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Survey based investigation on diet/BMI in Indian-American communities

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Survey based investigation on diet/BMI in Indian-American communities

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Abstract

Obesity is defined as a disease where abnormal or excessive fat accumulation presents risks to one's health. It is also associated with a wide variety of metabolic diseases such as diabetes, hypertension, metabolic syndrome, sleep apnea, and cardiovascular health. In recent years, the rates of obesity have continued to grow in the United States, especially amongst the Indian-American community. Asians have a lower BMI cutoff ($\geq$27.5 kg/m^2) for obesity instead of the standard $\geq$30.0 kg/m^2 recommendations by CDC due to a higher prevalence of weight-related diseases at lower BMI and carrying 3-5% more body fat than an average Western European. In this study, we seek to address if the consumption of certain dishes specific to the Indian diet and the amount of time spent exercising offer a potential explanation for the increasing rates of obesity for Indians residing in the United States. To implement this study, we designed a survey that asked participants about their height, weight, dietary, and exercise habits. We calculated their BMI and analyzed their scores using a modified Likert Scale score with scores ranging from 1-5. In addition, we conducted a correlation between BMI and Likert Scale scores for each question. We found no significant correlations between the Likert Scale scores on the survey and BMI. This can potentially be attributed to the small sample size (n=34). However, the obese group, on average, reported exercising less, eating out more, consuming more sweets and fried foods, and adding sugar to their drinks when compared to the healthy weight group. And, 70.6% of respondents were overweight or obese, supporting the trend that weight related issues are becoming more and more prevalent in Indian-American communities. For future studies, research needs to be conducted with a larger sample size and more survey questions. Additionally, the survey needs to span the entire United States and incorporate the amount of time residents have resided in the US. The results of this survey in conjunction with the results of other surveys can help develop culturally appropriate solutions to combat weight related issues and diseases in the Indian-American community.

Introduction

Obesity

Obesity, according to the World Health Organization (WHO), is defined as a disease where abnormal or excessive fat accumulation presents risks to one's health. Obesity is also associated with a wide variety of metabolic diseases such as diabetes, hypertension, metabolic syndrome, sleep apnea, and cardiovascular health (Rhee, 2022). In addition, the high percentage of body fat characteristic of obesity can introduce functional limitations, leading to social and economic burdens as well as a higher risk for depression, lower health related quality of life, physical health measures, less likelihood of marriage, and lower income (Fjeldstad et al., 2008). According to Fjeldstad, these functional changes partnered with the risks associated with obesity, severely reduced the Quality of Life of many participants and life expectancy across all genders and ages.

This disease impacts people from every age range and background, including children and adolescents. Currently, 19.7% of adolescents (ages 2-19) and 42.4% of adults in the United States are obese and those numbers are only growing (WHO). Moreover, children who struggle with obesity are much more likely to have hypertension, diabetes, and related diseases as they transition into adulthood. According to Harvard School of Public Health, 60% of the US population will have obesity by 2030 and each state will have a prevalence of obesity higher than 35%. This is concerning for the United States because it signifies a trend towards lower overall health amongst the majority of the US population and associations with other obesity related diseases.

The development of obesity results from a complex interaction in individuals such as genetics, hormones, and epigenetics (Jia and Liu, 2021). From a genetic standpoint, mutations in

the hormone Leptin and the leptin-melanocortin have been implicated in the development of obesity for about 5% of the population. In a study conducted on human and mice models, it was found that mutations in the pathway resulted in hyperphagia and severe obesity (Loos and Yeo, 2022). In addition, those with a mutation in this pathway struggle with excessive hunger (Loos and Yeo, 2022). However, for most of the obese population, no single genetic cause can be identified. Since 2006, genome-wide association studies have found more than 50 genes associated with obesity, most with very small effects (CDC).

From a hormonal standpoint, obesity can be associated with the endocrine alterations arising from the hypothalamus-pituitary gland. The major contributors to obesity are leptin, insulin, oestrogens, androgens and growth hormones that influence our appetite, metabolism and body fat distribution. Most people who are obese have a certain combination of hormones that allow for accumulation of body fat. One such hormone is leptin. Leptin is produced by fat cells that are secreted into our bloodstream. Leptin works to reduce a person's appetite by acting on a specific center in the brain to reduce their desire to eat. In addition, Leptin appears to manage how the body stores fat. People who are obese have higher fat storages. Thus, they produce more leptin than those who are of normal weight. Despite having higher levels of Leptin, those who are obese are not as sensitive to its effects and struggle with feeling satiated by food (Izquierdo et al., 2019).

