ethnicity and circumstance. Because of the low occurrence of dietary-related chronic diseases prior to resettlement, many refugees have a poor understanding of the relationships between health and diet[7]. It appears that resettled refugees may become accustomed to the poor eating habits of their resettlement populations. The current literature indicates that resettled refugees are at increased risk of experiencing a

dual burden of malnutrition and chronic disease[8]. This dual burden is attributed to the preexisting condition of micronutrient deficiencies experienced by refugees before resettlement[9-11], as well as a high risk for food insecurity and chronic diseases attributed to limited resources and excess intake of sodium, fat, and sugar upon resettlement[5]. In addition, refugees in their early post-resettlement years continue to face nutritional challenges[12], including limited knowledge of how to access culturally acceptable safe and healthy food.

Nutrition education is the best approach to improve the knowledge, skills, and self-efficacy needed to make healthy food choices that meet dietary needs and improve the health of low-income families, including refugees[13,14]. Nutrition education may help refugees better navigate the challenges of their new food environment, address the need for nutrition behavior changes, prevent chronic diseases, and live healthier lives. Nutrition education curricula are more effective at changing behavior when rooted in theory[15-17]. The design, intervention length, contents, and clearly defined goals and objectives of nutrition education impact the efficacy of curricula[15]. The current literature highlights the need for nutrition education among refugees in the US[13]. Previous studies have consistently identified cultural uniqueness as one of the barriers to meeting the needs of the refugee communities effectively[18]. Hence, refugee-specific curricula are needed to address the cultural needs of refugee communities.

Create Better Health (CBH) is a nutrition education curriculum designed to teach Supplemental Nutrition Assistance Program-Education (SNAP-Ed) participants about healthy eating and to engage in healthy activities, consistent with recommendation from the United States Department of Agriculture (USDA) and the Department of Health and

Human Services (HHS). It was developed by a team at Utah State University and included SNAP-Ed program specialists, registered dietitians, and Extension nutrition faculty[15]. It is based on Social Cognitive Theory (SCT), which explains that human behavior is the result of personal, behavioral, and environmental factors. The goal of CBH is to teach participants how to engage in a healthy and active life with the limited resources available to them. The CBH curriculum has previously been adapted to meet the nutrition knowledge needs of Spanish speaking SNAP-Ed participants in Utah[19] and could be adapted for specific refugee populations.

The objective of this study was to assess the impact of the delivery of culturally adapted CBH program on nutrition-related behavior of Somali refugees in Utah by comparing the situation before and after the delivery of the program.

Methods

Participants and Recruitment Procedure

Participants were eligible to participate in the study if they were Somali women refugees, 18 years or older, and living in Salt Lake or Cache Counties of Utah and a current participant of or willing to join the refugee community education program and the nutrition education study. Those participants who missed the class for not more than three sessions were included in the study. Of the total number of Somali women who were asked to participate (n=75), 40 were in Salt Lake County and 35 were in Cache County. Of these, 66 agreed to participate, 35 in Salt Lake County and 31 in Cache County. There were 36 participants who completed the study, 20 in Salt Lake County and 16 in Cache

County. The Somali women refugee who did not meet the inclusion criteria are still allowed to participate the program.

The recruitment process took place with the help of the Somali Community Services of Utah (SCSU) and Utah Refugee Education and Training Center (URETC). The researcher contacted SCSU in these two counties and URETC in Salt Lake County and asked them to help recruit refugees attending community education programs by providing the participants' contact information. With the approval of SCSU and URETC, the researcher contacted potential participants, in their group education session or by phone and asked them if they were interested in participating in the nutrition education research program. These women had access to a laptop in their homes and Zoom as part of the community education program. They also used their smartphones to access the class. The researcher explained to the potential participant that their participation in the research was voluntary. The contacted participants spread the information about the program within the community through word of mouth. Any Somali woman refugee interested in the study contacted the researcher or SCSU. The researcher explained the intervention program concept and the consent process to the community leaders and the participants. For those contacted adults who indicated interest in participating in the research program, the researcher added their name and contact information and years in the US to a list of the participants. The USU IRB office reviewed and approved the study.

Adaptation of CBH Curriculum for Somali Refugees and Program Design

The CBH curriculum was previously adapted to be used by those teaching to refugees and others attending English as Second Language (ESL) programs. In this setting the

curriculum was taught in English to refugees from multiple countries. For this study, the CBH ESL program was further adapted to be culturally specific to Somali refugees and taught in the Somali language. The adaptation was informed by prior work including a nationwide survey among nutrition education practitioners (SNAP-Ed and Expanded Food and Nutrition Education Program (EFNEP) directors) in the U.S.[14], the scoping review and assessment of the evidence for nutrition education delivery strategies for refugees in high-income countries; chapter two in this dissertation[13], and semi-structured interviews on barriers and assets that influence nutrition behaviors and preferences for receiving nutrition education among Somali refugees; chapter three in this dissertation[20]. These studies identified a number of food and nutrition related items that were considered in this nutrition education program for Somali refugees. Table 1 describes how parameters identified as being important in the prior work were addressed in the adaptation of the CBH ESL curriculum for Somali refugees in Utah.

Table 4-1. Important parameters for nutrition education delivered to refugees as identified in prior studies and how these were addressed in the Create Better Health Curriculum.

Parameters	**How it was Addressed in the CBH**
Use of approaches that include need-based and hands-on participatory methods.	The Somali refugees' nutrition education needs were assessed through a collaborative process with the participants and community leaders. Participants were engaged in hands-on nutrition-related activities, such as cooking activities, videos and zoom meetings explaining grocery shopping. The nutrition education also included findings from the interviews with the Somali Community.

Use of strategies that address cultural and language barriers in nutrition education.	The information contained in each lesson was reduced. Therefore, additional lessons were added. The lessons were provided in Somali language. The cooking activities only involved Halal foods.
Consider safe settings where educational activities take place during program design.	The educational activities occurred through Zoom with participants in their own homes or places of their choosing. The researcher assured the participants that this is a non-judgmental environment.
Build trust and enhance honest response from participants for quality program evaluation.	The design and implementation of the education program was based on a collaborative process in which the participants were included in all phases of nutrition education. The researcher, who was well known to and trusted by the community, assured the participants that this is a non-judgmental environment, so that they can feel free to express their ideas and talk about their concerns regarding nutrition knowledge.
Helping refugees with their food and nutrition-related problems.	The nutrition education program contained lessons designed to enhance the participants' food and nutrition-related knowledge, including how to navigate the new food environment, budgeting, and healthy versus unhealthy foods. Participants were also linked to the food resources that were available in their community, such as food banks, food pantries, and farmers markets.

Sharing Experiences.	The researcher facilitated group discussion and allowed participants to share cooking skills and different traditional recipes in the class.
Use cultural practices and support systems.	The researcher facilitated group discussions regarding how the participants can utilize their health-related food experiences. Discussion topics included gardening, cooking from scratch, eating whole foods, eating together as a family, foods they normally use for health purposes, and engaging in the support system within their community.

The CBH ESL curriculum as adapted for delivery to Somali refugees in Utah State University (USU) was client-oriented and used a needs-based and hands-on participatory approach. Examples of activities included virtual cooking sessions (that emphasized using less sugar, oil, and salt), and sharing videos of store visits to explain grocery shopping process. Conducting one-time onsite farmers market visit on how to use the Supplemental Nutrition Assistance Program's (SNAP) Electronic Benefits Transfers (EBT) card and Double Up program. The program also used a collaborative approach in its design and implementation by including participants and other key stakeholders, such as Somali community leaders and Utah refugees' services, in all phases of the nutrition education process. This was done with the help of the two women representatives of the Somali Community in Salt Lake and Logan. In addition, the researcher was Somali and communicated in Somali language. For example, the education materials were shared with them ahead of time to build trust and improve honest responses for quality program

evaluations. The community leaders reviewed the lectures for cultural acceptability. The research team consisted of USU, Department of Nutrition, Dietetics and Food Sciences (NDFS) faculty members, and other nutrition experts from SNAP-Ed and EFNEP. The research team's, the community leaders', and the participants' feedback were then reviewed and finalized by the research team. This allowed us to use the experiences in the early lessons to continue adopting the remaining lessons. Appendix 1 contains weekly lessons that were provided to the participants.

During the program design phase, the researcher explained the nutrition education concept to the community leaders, including representatives from women groups, and the participants. Specifically, they were informed that the CBH curriculum was modified to make it culturally appropriate to the participants and would be adopted, participation was voluntary, participants would sign a consent form, and there would be an evaluation intended to assess the effectiveness of the nutrition program. The researcher also informed the community leaders and the participants that their feedback regarding content, cultural acceptability, and method of delivery will be considered.

Face-to-face nutrition education interventions have effectively improved nutrition knowledge and brought about healthy behavior changes and outcomes[21,22]. However, in addition to the adaptations specific to the target population for Somali refugees in Utah, due to conditions related to the COVID-19 pandemic, the curriculum was also adapted to a virtual format using Zoom. Online nutrition education delivery method offers a cost-effective and flexible way to deliver nutrition education while enhancing accessibility and convenience[23,24]. Online learning programs have the potential to facilitate synchronized forms of communication between instructors and learners or between

groups of different learners[25]. Best practices for online nutrition education were followed in the adaptation process[26]. This included:

1. Use of tailored messages and individualized feedback.
2. Human interactions between the participants and the investigators.
3. Intervention duration >3 months.
4. Identification of specific target behavior vs general health.
5. Alignment of intervention activities with stated objectives.
6. Use of theory-based interventions.

Table 2 describes how best practices for the delivery of virtual nutrition education was addressed in the adapted curriculum.

Table 4-2. Factors critical to the success of online nutrition education intervention and how they were addressed.

Factors	**How the factor was addressed**
Use of tailored messages and individualized feedback.	The researcher provided a tailored message by phone once a month based on individual participant's progress and performance during the intervention to enhance the participants engagement and increase the efficiency of the nutrition education program.

