THE ROLE OF SOCIAL SUPPORT IN A CHRONIC DISEASE PATIENT NAVIGATION PROGRAM AMONG A LATINO/HISPANIC AND SOMALI REFUGEE POPULATION

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Hope Velarde
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The Undersigned Faculty Committee Approves the

Thesis of Hope Velarde:

The Role of Social Support in a Chronic Disease Patient Navigation Program
among a Latino/Hispanic and Somali Refugee Population

[Signatures]

Elva Arrendondo, Chair
Graduate School of Public Health

Gregory Talavera
Graduate School of Public Health

Vanessa Malcarne
Department of Psychology

9/13/13
Approval Date
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DEDICATION

This thesis is dedicated to my parents, who have given me every opportunity to succeed, as well as their unconditional support and constant encouragement.
ABSTRACT OF THE THESIS

The Role of Social Support in a Chronic Disease Patient Navigation Program among a Latino/Hispanic and Somali Refugee Population

by

Hope Velarde

Master of Public Health with a Concentration in Health Promotion and Behavioral Science
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The Latino/Hispanic immigrant and Somali refugee population has grown at a rapid rate in the United States. At first, Latino/Hispanic immigrants and Somali refugees are healthier than their native counterpart, but their health advantages disappear over time and are more likely to suffer worse health outcomes compared to whites. Differences in cultural practices and a history of discriminatory health care in the United States negatively affect immigrant and refugee health. Research has shown that the use of culturally competent patient navigators (PNs) has the potential to improve health outcomes by eliminating barriers to timely health screenings, diagnosis, treatment and providing supportive care to reduce morbidity and mortality related to chronic diseases. This study uses data from Project Concern International’s Family Health Navigator Resource Center (FHNRC) Project. Using PNs, the FHNRC aimed to improve the health outcomes for individuals with cancer, diabetes, obesity and hypertension with specific emphasis on health disparity populations in San Diego County. The study examines whether the PN program resulted in significant changes in participant’s BMI, weekly hours exercised and daily servings of fruit and vegetables consumed following completion of the program. Using the Social Network Framework, the study also examined the influence of social support from patient navigators on participant’s health and health behaviors among a sample of Latino/Hispanic and Somali refugee adults enrolled in the FHNRC program for obesity and/or diabetes (n=60). A McNemar’s test, Wilcoxon Signed Rank Test and a paired sample T-test were used to determine whether baseline and post-intervention differences existed for the variables (1) weekly hours exercised (2) daily servings of fruit and vegetables consumed (3) and BMI. Multiple linear regression models were used to determine whether the social support covariates were significantly associated with the differences found between baseline and post-intervention scores for BMI and daily servings of fruit and vegetable consumed. Lastly, a mixed logistic regression model was used to determine whether social support covariates were associated with the change found from baseline to post-intervention weekly hours exercised. Results demonstrated there was a significant decrease from baseline to post-intervention scores regarding BMI and a significant increase from baseline to post-intervention scores regarding weekly hours exercised and daily servings of fruit and vegetables consumed. Number of encounters was found to only be significantly associated with the change in baseline and post-intervention scores regarding weekly hours exercised. Findings support evidence that culturally competent PNs are associated with improvements
in health behaviors and health outcomes, but further research is needed to understand the roles of social support and the use of PNs to influence positive behavior and health outcome change.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>ix</td>
</tr>
<tr>
<td>1 INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Latino/Hispanic Population</td>
<td>1</td>
</tr>
<tr>
<td>Somali Population</td>
<td>2</td>
</tr>
<tr>
<td>The Impact of Chronic Disease on Health and the Economy in the United States</td>
<td>2</td>
</tr>
<tr>
<td>The Effect of Healthy Behaviors on Chronic Disease Outcomes</td>
<td>3</td>
</tr>
<tr>
<td>Patient Navigator Model</td>
<td>4</td>
</tr>
<tr>
<td>Theoretical Basis</td>
<td>5</td>
</tr>
<tr>
<td>Goals of the Study and Research Question</td>
<td>6</td>
</tr>
<tr>
<td>2 LITERATURE REVIEW</td>
<td>8</td>
</tr>
<tr>
<td>Diabetes and Obesity and Ethnic/Minorities</td>
<td>8</td>
</tr>
<tr>
<td>Racial/Ethnic Disparities in Preventive Health Services</td>
<td>9</td>
</tr>
<tr>
<td>Language and Culture as Barriers to Health</td>
<td>10</td>
</tr>
<tr>
<td>The Role of Patient Navigators in Chronic Disease Interventions</td>
<td>12</td>
</tr>
<tr>
<td>SNF and PNM</td>
<td>18</td>
</tr>
<tr>
<td>Further Investigation of Patient Navigators on Chronic Disease</td>
<td>20</td>
</tr>
<tr>
<td>3 METHODS</td>
<td>21</td>
</tr>
<tr>
<td>Study Design</td>
<td>21</td>
</tr>
<tr>
<td>PN Eligibility and Training</td>
<td>21</td>
</tr>
<tr>
<td>Study Population and Eligibility</td>
<td>23</td>
</tr>
<tr>
<td>Data Collection</td>
<td>25</td>
</tr>
<tr>
<td>Social Support</td>
<td>26</td>
</tr>
<tr>
<td>Dependent Variables: Health Behaviors</td>
<td>27</td>
</tr>
<tr>
<td>Demographics</td>
<td>28</td>
</tr>
</tbody>
</table>
Statistical Analysis .......................................................... 29

4 RESULTS ........................................................................... 31

5 DISCUSSION ...................................................................... 36
  Limitations and Future Directions ........................................ 39
  Conclusion .......................................................................... 42

REFERENCES ....................................................................... 43
LIST OF TABLES

Table 1. Descriptive Variables........................................................................................................32
Table 2. Change in Participant’s Mean BMI Baseline to Post-Intervention.................................33
Table 3. Relative Change in Participant’s Daily Servings of Fruit and Vegetable Consumption Baseline to Post-Intervention .................................................................33
Table 4. Changes in Participant’s Baseline and Post-Intervention Responses to the Question: How Many Hours per Week do You do Some Physical Activity? ..................33
Table 5. Mixed Logistic Regression Model of Participant’s Baseline and Post-Intervention Responses Regarding Weekly Hours Exercising ......................................................35
CHAPTER 1

INTRODUCTION

The immigrant and refugee population has grown at a rapid rate in the United States. At first, Latino/Hispanic immigrants and Somali refugees are healthier than their native counterpart, but their health advantages disappear over time (Antecol & Bedard, 2006; Venters & Gany, 2011). Differences in cultural practices and a history of discriminatory health care in the United States negatively affect immigrant and refugee health (Singh, Rivers, Bae, Bellinger, & Glover, 2010). Also, foreign-born non-citizens (43%) are more likely to have a job that does not offer health coverage than U.S.-born citizens (14%; Buchmuller, Lo Sasso, Lurie, & Dolfin, 2007). Furthermore, compared to Whites, immigrants and refugees are less educated, face language barriers, and have substantially lower incomes, all of which are barriers to a healthy lifestyle (Capps, Fix, Passel, Ost, & Perez, 2006; Jacobs et al., 2002). As the number and diversity of immigrants in the U.S. increases, so to does the need to assess programs that aim to alleviate health disparities by improving health outcomes and healthy behaviors. This study examines the influence of social support from patient navigators on health behaviors and status among Latino/Hispanic adults and Somali refugee adults because of their growing population in the United States (United Nations High Commissioner for Refugees [UNHCR], 2010; United States Census Bureau, 2010).

LATINO/HISPANIC POPULATION

Latino/Hispanics are the fastest growing immigrant population in the United States. According to the U.S. Census 2010, 16% (50.5 million) of the U.S population consists of persons of Latino/Hispanic descent. In 2000, the Latino/Hispanic population was estimated to be 35.3 million. It is projected to exponentially increase by 378% and reach an estimated 132.8 million by 2050 (United States Census Bureau, 2010, 2011). Latino/Hispanics experience excess morbidity in chronic diseases such as obesity, diabetes, and hypertensive-related diseases compared to other racial/ethnic populations in the United States (Kanna,
The projected growth of the Latino/Hispanic population in the U.S. coupled with the disproportionate rate of chronic diseases that impacts this community will dramatically increase the number of cases of chronic diseases in the U.S. (National Alliance for Hispanic Health, 2004).

**SOMALI POPULATION**

Another fast growing population in the United States is Somali refugees (United States Office of Refugee Resettlement, 2004). The political turmoil and community unrest in Somalia has generated one of the highest numbers of refugees in the world (UNHCR, 2013). In 2010, there were 600,484 Somali refugees dispersed throughout countries bordering Somalia and the rest of the world (UNHCR, 2010). In 2004, the United States experienced an influx (more than 13,000) of Somali refugees seeking asylum. The majority of them resettled in Minnesota, Georgia, Washington, D.C. and California (United States Office of Refugee Resettlement, 2004). Currently, Somalia experiences civil war, border disputes, and warlords (Kemp & Rasbridge, 2004). Refugees have witnessed and suffered violence such as torture, rape, and starvation (Jaranson et al., 2004). Dislocation from their country of origin and experiences of human rights violations may contribute to Somalians’ mistrust of government and Western medicine, making it difficult for health professionals to identify and address their health needs (Moret, Baglioni, & Efionayi-Mäder, 2006; Warfa et al., 2006).

**THE IMPACT OF CHRONIC DISEASE ON HEALTH AND THE ECONOMY IN THE UNITED STATES**

Chronic diseases are diseases of long duration and require ongoing medical attention and can limit activities of daily living, thus decreasing one’s quality of life (Barker, 2012). Chronic diseases, such as heart disease, cancer, stroke and diabetes are the leading causes of death in the world (World Health Organization [WHO], 2013). In the United States, diabetes and obesity are among the more prevalent chronic diseases. Approximately 24 million Americans have diabetes and 57 million American adults are at risk for developing type 2 diabetes. Diabetes is also the leading cause for other health complications such as kidney failure, amputations and blindness among adults aged 20-74 (Centers for Disease Control and Prevention [CDC], 2007). In addition, obesity trends in the United States have continued to rise; 1 in every 3 adults is obese (Ogden, Carroll, McDowell, & Flegal, 2007). In 2005, it was
reported that 133 million US adults (1 out of every 2 adults) had at least one chronic disease and 1 out of 4 people with chronic conditions have one or more daily activity limitations decreasing quality of life (Anderson, 2004; CDC, 2012). The prevalence of chronic disease is expected to increase by the year 2030 and affect 171 million people in the United States (Wu & Green, 2000).

