Religiosity, Dietary Acculturation, and Obesity Among Immigrants To The United States

Samira Rahman

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RELGIOOSITY, DIETARY ACCULTURATION, AND OBESITY AMONG IMMIGRANTS TO THE UNITED STATES

by

Samira Rahman

A Thesis
Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Arts

Major: Sociology

The University of Memphis
August 2024
Dedication

This dissertation is dedicated to my cherished daughter Rufaida Amatur Rahman, whose presence has filled my life with joy and purpose, and to my loving husband, whose steadfast support and encouragement have been my anchor throughout this journey.
Acknowledgement

I would like to express my deepest gratitude to my thesis advisor, Dr. Joseph Lariscy, for his invaluable guidance, insightful feedback, and unwavering support throughout this journey. His expertise and dedication have been instrumental in shaping this dissertation.

I am also profoundly thankful to my committee members, Dr. Gracen Peterson and Dr. Wesley James, for their thoughtful critiques, encouragement, and the wealth of knowledge they shared. Their contributions have significantly enhanced the quality of my work.

To my friends and family members, your constant encouragement and understanding have been a source of strength and motivation. Your patience and belief in me have carried me through the challenging moments and celebrated with me in the victories. I am especially grateful to my beloved husband, whose unwavering support has been my rock, and to my daughter, who inspires me daily and to my parents for their continued support and prayers for my success.
Abstract

Obesity, influenced by lifestyle choices, has risen sharply worldwide and is linked to diabetes, cancers, and cardiovascular diseases. Among U.S. immigrants, obesity risk often increases with acculturation to American practices. However, religious involvement and maintaining a native diet may protect against obesity. Using 2003 New Immigrant Survey data, this study examines the relationship between religion and obesity among immigrants. Results show significant variations: Jewish immigrants have the highest obesity risk, while Buddhist immigrants have the lowest, due to cultural and dietary practices. Longer U.S. residence and older age correlate with higher obesity rates. The findings emphasize the need for culturally and religiously tailored public health interventions to address obesity in diverse immigrant populations. Understanding these factors can help develop targeted strategies to combat obesity and its associated health risks.
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**Introduction**

Obesity is now a critical health concern globally. In the United States in 2017-2018, 42.4% of adults and youth were obese, and 9.2% severe obese, up from 30.5% of obese, and 4.7% of severe obese in 1999-2000 (U.S. Department of Health and Human Services. (n.d.)). High-caloric, processed foods have become more accessible, leading to increased caloric intake (Rolls 2003). Concurrently, physical activity has drastically declined, with a 50% reduction since 2005 (CDC 2007). This combination of dietary habits and sedentary lifestyles escalates obesity rates, positioning it as a risk factor for significant health issues such as heart disease, type 2 diabetes, and certain cancers (CDC 2021). Obesity also impacts psychological and financial well-being, indicating a multi-faceted challenge needing comprehensive strategies (Li & O'Connell 2012).

Given the complex factors contributing to obesity, examining how these factors manifest in diverse populations, such as U.S. immigrants, becomes increasingly important. Immigrants account for over 13% of the U.S. population, more than 45 million people, and they present a unique blend of cultural and religious backgrounds with significant implications for their health behaviors (American Immigration Council, 2023). By 2065, their numbers could exceed 78 million. The varied origins, cultural practices, and religious beliefs of these immigrants - a majority being Christians (68%), and significant proportions being Muslims and Hindus (each around 4%) according to the Pew Research Center (2015) - underscore the need to understand how these factors interplay with dietary and lifestyle choices. Over 80% of these immigrants consider religion as necessary (Pew Research Center, 2024), influencing their nutritional habits and physical activities, thus affecting their obesity risk. This consideration is vital for tailoring health-related studies and interventions for more effective social and economic integration.
Existing research highlights a range of social and cultural factors, such as religion and religious practices, which are closely linked to dietary habits, activity levels, and obesity. For example, while investigating the role of religiosity in obesity, Dodor (2012) and Reeves et al. (2012) suggest that religiosity can affect people’s health behaviors. Dodor (2012) found that a high level of church attendance combined with religious practices encouraged healthy eating habits among participants. Similarly, religious practices in general have been associated with several measures of well-being (Ferraro 1998). Contrary to this finding of a positive relationship, Ellis and Biglione (2000) and Reeves et al. (2012) did not observe any significant relationship between religiosity, spirituality, and weight. Yet other research found that overweight or obesity people self-reported a higher prevalence of attending religious services that others (Gillum 2006). Reeves et al. (2012) further revealed a non-significant moderation effect of demographic factors on the relationship between religiosity and obesity. Similarly, Dodor (2012) also found that increased prayer time or making religion more important in life were tied to poor eating habits and obesity.

