5-1-2024

Barriers Faced by Members of Marginalized Communities when it Comes to Eating Healthy and Cultural Adaptations to Nutrition Education Materials

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A Capstone
Submitted in Partial
Fulfillment for Graduation with Honors Distinction and
the Degree of Bachelor of Science

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May 2024

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RECEIVED BY THE UNIVERSITY THESIS/CAPSTONE PROJECT COMMITTEE ON:
5/4/2024

Abstract

Background: In the United States, major health disparities exist among low socioeconomic status (SES) and other marginalized communities. Many of these health disparities are nutrition-related and include diabetes, hypertension, and cardiovascular disease. Many individuals in this population lack education regarding nutrition, increasing risk of disease and the detrimental impacts that these diseases can have.

Objective: The aim of this project was to identify barriers that members of low SES and marginalized communities face and adapt nutrition education materials to be culturally appropriate for the immigrant and refugee population in the Northern Colorado area.

Methods: I conducted a needs assessment with staff members at Lutheran Family Services in Greeley, Colorado to determine the population's needs and the barriers that this population faces. I then worked to develop core themes identified in the needs assessment to be the core of the nutrition education intervention. From these core themes, I created and adapted the materials so that it is accessible and appropriate for the immigrant population.

Significance: Immigrant and marginalized communities face nutrition-related health disparities, and nutrition education materials may not effectively communicate to these communities. Culturally appropriate nutrition education materials play an important role in reducing health disparities in immigrant and marginalized communities.

Acknowledgements

I would like to thank my thesis advisor, Dr. Buckner, for supporting me throughout this project. She has gone above and beyond to help me better myself as a student, a researcher, and as a person.

I would also like to thank my friends and family for helping me persevere when times are tough and supporting me throughout this project, and all throughout my college education.

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Introduction

Some of the most prevalent chronic conditions in the United States are related to nutrition, including diabetes, heart disease, hypertension, and obesity/overweight. These conditions are often exacerbated by differences in socioeconomic status (SES) and/or being a member of a marginalized community. Marginalized communities include racial, ethnic, and religious minorities as well as immigrants. In the United States, over 37 million people are living in poverty (census.gov). A large percentage of those living in poverty are also members of marginalized communities, leading to major health risks among this population due to the disparities faced including income, education, and lack of culturally appropriate resources available.

My project aims to answer the following questions: What barriers to healthy eating do adults with low socioeconomic status or from marginalized communities face? Would a culturally appropriate nutrition education intervention impact, or lessen these barriers? My project aims to fill the education and accessibility gaps present between low SES and immigrant populations compared to the public in the northern Colorado area. This project includes conducting a needs assessment at Lutheran Family Services in Greeley, Colorado, preparing nutrition education materials, and adapting these materials to be culturally appropriate and accessible to members of marginalized communities in the Northern Colorado area.

The following is a review of the literature highlighting how lower SES or being a member of a marginalized community can have detrimental impacts on the individual's health, as well as putting this population at a higher risk for many nutrition-related health conditions. The literature review is organized into health disparities in the United States with a focus on disparities more prominent in marginalized groups, steps necessary for a successful nutrition

intervention, culturally appropriate adaptations made to nutrition education materials, and appropriate delivery of educational materials.

Without adequate resources and education, these health disparities will continue to grow and broaden, making it increasingly difficult for members of these communities to lead healthy lifestyles and prepare for a healthy future.

Literature Review

Nutrition-Related Health Disparities in the United States

Nutrition-related health concerns encompass many of the top diseases leading to death in the United States, including diabetes. Diabetes has proven to be a prevalent nutrition-related health concern, especially in the United States. The CDC reports as of 2022, that in the United States, 96 million people have prediabetes, 37 million people have diabetes, and 90-95% of cases are accounted for by type 2 diabetes (T2D), which occurs when the body cannot properly use insulin (CDC.gov). T2D is related to environmental, genetic, and dietary factors, therefore it is preventable. Prevention is achieved not through a specific diet, but by one that is high in fiber, polyunsaturated fatty acids, coffee, and nuts and low in carbohydrates, *trans*-fatty acids, red and processed meat, and sugary beverages (Wang, 2022). Greater adherence to said diet has indicated a lower risk for diabetes and subsequent conditions including cardiovascular disease (CVD), cancer, and death (Wang, 2022). Nutrition education with an emphasis on diabetes prevention and reversal has decreased the development and mortality rate of T2D (Coppola, 2018). Lee et al found that there was a steady decrease in diabetes with increased income and level of education (2011).

Among marginalized communities, there is a higher incidence of nutrition-related diseases such as birth defects, anemia, cognitive and behavioral problems, mental health problems, diabetes, hypertension, and cardiovascular disease. These nutrition-related diseases are associated with food insecurity, which has been shown to be more common in households with children, with lower SES, less general education, and less education regarding nutrition (Gundersen, 2015). Lower SES has been shown to increase difficulties with access to nutritious foods, education, and a better local food environment. Local food environments, as well as car

ownership, contribute to nutrition-related health concerns, specifically body mass index (BMI) measures. For example, those who own cars can travel further to obtain healthier food, while a lack of car ownership may limit the variety of healthy foods available, as well as increasing the likelihood of visiting fast food restaurants compared to other restaurants. This study also showed that total restaurant concentration was associated with higher BMI (Inagami, 2009). One gap addressed in this article was grocery store access, which has been shown to impact nutrition-related health concerns. Another study on fresh fruit and vegetable consumption compared to the size of grocery store demonstrated that customers of smaller grocery stores were more likely to consume fewer fresh fruits and vegetables due to lack of both availability and variability (Bodor, 2008). Geographical access to supermarkets, education, product diversification, and supply are also significant factors regarding grocery store access (Rodier, 2017).

Mode of transportation and/or availability of public transportation should be included as a variable on the food environment as it is a significant barrier to healthy eating among low SES and marginalized communities (McDermot, 2016). Based on geographical location, people may not have a choice of grocery store size, especially if there is no access to transportation resulting in differences in the amounts of fresh produce that a person can purchase and consume. Geographical location may be associated with SES, since members of lower SES strata are more likely to live in a lower-income area. These areas may have a higher concentration of fast-food restaurants, and access to reliable transportation, thus, the target population of low SES and members of marginalized communities are likely to face these same issues.