Chronic diseases not only pose a problem for the health of individuals, they also place a huge economic burden on our nation. More than 75% of health care expenditures are related to chronic conditions (Anderson, 2004). Furthermore, an estimated $280 billion is contributed to lost productivity by chronic disease (DeVol & Bedroussian, 2007). For immigrants and refugees, the risk for developing chronic diseases increases after arrival to the United States, therefore, contributing to the economic burden of chronic disease (Morrison, Wieland, Cha, Rahman, & Chaudhry, 2012).

**The Effect of Healthy Behaviors on Chronic Disease Outcomes**

Research shows that there are preventive measures that one can take to prevent development of chronic disease (Barker, 2012). Good nutrition can reduce risk for many chronic diseases. Unhealthy dietary practices such as increased fat and sugar intake can contribute to the development of chronic diseases such as diabetes and obesity and should be avoided (Chiuve et al., 2012). Additionally, a balanced nutrition is very important in maintaining a healthy diet and weight (Chiuve et al., 2012). In 2007, only 24% of adults ate the recommended serving of 5 or more servings of fruits and vegetables per day, with Somali refugees consuming less fruits and vegetables as compared to Whites (CDC, 2008; Dharod, Croom, Sady, & Morrell, 2011). The Latino/Hispanic population was found to consume more fruits and vegetables than whites but was still not reaching the recommended serving of 5 or more servings of fruits and vegetables per day, with more acculturated Latino/Hispanics reporting less fruit and vegetable consumption compared to less acculturated Latino/Hispanics (Neuhouser, Thompson, Coronado, & Solomon, 2004).

Daily physical activity is also beneficial to health. Physical activity regulates body weight, reduces risks for cardiovascular disease, type 2 diabetes and metabolic syndrome; improves mental health and mood and the ability to do daily activities (CDC, 2011b).
However, more than one-third of all U.S. adults do not meet the recommendation of 150 minutes of moderate-intensity activity per week, or 75 minutes of vigorous-intensity activity per week, or an equivalent combination of moderate and vigorous intensity physical activity (Carlson et al., 2008). Physical inactivity is most prevalent among ethnic and racial minority groups, particularly among Latino/Hispanics (Marquez, Bustamante, McAuley, & Roberts, 2008). Studies have shown that 37% of Latino/Hispanics are physically inactive compared to non-Hispanic whites where only 22% are physically inactive (Neighbors, Marquez, & Marcus, 2008). Additionally, it has been found that Somali refugees are less likely to participate in physical activity than other Western cultures due to barriers such as traditional Muslim clothing that requires them to be fully covered (Guerin, Diiriyeh, Corrigan, & Guerin, 2003). The social implications of dressing differently can prevent participation in some forms of physical activity (Guerin et al., 2003). In addition, gender-exclusive spaces for exercise are important for the traditional Somali population for activities such as swimming. (Moore, Ali, Graham, & Quan, 2010). The Somali’s traditional Muslim culture mandates that men and women have separate and private spaces for physical activity to allow the women to dress in the appropriate clothing when exercising (i.e. swim suites) as well as to avoid physical contact with the men. Despite the need for gender-exclusive spaces for exercise, few public venues offer such accommodations, thus resulting in a decrease in physical activity (Moore et al., 2010).

Although there are preventive measures against the development of chronic diseases, many Somali refugees and Latino/Hispanic adults do not adhere to the recommended guidelines of a healthy diet and physical activity which can lead to a reduction in the quality of life and increase the risk of developing chronic disease (Dharod et al., 2011; Marquez et al., 2008; Neighbors et al., 2008). It is important to understand programs and interventions that are culturally appropriate that can break barriers to healthy lifestyles and provide education to increase health knowledge within the Latino/Hispanic and Somali refugee population.

**PATIENT NAVIGATOR MODEL**

The Patient Navigator Model (PNM) guides this study’s examination of enrollment in a patient navigator program for chronic disease in explaining changes in BMI and health
behaviors (daily fruit and vegetable consumption and weekly hours spent exercising) at baseline compared to post-intervention. The PNM has the potential to improve health outcomes by eliminating barriers to timely health screenings, diagnosis, treatment and providing supportive care to reduce morbidity and mortality related to chronic diseases (Freeman, Muth, & Kerner, 1995). According to the Harold P. Freeman Patient Navigation Institute (2013), the PNM is best applied between the point of an abnormal health finding to the point of resolution by diagnosis and treatment. Currently, the PNM navigates patients across the entire health care continuum from prevention, detection, diagnosis, treatment and supportive and end-of-life care. An important aspect of the PNM is the use of culturally competent patient navigators (PNs) to build trust and rapport with the target community. PNs usually identify with the target community by sharing similar characteristics such as race/ethnicity or fluency in a particular language. In addition, PNs must be familiar with health topics and diseases and be knowledgeable of the community and the resources available in order to improve patient’s health across the continuum of care (Whop et al., 2012).

**THEORETICAL BASIS**

The Social Network Framework (SNF) (House, 1981) guides this study’s examination of the role of social support provided by PNs in explaining and predicting healthy behavior change among Latino and Somali refugee adults with chronic disease enrolled in a patient navigator program. Social networks serve various social functions: social influence, social control, social undermining, social comparison, companionship and social support (House, 1981). According to House (1981), social support is the useful aspect in the relationship that can be categorized into four general types of supportive behaviors:

1. Emotional support involves the empathy, love, trust and care
2. Instrumental support involves tangible aid and services that directly assist a person in need
3. Informational support which includes advice, suggestions and information that a person can use to address problems
4. Appraisal support which includes constructive feedback and affirmation. Social support is distinguished from intentional negative interactions in that, social support is always intended to be useful (Glanz, Rimer, & Viswanath, 2008).
In addition, social support is the aid and assistance exchanged through meaningful social relationships and interpersonal transactions (Glanz et al., 2008).

**GOALS OF THE STUDY AND RESEARCH QUESTION**

This study seeks to build on previous research demonstrating the effectiveness of improving healthy behaviors using the PNM among Latino and Somali groups. (C. Phillips et al., 2011; Shlay et al., 2011). This study uses Project Concern International’s (PCI) data. PCI is a global non-profit organization that works to prevent disease, improve community health and promote sustainable development worldwide. PCI’s U.S. Border office primarily works with San Diego’s low-income populations consisting of the Hispanic and Somali refugee population to prevent disease and improve quality of life for their participants. Using PCI’s Family Health Navigator Resource Center (FHNRC) data, this study evaluates the changes in healthy behaviors (daily fruit and vegetable consumption and weekly hours spent exercising) and BMI outcome from baseline to post-intervention among a sample of Latino/Hispanic and Somali refugee adults consisting of both men and women. The following questions were assessed:

1. Did a PN program result in significant changes in participants’ BMI following completion of the program?
   
   Hypothesis: Participants’ BMI will decrease following completion of program activities.

2. Did the PN program result in significant changes related to participants’ daily fruit and vegetable consumption following completion of the program?
   
   Hypothesis: Participants will report an increased frequency of daily fruit and vegetable consumption following completion of program activities.

3. Did the PN program result in significant changes in weekly hours exercised following completion of the program?
   
   Hypothesis: Participants will report an increase in weekly hours exercised following completion of program activities.

4. If improvements in BMI from baseline to post-intervention occurred, were PN variables (i.e., satisfaction with PN and number of encounters) predictive of the changes?
   
   Hypothesis: Participants who rate their navigator as pleasant and had more encounters will demonstrate a decrease in BMI compared to the pre BMI average of 32.24.
5. If improvements in daily consumption of fruit and vegetables from baseline to post-intervention occurred, were PN variables (i.e., satisfaction with PN and number of encounters) predictive of the changes?

Hypothesis: Participants who rated their navigator as pleasant and had more encounters will be more likely to demonstrate an increase in daily consumption of fruit and vegetables.

6. If improvements in weekly hours exercised from baseline to post-intervention occurred, were PN variables (i.e., satisfaction with PN and number of encounters) predictive of the changes?

Hypothesis: Participants who rated their navigator as pleasant and had more encounters will be more likely to demonstrate an increase in weekly hours exercised.
CHAPTER 2

LITERATURE REVIEW

There are a number of factors that contribute to health disparities in chronic diseases among marginalized communities. In 2002, the Institute of Medicine (IOM) released the report, *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. The IOM reported factors that may contribute to health disparities like the lack of timely medical care, poor quality of care and cultural incompetence (Smedley, Stith, & Nelson, 2002). Factors such as race/ethnicity, socioeconomic status, education and health insurance status continue to affect the health status among vulnerable groups (Natale-Pereira, Enard, Nevarez, & Jones, 2011). Refugees and immigrants are vulnerable groups and are considered to be at a higher risk for adverse health outcomes such as hypertension, diabetes and obesity compared to whites (Valverde et al., 2010). This chapter will explore factors such as race/ethnicity and culture as they likely contribute to health disparities and review findings of studies that involve patient navigation interventions aimed to improve health behaviors and outcomes among the Latino/Hispanic and Somali refugee population.

**DIABETES AND OBESITY AND ETHNIC/MINORITIES**

Studies have found that ethnic/minorities are more likely to be diagnosed with diabetes compared to whites. In a study that examined differences in diabetes between immigrants and refugees (I & Rs) from Vietnam, Cambodia, Bosnia, and Somalia, Kinzie et al. (2008) found a significantly higher prevalence for diabetes among I & Rs (15.5%), compared to the national prevalence for diabetes (8.3%) and prevalence for whites (6.0%) (CDC, 2011a; Kinzie et al., 2008). A study on Latino/Hispanic adults found similar results; the prevalence for diagnosed diabetes among Latino/Hispanics (10.7%), was significantly higher than the prevalence for white Americans (7.0%) (Beckles, Zhu, & Moonesinghe, 2011). Another study examined prevalence and patterns of total diabetes (undiagnosed and diagnosed) by race/ethnicity. The prevalence for total diabetes among Latino/Hispanics
(15.6%), in 2010, was more than double the prevalence for white Americans (7.6%) (Cowie et al., 2010).

