The factors associated with immigrant obesity in the United States

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Dedication

I dedicate this work to the most important individual in my life, the one person whom without, this journey would not ever have been possible: Jeanette Z. Sufyan; the greatest mother, friend, and mentor. She taught me how to see the world through the eyes of others. I also thank my wife and five children for their continued patience and support throughout my education. Furthermore, I thank all of my teachers and mentors for their hard work and effort.
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Chapter 1: Introduction:

Background and significance of the project.

Obesity is a growing morbidity in the United States (U.S.) that is directly associated with the top causes of mortality (Stein & Graham, 2004), and the efforts of health care providers have failed to meet standards of the Healthy People 2010 projection of 15% obesity in all States (Ogden, Carroll, Kit, & Flegal, 2012). The U.S. has the highest numbers of obese and overweight population leading the top ten countries worldwide (Singh et al., 2009). The most recent CDC figures taking into consideration individuals who are twenty or older show 33.9% are obese and 34.3% are overweight and on their way to becoming obese in the U.S. (Ogden et al., 2012). This translates into 68.2% of the total U.S. population is above their ideal weight. Obesity has been steadily increasing over the last three decades (Ogden et al., 2012), and concurrently, during this period the fastest growing population in the U.S. is the immigrant population (Martin & Midgley, 2003). Very little is known regarding appropriate provider techniques to discuss obesity with this population, because the factors associated with obesity in the immigrant population are not well understood. There is a need to investigate these factors in order to understand how to appropriately counsel the obese immigrant patient. We aim to quantify the factors implicated in the increasing rates of obesity among the immigrant population, which may better equip health care providers when counseling patients to decrease obesity in this target population.

Problem statement:

Obesity is an increasing morbidity in the United States that is directly associated with the top causes of mortality in the immigrant population. Very little is known regarding appropriate provider techniques to discuss obesity with this population, because the factors associated with
obesity in the immigrant population are not well understood. There is a need to investigate these factors in order to understand how to appropriately counsel the obese immigrant patient. We aim to quantify the factors implicated in the increasing rates of obesity among the immigrant population, which may better equip health care providers when counseling patients to decrease obesity in this target population.

**Purpose:**

Our aim was to quantify the factors implicated in the increasing rates of obesity among the immigrant population, which may better equip health care providers to reduce obesity in the immigrant population.

**Research Question:**

What are the factors associated with obesity in the immigrant population?

**Definitions:**

Healthy People 2010: a government sponsored initiative that sets 28 focus area objectives every ten years in order to identify and reduce the most detrimental preventable health threats in the United States in order to promote the overall health of the American population. (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1127182/pdf/818.pdf)

BMI: body mass index, a ratio of weight to height used to assess body composition (http://www.thefreedictionary.com/BMI)


Obesity: defined as a BMI over 30 in adults and greater than the 95% in children (http://www.pediatricweb.com/seattle/article.asp?ArticleID=834&ArticleType=9#1)

WHO- World Health Organization, an organization that seeks to monitor and link health practices throughout the world. (http://www.thefreedictionary.com/WHO)
CDC- Center for Disease Control, the United States organization that monitors, promotes, educates, and facilitates health issues primarily for the U.S. population. (http://www.thefreedictionary.com/CDC)

Immigrants: people who have directly migrated to the United States or their descendants.
Assimilation: adopting the norms of the majority and forsaking ones cultural practices that contradict those norms.

Literature review:

In this research, we sought to locate the factors associated with obesity in the immigrant population by revealing aspects of the individual that are overlooked by health care professionals during the medical interview to reduce bias, yet we argue this is the most valuable tool to combat obesity in the immigrant population. The aim of this research is to equip health care providers with the necessary tools to combat obesity among the immigrant population in the United States. We hope to achieve this aim by seeking to quantify the factors implicated in the increasing rates of obesity among the immigrant population by reviewing the literature and amalgamating these factors into a schema, which will be used to address the gap in dealing with obesity more appropriately. We seek to develop a more effective interview technique based on cultural understanding, which will allow more effective focus on the main determinants of obesity. Targeting these factors we will offer a methodology to produce cognitive change in the obese patient in order to modify detrimental behaviors that promote obesity. We will conclude with a discussion of the results, limitations, and recommendations for future research.
Methodology:

Search terms.
Healthy People 2010 objectives, Obesity and chronic disease, Epidemiology of obesity, Immigrant obesity, Effects of childhood diet on obesity, Immigrant health in the U.S., The decline of health among immigrants, Demographics of obesity, Counseling the obese patient, Understanding culture, culture competence among health care professional, effective medical interviewing, The health belief model, Motivational interviewing, cognitive behavioral therapy.

Databases.
PubMed, Ovid MEDLINE, UpToDate, DynaMed, and AccessMedicine.

Inclusion and exclusion criteria for articles:
Articles selected for my scholarly project were those that identified factors associated with obesity in the immigrant population within the years of 1998-2012. Each reference will be scrutinized and limited to include only peer reviewed articles in the English language, to ensure I use research information that is relevant, accurate, and unbiased. Exclusion criteria will be any articles that are more than fifteen years old, are not associated with obesity in the immigrant population, and that are not in the English language. In addition, I will not include in this study articles from sources that are not peer reviewed research based such as magazines or Wikipedia.