Therefore, current findings present a varied perspective on the impact of religion on obesity, lacking a unified consensus. Moreover, to the author's knowledge, there appears to be a gap in research regarding how obesity prevalence varies among major religious groups, particularly within the context of immigrants in the United States. Moreover, as people stay longer in the United States, they become accustomed to the culture and the food habit of the native residents and hence are susceptible to a higher obesity rate. But immigrants who maintain the diet of their origin country may be less likely to become obese, and religious involvement may encourage such diets.

While previous research has often focused on the direct impact of religion on obesity within specific sub-groups, such as Muslims, my study expands this scope to explore obesity differences
among followers of significant religions among immigrants in the United States. This leads me to the central research question: how do religiosity and dietary acculturation influence obesity among immigrants in the United States? I utilize data from the New Immigrant Survey (NIS) to address this research question.

Background

New Immigrant Survey

The New Immigrant Survey (NIS) is a significant endeavor that aims to create a comprehensive public-use database on new legal immigrants to the United States and their children. This database provides valuable insights into migration behaviors and impacts, a crucial aspect of our society. The project involves sampling cohorts of new legal immigrants and tracking them over time, with new cohorts selected every four to five years or as needed due to changes in U.S. immigration policy or global conditions. The sampling frame is based on electronic administrative records from the U.S. government, including all adult immigrants granted lawful permanent residence (LPR) during a specified period and two types of child immigrants. This frame includes both new-arrival immigrants and adjustee immigrants, who adjust to LPR status from within the U.S.

These surveys are part of a longitudinal study aimed at understanding migration behaviors and the impacts of migration on new legal immigrants to the United States and their children. The data collected provides insights into various aspects of immigration, including integration, health, and socioeconomic status, and is publicly accessible for research purposes. The design and execution of the NIS were the result of a collaborative effort, with support from various institutions, including the National Institutes of Health, the National Science Foundation, and the
Pew Charitable Trusts. Interviews are conducted with sampled adult immigrants, their spouses, sponsor-parents of sampled child immigrants, and their spouses. The NIS design, refined over many years through discussions among immigration researchers and policymakers, involves a multiple-cohort, longitudinal survey that collects both retrospective and prospective data. The survey's feasibility was confirmed through a pilot study in 1996 (Jasso et al. 2005).

NIS survey includes two primary cohorts of data collection. The first, a pilot study known as NIS-P, conducted baseline interviews with 1,127 adult immigrants from October 1996 to February 1998. The second, the first entire cohort (NIS-2003), sampled immigrants between May and November 2003, with a baseline round conducted from June 2003 to June 2004. Follow-up surveys, which were conducted in early 2007 and beyond, covered both adult and child samples, and aimed to track the experiences and outcomes of the initial cohort over time. The initial entire cohort included a total of 8,573 adults and 810 children (Office of Population Research, n.d.).

Religion and Health

According to current studies, religion may impact a person's health, health behaviors, and overall well-being. Higher religious adherents have been found to have healthier lifestyles, experience fewer illnesses, feel better overall, and live longer than average (Hummer et al. 1999; Koenig 1999). Religious affiliations can influence dietary practices and physical activities, thereby impacting obesity risk. Investigations into eating habits across various religious communities uncover a nuanced relationship involving cultural, religious, and personal elements. Current findings indicate that people’s religious dietary precepts can shape their food habits (Shatenstein 1998). Similarly, White (2018) highlights the heterogeneity of religious consumers and the impact of religiosity on food production and consumption. For example, some religions promote fasting
during religious holidays and dietary restrictions. Muslims are encouraged to eat according to halal requirements, Jews are encouraged to eat kosher diets, and Hindus are encouraged to abstain from beef. In addition to being displays of religious adherence, these dietary practices may confer health benefits and reduce the risk of obesity. Many religions also encourage abstinence or moderation of alcohol consumption, tobacco use, and drug use.