Other studies have explored the relationship between ethnic/minority status and obesity and have found that foreign-born ethnic/minorities are more likely to become obese the longer they live in the U.S. compared to U.S. and foreign-born whites. A study that used data from the NHIS (1990-2004; as cited in Goel, McCarthy, Phillips & Wee, 2004), found that the rate of obesity for white U.S. and foreign-born was significantly lower than in the U.S. born and foreign-born Latino/Hispanic and Black population. In another study using 2006-2008 BRFSS data, it was found that Latino/Hispanics were more likely to be overweight/obese than non-Hispanic whites (CDC, 2008). The prevalence of obesity for Hispanics in all 50 states ranged from 21 – 36.7% compared to non-Hispanic whites whose obesity levels ranged from 9 – 30% (Pan et al., 2009). Similarly, a study conducted in Oslo, Norway demonstrated that the Somali refugee population was more likely to be overweight/obese than Whites (Gele & Mbalilaki, 2013). Results demonstrated that overweight/obesity levels were significantly higher among Somali refugees compared to native Norwegians (Gele & Mbalilaki, 2013). These findings support other studies that demonstrate ethnic/minorities are more likely to suffer worse health outcomes compared to whites (Delva, O’Malley, & Johnston, 2006; Kumanyika & Grier, 2006; Williams, 2006). The Somali refugee and Hispanic population may benefit from culturally significant and appropriate programs that understand ethnic/minority issues and acculturation as it applies to health (Goel et al., 2004; Pan et al., 2009).

**Racial/Ethnic Disparities in Preventive Health Services**

Studies have demonstrated that ethnic/minorities are less likely to use preventative and primary care health services than non-Hispanic Whites (Franks, Fiscella, & Meldrum, 2005; Samuel Pringle, James, Fielding, & Fairfield, 2009). A study conducted by Morrison et al. (2012) assessed racial/ethnic disparities in preventive health services among 810 Somali immigrants and non-Somali patients from various clinics. The comparison group included all patients who did not self identify themselves as Somali. Electronic medical records (EMR) showed preventive health services such as cancer screenings and vaccinations
were not commonly used by Somali patients compared to the non-Somali group (Morrison et al., 2012). Similarly, Latinos/Hispanics are not as likely to access healthcare services than Whites, which might be attributable to a lack of health insurance (Smedley et al., 2002). In a study conducted by Richardson and Norris (2010) Hispanics were less likely to have health insurance and basic knowledge regarding preventive and primary care health services as compared to non-Hispanic Whites. The lack of health insurance, usual source of care and knowledge were associated with lower utilization of health care services among Hispanics (Richardson & Norris, 2010). This suggests a need to improve access to healthcare among Hispanic immigrant population to alleviate the health service disparity.

Additionally, a study conducted by De Jesus and Xiao (2012) examined healthcare service utilization in the U.S. using the Behavioral Model of Health Service Use (BMHSU), a framework that attempts to analyze the factors associated with patient utilization of healthcare services (K. Phillips, Morrison, Andersen, & Aday, 1998). Using data from the 2007 Pew Hispanic Healthcare Survey, De Jesus and Xiao (2012) suggest that Hispanic adults living in the U.S. are more likely to seek health care services in Mexico or other Latin American countries than seek health care services in the U.S. Factors including lack of regular health insurance, perceived lack of quality health care and low English proficiency decrease the likelihood of accessing health services in the U.S. among Hispanic adults (De Jesus & Xiao, 2012). These studies suggest that culturally appropriate PN programs may help address some of the barriers ethnic/racial groups encounter in accessing adequate health care.

**LANGUAGE AND CULTURE AS BARRIERS TO HEALTH**

Several factors contribute to racial/ethnic disparities in healthcare utilization. According to Bell, Branston, Newcombe, and Barton (1999), many Somalis are not accustomed to using clocks and keeping track of time in a formal manner. Dislocation to the U.S. has forced them to start utilizing the foreign concept of time resulting in missed medical appointments (Bell et al., 1999). Also, many Somali refugees lack means of transportation and must rely on friends or family; (Bell et al., 1999). This limits their ability to travel to and from medical appointments also resulting in missed medical appointments (Bell et al., 1999). In addition, only an estimated 5% of Somali refugees are proficient in English and have difficulty communicating and understanding health professionals; this likely deters many
Somalis from seeking care (Carroll, Epstein, Fiscella, Gipson, et al., 2007). A competent and trustworthy translator from a similar background may bridge the communication gap between Somali patients and health care providers and improve the quality of care received (Parve & Kaul, 2011). The use of an interpreter has been found to significantly contribute to the increased rates of preventive services used (Morrison et al., 2012).

Traditional cultural practices and beliefs among the Somali refugee population likely contribute to a lack of healthcare utilization. Pavlish, Noor, and Brandt (2010) examined factors that influenced Somali women’s health experiences through focus groups that consisted of 57 Somali women. Findings suggest mistrust in western medicine and the implications of going to see a doctor create negative feelings and lead to worse health outcomes (Pavlish et al., 2010). In another qualitative study involving 34 resettled Somali refugee women, Carroll, Epstein, Fiscella, Volpe, and colleagues (2007) found that many Somalis believe in traditional healers and healing ceremonies to cure ailments. Additionally, many Somalis believe that praying and reading the Koran will help maintain one’s wellbeing. Home remedies and specific foods to treat or prevent illness is also a common practice (Carroll, Epstein, Fiscella, Volpe, et al., 2007). A 22-year-old woman from the study stated, “The child wake up in the nighttime with stomachache and no one knows what causes it. They give them, you know, herbs, things like garlic, lemon because the stomachache will go away in a while” (Carroll, Epstein, Fiscella, Volpe, et al., 2007, p. 368). The mistrust in western medicine and the strong belief in traditional healers, home remedies and prayer deter the use of appropriate health care services (Carroll, Epstein, Fiscella, Volpe, et al., 2007).

Additionally, there are various characteristics in Hispanic culture that act as a barrier to improved health outcomes. Some Hispanics believe in fatalismo, the belief that their destiny cannot be altered (Hunter, Fernandez, Lacy-Martinez, Dunne-Sosa, & Coe, 2007). This deters them from participating in preventative medicine or from accessing any type of health services because they believe they are going to die regardless of health services (Caballero, 2011; Hunter et al., 2007). Fatalismo can cause non-compliance with recommended treatment plans because of the belief that their fate is already determined (Caballero, 2007b; Schwab, Meyer, & Merrell, 1994). Similar to the Somali refugee population, it has been found that when Latino patients and providers speak the same language, Latinos report improved communication, improved perception of health care
quality and increased willingness to use healthcare services (González, Vega, & Tarraf, 2010).

Research suggests that culture plays a strong role in influencing health practices among the Somali refugee and Latino/Hispanic populations (Bell et al., 1999; Caballero, 2007a). Cultural practices may act as barriers to health and need to be addressed through the use of culturally relevant interventions that are tailored specifically to work with vulnerable and hard to reach populations (Harold P. Freeman Patient Navigation Institute, 2013). PN programs are designed to be culturally tailored to specific populations and break down cultural barriers to improve health outcomes and health access among participants with chronic disease (Harold P. Freeman Patient Navigation Institute, 2013). PN programs have been found to address barriers to health care utilization and access through the use of cultural and linguistically matched PNs who bridge the communication gap between patient and provider. Lastly, PNs address cultural barriers by using culturally relevant health education and strengthening interpersonal relationships to build trust and establish meaningful relationships (Harold P. Freeman Patient Navigation Institute, 2013; Morrison et al., 2012).

**The Role of Patient Navigators in Chronic Disease Interventions**

PNs have been used with a variety of racial and ethnic groups as an approach to minimize or eliminate adverse health outcomes related to chronic disease and cancer due to the use of culturally competent PNs who share similar demographics as their participants (Freeman et al., 1995). PNs work to successfully navigate patients through the health care system (Cohen, Scott, White, & Dignan, 2013). Although PNs have been trained to address a range of health issues including prevention and treatment of AIDS, diabetes, obesity, hypertension, and promotion of physical activity, PNs for cancer care is used more widespread (Whop et al., 2012). The effectiveness of PNs is still being explored due to the few randomized controlled trials (RCT) utilizing PNs. However, studies that compare pre and post-test results have shown that PNs can improve health outcomes and heath behaviors (Dohan & Schrag, 2005).

Dohan and Schrag (2005) conducted a systematic review that examined the impact of various cancer interventions using PN services at all stages of cancer care: prevention,
screening, treatment and survival. The review was unable to find randomized controlled studies and only included studies that compared pre and post-test results and qualitative studies. The review provided some evidence that PN may help address barriers within all stages of cancer care (Dohan & Schrag, 2005). Furthermore, the review distinguished the difference between PNs and community outreach workers, such as lay health advisors (LHA) by stating that community outreach workers’ focus on informing patients about the importance of adherence to a health behavior compared to the PNs who play a more active role in patients’ continuum of care by helping patients address specific barriers to health and healthcare. According to this review, LHAs have been found to increase health knowledge regarding topics such as importance of early cancer screening. PNs were associated with improved rates of screening and follow-up, lower clinical stage of presentation and higher patient satisfaction (Dohan & Schrag, 2005). This suggests that although LHAs increase knowledge, PNs are more useful in helping change behavior due to the PNs active involvement in participant’s continuum of care combined with the PNs focus on identifying barriers and adopting strategies to eliminate or reduce barriers (Dohan & Schrag, 2005).

In a more recent systematic review of cancer PN interventions, Wells et al. (2008) examined data on efficacy of navigation in improving timeliness and delivery of screening, diagnosis and treatment among cancer patients. Sixteen studies measured the efficacy of a patient navigation intervention using RCT. The sixteen studies randomly assigned participants to either a PN program or a control group. Fifteen out of the sixteen RCT studies demonstrated results that indicated improvements in adherence to follow-up after an abnormal screening and in timeliness of receiving care from an abnormal screening among patients screened for breast, cervical, prostate and colorectal cancer. However, results from one of the RCT studies demonstrated that there was no improvement on patient’s timeliness to care (Wells et al., 2008). In addition, 3 studies paired PN with counseling making it difficult to distinguish whether improvements were due to the PN or counsel (Wells et al., 2008). Overall the review was able to provide evidence for the effectiveness of PN programs to timeliness of cancer care however, additional research must be performed.