Conversely, a 2018 study showed that higher levels of income do not have as great of an impact on nutrition-related health concerns as education level does. The difference in the prevalence of childhood obesity was consistent with head-of-household education levels showing

the highest prevalence among children whose head of household had an education level of a high school graduate or less, and the lowest prevalence of childhood obesity was found among children whose head of the household was a college graduate (Ogden, 2018). This study recognizes that general education has a greater impact than income, thus nutrition education interventions could prove to be helpful to these marginalized communities, especially when tailored to their needs. Additional studies have shown that nutrition-specific education has an even greater impact on individuals in vulnerable populations (Dave, 2017). A nutrition education intervention may create a positive impact on those individuals in the community.

Marginalized Communities and SES Impacts

A challenge faced by underserved members of the community that rely on food banks is the lack of culturally specific foods and foods for special diets, such as specific diets required for health conditions such as diabetes and celiac disease, as well as diets for personal, religious, or cultural beliefs such as vegan or kosher diets. Verpy's study outlines that donors to food banks may need more education regarding ethnic foods than food bank clients would most desire. Most donors also did not consider special dietary needs such as diabetes (2003). This may lead to the worsening of nutrition-related conditions or malnutrition in members of marginalized groups and those with low SES. It is important to improve access to specific dietary needs, as medications for similar medical needs would be accessible. "Nutrition profiling" is best described by Handforth et. al. as ranking the nutritional value of foods and how often they should be eaten. This has proved to help navigate the needs of food bank clients and effectively communicate those needs to donors to help them obtain access to food that is culturally appropriate, good quality, and can be tailored to specific health needs in the community (Handforth, 2012). An

additional application of nutrition profiling may be to add a category for culturally appropriate foods. Access to culturally appropriate and healthy food is an important factor that can influence what or how much a client eats, and these foods are not likely to be donated by people that aren't members of that community as they are unaware of others' needs. An important part of nutrition education is providing information on risks faced by those who do not follow a healthy diet or live a healthy lifestyle. This includes possible outcomes that may occur if no behavior change occurs, urging people to have a greater desire for change.

Conducting a Needs Assessment

A needs assessment lays the groundwork for a nutrition intervention. Researchers have used needs assessments to influence the development of nutrition education programs. A needs assessment can help identify core themes to be addressed in a nutrition education intervention. A 2020 study provides examples of sample interview questions based on participants' ideas of nutrition-related health concerns that they feel are substantial and want to learn more about. This study highlights the need for family-based interventions and an interdisciplinary approach, as well as working with community organizations such as food banks to provide this education where it is already accessible and practical for the family (Lappan, 2020). The previous study was focusing on parental interventions and the impacts they had on their child's nutrition and health status; family-based interventions are focused on bettering the entire family, rather than single members, and can have a greater impact as it may promote family-level changes.

Partnering with a community resource that serves the target population has proven to be helpful for recruiting participants. A study from Houston, Texas that included food bank staff and their clients in their needs assessment gained a more comprehensive scope into this community's needs. Food bank staff stated that they provided USDA brochures and pamphlets

from the food bank to clients each time they visited and offered classes about budgeting, MyPlate, and grocery store tours, but these had low attendance. Food bank staff expressed concerns about specific themes such as food obtained versus desired, client health needs, current education tactics, and desired education tactics. The staff said the current method was not helpful and expressed a desire for a more comprehensive education plan such as budgeting, cooking, and shopping skills, reading food labels, and cooking for specific health concerns. Clients expressed that they were satisfied overall with pantry services, except for a lack of fresh produce; and expressed desires similar to pantry staff, including budgeting, cooking for specific health concerns, physical activity, and handouts with recipes (Dave, 2017). By tailoring education to meet the specific needs and desires of a community, it is more likely to have greater attendance and participation. Budgeting has been shown to be a major barrier in many studies, with some clients stating that their level of food insecurity has led them to be late paying bills to obtain food throughout the month (Kirkpatrick, 2009). Thus, budgeting may be one of the first things taught in a comprehensive nutrition education intervention if the clients express a specific desire to learn that in the needs assessment. Besides budgeting, a comprehensive needs assessment would also include client health and nutrition needs, physical activity, and handouts that would serve as a resource at home.

Another component of a needs assessment would be to assess the client's demographic, anthropometric, and nutrition-related information. Food recall strategies can be successful in measuring the overall nutrition status of an individual but have proven to be challenging among populations with low literacy rates. Studies conducted using food recall strategies have shown that even on a much smaller budget, most clients were able to meet energy and micronutrient needs, as well as having similar health and nutrition status as the general population, except

calcium, which was found low in women ages 18-49 and men and women aged 50+ (Starkey, 1998). It is possible to consume a healthy diet rich in vitamins and minerals even on a stricter budget. This may be important information to convey to clients, as a lower income can prove to be a significant challenge, but with adequate information, their income may not be such a substantial barrier to consuming a healthy diet.

Nutrition Education Interventions

A nutrition education intervention follows a needs assessment, used to gather information about what the audience knows and what they want to know. A comprehensive nutrition education intervention may include nutrition-related health risks, budgeting for and planning meals, and food safety and preparation. The client's desires can help form “core” themes can shape the education intervention. These core themes would be described as major themes identified in a needs assessment and would be addressed in an intervention. There may also be subtopics that go more in-depth. One example of a nutrition education intervention that used needs expressed by food bank staff and clients to create a comprehensive guide to nutrition included core themes of nutrition basics, the importance of breakfast and snacks, fruits and vegetables, dairy and meat, breads and grains, and smart shopping (Dave, 2017). Each of these topics had subtopics that correlated to the specific needs expressed by staff and clients. Creating and planning for a nutrition education intervention should follow the needs assessment closely to ensure that the information provided will be helpful and useful for the clients.

A 2018 pilot intervention focused on clients' healthy eating index (HEI) score (a measure of how closely a person adheres to Dietary Guidelines) and cooking skills. The intervention comprised a six–week curriculum that included cooking demonstrations with hands–on

opportunities for clients and a 30–40–minute nutrition education session addressing nutrition–related themes (Caspi, 2018). This intervention proved to be successful in improving clients' HEI and confidence in cooking and general nutrition knowledge. This provides further evidence that clients can benefit from structured intervention plans, and that positive change can be seen with relatively minimal intervention.