The complexity of obesity emerges from a blend of individual behaviors and broader social factors (Williams et al. 2015). The moderating effects of various social and environmental factors may make the causes of obesity more complex (Boardman et al. 2005). Existing research shows that a person's social environment strongly influences their behaviors, which impacts their health (Berkman and Kawachi 2000). Consequently, it is crucial to expand our present understanding to investigate and pinpoint how the direct consequences of various antecedents change depending on people's surroundings (Robert 1998). Particularly noteworthy is the situation of immigrants in the United States, who often strive to obtain fresh, traditional, and healthier food options. However, they encounter both structural and familial obstacles that adversely affect the healthiness of their diet (Berggreen-Clausen et al., 2022). Moreover, their religious adherence can affect their food preferences as indicated by other studies (e.g., Minton 2019; Mekoth 2018). For example, people who regularly attend churches had lower incidences of cancer, cardiovascular disease, mental health issues, etc. (Levin 2001). Similarly, people who practice religion, even in private, have reduced incidence of health problems (Helm et al. 2000), and attending religious services is consistently linked to healthy lifestyle choices, including abstention or moderate use of tobacco and alcohol. Hence, the effects of social and cultural factors can vary among different immigrant groups, and studying the contextual differences due to a participant’s religion is crucial.
Religion is frequently associated with fostering healthy behaviors. Numerous religious organizations endorse healthy dietary and lifestyle choices, pivotal in promoting wellness and mitigating obesity risk (Roff et al., 2005). Encouragement from religious communities is a motivational force, inspiring adherents to persist in healthful practices (Idler et al. 2003). Furthermore, the communal aspects of religious participation, such as conforming to group lifestyle norms due to social influence, can substantially shape health-related behaviors (Musick et al., 2000).

Nonetheless, research into the correlation between religion and health, specifically obesity, reveals mixed results. Some studies indicate a connection between increased religiosity and higher obesity rates, while others find no such association (Kim et al., 2003). Yeary and Wethington (2017) noted a significant impact of religious affiliation on body weight, yet there remains a diversity of opinions and evidence regarding the extent and nature of this relationship. The existing literature lacks a unified stance and does not thoroughly examine obesity variations across different religious groups, particularly among immigrants in the United States.

Islam presents an example for how religiosity could influence diet and obesity. The unique religious customs and teachings within Islam contribute to fostering a healthier lifestyle, potentially leading to lower obesity rates among Muslims compared with followers of other religions. Research indicates a positive relationship between Islamic practices and healthy living. Al Ayub Ahmed (2022) found that an Islamic lifestyle improves social health among Muslim teachers, demonstrating the beneficial impact of religious practices on overall well-being. Furthermore, Islamic teachings comprehensively influence Muslims' lifestyles, encompassing leisure and physical activities (Ibrahim, 1982; Zaman, 1997). This holistic approach to life, guided
by Islamic principles, cultivates a desirable lifestyle, promoting happiness and well-being (Toda 2001).

Some religions have activities that include higher level of physical movements. For instance, people who follow certain religions (e.g., Islam) might burn higher calories through their involvement in religious activities. Central to Islamic practice is the requirement of performing five daily prayers, which involve physical movements such as standing, bowing, and prostrating. This ritual introduces consistent physical activity into the daily routine, contributing to improved fitness and potentially reducing the prevalence of obesity. Additionally, fasting during Ramadan—from dawn to dusk—combined with Islamic dietary guidelines advocating for moderate eating and not overeating encourages disciplined eating habits and healthier dietary patterns. These distinct practices and teachings in Islam, not commonly observed in other religious traditions, indicate a likely disparity in health and obesity rates. The regular physical activity inherent in daily prayers and the dietary discipline promoted by Islamic teachings align with and actively encourage a healthier lifestyle. Consequently, these factors collectively support the hypothesis that Muslims, by their religious practices and teachings, can be expected to lead healthier lifestyles than followers of other faiths.

