HEALTH DISPARITIES AMONG SOUTH ASIANS: IS FOOD INSECURITY THE MISSING LINK?

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HEALTH DISPARITIES AMONG SOUTH ASIANS: IS FOOD INSECURITY THE MISSING LINK?

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Public Health

by
Valentina Roy Chawdhury

June 2019
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June 2019
Approved by:

Monideepa B. Becerra, Committee Chair, Health Science and Human Ecology
Salome Mshigeni, Health Science and Human Ecology Committee Member
Sen Padilla, Health Science and Human Ecology Committee Member
Objective: Food insecurity among South Asians in the US is a public health issue. Food insecure adults face a plethora of adverse outcomes and research shows that individuals with ancestral origins from South Asia have a higher susceptibility rate for cardiovascular disease after migrating to urban environments. As such, the goal of this study was to research possible barriers South Asians face when creating cultural dishes in the US.

Methods: This was a convergent parallel mixed-methods analysis to understand how South Asians feel about food insecurity. Pricing and availability of cultural food items were obtained from South Asian and Western grocery stores. Focus groups were conducted among twelve participants who identified as South Asian immigrants where participants discussed their experiences obtaining cultural food items. After the interviews, the discussions were transcribed, and patterns were identified and analyzed.

Results: The results of the study demonstrate that South Asians find barriers such as availability, price, and quality when shopping for cultural food items. Participants reported cooking cultural foods at a lower frequency than what they would prefer because while many of the food items commonly used in cultural dishes were available at both Western and South Asian grocery stores, South Asian stores were more expensive.
Furthermore, participants reported that some culturally specific ingredients were not available at South Asian stores thus further limiting their ability to cook healthy items.

**Conclusion:** The results of the study highlight the need for more public health initiative to address food insecurity among South Asians in the US.
ACKNOWLEDGEMENTS

I would first like to thank my thesis advisor Dr. Monideepa Becerra. Dr. Becerra provided the opportunity to delve into research on food insecurity among South Asians. She was always available to help whenever I had a question about my research or writing. I am gratefully indebted to her for her guidance.

I would also like to thank my committee members who were involved in validating my work to ensure it met the requirements: Dr. Salome Mshigeni and Dr. Sen Padilla. Without their passionate participation and valuable input, this paper would not be what it is.

Finally, I must express my very profound gratitude to my family for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

Valentina Roy Chawdhury
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CHAPTER ONE
INTRODUCTION

Problem Statement

The United States Department of Agriculture (USDA) defines food insecurity as “a household-level economic and social condition of limited or uncertain access to adequate food” (“USDA ERS - Definitions of Food Security,” 2018). It is the lack of access to nutritious food due to a number of reasons such as living in a food desert, not having adequate nutritional education, and not having the monetary means to purchase healthy food items. It is also defined as the “inability to afford enough food for an active, healthy life” (Seligman, Laraia, & Kushel, 2010). Addressing food insecurity is a critical public health issue as it allows for better assessment of healthy diet and preventive measures. According to Seligman et al. (2010), children from food insecure families are likely to have higher rates of chronic illnesses, developmental and mental health problems, obesity, iron-deficiency anemia, and acute infection. Likewise, among food insecure adults, higher rates of chronic diseases, including heart disease, hyperlipidemia, hypertension, and diabetes have been noted. Pan, Sherry, Njai, & Blanck (2012) discovered in their research among twelve states, one in three food insecure adults are obese. This piece of literature discovered that the frequent consumption of energy-dense foods and cyclical food restriction resulted in greater energy intake thus, leading to
obesity. Further research indicates that, food insecure adults between the ages of 30 and 59 years have a predicted 10-year risk for cardiovascular disease while also having higher concentrations of HbA1c and C-reactive protein (Ford, 2013). Stress is another indicator and outcome of an individual being food insecure as it can affect the body and create a domino effect of health issues. In their study, Seligman et al. (2010), reported that when a body is stressed, cortisol levels are raised which lead to visceral adiposity which in turn is a strong risk factor for diabetes. Depression, fatigue, and poor self-efficacy are seen as aids in promoting food insecurity and can accompany the resulting negative health effects. Depression and fatigue may prohibit motivation for food insecure individuals to seek resources to improve their circumstances. Low self-efficacy, which may stem from having low levels of nutritional education, can enable individuals to continue to practice unhealthy dietary habits.

**Purpose of Study**

There are multiple studies on food insecurity in America; however, there is limited research available on the issue of food insecurity among South Asians. The South Asian population was specifically chosen for this study because of the lack of information of food insecurity concerns among this population, as well as higher rates of chronic illnesses. According to Patel & Bhopal (2003), people with ancestral origins from South Asia have a higher susceptibility rate for cardiovascular disease
after migrating to urban environments. Furthermore, stress and racism may play a role in the increase of cardiovascular disease among the South Asian population. While most of South Asian immigrants come from rural areas, the new urban environment provides a range of disorders. These disorders include psychoses, depression, sociopathy, substance abuse, alcoholism, crime, delinquency, vandalism, family disintegration, and alienation (Trivedi, Sareen, & Dhyani, 2008). Furthermore, often due to aggregation of data, South Asians are often overlooked due to being categorized as Asian Americans, which in turn limits the ability to elucidate subgroup specific health issues and social barriers. Whether food insecurity is related to such chronic illnesses among South Asian population remains unknown in the United States and only one study to-date has highlighted the burden of food insecurity among disaggregated Asian Americans (Becerra, Mshigeni, & Becerra, 2018). Understanding the key factors that may lead to food insecurity among South Asians and their perception would be critical steps before understanding how such a social determinant may lead to negative health outcomes. As such, the goal of this project is to analyze the barriers to ensuring food security among South Asians in the United States.