1. First tier studies will be from studies utilizing the experimental design, which is the gold standard that employs double-blind randomized control trials with a placebo group and a large sample size.

2. Second tier studies will be articles that employ the quasi-experimental designed resembling first tier, but since they lack one of the crucial elements of the gold standard
these articles will be considered as possessing weaker evidence, however will be included in the literature review if the information displays strong validity to the research.

3. Third tier studies will be those articles based on surveys and census data.
Chapter 2- Literature Review

Introduction:

**Obesity in the immigrant population.**

Adult obesity is increasing among the immigrant population in the United States (Liu & Waldorf, 2012). Over 60% of the adult U.S. population is overweight/obese, and obesity is the second cause of preventable morbidity and mortality (Zhang & Wang, 2004). The conditions such as hypertension, coronary artery disease, and diabetes are illnesses of the obese patient that continue to plague society despite efforts of Healthy People 2010 (Singh, Kogan, & Yu, 2009). The United States government initiative Healthy People 2010 aimed to decrease the number of obese adults from 23% to 15% by the year 2010 (Singh et al., 2009). Unfortunately, not even one state has been able to accomplish this goal (Singh et al., 2009). Even more disturbing than these figures is the study results by Ogden, Carroll, Kit, & Felgal (2012), which finds that “more than one-third of adults and almost 17% of youth were obese in 2009-2010.” This statistic contradicts the goals of Healthy People 2010 that were set up in the year 2000 to decrease the number of obese, but instead we now have states boasting more than a 30% obesity rate for their population (Singh et al., 2009). Obesity is rising in the U.S. (Ogden et al., 2012) alongside the steady increase in the immigrant population (Martin & Midgley, 2003).

Review of the Literature:

**History and influence of immigration laws.**

During the first 100 years of our great nation’s existence, everyone was welcomed to migrate into our borders to call it their home. During this period, our founding fathers needed many people to settle here to work and build America’s vast lands. This would take many years
of hard work and a great number of individuals from many parts of the world. This opened the
doors of immigration.

In the 1880’s, America first started to bar certain immigrants from entry (Martin &
Midgley, 2003). The individuals who were barred were prostitutes, low skilled contract workers,
and the Chinese (Martin & Midgley, 2003). In the 1920’s, the only people who were allowed to
immigrate to the United States (U.S.) were mostly from Europe (Martin & Midgley, 2003). In
1965, a major policy change made it a priority to favor relatives of U.S. residents and citizens for
immigration (Martin & Midgley, 2003). This resulted in more Latin American and Asian
immigrants who were mainly the first to arrive and settle in the U.S. (Martin & Midgley, 2003).

Two extreme views exist on immigration in the United States. One group’s opinion (including
the Catholic Church) seeks to stimulate economic growth advocating for open borders (Martin &
Midgley, 2003). This group holds that allowing more people to immigrate to the U.S. will
provide the most workers at the lowest labor cost to increase profits and help build the continued
health of our capitalist economy.

The Federation for American Immigration Reform (FAIR) opposes open borders (Martin
Midgley, 2003). This school of thought charges that immigration causes an unnecessary
increase in the population that in turn results in the degradation to the environment and our
American culture. Additionally, there is the displacement of American workers and the lowering
of wages (Martin & Midgley, 2003). FAIR holds that manpower should be taken from our
nation’s current residents, and there should be only a limited number of individuals allowed to
immigrate to the United States. Today about 1 million immigrants are admitted to the U.S. each
year (Martin & Midgley, 2003). There has been a rapid increase in the number of immigrant
populations in the U.S. that has grown consistently since the 1970’s (Martin & Midgley, 2003).
This continued increase in the immigrant population has provided us the opportunity to compare health issues such as obesity to the non-immigrant population. Many professionals and institutions such as social scientists and the Centers for Disease Control and Prevention are investigating the health, social, and behavioral demographics of immigrants. These efforts seek to find similar and differing patterns with non-immigrants as it relates to the health issue of obesity.

There has been a steady increase in the number of individuals immigrating to the U.S. over the past decades. This consistent rise in the American population shows a shift in the demographics of the population. During the 1970’s, we find the population breakdown was that the number of individuals who were White-non Hispanic were 83%, Asian/Pacific Islanders 1%, and Hispanics were 5% (Martin & Midgley, 2003). In 2000, the number of individuals who were White-non Hispanic was 70%, Asian/Pacific Islanders 4%, and Hispanics were 13% (Martin & Midgley, 2003). The projected numbers of the U.S. population in the year 2050 show the number of individuals who will be White-non Hispanic is 52%, Asian/Pacific Islanders 10%, and Hispanics show a 500% increase since the 1970’s to 25% (Martin & Midgley, 2003). This is significant since the number of obese in the U.S. has consistently increased since the 1970’s as well as increasing illnesses in the U.S. population that are associated with obesity.