**Immigrant Assimilation**

Assimilation is the process by which immigrants come to resemble the native-born population of a country over time. Straight-line assimilation theory was developed by studying European-origin immigrants, who were predominantly of European origin, white, and Protestant Christian. These immigrants faced relatively few barriers to assimilation and were generally seen as “American” within a generation. Contemporary immigrants, on the other hand, are more likely to originate from Latin America, Asia, the Middle East, Africa, or the Caribbean. Immigrants in
these more recent waves are often darker-skinned and may be distinct from earlier immigrant waves in their culture and religion. They may encounter more barriers to assimilation and incorporation into U.S. society than earlier waves of immigrants (Alba and Nee 1997).

Most immigrants to the United States are positively selected; that is, they are a special subset of people from their country of origin (Akresh and Frank 2008). Immigrating to the United States is often a difficult and expensive process. Immigrants tend to be healthier than people in the country of origin who do not immigrate as well as healthier than the native-born U.S. population. Despite their initial good health, immigrants tend to adopt unhealthy habits with greater duration in America, a process termed negative health acculturation. Antecol and Bedard (2006) showed how immigrants are initially lower weight than the U.S.-born population when they arrive, but they gain weight to resemble the U.S.-born over time.

At the same time, alternative theories suggest that some minority groups in the U.S. context (including religious minorities and immigrants) face stressful treatment and discrimination that could harm their health (Lauderdale 2006). Experiences of xenophobia and religious intolerance could increase obesity in two ways. First, stress is associated with metabolic dysregulation. Chronic stress can disrupt bodily systems and lead to accumulation of excess fat. Second, minority group members experiencing stress of unfair treatment, or being vigilant against such treatment, may resort to eating comfort foods as a coping mechanism (Dallman et al. 2003).

This thesis examines whether weight status differs by religion and shows whether the level of religiosity and dietary assimilation can protect against obesity. Religious participation may buffer against negative health acculturation.
Methods

Data

The New Immigrant Survey (NIS) is a large-scale survey of legal immigrants who were granted legal permanent residency between May and November of 2003. The NIS was designed to be representative of the recently arrived immigrant population, with an oversample of individuals entering the United States through employment and diversity visas. The NIS collected data on a wide range of topics, including social, economic, and behavioral dimensions of immigrant life. The survey also included a module on religious beliefs and participation, which was funded by a grant from the Pew Charitable Trusts (Massey and Higgins 2011). The NIS data we analyze in this study pertains to questions posed to respondents about their diet, health, exercise, and religious beliefs. I additionally include variables that could confound our results, such as age, education, gender, etc., to minimize alternative explanations.

Measurement

My dependent variable is a binary indicator of obese versus non-obese. Body mass index (BMI) is calculated as weight in kilograms divided by height in meters squared (kg/m$^2$). Respondents with a BMI greater than 30 kg/m$^2$ are categorized as obese, and respondents with BMI less than 30 kg/m$^2$ are non-obese.

The key independent variables are religion and dietary acculturation. Respondents identify as one of the following eight religious groups: Muslim, Catholic, Orthodox Christian, Protestant, Jewish, Buddhist, Hindu, and no-religion. I chose Muslims as the base group and compared others to them. Choosing Muslims as the base group for analyzing the effect of religion on obesity among New Immigrant Survey participants is a significant decision, given the unique factors associated with their dietary practices and fasting habits. Muslims adhere to specific nutritional laws (halal).
that significantly shape their eating patterns, emphasizing the consumption of whole foods and discouraging overeating. This dietary framework can lead to different obesity rates compared to other religious groups (Haddad & Smith, 2014). Additionally, the practice of fasting during Ramadan, which involves abstaining from food and drink from dawn until sunset, has unique metabolic effects that can influence body weight and obesity rates. Studies have shown that fasting during Ramadan can lead to various changes in body weight and metabolic parameters, making it a distinctive dietary practice that justifies using Muslims as a baseline for comparison (Trepanowski & Bloomer, 2010).