Another successful strategy is the use of peer mentors in nutrition intervention. A 2020 study found that peer mentors reported that teaching other members of the community was an empowering experience. Patrons also stated that the use of peer mentors was helpful for them (Oliver, 2020). Peer mentors can be helpful in increasing participation in nutrition education interventions. Peer mentors could be identified as members in the later stages of the transtheoretical model of behavior change, such as the action, maintenance, and termination stages (Prochaska, 1997).

Another important component of nutrition intervention is accessibility to nutrition education. Providing education through community resources to already established clients has proven to be successful regarding accessibility. A recent study showed that between weekly text messages, individual nutrition counseling via phone, medically tailored food boxes, and virtual nutrition education, text messaging was the most feasible and accessible form of nutrition education, with a reach of 1,856 clients, and online nutrition education videos and demonstrations being the most convenient option for clients to obtain nutrition information (Mohn, 2022). Among many nutrition education interventions, the main concern is low attendance. This may be due to the lack of accessibility to all members of the population they aim to serve. This may include virtual education for those who work or have children, mobile

education, resources for those that have limited access to transportation, or hand-outs in multiple languages for those that struggle with communication.

Cultural Adaptations of a Nutrition Education Intervention

A major component of culture is food and traditions relating to food. Working with marginalized communities highlights a need for culturally appropriate resources related to nutrition and food. Barrera's model of cultural adaptations outlines five stages of adaptations. Phase one: information gathering, such as a needs assessment, and reviewing literature on health disparities and risk factors unique to the target population. The need for cultural adaptation is identified in phase one. Phase two: Preliminary adaptation design includes identifying core themes from the needs assessment and drafting education materials specific to the core themes. This phase also includes translating materials into appropriate languages for the population. Phase three: preliminary adaptation tests including training staff to deliver educational materials and then conducting a pilot adaptation test. Phase four: adaptation refinement includes using feedback from the pilot test to continue adapting materials and revising the intervention. Phase five: cultural adaptation trial includes a full trial of the adapted materials (2013). Phases four and five can then be repeated as many times as necessary. These cultural adaptations have greater short-term impacts than original interventions due to the increased participation of clients that feel their culture being valued in a health intervention (Barrera, 2013).

Conclusion

Based on the literature cited, accessibility to healthy food and nutrition education are crucial factors contributing to a healthy diet among low SES and marginalized individuals. A needs assessment will be needed to tailor a nutrition course to the community's specific needs. Some gaps in the literature are the following: Is there any similar previous work done in this

geographical area that could be important to know? What is the threshold for determining different socioeconomic groups? What has been done previously, in terms of cultural adaptation for a heterogeneous population?

Methods

Setting

The first step in this project was to determine what resources are already available to my desired population. I determined that Lutheran Family Services (LFS) in Greeley, Colorado would be appropriate for the desired population. LFS's mission is to strengthen communities by providing support, guidance, and resource coordination to individuals and families throughout the Rocky Mountain region. They value dignity, self-determination, equity, and inclusivity through honoring the identity differences of the clients that they serve (lfsrm.org).

Theoretical Model

The transtheoretical model of behavior change is the theoretical model for this project, as it has proven to be successful in similar initiatives. The transtheoretical model outlines six stages of behavior change, including precontemplation, contemplation, preparation, action, maintenance, and termination (Prochaska, 1997). The precontemplation stage of the transtheoretical model is defined as a person not intending to make a change within the next six months. Contemplation is defined as intending to make a change within the next six months. The preparation stage is defined as having a plan of action and planning to begin this plan within the next month. The final three stages occur after the plan has been started; the action stage is defined as the first six months of behavior change, maintenance as maintaining these behavior changes as they become habitual, and the termination stage is once the behavior changes are now a part of the person's life.

I used the information gathered from the needs assessment to develop educational materials intended to be appropriate for the population. Because I interviewed LFS staff

members rather than their clients, I tailored the nutrition education materials to be appropriate for individuals in the precontemplation and contemplation stages.

Needs Assessment

To begin, we sent out recruitment emails, which were distributed among LFS staff, from this, we had 5 staff members interested in the project and that were willing to be interviewed. We then scheduled zoom interviews with each of the staff members. After obtaining consent from the interviewee to continue, we asked them a series of questions (See Appendix "Sample Interview Questions and Protocol") to obtain information on their client's needs and desires regarding nutrition education. We also asked for information on where the immigrants and refugees came from, and any languages they speak to tailor the nutrition education materials to be appropriate. The interviews were recorded, deidentified, and transcribed.

Development and Distribution of Materials

After the interviews were transcribed, we went through each interview, one question at a time, discussing and recording the most common responses. The most common responses were then incorporated into themes that would be the core of the nutrition education materials.

To make the nutrition education materials, I hand-drew, using Procreate on my iPad, each piece of food that we wanted to be on each handout. Then, I created the materials, highlighting different themes that were identified in the interviews. I then created a second set of materials with a numbering system that would be able to be followed by LFS staff members when giving the materials to clients. The numbering system corresponds to a script, designed to be given while LFS staff members give clients grocery store tours. The materials were sent to LFS to be delivered by LFS staff members.

I made adaptations from generic nutrition information to tailor the nutrition education intervention to my specific population, highlighting cultural needs and dietary needs such as diabetes. I used the model for cultural adaptations outlined in Barrera's study of cultural adaptations (2013). I completed the first two steps of this model in my project, which are information gathering, such as my needs assessment, and the preliminary adaptation design, creating educational materials. The other steps include preliminary adaptation tests which include a pilot study, adaptation refinement, which includes using feedback to further revise educational materials, and finally the cultural adaptation trial, which includes a full trial of the adapted education materials. Given the time constraints, these steps were not possible for my project.

IRB Approval

This project was approved by the University of Northern Colorado Institutional Review Board on March 1, 2023.