Human interactions between the participants and the investigators.	The researcher engaged with the participants by being available for questions in real time during lessons and through telephone and text messages.
Intervention duration ≥3 months.	The duration of nutrition education intervention was 12 weeks. This helped the achievement of the objectives of the intervention.
Identification of specific target behavior vs. general health.	The researcher facilitated discussions to identify nutrition and physical activity that need to be addressed, such as their healthy eating behavior, including eating more fruits, vegetables, whole grains, and dairy products, and whether they are engaged in physical activities like regular exercise for at least 30 minutes a day.
Alignment of intervention activities with stated objectives.	In each lesson, the modified CBH curriculum contained tailored target behavior written as objectives of the study.
Use of theory-based interventions.	The nutrition education program was based on the CBH curriculum which is based on social cognitive theory (SCT).

Content and Delivery of the Nutrition Education Lessons

The CBH includes eight lessons that are intended to be taught consecutively. Each lesson has three components: a nutrition topic based on the current Dietary Guidelines for Americans, a physical activity discussion based on the Department of Health & Human Services (HHS) Physical Activity Guidelines for Americans, and a Create recipe

demonstration and sample. Each lesson builds upon knowledge participants learned in previous lessons. For this study, the Create concept and recipe were chosen to reflect the information taught in that lesson and the culture-specific foods. The CBH curriculum was tailored to the specific needs of the Somali refugee by addressing their cultural and language barriers. For example, the classes were delivered in Somali language. In addition, the number of lessons were increased to 12 to reduce the amount of information shared in each lesson to improve understanding and retention due to the literacy level of the participants. The 12 weekly lessons were culturally appropriate, tailored to the needs of the participants, and followed the US Dietary Guidelines. At the beginning of each lesson, there was an open-ended question designed to encourage participants to engage in the discussion. This discussion question pertained to the topic covered in the previous lesson. Similarly, during the classes in the middle of the class session, participants were asked questions about behavior changes made since the previous class.

A 12-week (from May 16 to August 1), 2 hours per week, nutrition education was provided via Zoom. The participants' feedback from each week's lesson was incorporated in the subsequent lessons. Similarly, every week the researcher and the participants discuss next week's Create Recipe and how it can be modified to make it culturally acceptable and appropriate.

Evaluation Instrument for the Nutrition Education Program

A pre and post assessment was conducted to assess the impact of the nutrition education on nutrition-related behavior of Somali refugees. This study used the EFNEP adult questionnaire (Appendix E), which is validated and commonly used by other nutrition education programs, such as SNAP-Ed in many states[27]. This questionnaire contained 30

multiple-choice questions and assessed behaviors in five domains according to national recommendations for each domain: diet quality using Dietary Guidelines for Americans (DGA) (11 questions), physical activity using Physical Activity Guidelines for Americans (3 questions), food safety using the DGA Food Safety Principles (4 questions), food resource management using U.S. Department of Agriculture, National Institute of Food and Agriculture, Community Nutrition Education Logic Model (CNE)[27,28] (9 questions), and food security using the US Department of Agriculture Household Food Security Module (3 questions)[29].

The survey was administered prior to the first lesson and again at the end of the final lesson. The time period between the pre- and post-intervention was 12 weeks, from May 16 to August 1, 2021. Because of the low literacy level, the researcher asked the questions to each participant in an individual breakout session over Zoom or by phone and recorded the responses.

Data Analysis

The data obtained from the pre- and post-intervention EFNEP surveys were analyzed using Web-based Nutrition Education and Evaluation and Reporting System (WebNEERS) and Statistical Package for the Social Sciences (SPSS) (version 26, IBM, Armonk, NY, 2019). The WebNEERS is a data collection, management and reporting system that is developed and maintained by the United States Department of Agriculture (USDA), National Institute of Food and Agriculture (NIFA) and Clemson University[30]. The WebNEERS was used to perform frequency analysis and to determine the percent of participants with improved indicators of the five domains and the percent of participants

that met the recommendations for these indicators. Participant's improvement for a particular indicator is determined by the direction of movement of the score between pre- and post-intervention periods. The determination of whether the recommendation for a particular indicator is met is determined by comparing it with the acceptable practice for that indicator as specified in the WebNEERS manual.

The SPSS was used to analyze the demographic data using descriptive statistics. It was also used to perform a Wilcoxon Signed Rank Test to assess changes in nutrition-related behavior. The Wilcoxon Signed Rank Test was performed on each of the indicators of the five domains. Statistical significance for the two-sided test was set at $p \leq 0.05$. The effect size (r) was calculated using Rosenthal 1998 method[31]. For each indicator, the effect size (r) was also calculated as the ratio the Z value obtained from the output of the Wilcoxon Signed Rank Test and the square root of the number of observations over the pre- and post-intervention periods (N = 72). The effect size is considered small if r is 0.1 - < 0.3, medium if r is 0.3 - < 0.5, and large if r is $\geq$ 0.5.

Results

Demographic Characteristics

Table 3 displays the demographic characteristics of the participants who completed the intervention program. A total of 66 Somali women refugees agreed to participate. Of these, 36 participants completed the study. These 36 female participants in the study had an average age of 41.7 years. Of these, 23 were married, 11 were divorced, and 1 was widowed. The average household size was 5.9, with 3.3 children and 2.6 adults. Eighty-nine percent of the participants stayed in a refugee camp prior to coming to the US and

the average time spent in the U.S. was 8.9 years. The average level of education was 2.3 years. The majority of the participants were employed (75%) and received SNAP or WIC benefits (83%, and 44%, respectively).

Table 4-3. Participants' demographic characteristics

Demographic Characteristics	**Mean (SD) / n(%)**
Age	41.7±9.6
Previous Refugee Camp	
Yes	32 (89%)
No	4 (11%)
Years in Refugee Camp	7.9±6.0
Years in US	8.9±3.8
Years in Utah	7.4±3.6
Marital Status	
Married	23 (67%)
Divorced	11(30%)
Widowed	1(3%)
Length of Education*	2.3±4.3
Employment status	
Employed	27(75%)
Unemployed	9(25%)
Hours of employment per week	27.9±15.6
Receive SNAP**	
Yes	30(83%)
No	6(17%)
Receive WIC***	
Yes	16(44%)
No	20(56%)
Household Size	5.9±3.2

Number of Children	3.3±2.7
Number of Adults	2.6±1.4

*Level of education is used here to mean the highest grade completed.

**Supplemental Nutrition Assistance Program's (SNAP)

***Women, Infants, and Children benefit (a federal or state program to ensure proper nutrition for poor mothers and their children).

Assessment of the Efficacy of the Nutrition Education

The 30 survey questions were categorized into five domains: Diet Quality, Physical Activity, Food Safety, Food Resource Management, and Food Security.

Diet Quality (Table 4)

The majority of participants (36 – 94%) made statistically significant improvements in nine of the 11 indicators of diet quality. Participants made improvements in fruit and vegetable intake as evidenced by the increased frequency of consumption of fruits and vegetables per day, as well as a greater variety of vegetables and increased frequency of consumption of red, orange, and dark green vegetables, and beans and peas. This is illustrated by 64-94% of participants improving in parameters from these six indicators. Wilcoxon signed-rank tests indicated that the post-survey results were statistically significantly higher than the pre-survey results for these six indicators (p-value <0.001). The effect sizes of differences were 0.44 – 0.61 indicating medium to large effects. No participant indicated that they were consuming vegetables at least 3 times per day prior to intervention, and though 83% of participants reported consuming vegetable more often in the post-survey, only 8% were consuming vegetable at least 3 times per day at the post-survey.

The greatest improvement in fruit and vegetable consumption was made in increasing the different kinds of vegetables eaten in a day; 17% of participants reported eating at least 3 kinds of vegetables at the pre-survey compared to 89% who reported eating at least 3 kinds of vegetables at the post-survey. Fifty-three percent of the participants reported that they were consuming at most one kind of vegetable and only six percent of the participants indicated that they consumed four or more kinds of vegetables before the intervention. After the intervention, no participant indicated that they were consuming one kind of vegetable or less and the percent of participants that consumed four or more kinds of vegetables increased to 64%. The intake of fruits also showed a dramatic improvement. The percent of participants who reported consuming fruits at least 2 times per day increased from 31% during the pre-survey period to 86% during post-survey period with 78% of the participants reporting improvement in their consumption of fruits.

At least 36% of the participants made statistically significant and medium improvements in consumption of dairy, including drinking milk or eating cereals with milk, and dairy alternatives, including eating yogurt or drinking smoothies with yogurt (P-values ranging from $p<.001$ to $p=.008$; medium effect sizes). There were no statistically significant differences in the pre- and post-survey reports of the frequency of cooking the main meal at home and drinking soda. The percentage of the participants who cooked dinner at home at least three times a week were 75% and 92% before and after intervention, respectively. Similarly, almost all participants drank soda three times or less per week both before and after intervention.

Table 4-4. Frequency Distribution, Participant Improvement, and Wilcoxon Signed Rank Test Results for Pre- and Post-Intervention Diet Quality Indicators**.**

Question	Pre/Post	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	Recommendation	% Meeting Recommendation	Improved Participants (%)	Pre-Intervention Median (IQR)	Post-Intervention Median (IQR)	Z (P-Value)	R (Effect Size)*
How many times a day do you eat fruits? (1-6)[a]	Pre	17	19	33	22	8	0	N/A	≥2 times a day	31	78	3(2-4)	4(4-5)	-4.632 (<.001)	0.55
	Post	0	0	14	47	36	3	N/A	≥2 times a day	86					
How many times a day do you eat Vegetables? (1-6)[a]	Pre	14	22	50	14	0	0	N/A	≥3 times a day	0	83	3(2-3)	4(4-4)	-4.966 (<.001)	0.59
	Post	0	0	22	69	8	0	N/A	≥3 times a day	8					
How many different kinds of vegetables do you usually eat a day? (1-5)[b]	Pre	11	42	31	11	6	N/A	N/A	≥3 kinds a day	17	94	2(2-3)	5(4-5)	-5.145 (<.001)	0.61
	Post	0	0	11	25	64	N/A	N/A	≥3 kinds a day	89					
Over the last week, how many days did you eat red or orange vegetables? (1-7)[c]	Pre	11	36	25	19	3	6	0	≥4 days a week	8	81	3(2-4)	4(4-5.75)	-4.249 (<.001)	0.50
	Post	0	0	19	42	14	17	8	≥4 days a week	39					
Over the last week, how many days did you eat dark green vegetables (1-7)[c]	Pre	19	50	14	11	6	0	0	≥2 days a week	31	78	2(2-3)	3(3-5)	-4.366 (<.001)	0.51
	Post	3	14	39	17	17	6	6	≥2 days a week	83					
Over the last week, how many days did you eat beans and peas? (1-7)[c]	Pre	8	36	25	19	11	0	0	≥2 days a week	56	64	3(2-4)	4(3-4.75)	-3.702 (<.001)	0.44
	Post	3	11	17	44	14	8	3	≥2 days a week	86					
	Pre	25	31	31	11	3	N/A	N/A	≥2 times a day	14	36				0.42