**Exposure to the United States and immigrant obesity.**

Liu and Waldorf’s (2012) study showed that obesity rose slowly in the U.S. from 1960 to 1990 gradually increasing 10% in 30 years. In the next 18 years from 1990 to 2008 there was a 13% increase in obesity (Liu & Waldorf, 2012). Today there are two-thirds of the total U.S. populations who are overweight with half being obese (Liu & Waldorf, 2012). Individuals immigrating to the U.S. are more likely to originate from countries that have a lower rate of
obesity than their U.S. born counterparts (Liu & Waldorf, 2012). Liu & Waldorf, (2012) found two of the strongest factors that safeguard immigrant populations from the obesity crisis that plagues the United States. The first is that in immigrant origin-countries, their ethnic diets are usually made with more whole grains and the use of fresh locally grown vegetables and fruits. The lack of refrigeration means food must be bought daily from the local marketplace, through physical means, such as capturing livestock, harvesting grains, walking from stall to stall haggling with merchant-farmers who grow their own fresh produce and crops. Furthermore, in the United States foods are processed and fortified with additional supplements, steroids, and fillers, whereas in countries abroad, food ingredients are natural and fresh (Liu & Waldorf, 2012). This causes a change in food content increasing the amount of calories consumed by immigrants once they arrive to the United States. Secondly, these populations are engaged in more physical exercise as a regular part of their daily activity (Liu & Waldorf, 2012). Life abroad is very different than lifestyles in the United States. Living in a village or a highly populated city abroad involves a very active lifestyle consisting of daily walking just to meet the basic daily needs of a family. This is due to the unpaved terrain and overcrowding that makes it impractical to get around in an automobile even if one can afford a vehicle in most impoverished areas. As a result, walking is the main mode of transportation in many immigrant homelands. In contrast, in the United States immigrants usually drive to the grocery store and purchase a large supply of groceries that is kept in a refrigerator. For the immigrant population, there is a change in lifestyle that reduces physical activity promoting obesity in this population (Liu & Waldorf, 2012). This recipe of reduced activity along with increased calorie consumption makes up the two main contributing factors that define the perfect formula to promote obesity among the immigrant population (Singh & Miller, 2004).
As immigrants settle in the U.S. and adopt a more sedentary lifestyle, along with the high calorie diet in the U.S., they are placed into a lifestyle of excess calorie intake. A high caloric diet and inactivity results in weight gain (Singh & Miller, 2004). Singh and Miller (2004) find that immigrant obesity has a positive correlation with increased length of stay in the U.S. They have found that immigrants who come to the United States are initially in general health when they first arrive, but later as they adopt a more sedentary lifestyle and consume higher calorie foods, become just as much at risk for the morbidities associated with obesity. There is a decline in the health of immigrant populations that is directly correlated with the amount of time in the United States since their immigration (Singh & Miller, 2004).

In order to gain an understanding of this phenomenon and explain how time in the U.S. effects the immigrant population, Liu and Waldorf (2012) researched different time scales, such as age at immigration and length of stay within the U.S. as it relates to obesity of different cultural backgrounds, mainly Latinos and Asians. The data of this research was obtained between May 2002 and November 2003 from the National Latino and Asian American Study (NLAAS). The number of subjects consisted of n = 2,554 Latinos and n = 2,095 Asian immigrants in the U.S who were 18 years or older. The main focus of the study was to look at the prevalence of psychiatric disorders and the use of mental health services in these immigrant populations. The survey also gathered demographic information including height and weight of participants. Persons who were excluded from the study included respondents born in the U.S., those who were over 65 years of age, and participants with any pertinent missing values. In addition, anyone who had extreme body mass index (BMI) values clustered as those persons falling in the top 1% or bottom 1% were also excluded to avoid outliers. The total number of analyzed subjects were n = 2,780 of which 51.9% were Asian immigrants and 48.1% Latino
immigrants. The analyzed subjects were further stratified into two subgroups based on the age they immigrated to the U.S. These two groups were divided into those who immigrated as adults (n = 1911) and those who immigrated as children (n = 869) (Liu & Waldorf, 2012).

Results of this study were based on bivariate correlation coefficients between BMI and explanatory variables. For both groups (immigrated as adults and immigrated as children) the immigrants’ origin (the county immigrated from) was found to be the strongest predictor of BMI for both Asians who immigrated as adults and for Asians who immigrated as children (p < 0.05). The remaining immigrated as adult variables were not significant predictors of BMI. Analysis of the group immigrated as children showed the variables age at time of survey, marital status, and education all as being moderately strong predictors of BMI (p < 0.05). These outcomes indicated that the BMI of immigrants increased with older age, immigrants who were never married were found to have lower BMI’s than those who were married, and having a lower education level was found to be associated with a higher BMI.

Three models were utilized to explain variation from the data for each group: the immigrated as adults group was explained using Models (one-three) and the immigrated as children group was explained using Models (four-six). The models were designed to measure effects of thirteen independent variables on the dependent variable BMI.