Results

Needs Assessment

We asked LFS staff members if they had ever participated in or led a health or nutrition focused program, and if there was any current curriculum for the clients, including handouts and other programs. Most LFS staff members had never participated in or led a health or nutrition focused program. One stated that the cultural orientation includes information on water safety. Another was a previous employee at WIC, so LFS can easily refer clients to WIC when possible. Currently LFS provides limited information about health and nutrition, most being verbal. They do not have a standardized curriculum for the clients, and any information shared comes directly from the staff member. During the cultural orientation at LFS, they are shown a generic video about health in the United States. Staff members expressed concerns that the clients were not absorbing all of the information adequately, as it is a very stressful and overwhelming time for them.

Staff members were also asked questions about where their client's were from and what languages they speak. We found that LFS currently has clients from Malaysia, Thailand, Burma, Ethiopia, Eritrea, Somalia, Rwanda, Dominican Republic of Congo, Kenya, Cuba, Haiti, Ukraine, and Rohingya. LFS serve several Muslim clients, and the languages that the clients speak include Burmese, Rwandan, Tigrinya, Spanish, Rohingya, and Swahili. LFS has staff members that speak Rohingya and Spanish, and translating services are provided through those staff members and phone translators. From this information, we decided that it would not be feasible to translate all materials into each language, especially since Rohingya does not have a written language. Because of this decision, the materials have few words, and most information is conveyed through images.

When speaking to the staff members about health concerns that this population faces, they shared concerns such as diabetes, overweight, high blood pressure, vitamin D deficiencies, high levels of lead, and tuberculosis. We focused the nutrition education on diabetes, overweight, and high blood pressure, as these can have detrimental effects, and can be mediated to a degree by proper nutrition. Nutrition-related concerns that the staff members expressed included: reducing fried foods, encouraging the clients to eat plenty of fruits and vegetables, consuming grains rather than rice, when formula is appropriate, what a healthy weight is, and exercise. Interviewees also expressed food safety concerns such as not using their pots and pans from other places, as there is a concern for lead, food storage, and ensuring them that tap water is generally safe to drink. Staff members also expressed concerns for clients with children as they do not understand that school lunches are safe and healthy for their children.

Staff members were asked about which resources clients have access to and found that LFS does provide resources to help their clients receive SNAP, WIC, and TANF benefits whenever they are eligible. The staff members interviewed shared that their clients tend to shop the most at King Soopers on 11th avenue in Greeley, Walmart, certain cultural stores in Greeley and Denver, as well as food banks. The clients tend to stay away from fast food, as they are wary of the "American diet". Some clients also grow their own food in home gardens.

We also asked about culturally specific foods that the clients may consume, which included lots of rice, beans, and fish, and they generally avoid pork. Staff members expressed that the clients may have some difficulties getting fish, as well as some fruits, and struggle with buying in bulk. They sometimes travel to Denver to go to specific stores such as MangoHouse, that has multicultural options.

Finally, staff members were asked to share details about transportation and what parts of Greeley the clients live in. Staff members shared that LFS clients generally walk, but have difficulty getting to certain places, so they may get rides from friends, family, or their LFS case managers. Some may also ride a bike or take the bus, but many are wary of the public transportation system for fear of missing their stop and not being able to communicate with someone that could help them. They also experience difficulties with obtaining a United States driver's license, and in some of their cultures, such as Rohingya, the women generally do not drive. Luckily, most clients live on the east side of Greeley, near King Soopers, and the Sunrise clinic in Evans, which serves this community.

Nutrition Education Materials

Becuase of time constraints, I was not able to observe the impact that this project had on this population.

Discussion

The materials that I created were based on the themes found in the needs assessment in order to ensure that the information was useful and applicable for the population. I also adapted basic nutrition information to be represented pictorially in an attempt to mediate any language barriers that may be present when working with a diverse population. As seen in a 2017 study, a third through fifth grade reading level is generally appropriate for low-income individuals (Dave), but when working with multiple languages, some of which are not written, it was crucial for me to find a way to share the information in a way that *all* clients would be able to understand and reference easily.

In response to the information regarding health and nutrition concerns gathered during the needs assessment, I made sure to include a variety of fruits and vegetables as well as other dairy, whole grains, and protein sources to promote a more well-rounded and balanced diet. In the script, concerns such as diabetes and high blood pressure were included to an extent. For example, the script states that canned beans and vegetables should be rinsed before being consumed becuase they can be high in sodium, which is directly related to blood pressure.

The originality of this project was using Barrera's cultural adaptation models in a nutrition education application, unique to this model of adaptations. This project is also the first of its kind in Greeley, Colorado. Because most studies tend to focus on one demographic or language, my project is unique in that I included multiple languages as well as individuals from many various backgrounds and demographics.

The next steps in this project are to assess the usefulness of the materials through a follow-up interview with LFS staff members, make changes where necessary, and continue working for more accessible health and nutrition resources.

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APPENDIX A

IRB Application Narrative

A. Purpose

Because of the growing racial diversity in the United States of America, as well as the ongoing and alarming presence of health disparities, the Academy of Nutrition and Dietetics has set "Embracing America's Diversity" as a priority in the 2017 Visioning Report for the Nutrition and Dietetics Profession (Kicklighter et al., 2017). This served as the motivation for this project aimed at improving cultural competence for Nutrition and Dietetics students. Cultural competence is a vital skill for credentialed Nutrition and Dietetics practitioners, and this skill must be firmly based in principles of diversity, equity, and inclusion. Efforts at improving cultural competence for dietetics students in programs around the country have taken the form of experiential learning, in-class work, as well as shorter courses and trainings. Although cultural competence is a component of formal dietetics curriculum, this training is not standardized.

Health education materials are more effective if they are delivered in a culturally appropriate manner, including use of relevant language, acculturation levels, and cultural practices (Broyles et al., 2011; HornerPhD & OrtizPhD, 2015). Therefore, cultural competence is a critical skill for Nutrition and Dietetics students. These trainings would engage students in a deeper awareness and understanding of cultural considerations that are particularly relevant to the community of Greeley. As a team, we will develop nutrition education materials that incorporate culturally appropriate content and language. Ultimately, this culturally relevant nutrition education program and cooking demonstration will be more impactful to the community because it will be tailored to the recipients.

The aim of this project is to conduct a needs assessment for a culturally appropriate nutrition education intervention in the Northern Colorado area. The first step in creating and carrying out a successful nutrition education intervention is conducting a needs assessment of the population of concern, specifically members of marginalized groups, including low socioeconomic status (SES) and racial and ethnic minorities. It has proven to be successful to conduct interviews first of staff at a community organization that serves the intended population. Second, the needs assessment will be used to inform nutrition education materials to meet the needs of the population. These materials may include presentations, cooking demonstrations, flyers, and handouts.