How many times a day do you drink milk or soymilk? (1-5)[d]	Post	11	11	39	39	0	N/A	N/A	≥2 times a day	39		2(1.25-3)	3(3-4)	-3.573 (<.001)	
Over the last week, how many days did you eat yogurt or drink smoothies with yogurt? (1-7)[c]	Pre	19	44	11	17	8	0	0	≥4 days a week	8	75	2(2-3.75)	4(3-5)	-3.763 (<.001)	0.44
	Post	0	17	31	22	17	14	0	≥4 days a week	31					
Over the last week, how many days did you eat cereal with milk? (1-7)[c]	Pre	56	17	11	14	3	0	0	≥3 days a week	17	50	1(1-3)	2(1-4)	-2.651 (.008)	0.31
	Post	39	14	17	19	0	3	8	≥3 days a week	31					
How many days a week do you cook dinner at home? (1-7)[e]	Pre	0	14	11	28	3	22	22	≥3 days a week	75	42	4(3.25-6)	5(4-7)	-1.329 (.184)	0.16
	Post	3	0	6	36	17	8	31	≥3 days a week	92					
How often do you drink sodas (not diet)? (1-7)[f]	Pre	47	53	0	0	0	0	0	≤3 times a week	100	39	2(1-2)	1(1-1.75)	-1.706 (.088)	0.20
	Post	75	19	3	0	0	0	3	≤3 times a week	94					

*Effect size (according to Cohen, 1998): .1=small effect, .3=medium effect, .5=large effect; [a]Response options: 1 = I rarely eat, 2 = less than 1 time a day (a couple times a week), 3 = 1 time a day, 4 = 2 times a day, 5 = 3 times a day, 6 = 4 or more times a day; [b]Response options: 1 = I rarely eat, 2 = 1 kind a day, 3 = 2 kinds a day, 4 = 3 kinds a day, 5 = 4 or more kinds a day; [c]Response options: 1 = I did not eat, 2 = 1 day a week, 3 = 2 days a week, 4 = 3 days a week, 5 = 4 days a week, 6 = 5 days a week, 7 = 6-7 days a week; [d]Response options: 1 = I do not drink milk, 2 = 1 rarely drink milk, 3 = 1 time a day, 4 = 2 times a day, 5 = 3 or more times a day; [e]Response options: 1 = I rarely cook dinner at home, 2 = 1 day a week, 3 = 2 days a week, 4 = 3 days a week, 5 = 4 days a week, 6 = 5 days a week, 7 = 6-7dyas a week; [f]Response options: 1 = Never, 2 = 1-3 times a week, 3 = 4-6 times a week, 4 = 1 time a day, 5 = 2 times a day, 6 = 3 times a day, 7 = 4 or more times a day.

Physical Activity (Table 5)

Between the pre- and post-intervention periods, the participants made an improvement in the number of days in a week they exercised for at least 30 minutes and the frequency of making small changes on purpose to be more active (70, 60%, respectively; p-value <0.001; medium effect size), though there was no change in the number of days

participants exercised to build and strengthen muscle. Before the intervention, no participant met the recommendation of the number of days per week she did exercise for at least 30 minutes or the frequency of making small changes on purpose to be more active. The percent of participants meeting the recommendations increased to 6% and 11%, respectively, for these indicators after the intervention.

Table 4-5. Frequency Distribution, Participant Improvement, and Wilcoxon Signed Rank Test Results for Pre- and Post-Intervention Physical Activity Indicators.

Question	Pre/Post	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	7 (%)	8 (%)	Recommendation	% Meeting Recommendation	Improved Participants (%)	Pre-Intervention Median (IQR)	Post-Intervention Median (IQR)	Z (P-Value)	R (Effect Size)*
In the past week, how many days did you exercise for at least 30 minutes? (1-8)[a]	Pre	33	50	6	8	3	0	0	0	≥5 days	0	70	1(0-1)	2(1-3)	-3.461 (.001)	0.41
	Post	11	33	19	22	6	6	0	0	≥5 days	6					
In the past week, how many days did you do work out to build and strengthen your muscles? (1-8)[a]	Pre	56	28	8	8	0	0	0	0	≥2 days	16	18	0(0-1)	0(0-1)	-.097 (.923)	0.11
	Post	56	22	19	0	3	0	0	0	≥2 days	21					
How often do you make small changes on purpose to be more active? (1-6)[b]	Pre	11	42	44	0	0	0	N/A	N/A	Often, usually, or always	0	60	2(2-3)	3(3-3)	-4.104 (<.001)	0.49
	Post	0	11	78	11	0	0	N/A	N/A	Often, usually, or always	11					

*Effect size (according to Cohen, 1998): .1=small effect, .3=medium effect, .5=large effect; . [a]Response options: 1 = 0 days, 2 = 1 day, 3 = 2 days, 4 = 3 days, 5 = 4 days, 6 = 5 days, 7 = 6 days, 8 = 7 days; [b]Response options: 1 = Never, 2 = rarely (about 20% of the time), 3 = sometimes (about 40% of the time), 4 = often (about 60% of the time), 5 = usually (about 80% of the time), 6 = always.

Food Safety (Table 6)

Participants made statistically significant improvement in three of four indicators of food safety. Fifty-six percent of participants made improvements in washing hands with soap and running water before food preparation (p=.001; medium effect size) and 75% of participants were meeting recommendations of hand washing post-survey. Forty-four percent of participants made improvements in cleaning surfaces and other items that came in contact with the raw meat or seafood when it was cut (p<.001; medium effect size), however none were meeting recommendations post-survey. Fifty-six percent of participants made improvements in the frequency of thawing frozen food on the counter or in the sink at room temperature (p=.004; medium effect size), however, only 44% of participants were meeting recommendation post-survey. No participant made significant improvement in or met the recommendation of using meat thermometer to see if meat is cooked to a safe temperature.

Table 4-6. Frequency distribution, Participant Improvement, and Wilcoxon Rank Test Results for Pre- and Post-Intervention Food Safety Indictors.

Question	Pre/Post	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	Recommendation	% Meeting Recommendation	Improved Participants (%)	Pre-Intervention Median (IQR)	Post-Intervention Median (IQR)	Z (P-Value)	R (Effect Size)*
How often do you wash your hands with soap and running water before food prep? (1-6)[a]	Pre	0	8	19	42	6	25	Usually or always	31	56	4(3-5.75)	6(4.24-6)	-3.677 (<.001)	0.43
	Post	0	3	3	19	19	56	Usually or always	75					

After cutting raw meat or seafood, how often do you wash all items and surfaces that came in contact with these foods? (1-4)[b]	Pre	0	17	33	50	0	0	More than often	0	44	3.5(3-4)	4(4-4)	-3.477 (.001)	0.41
	Post	0	0	14	86	0	0	More than often	0					
How often do you thaw frozen food on the counter or in the sink at room temperature? (1-6)[a]	Pre	0	17	39	25	6	14	Never or rarely	17	56	3(3-4)	3(2-3.75)	-2.873 (.004)	0.34
	Post	14	31	31	14	3	8	Never or rarely	44					
How often do you use a meat thermometer to see if meat is cooked to a safe temperature? (1-6)[a]	Pre	86	3	8	3	0	0	Often, usually, always	0	28	1(1-1)	1(1-2)	-.963 (.335)	0.11
	Post	69	14	17	0	0	0	Often, usually, always	0					

*Effect size (according to Cohen, 1998): .1=small effect, .3=medium effect, .5=large effect; [a]Response options: 1 = Never, 2 = rarely (about 20% of the time), 3 = sometimes (about 40% of the time), 4 = often (about 60% of the time), 5 = usually (about 80% of the time), 6 = always; [b]Response options: 1 = Never, 2 = rarely (about 20% of the time), 3 = sometimes (about 40% of the time), 4 = often (about 60% of the time);

Food Resource Management (Table 7)

Participants made statistically significant improvements in all nine food resource management indicators ($p<.001$; medium to large effect size) and 42-86% of the participants reported improvement in the indicators.

Prior to intervention no participant met the recommended frequency of use of food coupons for food purchase, budgeting enough money for food purchase, and checking for food items on sale when at the store. The percentage of participants who met the recommended levels for these food resource management indicators increased to 6%, 36%, and 19%, respectively after the intervention. Among the remainder of the food resource management indicators, the ones that showed greatest improvement in the

percent of participants meeting the recommendation were the frequency of comparing food prices to save money (6% to 61%) and the frequency of checking the refrigerator or cupboard before grocery shopping (33% to 89%). Planning meals also showed substantial improvement with 56% meeting recommendations post intervention versus 25% before.

Table 4-7. Frequency distribution, Participants Improvement, and Wilcoxon Signed Rank Test Results for Pre- and Post-Intervention Food Resource Management Indicators.