Moreover, the social and cultural context of Muslim immigrants can influence their lifestyle choices, including physical activity levels and food consumption patterns, which are often distinctly different from those of other religious groups. These factors contribute to the unique health profiles of Muslim immigrants, which are markedly different from those of other religious groups, providing a meaningful reference point for analyzing the impact of religion on obesity. Existing studies on health behaviors and outcomes among Muslim populations highlight unique dietary and lifestyle practices that affect health metrics, including obesity (Kandula, Lauderdale, & Baker, 2007). Furthermore, the significant and growing demographic presence of Muslim immigrants in Western countries ensures that their health outcomes are adequately represented in research, supporting the rationale for selecting Muslims as the base group in studies on obesity (Pew Research Center, 2017). By using Muslims as the base group, researchers can leverage these unique factors and existing data to provide a comprehensive and insightful analysis of the effects of religion on obesity among new immigrants.

Two important control variables are dietary acculturation and physical activities. Dietary acculturation is reverse coded and measured using a scale of 1 to 10, where 1 means a high
similarity to original diet (before coming to United States). In our study, we reverse coded it so that higher values indicate a more original diet, following extant studies (e.g., Akresh 2007). Low and vigorous physical exercise is measured as per week/per month/per year and other period that we convert into a weekly scale. Other control variables include sex, age, education, and duration in the United States that we included in the models following extant literature.

Analytic Approach

In our study, we employed a series of data preparation and cleaning steps to ensure the integrity and usability of the NIS dataset. We utilized the haven and sjmisc libraries for data import and manipulation, which are well-suited for handling survey data and generating descriptive statistics. To start, we reviewed the variable names and frequencies of key variables. Gender data, originally coded as 1 for male and 2 for female, was recoded for clarity. Age data required adjustments where invalid responses (-1, -2) were set to missing values, and age was calculated by subtracting the reported birth year from 2003.

We then addressed the dietary similarity variable by recoding invalid responses to missing values and examined its distribution. For educational attainment, we recoded invalid and special case values (such as 86) to missing, ensuring accurate representation of years of schooling completed. Health status was another critical variable. We recoded the self-reported current health status and compared it with previous health status. The responses were cleaned by setting invalid values to missing. Additionally, we assessed alcohol consumption frequency and average weekly alcohol intake over the past three months, recoding invalid responses accordingly. Physical activity was measured through light and vigorous exercise frequency. We developed a conversion function to standardize the reporting units (weeks, months, years) to weekly values. This standardization enabled consistent analysis and interpretation of exercise frequency data.
Educational qualifications were reviewed, focusing on the highest degree, diploma, or certificate received. We recoded special cases and invalid responses to maintain data accuracy. Country of birth and income from wages and salary were also analyzed after cleaning invalid data points. Body mass index (BMI) was calculated by first converting weight and height into standard units (kilograms and meters, respectively). We addressed outliers by recoding extremely high and low BMI values as missing. BMI was then categorized into four groups: underweight, normal weight, overweight, and obese, based on standard BMI ranges. Finally, the cleaned and recoded dataset was saved for further analysis. These steps ensured a robust and reliable dataset, facilitating accurate and meaningful analysis of the factors influencing health and socio-demographic characteristics in the NIS population.

Because our dependent variable obese is binary (obese = 1, 0 otherwise), we apply logistic regression to investigate if our independent variables are significantly associated with the dependent variable (King 2008). We perform a nested regression by gradually adding more variables to check the robustness of our findings and to eliminate the effect of confounding factors. Finally, because the NIS dataset also contains a no religion group, people who do not adhere to any specific religion, we present the result both including them in the dataset and excluding them. Our results are robust in both scenarios.

Results

Table 1 summarizes the descriptive statistics of our dataset. Our analysis reveals that Muslims represent 8% of the sample of contemporary immigrants, with an overall obesity prevalence of 10.7% among all immigrants (body mass index > 30 kg/m²). Among the various religious groups, Jewish respondents exhibited the highest obesity rate at 18.5%, while Buddhist respondents had the lowest at 3.2%. In bivariate analyses (Model 1, Table 2), significant
differences in obesity rates were observed across different religious affiliations. Further statistical adjustments in the multivariate model, controlling for diet, physical activity, and other covariates, showed that Jewish respondents had significantly higher odds of obesity compared to the Muslim reference group, while Buddhist respondents had significantly lower odds.