Category Justification: This project falls into the exempt category because it involves interviews with adults. Interviews will be audio-recorded, but the responses of the interview questions are related to operations at the Immigrant and Refugee Center of Northern Colorado (IRCNoCo) and Lutheran Family Services in Greeley (LFS) and will not reveal personally identifiable information. The identity of the interviewees will not be easily ascertained, and the answers given in the interviews will not place the interviewees at risk of criminal or civil liability, damage interviewee's financial standing, employability, educational advancement, or reputation. Recordings will be transcribed and de-identified

B. Methods:

Participants: This nutrition education intervention will be conducted at the Immigrant & Refugee Center of Northern Colorado (IRCNoCo) and Lutheran Family Services in Greeley (LFS), which provides members of the immigrant and refugee community of Northern Colorado

with education, community navigation, and other resources to facilitate successful integration. The needs assessment will be conducted with 5 staff members at IRCNoCo and 5 staff members at LFS. The target population for the nutrition education program will include immigrants and refugees among the Greeley, Colorado area.

Data Collection Procedures: For the needs assessment, we will interview staff members (n=5) of IRCNoCo and LFS (n=5) to determine what they view as the most pressing needs of the IRCNoCo and LFS clients regarding nutrition education. Interviews will last 1 hour and will be conducted by Dr. Teresa Buckner and two undergraduate students (Kennedy Larsen and Jordan Fambro). Sample questions are attached. The needs assessment will include demographic information of the staff workers. The researchers will take notes during the interview and will record the conversation. The conversations will be transcribed, subjects de-identified, and audio recordings deleted.

The needs assessment will be used to develop educational materials that will be appropriate for the population. The transtheoretical model of behavior change will be used to assess the level of understanding of nutrition of IRCNoCo and LFS clients have and to tailor the education materials to meet specific needs. We will use the needs assessment to create evidence-based nutrition education materials. Evidence-based nutrition education materials will be tailored to the specific population, highlighting cultural needs and dietary needs such as diabetes. Barrera's method of cultural adaptation of behavioral modification interventions will be used to adapt nutrition education materials to be culturally appropriate (Barrera et al., 2013). This study will encompass the initial steps of information gathering and preliminary adaptation design of the materials.

Data Analysis: Quantitative analysis methods will be used to determine common themes that staff members expressed concern over to incorporate into the education materials. Thematic analysis techniques will be implemented to determine the most priorities for IRCNoCo and LFS. We will us an inductive approach to develop themes from the interviews.

Data Handling: The conversations will be transcribed, subjects de-identified, and audio recordings deleted. Files of the audio recording transcriptions will be stored on a password-protected computer belonging to the University of Northern Colorado. IRB consent forms will be stored in a locked cabinet by Dr. Teresa Buckner in the Department of Kinesiology, Nutrition, and Dietetics for a period of 3 years

C. Risks, Discomforts and Benefits:

Risks are minimal and would include discomfort or anxiety in answering open-ended questions. There are no direct benefits of participating in this study. Indirect benefits include contributing to the addition and improvement of programing at IRCNoCo and LFS.

D. Costs and Compensations:

The researchers will meet IRCNoCo and LFS staff on-site, so there will be no costs to the participants, and no compensation will be provided to IRCNoCo and LFS staff. Risks and benefits will be communicated through the informed consent document.

E. Grant Information:

This study is not funded through a grant.

Sample Interview Protocol and Questions

Interview Protocol

We will collect informed consent from the participants, (Immigrant and Refugee Center of Northern Colorado and Lutheran Family Services staff members.) The interview will last around one hour and will consist of around five to ten open-ended questions, beginning with simple questions before moving to more complex questions.

Interview Questions

1. Have you ever participated in or led a program focused on health and nutrition? What did you like about this program? Was it helpful? What do you feel was missing? How do you feel the individuals took to the information?
2. Does LFS currently offer any nutrition education materials? What are these materials? How are they distributed? Do you or the clients find them helpful or useful? If there are current educational lessons provided, what is the attendance and participation?
3. What cultural backgrounds do the clients have? What languages do they speak and will there be translational services for the nutritional information we will be providing?
4. What health concerns do you feel this population expresses?
5. What nutrition topics do you think would be most helpful for this population?
6. Do your clients express any nutrition-related concerns?
7. Is there anyone who helps these individuals get connected with SNAP? Where are they getting most of their food? What culturally specific foods might they consume? Do they have difficulty accessing these foods?
8. What are the modes of transportation the clients use? What neighborhoods do these individuals live in?

Informed Consent Document to be Signed by Interview Participants

CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH

UNIVERSITY OF NORTHERN COLORADO

Researcher: Teresa Buckner, PhD, RDN, Kinesiology, Nutrition, and Dietetics Department

Phone Number: 970-351-2879 *Email*: teresa.buckner@unco.edu

Purpose and Description: The primary purpose of this study is to determine the needs and priorities for a culturally appropriate nutrition education program at the Immigrant and Refugee Center of Northern Colorado (IRC). In order to best serve the clients of IRC, we would like to interview IRC staff to better understand the demographics and needs of IRC. For this study, we will ask you open-ended questions about your experiences at, and understanding of IRC, in order to conduct our needs assessment.

Potential risks in this project are minimal. You may experience some discomfort while answering questions, but you are free to decline to answer any question that you choose. While there is no direct benefit to you for participating in this research, indirect benefits may include improving the programing at IRC and provision of additional programs for IRC.

We will take every precaution in order to protect the confidentiality of your participation. We will assign a subject number to you. Only the lead investigator and his assistants will know the name connected with a subject number and when we report data, your name will not be used. Data collected and analyzed for this study will be kept in a locked cabinet in the Department of Kinesiology, Nutrition, and Dietetics, which is only accessible by the researcher and her

undergraduate and graduate students.

We may record the audio of the interview to back up the notes taken by the researchers. To further help maintain confidentiality, computer files of audio recordings will be created, and participant's names will be replaced by numerical identifiers. The names of participants will not appear in any professional report of this research. Recordings will be deleted after transcription. Be assured that we intend to keep the contents of these audio recordings.