There were several limitations that merit caution in making conclusions about the effectiveness of PNs noted by the researchers. One review did not include RCT studies and was not able to successfully conclude the effectiveness of PNs, however the review provided
preliminary evidence that PNs can improve health behaviors and outcomes. The follow-up review of the PN programs found evidence of its effectiveness, however one study out of 16 failed to show significant results yielding mixed support for the use of PNs in future studies (Dohan & Schrag, 2005; Wells et al., 2008). Other reviews of PNs reported similar mixed results and suggest that randomized controlled groups must be applied consistently to appropriately assess the effectiveness of the PNM (Manderson, McMurray, Piraino, & Stolee, 2012; Robinson-White, Conroy, Slavish, & Rosenzweig, 2010). Although there is a growing body of literature that has documented success of PNs, the evidence is still viewed as mixed due to the lack of utilization of control groups (Han, Lee, Kim, & Kim, 2009; C. Phillips et al., 2011).

Although some studies using PN have failed to demonstrate significant improvements in timeliness and access to care among their participants, some PN programs have successfully demonstrated their positive impact on health and health behaviors. The project Community Health Advisors in Action Program (CHAAP) sought to help breast cancer patients from 23 Alabama counties overcome diagnostic and treatment barriers. CHAAP utilized volunteers from the community and trained them as PNs to help low-income, underserved women (majority African American) by assisting access to care to increase adherence to treatment and follow-up appointments (Fouad, Wynn, Martin, & Partridge, 2010). According to Fouad et al. (2010), PNs’ main responsibilities were to identify health care resources in the community, connect patients with healthcare providers for follow-up appointments and treatment, guide patients through the healthcare system by scheduling appointments, explaining diagnostic and/or treatment plans and obtain and review benefits if eligible. The majority of the 24 PNs involved in the study were African American women (96%) one was male (4%). PNs were volunteers from the community and were required to accept at least a one-year commitment to the study, attend 8-2-hour weekly training sessions, and maintain contact with their appointed patients. Volunteer county coordinators from the community enrolled eligible participants and were matched with the appropriate PN. Results of the study concluded that PNs were able to successfully help patients keep follow-up appointments, with an adherence rate of 93% and with 75% of the counties yielding an adherence rate >95% (Fouad et al., 2010). The results suggest that programs using trained
and culturally competent PNs to address health barriers and access can be successful in having participants adhere to care (Fouad et al., 2010).

In a patient navigation program, C. Phillips et al. (2011) applied a study design and utilized a PN intervention group and a control group to test the efficacy of PNs to reduce breast cancer disparities. The study consisted of low-income women aged 51-70 comprised of Whites, African-Americans, Hispanics and other (other classified as those who do not identify with White, African-American and/or Hispanics). The study utilized 5 PNs. Local and national navigation training programs were completed by 3 PNs in the program. The additional 2 PNs completed only local navigation training programs, were bilingual and were matched to participants based on a common language spoken. Main responsibilities for the PNs were to address barriers to care and track completion of mammograms. A total of 3,895 women were randomized into either an intervention group (n=1,817) or a control group (n=2,078). Baseline measurements demonstrated that adherence rates for mammography screenings were the same for the intervention and control groups. At 9 month follow-up, the adherence rate for those in the intervention group (87%) was significantly (p<0.05) higher compared to those in the control group (76%). High adherence rates in the intervention were true for all race/ethnicities except for the Hispanic group that showed high adherence rates among the intervention group and the control group (85% and 83%). The results are consistent with findings from other PN interventions showing improvements of mammography-screening rates among low-income minority women (Dignan et al., 2005; Han et al., 2009; Paskett et al., 2006; C. Phillips et al., 2011).

The use of PNs has demonstrated a reduction in cancer mortality and is presently being applied to reduce mortality in other chronic diseases (Esperat et al., 2012; Wells et al., 2008). The program “Transformacion Para Salud” (TPS) aimed to improve chronic disease self-management among vulnerable populations in Texas. TPS used trained PNs to assist behavior change among 152 people with chronic diseases health measures were compared from pre and post-tests; no control group was used. The Transformation for Health Framework (TFH) was used to guide the study. TFH is a framework that conceptualizes a process where people overcome circumstances that create the feeling of defeat of the human spirit (Esperat et al., 2008). The initial phase of the TFH consists of the “cognition phase”, which allows for the individual to develop a critical understanding of their health condition.
and the potential affects on their life. Social networks and relationships can facilitate the “cognition phase” such as PNs to help the individual comprehend their current state of health through interactions and relationships formed. The individual’s critical consciousness and awareness of their state of health are formed in the previous phase and motivate the “intention phase.” In this phase, the individual will start the process to develop changes in health behaviors. In the “decision phase,” the individual starts to make a change and works to maintain the change. Lastly, the “transformation phase” allows the individual to self evaluate the changes made to improve their health (Esperat et al., 2012).

Using the TPS framework, patients with diabetes, hypertension, asthma, co-morbidities of obesity, and depression were referred to the 2-year program. In the program, PNs received 160 hours of basic training as well as a six-week training in chronic disease management and the application of the TFH to assist behavior change. The majority of the patients in the TPS program consisted of Latino/Hispanics and were diagnosed with chronic diseases such as diabetes, hypertension, asthma, co-morbidities of obesity and depression. The PNs were used to help navigate the patients with their health needs through monthly home visitations using motivational interviewing. The PN helped patients develop weekly goals to manage their chronic disease as well as self-management plans and care for their condition. Results were obtained at the 12 month follow up; the program demonstrated a significant decrease in blood pressure, average HbA1c scores, total cholesterol, LDL and HDL. Self efficacy, diet and exercise all improved (p<.05). Results of this program show the ability of PNs to reduce chronic disease mortality (Esperat et al., 2012; Robinson-White et al., 2010).

In another study that also used PNs to reduce mortality in chronic diseases, Shlay et al. (2011) conducted a study to examine the influence of a PN intervention reducing participants’ risk for cardiovascular heart disease (CHD) compared to those in a control group. The study consisted of low-income participants, majority of whom were Hispanic (66%); the risk for CHD was assessed using the Framingham risk score (FRS). The FRS estimates 10-year risk for CHD outcomes in people who do not have heart disease. All participants had a Framingham risk score (FRS) greater or equal to 10% at baseline. At the 12-month follow-up group, the intervention group (n=340) that used patient navigation had a significantly lower mean FRS score than those in the control group (n=340) that received no
patient navigation (mean FRS = 15% vs. 16%). Total cholesterol was also significantly lower compared to the control group (mean total cholesterol, 183 mg/dL vs. 197 mg/dl) (Shlay et al., 2011).

In addition to the benefits PN programs have on health, PN programs have the ability to be cost-effective among low-income populations seeking cancer care in the U.S (Donaldson et al., 2012). Donaldson and colleagues (2012) conducted a one-year study that compared the cost-effectiveness of 3 colorectal and breast cancer PN programs in a community hospital setting compared with standard cancer care. Data regarding standard cancer care included published estimates in the literature and primary costs. Results demonstrated that, a cancer PN program would allow an additional 78 to 959 patients with an abnormal breast cancer screening and an additional 21 to 411 individuals with abnormal colonoscopies to reach timely diagnostic resolution. The cost-effectiveness ranged from $511 to $2080 per breast cancer diagnostic resolution completed and from $1192 to $9708 per colorectal cancer diagnostic resolution completed. In addition, it was found that if a PN program were successful in preventing ≥ 3 cancer deaths per year, establishing a PN program would be cost effective addition to standard cancer care. The study showed that PN programs in community hospital settings can result in timely cancer care and has the ability to produce health and economic benefits.

Although reviews of the PNM have not always yielded changes in behavioral outcomes or health status, most studies have demonstrated preliminary evidence of the positive impact PNs have on improved timeliness to care, increase in cancer screenings and improved health outcomes such as decreased blood pressure and cholesterol. According to Freeman (Harold P. Freeman Patient Navigation Institute, 2013), the pioneer for this model, the PNM is a cultural approach for targeting ethnic/minorities due to the use of culturally competent PNs. Overall, there is evidence to suggest that the PNM is a useful and cost-effective method for reaching vulnerable populations, such as ethnic/minority groups who lack the understanding of healthcare and do not benefit from conventional health promotion methods (Harold P. Freeman Patient Navigation Institute, 2013).
SNF AND PNM

The SNF will be used to assess whether behavior change among PN interventions can be attributed to factors associated with social support. According to House (1981), the SNF is comprised of various social functions: social influence, social control, social undermining, social comparison, companionship and social support. Social support is the aid and assistance exchanged through meaningful social relationships and interpersonal transactions and can be categorized into four types of supportive behaviors: (1) emotional support involves the empathy, love, trust and care, (2) instrumental support involves tangible aid and services such as labor, money and time that directly assist a person in need, (3) informational support includes advice, suggestions and information that a person can use to address problems, and (4) appraisal support includes constructive feedback and affirmation (Glanz et al., 2008; House, 1981). PNs have been identified as a source of social support because they provide comfort by “being there” for participants throughout the continuum of care (Carroll et al., 2010).

The social support PNs provide serve as the foundation for successful PN programs. A qualitative study conducted by Nguyen, Tran, Kagawa-Singer, and Foo (2011) aimed to discover what important interpersonal factors a breast health navigation program should address. This qualitative study involved focus groups with 110 Southeast Asian women recruited from a study called, Promoting Access to Health for Pacific Islander and Southeast Asian Women (PATH for women). PATH utilized PNs to address participants’ barriers to breast cancer care throughout Southern California. Results of the focus group indicated that the women valued the interpersonal relationship with their PN. One woman stated, “In my country, I never know what a Pap smear or mammogram is…however a navigator help me understand” (Nguyen et al., 2011, p. 89). Participants also emphasized the emotional support PNs provided; the PNs provided support and confidence to participate in their own healthcare. During a focus group session, one woman shared, “I was so happy to learn that the health navigator always keep my confidentiality. I fully trust her and feel very comfortable to tell her all my problems with no doubt” (Nguyen et al., 2011, p. 89). PNs were also interviewed to gain their perspective on interpersonal factors that work best in a breast cancer navigation program. In accordance with the results of the participant focus groups, the PNs noted that the strong foundation of PN programs lies within the social
support and interpersonal relationships established between participants and PNs (Nguyen et al., 2011).