Table 1. Descriptive Statistics of Survey Respondents by Obesity Status

<table>
<thead>
<tr>
<th>Religion</th>
<th>Total Count</th>
<th>Obese (%)</th>
<th>Not obese (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muslim</td>
<td>605</td>
<td>7.8</td>
<td>92.2</td>
<td>8.1</td>
</tr>
<tr>
<td>Catholic</td>
<td>2,917</td>
<td>13.8</td>
<td>86.2</td>
<td>39.3</td>
</tr>
<tr>
<td>Orthodox Christian</td>
<td>778</td>
<td>10.5</td>
<td>89.5</td>
<td>10.5</td>
</tr>
<tr>
<td>Protestant</td>
<td>1,218</td>
<td>11.2</td>
<td>88.8</td>
<td>16.4</td>
</tr>
<tr>
<td>Jewish</td>
<td>97</td>
<td>18.6</td>
<td>81.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Buddhist</td>
<td>293</td>
<td>3.4</td>
<td>96.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Hindu</td>
<td>586</td>
<td>4.6</td>
<td>95.4</td>
<td>7.9</td>
</tr>
<tr>
<td>No religion</td>
<td>932</td>
<td>7.6</td>
<td>92.4</td>
<td>12.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Numeric control variables</th>
<th>min</th>
<th>max</th>
<th>mean</th>
<th>median</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>18</td>
<td>84</td>
<td>41.5</td>
<td>39</td>
<td>13.1</td>
</tr>
<tr>
<td>Non-Obese</td>
<td>18</td>
<td>94</td>
<td>38.8</td>
<td>36</td>
<td>13.5</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>94</td>
<td>39.1</td>
<td>36</td>
<td>13.5</td>
</tr>
<tr>
<td>Dietary acculturation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>1</td>
<td>10</td>
<td>5.4</td>
<td>5.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Non-Obese</td>
<td>1</td>
<td>10</td>
<td>5.8</td>
<td>6.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>10</td>
<td>5.8</td>
<td>6.0</td>
<td>3.1</td>
</tr>
</tbody>
</table>

The analysis of covariates revealed that both the duration of residence in the United States and age are positively associated with higher obesity prevalence. Conversely, higher education levels and more frequent vigorous exercise were associated with lower odds of obesity. Table 2 presents the odds ratio of obesity for the coefficients in our regression model.
### Table 2: Odds Ratios of Obesity

<table>
<thead>
<tr>
<th>Religion</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muslim</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
</tr>
<tr>
<td>Catholic†</td>
<td>1.36</td>
<td>1.34</td>
<td>1.36</td>
<td></td>
</tr>
<tr>
<td><strong>1.91</strong>*</td>
<td><strong>1.36</strong></td>
<td><strong>1.34</strong></td>
<td><strong>1.36</strong></td>
<td></td>
</tr>
<tr>
<td>Orthodox</td>
<td>1.39</td>
<td>1.41*</td>
<td>1.44</td>
<td>1.44</td>
</tr>
<tr>
<td>Protestant</td>
<td>1.50*</td>
<td>1.33</td>
<td>1.31</td>
<td>1.31</td>
</tr>
<tr>
<td>Jewish</td>
<td>2.71***</td>
<td>2.75**</td>
<td>2.81***</td>
<td>2.73**</td>
</tr>
<tr>
<td>Buddhist</td>
<td>0.41*</td>
<td>0.37**</td>
<td>0.38**</td>
<td>0.38**</td>
</tr>
<tr>
<td>Hindu†</td>
<td>0.57*</td>
<td>0.66</td>
<td>0.62</td>
<td>0.61</td>
</tr>
<tr>
<td>No religion</td>
<td>0.98</td>
<td>0.91</td>
<td>0.91</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>ref.</td>
<td>ref.</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.18*</td>
<td>1.14</td>
<td>1.164</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.01*</td>
<td>1.01**</td>
<td>1.01**</td>
<td></td>
</tr>
<tr>
<td>Duration in the U.S.</td>
<td>1.04***</td>
<td>1.04***</td>
<td>1.04***</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.94***</td>
<td>0.94***</td>
<td>0.94***</td>
<td></td>
</tr>
<tr>
<td>Dietary acculturation</td>
<td>1.02</td>
<td>1.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light Exercise</td>
<td>0.99</td>
<td>0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy Exercise</td>
<td>0.94*</td>
<td>0.94*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** p < 0.001, ** p < 0.01, * p < 0.05 italicized odds ratios indicate a significant effect at the 0.01 confidence level.
Model 4 excludes ‘No religion’ group; Religions with † symbols are marginally significant (p < 0.1)