Participation is voluntary. You may decide not to participate in this study and if you begin participation, you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled. Having read the above and having had an opportunity to ask any questions, please sign below if you would like to participate in this research. A copy of this form will be given to you to retain for future reference. If you have any concerns about your selection or treatment as a research participant, please contact the Office of Research, Kepner Hall, University of Northern Colorado Greeley, CO 80639; 970-351-1910.

Participant's Signature Date

Researcher's Signature Date

Core Themes From Needs Assessment

a. Health Concerns
    - **i.** Diabetes
    - **ii.** High blood pressure
    - iii. Vitamin D deficiency
    - iv. Physical Activity

b. Food and water safety
    - i. Cooking materials
    - ii. Drinking tap water instead of bottled water
    - iii. Food storage

c. Balance
    - i. Reduce fried foods
    - ii. Rice
        1. Portion Sizes
        2. Brown rice
        3. More variety
    - iii. Fresh fruits and vegetables

Script

1. As we come up to the store, we may see a sign that states that you can purchase things through SNAP. King Soopers accepts SNAP, as well as Save A Lot, Safeway, and Sam's Club to name a few.
2. The first thing you see when you enter the store is the produce section; it is the largest section of the store.
    a. As you travel to the back of the produce section, you may notice that it gets more expensive. This is organic produce, and it is not necessary for a healthy diet to eat organic.
    b. Prices may vary in the produce section. Some fruits and vegetables may only be available during certain seasons and may not be available or may be very expensive during other seasons. Try to shop what is "in season" to save money.
    c. Prices can also vary based on if they are priced per unit versus by weight. This information is available on the price tags.
    d. King Soopers also has sales sometimes, so look out for colored tags.
    e. Produce should make up half of what we eat daily. It is important because it contains fiber, water, vitamins, and minerals.
    f. Eating more produce can decrease disease risk and can help with high blood pressure. The fiber in fruits and vegetables can also help regulate blood sugar.
3. The next section is the meat section.
    a. The pricing for this can vary too but is usually based on weight and quality.

   b. Buying a whole chicken or turkey is typically cheaper than buying parts separately. Unused parts can also be frozen for a later date, or to be made into broth.
   c. When purchasing meat, you should look for meat with a low fat percentage. On a package of ground meat, for example, you will see 80%/20% or 90%/10%. The second percentage is how much fat is in the meat. Try to get meat with a lower fat percentage.
   d. Consuming meat that has a lower fat percentage can help decrease the risk of high cholesterol, high blood pressure, heart disease, and stroke.
4. The next section is the bakery and bread section.
   a. Try to consume as many whole grains as possible. They have more fiber and can prevent high blood pressure.
   b. If you cannot consume gluten, there are some common gluten free brands such as: Canyon Bakehouse, La Brea, Rudi's, and Udi's.
   c. You may also find bread in some of the middle aisles as well. Near here you may find peanut butter, which can be purchased with WIC if you are pregnant, breastfeeding, or have kids under the age of 5.
   d. In the middle aisles, you can also find rice, which is cheaper purchased in bulk. You should try to eat brown rice, as it is a whole grain, and provides more fiber and micronutrients than white rice. The fiber helps to regulate blood sugar.
5. Next up in the middle aisles, we find canned foods such as fruits, vegetables, and beans.
   a. These can be a good alternative to fresh produce, because they last much longer and reduce waste.

   b. Canned beans and vegetables should be rinsed before eating, because they are usually packed with a lot of sodium, which can cause high blood pressure.
   c. Dry beans are cheaper than canned beans, but both provide fiber, which helps with digestion, and protein.

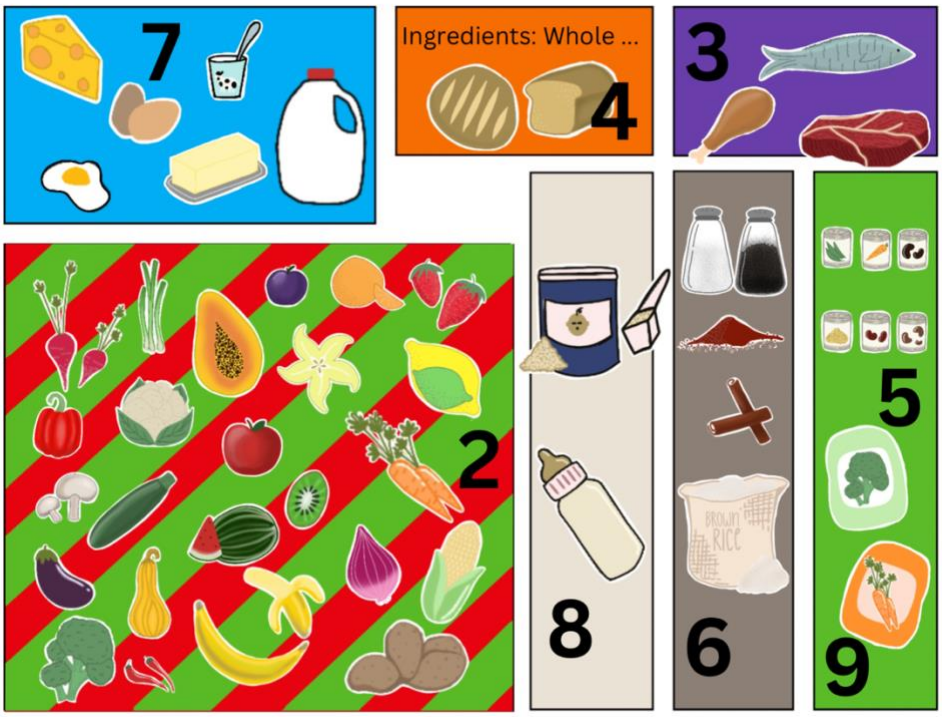
6. The spice section is filled with many various spices in different forms. They may be cheaper to buy other places and in bulk, than the grocery store.
   a. Seasonings other than salt should be used because high amounts of salt can increase blood pressure.
7. Up next, we have the dairy section, which has a lot of variety. Everything found in the dairy section should be kept refrigerated.
   a. Dairy provides calcium, vitamin D and protein, which is good for maintaining bone density.
   b. Starting with milk, there are many different kinds, each having a different fat content. This is shown in the percent on the container.
      i. If you get WIC benefits, you are limited to the percentage of fat that you can purchase. This correlates with the age of your child. Purchasing fat percentages outside of their age range, with WIC, will require a prescription from your child's doctor.
   c. Non-dairy alternatives are also available, and include almond, oat, and soy milk. Soy milk has the closest protein content to regular milk.
   d. Yogurt can be a good source of protein and can be flavored or unflavored. Some may also include fruit.

    e. Many dairy products are available in lower fat content. This is beneficial for decreasing risk of heart disease.
    f. Brown and white eggs provide the same nutritional value.