Question	Pre/Post	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	Recommendation	% Meeting Recommendation	Improved Participants (%)	Pre-Intervention Median (IQR)	Post-Intervention Median (IQR)	Z (P-Value)	R (Effect Size)[a]
How often do you compare food prices to save money? (1-6)[a]	Pre	36	22	36	6	0	0	Often, usually, always	6	86	2(1-3)	4(3-4)	-4.869 (<.001)	0.57
	Post	0	11	28	44	14	3	Often, usually, always	61					
How often do you plan your meals before you shop for groceries? (1-6)[a]	Pre	6	31	39	25	0	0	Often, usually, always	25	58	3(2-3.75)	4(3-4)	-3.419 (.001)	0.40
	Post	0	6	39	33	22	0	Often, usually, always	56					
How often do you look in the refrigerator or cupboard to see what you need before you go shopping? (1-6)[a]	Pre	6	22	39	19	11	3	Often, usually, always	33	83	3(2-4)	5(4-5.75)	-4.785 (<.001)	0.56
	Post	0	0	11	25	39	25	Often, usually, always	89					
How often do you make a list before	Pre	78	6	11	0	6	0	Often, usually, always	6	58	1(1-1)	2(1-3)	-3.243	0.38

going shopping? (1-6)[a]	Post	36	22	19	6	11	6	Often, usually, always	22				(.001)	
How often do you use food coupons for food purchases? (1-6)[a]	Pre	78	8	14	0	0	0	Often, usually, always	0	42	1(1-1)	2(1-3)	-3.404 (.001)	0.40
	Post	47	8	39	3	0	3	Often, usually, always	6					
How often do you use a written weekly or monthly food spending plan? (1-6)[a]	Pre	47	22	19	8	3	0	Usually, always	3	72	2(1-3)	3(3-4)	-4.245 (<.001)	0.50
	Post	8	11	39	28	11	3	Usually, always	14					
How often do you budget enough money for food purchase? (1-6)[a]	Pre	22	39	28	11	0	0	Usually, always	0	86	2(2-3)	4(3-5)	-4.938 (<.001)	0.58
	Post	0	17	17	31	31	6	Usually, always	36					
How often do you check for sales on foods before you shop? (1-6)[a]	Pre	39	22	31	6	3	0	Usually, always	3	61	2(1-3)	3(2-3)	-3.902 (<.001)	0.46
	Post	3	31	44	6	14	3	Usually, always	17					
How often do you check for food items on sale when you are at the store? (1-6)[a]	Pre	25	31	44	0	0	0	Usually, always	0	86	2(1.25 -4)	4(3-4)	-4.970 (<.001)	0.59
	Post	0	6	39	36	17	3	Usually, always	19					

*Effect size (according to Cohen, 1998): .1=small effect, .3=medium effect, .5=large effect; [a]Response options: 1 = Never, 2 = rarely (about 20% of the time), 3 = sometimes (about 40% of the time), 4 = often (about 60% of the time), 5 = usually (about 80% of the time), 6 = always.

Food Security (Table 8)

The food security indicators are based on the participant's food situation over the last 30 days. The results show a statistically significant improvement in all three food security indicators, namely whether the food that participants bought lasted, whether they could afford to eat balanced meals, and whether they cut the size of their meals or skipped meals because they did not have enough money for food (p=.008, p=.028, p=.007, respectively; small to medium effect size). The percent of the participants who reported improvement for these indicators were 34%, 47%, and 28%, respectively. There were considerable percent of the participants who met the recommended levels for these indicators during the post-intervention periods.

Table 4-8. Frequency distribution, Participant Improvement, and Wilcoxon Signed Rank Test Results for Pre- and Post-Intervention Food Security Indicators.

Question	Pre/Post	1 (%)	2 (%)	3 (%)	4 (%)	Recommendation	% Meeting Recommendation	Improved Participants (%)	Pre-Intervention Median (IQR)	Post-Intervention	Z (P-Value)	R (Effect Size)*
The food I bought just didn't last, and didn't have money to get more. (1-4)[a]	Pre	8	67	22	0	Never true or don't know	23	34	2(2-2)	2(2-3)	-2.668 (.008)	0.32
	Post	3	50	47	0	Never true or don't know	47					
	Pre	6	86	8	0	Never true or don't know	8	47	2(2-2)		-2.200	0.26

I couldn't afford to eat balanced meals. (1-4)[a]	Post	17	33	50	0	Never true or don't know	50			2.5(2-3)	(.028)	
Did you ever cut the size of your meals or skip meals because there wasn't enough money for food? (1-3)[b]	Pre	39	61	0	N/ A	No or don't know	61	28	2(1-2)	2(2-2)	-2.714 (.007)	0.32
	Post	14	86	0	N/ A	No or don't know	86					

*Effect size (according to Cohen, 1998): .1=small effect, .3=medium effect, .5=large effect; [a]Response options: 1 = Often true, 2 = sometimes true, 3 = never true, 4 = Don't know; [b]Response options: 1 = True, 2 = No, 3 = Don't know.

Discussion

In this study, the CBH curriculum was adapted for cultural appropriateness among the Somali refugees in Utah. The curriculum was then delivered and the nutrition-related behavior was assessed before and after the delivery 12-week class series. The overall result was that the adapted CBH curriculum improved the nutrition-related behavior of the Somali refugees in Utah. This can be deduced from the observed significant improvement in 26 of the 30 indicators of the five domains of the study.

This study supports the findings of other studies that recognized the need for the development of nutrition education for refugees[32,18] and the importance of this education to be culturally appropriate to promote better health outcomes and program acceptance among diverse, and underserved population, such as refugees[33,34,13]. The use of native language, Somali for the target population, enhanced the effectiveness of the communication. This is essential for nutrition education delivery to be culturally appropriate and respectful to the participants. A study that examined how nutrition outreach efforts addressed changing food practices among refugee populations resettled

in the US concluded that nutrition education efforts should be based on the diverse socioeconomic and cultural realities of the refugees[33].

The participants of the nutrition education program reported improvements in all five domains of the survey. In the diet quality domain, nutrition education improved the number of times participants consumed fruits and vegetables a day, including red, orange, and dark green vegetables. It also improved the number of different kinds of vegetables they consumed in a day. The increased intake of fruits and vegetables is similar to what other studies among Somali refugees found. A study about dietary acculturation among new Americans found that the Somali refugees increased intake of vegetables, fruits, and whole grains as the length of their stay in the US increased[35].

Though participants reported improvement in vegetable consumption, only 6% met the recommended number of times a day to eat vegetables after intervention. This low consumption of vegetables among participants, the majority of whom (83%) are receiving SNAP benefits, has been found by other studies. Two studies about Somali refugees in the US found that the intake of fruits and green leafy vegetables at least once a day was significantly lower among food insecure households[36,37].

The low percentage of participants meeting the recommended consumption level of vegetables can be explained by the fact that the Somali culture prefers meat and use it as the main ingredient of their meal. Hence, Somali families would rather purchase meat instead of fruits and vegetables when they are financially constrained[36]. In addition, meat is considered as a high-status food[35]. Another study found that the perception that fruits and vegetables do not satisfy hunger may deter low-income households from buying them[38]. On the contrary, the percentage of participants meeting the recommended

consumption level of fruits was 86%. This is because, it is more convenient to consume fruits than vegetables and the Somali refugees prefer to consume fruits over vegetables therefore it is easier to increase the consumption of fruits than vegetables.

The intake of dairy and dairy alternatives also improved between the pre- and post-intervention periods. This agrees with findings from another study that found that the Somali refugees in US increased their consumption of dairy[39]. Previous study done by Burge and Jigna[40] found that participants' purchase of dairy was minimal and half of their budget was spent in ethnic food stores. One study about nutrition assessment of South-Asian refugees in US found that dairy was the least common food group they purchased. Another nutrition assessment study of refugee children living in Australia reported that the overall prevalence of inadequate dairy intake among children 12 years and older was 85%[41]. Another study of children in Canada reported that the children did not have access to milk before resettlement, and this influenced their milk consumption habits after resettlement[42]. Though Somalis do not commonly consume cereal for breakfast, the percent of participants that met the recommended level for this indicator increased between the pre- and post-intervention periods. For breakfast, Somalis commonly eat Anjera (fermented thin flat bread).

The percentage of the participants who cook dinner (the main meal) at home for at least three times a week were 75% before the intervention. This is because the Somali tradition is such that they cook food at home every day from scratch[43,44]. This percent increased to 92% after intervention. Previous studies have reported potential benefits of frequent cooking at home, these include intake from healthier food groups[45,46,47] and greater fruit and vegetable preference[48].

The low consumption of sodas can be explained by the fact that it was not available to the refugees before they came in the US. They used to consume tea instead of soda. This tradition continued even after arriving in the US. Therefore, even though their consumption of soda increased over time, they still drink more tea and less soda. A study about dietary acculturation among new Americans found that Liberian refugees perceived they consumed more soda in the US[37]. Another study examining post-migration dietary changes among African refugees in Geneva found that African refugees perceived that their consumption of soft drinks increased post-migration[49].

The results show that the physical activities of the participants were low before the intervention as evidenced by 83% of them engaging in exercises for at least 30 minutes for $\leq$1 day a week. A similar result was found in a study with Bhutanese female refugees in Ohio where 73% of the participants reported having no regular physical activities[52]. For the Somali women, like many other refugee women, leisurely physical activity is not a typical habit and lifestyle behavior. Hence, women do not usually engage in physical activities that are not related to their daily living tasks[50].

The results show a significant improvement in the number of days they exercise for at least 30 minutes or make small changes on purpose to be active. However, not enough people met the recommendations for these indicators after intervention, 6% and 11%, respectively, and none met the recommendation before the intervention. There are a number of factors that hinder progress in engaging in exercises even after the intervention, including that many cultures view sports or exercise as useless and a waste of time. Due to often being resettled in disadvantaged neighborhoods with higher crime rates, refugees may be concerned about their safety at a local public park or even outside

in their own neighborhoods, and many mothers are too busy with their family and working[51]. Therefore, though the intervention with nutrition education helped, the participants could potentially benefit from additional support for improving physical activity.

There was no significant improvement in the number of days participants worked out to build and strengthen the muscles. This could be explained by the fact that, traditionally, Somali women do not normally attend gymnasiums. For cultural and religious reasons, they typically would only attend gyms where there is an exclusive exercise area for women with no access for men. In addition, the concept of women working out is nonexistent in their country of origin.

Regarding food safety domain, nutrition education generally improved the food safety practices of the participants. Other studies found the same results. For example, the pre- and post-survey results showed that participants' overall food safety knowledge mean score increased significantly after receiving an education program[52]. The frequency of participants washing their hands with soap and running water before food preparation increased. Studies have shown that hand washing can prevent 1 in 3 diarrhea-related sicknesses and 1 in 5 respiratory infections, such as a cold or the flu[53]. The frequency of thawing frozen food on the counter or in the sink at room temperature also increased. Since participants had no access to freezers before they came to the U.S, the concept of thawing is new to them, and they adapted it as it was introduced to them.

