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Lifestyle and Food-Related Behaviors Refugees and Immigrants Experience Upon Migration to Atlanta, Georgia

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

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By Rabab Al-Araji

BACKGROUND: The number of immigrants in the USA continues to rise, however, there is limited understanding of what factors are associated with post-resettlement food intake and how to best promote immigrant health and nutrition.[1]

DATA: In chapter 2 we also used photovoice to examine the complexities associated with integration among a group of refugee adolescents (n=40) between the ages of 10-18. In chapter 3 we used a simple survey instrument to examine food and beverage items immigrants report consuming more or less of post-migration, socio-environmental factors that may influence changes in dietary selection, and perceptions of the healthfulness of foods and beverages. A sample of (n=49) adult immigrants and refugees between the ages of 18-65 were included in our study

METHODS: In chapter 2 a thematic analysis approach was used to analyze this group-generated qualitative data. We thematically analyzed frequently re-occurring images to identify topical areas and themes throughout the photos. We then combined and categorized recurring segments from the transcripts along with recurring images to create meaningful categories. In chapter 3 we conducted post-survey coding of food groups, followed by descriptive analysis were conducted for all variables in the survey. Findings were stratified by region of origin – Asia, Africa, Middle East, Europe. Chi-square analyses were analyzed with ordinal logistic regression analysis, presented with odds ratios (OR) and 95% confidence interval (CI).

FINDINGS: Results of this study highlight an increase in leisure-time sedentary behaviors, physical activity related barriers and changes in food related habits. Unprocessed low-energy dense foods and food high in fiber were reportedly replaced with foods that are refined high-energy dense and low in fiber. This may have implications for dietary intake of sugar, fat, simple carbohydrates.[2] Cost, convenience and taste preferences were found to predominate food consumption, over and above individual factors such as knowledge, skills, and motivation.[3]

INTERPRETATION: Knowledge of potential determinants of behavior is necessary for developing interventions, and information on health determinants in ethnic groups is often lacking. Nutrition educators should consider the dietary changes of immigrant participants, such as increased consumption frequency of fast foods and soft drinks, which were observed in this study. Moreover, further research is warranted to examine the impact of leisure time sedentary behaviors, transportation, land use, and infrastructure have on health.

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CHAPTER 1. INTRODUCTION

Nearly sixty thousand refugees per year and thousands more immigrants move and make the transition to life in America.[4] Upon resettlement, migrants face substantial changes to their lifestyle and diet which may have a lasting impact on health.[5] Health behaviors of migrant populations may converge with those of destination countries but this process is quite complex.[6] The knowledge base surrounding behavioral and cultural topics such as the role of acculturation, health screening, eating behaviors, exercise behaviors, as well as culturally competent practices and interventions is insufficient, making it challenging to address needs and encourage healthy integration.[7] Although previous data describing acculturation and health-related behaviors of resettled refugees exist, the changing demographics and countries of origin of refugees and immigrants highlights the importance of collecting current, local data. This paper aims to examine behavioral changes observed in immigrant and refugee populations during integration to life in the United States. Analysis of the interrelations between elements of integration and health determinants would contribute to widen integration oriented perspective in policy interventions. In chapter 2, a community-based participatory research approach, *Photovoice*, was used to illustrate the experiences of 40 refugee adolescents (ages 10-18) recently arrived to the Atlanta Metropolitan area. The photo journals were used to convey adolescent's self-reported perspective of unique elements experienced in the U.S.
In chapter 3 we use a simple survey instrument to investigate food consumption patterns, perceptions of healthy eating, and motives influencing dietary decisions among 49 adult immigrants and refugees in Atlanta, Georgia (ages 18-65). Findings may be used to learn

about how refugee integration in the U.S. may affect health-related behaviors, including dietary modifications and physical activity. The results of these studies can be useful to inform diet and health related initiatives for improved access to nutritious foods, health education, and environments that support healthy choices.

CHAPTER 2.

America Through the Eyes of Newly Arrived Refugee Youth

Preface

Global humanitarian organizations respond to the world's worst humanitarian crises and help refugees survive and rebuild their lives, restoring safety, dignity and hope. Visiting a refugee-focused afterschool program run by a non-governmental organization (NGO), I saw a wide-eyed curiosity in the recently arrived refugee students. As an immigrant myself still adapting to life in the U.S., I was intrigued to learn about the cultural transformations that takes place among newcomers. More precisely, I was curious to get a first-hand perspective of the elements that refugees tend to struggle with as they integrate into a new country. It is difficult to define exactly what "living in the U.S." means to everyone; American culture has been enriched by the values and belief systems of virtually every part of the world. From an immigrant student's perspective, that diversity is very valuable. This interest, coupled with my experience in Global Health, stirred a curiosity and determination to learn more about acculturation in the refugee community and find ways to support healthy transitions in America. As a graduate research assistant working with a refugee related research project, I had the opportunity to investigate my interest and develop a research project with refugee adolescents within the NGO's afterschool program. Due to language barriers, the use of photo images to capture aspects of their environment and experiences was likely to be the most inclusive method to learn about the hardships that the adolescents face first hand. Every step of this process, including the literature review, instrument development, data collection, and articulation of the results has taught me a great deal about the value of research and the need for evidence-based interventions. In

both my professional practice as a public health graduate student and in my personal interactions with vulnerable populations such as refugees, I aim to help children and their families build healthy, successful lives. Providing health services to these populations is not only important for their benefit, but also for the benefit of the overall population. Healthy integration should be a normal part of growing up in America. The lessons learned from this project can be used to help build an environment where kids from all backgrounds have healthy futures.

Abstract

Nearly sixty thousand refugees and thousands more immigrants arrive to start new lives in the United States each year. Among them, close to 20,000 people under the age of 18 are resettled and must quickly learn to integrate with American ways of life. Through this process, they observe, learn about, and potentially adopt new ideas, preferences, and behaviors that may have implications for health. To better understand the complexities of their integration, a community-based participatory research (CBPR) approach, *Photovoice*, was used to learn about the perceptions of refugee adolescents newly arrived to the Atlanta Metropolitan area. This method can illustrate the experiences of these youths that may be relevant to their health and integration.

Keywords

Refugee, adolescents, acculturation, resettlement, photovoice

Introduction

Rates of international migration have reached unprecedented levels in the United States and throughout the world.[8] By the end of 2015, there were an estimated 65.3 million forcibly displaced people world-wide. This includes 40.8 million internally

displaced people, 21.3 million refugees, and 3.2 million asylum seekers.[9] While the vast majority of refugees and other forced migrants are hosted in developing regions, it remains the case that the United States operates the world's largest formal refugee resettlement program.[4] With the high level of migration, the United States has become a nation of countless diverse cultures and peoples. Each year, close to 20,000 people under the age of 18 are resettled in the United States and learn to become American and potentially adopt native-born behaviors.[10] Adopting new behaviors may have important health implications, altering health-related activities, including food consumption.[11-14] This change is particularly important during the formative years of adolescence, a time sensitive to social norms, yet dynamic with growth and development.[15] The type of changes made upon acculturation and adaptation in the United States will determine migrant adolescents' relationships with healthy behaviors, which may lead to either beneficial or deleterious outcomes.

Compared to those born in the United States, immigrants and refugees tend to have healthier diets and participate in fewer risky health behaviors.[16] However, the longer they reside in the United States, the likelier their health is to deteriorate.[17-20] With longer duration of residence in the United States, the proportion of overweight and obese foreign-born individuals is found to increase.[21] These findings may provide important insight into the health of the immigrant population after several years in their new environment.

Foreign-born individuals now account for approximately 13% of the U.S. population.[22] Despite representing a significant and growing portion of the U.S. population, relatively few studies have looked at immigrants' changing health status. To

understand the lives of adolescents in this changing context, we take an adolescent-centered approach to understanding their transition into the U.S. and its implications on their well-being. By using photovoice followed by a discussion group, we aim to learn about the experiences adolescent refugees encounter while embracing the 'American' culture, and how it may affect health-related behaviors, including dietary modifications and physical activity.

The results of this study can be used by refugee organizations to guide new health education initiatives and arrival orientations. This study may also be used for future projects at Emory University. Finally, the results of this study may be useful to inform diet and health related initiatives for improved access to nutritious foods, health education, and environments that support healthy choices.

Background

The number of immigrants in the USA currently is higher than at any other time in American history.[23] While migration pressures continue to mount in Europe and the Middle East, the United States remains the top resettlement country.[24]

As they integrate into new societies, individuals from different cultures come into continuous firsthand contact, leading to changes in the original cultural patterns of either or both groups, called acculturation.[25] Acculturation intrinsically interacts with the dynamic social environments in which it takes place.[26] Personal characteristics, including age, gender, and social support, may influence the perceptions and interpretations of the acculturation experience.[27] Individuals entering the acculturation process in childhood or adolescence may embrace the dominant cultural values and behaviors as a way of fitting in, and therefore may reject some aspects of their culture of origin. However, these same

individuals later in life may then embrace their culture of origin and integrate the two cultural orientations.[28] As refugee youth integrate into their culture, they begin to establish a sense of belonging, which is foundational for well-being.[29,30,31,32] There is mounting evidence that resettlement can have an equal if not greater negative impact on the well-being of refugee adolescents as the pre-migration context.[33] In the past several decades, the US population has experienced a decrease in physical activity and an increase in obesity, especially among children. These health trends pose a risk to migrant youth as they assimilate into US culture and adopt the behaviors of their host country. In the 21st century, adolescent development occurs in "a world where changes in communication, technology, culture, the environment, education, and demographics are creating challenges, vulnerabilities and opportunities unlike ever before." [34] Newly acquired behaviors may have important health implications on the growth and development of adolescents.

Increased access to transportation has decreased the need for physical activity and contributed to the prevalence of obesity and type 2 diabetes has increased dramatically in the past several decades in the United States.[35] In 2001, 90% of U.S. households owned at least one car and nearly 60% had two or more.[36] The dominance of cars has made many urban environments hostile to walking and cycling, thereby reducing levels of physical activity. Apart from encouraging a sedentary lifestyle, reliance on motor vehicle transport has a range of adverse health effects: traffic accidents, air and noise pollution, and greenhouse gas emissions.[37]

Sedentary lifestyles have become more prevalent and pervasive. This is reflected by the large numbers of TV sets, VCRs, and remote controls per household and

increasing time spent watching TV in the past several decades.[38] Children and adolescents are now the target of intense and specialized food marketing and advertising efforts. Food marketers are interested in youth as consumers because of their spending power, their purchasing influence, and as future adult consumers. [39] The food industry is the second largest advertiser in the American economy. It is also a leading buyer of television, newspaper, magazine, billboard, and radio advertisements.[40] The average American child will have viewed approximately 500,000 television commercials by the end of high school.[41] Among products seen on television, food is the most widely advertised and food preferences develop primarily through learning processes.[42] In children's shows, 50 percent of advertisement time is devoted to foodstuffs. Most of these ads are for products that nutritionists argue should be consumed only occasionally or in small portions. Only 15 percent of food ads targeting children include reference to an active lifestyle.[43]

Eating processed foods and eating out have been associated with obesity among children aged 5–19 years.[44-47] Microwaves are regularly used as a part of meal preparation and re-heating in approximately 90% of American homes.[48] Microwaves allow individuals to steer towards quick-prep meal options and microwavable foods, many of which are heavily processed.

The school represents the primary setting where refugee children first confront the "majority American culture." [49,50] School serves as an enabling environment for acculturation, not only for academic development and language acquisition but also for cultural learning through such experiences as peer relations, classroom expectations, extracurricular activities, and school norms.[51,52] One can expect that the more

Americanized the social contexts are in which immigrant children live and interact, the greater similarity these children would share with the native-born Americans.

The Atlanta Metropolitan Area is one of the leading destinations for refugees and immigrants: in the final 3 months of 2016, close to 1,000 refugees came to Georgia, accounting for 4% of all refugees arriving the U.S. in that three-month period, making it the 8th highest migrant recipient in the United States. The top four countries from which Georgia accepted refugees are Democratic Republic of Congo, Syria, Somalia, and Burma.

This project aims to use the powerful medium of photography to elucidate the experiences of migrant youth acculturating to life in the US, a methodology known as photovoice. Photovoice will be used to learn about the elements that refugee adolescents are unaccustomed to while in contact with American culture within the first 6 months of resettlement. Photovoice is an example of a community-based participatory research method where pictures taken by participants become visual data, which helps to overcome potential literacy and language barriers and may be more appropriate for cultures with oral rather than written methods of conveying information.[53] Prior studies have demonstrated its feasibility in studies among youth and in developing settings.[54,55] By exploring what children perceive to be important activities and consumption goods, this study offers a new perspective on the course of the nutritional transition among refugee adolescents and its implications for children's health.