Research Questions

This study hypothesizes that South Asians in the United States may face food insecurity due to a lack of knowledge on where to buy culturally
specific ingredients, limited South Asian grocery stores depending on location, and the unavailability of some of those ingredients in Western grocery stores. Hence, the research questions are:

1. How readily available are South Asian culturally appropriate grocery stores and food items?
2. Are there differences in availability of South Asian food items based on store type?
3. How do South Asians feel about barriers to food security when cooking for culturally appropriate food items?

Significance to Public Health

Addressing food insecurity among the South Asian population is necessary in bringing to light a key social determinant of health issue, discussing where the issue stems from, and determining what plausible solutions exist. There is currently limited research available on food insecurity among South Asians as it is a population that is often masked under the Asian American title. South Asian immigrants face many discrepancies in America when searching for culturally specific ingredients to create cultural dishes. Understanding what factors create this gap among the population and their culturally specific food accessibility is necessary to create solutions for this overlooked group of people. This study will provide the missing information and data needed to decrease the gap on our understanding of food insecurity among South Asians.
The program learning outcomes (PLOs) that will be met by the completion of the proposed thesis are:

- Select quantitative and qualitative data collection methods appropriate for a given public context,
- Communicate audience-appropriate public health content, both in writing and through oral presentation,
- Apply systems thinking tools to a public health issue, and
- Design theory-based health education programs for populations at-risk.

The tasks that will meet the PLOs include:

- Physically visiting ethnic grocery stores to obtain the price of each ingredient to create the most popular South Asian dishes.
- Compare the price of food items between ethnic grocery stores and Western grocery stores.
- Identify and discuss accessibility of ethnic grocery stores among vulnerable populations.
- Discuss possible solutions, and present findings.
CHAPTER TWO
LITERATURE REVIEW

Introduction

Food insecurity is defined by the United States Department of Agriculture (USDA) as having limited or uncertain access to adequate food ("USDA ERS - Definitions of Food Security," 2018). There is a plethora of literature to support the detrimental effects of food insecurity among individuals, but little is known for Asian Americans. For example, it can lead to cardiovascular disease, obesity, depression, stress and behavioral patterns among adults and children (Whitaker, Phillips, & Orzol, 2006). Given the empirical evidence on the negative burden of food insecurity, it is critical to assess the associated factors and outcomes among the most vulnerable populations. This piece of literature is going to focus on South Asians, as this population is often masked under the Asian American category. This makes it difficult to identify and combat specific issues this population faces as they have a higher risk for cardiovascular disease, which is just one of the negative health effects arising from becoming food insecure.

Food Insecurity

The USDA defines food insecurity as “a household-level economic and social condition of limited or uncertain access to adequate food” ("USDA ERS - Definitions of Food Security," 2018). It is the lack of access
to nutritious foods due to a number of social determinants. These social determinants include: living in a food desert, having a lack of nutritional education, as well as having a lack of monetary means to afford healthy food items, among other items. According to Coleman-Jensen, Rabbitt, Gregory and Singh (2018), 11.8% of households (or 15.0 million households) in the United States were identified as being food insecure at some point in the year 2017. This means that they did not have access to nutritious food items to sustain optimal health. Furthermore, individuals who are considered food insecure experience disruptions in eating patterns and reduced food intake. Research shows that non-Hispanic Black and Hispanic households have the highest rates of food insecurity, as compared to non-Hispanic Whites (Coleman-Jensen et al., 2018). Other populations that have higher rates of food insecurity include: households that have children headed by a single parent of either gender, households that have an income below or near the federal poverty line, men and women living alone, and households located in principal cities of metropolitan areas (Coleman-Jensen et al., 2018).

**Health Outcomes of Food Insecurity**

If not addressed, food insecurity can lead to a plethora of negative health outcomes that may diminish the quality of life for individuals. For example, in a study done to establish the correlation of obesity and food insecurity among adults, Pan, Sherry, Njai, and Blanck (2012) discovered
from data collected among twelve states, one in three food insecure adults are obese. Pan et al., (2012) also discussed that food insecure people fell into the category of being low income. Therefore, it was deduced that in order to compensate for being low income and food insecure, foods purchased were energy-dense (high in sugar and fats) as energy-dense food are easier to access. Due to food insecure individuals experiencing cyclical food restriction, these energy-dense foods resulted in greater energy intake and ultimately obesity. Specifically, this study found that in the twelve states surveyed, the prevalence of being obese among food insecure adults was 35.1% (Pan et al., 2012). In a cross-sectional study done to establish the correlation of food insecurity and cardiovascular disease Ford (2013), discovered that food insecure individuals who fall within the age range of 30 to 59 years have a predicted 10-year risk for cardiovascular disease and have higher concentrations of HbA1c and C-reactive protein when compared to their food secure counterparts. This is important to note as having higher concentrations of HbA1c and C-reactive protein are indicators of increased risk for cardiovascular disease.