Nutrition education had a positive impact on the indicators of food resource management. After participating in nutrition education, significantly more participants were comparing food prices to save money, planning meals before they shop for groceries, looking in the

refrigerator or cupboards for what they need before they go for groceries, using food coupons, budgeting enough money for food purchase, and checking for sales on foods. Some of these indicators are things that the participants did not have access to prior to arriving in the U.S. For instance, the participants did not have refrigerators, nor did food coupons or food sales exist in the country of their origin, Somalia. These findings are generally comparable to evaluations of other nutrition education programs that examined food resource management. For example, participants in an Eat Smart – being active intervention demonstrated increases in mean food resource management scores ($p<.001$) that included planning meals ahead of time, comparing prices when shopping, not running out food at the end of the month, and making a grocery list[54].

One study examined how food resource management mediates the relationship between participation in a SNAP-Ed nutrition education program and diet quality[55]. The study found that participation in a SNAP-Ed program enhanced participants' food resource management, which in turn enhanced their diet.

The results indicate that there was significant improvement in all three food security indicators. However, there may not have been enough time to realize consistent improvement in the food security indicators because the impact of nutrition education to manifest itself takes time. The food security indicators are based on the participants' food situation over the last 30 days.

Food insecurity is linked with chronic diseases such as hypertension, hyperlipidemia, diabetes, and heart disease. This link occurs because the food insecure people consume less variety of food and more energy dense foods. These results are expected because

food insecure people consume fewer servings of fruits, vegetables, and dairy[56]. Other studies reported association between food insecurity and inadequate dietary intake[39,57].

Implications for Research and Practice

The current literature highlights the need for culturally adapted nutrition education curriculum among refugees. The CBH curriculum was previously adapted to meet the nutrition knowledge needs of Spanish-speaking SNAP-Ed participants in Utah. In this study, the CBH curriculum was adapted for and delivered to Somali refugees in Utah. Tailoring the CBH curriculum to Somali refugees' actual traditions may enhance community interest and participation in the program.

The nutrition education was highly effective in improving participants' nutrition-related behavior, and physical activities, as evidenced by the improvements in most of the indicators of the five domains. Furthermore, for many indicators, the percent of participants meeting recommendations was low, indicating the need for additional nutrition and physical activity-related education.

Further research is needed to develop culturally appropriate nutrition education resources for refugees from different countries of origin. This culturally adapted curriculum needs to be validated against the cultural background of the refugees. The impact of physical delivery of the adapted curriculum compared to online delivery also needs to be assessed. Finally, the limitation of this study was that a control group was not used. To address this limitation, the use of a control group is recommended.

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Appendix 1: Lesson outline

Lesson	Nutrition Topic	Physical Activity Topic	Create Recipe Demonstration Recommendation
Week 1	Introduction to MyPlate and Dietary Guidelines	Introduction to HHS Physical Activity Guidelines for Americans	Any Create recipe that incorporates all five food groups
Week 2	Meal planning and grocery shopping	Physical activity goal setting	Any Create Recipe
Week 3	Nutrition Facts Label	Overcoming barriers to being physically active	Any Create Recipe
Week 4	Fruits and vegetables	Aerobic activity	Create Amazing Veggies, Create a Salad or Create a Fruity Dessert
Week 5	Protein	Resistance training	Create Easy Eggs or Create Healthy Snacks
Week 6	Food Safety	Physical activity goal of the week	Any Create Recipe
Week 7	Whole grains	Balance and flexibility	Create a Wrap/Sandwich, Create a Quick Bread, or Create a Casserole
Week 8	Dairy and Beverage Choice	Physical activity goal of the week	Create a Smoothie or Create a Pizza
Week 9	Healthy Eating Pattern	Physical activity goal of the week	Any Create Better Health Utah recipe

Week 10	MyPlate Review	Physical activity goal of the week	Any Create Recipe
Week 11	Participants Food Demonstration	Physical activity goal of the week	Any Create Recipe
Week 12	Participants Food Demonstration	Physical activity goal of the week	Any Create Recipe

CHAPTER 5

SUMMARY AND RECOMMENDATION

By Habiba Ali Nur

Summary

Refugees are confronted with many challenges that hinder their ability to obtain and prepare nutritionally adequate and culturally acceptable desired foods in their resettlement communities (1). Refugees also face challenges with diet acculturation and food environment. They experience language barriers (4) and issues navigating large grocery stores, accessing food outlets that stock traditional foods in their new food environment and using electronic benefits (SNAP) (5, 2, 6). The challenges refugees face in their resettlement communities increases their risk of experiencing food insecurity (2). Food insecurity coupled with the preexisting micronutrient deficiencies often experienced by refugees before resettlement leads to the dual burden malnutrition and chronic disease (3).

Nutrition education may provide refugees with the skills necessary to make healthy nutrition choices and reduce the risk of developing chronic diseases. However, available nutrition education may not adequately address the cultural differences of this target audience. To address this problem, this study

1. Identified the strategies that are currently being used to deliver nutrition education to refugees,

2. Identified barriers and assets for refugee food gatekeepers in Utah that influence their current nutrition behaviors as well as their preferences for receiving nutrition education, and
3. Assessed the impact of culturally adapted Create Better Health curriculum to be culturally relevant for Somali refugees living in Utah and used the adapted curriculum to teach Somali refugees in Utah about nutrition. The impact of the program on the nutrition-related behaviors of the participants was assessed by a pre- and post-program survey.

The scoping review (**Chapter 2**) identified nutrition education interventions among refugees, but there is a limited amount of evidence demonstrating the impact of interventions on refugees' nutrition knowledge and diet-related behaviors. Delivery strategies of existing nutrition education targeting refugees include conducting needs assessment of the target population to develop nutrition education resources, various client-tailored approaches used in designing and delivering nutrition education resources including cultural sensitivity, food literacy level, and English language proficiency. The strategies also included using collaborative efforts from the academic and local refugee communities in intervention or curriculum development, delivery, or evaluation as well as including a diverse intervention content and delivery methods including store visits, lessons, and training (7).

From the scoping review, we learned that adapting a context specific and flexible model for delivering nutrition education among the refugee population is important. On this note, the scoping review informed one of the steps taken to develop a context specific nutrition education among Somali refugees in Utah. This included conducting a

community assessment to identify assets and barriers to healthy cooking and eating practices, preferences, and experience for nutrition education among Utah Somali refugees as reported in **Chapter 3**.

As reported from the interviews with Somali refugees (Chapter 3), they primarily eat their traditional foods for the first few years after arrival. Although the newly arrived participants' children prefer traditional foods initially, they often come to prefer American foods. Further, Somali refugees do not consume enough fruits and vegetables, but they understand that these foods are healthy. The reason for this insufficient consumption is due to poor access to culturally acceptable fruits and vegetables and lack of preference for fruits and vegetables (1, 8). However, further research is needed to determine why the intake of fruits and vegetables is low and what types of fruits and vegetables Somali refugees prefer.

Most of the participants reported that they were responsible for cooking for the family, and most children help in the food preparation work and cleaning. Most participants enjoyed cooking for their family for a variety of reasons and they are used to cooking from scratch every day. Participants found that cooking was easier when they had the ingredients and equipment needed for cooking and food was easily accessible and affordable. These challenges are most severe for the newly arrived refugees and are attenuated as they stay longer in their newly resettled community. The decision regarding what to feed the family each day was based on four factors: preference of family members, having diversified foods, availability of the food, and time constraints. Most of the time participants eat the main meal together. When eating together, they may eat from the same plate sitting on a mat, which is their cultural norm, or separate plates on the

table.

Participants of the study indicated interest in attending a class about nutrition and food in the future including food safety, food labels, child nutrition, and how to cook American foods. They would also like the instructors to provide a practical demonstration of the concepts discussed in the class. They also suggested they preferred the instructor to be someone from the community with a professional degree. Most of the participants would like to attend the class with a group in a community location. Despite their interest in nutrition education some expressed that their work schedule and lack of childcare may prevent them from attending a nutrition education section.

The target population's needs, interests, and concerns were taken into consideration by designing a nutrition education based on culturally adopted successful and validated Crete Better Health curriculum that was delivered by a professional who speaks this local language, incorporate cultural food and resource, and used a virtual platform of delivery. The program was delivered to 36 refugees over Zoom in an hour-long session that occurred once per week for 12 weeks. The piloted culturally adapted nutrition education intervention led to improved fruit and vegetable intake. However, the percent of participants meeting the recommended level of fruits (86% consuming $\geq$2 times a day) was higher than that of vegetables (8% consuming $\geq$3 times a day) post intervention. Also, the participants made an improvement in the number of days in a week they exercised for at least 30 minutes and the frequency of purposefully making small changes to be more active.

Furthermore, participants made statistically significant improvement in three of four indicators of food safety. However, food safety continues to be a concern because no

participant met the recommended frequency of washing all items and surfaces that came in contact with the raw meat or seafood they cut. To remedy this problem, future intervention focused on food safety is needed. This would alleviate the possibility of cross contamination. Similarly, participants made statistically significant improvements in all nine food resource management indicators ($p<.001$) and in all three food security indicators.

Overall, the culturally adapted version of the Create Better Health curriculum delivered in an online format was effective in improving nutrition-related behaviors in Somali refugee women living in Northern Utah. Although improvements were realized the percentage of the participants meeting the recommendations remained below 50% for most of the parameters measured. This culturally adopted CBH was found to be feasible to implement and appeared to be accepted by participants.

The results from the research included in this dissertation and published in the *Advances in Nutrition* add to the existing evidence on culturally adopted nutrition education among refugees and highlight areas of effective practice and needed research.

A limitation of Chapter 4 study was that there was no control group in the study. Future studies of this kind would benefit from a control group.

Recommendations

The implication of the findings of this dissertation is that providing nutrition education to the refugees, may not be sufficient to substantially improve nutrition-related behavior of the refugees. The fact that the culturally adopted nutrition education resulted

in improvements of most of the indicators in the five domains but were mostly less than their respective recommended levels show the need for more culturally adopted nutrition education. This can be done using content that addresses the assets and barriers that are specific to the target population. To deliver such nutrition education program, it is important to hire educators who understand the culture and speak the language of the target refugee population. Providing more effective nutrition education may improve the quality of life and health of refugees and thus strengthen their potential within the communities where they live. It will also attenuate disparities in diet quality and dietary intake and reduce the risk of diet related chronic disease among refugees.