Data and Methods

Photovoice is a process by which people can identify, represent, and enhance their community through a photography. Photovoice has three main goals: (1) to enable people to record and reflect their community's strengths and concerns, (2) to promote critical dialogue and knowledge about important issues through large and small group discussion of photographs, and (3) to reach policymakers.[56] Pictures taken by participants become visual data, which helps to overcome potential literacy barriers and may be more appropriate for cultures with oral rather than written methods of conveying information.[53] The use of photographs touches on the limitations of language, especially language used for descriptive purposes. Moreover, photograph-making and photo-elicitation seem to work particularly well with children who may find it difficult to articulate more abstract or conceptual thoughts. The photographs give them something concrete on which to hook their thoughts and feelings. [57] Researchers have involved children in photovoice projects to gain a better understanding of play experiences in Tanzania, physical activity participation among Vietnamese refugees in the United States, and food choices among African American girls.[58-60] Photovoice has informed the development of tobacco, drug, and alcohol use prevention curricula for youth in South Africa and provided content for reports to pediatric hospital administrators in the United Kingdom.[61,62] Photovoice is defined as a qualitative research method in which participants use cameras to generate data, and allows for the elicitation of the point of view of participants represented in the form of still images of cultural scenes that they deem meaningful. This is complemented by discussion groups in which the participants explain the cultural scene represented in

the photograph and places it within the larger context of daily life and/or community experience. [63]

This project was conducted in collaboration with a local NGO-run afterschool program designed for refugee and immigrant students. The program provides support and academic assistance for refugee youth and young adults as they adapt to life in the United States. During the academic year, the center has 4 groups of 20-30 students in the program. Our photo voice study was introduced as a volunteer opportunity for the students at the beginning of two single group. The project took place at two points in time:

> In December 2017, research assistants introduced the project to a group of students. Within this group were 20 refugee adolescents (ages 10-18) from Burma, Democratic Republic of Congo, Sudan, and Afghanistan, eight of whom had been in refugee camps prior to resettlement in America. The group consisted of 12 boys and 8 girls. All students were invited to participate in the project. Each of these adolescents was resettled in the Atlanta Metropolitan Area within 6 months of data collection.
>
> In February 2017, the research assistants introduced the project to all students within the second group. Within this group was a group of 28 refugee adolescents (ages 10-18) from Burma, Democratic Republic of Congo, Sudan, Afghanistan and Iran, six of whom had been in refugee camps prior to resettlement in America. The group consisted of 12 boys and 16 girls. All students were invited to participate in the project. Each of these adolescents was resettled in the Atlanta Metropolitan Area within 6 months of data collection.

Photo Prompts

A literature search was first conducted to identify questions of interest and readily available materials. The team then prepared detailed instructions for participants on taking photographs developed to directly address the goals of the study. Due to the lack of translators, prompts were kept short. The instrument was tested with two children prior to the start of the project to ensure clarity of the instructions and to ensure the questions are appropriate and understandable. The journals containing prompts were given to participants. Each journal consisted of 3 prompts about their experiences with their environment, food, and activity. Prompt 1 instructed participants to take "2-3 photos of things that are new to you in America." Prompt 2 instructed participants to take "2-3 photos of new foods or drinks you've seen in America." Prompt 3 instructed participants to take "2-3 photos of new activities that you've seen in America."

First group (December 2017): Each participant was given a disposable camera, a set of prompts, and a journal. The participants were given detailed instructions about taking photographs and writing in their journals in advance. Research assistants explained for 10-15 minutes the purpose of the study and how to use the cameras. Participants were given 7 days to take pictures. Only 14 of the 20 participants used the cameras and took pictures.

Second group (February 2017): Each of the 28 participants was given detailed instructions about how to take images with their camera phones or another camera device of their own. Translators were present to help translate the instructions and ensure that the objectives of the project were clear. The same set of prompts were

handed to the participants as a guide to facilitate their activity. Research assistants, with the help of the translators, explained for 10-15 minutes the purpose of the study and how to use the cameras. Participants were given 7 days to complete the project. Only 17 of the 28 participants took pictures.

Discussion Groups: Language barriers introduced limitations to journal responses; therefore, a group discussion facilitated by translators of every language was conducted for both group to capture direct quotations about personal perspectives and experiences. The discussion groups allowed the participants to engage in a discussion guided by the images they had taken. Two research assistants conducted these discussion groups in a single room over a duration of 30 minutes during the afterschool program. The discussion group interview was audio-taped for transcription purposes. The research assistants took notes as well. Transcription data and notes was used to support the findings and the experiences of the participants.

Data Analysis

In our study, a thematic analysis approach was used to analyze this group-generated qualitative data.[64] Initially, research assistants read through the transcripts to identify meaningful and recurring segments. In extracting themes, the team considered meanings of key words, their context, internal agreement or shifts in opinion, and whether or not opinions were grounded in particular experiences. All cameras and images were collected and photos were developed; low quality and unclear images were not included in our analysis. Subsequently, research assistants thematically analyzed frequently re-occurring images to identify topical areas and themes throughout the photos. The research assistants then worked together to combine and categorize recurring segments from the transcripts

along with recurring images to create meaningful categories. The categories were then defined so that each category was internally consistent and externally distinct from other categories. Themes were then labeled.

Results

A total of 40 students aged 10-18 years agreed participate in this study; only 31 actually completed the study, for a retention rate of 77.5%. Only 4 participants made at least one journal entry. In total, respondents provided 139 images. We did not include low quality and unclear images in our analysis. The remaining images (n=92) were thematically analyzed by the most commonly represented photographs, and were organized into 5 main themes: technology, transportation, kitchen appliances, food items, and recreational activities (see Table 1). Once the themes were created, potential health complexities surrounding the use of these themes were analyzed.

Table 1 presents the main themes and number of images commonly represented among the photographs taken.

Theme	n	Photo Description
Technology	30	Big Screen T.V., computer, phone, Wi-Fi router, home security system, water heater, AC, PlayStation, electricity, fire extinguisher
Convenient Tools / Kitchen Appliances	21	Refrigerator, microwave, vending machine, thermos, juice maker, electric stove, tea kettle, fan, cooler, water fountain
Food	21	Canned foods, Powerade, cereal, juice, pizza, burger, hot dog pecans, school milk cartons, pre-cut celery, pre-cut broccoli, pre-cut apples
Recreational Activities	10	Swimming pool, American Football, playground
Transportation	10	Bus, car, stroller, fire truck
Miscellaneous	*30*	*Toilet, toilet paper, table, desk, toy cars, Christmas tree, church, plants, curtains, light switch, shower, library books, flowers, knight statue, posters, lamp, stuffed animals, mug, backpack*

Photo descriptions represents one (or more) images taken by participants.

Five major themes emerged from the photographs and transcription: technology, transportation, kitchen appliances, food items and recreational activities. Participants most frequently described certain unfamiliar or new technology as an innovative element to them. Thirty-three percent (n=30) of the photographs primarily depicted technology, 20% (n=6) of which were taken by participants who grew up in refugee camps. The next most frequently taken images represented kitchen tools and appliances, representing approximately 23% (n=21) of photographs, 33% (n=7) of which were taken by participants who had lived in refugee camps. Another 23% (n=21) depicted food or food-

related objects, 43% (n=9) which were taken by refugees who had lived in camps. Recreational activities were represented in 11% (n=10) of images, 40% (n=4) of which were taken by refugees who grew up in camps. Finally, 11% (n=10) primarily depicted transportation methods, 30% (n=3) of which were taken by refugees who had lived in camps. Boys and girls contributed equally. Table 1 lists the number of photographs taken by adolescents in each of the main categories.

Technology

Information and communication technologies have transformed the way Americans work and learn and the means by which they achieve personal and collective goals. As the digital transformation across countries continues to unfold, America remains one of the most technically advanced countries in the world.[2] A recent Nielsen study found that about 94% of Americans have an HD television and that the average adult in the United States spends about 4½ hours a day watching shows and movies.[3]

Image 1 - Technology images

Description (clockwise)- flat screen television, Wi-Fi router, flat screen computer, computer lab

Technology was a recurrent theme among the participants in our study. Some participants also described using technology in the U.S. more than in their country of origin. A total of 30 images depicted at least one technological piece of equipment, comprising more than a third of the 92 images. Big screen TVs, computers, cell phones, Wi-Fi, and video game systems were among the images taken, with televisions being predominant. Boys contributed a higher number of the technology-related images taken, with 21 images to the girls' 9. More specifically, boys captured images of technology used for entertainment. Two of the 30 photos depicted a PlayStation, both of which were taken by

boys. During the group discussion, one 14-year old boy mentioned video games as a pastime he enjoyed in the United States, which he did not have back home. He stated, "Games on a big TV… I like it… it's new to me!" Another boy mentioned playing video games as an active pastime: "I enjoy soccer, so I play soccer games on the television." Approximately 68% of the photographs were taken from participants' homes, while the other 32% were taken from school. During group discussion, one 14-year-old boy from Afghanistan claimed, "…in America I use media more and more." Participants emphasized that their experiences with technology in America was distinct from their previous experiences. A 19-year old girl, who had spent all her life in a refugee camp in Thailand stated, "I never saw televisions like televisions here in America."

Convenient Tools/ Kitchen Appliances

Americans have an ever-increasing need for convenience when it comes to eating. [65] When immigrants and refugees arrive in the United States, many elements associated with food may influence their overall health as they integrate: unfamiliar foods, food storage, food preparation, and food-buying habits. In the United States, a kitchen is packed with electronic devices, some of which may be unfamiliar to refugees. Modern kitchen appliances, such as the refrigerator, microwave, thermos, and coolers, are believed to provide greater efficiency on complicated and time-consuming kitchen tasks.

Image 2- Kitchen technology

Description (clockwise) - electric stove, juicer, thermos, microwave

Convenient cooking and storage methods appear to be innovative equipment to several of the participants in our study. Some of the most common images captured include microwaves, thermoses, refrigerators, electric stoves, and coolers. A total of 21 of the 92 images used were kitchen appliances and convenient storing methods. Girls (n=14) were more likely to capture this theme than boys (n=7). In group discussion, one 13-year old girl from Afghanistan mentioned: "(In America) we make food hot in a minute in the microwave, in my country we don't make food like that." The microwave is a household

appliance that is regularly used as a part of meal preparation and re-heating in approximately 90% of American homes.[48] The microwave has gained considerable importance as an energy-saving, convenient, and time-saving cooking method. [66] It allows individuals to steer towards quick-prep meal options. A study conducted by Beck found that most evening meals in the U.S. included processed commercial foods in at least moderate amounts.[67] One girl from Democratic Republic of Congo mentioned the increased use of the microwave in the U.S. by her family. She stated "now we use microwave every day… it's faster!" The use of coolers in the US was also commonly represented and discussed among the participants. During group discussions, participants acknowledged the importance of using coolers to pack perishable food items. After noting juice as her favorite beverage, one 17-year-old girl from a camp in Thailand claimed "…I can keep my juice cold, and go outside... I like it." Drink filled vending machines were located around the school. With that, students can conveniently purchase beverages at their own desire. Three of 21 images depicted the vending machine, and children expressed an interest in purchasing beverages when possible.

Processed Foods

Grocery store aisles are full of foods that appear healthy, but may not be as good for you as they seem. In the United States, some foods are processed – changed, prepared, or packaged – in some way before eating them.[68] They fall somewhere on a range from minimally processed to what some nutrition experts refer to as "highly processed." Some processed foods have ingredients added, some are fortified to add nutrients, and some are simply prepped for convenience (washed or chopped) or packaged to last longer.[69] In a nationally representative sample, moderately and highly processed products dominated

purchasing patterns by collectively providing more than three-fourths of energy. [70] Becoming accustomed to an American lifestyle can lead to the increasing consumption of processed foods.

Image 3- Processed Foods

Description (clockwise) - Powerade, canned foods, cereal, canned foods

Among food items captured, participants showed an emphasis on prepackaged and processed foods. Respondents did not, however, differentiate between foods that were

new to them and food they actually eat. Among the 21 images taken of food, 8 were taken from the household and 13 were taken at school. A majority of the images were taken by girls (n=12), while only 9 were taken by boys. Foods most commonly represented as 'American' by the participants included pizza, corn flakes, fruit juice, milk cartons, pre-packaged fruits and vegetables, and canned foods. One 11-year old girl from Afghanistan noted, *"*pizza, pizza, pizza, I have never seen it before coming to the U.S.*"* Participants claimed that while some of these foods were not specifically new to them, they were packaged differently and tasted different. Four photos depicted pre-cut and packaged fruits and vegetables such as apples, broccoli, and celery. A 10-year-old boy from Afghanistan brought this topic to light, "... fruit here doesn't taste the same, like, it's good, it's different." Another 10-year old boy stated, "apple, banana, carrot, cereal, I saw them (in Africa) but I see them more here, they taste different" The most popular beverages represented in the photographs were juice and milk cartons. When discussed, juice was described as nutritious and tasty. Rarely did the participants mention health during any other discussion points. Two of the 21 photos depicted milk cartons, taken from school. While milk was common in their country of origin, most participants noted the packaging producing an appeal to the product. Among the less represented and excluded images were 3 photos of meals consisting primarily of traditionally local and home-made foods. Participants mentioned the use of raw ingredients for cooking home-made foods back in their country of origin. The availability of pre-prepared and frozen foods was uncommon and an element of the U.S that seemed to intrigue many of the participants. One girl stated "my mother cooks for us only…we don't buy from the store." Moreover, the school provided the students with snacks and food items throughout

the day. The students rarely brought their lunch from home, and mentioned enjoying snack time at school.