Although food insecure adults are prone to health issues such as obesity and cardiovascular disease, children are also subject to similar outcomes. For example, in a cross-sectional study among 2,870 mothers of 3-year-old children, Whitaker et al. (2006), discovered that the rate of mothers who experienced food insecurity also had higher rates of
depressive episodes or anxiety when compared to their food secure
counter-parts. Furthermore, the percentage of behavior problems among
children of these mothers increased with increasing food insecurity
(Whitaker et al., 2006). Therefore, it was deduced that food insecure
mothers who experience depressive episodes and generalized anxiety
have children that are more likely to exhibit behavioral issues, making
mental health an affected area of food insecurity. In their study, Robson,
Lozano, Papas, and Patterson (2017), found that cardiometabolic risks
were higher and prevalent among adolescents that identified as being
food insecure. The adolescents studied exhibited behavioral patterns
associated with an increase in cardiometabolic risks, such as, getting less
than eight hours of sleep per night, not eating breakfast, smoking, and
drinking alcohol (Robson, Lozano, Papas, & Patterson, 2017). Having
these patterns from a young age can offset the health of adolescents and
follow them throughout their adulthood.

South Asians and Food Insecurity

Although there are multitudinous reports on food insecurity and the
negative health outcomes it causes, primarily among the Hispanic and
African American populations, there is limited literature on the prevalence
of and outcomes associated with food insecurity among South Asians.
This is due to the population being categorized as Asian Americans, which
limits the opportunity to delve into specific barriers this subgroup faces.
Understanding such a burden among the South Asian population is imperative due to the heterogeneity of the Asian American population. While being one of the fastest growing minority groups in the United States, Asian Americans are a diverse group with multiple languages and cultural backgrounds (Colby & Ortman, 2014). Due to the vast cultural differences among this subgroup, there are specific needs that should be met to ensure the utmost quality of life for this population, and thus elucidating the unique needs of subgroups is critical. The term “South Asians” is utilized to describe a subgroup of the Asian continent. Countries included within this subgroup are Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka (SAALT, 2012). South Asians are a population that face multiple health disparities, including, metabolic syndrome, cardiovascular disease, obesity, diabetes, myocardial infarction among many others. Patel & Bhopal (2003) found that individuals with ancestral origin from South Asia have a higher susceptibility rate for cardiovascular disease after migrating. Also, stress and racism were found to be major players in the increase of cardiovascular disease among this subgroup. South Asians immigrating from their country of origin to the United States face the burden of acculturation and therefore, may face disorders as a result such as psychoses, depression, sociopathy, substance abuse, alcoholism, crime, delinquency, vandalism, family disintegration, and alienation (Trivedi et al., 2008). Another pattern found among South
Asians is the acculturation of dietary habits after immigration. Gilbert & Khokhar (2008) noted that South Asians alter their diet gradually based on increasing length of residency from grain-based and low-fat to a more animal-based diet. Such changes in diet can further lead to disproportionately higher rates of cardiovascular disease risk. Whether food insecurity plays a role in dietary practices, especially differing role by immigration status, remains to be evaluated. In one study, Becerra et al. (2018) noted that South Asians who spoke a non-English language at home, thus less acculturated, had a higher prevalence of food insecurity. Such evidence highlights that the immigrant South Asian generation may be disproportionately impacted by food insecurity. However, further empirical evidence for this population is lacking, and thus there remains an imperative need to address the burden of food insecurity among South Asians in the United States.
CHAPTER THREE

METHODS

Study Design

This study was a convergent parallel mixed-methods analysis to understand the barriers to food security that South Asians in the United States may face. This type of method allows for better exploration of why certain behaviors or patterns occur in a population that has limited empirical evidence. In this method, both qualitative and quantitative data were collected and analyzed separately and compared and contrasted during final discussion.

Overall, the study was divided into two parts. Part one consisted of quantitative field data collection, which was further divided into five phases. Part two consisted of quantitative (through surveys) and qualitative (focus group) data collection from South Asian participants; the latter included for the purposes of this thesis. In addition, the geographic region for this study was limited to the Inland Empire of Southern California.

Data Source and Collection

Part one of the quantitative data collection in this research was divided into five phases (Appendix A). In phase one, data was collected from the internet to find South Asian-specific grocery stores within San
Bernardino County. Phase two also utilized the internet to identify ten commonly prepared food items in South Asian culture as well as the ingredients needed to prepare such items. Phase three involved visiting each grocery store identified within phase one to assess prices of each ingredient needed in the previously identified common food items in phase two. Phase four, data collection involved identifying Western grocery stores of three different price levels (low, medium, high). Data collection for phase five involved visiting each grocery store mentioned in phase four to assess process for each ingredient needed in the previously identified common food items in phase two.

Next, for part two of the data collection, a 16-item survey instrument was developed and both quantitative and open-ended qualitative data were collected to explore whether South Asians found culture specific food readily available and barriers they may face to ensure food security while cooking culturally appropriate food items. In addition, focus groups were conducted to further explore such questions among the same participants.

Measures for Quantitative Data

The following measures were relevant to part one of the study (field data collection). Phase one: store name, location, specific ethnicity of the store in regard to South Asian identity, and hours of operation. Phase two: food items commonly eaten during breakfast, lunch, dinner, snack, etc., specific South Asian ethnicity, and common ingredients used.
Phase three: cost of common ingredients for each food item from phase two, availability of the ingredient. Phase four: names of Western grocery store and cost tier. Phase five: cost and availability of ingredients to cook South Asian specific food items identified in phase two.