Furthermore, a rigorously designed large-scale study using different refugee communities to measure the effectiveness of culturally adapted nutrition education to increase the refugees' nutritional knowledge and behavior is needed. There may be a cost-effective way to address the lack of refugee-specific curricula. Examples include focusing on funding and resources on testing culturally adopted nutrition education curriculum through SNAP-Ed and EFNEP and developing a standardized tool to help develop a culturally appropriate nutrition education and to measure outcomes and educators' training.

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APPENDICES

APPENDIX A: IRP APPROVAL LETTER FOR REFUGEE INTERVIEW

OFFICE OF RESEARCH
UtahStateUniversity.

Institutional Review Board

Exemption #2
Certificate of Exemption

From: Melanie Domenech Rodriguez, IRB Chair

Nicole Vouvalis, IRB Director

To: ***Heidi Wengreen***

Date: ***November 15, 2021***

Protocol #: ***12384***

Title: ***Nutrition education for refugees***

The Institutional Review Board has determined that the above-referenced study is exempt from review under federal guidelines 45 CFR Part 46.104(d) category #2:

> *Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subject; (ii) Any disclosure of the responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation, or (iii) the information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and the IRB conducts a limited IRB review to make required determinations.*

This exemption is valid for five years from the date of this correspondence, after which the study will be closed. If the research will extend beyond five years, it is your responsibility as the Principal Investigator to notify the IRB **before** the study's expiration date and submit a new application to continue the research. Research activities that continue beyond the expiration date without new certification of exempt status will be in violation of those federal guidelines which permit the exempt status.

If this project involves Non-USU personnel, they may not begin work on it (regardless of the approval status at USU) until a Reliance Agreement, External Research Agreement, or separate protocol review has been completed with the appropriate external entity. Many schools will not engage in a Reliance Agreement for Exempt protocols, so the research team must determine what the appropriate approval mechanism is for their Non-USU colleagues. As part of the IRB's quality assurance procedures, this research may be randomly selected for audit during the five-year period of exemption. If so, you will receive a request for completion of an Audit Report form during the month of the anniversary date of this certification.

In all cases, it is your responsibility to notify the IRB **prior** to making any changes to the study by submitting an Amendment request. This will document whether or not the study still meets the requirements for exempt status under federal regulations.

Upon receipt of this memo, you may begin your research. If you have questions, please call the IRB office at (435) 797-1821 or email to irb@usu.edu.

The IRB wishes you success with your research.

APPENDIX B: IRP APPROVAL LETTER FOR SURVEY ABOUT NUTRITION EDUCATION EVALUATION

Institutional Review Board

Exemption #2

Certificate of Exemption

From: Melanie Domenech Rodriguez, IRB Chair

Nicole Vouvalis, IRB Director

To: ***Heidi Wengreen***

Date: ***March 29, 2021***

Protocol #: ***11689***

Title: ***Nutrition education for refugees***

The Institutional Review Board has determined that the above-referenced study is exempt from review under federal guidelines 45 CFR Part 46.104(d) category #2:

> *Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subject; (ii) Anydisclosure of the responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation, or (iii) the information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and the IRB conducts a limited IRB review to make required determinations.*

This study is subject to ongoing COVID-19 related restrictions. As of March 15, 2020, the IRB has temporarily paused all in person research activities, including but not limited to recruitment, informed consent, data collection and data analysis that involves personal interaction (such as member checking and meaning-making). If research cannot be paused, please file an amendment to your protocol modifying procedures that are conducted in person. The IRB will notify you when in person research activities are once again permitted.

This exemption is valid for five years from the date of this correspondence, after which the study will be closed. If the research will extend beyond five years, it is your responsibility as the Principal Investigator to

notify the IRB **before** the study's expiration date and submit a new application to continue the research. Research activities that continue beyond the expiration date without new certification of exempt status will be in violation of those federal guidelines which permit the exempt status.

If this project involves Non-USU personnel, they may not begin work on it (regardless of the approval status at USU) until a Reliance Agreement, External Research Agreement, or separate protocol review has been completed with the appropriate external entity. Many schools will not engage in a Reliance Agreement for Exempt protocols, so the research team must determine what the appropriate approval mechanism is for their Non-USU colleagues. As part of the IRB's quality assurance procedures, this research may be randomly selected for audit during the five-year period of exemption. If so, you will receive a request for completion of an Audit Report form during the month of the anniversary date of this certification.

In all cases, it is your responsibility to notify the IRB **prior** to making any changes to the study by submitting an Amendment request. This will document whether or not the study still meets the requirements for exempt status under federal regulations.

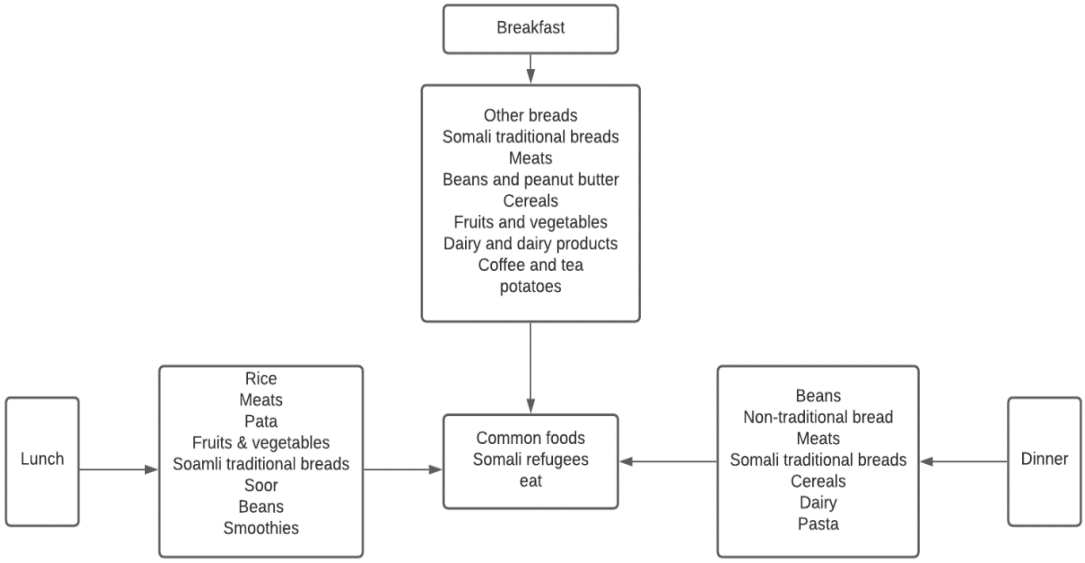
Upon receipt of this memo, you may begin your research. If you have questions, please call the IRB office at (435) 797-1821 or email to irb@usu.edu.

The IRB wishes you success with your research.

435.797.1821 | 1450 Old Main Hill | Logan, UT 84322 | MAIN 155 | irb@usu.edu | FWA#00003308

APPENDIX C: FOOD FAMILY MEMBERS COMMONLY EAT

Figure 3-1. Foods family members commonly eat.



APPENDIX D: Refugee Nutrition Education Final Draft Questions

Demographic information.

What is your age?

Country of Origin:

Were you previously in a refugee camp? If so, how long?

How long have you been in the US?

How long have you been in Utah?

What is the highest level of education that you have obtained?

Where did you complete your schooling?

Marital status: Married Single Parent

Are there others that live in your house, but buy and eat food separately from you, such as another family?

If yes – then instruct the participant to not include those people in the answers to the next questions.

a. How many people in your household share food together (yourself included)?
b. How many children in the household are 5 or under?
c. How many children in your household are between 6 and 17 years of age?
d. How many in your household are adults, 18 and older?

Are you currently employed? Yes No.

If yes, how many hours a week do you work?

Are you or someone in your household currently receiving SNAP? Yes No

Are you or someone in your household currently receiving WIC Benefit(s)? Yes No

These first few questions are about what foods you and your family normally eat and what food you normally cook for your family.

1. What are the most common foods that you and your family eat for breakfast?
2. What are the most common foods that you and your family eat for lunch?
3. What are the most common foods that you and your family eat for dinner?
    a. Do your children prefer American food or food from your country?

4. How do you decide what you feed your family each day? For example foods your family members like, time constraint, shopping pattern, what is available or in hand.
5. Do you do all of the cooking for the family? Do other family members help? If so, who helps you and what do they do?
6. Does your family eat together at the same times? Please describe- do you sit together at the table, sit on other furniture, watch tv, etc.
    a. If you don't eat together describe when and how family members eat.

These next few questions are about things that make it easier or harder for you to cook for your family.

7. Do you enjoy cooking for your family? Tell me why or why not?
8. What makes it hard for you to prepare food for your family?
    a. Do you have all the things you need to cook the things you want? Eg. Equipment or ingredients?
    b. Do you have an oven? Do you use the oven for cooking? Why or why not?
    c. Do you have a stove top? Do you use the stove top for cooking? Why or why not?
    d. Do you have a dishwasher? Do you use it to wash dishes? Why or why not?
    e. Do you have a refrigerator? Do you use it? Why or why not?
    f. Do you have a slow cooker? Do you use it? Why or why not?
    g. Do you have a pressure cooker? Do you use it? Why or why not?
    h. Do you have a blender? Do you use it? Why or why not?
    i. Do you have a mixer? Do you use it? Why or why not?
    j. Do you have a microwave? Do you use it? Why or why not?
    k. Is there any other cooking or kitchen equipment that you don't have that you wish you had**?**
    l. Do you have all the cooking utensils that you need for cooking? (Example: spoons, spatulas, whisks, knives for cutting vegetables) Are there any cooking utensils that you have but do not know how to use? If yes, please explain which ones. Are there any cooking utensils you do not have that you wish you had?
    m. How do you get to the grocery store? You drive?
    n. Do you easily find the foods you want to buy in the grocery store? If not, what makes it difficult?
    o. Do you read food labels when shopping for food? If yes, what on the label do you look at?
    p. Do you understand the price/cost of the food? If not, what is hard to understand?
    q. Do you choose foods based on what you think is healthy?
    r. What types of foods do you consider healthy? Why do you consider these foods healthy?
    s. What types of foods do you consider unhealthy? Why do you consider these foods unhealthy?