Transportation

Several cities in the United States have engineered walkability out of communities. Community designs are oriented almost exclusively to driving.

Image 4- transportation methods

Description (left to right)- car and school bus

Urban environments that are designed around automobiles have become pervasive in the United States. In 2001, 90% of U.S. households owned at least one car and nearly 60% had two or more.[36] The dominance of cars has made many urban environments hostile to walking and cycling, thereby reducing levels of physical activity. The fourth most common theme found among the refugees' images was the use of cars and buses for transportation, contributing to 11% of all images taken. A total of 10 of 92 images represented transportation methods, with the bus being among the predominant images (n=6). Boys contributed to slightly more to the transportation images taken (n=6), with

four images taken by girls. During the group discussion, the use of a bus for transportation was a leading topic. Most of the participants mentioned the school bus as a concept they had never seen back in their country of origin. A 14-year old girl from Tanzania shared, "…in Africa there is no bus." A number of girls and boys mentioned maintaining an active lifestyle by walking to and from school in their country of origin. An 11-year old boy from Afghanistan stated, "…in my country we walk, walk, walk, walk." Two girls who had grown up in refugee camps in Thailand stated, "In the camps we used to walk everywhere... we never had buses." One girl from Democratic Republic of Congo brought to light the use of seat belts by motor vehicle users in Africa… "…you don't wear a seatbelt if you sit in the backseat."

Recreational Activities

Some recreational activities and sports have a universal appeal. You can find versions of these games in many different countries all over the globe. However, some countries do have their own unique activities that are popular. There is a wide variety of sport activities in the USA. American football, baseball, and basketball are Americans' favorite sports, but soccer, hockey, and golf are also popular.

Image 5- Recreational Activities

Description (clockwise)- American football, playground, playground, swimming pool

Specific sports mentioned as novel to the participants were captured in the images. Predominantly, swimming pools (n=4), playgrounds (n=4), and American football (n=2) were captured. The presence of these recreational facilities in their neighborhoods facilitated the capture of these images. Golf and tennis were also reported to be new sports by several participants, although these were not represented among the

photographs. All of the images of swimming pools and playgrounds were shared by girls (n=8), while the two photos of American football were taken by boys. Although swimming is the fourth most popular sports activity in the United States and a good way to get regular aerobic physical activity, it is a new idea to many refugees in the region.[71] A 17-year old girl who grew up in a camp in Thailand shared, "I never saw a pool before." Several female participants mentioned how some of the available physical activity resources in their country of origin or camp sites are not compatible with their religious practices, or are only accessible to males. When discussed further, a 13-year old girl from Afghanistan confirmed, "in Afghanistan and in Iran it's the same… girls are not allowed to swim." Female participants reported the importance of modesty in their country of origins – specifically Afghanistan and Iran. They also expressed their desire to exercise in women-only facilities, where they can dress freely. Along with swimming pools, playgrounds were described as a new phenomenon for several participants who had spent their whole lives in refugee camps. A 19-year-old girl from a camp in Thailand who migrated to the United States in 2017 said, "When I came to America it was my first time to see a playground." Soccer was a sport most boys mentioned familiarity with in their home countries.

Discussion

A number of authors have commented on the complex dynamics of the social and personal forces that precipitate changes in health habits and exposure during the migration process. These dynamics may vary according to the point in time or stage in the overall migration process.[12] In this study, we took an adolescent-centered approach to exploring experiences of integration among refugees in the Atlanta Metropolitan Area.

Photo journals conveyed adolescent's self-reported perspective of novel elements experienced in the U.S. Analysis of the relationship between these elements of integration and health determinants can provide an integration-oriented perspective in future interventions aimed at migrant youth.

Technology was an integral element among the adolescents, contributing to one-third of all photos captured. Gender differences in the frequency of technology related images was found, in specific, televisions were more commonly represented in this group of images. Boys, more than girls, were inclined to share photos of technological equipment including the use of technology for entertainment. Participants mentioned the prevalent use of technology in their daily lives, at school and at home for entertainment and usage. While technological innovations were not necessarily 'new', the design and structure of those seen in the U.S differed from those back home. Moreover, boys expressed an increasing interest in the use of video-games as a leisure pastime. While soccer was a recreational activity most enjoy, soccer-related video games seemed to be an accessible and convenient form of entertainment for some.

With change in lifestyle, comes change in food related habits: unfamiliar foods, food storage, food preparation, and food-buying habits. Notable in the photo journals was the prevalence of processed and pre-packaged foods newly introduced to the migrants in the U.S. Packaging produced an appeal to fruit and vegetable products among the participants, allowing them to enjoy them in ways they previously had not. Consumption of processed snack and beverage products, provided by the school, were expressed more prominently. Moreover, the use of raw ingredients for cooking home-made food was

described as more prevalent in their country of origin compared to the U.S., where pre-packaged and frozen dinners were widespread. The increased usage of the microwaves was commonly noted among the participants. Despite basic research assessing family dynamics accompanying house-work related tasks, none have specifically concentrated on the importance of convenient household tools for refugee and immigrants.

Transportation methods, specifically buses, were commonly represented in the photos taken and was a predominant theme in the group discussion. The use of the bus as a transportation method sheds light to the reduction in physical activity rates among participants. Features of the built environment can enable physical activity by offering supportive infrastructure and associated programmes at an affordable cost.[72] Participants mentioned walking as an integral part of their lives back home. Walking to and from school was the most common form of physical activity, which had been reduced post migration due to the increase in usage of transportation methods.

The female participants talked about available physical activity resources that were not compatible with their religious practices, such as swimming pools. Among the images shared was the pool within their apartment complex which they could not utilize. The girls reported the importance of modesty in their culture, and the desire to exercise in all-women sport facilities.

Implications for future research and practice

About one-third of captured images in this study depicted technology at home or school, for entertainment or education. In the U.S., one of the most common leisure-time sedentary behaviors, television viewing, has been studied extensively in adults and children. Findings suggest that this behavior may have detrimental effects on overweight and obesity that can be independent of leisure-time physical activity level.[73] Given the ubiquitous and increasing nature of sedentary behaviors, further investigation is warranted to clarify the impact of behaviors from different domains.[74] Moreover, increases in television viewing may be associated with increased calorie intake among youth. This association is mediated by increasing consumption of calorie-dense low-nutrient foods frequently advertised on television. [75] It is especially crucial to promote media awareness in migrant youth and to highlight the negative health consequences of eating highly processed foods seen in advertisements.

Becoming accustomed to an American lifestyle can lead to the increasing consumption of processed foods. The images taken by migrant youth in our study showed that processed and canned foods were featured in their households. In a nationally representative sample, moderately and highly processed products dominated purchasing patterns by collectively providing more than three-fourths of energy in US households. [70] However, according to a Nielson survey, only 40% of consumers actually understand what nutrition labels actually mean.[76] Education initiatives should take place to help consumers be more aware of nutrition labels.

Participants in the study cited the school as influential in their eating and physical activity habits. For the children in this study, the majority of snacks were provided by the school and consumed during school hours. Most of the snacks provided appeared to be processed foods. Processed foods are an integral part of American diets, and are frequently associated with obesity and diet-related non-communicable diseases.[77,78] Improving the nutrition standards for foods offered in school meals may enhance the positive effects of school meal programs on student eating behavior.

We have been slow to recognize the impact that decisions about transport, land use, and infrastructure have on health. Communities and neighborhoods conducive to walking may be of importance and may play a key role in maintaining or improving the health of immigrants and refugees as they settle. Cultural and religious restrictions may present barriers to being physically active and enjoying recreational sports in the U.S. Further research is warranted to examine whether recreational activities devoted to women only may help overcome these religious and cultural barriers.

This research highlights a successful community-based participatory research program utilizing photovoice to better understand and advocate for community change related to health.[53] This research addresses a population that has received little attention in health behavior research, yet has a growing need for resources and self-identified challenges to maintaining healthy integration.[53] Future efforts would benefit from an emphasis on promoting health and opportunities for a healthy lifestyle for all U.S. residents—regardless of race, religion, or nationality. [53]

Challenges and limitations when working with a refugee population

Conducting research with participants from ethnic minorities who come from different cultural backgrounds presents a unique set of opportunities and challenges. Young refugees currently arriving in the United States are confronted by social and cultural conditions and systems which are radically different from their past experiences. Their experiences may render them vulnerable in a number of ways: some may have been subjected to violence or undertaken migration precipitated by trauma. Most have spent long periods of time—frequently many years, and in the case of some young people, their entire lives—in refugee camps. Despite these experiences, most refugee-background youth appear to arrive in the U.S. with an enormous sense of optimism and determination to succeed. However, many refugees and immigrants must come to terms with significant barriers to achieving social inclusion associated with disrupted education: challenges of learning to speak English, fewer housing options, poor employment prospects, and discrimination. The research methodology used in this project was guided by a community-based research (CBR) approach. CBR, also known as participatory, empowerment, or action research, is a collaborative approach to research that acknowledges the expertise of community and the right of community members to participate in the quest for knowledge.[79] Adopting a qualitative research approach using '*photovoice*' allowed the participants to visually portray experiences and share personal knowledge about particular issues that might've been difficult to express with words alone. But alongside this unique opportunity comes challenges:

Language barrier: Language is one major barrier for the participants in our project.

Participants with limited English are less likely to engender empathic response from research assistants and establish rapport in these relationships.[80] This may hinder their ability to receive sufficient information about the project. Language barrier is frequently mediated through the use of a translator or interpreter. Without an interpreter, we were concerned that the refugee participants may have had a difficult time understanding the study purpose and methodology.

Failed technology: To ensure complete creative expression and engagement with the techniques of photovoice, the cameras must be easy to use. Most of the participants owned camera phones and were accustomed to this form of picture taking. Upon distribution of the disposable cameras used in this study, it became apparent that most participants were unfamiliar with their use. The project required participants to take images for a duration of 7 days; however, most of the participants had used up their film within the first few days claiming their cameras weren't working as they could not visually see the image they had captured. However, once the images were developed we noticed a sufficient number of high quality images taken by most of the participants with meaning behind each individual image. Some shots taken were blurry or dark and therefore unusable for the purposes of this project. To alleviate this issue, we asked participants to take images using their camera phones, which seemed to be a more convenient method for most.

Group discussion: It crucial for any community-based participatory research project that individuals are enabled to explore their experiences and their perspectives. Our second research activity was a discussion group guided by the images to spark dialogue about the

participants' unique perceptions of their own individual and group experiences in the US. The purpose of the group discussion phase is for small groups to have a deeper conversation about selected photos, uncovering root causes and discussing possible impacts of the identified issues. However, it can be especially difficult to maintain energy and engagement when the group discussions are held in a classroom-based environment with English being an unfamiliar language to most. Our open-ended questions tended to produce limited responses dominated by only a few respondents. Some participants carried out separate conversations in other languages. Some members of the group discussion tended to be more eager to share their own experiences and thoughts, making it difficult to maintain dialogue among all members of the group. The presence of interpreters and conducting smaller groups for discussions may have alleviated this issue.

Many researchers have emphasized children's right to speak about their own lives but urge caution in interpreting participatory research as inherently authentic or generalizable.[81,82] Our analysis is restricted to the objects participants photographed during the seven days they had the cameras and does not provide a full or representative portrait of what they encounter on a daily basis. To accommodate a short timeframe for data collection, we limited the sample to 40 students and used modified photovoice procedures. To delve deeper into students' experiences, we augmented the photo journal responses with discussion groups. The combination of photos and group discussion offered a more in depth representation of participants' integration experience. Simple barriers made it difficult to obtain detailed and informed research. Whilst these difficulties created challenges, they were not insurmountable. Having made the decision to conduct research with refugees, we needed to determine how to best work through

these challenges. We learned that the methodological practices must be flexible and evolve throughout the research process, challenging researchers to be critical and to respond rapidly to constantly arising, multi-dimensional dilemmas.