Data Analysis

For part 1 of the study, first, visual maps were created, utilizing Google Maps, to demonstrate the availability and distance of each South Asian grocery store in the Inland Empire of Southern California, as compared to proximity and prevalence of Western grocery stores within the same region. Second, tables were created to assess the availability of each South Asian food ingredient by store type, and then availability of ingredients in overall. This allowed for a comparison of how readily available ingredients are based on store type and overall (regardless of store type). Third, ability to cook each food item was assessed based on availability of all food ingredients needed, and this was further stratified by store type. These analyses were conducted using descriptive statistics in Microsoft Office Excel.

To evaluate participants’ understanding of availability of grocery store and items, thematic analysis was conducted on qualitative data from focus groups using the grounded theory. For this method, first open coding was used, where common phrases/words were identified. Next, axial coding was conducted where such common phrases/words were
organized into categories, and finally during selective coding, a central theme was identified.

Ethics

The Institutional Review Board of the California State University, San Bernardino has approved this study (IRB-FY2018-130).
CHAPTER FOUR
RESULTS

Availability of South Asian Culturally Appropriate Grocery Stores and Food Items

Research questions 1 and 2:

How readily available are South Asian ethnic specific food items?

Are there differences in availability of South Asian food items based on store type?

In order to answer the first two research questions, Google Maps was used to visualize location and prevalence of grocery stores. (Names and geographic location of specific stores are left out to ensure privacy).

Map analysis showed South Asian grocery stores were scattered and there was a substantial distance between each shop. Each city evaluated had an average of one South Asian store within its area. For example, Ethnic grocery store 2 was the only South Asian market located in Rancho Cucamonga, Ethnic grocery store 6 and Ethnic grocery store 5 were both located in Loma Linda with a distance of 1.2 miles between them, Ethnic grocery store 3 is the only South Asian grocery store located in Hesperia and is twenty-nine miles away from the next closest South Asian market, and Ethnic grocery store 1 was located in Fontana. Lastly,
Ethnic grocery store 4 was the only South Asian grocery store located within Chino Hills. On the other hand, Western grocery stores are seen to be in abundance and are in closer proximity to each other.

To further elaborate on the availability of South Asian culturally specific food items, data on food items’ availability was analyzed. Table 1 shows the South Asian food items available at the various South Asian grocery stores analyzed. For example, among South Asian grocery stores, Ethnic grocery store 1 sold 17 of the 17 (100%) listed ingredients, Ethnic grocery store 2 sold 13 of 17 (76%), Ethnic grocery store 3 sold 10 of 17 (58%) items, Ethnic grocery store 4 sold seven of 17 items (41%), and Ethnic grocery store 5 sold nine of the 17 (52%) ingredients.

When comparing ingredients, orange lentils were available at three of the five (60%) South Asian grocery stores. Similar trend was noted for ghee and tea powder for the same stores. Rice, black gram, basmati rice, dried onion, bay leaf, fenugreek, and fennel seeds were sold at two of the five (40%) South Asian grocery stores. Ginger paste, garlic paste, and cumin powder were available at all five (100%) South Asian grocery stores. Cloves, cardamom, and garam masala were available at four of five (80%) South Asian grocery stores. Cinnamon sticks were sold at all five (100%) South Asian grocery stores.

Table 2 shows the South Asian food items available at Western grocery stores in order to compare the availability by store type. For
example, among Western grocery stores, Western grocery store 1 sold 10 of 17 (58%) ingredients, Western grocery store 2 had 12 of the 17 (70%) items, and Western grocery store 3 sold 14 of 17 (82%) items. When comparing ingredients, orange lentils, ginger paste, garlic paste, cumin powder, rice, basmati rice, tea powder, cloves, and cinnamon sticks were available at all three (100%) Western grocery stores. Other trends noted include ghee, garam masala, and fenugreek seeds being available in one of the three (33%) Western grocery stores. Furthermore, bay leaf, fennel seeds, and cardamom were available at two of the three (66%) Western grocery stores. Black gram and dried onion was not available in any of the three (0%) Western grocery stores.

Cumulatively, of all of the Western and South Asian grocery stores, Ethnic grocery store 1 was the only market to sell all 17 (100%) listed culturally specific ingredients. Among all South Asian grocery stores, Ethnic grocery store 1 sold the highest amount of the 17 ethnic specific ingredients while Ethnic grocery store 4 had the least. Among all Western grocery stores, Western grocery store 3 had the highest amount of the 17 culturally specific ingredients while Western grocery store 1 had the lowest.
Table 1. South Asian Culturally Specific Ingredients Among South Asian Stores

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Ethnic Grocery Store 1</th>
<th>Ethnic Grocery Store 2</th>
<th>Ethnic Grocery Store 3</th>
<th>Ethnic Grocery Store 4</th>
<th>Ethnic Grocery Store 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange Lentils</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Ghee</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Garam Masala</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>Ginger Paste</td>
<td>X</td>
<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>Garlic Paste</td>
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<td>X</td>
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<tr>
<td>Cumin Powder</td>
<td>X</td>
<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>Fenugreek Seeds</td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>Fennel Seeds</td>
<td>X</td>
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<td></td>
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<tr>
<td>Rice</td>
<td>X</td>
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<td>Black Gram</td>
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<tr>
<td>Basmati Rice</td>
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<td>Bay Leaf</td>
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<tr>
<td>Cinnamon Sticks</td>
<td>X</td>
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<tr>
<td>Dried Onion</td>
<td>X</td>
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<tr>
<td>Cloves</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>Cardamom</td>
<td>X</td>
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</tr>
<tr>
<td>Tea Powder</td>
<td>X</td>
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</tbody>
</table>
Table 2. South Asian Culturally Specific Ingredients Among Western Stores