8. In other middle aisles, we can find baby formula. There are many different options here, but WIC covers the brand Enfamil. A prescription from your child's doctor is required to purchase other formulas through WIC.
    a. Point out WIC tags
9. Onto the frozen section, these products are frozen when they are the freshest, so they may contain more nutrients than fresh produce. Frozen fruits, vegetables, and meat can be cheaper, and last longer, when they stay frozen. Some frozen fruits and vegetables are also covered by WIC.
10. Most other sections such as the pet aisles, alcohol, or household products are not covered by SNAP or WIC.
11. As we go to the checkout area, we see self-checkout areas, and checkout areas with people helping. You are welcome to use either one.
    a. Remember to bring reusable bags, or you will have to pay for the plastic bags provided by the store.
    b. When it is time to pay for your groceries, you can first use your WIC/SNAP card or app before paying any remaining balance with cash or card.

Materials

1


7
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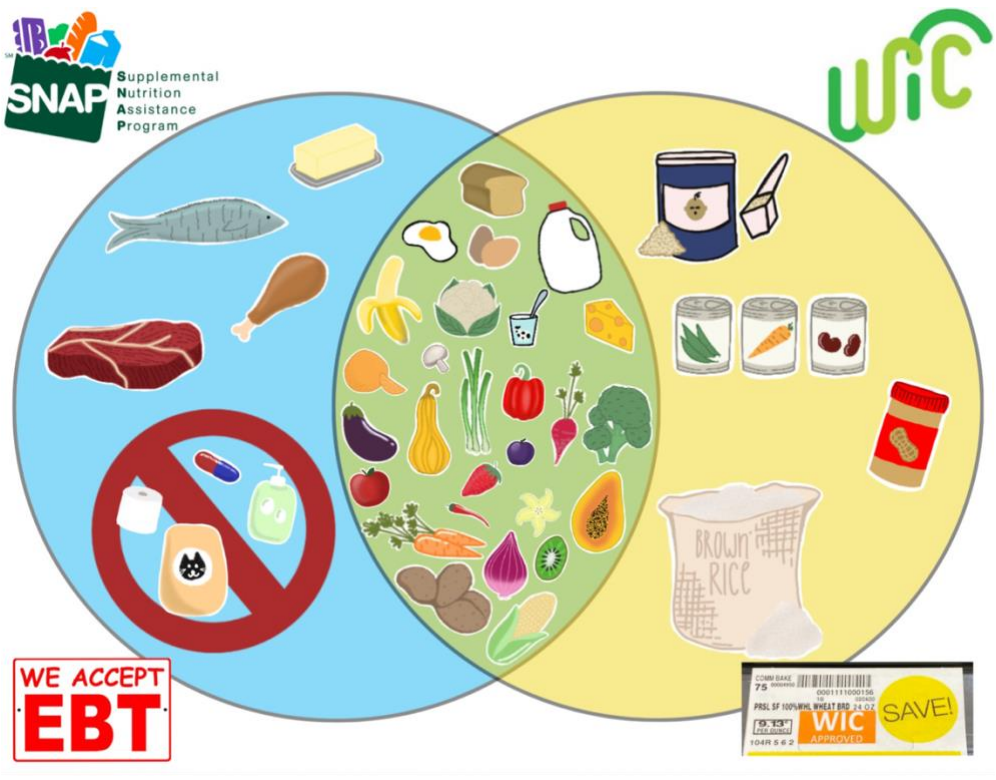
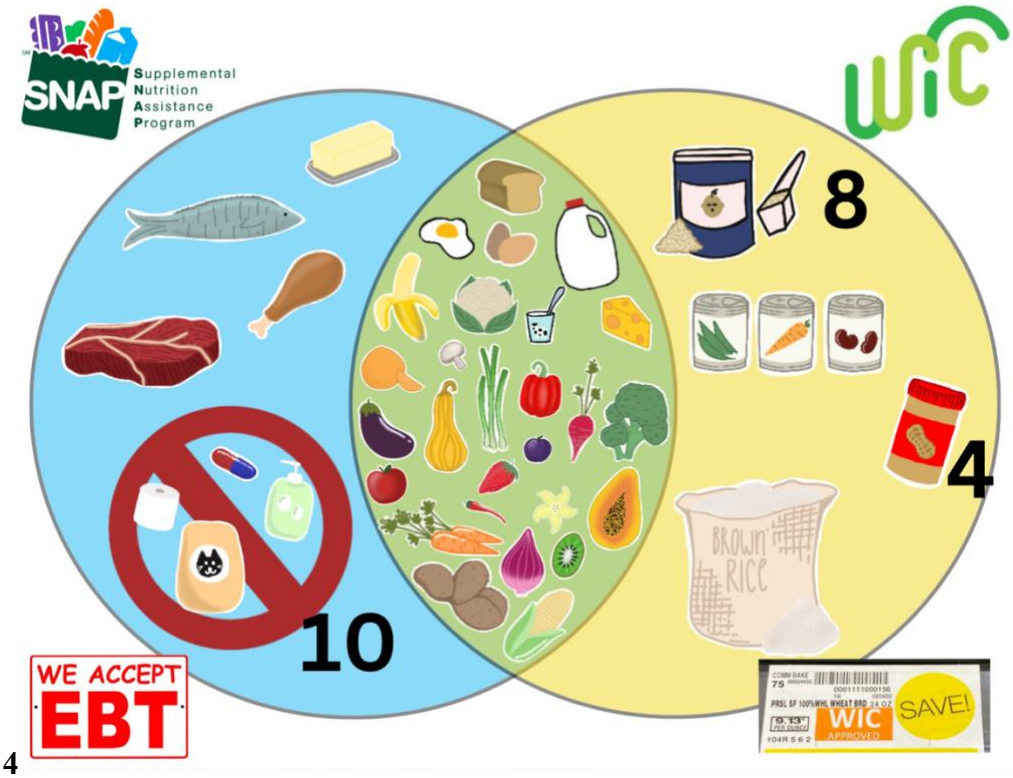
2