From an environmental standpoint, the recent rise in obesity in the United States can partially be explained by an "obesogenic" environment. In this particular environment, there is more access to high calorie foods and more technological implications that significantly reduce daily physical activity (Mahmoud, 2022). These variables, along with altered sleeping patterns, and alcohol consumption have been implicated in the epigenetics of obesity by altering DNA

transcription and expression of certain genes. Growing research has shown that addressing these epigenetic modifications could serve as a way to avoid obesity. (Mahmoud, 2022). In addition, unlike genetics, these epigenetic modifications are reversible and should serve as an important place of research in the development of obesity therapeutics (Mahmoud, 2022).

Current health recommendations indicate that the fat accumulation characteristic of obesity has to do with patients consuming more calories than they are burning throughout the day. This fat accumulation caused by excessive calories can occur in different regions of the body depending on that sex hormones, use of glucocorticoids, genetic make-up and epigenetic mechanisms. Studies have shown that accumulation of fat in the lower body (gluteofemoral region) is associated with decrease in cardiovascular and metabolic disease (Goossens, 2017). Abdominal fat accumulation has been shown to increase the risk of developing other diseases such as type 2 diabetes, cardiovascular diseases, cancer, and asthma (Safaei et. al, 2021). Thus, obesity is not only a condition in itself, it can accelerate pre-existing conditions and lead to the development of new ones.

In the case of type 2 diabetes, those who are obese are more susceptible because both are linked with insulin resistance. With insulin resistance, there is an overaccumulation of glucose in the bloodstream, leading to diabetes. Further, obesity accelerates the risk of developing cardiovascular diseases and hypertension. It does this by increasing the body's bad cholesterol, low density lipoproteins, as well as triglyceride levels. In addition, it decreases the amount of high density lipoprotein or good cholesterol needed to remove bad cholesterol. Thus, leading to a higher risk of cardiovascular disease. Lastly, it can cause blood pressure to rise. This occurs because obese individuals require more blood to supply nutrients and oxygens to their bodies,

increasing blood pressure. In addition, the body requires more pressure to facilitate the movement of this blood (Zanella et. al, 2001).

Obesity is oftentimes evaluated using the body mass index scale which is calculated by dividing a person's weight in kilograms by their height in meters squared (kg/m^2). According to the Centers for Disease Control and Prevention (CDC), a body mass index (BMI) less than 18.5 kg/m^2 is within the underweight category while a BMI between 18.5 kg/m^2 and 25 kg/m^2 is within the healthy weight range. In addition, a BMI between 25-30 kg/m^2 is classified as overweight and a BMI over 30 kg/m^2 is classified as obese.

BMI Scale

For the sake of this study, the BMI scale will be used. The BMI scale is both cheap and easy to calculate, and is therefore easily applicable for research purposes. Higher BMI is also strongly correlated with onset of type 2 diabetes, cardiovascular disease, high blood pressure, increase in low-density lipoprotein or "bad cholesterol," triglycerides, inflammation, and overall mortality (Shamai et. al, 2011). In addition, according to Harvard School of Public Health, it is a suitable indicator of obesity in the vast majority of the population and a reasonable indicator of disease risk (Harvard School of Public Health, 2016).

It is worth noting that the BMI scale has shortcomings that need to be addressed. First and foremost factors such as age, sex, and ethnicity can influence the BMI scale. For instance, the current BMI model and cutoff points were based largely on Western Europeans. Therefore, this scale is a better predictor of weight and weight-related issues in Caucasian groups than other ethnic groups. Secondly, the BMI scale does not take into account muscle density or bone density. This essentially means someone with high amounts of lean muscle or bone density will be classified as obese because they weigh more, resulting in a higher BMI. Thirdly, the scale

does not take into account the different types of fat. For instance, subcutaneous fat that is below the skin is not generally associated with a steep rise in abdominal fat. Abdominal fat, on the other hand, is considered to be associated with mortality and other diseases such as type 2 diabetes (Humphreys, 2010). As a result of these flaws, health professionals are recommending that BMI be used as a measure to track risk and screen for weight related disease and as less of a diagnostic tool.