Conclusion

This research highlights a successful community based-participatory research program utilizing photovoice to better understand and advocate for community change related to acculturation and the health complexities that may follow. This research addresses a population that has received little attention in health behavior research, yet has a growing need for resources and many self-identified challenges to initiating and maintaining a healthy lifestyle in their new environments.[53] The adolescent's photo journals offered insight into the experiences they encounter while interacting with American culture and the unfamiliar elements they face in their everyday lives. The emergent themes emphasize that future research and interventions to promote health and well-being during the acculturation period is essential as adolescent immigrants and refugees learn to adapt to new food habits and new activities in their host society. School-based creative workshops for immigrant and refugee children and adolescents may be implemented to help refugees bridge the gap between their culture of origin and the host society. These could lead to beneficial health outcomes upon acculturation. With ever-increasing levels of human movement and cultural diversity in every country around the globe, the need for such strategies is paramount in efforts to promote health equity.[53] Further efforts to more systematically assess acculturation and intervention programs are warranted.

CHAPTER 3. FIELD NOTES

December 5, 2017:

Walking into the DISC feels like a very international atmosphere – paintings on the wall with different languages and flags. It was our first time to meet all the kids; most were timid and reserved, but those who had been in the U.S. for longer were more extraverted and excited to meet us. They were sitting in groups. Within each group, most of the individuals spoke similar languages. They all took their places in the cafeteria and we worked through the consent forms, all agreed on participation, and signed. They continued to chat with one another as we tried to explain the project guidelines. When handing out the disposable cameras, they held on to it with fascination, as though it were a foreign object. They clicked away excitedly, unaware of how to use the camera. The research assistants and I made sure to demonstrate how the cameras were used and described the objectives of the project the best we could. It was difficult to clearly explain the objectives due to the lack of translators on site that day. We gave them the set of prompts and told them that we would be back within a week to pick up the cameras.

December 6, 2017:

Walking into school the following day to get an update, I noticed all the students sitting in the library together. Several mentioned they were unable to take pictures because their cameras were 'broken'. Whether the cameras were really broken or they did not know how to use them wasn't clear. The 'broken' cameras were collected, and the rest kept their cameras for another 3 days. None of the students, apart from two, had written anything on their prompts sheet. The seven 'broken' cameras that were picked up were

taken to a nearby store to have the film get developed. Three days later, the rest of the cameras were picked up and taken to be developed.

December 13, 2017

A week later, we visited the DISC to conduct a group discussion with the participants regarding the aspects of the U.S. that were new to them. We conducted the group discussions in the library right after recess, so there was a lot of energy in the room. We sat everyone down and began to ask them questions; several were shy to respond and felt that they didn't want to participate in the discussion. There were a few students who felt confident to give their opinion and were dictating where the discussion was headed. Most were distracted by their cell phones, playing games and music while speaking their own languages. We mentioned rewarding those who participated with chocolate. Several did, some didn't – most likely because there were no translators and they were having difficulty comprehending the discussion. The majority of students had unique experiences from back home that played major roles in their integration experience in the U.S. Most students mentioned transportation as something unfamiliar to them in the United States, and that they were accustomed to walking everywhere back home.

December 14, 2017:

As we waited for the disposable cameras film to develop, we thought of alternative methods to conduct the photovoice in the case that the images were unclear or the cameras were in fact broken. We noticed that almost every student had a camera phone that he or she would constantly play with and that students used their phones creatively.

We figured the students may be more comfortable taking pictures with their own phones, at their own convenience.

The research team agreed it would be best to give them an opportunity to conduct the photovoice project using their camera phones. We gathered the students together and explained the project one more time, with the modification of using their phone cameras this time. We gave them a week to take as many pictures as they want with their phones and provided them with the same set of prompts.

December 19, 2017:

We went back to see the images they had taken with their camera phones. There were several interesting images, however once again, no one had taken notes on the set of prompts as asked previously – possibly due to the language barrier and lack of translators.

January 6, 2018:

We collected all the developed film and looked through the complete set of pictures. Although many of them had complained that their cameras were broken - it came to our surprise that all the film had been used up and the participants had taken some remarkable images. There were several blurry and unusable images, but there were many that were clear and well taken. As we initiated data analysis, we worked through the images for themes and we noticed several overlap in the images that the students had taken. One image that almost every student had taken a picture of was a specific form of transportation. We then went back to collect the rest of the images that we had asked the students to take with their camera phones 3 days later and then conducted further data analysis.

January 30, 2018:

We walked into the school and met all the new students from group two. We learned that many of them had moved to the U.S. within the past 2 months and most could not speak English. They took their places in the library and we worked through the consent forms, all agreed on participation and signed. As the previous group, we had asked these students to use their camera phones or devices to take the images, and we handed out the set of prompts. Fortunately, an interpreter was present to translate the prompts and requirements. This group was very different from the previous group – they seemed slightly unsettled and much more reserved. The interpreters noted that all had understood what was asked of them and we told them that we would return within one week to collect the photos.

February 6, 2018:

We went back to collect the photos one week later. As in the previous group, no one had written any notes on their prompts sheet. However, the images taken by this group were very different from the images taken by group one. Some of the overlapping images taken among the students in this group included: skyscrapers found in the Atlanta metro area, snow, nature, the classroom, and recreational activities. Technology and food items were a common theme among both group. They had mentioned that skyscrapers weren't common back in their countries and it was the first time they had seen such tall buildings. Many of them had never seen snow before. A number of students had been born and raised in a refugee camp, so many of the things they were experiencing in Atlanta were new to them.

February 13, 2018:

A group discussion took place in the library. We started off the discussion by simply asking the students to talk about some of the things they've seen in America that they hadn't seen before. Most of them were too shy to speak, however, the interpreters had been available to translate and motivate the students to reply. Several mentioned pork, alcohol, energy drinks, and juice. A few girls mentioned swimming pools. When probed further into the topic of recreational activities, they mentioned that in their country of origin, swimming pools were meant to be just for boys, and that they saw a swimming pool for the first time in their new apartment complex. Golf, tennis and American football were also new activities for several students – they noted that the only sport they played often in their country of origin was soccer. Among those who had grown up in a refugee camp, kitchens, bathrooms, playgrounds, and classroom design were very new to them. They noted that the bathrooms in the campsites didn't look like the bathrooms in the U.S.

CHAPTER 4.

Food Consumption Patterns, Perceptions of Healthy Eating, and Motives Influencing Dietary Decisions Among Adult Immigrants and Refugees in Atlanta, Georgia

Abstract

Almost 1 million foreign-born individuals enter the U.S. annually. As the number of immigrants in the USA continues to rise, it becomes increasingly important to understand how their health differs from native-born individuals.[83] Refugees may face health-related challenges after resettlement in the United States, including higher rates of chronic diseases due to problems such as language barriers and difficulty adapting to new food environments.[1] While recent immigrant and refugee populations may still benefit from the "healthy migrant phenomenon" showing a better health status than native-born residents, immigrants with 15 years of residence or longer and their children become affected by the obesity epidemic in the United States.[84-91] Environmental influences and sociocultural factors underpin food preferences and dietary decisions.[92-97] Changes in lifestyle and availability of western foods are hypothesized to be associated with increased consumption of fats and refined carbohydrates, which are associated with chronic conditions. There is limited understanding of what factors are associated with post-resettlement food intake and how to best promote refugee health and nutrition. The goal of this study is to assess: whether consumption of specific foods was more pronounced post-migration; motives influencing dietary selection, and whether knowledge of healthy eating plays a role in healthy food selection. We also aim to examine how these factors vary between migrant subgroups from different regions of origin.

Key words

Immigrants, refugee, adults, health, dietary selection

Introduction

About 65.5 million people have been uprooted from their homes by conflict and persecution.[98] As the number of immigrants in the USA continues to rise, it becomes increasingly important to understand how their health differs from native-born individuals.[99] There are different categories of migrants, including refugees, economic migrants, asylum seekers, irregular or undocumented persons, and displaced persons.[100] These groups face different health challenges and have different levels of access to health and social services. A growing body of literature describes what has come to be known as the 'healthy migrant' phenomenon—the fact that, on a variety of measures, immigrants to the United States, Canada, Australia and Western Europe are often healthier than native-born residents in their new countries of residence.[14,84,89,101-103] Over time, however, the migrant health advantage is believed to diminish, such that immigrants with 15 years of residence or longer see similar rates of obesity as native-born Americans. [89-91] Environmental and sociocultural factors underpin food preferences and dietary decisions.[92,93,95-97] Changes in lifestyle and availability of Western foods are hypothesized to be associated with increased consumption of fats and refined carbohydrates, which contribute to obesity and other chronic conditions. There is limited understanding of what factors are associated with post-resettlement food intake and how to best promote immigrant health and nutrition. This study examined some of the self-reported dietary selection among an immigrant population in Atlanta, Georgia. The research question of interest – what are the predictors of dietary selection among adult immigrants upon

resettlement in Atlanta, Georgia and does ethnicity play a role? To investigate the question of interest, we examined food and beverage items immigrants report consuming more or less of post-migration, socio-environmental factors that may influence changes in dietary selection, and perceptions of the healthfulness of foods and beverages. These findings are also stratified by region of origin to examine whether ethnicity plays a determinant role in dietary selection post-migration. The findings will help gain insight on lifestyle changes that accompany immigration and how it may limit or expand options for access to health-promoting activities such as dietary choices.[104]

Background

The Migration Experience

Rates of international migration have reached unprecedented levels in the United States and throughout the world.[98] The United Nations High Commissioner for Refugees (UNHCR's) annual Global Trends report indicates that an unprecedented 65.6 million people were uprooted from their homes by conflict and persecution at the end of 2016.[98] While international migration is common in the world today, those who leave their home countries to resettle in another might vary greatly in their characteristics and motivation. According to the UNHCR, a person who leaves one country to settle permanently in another is considered an immigrant. A refugee on the other hand, is someone who 'owing to a well- founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality, and is unable to, or owing to such fear, is unwilling to avail himself of the protection of that country.'[105] While the vast majority of refugees and other forced migrants are hosted in developing regions, it remains the case that the United States

operates the world's top resettlement country. [83] In 2017, nearly 42,400 refugees were admitted in the United States. Approximately 80 percent of the refugees admitted in the United States in 2017 were from Africa, the Near East, and South Asia. In specific, nationals of the Democratic Republic of Congo, Iraq, and Syria were of the top three origin groups.[83]

During all stages of the migration process, migrants make various experiences influencing their health. The physical and socio-economic environment at the migrants' place of origin (the pre- migration phase) determine many of the pre-conditions with which people migrate.[106] However, most migrants arrive in the host country in relatively good health. This has been attributed to the fact that the young and healthy are more likely to migrate and to survive a difficult journey.[107] Nevertheless, migration processes can positively or negatively impact health outcomes just as health status can affect migration outcomes.[106] Health disparities among migrants in the host country may be explained by a number of factors including socioeconomic characteristics, barriers to health care, language differences, and health behaviors, such as diet and physical activity.[85,108-114] The inverse relationships between socioeconomic status (SES) and unhealthy behaviors such as tobacco use, physical inactivity, and poor nutrition have been well demonstrated empirically. In terms of diet, Miech et al. (2006) find that family poverty status is associated with increasing overweight prevalence for 15- to 17-year-olds.[115] Chou et al. (2004) find that the growth in fast-food restaurants and the simultaneous decline in the relative cost of a meal over time in the United States coincide with weight gain.[116] Further, examining groups by English proficiency can reveal "hidden" health disparities.[117] Sentell and colleagues found that Asians did not have significantly lower

access to mental health care than whites, after accounting for other factors. However, splitting the Asian population, into those who spoke English and those who did not, revealed stark disparities. Non-English-speaking Asians were substantially less likely than the general, English-speaking population to receive needed services (11% vs 51%).[118] It is likely that language use in this instance serves as a partial proxy for acculturation, the degree to which people from other countries and cultures have adopted the norms of the majority population. Those who have not assimilated as fully to the dominant American culture may, for numerous reasons, experience lower levels of access, utilization, and quality of care.[117] The need to address these health disparities becomes more urgent as new immigrant populations in the U.S. continue to grow.