These next few questions are about your past experiences with nutrition and food or cooking classes.

9. Have you attended nutrition classes since arriving in the US?
   3a. If so, what are the nutrition classes you have attended?
   3b. Describe what was useful from the nutrition class.
   3c. Describe what you didn't like about the nutrition class.
10. How do you budget your SNAP fund to last until next month's payment?
    a) Do you run out SNAP funds before the end of the month? When in the month do you usually run out of funds?

These last few questions are about what you would like to have as part of a nutrition and food or cooking class that you might attend.

11. Would you be interested in attending a class about nutrition and food in the future?
    12.a. If not, can you tell me more about that?
    12.b. If yes:
        12.b.1. What topics would you like to have as part of the class?
        12.b.2. What time of day and day of the week could you attend?
        12.b.3. What are things that might prevent you from attending?
        12.b.4. Would you prefer that the class be with a group or with only you? Why?
        12.b.5. Would you like a teacher to come to your home or would you rather go to a community location for the class? Why?
        12.b.6. What type of teacher would you like for the class?
        a. For example, would you like the teacher to be someone with a professional degree in nutrition or dietetics, or someone from your own community who is a nutrition educator or someone with other specific characteristics?
        12.b.7. What type of education or food-related activities would you like included in the classes?
        12.b.8. Would you like to attend a class where you get to cook in the class?
        12.b.9. What would you like to learn how to cook?
        Why would you like to learn how to cook? What three foods would you would like to learn how to cook.
        12.b.10. Are there foods that you prepare now that you would like to show others how to cook because you think it may be helpful for them?
        a. How do you make it? Tell me more the ingredients and how you use them.
        b. Where did you learn how to make this food? Who taught you how make it?

APPENDIX E: ADULT QUESTIONNAIRE

SOCIO-DEMOGRAPHICS

Interview No. _____	Date _____
Start time _____	End time _____

1. What is your full name? _____

2. What is your age? _____ (note down in years)

3. What is your country of origin? _____

4. Were you previously in a refugee camp? If so, how long?

   Yes No. _____

5. How long have you been in the US? _____

6. How long have you been in Utah? _____

7. What is your marital status? (Circle the option)

   A. Married
   B. Single
   C. Divorced
   D. Have a partner
   E. Other, _____

8. What is the highest level of education that you have obtained?

9. Where did you complete your schooling?

10. Are you working?

    Yes No

    10a. If yes, how many hours a week do you work? _____

11. Are you or someone in your household currently receiving SNAP?

    Yes No

12. Are you or someone in your household currently receiving WIC benefits?

Yes No

13. How many members live in this household (including both adults and children)?

_____

☐ ENTRY ☐ EXIT

Name	Date

Adult Questionnaire

Please mark the response the **best** describes how you **usually** do things.

1. How many **times a day** do you eat fruit?

   Examples of fruits are apples, bananas, oranges, grapes, raisins, melon and berries. Include fresh, frozen, dried, or canned fruit. Do not include juice.

   ☐ I rarely eat fruit
   ☐ Less than 1 time a day (a couple times a week)
   ☐ 1 time a day
   ☐ 2 times a day
   ☐ 3 times a day
   ☐ 4 or more times a day

2. In the past week, **times a day** do you eat vegetables?

   Examples of vegetables are green salad, corn, green beans, carrots, potatoes, greens, and squash. Include fresh, canned, and frozen vegetables. Do not count French fries, potato chips, or rice.

   ☐ I rarely eat vegetables
   ☐ Less than 1 time a day (a couple times a week)
   ☐ 1 time a day
   ☐ 2 times a day
   ☐ 3 times a day
   ☐ 4 or more times a day

3. How many different kinds of vegetables do you usually eat a day?

   ☐ I rarely eat vegetables
   ☐ 1 kind a day
   ☐ 2 kinds a day
   ☐ 3 kinds a day
   ☐ 4 or more times a day

4. How many **times a day** do you drink milk or soymilk?

   ☐ I do not drink milk
   ☐ I rarely drink milk
   ☐ 1 time a day
   ☐ 2 times a day
   ☐ 3 or more times a day

5. Over the last week, **how many days** did you eat red and orange vegetables?

   Examples of red or orange vegetables are tomatoes, red peppers, carrots, sweet potatoes, winter squash, and pumpkin.

   ☐ I did not eat red or orange vegetables
   ☐ 1 day a week
   ☐ 2 days a week
   ☐ 3 days a week
   ☐ 4 days a week
   ☐ 5 days a week
   ☐ 6-7 days a week

6. Over the last week, **how many days** did you eat dark green vegetables?

   Examples of dark green vegetables are broccoli, spinach, dark green lettuce, turnip greens, or mustard greens.

   ☐ I did not eat green vegetables
   ☐ 1 day a week

- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

7. Over the last week, **how many days** did you eat beans and peas?

   _____

   Examples of beans and peas include black beans, navy beans, chili beans, refried beans, pork and beans, bean soup, barbeque beans, chickpeas, split peas, and black eyed peas. Include beans from a can or cooked from dry.

   _____

   - ☐ I did not eat red or orange vegetables
   - ☐ 1 day a week
   - ☐ 2 days a week
   - ☐ 3 days a week
   - ☐ 4 days a week
   - ☐ 5 days a week
   - ☐ 6-7 days a week

8. Over the last week, **how many days** did you eat yogurt or drink smoothies with yogurt?

   - ☐ I did not eat yogurt
   - ☐ 1 day a week
   - ☐ 2 days a week
   - ☐ 3 days a week
   - ☐ 4 days a week
   - ☐ 5 days a week
   - ☐ 6-7 days a week

9. Over the last week, **how many days** did you eat cereal with milk?

   - ☐ I did not eat cereal with milk
   - ☐ 1 day a week
   - ☐ 2 days a week

- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

10. How many **days a week** do you cook dinner (your main meal) at home?

- ☐ I rarely cook dinner at home
- ☐ 1 day a week
- ☐ 2 days a week
- ☐ 3 days a week
- ☐ 4 days a week
- ☐ 5 days a week
- ☐ 6-7 days a week

11. How often do you drink regular sodas (not diet)?

- ☐ Never
- ☐ 1-3 times a week
- ☐ 4-6 times a week
- ☐ 1 time a day
- ☐ 2 times a day
- ☐ 3 times a day
- ☐ 4 times a day

12. In the past week, **how many days** did you exercise for at least 30 minutes?

This includes things like jogging, playing soccer, and doing fitness or dance classes, or exercise videos. This 30 minutes could be all at once or a few minutes at a time. Do not count housework, taking care of your kids, or walking from place to place.

- ☐ 0 days
- ☐ 1 day
- ☐ 2 days
- ☐ 3 days
- ☐ 4 days

- ☐ 5 days
- ☐ 6 days
- ☐ 7 days

13. In the past week, **how many days** did you workouts to build and strengthen your muscles?

_____

This includes things like lifting weights and doing push-ups, sit-ups, or planks.

_____

- ☐ 0 days
- ☐ 1 day
- ☐ 2 days
- ☐ 3 days
- ☐ 4 days
- ☐ 5 days
- ☐ 6 days
- ☐ 7 days

14. How often do you make small changes on purpose to be more active?

_____

This includes things like walking instead of driving, getting off the bus one stop early, doing a few minutes of exercise, or moving around instead of sitting while watching TV.

_____

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

15. How often do you wash your hands with soap and running water before preparing food?

- ☐ Never
- ☐ Rarely (about 20% of the time)

- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

16. After cutting raw meat or seafood, how often do you wash all items and surfaces that came in contact with these foods?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

17. How often do you thaw frozen food on the counter or in the sink at room temperature?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

18. How often do you use a meat thermometer to see if meat is cooked to a safe temperature?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

19. How often do you compare food prices to save money?

- ☐ Never

- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

20. How often do you plan your meals before you shop for groceries?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

21. How often do you look in the refrigerator or cupboard to see what you need before you go shopping?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

22. How often do you make a list before going shopping?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

23. How often do you use food coupons for food purchases?

- ☐ Never
- ☐ Rarely (about 20% of the time)

- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

24. How often do you use a written weekly or monthly food spending plan?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

25. How often do you budget enough money for food purchases?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

26. How often do you check for sales on foods **before** you shop?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)
- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

27. How often do you check for food items on sale **when** you are at the store?

- ☐ Never
- ☐ Rarely (about 20% of the time)
- ☐ Sometimes (about 40% of the time)

- ☐ Often (about 60% of the time)
- ☐ Usually (about 80% of the time)
- ☐ Always

The next section has statements people have made about their food situation. Choose the answer that <u>best</u> fits your food situation over the last 30 days

28. The food that I bought just didn't last, and I didn't have money to get more.

- ☐ Often true
- ☐ Sometimes true
- ☐ Never true
- ☐ Don't know

29. I couldn't afford to eat balanced meals.

- ☐ Often true
- ☐ Sometimes true
- ☐ Never true
- ☐ Don't know

30. Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?

- ☐ Yes
- ☐ No
- ☐ Don't know

United States Department of Agriculture National Institute of Food and Agriculture

This material is based upon work that is supported by the National Institute of Food and Agriculture, US Department of Agriculture.

M

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The link for this survey is

https://www.nifa.usda.gov/sites/default/files/resource/EFNEP-Adult-Evaluation-Survey_508.pdf

APPENDIX F: CURRICULUM VITAE

Habiba Ali Nur

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Habiba.nur@usu.edu

Summary: Enthusiastic, results oriented USU PHD Candidate in Nutrition. I am an active member of the Society for Nutrition Education and Behavior (SNEB). I have 15 years of experience teaching and counseling on nutrition and health issues in a multicultural environment. My career has progressed from researching and teaching crop cultivation in Somalia, to presenting papers at international conferences, to teaching undergraduate courses on health and nutrition, and counseling individuals and families including refugee from different backgrounds on a wide variety of nutrition, social and community issues. I have proven skills in teaching, counseling, and mentoring students, and families to healthier lifestyles. I have strong verbal and written communication skills that I have developed by interacting with people of multicultural backgrounds. I am a self-motivated person. I thrive when contributing to projects designed to improve food, nutrition, and health options, and hunger and food insecurity.