BMI Scale for Asians

Due to the shortcomings of the BMI scale and its specialization for Caucasians, different ethnicities often have to develop an altered scale to better prevent the development of obesity related diseases. For instance people of Hispanic, Black, East, and South Asian backgrounds have different BMI cutoffs, but little research has been conducted on the matter (Nair, 2021).

The reason for the need to scale down by WHO for Asians has been attributed to the fact that Asians have a higher prevalence of weight-related diseases at a relatively lower BMI. For instance, in one study conducted, 80% of Asians had type 2 diabetes at a BMI greater than 23.5 kg/m^2 which should be considered a healthy weight (Hsu, 2015). In another study conducted in New York City, the onset of hypertension and cardiovascular disease was found to be at a lower mean BMI than Caucasians (Volgman et al., 2018).Another possible explanation for this has to do with body fat. It is believed that Asians carry about 3-5% more body fat relative to weight than the average western European. Consequently, a low BMI does not necessarily correlate to a low body fat percentage in Asian Indians (Raji et al., 2001). Similarly, South Asians and the Indian population tend to have higher rates of abdominal obesity, total abdominal fat, and

intra-abdominal adipose tissue when compared to the Caucasian population. This drastically increases their risk for obesity-related diseases at the standard healthier BMI ranges recommended by the WHO. (Kalra et al., 2013) .

Consequently, the Asian population has a lower BMI cutoff point when compared to the cutoff recommendations by the CDC. This new scale places Asians with a BMI less than 18.5 kg/m^2 as underweight, between 18.5-23 kg/m^2 as healthy weight, between 23-27.5 kg/m^2 as overweight, and a BMI greater than or equal to 27.5 kg/m^2 as obese (Jih et. al, 2014).

Asian Indian diet and lifestyle

While genetics and heritability play a role, the Indian diet and inactive lifestyle are a contributing factor (Volgman et. al, 2018).. Addressing these dietary and lifestyle factors offer the most promising results for addressing the obesity rates amongst the Indian-American community.

Ethnographic research showcased that eating amongst immigrant and minority populations is used as a vehicle of establishing and maintaining cultural identity in places of a new dominant social structure. For example, foods normally consumed during special occasions have become a regular part of dietary practices for certain immigrant groups to help preserve traditions. Indian-Americans follow a similar pattern of maintaining dietary practices to preserve their culture in the United States. (Mukherjea et al., 2013).

In order to develop a complete and comprehensive understanding of the Indian diet, it needs to be standardized and compared to other diets across the world. Standardizing criteria ensures consistency and fair assessment of criteria. The EAT-Lancet (E-L) criteria aimed to standardize the Indian diet to allow for a comparison to be made.

The E-L criteria develops a report that compares diets to a reference diet, consisting of 8 food groups: whole grains, tubers and starchy vegetables, fruits, other vegetables, dairy foods, protein sources, added fats, and added sugars. Upon comparison, the report developed a healthy reference diet that improves lifestyle and creates better health outcomes. According to the E-L, the Indian diet is labeled as unhealthy (Sharma et al., 2020). The report found that only 6-8% of the calories in the diet come from protein -- much lower than the 29% recommended by the E-L report. In addition, the Indian diet consists of more unhealthy saturated oils rather than the less healthier oils and fats. Overall, according to this report, it was found that the Asian Indian diet was low in protein, fruit and vegetable intake while being high in salt, sugar, carbohydrate and fat consumption (Sharma et. al, 2020).

While diet is one factor that is responsible for the growing rates of obesity for Indian-Americans residing in the United States, Daniel believes the issue also has to do with the activity behavior of South Asian immigrants (Daniel, 2014). Regular physical activity can drastically reduce obesity and obesity-related diseases (Jia and Lui, 2022). In a cross-sectional study, South Asian immigrants (which includes Indian-Americans) activity related behaviors were analyzed. It was found that only 51.8% of South Asian immigrants met the classification for leisure time physical activity (≥150 minutes moderate-intensity or ≥75 minutes vigorous-intensity) (Daniel, 2014). In addition, on average, South Asian immigrants took an average of 6904.3 steps per day, classifying them as “low” active (Daniel, 2014). This low level of activity partnered with dietary imbalances is likely to play a significant role in the growing rates of obesity in Indian-Americans.