Change in Dietary Patterns upon Migration

The refugee diet is dependent on location, access to resources, intensity of conflict, and humanitarian support. While the migratory journey itself can affect the health of migrants, there is evidence that most immigrants are relatively healthy upon arrival in their host countries. Newly arrived migrants show lower mortality rates than their U.S.-born counterparts. Increasing duration of residence leads to the adoption of the host country's dietary patterns, and may be especially important in the context of overweight and obesity.[119-121] Fishman et al. (1999) found that Latino migrant children were less likely to eat junk food or to skip meals than their non-migrant peers, but that over time, these differences disappeared.[122] According to the Centers for Disease Control and Prevention, poor diet and physical inactivity, both modifiable behaviors, cause a large part of this mortality from overweight.[123] The high rates of obesity in the United States represent a population-level trend that immigrants gradually reflect during acculturation -

the process by which an individual integrates aspects of their new culture and heritage culture. [21,124] Several factors may account for this, such as: decreased availability of traditional foods, busy lifestyle, economic barriers, increased availability of convenient foods, advertising, education level, interaction with persons in the dominant culture, and circumstances surrounding migration.[85,104] Using the New Immigrant Survey, Akresh (2007) highlights the impact of cultural integration on diet and health among a Hispanic immigrant population. Results of the study indicate three emergent themes. First, individuals who have been in the United States longer report a greater degree of dietary change. Second, after controlling for behavioral characteristics and preexisting diet-related conditions, more dramatic levels of change in diet are associated with higher measures of body mass index. Among individuals reporting greater levels of dietary change, those with worse health have been in the United States for longer and are more likely to report the use of English at work, an indicator of acculturation and exposure to broader U.S. society.[125]

Effects of Integration on Diet and Health Outcomes

An estimated 133 million people in the U.S. had at least one chronic illness in 2005. In 2004, 85% of every healthcare dollar in the U.S. was spent on the care and treatment of people with chronic health conditions, such as hypertension, high cholesterol and diabetes [126]. Overweight and obesity prevalence in the United States has increased dramatically over the past decades, and has recently become a pressing public health concern in the immigrant community. During 1991–2008, obesity prevalence for US-born adults increased from 13.9 to 28.7%, while prevalence for immigrants increased from 9.5 to 20.7%.[91] While immigrants in each ethnic group and time period had lower

obesity and overweight prevalence and BMI than the US-born, immigrants are quickly catching up to their U.S-born counterparts. Moreover, immigrants' risk of obesity and overweight increased with increasing duration of residence.[91] Obese adults are at elevated risk for chronic conditions, including diabetes and cardiovascular disease, as well as poorer birth outcomes and health in the next generation [127-131]. Research conducted in France on adult migrants from southern Europe and North Africa -who report dietary practices consistent with the typical Mediterranean diet- found that these migrants on average remain healthier and have lower mortality rates than the local-born population [132]. Another study using data from the New Immigrant Survey reported that Hispanic immigrants who rated their current health as "worse" than before coming to the U.S. were on average living in the U.S. two years longer compared to those who rated their health as being "better" than before coming to the U.S. [125] Refugees and immigrants will experience a diet change upon moving to America and these changes have the potential to either increase or decrease their risk of obesity and chronic disease.[133,134] On the one hand, American diets often contain processed foods which tend to be high in sodium and fat. If a part of what immigrants are embracing is the consumption of these items, this may lead to weight gain and a subsequent decline in health. On the other hand, many grocery stores in the United States offer a wide selection of fruits and vegetables that is not available in other countries. If dietary changes involve taking advantage of this variety, an improvement in health or maintenance of good health may be experienced. [135] A study conducted by Gasevic et al. found that South Asian immigrants in Canada reported a variety of positive dietary practices, including an increased consumption of fruits and vegetables and an improvement in healthy methods of food preparation

(including an increase in grilling and a decrease in deep frying when cooking). [136] However, there was also a reported increase in the consumption of convenience foods, sugar-sweetened beverages, red meat and in dining out. Consumption of foods that are high in calories, fat and refined carbohydrates may lead to abdominal obesity and has been associated with the occurrence of metabolic syndrome, hypertension, type 2 diabetes, and cardiovascular disease morbidity and premature mortality.[137-139]

Perceived Healthiness of Food

Health has become a central aspect of the food culture in western societies, influencing the ways in which food is categorized and perceived by people. [140] Perceptions of healthy eating can be defined as meanings, understandings, views, attitudes, beliefs and knowledge about healthy eating and healthy foods.[141] Individual and societal conceptualizations of healthy eating are important factors in people's dietary choices; however, these perceptions may not be consistent between groups and between individuals within groups. [140,142-145] This variation, like other variations in food choices, is the result of a dynamic process influenced by an integration of biological, psychological, social and cultural factors, and is shaped by life-course experiences. [93] [142,146] Socialization of health behavior during childhood may be a determinant of immigrants' health. Since it is difficult to shake off long-learned habits, patterns of health-related behavior often persist after migration.[147] The health and lifestyle survey of England looked at health and diet in four immigrant groups: Afro-Caribbean, Indian, Pakistani and Bangladeshi found that about half in each ethnic group perceived their own traditional diets to be healthier than Western diets.

In contrast, other studies have suggested that the informants often view the diet of the host country as healthier. [148,149,150] In a study from Norway, exploring the experience of dietary advice among Pakistani-born persons with type 2 diabetes in Oslo, participants advised to avoid elements of traditional food-items, which contributed to the impression that Pakistani food was less healthy. [149] Similarly, British South-Asians frequently also referred to the un-healthiness of the South-Asian "traditional diet" in two studies related to causes and prevention of coronary heart disease.[151] Culture is a dynamic construct in that shared understandings change over time as they are shaped or informed by the experience of individual members of a group or the entire group. For instance, beliefs relating the normative and pragmatic rules for engaging in health-promoting behavior (diet and exercise) or leisure activity (watching television or playing video games) will change as individual members of an ethnic group experience and come to value innovative practices.[152]

Research Question

Refugees are a large and growing immigrant group today, facing many challenges in terms of access to care, stress, and violence that may have implications for their health. Indeed, food intake and adaptation to the U.S. food environment is a complex phenomenon. Early intervention with diet and physical activity may represent an opportunity to prevent weight gain, obesity, and obesity-related chronic illnesses.[21] There is limited understanding of what factors influence post-resettlement food intake and how to best promote immigrant health. Diet in particular is the focus of many treatment and prevention strategies for chronic diseases including obesity, diabetes, cardiovascular disease and cancer. Food may be of particular importance for ethnic minorities, especially

immigrant minorities, as they face the challenge of adapting to new cultural norms and attitudes. Thus, what are the predictors of dietary change among adult immigrants in the U.S.? More specifically, what factors in the community predict dietary selection? The picture of dietary change is complex, depending on a variety of factors related to country of origin, urban/rural residence, socio-economic and cultural factors and situation in host country.[153] Socioeconomic and demographic factors, together with the cultural norms that immigrants bring with them, influence the degree of exposure to the host culture. This, in turn, leads to changes in psychological factors, taste preferences, and changes in food procurement and preparation.[104] The goal of this study is to assess: whether consumption of specific foods was more pronounced post-migration; potential motives underlying selection of foods, and whether knowledge of healthy eating plays a role in healthy food selection. We also aim to examine how these factors vary between migrant subgroups from different regions of origin.

Data & Methods

Overview

Georgia, and particularly the Atlanta Metro Area, is a major destination for refugees and immigrants: almost 2,900 refugees arrived in 2015, making it the 9th state for most refugee arrivals. In 2015, about 33% of refugees in Georgia came from Burma, 16% from Democratic Republic of Congo, 12% from Bhutan, and 9% from Iraq. [154] The purpose of this study is to explore factors that may affect migration health among immigrants in Atlanta, Georgia. A group of 49 male and female adults between the ages of 18 and 65, participated by answering a questionnaire. The questionnaire included a modified diet

recall, reasons for dietary choices post-migration, and health related perceptions that influence food choice.

Sampling

Partnering with an NGO that serves refugees in a city in the Southeast of the U.S., we sampled refugees seeking assistance with green cards, visas, and other legal services. As individuals walked through the NGO, research participants randomly selected individuals by using chance selection so that biases will not systematically alter the sample.(john pryor) We randomly selected individuals from the overall population who enter the NGO seeking assistance with legal services. Those who were over the age of 18 and who defined themselves as refugees were invited to participate in the study.

The study sample consists of 49 adults ages 18-65 living the Atlanta Metropolitan Area. All participants are first-generation immigrants. Participants in the study were originally from: Iraq, Iran, Bosnia, Thailand, Pakistan, Nepal, Myanmar, India, Burma, Bhutan, Afghanistan, Somalia, Liberia, Kenya, Ethiopia, Congo and Burundi.

Data collection procedures

Data collection of the study took place between September 2016 and February 2017. Upon randomly selecting 49 individuals from the population, refugee participants were given surveys administered by research assistant and interpreters. Data were collected in 30-min sessions in a private space within the NGO. Trained interpreters conducted interviews in participants' native languages. Interpreters were reimbursed $5 USD and participants were reimbursed $10 USD for their time.

Measures

The study examined whether consumption of specific foods was more pronounced post-migration; whether environmental factors influence dietary selection, and whether knowledge of healthy eating plays a role in healthy food selection. Several methods of diet and food choice evaluation were considered, however a simple questionnaire was selected as an objective means of collecting information about people's knowledge, beliefs, attitudes, and behaviours.[155] A literature search was first conducted to identify questions of interest and pre-existing, tested questionnaires. Further, we adapted question from the New Immigrant Survey as well as surveys from a survey design and methods course offered at Emory University. Building on these findings, a simple survey instrument was developed to collect basic socio-demographic and migration data, self-reported food selection, motives behind dietary selection and knowledge of healthy foods. In addition to dietary change being part of a larger process of adaptation that occurs after living in the U.S. for a substantial period, the individual's social environment, household factors, residential setting, and perceptions of healthy foods and healthy body image may all be influential factors.[135]

a) Pretesting

One-on-one cognitive interviews and focus groups were conducted by graduate research team members (n=3) using a draft questionnaire. The cognitive method has come to be viewed as an important means to ensure the quality and accuracy of survey instruments and is used to identify and analyze sources of response error in survey questionnaires.[156] During cognitive interviews and focus groups, an interviewer and a note taker were present. At the end of the cognitive testing, graduate researcher assistants prepared a report containing the results,

recommendations for questionnaire revision, and discussion of other issues that arose during the testing.

b) Pilot testing

Following this revision process, the data collection instrument was piloted with a small set of respondents (n=4) from the population within the NGO. The pilot test served as a means to validate the field-testing process and ensure that interviewers were able to answer questions and competently explain the survey purpose and research topic, as well as a means to assess interviewer objectivity or bias.

c) Final Questionnaire

Once pilot testing was completed, final revisions to the survey were made, and the survey was administered to the full sample of participants.

1. Demographic characteristics

The survey asked participants about socio-demographic characteristics such as age, sex, migration background, language, marital status, country of origin, employment, and income.

2. Dietary choices

Dietary choices were assessed by asking respondents to report food and beverage items more frequently consumed pre-migration and food and beverage items most frequently consumed post-migration. Change in dietary selection was estimated by asking: ‘Please tell me 3 things that you ate or drank most frequently before coming to the United States that you rarely eat now. Please be specific in regards

to type of food.' 'Please think about the things you eat and drink now in the U.S. What are three things that you eat or drink very often now that you rarely ate or drank after you came to the United States?' An open ended question was used to capture information that is traditionally underreported. Respondents were permitted to list up to three items each, and responses were recorded verbatim.

3. Motives underlying food selection

Reasons for the adoption or abandonment of specific food items were captured to evaluate reasoning behind changes in food consumption. Motives underlying selection of foods are various and unique. A number of factors are thought to influence people's dietary choices, including health, cost, convenience and taste. External environmental factors such as forms of transportation to, and distance from nearby grocery stores were asked to assess availability. Personal factors covered includes time constraints, taste preferences and social interactions, child and partner preferences and socioeconomic issues. Following dietary selection, motives underlying dietary choice was examined by asking: 'Now let's talk about the items you just listed. Why do you eat these items more/ less now than before you came to the United States?' Participants were given a range of options as well as an open-ended response entry to permit flexibility in answering this question. Participants could select from a range of options including health, partner selection, child selection, convenience, distance, transportation, price, and taste.

4. Perceptions of Healthy Eating

Perceptions of healthy eating may be a key factor in consumers' food behaviors. Questions regarding beliefs of healthy foods and beverages were administered to

assess the relationship between food choices and knowledge of healthy eating. To learn about the food and beverage items considered healthy and unhealthy the following questions were asked: 'What foods and beverages do you consider healthy?' 'What foods and beverages do you consider unhealthy?' Questions were left open-ended to illicit a fuller response from a respondent based on their complete knowledge, beliefs and understanding of healthy and unhealthy food options.

Data Analysis

Food items listed were recorded and classified based on the food reported by the respondents, as well as into different food groups. Post-survey coding of food groups in the current study included fast food/ junk foods (e.g. hamburgers, french fries, pizza, as well as specific restaurants such as McDonald's), grains (e.g. rice, bread, cereal, pasta, maize meal), fruits/vegetables (e.g. apples, grapes, guava, bananas, plantain, leafy vegetables, and any region-specific food identified by the respondent as a fruit or vegetable), dairy (e.g. milk, cheese and eggs), sodas and alcohols. Food items were then assigned numeric codes based on the dietary codebook. Participants were able to report up to three food or beverage items each. For each food item, you summed up the number of times that item was chosen by the survey respondents. In addition, we reported percentages of respondents who chose a particular food type as percentages for the data as a whole, followed by percentages within each region.