SNAP
Supplemental
Nutrition
Assistance
Program
WIC
WE ACCEPT
EBT
BROWN RICE
SAVE!
WIC
APPROVED

3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SAVE!
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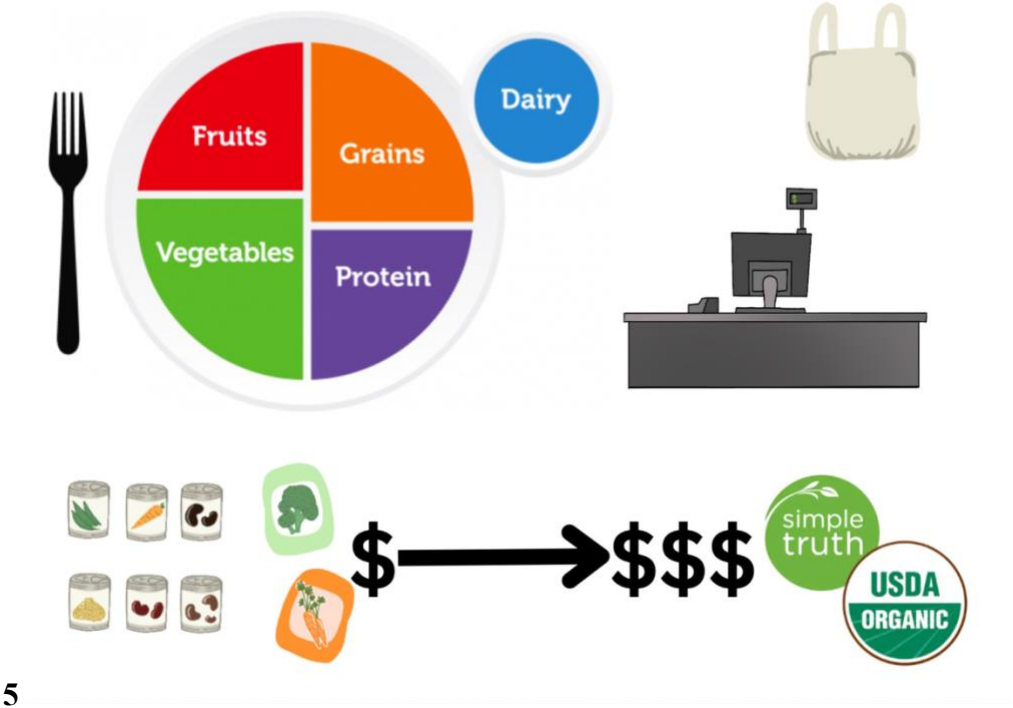
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ORGANIC

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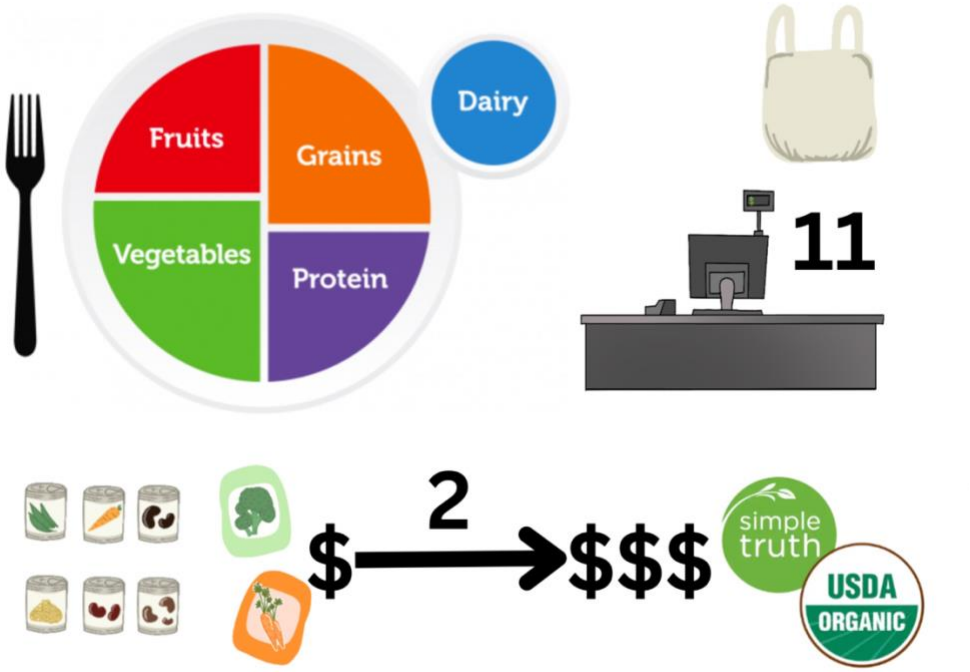

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Notes:

Handout 1: Grocery store map outlining different grocery store sections. Includes fruits and vegetables, grains, dairy products, protein sources, spices, baby formula, frozen and canned goods, and buying in bulk. Sections are also color-coded to align with MyPlate standards set by the USDA.

Handout 2: Same grocery store map as above but has numbers for staff members to use when guiding clients through the store. Directly correlates with script.

Handout 3: Venn diagram depicting what can and cannot be purchased through assistance programs such as WIC and SNAP. Also includes labels for these items, and what the client should look for to purchase.

Handout 4: Same diagram as above but has numbers for staff members to use when guiding clients through the store. Directly correlates with script. Can also be used as a stand-alone reference for WIC and SNAP users.

Handout 5: "Quick Reference Guide" including MyPlate, pricing differences between frozen and canned goods versus fresh, organic, produce, and reminders about bringing reusable grocery bags to decrease costs, and checkout, where they can use WIC and SNAP benefits.

Handout 6: Same guide as above but has numbers for staff members to use when guiding clients through the store. Directly correlates with script.