Model 1 shows the bivariate association between religion and obesity. Every religious group with a 90% confidence interval (except for the no religious group) differs from Muslims in their odds of being obese. Catholics, Orthodox Christians, Protestants, and Jews exhibit higher obesity odds than Muslims, whereas Buddhists and Hindus exhibit lower obesity odds than Muslims. Specifically, Catholics have 91% higher odds of being obese compared to Muslims, while Jews have the highest odds, at 171% greater. On the other hand, Buddhists have 59% lower odds of obesity, and Hindus have 43% lower odds compared to Muslims.
Model 2 controls for sex, age, duration in the United States, and years of education. By holding these demographic factors constant, we observe that the odds ratio for Protestants is reduced to non-significance. This indicates that the higher odds of obesity observed among Protestants in Model 1 can be explained mainly by these demographic factors. The associations between these confounders and obesity are significant and align with existing literature. Women have higher odds of obesity compared to men, which is consistent with findings from numerous studies on gender differences in obesity. Furthermore, the odds of obesity increase with age and duration of residence in the United States, supporting the theory of negative health acculturation. Conversely, higher educational attainment is associated with lower odds of obesity, underscoring the protective role of education in health outcomes.

Model 3 further controls for dietary acculturation, light exercise, and heavy exercise. The inclusion of these lifestyle factors results in minimal changes to the odds ratios from Model 2 to Model 3. This suggests that while dietary acculturation and exercise habits do contribute to obesity risk, they do not significantly alter the associations observed with religion and other demographic factors. In this fully controlled model, adherents of the Jewish faith have the highest obesity odds: 180% higher than those of Muslims. This substantial increase highlights the importance of considering religious dietary practices and their potential contribution to obesity. Conversely, Buddhists continue to exhibit the lowest obesity odds, with a 62% reduction compared to Muslims. This persistent association may reflect the strong influence of vegetarian dietary practices and lifestyle habits encouraged by Buddhism.

Model 4 removes non-religious respondents (12.6% of the sample) so that only members of religious groups are included in the logistic regression model. The results are similar between Models 3 and 4, indicating that the exclusion of non-religious respondents does not substantially
alter the observed associations. This consistency suggests that lifestyle and demographic factors significantly contribute to the variations in obesity rates among immigrants from different religious backgrounds. The findings from Model 4 reinforce the robustness of the associations and the importance of considering religious affiliation in obesity research among immigrant populations.

To conclude, the regression models highlight the significant role of religious affiliation in obesity risk among immigrants, even after accounting for various demographic and lifestyle factors. These results underscore the need for culturally sensitive public health interventions that consider the unique dietary practices and lifestyle habits associated with different religious groups. This approach is not just important, but it is also urgent, as it can lead to more effective strategies to combat obesity and promote overall health within immigrant communities.

**Discussion**

In this study, utilizing the New Immigrant Survey (NIS) data, I investigated how immigrants to the United States differ in obesity based on their religious affiliations and how religiosity, acculturation, and other covariates affect obesity. The study's findings have several theoretical and practical implications.

*Theoretical Implications*

The study contributes to the ongoing discourse on the intersection of immigration, acculturation, and health outcomes, specifically obesity. The variation in obesity rates among different religious groups of immigrants aligns with existing theories on the role of cultural and religious norms in shaping health behaviors and outcomes. The heightened risk observed among Jewish immigrants and the lower risk among Buddhist immigrants might be indicative of underlying differences in dietary practices and communal norms linked to each religious group. One possible reason behind a lower obesity rate among Hindus and Buddhists is that both religions
highly encourage vegetarian foods (Mitchel and Mitchel, 2024). These dietary norms, which often emphasize lower-calorie and plant-based foods, may contribute to the observed lower obesity rates.