Purpose

Despite the Indian population being more susceptible to metabolic diseases and the growing obesity epidemic in Indian-American communities, little research has been conducted on the Indian-American population and their dietary practices. Additionally, the Indian diet has been praised for being healthy and rich in nutrients, but it does have its setbacks, including a disproportionate emphasis on carbohydrates, unhealthy saturated oils, and reduced protein consumption. Moreover, Indians are becoming increasingly more inactive (Anjana et. al, 2014). These dietary flaws partnered with physical inactivity could be a potential explanation for the obesity rates growing amongst the Indian-American population. This study seeks to gain insight into the dietary habits and exercise activity of the Indian-American population to better understand if those practices are a contributing factor in a survey based assessment. This is a small pilot study with most recruiting being done in the greater Los Angeles area. Future research will be conducted with a larger sample size across the United States and a more rigorous survey to better understand the dietary practices and exercise activities of Indians residing in the United States.

Methods

Participant recruitment:

Each participant recruited responded to a flyer posted at places of worship (i.e. Gurdwara, Mandir, and Mosque) and convenience stores. See supplemental information #1 to see the flyer. The link on the flyer took them to a consent form designed by me that highlighted details about the study, including contact information for the researchers conducting the study, and the

necessary criteria needed to participate in the study. See supplemental information #2 to gain access to the consent form.

Participant Logistics:

The participants were all over the age of 18 and lived in the United States for over a year. Each participant was recruited through flyers. All participants consented to participate in the study and were allowed to leave any question blank.

Survey

If participants agreed to the consent form, they would be taken to a survey that asked questions about the Indian diet and lifestyle habits. Questions 6-11 from the survey were adapted from Dubasi, 2019. For those that did not agree, they would not gain access to the survey. See supplemental information #3 for access to the survey questions.

Data collection:

This procedure was not done until after approval from the Pitzer IRB board. All data was collected using a qualtrics survey on an encrypted computer. Each participant was able to skip any question with no penalty.

Data analysis:

Participants's BMI was calculated by the formula BMI = kg/m^2. After calculating their BMI, a modified Likert scale was used to determine their health and physical habits (Sullivan & Artino, 2013). A score was assigned to each response based on association with healthier dietary

habits and physical activity. The scale ranged from 1-5 with healthy dietary habits and physical activities receiving a higher score (Table 1). The scores were then averaged and compared to BMI using a correlation. The correlation was conducted by inputting the BMI and Likert Scale scores for each question on SPSS statistics to get an R value and P value.

Question	Unhealthy (1)	Moderately Unhealthy (2)	Average (3)	Moderately Healthy (4)	Healthy (5)
4	0-30 mins	30-60 mins	60-90 mins	90-120 mins	120+ mins
6	At least once daily	3-6 times a week	1-2 times a week	2-3 times a month	Once a month or less
7	At least once daily	3-6 times a week	1-2 times a week	2-3 times a month	Once a month or less
8	At least once daily	3-6 times a week	1-2 times a week	2-3 times a month	Once a month or less
9	At least once daily	3-6 times a week	1-2 times a week	2-3 times a month	Once a month or less
10	At least once daily	3-6 times a week	1-2 times a week	2-3 times a month	Once a month or less

Table 1. Rubric for Likert Scale score (1-5) assignment

Results:

The purpose of this survey was to determine if certain dietary habits and exercise habits specific to the Indian diet would contribute to the growing rates of obesity amongst the Indian community. In order to address this, a survey was conducted which asked questions about different lifestyle habits specific to the Indian diet and a question about exercise. The responses were analyzed using a 1-5 Likert Scale with higher answers corresponding to healthier habits. The participants were separated into groups based on their BMI's and their Likert Scale scores

were averaged. In addition, a correlation was run between the BMI's and Likert Scale scores to determine if there were any questions that were better predictors of weight related problems than others.

The flyer was distributed in January of 2023 and the survey accepted responses till March 2023. There were 34 valid responses and 13 responses which were voided. Entries were voided based on failure to identify sex or weight and not consenting to partaking in the survey. In Table 2, the average BMI, sex identity, and weight of the participants was recorded. In Table 3, the participants were categorized based on their BMI's and their Likert scale scores were analyzed based on those classification. In Table 4, a correlation was run between BMI and Likert Scale score. In figure 1, the average Likert Scale scores for each weight classification category were placed on a bar graph.