Further, for socio-demographics, the data of participants from specific regions of origin were compared. Data were analyzed by region of origin (Asia, Africa, Europe, or Middle East) for potential variation in diet, nutrition, and related contextual factors. We

hypothesized that these variables may be salient moderators, particularly for dietary change variables, given that some countries or regions may be characterized by lifestyles that more closely resemble those of the U.S. The association between variables related to perceived changes in dietary patterns and region of origin were analyzed Pearson's chi-squared test statistic. The significant outcomes from the Chi-square analyses were subsequently analyzed with ordinal logistic regression analysis, presented with odds ratios (OR) and 95% confidence interval (CI). If the interaction between a region of origin and dietary selection was significant at the .05 level, this variable was considered to be an effect modifier.

Ethics and informed consent

This study, including informed consent protocol, was approved by the Emory University Institutional Review Board. All participants had the study explained to them verbally in plain terms and were asked to read (aloud) and sign a Consent Form, a copy of which they retained. The consent form contained an explicit statement that participation in the research was completely voluntary, and subjects could withdraw at any time. This was also communicated to the project manager working for the NGO facilitating their settlement. The consent form contained the contact details of appropriate university contacts and participants were advised to contact the research team or University Institutional Review Board at any time should they have concerns or wish to withdraw from the study. The researchers had no contact with the participants, other than specifically for the conduct of the research.

Results

Sample Description

The analytic sample contained 49 immigrants, 53% of which were female and 47% of which were male. On average, participants had resided in the U.S. for 7.7 years. Of the 49 immigrants surveyed, 45%, 35%, 14% and 6% were originally from Asia, Africa, Middle East and Europe, respectively. The average age of all participants was 36 years. Of the participants, 43% lived in refugee camps, and had spent an average of 11 years in camps prior to migration. The majority of respondents (70%) were married, and 41% had children. Participants had completed an average of 12 years of schooling. Table 1 summarizes sociodemographic characteristics of the sample.

Table 1- Descriptive statistics for sample population

	N	**%**
Number of participants	49	
Female	26	53
Male	23	47
Married	35	70
Country of origin		
Asia	22	45
Africa	17	35
Middle East	7	14
Europe	3	6
Lived in a camp	22	43
Have children	31	41
	Mean	**SD**
Length of stay in USA	7.7 yrs.	0.84
Length of stay in camp	10.7 yrs.	1.9
Age	36.1 yrs.	1.71
Years of schooling	11.6 yrs.	0.57

Self-reported pre-migration and post-migration differences in dietary consumption

Immigrants generally experience moderate dietary change since arrival to the US. Foods less consumed and more consumed post-migration among immigrants are shown in Figure 1 (below).

About a third of respondents (33%) reported a reduction in the consumption of grains upon migration to the United States. Overall, 23% of the respondents reported consuming soda less in the United States compared to their country of origin. The third least-consumed food or beverage item reported among respondents is fruits and vegetables, at 21%. Approximately 35% of respondents indicated no change in food selection after migration, citing the availability of pre-migration foods in the United States. A small proportion of respondents (3%) indicated a reduction in the consumption of alcohol upon migration to the United States. Approximately one third of respondents, 33% and 29%, reported a higher consumption of grains and sodas, respectively, roughly equivalent to the number reporting reduced consumption of these items. The highest reported food group adopted since arrival happened to be fast food consumption. Approximately 41% of respondents reported an increase in consumption of fast-food items post-migration.

Figure 1- Foods less consumed in the United States by percentage of respondent (left) and foods more consumed in the United States by percentage of respondent (right).

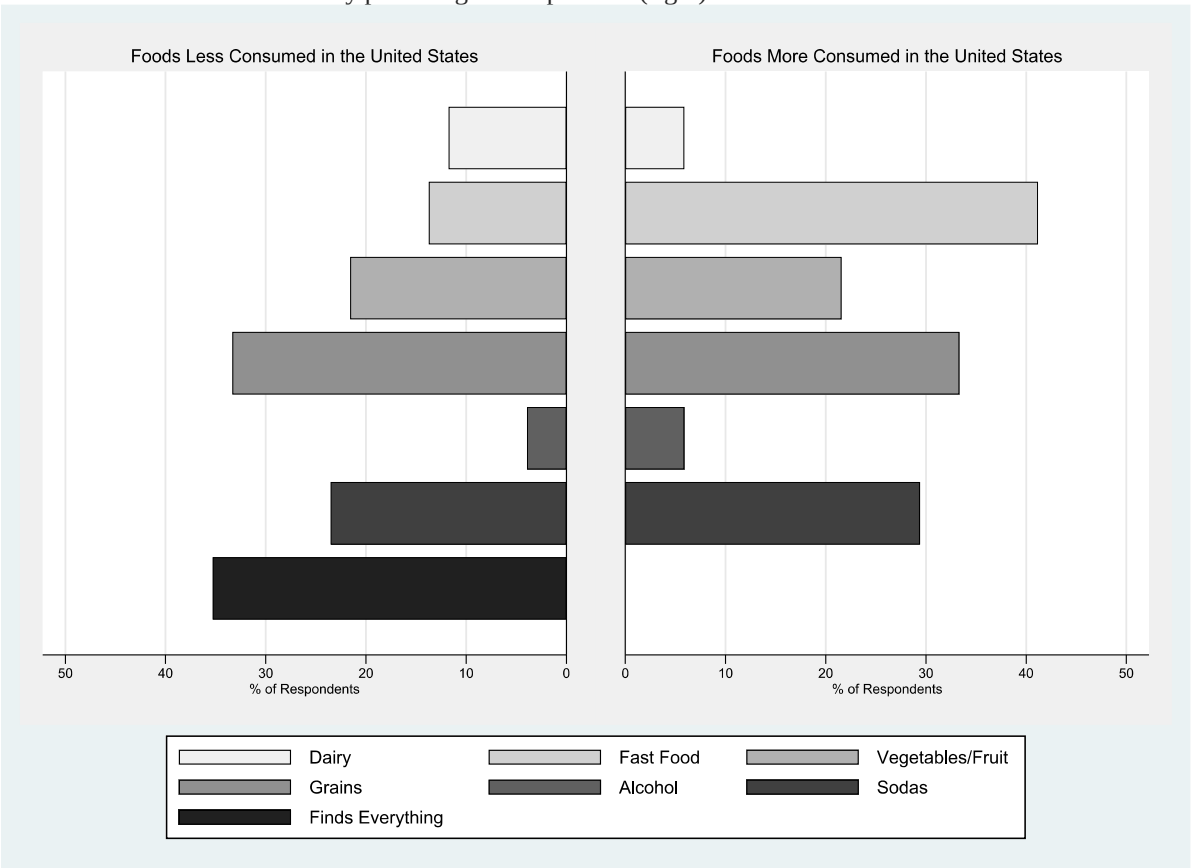

Table 2 - Foods less consumed in the United States by percentage of respondents

Foods Less Consumed in the United States	**Percentage of Respondents**
Dairy	12%
Fast Food	14%
Vegetables/Fruit	21%
Grains	33%
Alcohol	3%
Sodas	23%
Can Find Everything	35%

Table 3 - Foods more consumed in the United States by percentage of respondents

Foods More Consumed in the United States	Percentage of Respondents
Dairy	16%
Fast Food	41%
Vegetables/Fruit	21%
Grains	33%
Alcohol	6%
Sodas	29%

Role of region of origin on food selection

In an investigation into the influence of ethnicity on food choices Devine et al. (1999) showed that factors influencing food choice differ depending on the ethnic group.[157] Eating culture and the importance of food in the migrating ethnic group are of significant relevance for dietary changes in the host country**.** Due to the variation in sample size, we examined whether there may be differential associations between frequencies of common food items reported by the categorical variable, region of origin. To compare changes in dietary habits by region of origin, we conducted chi-square analysis; if interaction between region of origin and self-reported change in diet preference was significant at the .05 level, region of origin was considered to be an effect modifier (Tables 4 & 5). Applying the chi-square test for independence to sample data indicates that there is no overall significant difference ($p<=0.05$) in dietary preferences after migrating to the U.S. across regions of origin. However, grain consumption after migration indicates a p-value of 0.094. While this value is not statistically significant, it indicates a slight variability in grain consumption across regions of origin after migration to the U.S. Soda consumption across regions of origin in the pre-migration context is significant with a p-value of

0.007. Pre-migration fast food consumption appears to be significantly different across regions of origin, at a p-value of 0.005. While there may be variability in eating patterns, the broad themes seem to be retained across most regions of origin in our sample, and across individual consumption of these items post migration.

Table 4 - Chi^2 analysis of foods abandoned pre-migration by region of origin by percentage of respondent, stratified by region of origin

	Asia	Europe	Middle East	Africa	Pr Value
Fast food	0%	50%	38.46%	5.88%	0.005*
Dairy	10.53%	0%	7.69%	17.65%	0.79
Fruits	15.79%	50%	23.08%	23.53%	0.70
Grains	42.11%	50%	23.08%	29.41%	0.65
Alcohol	21.05%	0%	0%	11.76%	0.31
Soda	52.63%	0%	15.38%	5.88%	0.007*

Table 5 - Chi^2 analysis of foods abandoned post-migration by percentage of respondent, stratified by region of origin

	Asia	Europe	Middle East	Africa	Pr Value
Fast food	52.63%	50%	38.46%	29.41%	0.551
Dairy	5.26%	0%	0%	11.76%	0.57
Fruits	21.05%	50%	15.38%	23.53%	0.73
Grains	31.58%	100%	15.38%	41.18%	0.094*
Alcohol	10.53%	0%	7.69%	0%	0.571
Soda	31.58%	50%	23.08%	29.41%	0.873

Percentage of self-reported reasons for abandoning pre-migration / adopting post migration foods

Socio-cultural and environmental factors that may be presented as barriers for food and beverage choices were coded based on common themes and frequencies were analyzed. The lack of food from the home country, due to high cost or lack of availability may force dietary changes based the replacement of traditional foods by food items from the

host country.[2] Additionally, migrants often mention the lack of time and convenience as reasons for their dietary changes post-migration.[158,159]

Patterns of dietary selection among immigrants stratified by region of origin are shown in Figure 2. Our results indicated that a high percentage of respondents (52%) reported abandoning pre-migration foods upon re-settlement due to inability to find traditional foods. Social circumstances were the second most comply reported reason for abandoning pre-migration foods (41%).

Taste preferences often are cited as a primary motivator of individuals' food choices.[160] However, in our study, taste preferences appeared to be the third highest reported reason for abandoning pre-migration foods (40%). The least common reasons selected for abandoning pre-migration foods include transportation (6%), child preference (8%), and partner preference (8%). In terms of adopting post-migration foods, majority of participants (78%) selected the ease of finding food items as a facilitating factor. About 58% of the respondents selected child preferences as the reason for adopting post-migration foods. In terms of the affordability of traditional foods, 48% of the respondents indicated that post-migration foods are slightly more affordable, while 12% felt that affordability of traditional foods presented a barrier leading to abandoning pre-migration foods. The lowest percentage of respondents indicated partner preference (32%) and social circumstances (38%) as a reason for adopting post migration foods.