The success of culturally significant and appropriate PN programs are attributed to social support and established meaningful relationships between the PN and participant (Nguyen, Tanjasiri, Kagawa-Singer, Tran, & Foo, 2008). An exploratory study analyzed the role of social support and the effect of a PN program aimed to reduce breast and cervical cancer among Cambodian and Laotians participants (Nguyen et al., 2008). It was found that the basis of the PNs relationship with the participants consisted of the four categories of social support outlined by House (1981). PNs provided informational support through culturally appropriate and educational health posters promoting breast and cervical cancer screenings. In addition, one-on-one, multiple home visits for educational sessions regarding the importance of early cancer screenings and detection were utilized. PNs provided instrumental support by aiding participants in scheduling appointments, providing transportation, interpretation, and explanation of procedures, medical paperwork and applications for free/low-cost screening exams. Affective / emotional support was provided through the understanding and use of culturally appropriate customs. Understanding the culture includes respect, trust and positive environments that strengthen the relationship between the PN and participant. Lastly, appraisal support was provided through follow-up phone calls used to explain test results and need for re-screening. The findings from the exploratory study suggest that social support interventions effect change in health behavior or health status (Nguyen et al., 2008). Strengthening interpersonal relationships may provide the key emotional connection necessary for effective health promotion programs (Nguyen et al., 2008).

Although social support and interpersonal relationships are the core of successful PN programs, limited studies have explored the application of the SNF while using PN programs (Nguyen et al., 2008). As previously mentioned, many studies have shown health behavior changes from programs involving PNs. The use of the PNM is becoming a more common practice in public health due to the culturally appropriate social support PNs provide to the ethnic/minority populations they serve (Jean-Pierre et al., 2011). It is important to understand the PNM and how their role in public health can significantly change health behaviors and outcomes through established meaningful relationships.
FURTHER INVESTIGATION OF PATIENT NAVIGATORS ON CHRONIC DISEASE

In the proposed study, PCI used the patient navigation model to help reduce health disparities among the Hispanic and Somali refugee population. The study will add to the body of literature regarding the use of PNs and their influence in health behaviors and outcomes among the Latino/Hispanic and Somali refugee population. In addition, the study will also explore the use of the SNF and PNM on the Hispanic and Somali refugee population and add to the limited research regarding the application of health promotion theory to PNM for these particular groups.

Furthermore, as a nation, Healthy People 2020 has made it a goal to “attain high-quality, longer lives free of preventable disease, disability, injury and premature death” (United States Department of Health and Human Services, 2010). As well as to “achieve health equity, eliminate disparities, and improve the health of all groups” (United States Department of Health and Human Services, 2010). Various organizations fail to collect precise data regarding ethnicity creating an information gap on immigrant health disparities. It is important to explore programs that work to improve immigrant health status to determine what methods are appropriate and efficient. This study will examine the role of PNs in a PN program in changing BMI and health behaviors among Somali refugee and Hispanic populations based on the SEM of health promotion as it applies to the study. Health behaviors and BMI will be analyzed to determine whether enrollment in a PN intervention causes a significant change in health behaviors at baseline to post-intervention. Social support provided by the PNs will be examined to determine whether the interpersonal relationship influences change in the health behaviors baseline and post-intervention.
CHAPTER 3

METHODS

STUDY DESIGN

This thesis is a prospective study using data from Project Concern International’s (PCI) Family Health Navigator Resource Center (FHNRC) Project funded by Health Resources and Services Administration (HRSA). The FHNRC program was implemented between September 2010 and August 2012. The FHNRC aimed to improve the health outcomes for individuals with cancer, diabetes, obesity and hypertension with specific emphasis on health disparity populations in selected US/Mexico border communities of San Diego County. PCI designed the project in close collaboration with key hospitals, clinics and social service providers in the region that provided services to underserved communities. The purpose of the FHNRC project was consistent with the legislative purpose of the Patient Navigator Outreach and Chronic Disease Prevention Act of 2005, Section 340A of the Public Health Service Act (42 U.S.C. 256a), as amended by the Patient Protection and Affordable Care Act (P.L. 111-148, Sec 3510) of 2010 (Govtrack, n.d.). The FHNRC was a local initiative that aimed to reduce the burden of chronic disease and barriers to accessing quality health care services by: (1) increasing utilization of quality chronic disease services by the target population; (2) improving knowledge, attitudes, behaviors (KAB) among target population in chronic disease prevention/access; (3) improving communication and collaboration on chronic disease issues among local health care providers; and (4) improving cultural competency of health care providers serving the Somali refugee and Hispanic communities.

PN ELIGIBILITY AND TRAINING

The PNs used in the study were required to be health-literate and culturally-competent, meeting the principal competencies defined as: a respected source of information among people in their targeted communities, able to interpret the medical culture to those who are unfamiliar with it, sensitive and compassionate about the concerns and potential
qualms of patients, knowledgeable about the County’s health care system, proficient at communicating with health care providers and institution, and speak the same language and have a similar cultural background as target populations. PNs were also required to have reliable transportation, ability to use Microsoft Office and have availability for some weekend and evening assignments. PNs were recruited through job postings and interviews were held at PCI’s National City office. PNs were chosen based on their qualifications and eligibility to perform the role of a PN. The PNs consisted of 3 adult women, one Filipino, one Somali and one Latino woman and were ethnically matched to navigate the three populations enrolled in the FHNRC.

All PNs received training in all chronic diseases to ensure their ability to respond to interrelated aspects of chronic disease. PNs were trained in all relevant functions of the project e.g. level of care assessment, referral procedures, case management, care group model and health education/training. Specifically, all PNs were required to attend a 40-hour training to prepare the PNs to work with clients and understand and address health issues related to chronic disease. The 40-hour training occurred over the course of 7 days and was given by the following partners:

1. San Diego Health and Human Services
2. Operation Samahan
3. Network for a Healthy California
4. American Cancer Association (ACA)
5. American Diabetes Association (ADA)
6. United Women of East Africa (UWEAST)
7. International Rescue Committee (IRC)
8. UCSD Health Systems
9. Scripps oncology
10. UCSD Moore’s Cancer Center

The trainings covered the following topics:

1. Orientation to PCI and the program FHNRC
2. The role of a navigator
3. Case management
4. HIPPA
In addition, PNs received cultural competency training to improve skills to more effectively provide care to diverse populations. PNs were required to take a pre/post exam regarding the 40-hour training and were required to receive a passing score of 90% or higher. At the end of the training, PNs received a certificate to signify their completion of the training. Lastly, PNs were required to attend the Colorado Patient Navigator Training, a 4-day training that taught the PNs basic patient navigation skills, health promotion, professional conduct, care coordination, motivational interviewing/coaching/behavior change and physical aspects of disease.

**STUDY POPULATION AND ELIGIBILITY**

PCI conducted a needs assessment to establish the populations present in San Diego County who experience excess morbidity due to chronic diseases and are less likely to seek access to care. Based on San Diego County (2011) data, the three population groups with the least access to care and increase morbidity were the: Latinos in the Central, South and East Regions of the County; Asian American/Native Hawaiian Pacific Islanders (AA/NHPI) in the South Region and Somali Refugees in the Central Region. In addition, the chronic diseases for the FHNRC were determined using San Diego County (2011) data. It was found that the poorest health outcomes defined as leading causes of morbidity and mortality were due to obesity, heart disease and stroke, diabetes and cancer. The needs assessment focused data collection on these target populations, target locations and target chronic diseases. Trained PCI staff as well as outreach volunteers collected the data with the use of surveys administered through random door to door sampling, grocery stores and Laundromats. Data collected from the needs assessment include basic demographics such as age, primary language spoken, race, income and education. Health status and access data included having
a medical home, health insurance, number of emergency room visits and prevalence of delayed care. Lastly, health outcomes and health behavior data included BMI, smoking frequencies, fruit and vegetable consumption, physical activity, sugary beverage intake and prevalence of blood pressure, diabetes and cancer screenings. In accordance with the findings of the needs assessment, the FHNRC program consisted of those with or at high risk for chronic diseases (i.e. obesity, heart disease, stroke, diabetes and cancer) and their families, from areas of San Diego that represent the poorest health outcomes and highest levels of poverty in the County: Latinos in the Central, South and East Regions of the County; Asian American/Native Hawaiian Pacific Islanders (AA/NHPI) in the South Region and Somali Refugees in the Central Region. Program participants were recruited via convenience sampling; some participants were retained from the needs assessment performed before the study. Each PN had a volunteer to help recruit participants, the volunteer was paid a stipend for their service. PNs and volunteers recruited participants through door-to-door sampling, word of mouth, Laundromats, grocery stores, ethnic grocery stores, Mosque and apartment complexes as well as referrals from partners. Key Partners included Operation Samahan Clinic, California Border Healthy Start Project, United Women East African Support Team and the International Rescue Committee. FHNs and volunteers informed potential participants about the FHNRC program, the benefits of participating in the program and the home visitations that would occur. There was no incentive for joining the program.