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Western Grocery Store 1</th>
<th>Western Grocery Store 2</th>
<th>Western Grocery Store 3</th>
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<tbody>
<tr>
<td>Orange Lentils</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Ghee</td>
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<td>X</td>
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<tr>
<td>Garam Masala</td>
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<td>X</td>
</tr>
<tr>
<td>Ginger Paste</td>
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<td>Garlic Paste</td>
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<td>Cumin Powder</td>
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<td>Fenugreek Seeds</td>
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<tr>
<td>Fennel Seeds</td>
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<td>Rice</td>
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<td>Black Gram</td>
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<tr>
<td>Basmati Rice</td>
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<td>Bay Leaf</td>
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<tr>
<td>Cinnamon Sticks</td>
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<tr>
<td>Dried Onion</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cloves</td>
<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>Cardamom</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Tea Powder</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</table>

Next, availability of all ingredients to cook each specific food item was analyzed. For example, as shown in Figure 1, in order to create the South Asian dish ‘Daal,’ the ingredients needed are orange lentils, ghee, garam masala, ginger paste, garlic paste, and cumin powder. Orange lentils were found in 60% of South Asian Stores and 100% of the Western Stores. Ghee was found in 60% of South Asian Stores and 33% of Western stores. Garam masala was available in 80% of South Asian.
stores and 33% of Western stores. Ginger paste, garlic paste, and cumin powder was available in 100% of South Asian and Western grocery stores.

![Figure 1. Availability of South Asian ingredients for Daal](image)

As shown in Figure 2, in order to create the South Asian dish of ‘Sabzi’ the ingredients of ginger paste, garlic paste, cumin, fenugreek seeds, and fennel seeds are needed. Ginger paste, garlic paste, and cumin were found in 100% of South Asian and Western grocery stores. Fenugreek seeds and fennel seeds were available in 40% of South Asian stores. Furthermore, 33% of Western grocery stores sold fenugreek seeds and 67% sold fennel seeds.
As shown in Figure 3, to create the South Asian dish ‘Dosa’ rice and black gram are needed. Both rice and black gram were found in 67% of South Asian stores. Rice was available in 100% of Western grocery stores and black gram was not available in any of the Western grocery stores.
As shown in Figure 4, the main ingredients needed to create ‘Pulao’ are basmati rice, bay leaf, cinnamon sticks, and dried onions. Basmati rice, bay leaf, and dried onion were found in 60% of South Asian stores while cinnamon sticks were found in 100% of South Asian grocery stores. Basmati rice, bay leaf, and cinnamon sticks were available in 100% of Western stores while dried was not available in any.
As shown in Figure 5, to create the South Asian dish ‘Curry,’ ginger paste, garlic paste, garam masala, cinnamon sticks, cloves, and cardamom were needed. Ginger paste, garlic paste, and cinnamon sticks were available in 100% of the South Asian grocery stores. Cloves and cardamom were found in 60% of the South Asian grocery stores and garam masala was found in 80% of South Asian markets. Ginger paste, garlic paste, cinnamon sticks, and cloves were sold in 100% of Western stores. Garam masala was found in 33% of the Western stores while cardamom was found in 67%.
As shown in Figure 6, to create the South Asian dish 'Chai,' the main ingredient needed is tea powder. Among the South Asian stores, 60% sold this item while 100% of the Western stores had it available.
South Asians’ Feelings Towards Barriers to Food Security When Cooking Culturally Appropriate Food Items

Research question 3:

How do South Asians feel about barriers to food security when cooking for culturally appropriate food items?"

To answer this question, focus groups were conducted among 12 participants who identified as South Asians currently residing in the Inland Empire. In this study, all participants were immigrants.

Since the primary focus of this study is to assess availability of food items specific to South Asian culture, the participants were then asked to compare Western and South Asian grocery stores in a focus group. As with the previous question, expense was a major emergent theme. Thematic analysis demonstrates that participants consistently stated that

Figure 6. Availability of South Asian ingredients for Chai
they were unable to find their culturally appropriate food items and had to travel a significant distance to find ingredients; which often served as a limiting factor.

“It depends very strongly on where you live.”

“Since the stores where I can find these ethnicity specific food items, they’re far from our house. So, we have transportation problems and many other problems to go. So, it hard to find.”

“Yeah it is always difficult, because there are very limited shops to get those ingredients. So, we have to go far away from our home.”

A unique theme that emerged specifically when discussing South Asian grocery stores was that of safety and quality of food items. Participants often noted poor quality of ingredients that were found, either in comparison to expectations or what they were used to in their home country, with phrases such as “bad quality” or “expired” used to refer to the food items.

Participants also felt that while many of the food items commonly used in cultural dishes were available at both types of stores, South Asian stores were substantially more expensive or often times, items needed for cultural food were not available at any type of stores.