Model one reveals that on average male BMI is higher than female BMI by 1.131 Kg/m2 (p < 0.05), however many of the variables that one would expect to be strong BMI predictors such as the Income variable, Education variable, and the Smoking variable were not significant. However, in contrast the immigration context variables do have a strong impact on immigrant BMI (p < 0.05). The results show that these variables proved to be significantly different than zero at (p < 0.05). The country of origin variables Mexican and Asian were significant as it
relates to BMI (p < 0.05). The Asian immigrants have a lower BMI by 3.54 kg/m² than non-Asian immigrants’ BMI. Furthermore, being from Mexico adds 1.064 kg/m² to persons BMI. In addition, the first few years after immigration (< 5 years) also proved to be significant (p < 0.05) as it relates to BMI. Arriving to the U.S. less than five years on average showed a 0.588 kg/m² higher BMI than immigrants who have resided in the U.S. longer. This result points to an “immediate cultural disruption” that occurs when initially arriving to the U.S. imposing a high weight gain risk for immigrants (Liu & Waldorf, 2012).

Model two analyzed female and male differences and model three evaluated disparities between Asians and Latinos. The effects of BMI predictors in model 2 differ between males and females. Higher income for men (p <0.05) was found to be associated with higher BMI, but this was not true for females. Higher English literacy for females (p < 0.05) increases their BMI significantly, but this was not true for males. In model 3 it was found that BMI disparities between Asians and Latinos differed significantly (p < 0.05). The variables income and education significantly impact BMI (p < 0.05) on average increasing BMI when income is higher and education level is lower for Asians, but this was not true for Latinos. Yet, Latinos with better English proficiency (p < 0.05) had a significantly lower BMI (Liu & Waldorf, 2012). For the Hispanic immigrant whose length of stay increased so too did the ratio of obesity (p < 0.05). The long term immigrants (>15 years) showed 4 times the increased risk of obesity (p = < 0.05) than did recent immigrants (<5 years). The rate of obesity among recent immigrants, although initially lower tends to increase to rates equal to their U.S. born counterparts over time (Liu & Waldorf, 2012). Several studies have researched the length of residence in the United States and its relationship to the obesity of the immigrant population.
**Increased length of residence and obesity of immigrants.**

In Kaplan, Huguet, Newsome, and Mcfarland (2004), Hispanics were the focus group of this study that analyzed the length of residence in the U.S. as it relates to obesity among Hispanic immigrants. Kaplan et al. (2004) argue that in general, newly arrived Hispanics are healthier than their U.S. born counter parts, but this healthy aspect tends to diminish with longer duration of stay in the U.S. The study sought to examine if length of residence in the U.S. was associated with obesity (BMI>30) by utilizing a multiple regression to analyze the results of n = 2,420 foreign born Hispanics who were over 18 years of age from the 1998 National Health Interview Survey (NHIS).

In this study there were n = 1,341 females and n = 1,079 males whose ages ranged from 18 to over 65 with the mean age at 38.9. Most participants were from Mexico 54.4%, 8.2% were from Cuba, and 37.4% were from various other Latin American countries with less than half 42.9% having graduated high school. The results were divided into 0-4 years, 5-9 years, 10-14 years, and more than 15 years of stay in the U.S. Obesity for the 0-4 group was 9.4%, the 5-9 group was 14.5%, the 10-14 group was 21%, and the over 15-years group was 24.2%. The results of this study indicated that assimilation and acculturation help Hispanics gain improvement in economic and social standing initially, because incomes increased, but adopting the unhealthy eating habits and sedentary lifestyle in the U.S. increased their risk of obesity the longer they reside in the U.S. (p < 0.05). For participants with >15 years of residence, the risk of obesity was 4.31 times greater with an estimated OR of 4.31 with 95% CI [2.39, 7.78] compared to individuals who immigrated to the U.S 0-4 years. As a result, their risks of morbidity leading to premature mortality also increased.
Individuals who carry excess weight are steadily increasing in the U.S. and have been estimated to be close to 65% of the U.S. population (Bowie, Juon, Cho, & Rodríguez, 2007). Between the years of 1976-2000, obesity has increased by 110% among all ages and ethnicities according to the National Health and Nutrition Examination Survey, yet the greatest increases have occurred in the Hispanic population (Bowie et al., 2007). Bowie et al. (2007) argue that Hispanics are the fastest growing demographic in the U.S; yet using the term “Hispanic” is too broad to understand the variations within the multiple countries encompassed by this term. As a result this study sought to estimate the prevalence of those who are overweight or obese among Mexican and Central American California residents using the 2001 California Health Interview Survey. The Survey examines social, cultural, and behavioral factors as variables. This study examined n = 9,460 respondents of which 87.8% were Mexican American and 10.8 were Central American with 73% being immigrants. There were 51% males and about 49% females whose ages ranged from 18-105 years of age. For all analyses statistical significance was considered at a p value less than or equal to 0.05. Findings of this study indicated that being Hispanic was more likely to be associated with being overweight than being non-Hispanic and females had higher rates of being overweight than men (Bowie et al., 2007). Mexican American’s had high rates of obesity (33%) especially if they had lower education (Bowie et al., 2007). Higher age was associated with obesity in both groups, yet Central Americans with a college education were more likely to be obese than Central Americans without a college education. In addition, living in the U.S. for more than 15 years was strongly correlated with obesity for both Central American and Mexican American men, but not for women in either group. Yet, the lack of physical activity was associated with obesity among Mexican American women.
Driscol (2010) reports that the Mexican population is predicted to grow from 16% in 2010 of the total U.S. population to 30% in 2050. This is important because in 2007-2008 obesity rates grew for Mexican men in the U.S. from 28.9% to 35.9% and for Mexican women from 39.7 % to 45.15 (Driscol, 2010). The National Health and Nutrition Examination Survey (NHANES), which is a nationally representative annual study of 5000 individuals, is the data source for this study. The sample includes respondents ages 24-70, of which 1,117 were female and 1,083 were male who all identified themselves of Mexican origin. Interviews were conducted where heights and weights were measured. The interviews gathered information about demographics, socioeconomic status, dietary, and health-related questions. Results indicated that Mexican Americans (p < 0.05) have a higher rate of obesity than other immigrants. If the immigrants came to the U.S. before age 20, they were most likely to be obese. This study found that a major factor for obesity is the age at immigration (p < 0.05). Immigrants adopt the American lifestyle when they arrive at a younger age to the U.S. Immigrants younger than 20 years of age at arrival to the U.S. are at higher risk of being obese with increasing duration of residence (p < 0.05) than those who arrive at an old age. Thus health intervention should target young immigrant Mexican men to best prevent obesity. Older Mexican males who immigrated to the U.S. tended not to gain weight or adopt an American life style. For Mexican women (p < 0.05), there was no distinction of age as it relates to intervention timing and overall Mexican females in this study became obese over time in the U.S. since immigration.