Participant Demographics

Out of 34 participants, 20 were females and 14 were males. The average BMI was 24.4±2.86 and average weight was 156.6±25.7 Lbs. Based on the Asian-American BMI scale, one participant was classified as underweight, 9 were classified as healthy weight, 21 were overweight, while the remaining 3 were obese. The one underweight participant was not given a table in the results section as the sample size of one was much too small for statistical significance nor would it be scientifically informative.

	Mean ± SD

Weight (lbs)	156.6±25.7
BMI	24.4±2.86
Male	14
Female	20

Table 2. Average characteristics of participants (n = 34)

In table 3, the obese group, on average, reported exercising less, eating out more, consuming more sweets and fried foods, and adding sugar to their drinks when compared to the healthy weight group. The overweight group reported exercising more, drinking less sweetened drinks, consuming less sweets and fried foods, adding less sugar to their tea and coffee as well as eating out less compared to the healthy weight group on average.

Question	Avg Likert score for healthy BMI individuals (n=9)	Avg Likert score for overweight BMI individuals (n=21)	Avg Likert score for obese BMI individuals (n=3)
4	4.00	4.52	3.00
6	3.78	4.10	4.33
7	3.33	4.43	3.00
8	4.22	4.33	4.00
9	3.00	4.33	1.33

10	2.22	2.57	2.00

Table 3. Average Likert Scale per healthy weight, overweight, and obese participants for each question (n = 34).

In table 4, there were no significant correlations detected between BMI and Likert Scale scores. There was a weak but positive correlation (0.13) between drinking sweetened beverages and BMI and a weak but positive correlation (0.17) between consuming sweets and BMI. There was a weak but negative correlation (-0.07) between adding sugar to coffee, tea, curd, and lassi and BMI and a weak but negative correlation (-0.13) between consumption of food outside of the house and BMI

Question	R (p value)
4	0.03 (0.43)
6	0.13 (0.44)
7	0.17 (0.32)
8	-0.04 (0.42)
9	-0.07 (0.34)
10	-0.13 (0.47)

Table 4. Correlation between BMI and Survey Scores (n=34)