“There’s not a lot of stuff that is common in both the stores but stuff like cloves or bay leaves are expensive in Indian stores compared to the Western grocery stores.”
“A few items that we get in Western stores, they are that little inexpensive as compared to the Indian stores.”

“…it’s been difficult because making few dishes require very specific food items of which specific ethnic food items and it’s difficult to find it even it in Indian stores.”

“…there are some items which we don’t even find in Indian stores and we would love to have them there.”

Summary

The results of this study have the following major findings:

1) South Asian culture specific grocery stores are less available as compared to Western grocery stores in the Inland Empire.

2) The ingredients needed to cook South Asian culture specific food were dispersed between South Asian and Western grocery stores with no consistency found.

3) Focus groups results illustrated that individuals felt not only were ingredients to cook South Asian food more expensive in culturally appropriate stores, some ingredients were not available regardless of the store type.

4) Focus group participants also noted issues related to food quality assurance among cultural grocery stores.
CHAPTER FIVE

DISCUSSION

Food insecurity among South Asians in the U.S. is a public health issue as food insecure individuals face a plethora of adverse health outcomes and research (Patel & Bhopal, 2003) shows that individuals with ancestral origins from South Asia have a higher susceptibility rate for cardiovascular disease after migrating to urban environments. Therefore, this paper focused on researching possible barriers South Asians face when creating culturally specific dishes in the U.S.

Some of the major findings include: South Asian culture specific grocery stores are less available as compared to Western grocery stores in the Inland Empire. Western grocery stores such as Western grocery store 1, Western grocery store 2, and Western grocery store 3 are found in abundance and are easily accessible within the Inland Empire. In contrast, South Asian grocery stores are not as common for example, there is only one South Asian grocery in the city of Hesperia, Ethnic grocery store 3. This particular South Asian store is also the only one of its kind found in the high desert. Therefore, it can be deduced that South Asian grocery stores are less accessible compared to Western grocery stores. A similar trend can be seen in a study observing Chinese immigrants living in Toronto, Canada and their grocery shopping behaviors. Wang & Lo (2007) discovered Chinese immigrants who lived in
areas with limited Chinese grocery stores traveled great distances to culture specific stores instead of purchasing items at easily accessible in Western grocery stores. This was due to the sociocultural significance this population associated with shopping at Chinese grocery stores.

The ingredients needed to cook South Asian culture specific foods were dispersed between South Asian and Western grocery stores with no consistency found. Although Asian Americans are considered to be one of the fastest growing minority groups in the United States (Colby & Ortman, 2014), there is a lack of accommodation to provide culturally specific dishes or ingredients to cook those dishes. This is especially proven when comparing the availability of South Asian culturally specific ingredients among South Asian grocery stores and Western grocery stores. A similar theme was discovered in a cross-sectional survey of 115 stores in African-American neighborhoods and 110 stores in Latino neighborhoods examining commonly consumed and culturally specific fruits and vegetables in Southwest Chicago, Illinois. Grigsby-Toussaint, Zenk, Odoms-Young, Ruggiero, & Moise (2010) discovered that less than 50% of stores in both neighborhoods carried commonly consumed or culturally specific fruits and vegetables which further limited fruit and vegetable consumption.

Focus groups results illustrated that, participants felt not only were ingredients to cook South Asian food more expensive in culturally
appropriate stores, some ingredients were not available regardless of the store type. Although the lack of culturally specific food items among Western grocery stores have been established, it is important to note the lack of availability of certain culturally specific ingredients among South Asian grocery stores. Focus group participants reported a lack of certain ingredients that would have otherwise been available in their native land. This can lead to a South Asian immigrant in the United States freshly navigating South Asian grocery stores and Western grocery stores to face food insecurity as they would not be able to create culturally specific dishes.

Focus group participants also noted issues related to food quality assurance among cultural grocery stores. A theme emerged in which participants consistently noted poor quality of ingredients that were sold among South Asian grocery stores, either in comparison to expectations or what they were used to from their home country. Phrases such as “bad quality” or “expired” were consistently used by participants to refer to the food items. This further emphasizes barriers South Asians face towards food security as the consumption of expired or bad quality food items may negatively affect their health.

Strengths and Limitations

A strength of this study was that it discovered barriers to food security for South Asians residing in the Inland Empire of Southern
California went further beyond the aspect of accessibility. Although accessibility to South Asian grocery stores was noted by participants as a barrier to finding culturally specific food items, this study discovered quality control as another barrier to food security this population faces.

There are a few limitations of this study. One limitation includes the small sample size of twelve South Asian participants within the Inland Empire of Southern California. This may not be representative of all South Asians residing in the specified region. Furthermore, all participants were students which may not be representative of the entire population in the Inland Empire. Moreover, this study did not consider if participants utilized food stamps or food assistance programs.

Recommendations for Research and Practice

As a result of this study, it appears South Asians residing within the Inland Empire of Southern California may be experiencing food insecurity. This study highlighted an interesting point that there were limited studies available regarding food insecurity among South Asians. Therefore, further research is needed to expand to larger geographic areas to gain a better understanding of how food insecurity affects South Asians in other regions. Furthermore, future research should focus on different South Asian subgroups to provide a comparison of the availability of culturally specific food items among the different types of grocery stores.
The findings of this study have implications for how the lack of availability of South Asian grocery stores and culture specific food items play a role in food insecurity among South Asians within the Inland Empire of Southern California. Furthermore, the findings also imply that the cost and quality of culture specific food items cause South Asians to seek alternatives which can further lead to food insecurity. As such, there is a need to improve quality control among South Asian grocery stores. Moreover, to increase accessibility, organizing culture specific farmers market is highly recommended.