Sanchez-Vaznaugh, Kawachi, Subramaniam, Sanchez, and Acevedo-Garcia (2008) examined the effect of birthplace and length of residence on body mass index (BMI) to help understand obesity contributors in California’s immigrants, as well as to locate factors that could prevent obesity. The survey used data collected from n = 37,150 adults from the 2001 California
Health Interview Survey and attempted to investigate how the influence of birthplace and length of residence varied by gender, education, and race. The sample of respondents varied in age from 25-64 years of age, n = 13,072 were female and n = 9,942 were male. The racial ethnicity of study participants included 56% White, 6% Black, 13% Asians, and 25% Hispanics. Results showed an increase of BMI with length of residence for both women and men (p < 0.05), with women having a steeper BMI increase with longer residence. BMI was also found to be increased when immigrants had a lower education or some college education, while graduate or higher educated immigrants actually had a decrease in BMI by 1.4%. Hispanics were found to be the group at most risk for increased BMI (p < 0.05) when compared to the other groups of this study (Sanchez-Vaznaugh et al., 2008).

Sanchez-Vaznaugh et al. (2008) found in their analyses that there is a protective effect of foreign birthplace on BMI that tends to diminish with increased U.S. residency. Having longer residence was the strongest association linked to having the greatest increase in BMI (p < 0.05), among females, Hispanics, and the educationally disadvantaged. Sanchez-Vaznaugh et al. (2008) also recommends that when seeking to combat obesity, efforts should take into consideration immigrant status including education, gender, and race/ethnicity to effectively prevent this epidemic. Sanchez-Vaznaugh et al. (2008) also found that being born outside the U.S. is an independent determinant of BMI. In comparison to U.S. born adults, being born outside the U.S. was associated with lower BMI (p < 0.001) even when controlling for other variables such as gender, age, income, education, marital status, and fruit and vegetable consumption (Goel et al., 2004). It was found that U.S. born adults had the highest BMI, and immigrants with short U.S. residence had the lowest BMI, yet when looking at immigrants who were in the U.S. for longer than 15 years (p < 0.05) their BMI was almost as high as the U.S. born respondents.
McDonald and Kennedy, (2004) combine several cross sections of data from the National Population Health Survey and Canadian Community Health Survey in an attempt to locate the ‘healthy immigrant effect’. This study was done to understand if immigrants are an undue burden to Canada’s tax payer funded health care system and to test for their health care system’s adequacy in regards to cost as it relates to the immigrant population. The participants ranged in ages from 20-65 with n = 63,953 women born in Canada, n = 9,812 women born elsewhere, n = 57,224 men born in Canada, and n = 8,942 men born elsewhere. Ethnicity was not included as part of this research design only with respect to native Canadian or non-native Canadian. In 2001, 18% of Canada’s populations were immigrants. This study found that the health of new arrivals usually improves (p < 0.05) at first after immigrating to Canada and is actually better for period (< 10 years) than their native-born citizens. This survey finds that both female and male immigrants possess a protective health mechanism upon initial arrival to the west that diminishes with increased time. After 10 years or more from immigration to Canada, the health of these immigrants worsened.

In a later study, McDonald and Kenney (2005) sought to understand immigrant health issues by seeking to find the factors associated with gaining excess weight by utilizing data from two combined large health surveys the 1996 National Population Health Survey and the 2000-2001 Canadian Community Health Survey. The purpose of this study was to understand how the weight of recent immigrants to Canada compares to native-born Canadians, and how likely immigrants are to become overweight/obese with increase residents in Canada. The study results showed that the probability of being overweight or obese for most immigrants to Canada is initially lower when they arrive to Canada and then as the duration of residency increases so too does this risk of obesity (p < 0.05). Even more remarkable is the findings that after about 20
years in Canada risks of being obese meet and even exceed the native born Canadian counterpart risk ($p < 0.05$).