Eligibility was assessed using the Family Health Navigator Eligibility form, created by HRSA and PCI. The FHNRC required that participants be 18 years or older and be at or below 200% poverty. Participants had to live in one of the indicated zip codes listed and have at least one health issue specified below. Eligibility according to racial/ethnic group varied within each specific population. Eligibility for the Latino population included: (1) residence within the indicated zip codes 92102-92105, 92113 – 92116, 92139, 91945, 91950 and 91977, (2) eligible health issues were collected via self-report or referrals from partner clinics, these included obesity (BMI > 25), and diabetes (gestational now, pre-diabetes, type 1, type 2, at risk/family history – parents, grandparents, siblings and gestational past). For men and women of the Somali population, eligibility included: (1) residence within zip codes 92105, 92114, 92115 and 92139, (2) health issues such as hypertension, obesity (BMI >25), cancer (women age 21+: has not had a pap smear in past 3 years or ever, women age 42+:
has not had a mammogram in past 2 years or ever, man age 50+: has never discussed having a PSA test or digital rectal exam with a health care provider for prostate cancer, man or woman ages 50+: has not had a colorectal cancer screening – stool or fecal blood test, sigmoidoscopy or colonoscopy – tests that examine the bowel by inserting a tube in the rectum, abnormal findings and/or a cancer diagnosis) and diabetes (gestational now, pre-diabetes, type 1, type 2, at risk/family history – parents, grandparents, siblings and gestational past). For this analysis, only Latino and Somali men and women with diabetes and/or those that had a BMI >25 were included. The Filipino participants of the FHNRC study were enrolled for cancer treatment or prevention and were therefore excluded from this current study because health outcomes and measures differed from that of obesity and diabetes. Cancer outcomes and measures included date of last cancer screenings and adherence to medication while obesity and diabetes outcomes and measures focused more on BMI and health behaviors such as diet and exercise making cancer incomparable to obesity and diabetes. The Somali refugee and Latino/Hispanic population were clustered together based on their diagnosis of obesity or diabetes. Obesity and diabetes share similar causes and health risk factors and are considered to be interrelated diseases (Maric-Balikan, 2013). In addition, the sample sizes of the Somali refugee and Latino/Hispanic population were too small to be analyzed separately. Combining the groups allowed for an adequate sample size to complete analysis.

**DATA COLLECTION**

The PNs distributed and collected baseline and one month follow-up surveys. Completion of the surveys lasted on average 25 minutes. Participants were not compensated for completing the assessments. PNs followed-up with participants once a month. The first encounter and the last encounter were considered to be the pre and post scores for the surveys. If the participant was unable to complete the survey by him/herself, a staff member was responsible for reading the survey to the participant and/or helped record responses. Participant surveys contained no names or identifying information. A coded-identifier was assigned to each participant and was printed on each survey. The electronic master list matching client names to coded-identifiers was kept confidential and password protected. The PNs entered the survey responses into the database. Validity and reliability checks were
used, such as double entry of a randomly selected subset of surveys. Data collection tools used for evaluation activities (e.g., demographic data forms, referral tracking form and various progress tracking forms) were developed by HRSA and by PCI’s Monitoring and Evaluation Coordinator. The survey questions pertained to demographics, program feedback, health and health behaviors. The Spanish and Somali forms were initially translated from English to the target language using native speakers. The translated forms were pilot tested on two additional native speakers to ensure accuracy and clarity. The present study examines the extent to which participation in the program was associated with changes in health behaviors among the Somali refugee and Hispanic participants. The specific variables analyzed are described below.

**SOCIAL SUPPORT**

The SNF is comprised as various social functions: social influence, social control, social undermining, social comparison, companionship and social support. Social support is intended to facilitate individual behavior change and aid the individual in overcoming barriers by affecting social and cultural norms and strengthening interpersonal relationships (Glanz et al., 2008). Social support provided by the PNs to the participants was measured using the Navigator Encounter Form (NEF) and the Client Feedback Form (CFF), both created by PCI’s Monitoring and Evaluation Coordinator. The NEF is a nine item form that collects data regarding the method of encounter, topics discussed, tasks, barriers, navigated conditions, updates to coverage (i.e. no coverage or access to Medicare, Medicaid, private insurance, reduced-fee/sliding scale etc.), cancer related conditions, healthcare coverage and the total number of times the PN encountered the participant. Affective/emotional support was measured by the total encounters each PN had with a participant, which on average lasted approximately 1 hour. The number of encounters demonstrated the PN remained in good contact with the participant providing emotional support to the participant. Encounters were recoded into a dichotomous variable due to the distribution of the data. The distribution of the encounters variable consisted of a bimodal distribution therefore a median split was performed to collapse the continuous variable into two categories (Zikmund & Babin, 2007). Encounters were recoded, if encounters were <10, then 0, if encounters were ≥10, then 1. Encounters are defined as either face-to-face visitations or phone calls. Additionally, the CFF
rated affective/emotional support between the PN and themselves (good, fair and poor) with the following question: (1) how the navigator made the visits comfortable and pleasant. There were no “poor” responses, all responses consisted of either “fair” or “poor” therefore responses were recoded as 0=fair and 1=good.

**DEPENDENT VARIABLES: HEALTH BEHAVIORS**

Health behaviors and health outcomes among participants with diabetes and obesity were assessed using the Health Assessment Form created by HRSA and PCI’s MEC. The nationally accepted clinical outcome measures of Healthy People (United States Department of Health and Human Services, 2010) were used to measure clinical outcomes for diabetes and obesity. Clinical outcomes were assessed at baseline by self-report through structured surveys, which were administered upon participants’ entry into the program and once every month month to track the participant’s health progress. For the purpose of this thesis, only baseline and one month post-intervention surveys will be used.

Baseline and post-interventions measurements included health behaviors: (1) diet- the daily servings of fruits and vegetables consumed (2) exercise- hours spent exercising per week (3) and BMI. The health assessment measures were collected via self-report from participants. The questions below were used to assess whether change in health behaviors occurred from baseline to post-intervention. The following health assessment questions were asked in an open-ended format: (1) “What is your height and what is your weight?” BMI was calculated once height and weight were determined. (2) “How many servings of fruits and vegetables do you eat each day?” The additional health assessment question contained open-ended continuous responses but was recoded into a dichotomous variable: (1) “How many days per week do you do some physical activity or exercise in your spare time? And, on days when you do exercise in your spare time, how many minutes does it last?” This was recoded into meeting or not meeting the recommended 150 minutes of exercise per week (CDC, 2011b). More specifically, those who reported not meeting the 150 minutes of exercise per week were categorized as 0 and those meeting the guidelines as 1.

An examination of the behavior change would be examined if improvements in daily consumption of fruit and vegetables and BMI from baseline to post-intervention occurred. New variables would represent the behavior change between baseline and post-intervention
scores. The variables (1) change in F & V and (2) change in BMI would be generated by calculating the difference in baseline and post-intervention scores for each participant regarding BMI and daily fruit and vegetable consumption.

**DEMOGRAPHICS**

Demographics were assessed using the Patient Intake Form, created specifically by HRSA and the PCI team. Gender was measured categorically (1) male, (2) female, and (3) transgender. Birth date was collected in an open-ended format. Education was measured categorically, participants were asked to report the highest grade or year at school completed:

1. No formal education
2. Primary education only
3. Some HS/secondary education
4. HS Diploma/GED/other secondary education
5. Some college/vocational school/other post-secondary education
6. Completed college, post-secondary or vocational school
7. Post-college/graduate school

Ethnicity was measured as either Hispanic or Latino, or non-Hispanic. Race was measured categorically:

1. White
2. Black/African American
3. Asian
4. Native Hawaiian/Pacific Islander
5. American Indian/Alaska Native

Primary/preferred language was asked, only one answer permitted:

1. English
2. Spanish
3. Filipino – Tagalog, Ilocano, Visayan, other
4. Mixteco
5. Somali
6. Other

Household variables such as zip code and household size were collected via fill-in-the-blank. Income was reported categorically:
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Healthcare utilization was assessed by asking the number of hospital stays and number of Emergency Room (ER) visits within the past year; participants respond categorically: (1) none, (2) one stay, or (3) more than 1 stay. Participants were asked to check all that apply for healthcare coverage:

1. No coverage
2. Medicare
3. Medicaid (Medi-Cal in CA)
4. IHS – Indian Health Service
5. Private insurance
6. Other government plan
7. Single service/plan
8. Reduced-fee/sliding scale
9. Free care
10. Other

Health conditions were also collected. Type of diabetes consisted of (1) diabetes, at risk/family history, (2) diabetes, pre-diabetes, (3) diabetes, diagnosed, or (4) gestational diabetes. Hypertension was collected as either (1) hypertension, positive screen or (2) hypertension, diagnosed. Obesity was measured based on the participant’s BMI which was calculated based on their height and weight, participants were categorized as either obese or not. Cancer was measured via the type of cancer as well as whether the participant was either due/overdue for a cancer screening, had an abnormal finding or if diagnosed with cancer what stage, 0, 1, 2, 3 or 4.

**Statistical Analysis**

For the purpose of this study, the Somali refugee and Latino population were combined because each sample size was too small to examine separately. Due to the
eligibility criteria of the FHNRC study, both samples shared homogenous characteristics in their weight, health behaviors and diagnosis of diabetes. Obesity and diabetes share similar causes and health risk factors and are considered to be interrelated diseases (Maric-Balikan, 2013). Descriptive statistics were determined to provide an overall picture of the total sample. Frequencies and percentages on demographics such as age, sex, income and education were assessed.

All statistical analysis was performed using SPSS version 19 software 2010. Outliers were identified and excluded. BMI scores from three participants were excluded outliers whose reported BMI scores were more than two standard deviations from the mean. Data were assessed for normality using the Kolmogorov-Smirnov and Shapiro-Wilk normality tests (Laerd Statistics, 2013). The only variable that was skewed was daily fruit and vegetable consumption (p-value<0.05). Hence, a nonparametric Wilcoxon Signed Rank Test was used to examine differences between baseline and post scores for this particular variable (Laerd Statistics, 2013). BMI was continuous and normal, so a paired sample T-test was used to test whether there was a significant difference between baseline and post BMI scores. Lastly, the McNemar’s test examined baseline and post-intervention differences between two categorical variables (e.g., weekly hours spent exercising).