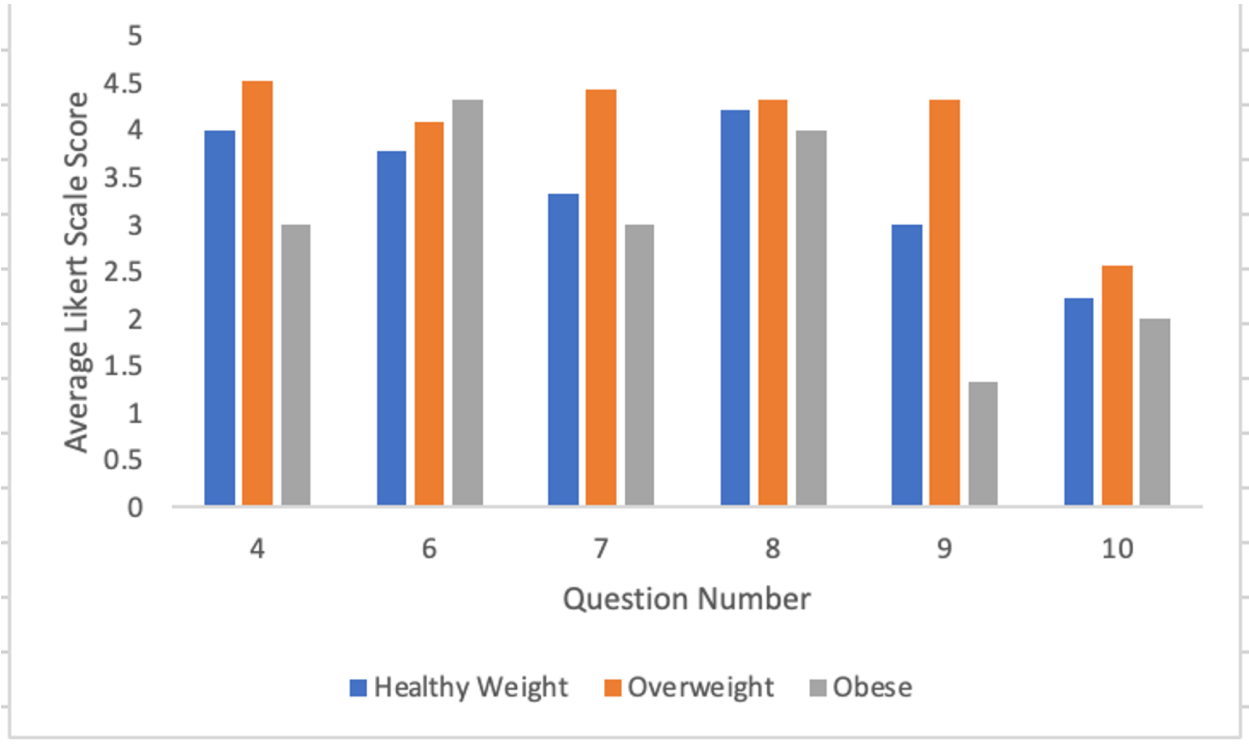

Figure 1. Bar graph for Likert Scale scores per question and BMI classification (n=34).

Discussion and Conclusion

Obesity is a significant public health epidemic in the United States, and has significant rates of comorbidity (WHO). It can be caused by a complex interplay of genetic, environmental, and behavioral factors (Jia and Liu, 2021). Obesity is associated with a range of health consequences, including an increased risk of heart disease, stroke, type 2 diabetes, and certain types of cancer (WHO).

The most common way to calculate whether a person is obese or not is using the BMI scale which is defined as weight(kg)/height^2(meters). Although the scale has its shortcomings as discussed in the introduction, it is largely considered to be the quickest and most practical way to distinguish whether a person is susceptible to obesity and other weight related diseases.

Indians, in particular, are more susceptible to these metabolic diseases at lower BMIs due to genetic predispositions and carrying more body fat than Caucasians (Raji et al., 2001). This has led to a scaling down of the BMI scale to better meet the needs of the Indian population (Jih et. al, 2014). In recent years, obesity rates have grown across the United States, including amongst the Indian population (WHO) . The increasing rates of obesity in the US partnered with the genetic susceptibility of Indians to the metabolic diseases associated with obesity, increasing the need for a better understanding of the dietary and exercise practices of Indian-Americans.

Based on my sample size, it offers suport that weight related issues are becoming more prevalent amongst the Indian population residing in the United States with 62% of survey participants being overweight. This is much higher than the 30.7% national average in the United States cited by the NIH. In addition, 3 more participants were categorized as obese, showcasing that 24 out of 34 participants (70.6%) were obese or overweight.

The results above show no statistically significant correlations between BMI and scores on the Likert scale, partially due to a sample size. However, Indians are one of the fastest growing migrant populations in the United States, making up 1.35% of the US population --the largest South Asian population in the US and 2nd largest Asian population (Hanna and Batalova, 2020). With this transition, many immigrants are bringing their cultural understanding and conception of their dietary practices from an agricultural India to a capitalist US society. This change in society requires an alteration of dietary and exercise habits to maintain a healthy lifestyle and avoid the onset of obesity. Yet, Indians, like many other ethnic groups, connect to their culture through diet and pass this onto their children. This passing of culture without adapting to the food environment, including a change in the ingredients used for cooking

traditional foods could offer a possible reason for the obesity rates growing. An in depth analysis of the ingredient profile of those used in traditional Indian food in the United States and those used in India is needed to better make this comparison

Across all participants, there did seem to be a trend of all three groups reporting eating out more than once a week, with the obese group reporting the lowest average. As shown in figure 1, the obese group in comparison to the healthy weight group, on average, reported exercising less, eating out more, consuming more sweets and fried foods, and adding sugar or honey to their drinks. These results offer evidence for the studies indicating an increase in calorie and fat intake for Indian-Americans offered a trend of obese participants potentially adapting to the changing food environment in the US, including easier access to fast food and more unhealthy options readily available, partnering with reduced exercise activity as a potential contributor to the obesity epidemic plaguing Indian-Americans (Holmboe-Ottesen and Wandel, 2012). However, further research would need to be conducted assessing what sorts of food are being consumed when eating out and comparing consumption patterns in India to the United States.

Future research

This study was a pilot study meant to gain an insight and understanding on the Indian diet and exercise activity in Los Angeles and the surrounding areas. The sample size was relatively small (n = 34) and was not nearly expansive enough to provide evidence for the larger problems facing the entire Indian-American population in the United States. Future research would have to undergo extensive outreach and alteration of the survey question.