Goel, McCarthy, Phillips, & Wee (2004) published an article focusing on the duration of residence of several immigrant populations that showed the longer the duration of residence of an immigrant population in the U.S. the higher their body mass index (BMI). Living in the U.S. for 10 years or more showed a definite increase of BMI in all immigrants except “foreign-born blacks” (Goel et al., 2004). The study examined $n = 32,374$ respondents out of which $14\%$ were immigrants. The ethnic breakdown for U.S. born respondents was $n = 20,184$ White, $n = 4,087$ Black, $n = 2,279$ Latino, and $n = 150$ Asian and the ethnic breakdown of respondents born outside the U.S. was $n = 1,019$ White, $n = 405$ Black, $n = 3,198$ Latino, and $n = 696$ Asian. The prevalence of obesity among all respondents was found to be $16\%$ in immigrants and $22\%$ of the U.S. ($p < 0.001$) born respondents. Goel et al. (2004) found that among foreign-born participants, those with greater than 15 years of residency in the U.S. had a $39\%$ increased risk of obesity with estimated OR of $1.39$ with $95\%$ CI $[0.84$ to $1.94]$. For respondents living in the U.S. for less than one year, obesity prevalence was $8\%$, but living in the U.S. for at least 15 years increased prevalence of obesity to $19\%$ (U.S. born was $22\%$), more than doubling the risk of being obese for the immigrant population.

**Obesity in the pediatric adolescent Immigrant.**

Popkin and Udry (1998) conducted a longitudinal study of adolescent health looking at obesity, because of its implications on health, social, and economic consequences. The participants for this research were adolescents in grades 7-12 from 80 high schools in the U.S. The research was conducted by the University of North Carolina at Chapel Hill, which collected data from $n = 13,783$ adolescents from which overall $26.5\%$ of students were obese. There were
n = 7,384 females (50.9%) and n = 7,120 males (49.1%) whose ages ranged from 12-22. In this study 24.2 % were white-non-Hispanic, 30.9% Black-non-Hispanic, 30.4% Hispanic, and 20.6% Asian American. Results of this study showed that Chinese 15.3% and Filipino 18.5 % had lower obesity than non-Hispanic whites (p < 0.05). Yet, all groups showed more obesity in males than in females (p < 0.05) except for Blacks. For Black males 27.4 % were obese and for Black females 34% were obese. Asians and Hispanics born in the U.S. are more likely to be obese than Asian and Hispanic new immigrants (p < 0.05).

Singh, Kogan, and Yu (2009), using the 2003 National Survey of Children’s Health, examined n = 46,707 immigrant and U.S. born youths ranging in ages from 10-17 to find the prevalence of obesity as well as the “socio-behavioral correlates of obesity” and being overweight. The data was divided into 12 ethnic-immigrant subgroups from the main groups of Hispanic, non-Hispanic Whites, non-Hispanic Blacks, and non-Hispanic-other that were studied using logistic regression based on race and generational status as it relates to obesity. Findings indicated that first generation immigrant children (p < 0.05) had a 26% lower risk of obesity than their U.S. born counter parts, and obesity was lower for immigrant children than U.S. born children (p < 0.05). When comparing native-born white children, the odds of obesity was 55% higher for second-generation Hispanic immigrants and 63% lower for first-generation Asian Immigrants (p < 0.05). Overall the study found that 15% of all U.S. children 10-17 were obese and 31% were overweight (p < 0.05) and on their way to becoming obese.

**Obesity in Adult Immigrants in the United States.**

Roshania, Narayan, and Oza-Frank (2008) analyzed data on n = 6,421 adult immigrants from the New Immigrant Survey to understand if obesity among the immigrant population is associated with age at arrival to the U.S. and if there is a dietary change that occurs. The
respondents were 55% female who were divided into ethnic regions of origin that included Latin America and the Caribbean (45.83%), Sub Saharan African (5.69 %), Europe and Central Asia (12.73%), Middle East and North Africa (3.46%), and Asia (30.52%). Most immigrants in this sample lived in the U.S. less than or equal to five years and half were younger than 30 years of age. The effects of the duration of residence and age at arrival on obesity were tested using multiple regression analyses. For all analysis statistical significance was considered at a p value less than or equal to 0.05. The study results showed that 23.74% of Asian’s immigrants were overweight/obese upon arrival compared to 51.25% of immigrants from Latin America and the Caribbean. The study found that immigrants arriving younger than 20 years of age were more likely to be obese (p < 0.05) with longer U.S. residence than immigrants who arrive to the U.S. at an older age. The most significant factor was found to be that increased duration of residence increases the odds of being obese, and the age of the immigrant at arrival significantly affects these odds. There was a significant interaction between duration of residence in predicting dietary change (P < 0.001). Therefore, immigrants who have been in the U.S. longer were more likely to report high dietary change when compared to new immigrants who recently arrived to the U.S. Immigrants who arrive to the U.S. at a younger age are more likely to change their diet with longer residence and to be 1.32 times likely to be obese with a 95% CI [1.13, 1.53].