Two multiple linear regression models were used to determine whether or not the independent social support variables were significantly associated with the differences found between baseline and post-intervention scores for the dependent continuous variables (1) BMI and (2) daily fruit and vegetable consumption. To account for repeated measures on each subject with dichotomous responses, a mixed logistic regression model was used to determine if the social support covariates were associated with the change found from baseline to post-intervention weekly exercise hours. (Institute for Digital Research and Education, 2013). Slight variance in the implementation of the intervention may have occurred due to the two different populations enrolled and matched with their unique PN based on race/ethnicity. To control for this variance, all regression models were analyzed using hierarchical multiple regressions and controlled for race to determine whether a true relationship occurred between social support and changes in health behaviors and BMI. Alpha levels were set at 0.05 for all significance tests.
CHAPTER 4

RESULTS

The FHNRC program initially enrolled 50 Somali participants and 37 Latino participants. However, only 31 Somali participants (51.66%) and 29 Latino participants (48.33%) completed both a pre and post health assessment for diabetes or obesity. The total sample size consisted of 60 Somali and Latino men and women. Participants’ age ranged from 21 to 84 years of age, with a mean age of 53.63 years (SD=16.02). The majority of the participants were female (90%), preferred to speak a language other than English (98%), had an annual income between $10,000-$19,000 (43.33%), received no formal education (40%), have visited the ER in the past year more than once (48.33%), and reported having a household size of 1-3 people (65%). Table 1 lists the demographic characteristics.

Research Question 1: Did the PN program result in significant changes related to participants’ BMI? (see Table 2).

The hypothesis, that participants will report a decrease in average BMI outcomes following completion of the program was supported by the results. Table 2 shows the results of the paired sample t-test comparing participants’ average BMI scores from baseline scores to post-intervention. There was a significant decrease in BMI from baseline (t(56)=2.4, p <0.05).

Research Question 2: Did the PN program result in significant changes related to participants’ daily fruit and vegetable consumption? (see Table 3).

The hypothesis, that participants will report an increase in daily fruit and vegetable consumption following completion of the program was supported by the results. Table 3 shows the results of the nonparametric Wilcoxon Signed Rank Test comparing the differences between baseline and post scores for daily fruit and vegetable consumption. There was a significant increase from baseline to post-intervention in daily servings of fruit and vegetable consumption (Z= -5.7, p-value <0.05).
Table 1. Descriptive Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>90</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td><strong>Preferred Language</strong></td>
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<td></td>
</tr>
<tr>
<td>Somali</td>
<td>31</td>
<td>51.7</td>
</tr>
<tr>
<td>Spanish</td>
<td>28</td>
<td>46.7</td>
</tr>
<tr>
<td>English</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10,000-$19,000</td>
<td>26</td>
<td>43.3</td>
</tr>
<tr>
<td>$20,000-$29,000</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>$30,000-$39,000</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>&lt;$10,000</td>
<td>24</td>
<td>40</td>
</tr>
<tr>
<td><strong>Education</strong></td>
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<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>24</td>
<td>40</td>
</tr>
<tr>
<td>Primary education</td>
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<td>21.7</td>
</tr>
<tr>
<td>HS diploma, GED or other secondary education</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>Some HS or secondary education</td>
<td>13</td>
<td>21.7</td>
</tr>
<tr>
<td>Completed college, post-secondary or vocational school</td>
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<td>1.7</td>
</tr>
<tr>
<td>Some college or other post secondary education (vocational school)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Post college or graduate school education</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Utilization of Emergency Room</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than one</td>
<td>29</td>
<td>48.3</td>
</tr>
<tr>
<td>One</td>
<td>4</td>
<td>6.7</td>
</tr>
<tr>
<td>None</td>
<td>25</td>
<td>41.7</td>
</tr>
<tr>
<td>Not available</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td><strong>Utilization of Hospital</strong></td>
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<td></td>
</tr>
<tr>
<td>More than one</td>
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<td>48.3</td>
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<td>One</td>
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<td>15</td>
</tr>
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</tr>
<tr>
<td>Not available</td>
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<td>1.7</td>
</tr>
<tr>
<td><strong>Household Size</strong></td>
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<td></td>
</tr>
<tr>
<td>1-3</td>
<td>39</td>
<td>65</td>
</tr>
<tr>
<td>4-6</td>
<td>17</td>
<td>28.3</td>
</tr>
<tr>
<td>&gt;6</td>
<td>4</td>
<td>6.7</td>
</tr>
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</table>
Table 2. Change in Participant’s Mean BMI Baseline to Post-Intervention

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>57</td>
<td>32.24</td>
<td>6.65</td>
<td>2.40</td>
<td>56</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post BMI</td>
<td>57</td>
<td>31.23</td>
<td>5.79</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Table 3. Relative Change in Participant’s Daily Servings of Fruit and Vegetable Consumption Baseline to Post-Intervention

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Baseline Mean Assessment Score</th>
<th>Post-Intervention Mean Score</th>
<th>Wilcoxon Signed Rank Test (Two Tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit and Vegetable Consumption</td>
<td>60</td>
<td>1.85</td>
<td>3.32</td>
<td>Z= -5.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p=0.001</td>
</tr>
</tbody>
</table>

Research Question 3: Did the intervention result in significant changes in weekly hours exercised? (see Table 4).

Table 4. Changes in Participant’s Baseline and Post-Intervention Responses to the Question: How Many Hours per Week do You do Some Physical Activity?

<table>
<thead>
<tr>
<th>Baseline Responses</th>
<th>&lt;150 Minutes</th>
<th>≥150 Minutes</th>
<th>Totals</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;150 Minutes</td>
<td>22</td>
<td>23</td>
<td>45</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>≥150 Minutes</td>
<td>2</td>
<td>13</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>24</td>
<td>36</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

The hypothesis that participants will report an increase in weekly hours exercised following completion of program activities was supported by the results. McNemar test results in Table 4 demonstrate the proportion of participants who reported exercising ≥ 2.5 hours per week significantly increased from baseline (.25) to post-intervention (.60; p< 0.5). Consequently, as more participants reported exercising ≥ 2.5 hours per week at post-test, the proportion of participants that reported exercising < 2.5 hours per week from baseline (.75) to post-intervention (.40) significantly declined.

Research Question 4: If improvements in BMI from baseline to post-intervention occurred, were PN variables i.e., satisfaction with PN and # of encounters predictive of the changes.
The hypothesis, participants who rated their navigator as pleasant and had more encounters will more likely demonstrate a decrease in BMI than those who rated their navigator as fair and with less encounters was not supported. Controlling for race, the hierarchical multiple linear regression revealed that the variables: race (p< .14), pleasant navigator visits (p< .67) and number of encounters (p< .47) were not significant predictors for change in BMI. Overall there were no significant associations for change in BMI and social support variables.

**Research Question 5:** If improvements in daily consumption of fruit and vegetables from baseline to post-intervention occurred, were PN variables i.e., satisfaction with PN and number of encounters predictive of the changes?

The hypothesis, participants who rated their navigator as pleasant and had more encounters will more likely demonstrate an increase in daily consumption of fruit and vegetables than those who rated their navigator as fair and with less encounters was not supported. Controlling for race, the hierarchical multiple linear regression revealed that social support variables: pleasant navigator visits (p< .86) and number of encounters (p< .35) were not significant predictors for the change in daily fruit and vegetable consumption. However, race (p< .01) was found to be significant in predicting the change in participant’s baseline and post-intervention scores regarding daily fruit and vegetable consumption.

**Research Question 6:** If improvements in weekly hours exercised from baseline to post-intervention occurred, were PN variables i.e., satisfaction with PN and number of encounters predictive of the changes.

A mixed logistic regression model was used to examine the relationship between the social support covariates and the repeated dichotomous observations within participants (Hedeker, 2005). The mixed logistic regression results in Table 5 revealed a significant association between the change in baseline and post-intervention weekly hours exercise scores and the number of encounters. However, pleasant navigator visits was not significant. Odds ratios were interpreted. The odds of exercising ≥ 150 minutes per week is 1.204 times more likely for those that had ≥10 encounters (p<0.05). The odds of exercising ≥150 minutes per week is 1.44 times more likely for those that rated their pleasant navigator visit as “good.” Lastly, the odds for exercising ≥150 minutes per week is 3.109 times more likely for Somalis compared to Latinos (p-value= 0.073). Race was found to be approaching
significance indicating a significant relationship between changes in repeated measures for each subject regarding weekly hours exercised and race.
CHAPTER 5

DISCUSSION

The goal of this study was to examine the potential impact of the PN program on changes in BMI, daily fruit and vegetable consumption and weekly hours exercised following completion of the intervention, with a secondary goal of examining the predictive ability of social support variables on behavior and BMI. The results of this study support the initial research questions and indicate there is preliminary evidence to suggest that the FHNRC is associated with improvements in BMI and health behaviors. At baseline, participants’ mean BMI score was 32.2, which reduced 31.2 (p<0.05) at post-intervention. At baseline, the mean for daily fruits and vegetable servings consumed was 1.85, which increased to 3.32 (p<0.05). Lastly, participants at baseline who exercised ≥ 150 minutes per week significantly increased from 25% to 60% at post-intervention (p<0.05). The social support variables were not able to fully predict the changes demonstrated from baseline to post-intervention scores regarding BMI, daily fruit and vegetable consumption and weekly hours exercised.

Surprisingly, number of encounters and pleasant navigator visits was not associated with changes in BMI (P>0.79) and daily fruit and vegetable (P>0.28) intake from baseline to post-intervention. Similarly, when adjusted for race, number of encounters and pleasant navigator visits was not associated with changes in BMI (R² = 0.04, P>0.469) and daily and fruit and vegetables consumed (R² = 0.14, P<0.030). Lastly, pleasant navigator visits was not associated with the changes in exercise from baseline to post-intervention. However, number of encounters (p<0.05) was significant. These findings don’t support the hypothesis that the social support variables, pleasant navigator and number of encounters predict change in BMI and daily consumption of fruit and vegetables. The results partially support the last hypothesis, stating that having a positive experience with the navigator and number of encounters will be associated with the change in weekly hours spent exercising, in that number of encounters was significantly able to predict the change. In this study, there was
evidence to suggest that the FHNRC was able to significantly improve BMI and health behaviors. However the social support variables were not statistically significant with the change in BMI and daily fruit and vegetable consumption. The social support variable, number of encounters was statistically significant with the change in weekly hours exercised.