Notable Accomplishments:

- Taught undergraduate courses, including Nutrition/Health 1020, Foundations of Nutrition, Health 2020, Nutrition Through the Life Cycle, NUTR 3420, Multicultural Health and Nutrition, NDFS 1260, Food Literacy, SW 6352, Global Issues in Women's Health, NUTR 1240, Nutrition and Sustainable Cooking, NUTR 4440, Advanced Human Nutrition.
- Assisted eligible clients in connecting with medical, social, educational, and other services, and ensured coordinated communication between all parties.
- Taught basic nutrition and health classes to refugee communities with different backgrounds.
- Presented a paper and lectured on female genital mutilation to health professionals across the region, showing the impact of cultural issues on greater health and nutrition issues.
- Trained and supervised field extension agents in how to teach 800 farm families to establish and maintain income generating activities such as home gardening, poultry farming and bee keeping projects.
- Completed practical, management and clinical rotations of various departments and methodologies.

Education:

Utah State University City: Logan State: Utah

Current Ph.D. Student in Nutrition August 2018 to Present

University of Utah. Division of Nutrition City: Salt Lake City State: Utah

Completed Dietetic Internship Program at the Coordinated Masters in Dietetics February 1998

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Utah State University City: Logan State: Utah

Degree: Master of Science. Major: Nutrition and Food Science

- Thesis was titled "Effect of Aging on the Quality of Beef Semitendinosus Muscle Treated with Ultra High Temperature Pasteurization."

Utah State University City: Logan State: Utah

Degree: Master of Science. Major: Agricultural Systems Technology and Education with emphasis in International Extension. 1993

- Thesis was titled "Improving Nutrition Balance By Implementing Home Gardening in the Bay Region of Somalia."

Somali National University State: Somalia

Degree: Bachelor of Science Major: Agricultural Science eptember 1984

Publications:

Nur H, Atoloye A.T, Wengreen H, Archuleta M, Savoie-Roskos M, Wille C., Jewkes M. (2021). Scoping Review Identifying Nutrition Education Strategies for Refugees in Western Countries. Advances in Nutrition. https://doi.org/10.1093/advances/nmab080

Atoloye A.T., **Nur H.A**., Wengreen H., & Archuleta M. (2021). Tackling Cultural Determinants of Health through Nutrition Education among Refugees. Health Equity. 5:1, 1–4, https://doi.org/10.1089/heq.2020.0109

Papers under review

Gough J., Wengreen H., **Nur H.**, Archuleta Martha (2020). Providing Nutrition Education to Refugees: Successful Strategies and Barriers to Success in Current Programs. Journal of Nutrition & Behavior.

Oral and Poster Presentations:

Wille C., Coombs., **Nur H**., & Atoloye A.T. Government Funds Nutrition Education, Supports Curricular Adaptations and Virtual Delivery to Effectively Reach Limited-Resource/Culturally Diverse Audiences During Pandemic. Twelfth International Conference on Health & Society. September 8, September 9, 2022.

Nur H., Atoloye A.T., Savoie-Roskos, M., Wengreen, H., Archuleta, M. Barriers and assets that influence nutrition behavior and preferences for receiving nutrition education of Somalia. Society of Nutrition Education and Behavior (SNEB) 54th Annual Conference, Atlanta, GA, July 30 – August 1, 2022.

Nur H., Atoloye A., Wengreen H., Archuleta M., Roskos, M.S., Munger, R., Straquadine, G. (2021). Evidence and Influences Regarding Food Insecurity Among Refugees in the USA: A systematic Review. Journal of Nutrition Education & Behavior (SNEB) 53th Annual Conference, Atlanta, GA, July 30 – August 1, 2021.

Nur H., Atoloye A., Wengreen H., Archuleta M. (2020). Identifying Nutrition Education Strategies for Refugees in Western Countries: Scoping Review. Journal of Nutrition Education & Behavior (SNEB) 52nd Annual Conference, Atlanta, GA, July 30 – August 1, 2020.

Gough J., Wengreen H., **Nur H**., Archuleta Martha (2020). Providing Nutrition Education to Refugees: Successful Strategies and Barriers to Success in Current Programs. Journal of Nutrition & Behavior (SNEP) 52nd Annual Conference, Atlanta, GA, July 30 – August 1, 2020.

Work Experience:

Currently I work with Create Better Health Program (SNAP-ED) as Utah Refugee Coordinator providing education to the refugees both directly and indirectly. Current

Asian Association of Utah
Refugee and Immigration Center
Salt Lake City, Utah

Behavioral healthcare provider specializing in mental health, substance abuse and prevention services for refugee clients from different backgrounds.

Clinical Case Manager November 2017

Client advocate responsible for assisting eligible clients in connecting medical, social, educational, and other services, ensuring coordinated communication between all parties.

- Assisted clients and their families with completing referrals to financial, social, medical, mental health, addiction and other appropriate providers, which improved their ability to function in the community.
- Facilitated assessments, individualized planning, monitoring of services and advocacy for clients in the home and community.
- Coordinated a well-trained and caring staff of therapists, psychiatrists, case managers, social workers, and medical staff in providing support for clients.
- Teaching nutrition and parenting education classes to refugee clients.

Valley Mental Health Salt Lake City, Utah

Behavioral healthcare provider specializing in mental health, substance abuse and prevention services for more than 20,000 clients of all ages.

Clinical Case Manager June 2006 - April 2011

Client advocate responsible for assisting eligible clients in connecting medical, social, educational, and other services, ensuring coordinated communication between all parties.

- Assisted clients and their families with completing referrals to financial, social, medical, mental health, addiction and other appropriate providers which improved their ability to function in the community.
- Facilitated assessments, individualized planning, monitoring of services and advocacy for clients in the home and community.
- Coordinated a well-trained and caring staff of therapists, psychiatrists, case managers, social workers and medical staff in providing support for clients.

Weber State University Ogden, Utah

Higher learning institution committed to meeting the needs of students at every stage of life and providing ongoing service to the community through more than 200 certificate and degree programs including eight graduate degrees.

Instructor January 2020 - present

Courses Taught in the classroom and online:

NUTR 1020, Foundation of Nutrition

NUTR 1240, Nutrition and Sustainable Cooking

NUTR 3420, Multicultural Health and Nutrition

NUTR 4440, Advanced Human Nutrition

Utah State University Logan, Utah

Lab Instructor Spring 2022

NDFS 1260, Food Literacy

University of Utah Salt Lake City, Utah

Adjunct Professor Spring 2021 and Spring 2022

Courses taught online:

SW 6352, Global Issues in Women's Health

Salt Lake Community College Salt Lake City, Utah

Largest state higher education institution with more than 60,000 students in credit and non-credit courses at 13 locations throughout the Salt Lake Valley, also offering online class options.

Adjunct Professor January 2004 - 2019

Responsible for teaching undergraduate courses in the classroom and online in Nutrition/Health 1020, Foundations of Nutrition, Health 2020, and Nutrition through the Life Cycle.

- Presented a paper on "Female Genital Mutilation, a Multicultural Health Issue" at the Southwest district, Northwest district and the State of Nevada AAHPERD combined conventions.
- Lectured on female genital mutilation to health professionals at the Utah department of Health, Asian Association of Utah (refugee re-settlement organization), Southwest District Heritage and Greatness Conference in Park City, and Weber State University.

Internship May 1998 - December 1999

Responsible for completing practical, management and clinical rotations of various departments and methodologies.

- Completed practical rotations in community nutrition WIC in Ogden, University Nutrition Clinic and diabetic outpatient clinic in McKay Dee Hospital.
- Completed management rotation: University Neuropsychiatric Institute.
- Completed clinical rotations at Davis Hospital and Renal Dialysis Center, Salt Lake City, Utah.

Ministry of Agriculture Mogadisho, Somalia

Headquarters and main office of Agriculture in Somalia, supporting research, training and development of agriculture by improving and increasing the production of different crops.

Deputy Director January 1987 - January 1990

Responsible for Women`s Development in Agriculture on the Farm Management Extension Training project.

- Trained and supervised field extension agents in the three regions.
- Established and maintained income generating activities such as home gardening, poultry farming and bee keeping projects for 800 farm families.

Researcher October 1984 - June 1986

Agronomy researcher, BONKAY Research Station. Responsible for conducting research on different aspects of sorghum agronomy.

- Determined optimal spacing/ thinning of planting time to maximize harvest yield.
- Developed quarterly reports.

Agriculture and Farm Management

Extension Training

Baidoa, Somalia

Covering four regions and more than 100 counties, one of the biggest agricultural projects in Somalia. Responsible for "training the trainers" to teach 800 farm families how produce more crops and create income generating activities through agriculture.

Extension Specialist January 1987 - January 1990

- Developed and organized regional extension training held each quarter to maintain currency of the training specialists.

Bay Project

Baidoa, Somalia

Research project emphasizing improvement of crop and animal production in the region, including infrastructure and wells.

Agronomist-Researcher October 1984 - December 1986

- Responsible for data collection and quarterly reporting, organizing and participating in seasonal workshops. Presented a paper at the first National Sorghum Conference held at Bonkay Research Station.

Skills:

Certifications

- Salt Lake Community College Online Teacher Credential April 30, 2018
- National Nutrition Certificate Program (NNCP) July 16, 2020
- Utah Food Handler Permit April 16, 2025
- Certificate of Completion of Master Food Preserver. USU Extension June 17, 2022
- Utah Regional Leadership In Neurodevelopmental Disability (URLEND) Program 2016-2017
- Utah State: Certified Adult Mental Health Case Manager August 2009
- Certificate of Appreciation. Somali Community Service of Utah July 2, 2022

Other Skills

- Nutritionist and Health /Instructor
- Registered Dietitian (RD Eligible)
- Multilanguage skills and Good Public speaking ability
- Project Manager and supervising people
- Curriculum Development and publications

Awards

CAAS Travel Award for NDFS, Utah State University 2022

Community Championship Award. Molina Healthcare May 8, 2013

Languages

English: Read Write Speak

Arabic: Read Write Speak

Somali: Read Write Speak