Figure 2 - Reasons for abandoning pre-migration foods/adopting post-migration foods

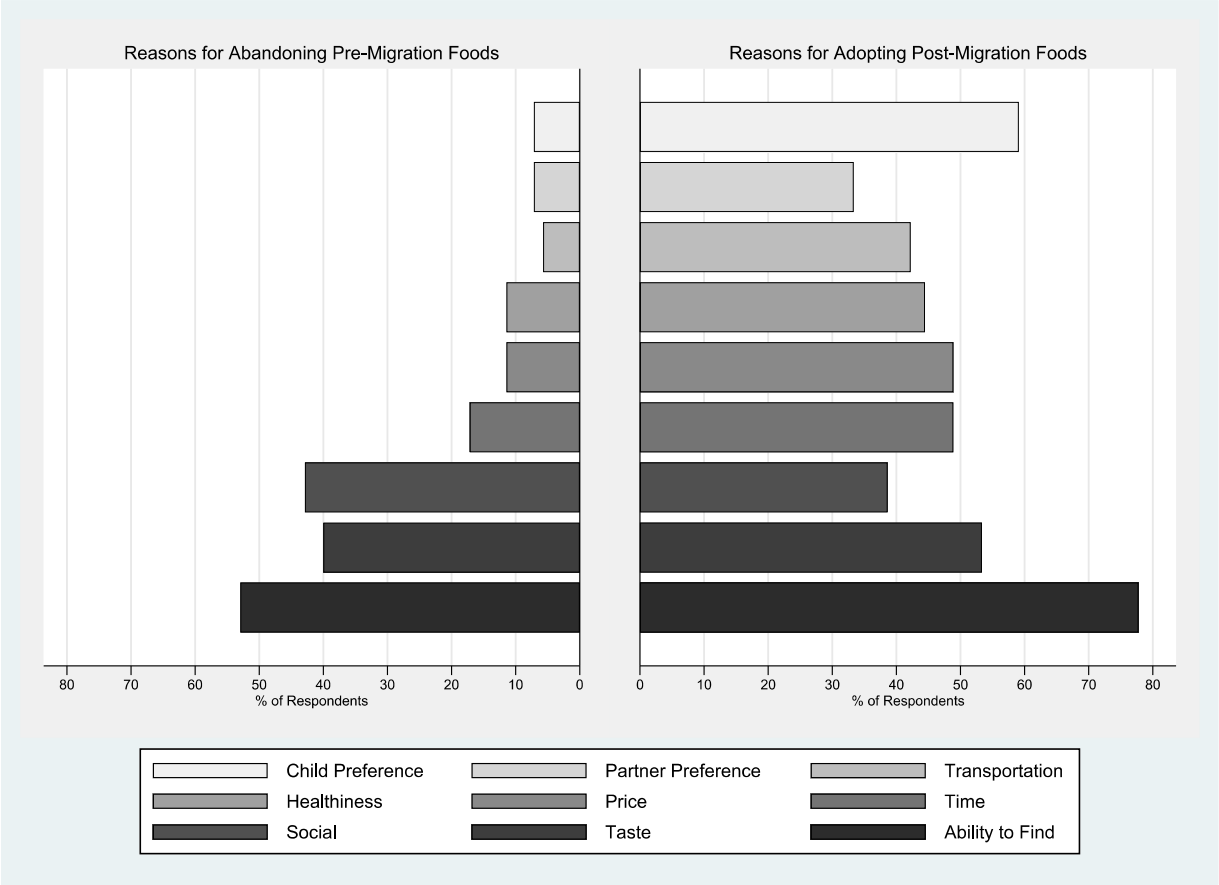

Table 6 - Reasons for abandoning pre-migration foods by percentage of respondents

Reasons for abandoning pre-migration foods	Percentage of Respondents
Child Preference	8%
Partner Preference	8%
Transportation	6%
Healthiness	11%
Price	11%
Time	17%
Social	41%
Taste	40%
Ability to Find	52%

Table 7 - Reasons for abandoning pre-migration foods by percentage of respondents

Reasons for adopting post-migration foods	Percentage of Respondents
Child Preference	59%
Partner Preference	32%
Transportation	41%
Healthiness	42%
Price	50%
Time	49%
Social	39%
Taste	52%
Ability to Find	78%

Percentage of self-reported reasons for abandoning pre-migration / adopting post migration foods by region of origin

Asia: As seen in Figure 3, for respondents originally from Asia, taste preference was the highest (58%) reported reason for abandoning pre-migration foods. Ability to find pre-migration foods (35%) and social circumstances (42%) were the next most common reasons reported. The three least reported reasons reported for abandoning pre-migration foods include price (13%), time (7%) and healthfulness of food items (7%). Child preference, partner preference, and transportation were not selected as reasons for abandoning pre-migration foods.

The most predominant reasons selected for adopting post-migration foods included child preference (85%), followed by ability to find post-migration foods (83%), affordability (57%) and taste preferences (58%). Healthfulness was reported by 52% of respondents as an important factor for adopting post-migration foods. Partner preference (50%), transportation (48%), time (48%), and social circumstances (35%) were the least selected reasons for adopting post-migration foods.

Europe: Due to the small number of participants originally from Europe (n=2), results showed minimal variability in respondent selections. Reasons for abandoning pre-migration foods included transportation, healthfulness, time, social circumstances and taste. Reasons not indicated include child preference, partner preference, affordability and ability to find. In terms of adopting post-migration foods, both respondents (n=2) indicated taste preferences and child preference as factors determining food selection. Other factors determining post-migration food selection included healthfulness, time and ability to find food items.

Middle East: Approximately 67% of all Middle Eastern respondents stated that finding pre-migration foods was a determining factor which lead them to abandon specific food items. Time and taste were the next most cited factors, selected by 42% and 41% of respondents, respectively. Transportation, healthfulness and price were amongst the least selected reasons for abandoning pre-migration foods, each being selected by 14% of respondents. A large majority of respondents (78%) indicated that the ability to find specific foods was a reason for adopting post-migration food items. Time was the second most chosen factor, selected by 67% of the respondents. Healthiness, price and taste were the least three selected themes, selected by 32%, 32% and 32% of respondents respectively.

Africa: Among respondents originally from Africa, ability to find pre-migration foods was selected by majority of respondents (75%) as a predominant factor causing them to abandon these foods. Social circumstances were the second most commonly selected reason for abandoning pre-migration foods, chosen by 50% of respondents. The least selected reasons for abandoning pre-migration foods were health, price, and time, each

selected by 7% of respondents. A majority of respondents (72%) indicated that the ability to find specific food items lead to the adoption of post-migration foods. Other commonly selected reasons for adopting post-migration foods included taste, selected by 52% of respondents, and affordability, selected by 51%. The least chosen reason was partner preference, selected by only 12% of respondents.

Figure 3- Reported reasons for abandoning pre-migration foods by region of origin (left) and adopting post- migration foods by region of origin (right)

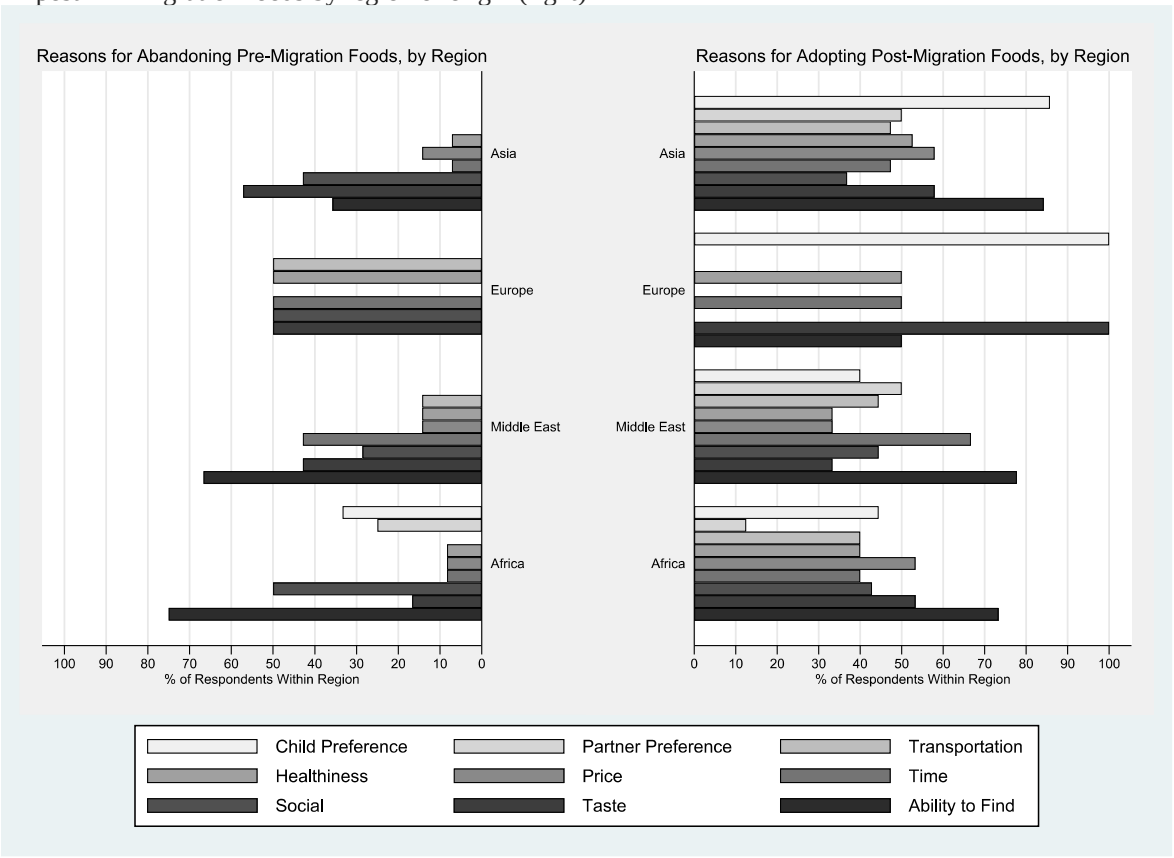

Table 8 - Reasons for abandoning pre-migration foods, by region by percentage of respondents, stratified by region

	Percentage of Respondents By Region			
Reasons for abandoning pre-migration foods	**Asia**	**Europe**	**Middle East**	**Africa**
Child Preference	-	-	-	32%
Partner Preference	-	-	-	25%
Transportation	-	50%	14%	-
Healthiness	7%	50%	14%	7%
Price	13%	-	14%	7%
Time	7%	50%	42%	7%
Social	42%	50%	29%	50%
Taste	58%	50%	41%	15%
Ability to Find	35%	-	67%	75%

Table 9 - Reasons for adopting post-migration foods by percentage of respondents, stratified by region

	Percentage of Respondents By Region			
Reasons for adopting post-migration foods	**Asia**	**Europe**	**Middle East**	**Africa**
Child Preference	85%	100%	40%	43%
Partner Preference	50%	-	50%	12%
Transportation	48%	-	45%	40%
Healthiness	52%	50%	32%	40%
Price	57%	-	32%	51%
Time	48%	50%	67%	40%
Social	35%	-	45%	42%
Taste	58%	100%	32%	52%
Ability to Find	83%	50	78%	72%

Perceptions of food healthfulness

A substantial majority of the respondents (72%) acknowledge that fruits and vegetables are beneficial for health (Figure 4). Juice was mentioned by 45% of respondents as a healthy beverage. Dairy and grains were also reported to be healthy food options.

Approximately 21% of respondents perceived dairy as a healthy food choice; similarly, 21% believed grains to be healthy. A majority of the respondents (60%) perceived soda as unhealthy, followed by fast food (51%). Alcohol was the third unhealthiest selected item chosen by 20% of the respondents as an unhealthy beverage.

Figure 4- Foods considered healthy (left) and foods considered unhealthy (right) by percentage of respondents

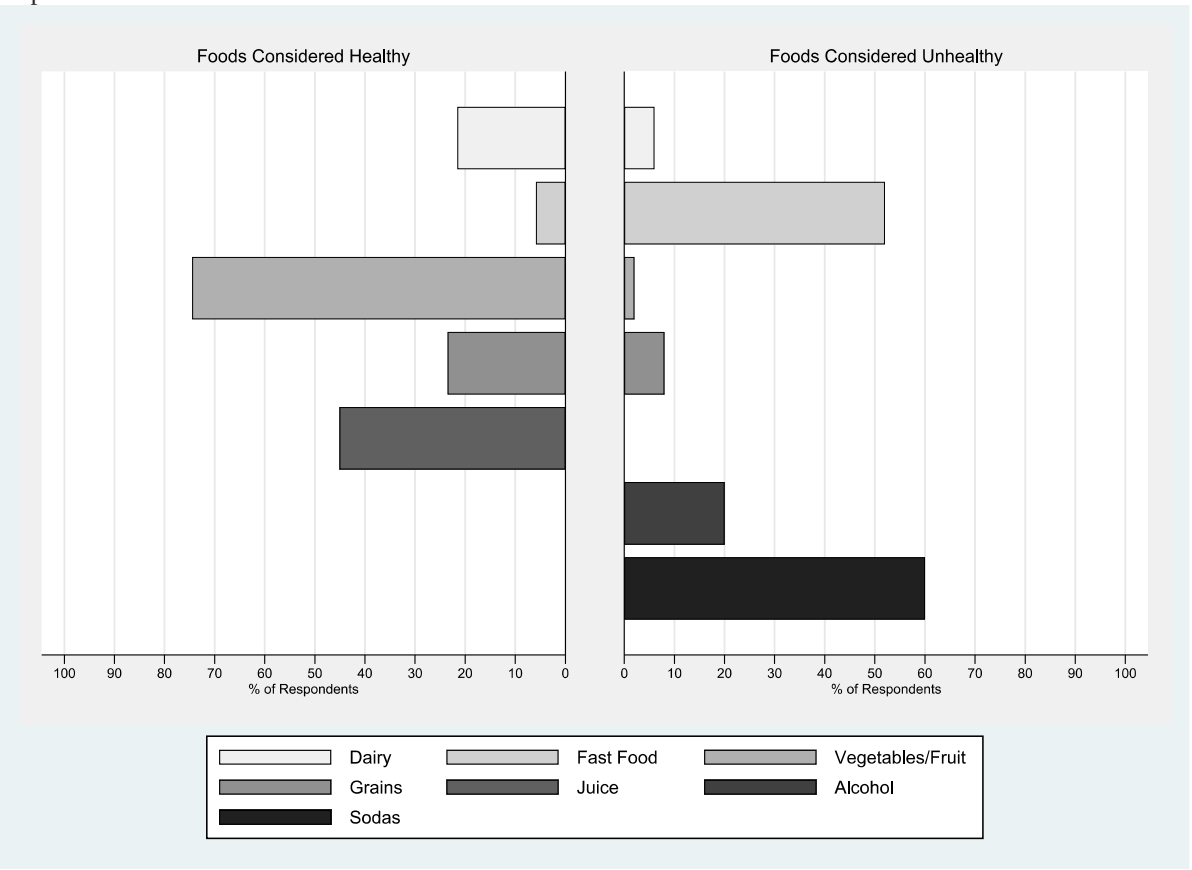

Table 10 - Foods considered healthy by percentage of respondents

Foods Considered Healthy	Percentage of Respondents
Dairy	21%
Fast Food	7%
Vegetables/Fruit	72%
Grains	21%
Juice	45%
Alcohol	-
Sodas	-