Zang and Wang (2004) studied the prevalence of obesity using the National Health and Nutrition Examination Survey III of 1988-1994 in adults aged 18-60 using the concentration index (p < 0.05) to assess socioeconomic status (SES) as it relates to obesity. In this study there were n = 5,762 respondents of which n = 1,863 females and 1,763 males who were divided into ethnic group variables of Non-Hispanic White (n = 524 females, n = 449 males) Non-Hispanic Black (n = 637 females, n = 560 males), Mexican American (n = 612 females, n = 674 males),
and Other (n = 89 females, 80 males). The findings of this study indicated socioeconomic inequality existed in most of the age and gender groups (p < 0.05). There was a relationship between SES and obesity that showed minority groups do not usually have a higher inequality in SES as it relates to obesity when compared with Whites, but minorities are more likely to be obese (p < 0.05). Yet, there was an inverse relationship between obesity and SES among Whites (p < 0.05). There was also a strong SES inequality of obesity in women when compared to men (p < 0.05).

**Mortality risks of the obese immigrant.**

The *American Journal of Public Health* published the results of a study in which data was analyzed from 1979-1989 to locate mortality risks of immigrants with respect to U.S. born individuals (Singh & Siahpush, 2001). The respondents of this study were n = 159,860 females and n = 141,323 males who were divided into ethnic groups of Hispanic (n = 237), Other (n = 192), Non-Hispanic-White (n = 14,666), and Non-Hispanic-Black (n = 1,761). This study revealed that mortality rates were lower in foreign born immigrants than for their U.S. born counterparts. Immigrant males had an 18% lower risk of mortality and immigrant females had a 13% lower risk of mortality than their U.S. born counterparts. This study did not examine length of stay or variations of life style behaviors which will be discussed later in this research project.

Ogden, Carroll, Kit, & Felgal (2012) find that “more than one-third of adults and almost 17% of youth were obese in 2009-2010.” This means over 78 million U.S. adults and 12.5 million children were obese in 2009-2010 (Ogden, et al. 2012). Obesity increases the risk of the health conditions such as type 2 diabetes, hypertension, and cardiovascular diseases that are the leading causes of morbidity in the U.S. (Ogden, et al. 2012). Obesity is increasing and the
harmful conditions associated with obesity are also increasing thereby putting the U.S. population at risk of debilitating morbidity and premature mortality.

Obesity is directly associated with all causes of mortality in the U.S. which is the focus of this paper as it relates to the immigrant population (Sanchez-Vaznaugh et al., 2008.) In the United States, many studies have been conducted to determine reasons why a health change occurs for the immigrant population as it relates to obesity. These studies have examined many aspects focusing on the length of residence in the U.S., as well as country of origin, and other demographic information such as gender, education, behavioral, and socioeconomic factors (Sanchez-Vaznaugh et al., 2008).

**Models to Reduce Immigrant Obesity in the United States.**

Kumanyika et al. (2008) conducted an interdisciplinary interventional research project for the American Heart Association that stated specific scientific aims to promote healthful eating, physical activity, and energy balance to prevent excess weight and obesity throughout life in the U.S. among immigrants and non-immigrants. The aims stated in the study were: “1) to raise awareness of the importance of undertaking population-based initiatives specifically geared to the prevention of excess weight gain in adults and children; 2) to describe considerations for undertaking obesity prevention overall and in key risk subgroups; 3) to differentiate environmental and policy approaches to obesity prevention from those used in clinical prevention and obesity treatment; 4) to identify potential targets of environmental and policy change using an ecological model that includes multiple layers of influences on eating and physical activity across multiple societal sectors; and 5) to highlight the spectrum of potentially relevant intervention and the nature of evidence needed to inform population–based approaches.” The study sought to highlight a way to combat and prevent obesity using a multi-factorial
approached to positively reinforce the many “environmental context factors” that are not within individual control. The design applied a public health effort to prevent obesity by seeking to develop a self-reinforcing approach, which will make both healthy eating and an active lifestyle a regular part of daily life.

The Institute of Medicine found that using an ecological approach to prevent obesity was one of the best methods to address the environmental and social determinants of obesity that are based on policies that are beyond individual control. This interventional system seeks to address the cultural influences upon the individual that promote obesity overall in the U.S. This method seeks to change the message of influences on the individual that continually promote over consumption through the media, marketing, agriculture, education, and social norms. The key to this intervention is promoting a way of life that includes healthy eating and daily activity through a lifestyle that is reinforced in all sectors of one’s life.
Chapter 3 – Discussion/Conclusion

The literature reviewed in this research differed in methodological approaches, sample sizes, and target populations; however, overall this study revealed there was a significant relationship found between duration of residence in the U.S. and weight gain for the U.S. immigrant. Despite the differences in each article researched in this study, this review expounded significant findings across studies that duration of residence is positively correlated with being overweight and obese in the immigrant population. We found this to also be true in other countries, such as Canada, even though the immigrant U.S. population was the focus of our research. In addition, age at arrival was found to be a significant factor with regard to immigrant obesity. Specifically, being younger at arrival to the U.S. makes an immigrant more likely to become obese. This further reinforces the importance of focusing on the duration of residence as an important aspect of immigrant obesity.