Other studies among populations with chronic disease using PN programs have found similar results regarding improvements in health behaviors and health outcomes. A two-year study in Texas used trained PNs to assist behavior change among 152 participants with chronic diseases such as hypertension, asthma, diabetes and obesity (Esperat et al., 2012). Culturally relevant PNs used motivational interviewing during monthly home visitations, which yielded positive results. The results were obtained at the 12-month follow-up and demonstrated a significant decrease in blood pressure, average HbA1c scores, total cholesterol, LDL and HDL among a Latino/Hispanic group. In addition, self-efficacy, diet and exercised all improved (Esperat et al., 2012). A study that consisted of an intervention (n=340) and control group (n=340) primarily comprised of low-income Hispanic participants (66%) used the PNM to reduce cardiovascular disease risk among the intervention group. The control group received no navigation from PNs. The intervention group had significantly lower FRS scores and total cholesterol was also significantly lower compared to the control group (Shlay et al., 2011). Results of the FHNRC study are in agreement with other PNM interventions; culturally competent PNs are associated with improvements in health behaviors and health outcomes (Nguyen et al., 2011; Shlay et al., 2011; Robinson-White et al., 2010).

Although qualitative studies have demonstrated that the foundation and success of PN programs lies within the interpersonal relationships established between participants and PNs, there have been limited quantitative studies that test for this association (Brashers, Neidig, & Goldsmith, 2004; Nguyen et al., 2011; Scott, Martin, Stone, & Brashers, 2011). One study using PNs examined whether the number of home visits was significantly predictive of HIV patients’ linkage to care. Their findings suggest that the number of home visits was found to be significantly predictive of HIV patient’s linkage to care (Hatcher et al., 2012). To our knowledge, this is the only study that tests whether social support (number of encounters) is significantly associated to health outcomes in a PN intervention.
Hatcher et al. (2012) study utilized a multi-level approach to the SEM. This might explain why the results were able to show a significant association between the interpersonal variable, number of home visits and HIV patients’ linkage to care. The current study only utilized social support as it is defined in the SNF; social support alone motivates change in health behaviors. The lack of multi-level approach such as the application of the SEM which combines social support with other influencing factors such as knowledge and community involvement to change health/health behaviors may explain why social support alone was unable to predict the changes in daily fruit and vegetable consumption and BMI. Using a multi-level approach that combines social support with other influential factors on behavior such as knowledge, skills, policies and community relationships are most effective in changing behavior (Glanz et al., 2008). Findings from FHNRC study suggest that in this sample of adults with diabetes or obesity, change in BMI, and fruit and vegetable consumption is not significantly influenced by social support variables. However, change in weekly hours exercised is significantly influenced by the number of encounters.

Although this was not part of the analyses, post hoc analyses examined whether race/ethnicity was associated with changes in BMI, fruit and vegetable consumption and weekly hours exercised. The results demonstrated that the Somali refugee population was more likely to demonstrate an increase in weekly hours exercised (p<0.07) and daily fruit and vegetables consumed (p<0.01) compared to the Hispanic/Latino population. This may be attributed to the Somali refugee’s existing knowledge and beliefs about health in the U.S combined with social support received from the PNs in the program. The current study examined baseline knowledge and skills among the Somali refugee and Latino/Hispanic population and found differences between the two groups. It was found that 100% of the Somali refugees agreed that eating fruits and vegetables and getting exercise improved health compared to only 79% of Latino/Hispanics. In addition, it was found that 87% of the Somali refugees were “very confident” in their ability to exercise for at least 30 minutes compared to only 34% of Latino/Hispanics. Their existing knowledge and beliefs coupled with social support from the PNs likely facilitated positive behavior change. Additionally, one study that used focus groups to explore Somali women’s knowledge and beliefs about health and preventive health in the U.S. discovered that women were very knowledgeable in the areas of exercise and good nutrition (Carroll, Epstein, Fiscella, Volpe, et al., 2007). The women in
this study expressed that they understood the importance of exercise and good nutrition. However, they were unsure of how and where to exercise and eat healthy in the U.S. (Carroll, Epstein, Fiscella, Volpe, et al., 2007). PNs were able to provide the participants with social support and access to resources to facilitate positive behavior change regarding nutrition and exercise (Harold P. Freeman Patient Navigation Institute, 2013). In addition, a study in New Zealand discovered that because Somali refugees come from a physical activity-enhancing environment in Somalia, they are accustomed to physical activity such as long distance walking and heavy lifting (Guerin et al., 2003). The Somali refugee women in the study who sought asylum in New Zealand were able to successfully exercise once they were encouraged to engage in activities that could be performed in traditional clothing, such as walking (Guerin et al., 2003). The Somali refugees’ existing knowledge and social support provided by the PN provide a stronger foundation for behavior change; it has been found that existing knowledge, combined with social support can yield more effective results (Glanz et al., 2008; McLeroy, Bibeau, Steckler, & Glanz, 1988).

LIMITATIONS AND FUTURE DIRECTIONS

The pilot study had several limitations. The statistical power of the study was limited due to the small sample size. Of the 50 Somali participants and 37 Latino participants, only 31 Somali participants (62%) and 29 Latino participants (93.5%) completed both a pre and post health assessment form for diabetes or hypertension. Some participants may have been lost to follow-up or unable to be contacted if they recently moved out of the area. Additionally, slight differences occurred between baseline demographics for those who completed a posttest compared to those who did not complete a posttest. First, the sample size for those who did not complete a posttest consisted of significantly more men compared to those that completed a posttest. Second, those that did not complete a posttest reported less annual income compared to those who completed a posttest. Those who did not complete a posttest also reported more instances of receiving no formal education, an increase utilization of the emergency room >1 and a decrease in hospital use compared to those who completed a posttest. These differences in demographics demonstrated between those who completed a posttest and those who did not may have provided a more well-rounded sample size if all participants in the program completed a posttest and were included in this study. Also, a
larger sample size would have provided more statistical power for the logistic and mixed model regressions. In addition, this study did not use intent to treat analysis. Although many of the initial participants of the study were lost to follow-up, intent to treat analysis includes all participants regardless of their lack of post-test or completion of the program. Due to the lack of intent to treat analysis, the PN program may appear to have provided benefits because analysis only included participants who finished the program.

The eligibility criteria for the PN program differed between the two groups. The Somali refugee eligibility criteria included cancer (i.e. overdue for cancer screenings, abnormal screening findings or diagnosis), as the Latino/Hispanic population did not. This may have prevented some Latino/Hispanic participants from enrolling in the program. Furthermore, some of the PNS verbally administered the surveys to participants in person or by phone when participants were illiterate or unable to meet in person. Interviewer error may have occurred while recording participants’ responses. Also, some participants may have been reluctant to truthfully report information about their health behaviors or ratings for the program in fear of being perceived as unhealthy or fear of disappointing the PN. This suggests that responses may have been subject to the social desirability bias.

In addition, because the FHNRC program’s funding was terminated early, behavior changes may have been too premature to measure. Moreover, participants’ survey responses were manually entered by the PN assigned to that case. This could potentially create bias in manipulation of positive data entry. Somali and Latino/Hispanic participants worked individually with their culturally matched PNs. Variability between the Somali PN and Latino/Hispanic PN may have caused slight differences in how the intervention was implemented and perceived between the two groups. Also, the surveys and forms used for this study were created specifically by HRSA and PCI’s MEC therefore they were not validated scales. The use of invalidated scales reduces the survey’s reliability and validity in identifying and quantifying the constructs of social support therefore the surveys used in the study may not have accurately measured social support.

Also, the number of encounters variable only measured the frequency of encounters and did not measure the content and discussion of the encounter between the PN and the participant. Content of the encounter might have varied from participant to participant based on their chronic disease at enrollment and goals established at the beginning of the
intervention. Variability in content of encounters may have caused the lack of predictability for BMI and daily fruit and vegetable consumption within this intervention. Lastly, the current study was able to show statistical significance in the changes in BMI, daily fruit and vegetable consumption and weekly hours exercised demonstrated from baseline to post-intervention, however the changes were minor and appeared to be clinically insignificant. The changes in BMI, daily fruit and vegetable consumption and weekly hours exercised were of a magnitude that did not convey practical relevance to a one-year PN study.

This PNM study used the SNF to assess whether social support received from PN was associated with favorable health behaviors and BMI; however the lack of study design serves as a limitation. It is recommended that future PNM studies incorporate health promotion theories to better understand the role of a PN. In addition, incorporating health promotion theory can demonstrate how the relationship between a PN and participant can be utilized to better support the participant in making favorable change in health outcomes and health behaviors. Future studies using the PNM that consider applying health promotion theory should also consider applying an intervention design that includes a comparison or control group to strengthen validity and evaluate the causal relationship between the PN intervention and its outcome measures.

Moreover, literature has shown that the PNM may be a culturally appropriate for intervention for underserved or minority populations. Many studies have demonstrated this through the use of PN in improving linkage to care for participants with cancer; however there are limited studies using PN for other chronic diseases such as heart disease, diabetes and obesity. It would be beneficial for future studies to use PNs for various diseases apart from cancer. Also, future studies should avoid clustering refugee groups together (i.e. African refugees). Lastly, there have been exploratory studies using focus groups and in-depth interviews regarding Somali refugee’s health and healthcare experiences. These studies have highlighted that the Somali refugees are a distinct and unique cultural group in need of culturally competent healthcare. However, there have been limited studies applying interventions to Somali refugee population. Future studies should consider implementing interventions among the Somali refugees that can be evaluated for significance and tested for efficacy.
CONCLUSION

This study contributes evidence to support the feasibility of interventions using the PNM to promote healthy behaviors and health outcomes among Latino/Hispanic and Somali refugee participants. This intervention attempted to alleviate chronic disease by encouraging healthy behaviors among the participants. Culturally competent PNs were trained to do home visitations, promote healthy behaviors and deliver health education. At post-intervention evaluation, the program did have a significant influence on changes in BMI, daily servings of fruit and vegetable consumption and weekly hours spent exercising among the Somali refugee and Latino/Hispanic population. Implications of the program’s influence on significant changes in BMI, fruit and vegetable consumption, and weekly hours spent exercising yielded mixed results. However, the number of encounters was significantly associated with the changes in weekly hours spent exercising implicating that social support between the PN and participant have the ability to influence positive change. Overall, the efforts of this study illustrate how the use of PNs is associated with favorable change in health behaviors and health outcomes between the Hispanic and Somali refugee population. However, the lack of significant predictive relationships sets the stage for further examination of the SNF, and the use of PNs to influence positive behavior and health outcome change.
REFERENCES