Conclusion

This study examined possible barriers to food security among South Asians in the Inland Empire of Southern California face. The results of the study demonstrate that South Asians find barriers such as availability, price, and quality when shopping for culturally specific food items. All participants’ responses incur they experienced at least one of the barriers mentioned. This study serves as a foundation for future research in providing information as to what barriers to food security this population experiences.
APPENDIX A

QUANTITATIVE FIELD DATA COLLECTION TABLES
<table>
<thead>
<tr>
<th>Store name</th>
<th>Location (address with zip code)</th>
<th>Specific ethnicity (Indian, Bangladeshi, mixed, etc.)</th>
<th>Hours of operation</th>
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<td>6.</td>
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<tr>
<td>Food item (use culture specific words)</td>
<td>Commonly eaten during (breakfast, lunch, dinner, snack, etc.)</td>
<td>Specific ethnicity (Indian, Bangladeshi, mixed, etc.)</td>
<td>Common ingredients used (not condiments unless ethnicity specific)</td>
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<td>10.</td>
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Table 3: Phase 3 of quantitative field data collection

<table>
<thead>
<tr>
<th>Food item (use culture specific words) and number from Table 2</th>
<th>Common ingredients used (not condiments unless ethnicity specific)</th>
<th>For each ingredient list the cost at each store from Table 1 (please use store # to identify)</th>
<th>Average and range of cost of cooking the food item</th>
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</thead>
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**Table 4: Phase 4 of quantitative field data collection**

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<tr>
<th>Price range</th>
<th>Name of grocery store</th>
<th>Justification for price range selection</th>
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<td>Low tier price</td>
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### Table 5: Phase 5 of quantitative field data collection

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<th>Food item (use culture specific words) and number from Table 2</th>
<th>Common ingredients used (not condiments unless ethnicity specific)</th>
<th>For each ingredient list the cost at each store from Table 4 (please use store # to identify)</th>
<th>Average and range of cost of cooking the food item</th>
</tr>
</thead>
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APPENDIX B

CONSENT FORM
Consent Form

Barriers to Food Security among South Asian

You are invited to participate in a study that would like to create a survey that is appropriate for South Asian residents in the United States. This study has been approved by the Institutional Review Board of California State University, San Bernardino. The goal of this pilot study is to understand what problems South Asian communities face in order to get culturally-appropriate and/or cost-effective food items. This study is being conducted by Mandopaya Bhatacharya Robens, PhD, MPH, CHES; Salome Moikung, PhD, MPH, MPA, and San Padilla, MPH (Faculty Researchers) from the Department of Health Science and Human Ecology at California State University San Bernardino along with students Subhakar Bhatacharya, Valentin Chaworthay, and Farhan Danish (Master of Public Health Students).

Purpose:
The study will try to understand what problems South Asian communities face when finding culturally appropriate and/or cost-effective food items.

Procedure:
You will fill out a brief questionnaire of 16 questions in English. It should take you no more than 30 minutes to fill out the questions. Next, you will discuss in groups about your South Asian specific food preparation practices and potential barriers you may face to obtain healthy food. This should take no more than 1 hour.

Risks and Benefits:
Your participation will involve minimal risk, however, you may feel uncomfortable providing some information, such as income, and education. Participation is completely voluntary and you may refuse participation at any time or refuse to answer any individual question that causes discomfort.

Confidentiality:
All records will be kept confidential to the extent allowed by law. All data will be collected anonymously and no identifiable information, such as name, contact information, address, etc. will be collected. All data will be saved at CSUSB campus in a password-protected desktop. Results of this study may be published but no names or identifying information will be used.

Right to Refuse:
Your participation is voluntary and you are free to withdraw from participation at any time without suffering penalty. No compensation for participating will be provided at this time. Please notify the researchers if you experience distress during or after participation. If you have
additional questions please contact Montecija B. Becerra, DPhil, MPH mbecerra@csusb.edu
(faculty researcher) at (909) 537-5969 or mbecerra@csusb.edu.

I have carefully read and/or I have had the terms used in this consent form and their significance explained to me. By checking the box below, I am choosing to participate in the study and I agree that I am at least 18 years of age and agree to participate in this project.

☐ I agree to participate in this study.
APPENDIX C

FOCUS GROUP SURVEY
1. “The food that (I/we) bought just didn’t last, and (I/we) didn’t have money to get more.” Was that often, sometimes, or never true for (you/your household) in the last 12 months? Please select one.

[ ] Often true
[ ] Sometimes true
[ ] Never true

2. “(I/we) couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for (you/your household) in the last 12 months? Please select one.

[ ] Often true
[ ] Sometimes true
[ ] Never true

3. In the last 12 months, did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn’t enough money for food? Please select one.

[ ] No (to move to question 4).
[ ] Yes

3a. How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months? Please select one.

[ ] Almost every month
[ ] Some months but not every month
[ ] Only 1 or 2 months

4. In the last 12 months, did you ever eat less than you felt you should because there wasn’t enough money for food? Please select one.