Changes in Survey

Future changes would include a question regarding how long participants have been residing in the United States to better understand if the transition to the food environment of the United States plays a major role in the onset of obesity and the metabolic diseases associated with obesity. In addition, offering participants with more options regarding exercise, including increased time intervals and classifications of their exercise to better align with WHO recommendations of 150+ which recommends an average engagement of 150 minutes of moderate physical activity a week.

Future Directions

Future research would need to conduct outreach across the US to better address the research question and gain an understanding of dietary practices of Indian-Americans to help explain the recent trends in obesity. Moreover, I distributed this flyer at places such as Gurdwaras and Mandirs that have a predominantly Northern Indian population. Therefore, this could reflect the dietary practices of those regions more so than the southern parts of India which have different foods and dietary practices. This would require a more expansive outreach to be conducted. In addition, most research regarding health literacy and development of obesity relates to western or european diets. Future research should aim to better understand the Indian dietary habits that span across all regions of India and disseminate useful and factual information to explain to the Indian communities about their diet and where it needs to be supplemented.

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Supplemental information #1

Are you an Indian-American? Participants needed to take a survey on obesity

- **Participants must be an Indian over the age 18 that has been residing in the US for at least a year. In addition, you must be a documented immigrant that is not in prison**
- **We are looking to see if Indian-American dietary behaviors and lifestyle practices contribute to the growing rate of obesity of Indians in the United States.**
- **The survey should take no longer than 15 minutes**

Arjan Deol, student at Pitzer College, and Aditi Vyas, Ph.D., faculty at Keck Science Center are conducting this study. If you are interested in participating or have more questions, please contact them at (916) 765-4346 or arjudeol@pitzer.edu

Please scan the QR Code to get more details and to see the consent form.

Supplemental information #2

Link to consent form:

https://docs.google.com/document/d/1pqW7_FzCX3Wy9KhnTHJ2nZ3cJzB3bpTX/edit?usp=sharing&ouid=105728890428761433981&rtpof=true&sd=true

p=sharing&ouid=105728890428761433981&rtpof=true&sd=true

Supplemental information #3

Survey: https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_bORBr6kILTgCxNA
Questions:

1. **Sex**
    a. **Male**
    b. **Female**
    c. **Prefer not to answer**
2. **Height**
3. **Weight**
4. **Approximately, how many minutes do you exercise per week?**
    a. **0-30 minutes**
    b. **30-60 minutes**
    c. **60-90 minutes**
    d. **90-120 minutes**
    e. **120+ minutes**
    f. **Prefer not to answer**
5. **What is the highest degree or level of school you have completed**
    a. **High School/GED**
    b. **Technical Degree/Some college**
    c. **Bachelor's degree**
    d. **Graduate Degree**
    e. **Other**
    f. **Prefer not to answer**

6. **How often do you drink sweetened beverages like soft drinks, juices, etc.?**
    a. **At least once daily**
    b. **3 to 6 times a week**
    c. **1 to 2 times a week**
    d. **2 to 3 times a month**
    e. **Once a month or less**
    f. **Prefer not to answer**
7. **How often do you eat sweets such as Laddu, Barfi, Jalebi, Kulfi, Chocolate, Halwa, Rice pudding, etc.?**
    a. **At least once daily**
    b. **3 to 6 times a week**
    c. **1 to 2 times a week**
    d. **2 to 3 times a month**
    e. **Once a month or less**
    f. **Prefer not to answer**

8. **How often do you eat fried foods such as Puri, Parathas, Kachori, Tikki, Bhature, Pakoras, Samosas etc.?**
    a. **At least once daily**
    b. **3 to 6 times a week**
    c. **1 to 2 times a week**
    d. **2 to 3 times a month**
    e. **Once a month or less**
    f. **Prefer not to answer**
9. **How often do you consume sugar and honey in tea, coffee, curd, lassi, etc?**
    a. **At least once daily**
    b. **3 to 6 times a week**
    c. **1 to 2 times a week**
    d. **2 to 3 times a month**
    e. **Once a month or less**
    f. **Prefer not to answer**
10. **How often do you eat out of the house (such as at a restaurant, wedding, party, family function etc.)?**
    a. **At least once daily**
    b. **3 to 6 times a week**
    c. **1 to 2 times a week**
    d. **2 to 3 times a month**
    e. **Once a month or less**
    f. **Prefer not to answer**