The association of longer duration in the United States with increased obesity prevalence supports the "negative health acculturation" theory, where longer-residing immigrants may adopt less healthy American dietary and lifestyle habits (e.g., Akresh, 2007). This finding underscores the importance of considering the duration of residency as a critical factor in public health interventions aimed at immigrant populations. Moreover, the significant impact of education on obesity highlights the protective role of higher educational attainment, possibly due to increased health literacy and access to health-promoting resources.

The findings also reveal a complex relationship between religious affiliation and obesity. For instance, the significantly higher odds of obesity among Jewish immigrants (OR=2.71 in Model 1) suggest that certain religious dietary customs, such as frequent consumption of high-calorie foods during religious festivals, may contribute to higher obesity rates. On the other hand, Buddhists exhibited significantly lower odds of obesity (OR=0.41 in Model 1), which could be attributed to the religion's emphasis on moderation and vegetarianism.

Practical Implications

From a practical standpoint, my results underscore the need for tailored health promotion programs that are sensitive to the cultural and religious contexts of immigrant communities. For instance, interventions that incorporate culturally appropriate dietary recommendations and physical activities might be more effective for specific groups. For Jewish immigrants who show a significantly higher risk of obesity, culturally tailored interventions that address specific dietary habits and promote physical activity could be crucial.
Moreover, the positive impact of education and exercise on reducing obesity risk highlights the potential benefits of educational campaigns and accessible recreational facilities that encourage active lifestyles among immigrant populations. These initiatives could be particularly impactful if they include language and culturally relevant materials to reach a broader audience. Heavy exercise, in particular, was shown to reduce the odds of obesity significantly (OR=0.94 in Models 3 and 4), suggesting that promoting vigorous physical activities could be especially beneficial.

The study's findings also suggest that health interventions should consider the length of time immigrants have been in the United States. Programs aimed at recent immigrants might focus on maintaining healthy dietary and exercise habits from their countries of origin. In contrast, those targeting long-term immigrants could emphasize the importance of adopting healthy American practices.

Future Research

Future research is crucial to delve deeper into the specific mechanisms through which religious and cultural practices influence dietary choices and physical activity levels among immigrants. It would also be beneficial to examine how these practices evolve with longer durations of stay in the U.S. with a longitudinal study and how they interact with other sociodemographic factors like socioeconomic status and education. Longitudinal studies could further provide insights into the causal relationships and long-term trends in obesity among different immigrant groups.

One notable limitation of the NIS sample is that it only includes legal permanent residents. Obesity patterns may differ among undocumented immigrants and those on more temporary visas. Including these groups in future research would provide a more comprehensive understanding of obesity disparities among all immigrant populations.
In sum, this study not only adds to the understanding of obesity disparities among immigrants but also underscores the need for culturally nuanced public health strategies. By acknowledging and addressing the diverse cultural backgrounds of immigrant populations, health professionals and policymakers can better combat the rising trend of obesity and associated health conditions. The integration of culturally sensitive approaches in public health policies could significantly enhance the effectiveness of obesity prevention and intervention efforts, ultimately leading to healthier immigrant communities.

Conclusion

In this study, I highlight significant variations in obesity rates among immigrant groups based on religious affiliation, underlining the complex interplay of cultural, religious, and lifestyle factors in influencing health outcomes. Jewish immigrants were found to have the highest risk of obesity. In contrast, Buddhist immigrants exhibited the lowest, indicating the influence of specific cultural and dietary practices associated with different religions. The analysis further revealed that more extended residence periods in the United States and older age are associated with higher obesity rates, suggesting an assimilation into less healthy dietary and lifestyle norms over time.

Our findings underscore the necessity of culturally and religiously tailored public health interventions that consider different immigrant groups' unique needs and behaviors. Such targeted approaches can enhance the effectiveness of health promotion efforts, ultimately reducing the prevalence of obesity and improving overall health outcomes in diverse immigrant populations.

Future research should continue to dissect the factors contributing to health disparities among immigrants, focusing on longitudinal studies to better understand the dynamics of health behavior change over time in these populations. We can better design interventions that promote
healthier lifestyles among all immigrant communities by fostering a deeper understanding of how cultural integration affects health.
References