Martin and Midgley (2003) conclude that the U.S. is fastest growing destination for the world’s immigrant population. Kaplan, Huguet, Newsome, and Mcfarland (2004) determined there is an increased risk of obesity to the immigrant population the longer they live in the U.S. due to adopting a more sedentary lifestyle and unhealthy diets. When seeking to combat obesity current programs and policies often exclude the immigrant population (Sanchez et al., 2008). Roshania et al. (2008) found that immigrants who arrive to the U.S. before age 20 are at greater risk for becoming obese than immigrants who arrive at an older age. Prevention programs must target at risk immigrant children in order to effectively combat obesity (Driscol, 2010). There is also a substantial socioeconomic inequality when it comes to obesity rates in the immigrant population (Zang & Wang, 2003). For this reason, Stein & Graham (2004) argue that to be successful in combating obesity, health care providers must advocate for a lifestyle intervention
overtime that encompasses a larger multilevel intervention. There are many targets that need attention in order to effectively combat obesity by promoting healthy eating and an active lifestyle on a daily basis. This comprehensive method focusing on, “influencing policy change, mobilizing neighborhoods, changing organizational practices” is calling for a different way of life, one that is reinforced at all levels (Kumanyika et al., 2008). This is not an individual problem and should not be approached in this fashion as it has been unsuccessful in the past. As health care providers, we must change the way we combat obesity in order to change this epidemic in the U.S. and across the world.

**Research Question.** What are the factors associated with obesity in the immigrant population?

The factors that were significant across the majority of articles reviewed in this research as determinants of immigrant obesity are an immigrant’s age at arrival and the duration of residence in the U.S.

**Future research and limitations.**

Future research is recommended to locate the frequency that medical providers mention the excess weight of an immigrant patient during the medical interview. This may better equip health care providers the ability to more effectively reduce obesity in the immigrant population. In addition, studying the various ethnic diets of immigrant groups may provide powerful data to help combat obesity.

Limitations of this research are that Sanchez-Vaznaugh et al. (2008), Bowie et al. (2007), Roshnia et al. (2008), and Gopal et al. (2009) used self-reported data in their research studies and did not record height and weight for BMI calculations. This study lacked the ability to make meaningful comparisons between ethnic immigrant populations with respect to their traditional diets, which may be a powerful influencing factor of obesity for each ethnic group. Kaplan et al.
(2004) states that specific “acculturation influences” such as diet, sedentary lifestyle, and social influences should be evaluated in future research. Furthermore, Liu & Waldorf, (2012) site that longitudinal research is needed to further evaluate the obesity promoting culture in the U.S. to better understand why immigrants tend to have increased BMI over time. Goel, McCarthy, Phillips, & Wee (2004) state that further research should explore the factors of obesity using a more “culturally sensitive” method such as looking at cultural differences between the provider and patients, language barriers, and the clinician’s “perception about lifestyle behaviors” of foreign born immigrants as it relates to obesity.

**Relevance to the PA Profession.**

Health care providers have continued in their struggle with the increasing rates of obesity in the immigrant population. To prevent the growing morbidity of the obese immigrant, factors implicated in the increasing rates of obesity must be understood. The aim of this study was to locate the factors associated in the increasing rates of obesity among the immigrant population. Understanding the pathophysiology of any disease process is an essential component to proper treatment. Similarly, understanding the factors associated with obesity is essential to the physician assistant (PA) who is seeking to appropriately counsel this patient demographic. The PA professional has a unique opportunity in primary care to begin medical intervention by helping the obese immigrant patient recognize the factors that promote obesity during the medical interview. Weight reduction strategies require a lifestyle change that includes healthy eating and daily activity that is reinforced in all sectors of one’s life. The key to this intervention is helping the immigrant patient feel empowered by promoting weight reduction focusing on the associated factors during every visit.
References


Figure 1.1

Figure 1.2

Figure 1.3

The United States Population by Race & Ethnic group in 2050. (Data from Martin and Midgley, 2003).
Figure 2

Figure 3

Obesity rates by country (Data from Liu & Waldorf, 2012).
“Multilevel, multisectoral approach” to combat obesity, Reprinted from Kumanyika et al. 2008.)
Abstract

Objective: Our aim was to quantify the factors implicated in the increasing rates of obesity of immigrants to help providers reduce obesity in the immigrant population.

Method: Databases searched included PubMed, Ovid MEDLINE, UpToDate, DynaMed, and AccessMedicine.

Results: Seventeen articles selected for this study were analyzed looking at demographic information and factors that were significant in predicting the body mass index of immigrants across different time periods since immigration.

Conclusion: Factors that were significant across the majority of articles reviewed in this research as determinants of immigrant obesity are an immigrant’s age at arrival and the duration of residence in the United States. Prevention programs must target at risk immigrant children in order to effectively combat obesity and health care providers must advocate for a change in lifestyle overtime that encompasses a larger multilevel intervention that addresses the environmental and social determinants that are beyond an individual’s control.