[ ] No
[ ] Yes

5. In the last 12 months, were you every hungry but didn’t eat because there wasn’t enough money for food? Please select one.
6. Is it difficult to find culture-specific food items to buy? Please select one.

[ ] No
[ ] Yes
[ ] I don’t buy any culture-specific food items (move to question 7).

6a. Do you find buying culture-specific food items to be more expensive? Please select one.

[ ] No
[ ] Yes

6b. When buying culture-specific food items, where do you commonly shop? Select all that apply.

[ ] South Asian markets (such as Indian stores, Bangladeshi stores, etc.)
[ ] Western grocery stores (Stater Bros., Ralph, Trader Joes, etc.)
[ ] Online
[ ] Other

7. In general, what difficulties do you face when buying healthy and affordable food?

8. Have you ever participated in a food assistance program (such as food stamp, WIC, etc.)?
8a. Which type(s) of food assistance program have you participated in?

8b. What problems have you faced when participating (including registering for or finding information about) such food assistance programs?

8c. Why didn’t you choose to participate in any food assistance program?

9. What benefits do you think are to participating in food assistance programs?
10. What do you think are the problems to participating in food assistance programs?

11. Where do you usually shop for food items?
- [ ] South Asian markets (such as Indian stores, Bangladeshi stores, etc.)
- [ ] Western grocery stores (Stater Bros., Ralph, Trader Joes, etc.)
- [ ] Online
- [ ] Other

12. What is your age (years)?
- [ ] 18-24
- [ ] 25-30
- [ ] 31-39
- [ ] 40-49
- [ ] 50-59
- [ ] 60 or more

13. What is your sex?
- [ ] Male
- [ ] Female

14. How long have you lived in the United States?
- [ ] Less than 1 year
- [ ] 1-5 years
- [ ] 5-9 years
- [ ] 10 or more years
15. What is your **yearly** household income level (in US dollars)?

_________________

16. What is your highest education level?
[ ] Less than high school
[ ] College graduate (Associate or Bachelor’s degree)
[ ] Masters or higher

Focus group central questions:

1) Do you usually cook your ethnicity specific food items?
   a. Probe if no: What type of food do you usually eat? Do you find healthy food to be expensive? *Skip question 2 if all say no to question 1, otherwise move to question 2.*

2) It been difficult finding your ethnic group-specific food items?
   a. Probe: Where do you usually shop for ethnic-specific food items? Do you feel they are expensive at ethnic stores compared to Western stores?

3) Have you changed how you cook because of lack of access to healthy food items, ethnic specific food items, or cost?
   a. Probe: Do you feel most South Asians living here in the Inland Empire find it easy to find their ethnic group food, why or why not?
APPENDIX D

CITI CERTIFICATE
COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- Name: Valentina Chawedny (ID: 5968274)
- Institution Affiliation: California State University, San Bernardino (ID: 692)
- Institution Email: 004724953@coyote.csusb.edu
- Phone: 909-800-3763
- Curriculum Group: Human Research
- Course Learner Group: Biomedical Research Investigators and Key Personnel
- Stage: Stage 1 - Basic Course
- Description: Biomedical Research Investigators and Key Personnel

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### REQUIRED AND ELECTIVE MODULES ONLY

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For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: [www.citiprogram.org/verify/7b05e0c1f0-7b5f-425a-a0ff-0c8b77e74a7c-22090738](http://www.citiprogram.org/verify/7b05e0c1f0-7b5f-425a-a0ff-0c8b77e74a7c-22090738)

Collaborative Institutional Training Initiative (CITI Program)
Email: support@citiprogram.org
Phone: 888-525-5929
Web: [https://www.citiprogram.org](https://www.citiprogram.org)
APPENDIX E

IRB APPROVAL FORM
February 13, 2019

CSUSB INSTITUTIONAL REVIEW BOARD
Protocol Change/Modification
IRB-FY2018-130
Status: Approved

Prof. Moniraeza Becerra
CNS - Health Science
California State University, San Bernardino
5500 University Parkway
San Bernardino, California 92407

Dear Prof. Becerra:

The protocol change/modification to your application to use human subjects, titled "Barriers to food security among South Asians" has been reviewed and approved by the Chair of the Institutional Review Board (IRB). A change in your informed consent requires resubmission of your protocol as amended. Please ensure your CITI Human Subjects Training is kept up-to-date and current throughout the study.

You are required to notify the IRB of the following by submitting the appropriate form (modification, unanticipated/adverse event, renewal, study closure) through the online Cayuse IRB Submission System.

1. If you need to make any changes/modifications to your protocol submit a modification form as the IRB must review all changes before implementing in your study to ensure the degree of risk has not changed.
2. If any unanticipated adverse events are experienced by subjects during your research study or project.
3. If your study has not been completed submit a renewal to the IRB.
4. If you are no longer conducting the study or project submit a study closure.

You are required to keep copies of the informed consent forms and data for at least three years.

If you have any questions regarding the IRB decision, please contact Michael Gillespie, Research Compliance Officer. Mr. Gillespie can be reached by phone at (909) 537-7598, by fax at (909) 537-7599, or by email at mgillesp@csusb.edu. Please include your application identification number (above) in all correspondence.

Best of luck with your research.

Sincerely,

Donna Garcia

Donna Garcia, Ph.D, IRB Chair
CSUSB Institutional Review Board

DG/MG
REFERENCES

https://doi.org/10.3390/ijerph15081684


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