Table 11 - Foods considered unhealthy by percentage of respondents

Foods Considered Unhealthy	Percentage of Respondents
Dairy	7%
Fast Food	51%
Vegetables/Fruit	1%
Grains	9%
Juice	-
Alcohol	20%
Sodas	60%

Foods that are considered healthy and unhealthy, stratified by country of origin

Participants were asked to identify foods healthy and unhealthy to them, and responses were stratified by region of origin (Figure 5). It is presumed that consumers with greater health concerns would have different food choice motives and better attitudes toward healthy eating. The relationship between health concern and attitudes toward healthy eating was fully mediated by food choice motives.[161]

Asia: Foods reported as healthy by respondents originally from Asia include dairy, fruits and vegetables, grains, and juice. A considerably large percentage of respondents (80%) correctly identified fruits and vegetables as a healthy food option. Foods considered unhealthy by migrants originally from Asia include soda, alcohol, fast foods, dairy and fruits and vegetables. A substantial number of responses indicated sodas, fast foods, and alcohol as unhealthy, at 50%, 43%, 40% respectively. Approximately 6% of respondents reported fruits and vegetables as unhealthy. Moreover, 6% of respondents also selected dairy and eggs as an unhealthy food option.

Europe: Among the small number of European participants, fruits and vegetables were selected by all as a healthy food option. Sodas, fast foods and grains were reported as

unhealthy.

Middle East: Among participants originally from the Middle East, fruits and vegetables, juice, and dairy were reported to be healthy food options. A majority of the respondents (84%) selected fruits and vegetables as a healthy food choice, followed by juice (46%) and dairy (38%). A high percentage of respondents (61%) accurately indicated fast food as unhealthy. Further, foods selected as unhealthy include sodas (52%), dairy (8%) and alcohol (8%).

Africa: Among participants of African origin, fruits and vegetables were the highest selected healthy food item (59%). Moreover, juice (40%), grains (35%), and dairy (11%) were selected as healthy food items as well. Fast food was selected as a healthy food option by 17% of the respondents, the highest proportion of any region. In terms of unhealthy food items, soda was selected by a majority of respondents (70%). Fast foods were indicated as unhealthy by 52% of the respondents. Grains were selected by 17% of respondents, followed by alcohol (11%), and lastly dairy and eggs by 7% of respondents.

Figure 5- Foods considered healthy, by region of origin (left). Foods considered unhealthy, by region of origin (right).

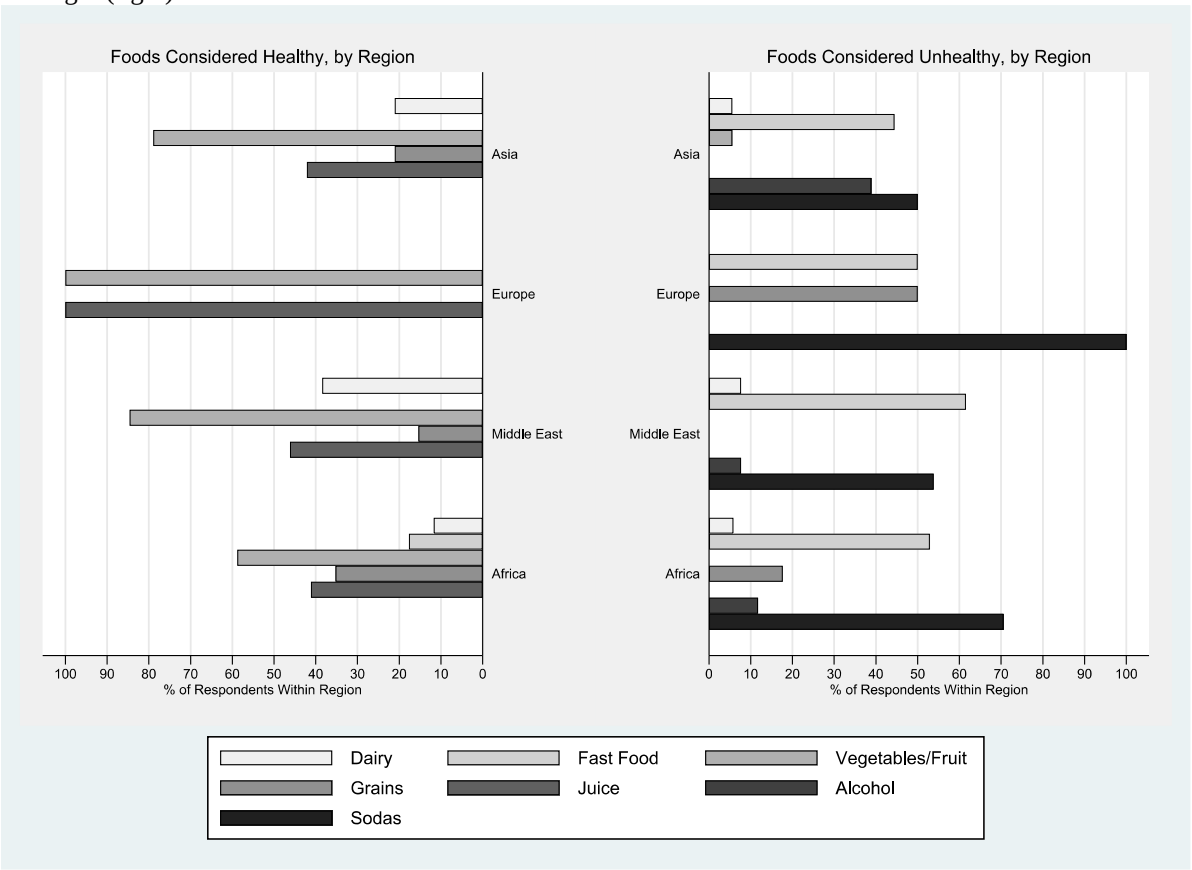

Table 11 - Foods considered unhealthy by percentage of respondents, stratified by region

	Percentage of Respondents By Region			
Foods Considered Healthy	**Asia**	**Europe**	**Middle East**	**Africa**
Dairy	20%	100%	39%	11%
Fast Food	-	-	-	17%
Vegetables/Fruits	80%	-	84%	59%
Grains	21%	-	15%	35%
Juice	41%	100%	46%	40%
Alcohol	-	-	-	-
Sodas	-	-	-	-

Table 12 - Foods considered unhealthy by percentage of respondents, stratified by region

	Percentage of Respondents By Region			
Foods Considered Unhealthy	**Asia**	**Europe**	**Middle East**	**Africa**
Dairy	6%	-	8%	7%
Fast Food	43%	50%	61%	52%
Vegetables/Fruits	6%	-	-	-
Grains	-	50%	-	17%
Juice	-	-	-	-
Alcohol	40%	-	7%	11%
Sodas	50%	100%	53%	70%

Discussion

The present study examined whether consumption of specific foods was more pronounced post-migration; the motives influencing dietary selection, and whether knowledge of healthy eating played a role in healthy food selection. Numerous studies reveal considerable variation in refugees' food intake and dietary selection following migration to the United States.[1] In particular, dietary patterns tend to be high in fat and low in fruits and vegetables.[104] However, specific ethnic dietary behaviors may be persistent in a new home country.[104,162,163] Consistent with previous research, the highest reported food group adopted since arrival happened to be fast food consumption. In addition, an overall reduction in the consumption of fruits, vegetables and grains upon migration to the United States is witnessed. This trend was seen on the individual level as well as across all four regions of origin. Awareness of food nutritive value is found among the sample population. Foods depicted as healthy on the individual level and across regions included fruits, vegetables and juice; foods reported as unhealthy included

fast foods and sodas. Simplicity of finding foods, taste preferences, and child preferences were cited to be prominent factors in food choice and purchase. Studies indicate that factors influencing food choice differ depending on the ethnic groups.[157] In the present study, similarities across regions of origin were witness in terms of dietary selection, reasons for dietary choice, and perceptions of healthy eating. In the majority of cases, unprocessed low-energy dense foods and food high in fiber are being replaced with foods that are refined high-energy dense and low in fiber. This may have implications for dietary intake of sugar, fat, simple carbohydrates.[2]. Correlation between nutrition knowledge and dietary selection was not evident – food items reported as unhealthy were adopted post-migration. Food and eating environments predominate food consumption, over and above individual factors such as knowledge, skills, and motivation.[164] Cost, convenience and taste preferences have been highlighted to be important factors in dietary selection among immigrants.[3]

This study presents several limitations. The study is based upon surveys conducted with a convenience sample of 49 immigrants from an NGO in Atlanta Georgia, which may limit the ability to extrapolate the findings to the general population. In addition, it is not known whether the experiences voiced by these participants can be generalized to immigrants in other areas in the U.S. The majority of recently arrived migrants reside in Clarkston, Georgia, which has a dense population of immigrants and has a variety of ethnic supermarkets, farmers' markets, and restaurants available. Immigrants living in other areas may have difficulty accessing a variety of foods at a reasonable cost to supplement their dietary habits. Therefore, recently arrived immigrants in other areas may not relate to the experiences of this sample group. Moreover, although

interpreters were available, language barriers may be presented as a limitation to the findings. However, the results obtained from this study should aid in further efforts to investigate migration effects on dietary changes among immigrants. Also, immigrant participants in this study are extremely varied in terms of country of origin, educational background and time spent in the US, and these differences should be considered in targeting interventions. Research on changing dietary patterns of immigrants in the US merits further investigation.

Conclusion

This study's finding that level of dietary change after migration is consistent with previous studies that have documented increased fat and sugar intake and decreased fruit and vegetable intake post-migration. [120,159,165] Although most of the respondents in the sample were knowledgeable of healthy eating practices, it did not influence overall food selection. Decreased availability of traditional foods, as well as increasing availability of western foods in certain regions could be explanations for the differences in dietary change. Nutrition educators should consider the dietary changes of immigrant participants, such as increased consumption frequency of fast foods and soft drinks, which were observed in this study. Practitioners working with immigrants should determine the degree to which dietary counseling should be focused on maintaining traditional eating habits, adopting the healthful aspects of eating in Western countries, or both.[104] Knowledge of potential determinants of behavior is necessary for developing interventions, and information on health determinants in ethnic groups is often lacking.

CHAPTER 5

CONCLUSION

A number of authors have commented on the complex dynamics of the social and personal forces that precipitate changes in health habits and exposure during the migration process.[12] Over time, migrants begin to adapt to new behaviors, and may be exposed to a broader array of what the host society offers.[125] This exposure may lead to the adoption of new eating habits, and because diet influences health, the level of change itself might have a direct link to health. [125] There is mounting evidence that resettlement can have an equal if not greater negative impact on the well-being of refugees and immigrants as the pre-migration context.[33] Knowledge of potential determinants of behavior is necessary for developing interventions, and information on health determinants in ethnic groups is often lacking. In chapter 2, *Photovoice*, was used provide insight into the experiences refugee adolescents encounter while interacting with American culture and the unfamiliar elements they face in their everyday lives. Results of this study highlight an increase in leisure-time sedentary behaviors, physical activity related barriers and changes in food related habits. Technology, automobiles and pre-packaged snacks were among the most commonly represented photos taken. Findings from chapter 3 indicate level of dietary change after migration leads to an increase in fat and sugar intake and a decrease in fruit and vegetable intake post-migration. Cost, convenience and taste preferences were found to predominate food consumption, over and above individual factors such as knowledge, skills, and motivation.[164,3] The findings were prevalent across four different regions of origin – Asia, Africa, Middle East and Europe. Results of both studies bring to light the significance of newly acquired

behaviors and how it may have important health implications on refugees and migrants. These findings illustrate the need for future research and interventions to promote health and well-being during the acculturation period and immigrants and refugees learn to adapt to new food habits and new activities in their host society.

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