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Abstract

Background: The San Joaquin Valley (SJV) is often called the salad bowl of the US. The level of poverty rivals Appalachia and is home to a large number of underserved populations. One such group, Punjabi Sikhs, has resided in the SJV since 1899 and has primarily worked in agriculture. Understanding health risks among this group is important, as South Asians are three times more likely as non-Hispanic Whites, and twice as likely than other Asians to be diagnosed with diabetes. The purpose of this study is to utilize a needs assessment to understand the prevalence of chronic diseases and risk factors within the SJV Punjabi Sikh community.

Methods: A convenience sample (n=267) of Punjabi Sikhs from Merced and Stanislaus County was collected in order to understand the lifestyle factors and disparities associated with chronic diseases. Surveys were self-administered in Punjabi or English, and we asked questions about chronic disease diagnosis, diet, exercise, and acculturation. Demographic information was also collected.

Results: The average age of the sample was 34 years and had an equal number of male and female respondents. 17% of respondents reported diabetes diagnosis. In addition, the majority of respondents had seen a primary care doctor in the last year (84%) and had a primary care doctor that speaks Punjabi (79%).

Conclusion: Our survey revealed that this population had a higher rate of diabetes than either Latinos or non-Hispanic Whites in the area,

and that interventions to address cultural factors that contribute to chronic disease are needed in this population. This needs assessment fills a research gap because the Punjabi Sikh population has generally been overlooked.

Introduction

Diabetes and diabetes-related diseases are increasing in both the US and California. There are serious efforts to decrease the disease prevalence rate among those who are at risk and to increase management of the disease among those who are diagnosed (Shah & Kanaya, 2014). Foreign born South Asian immigrants living in the United States are nearly five times more likely to receive a type 2 diabetes diagnosis compared to non-Hispanic Whites (Islam et al., 2014), and South Asians have the highest rate of type 2 diabetes of all Asian subgroups in the United States (Hasnain, Parikh & Nagaraj, 2017). As a result, diabetes research is needed when examining health in this community.

The majority of South Asian individuals in the United States live in California and have arrived after 1965 (Wilson, 1995). However, in the early 1900s, several thousand Punjabi Sikh's immigrated to the United States and settled in the Central Valley, becoming farmworkers (Gibson, 1989). Punjabi Sikhs are an ethnic Asian Indian subpopulation that is religiously and ethnically distinct from other Asian Indian groups. Of the 500,000 Sikhs living in the United States, the majority live in California and New York (Gibson, 1989; Islam et al., 2014). This includes the Central Valley, where the early Sikh immigration wave settled (Leonard, 1985). While there have been diabetes-related studies of South Asians and the Punjabi Sikh population in urban areas, such as New York City (Islam et al., 2014), relatively little attention has been paid to understanding the health needs of the agricultural

enclave of Sikh's in the Central Valley, despite it's historical longevity and location in an region of California with high levels of poverty, food deserts, and a healthcare professional shortage (Leonard, 1985). An understanding of diabetes and diabetes related health factors in this community are needed.

Diabetes in the South Asian Community

Diabetes rates in the South Asian Indian community are driven are , in part, driven by genetic factors. In fact, there is a higher risk for type 2 diabetes and heart disease among South Asians than any other US ethnic category (Lesser et al., 2016; Sanghera et al., 2006). This is due to the genetic predisposition that increases the risk of diabetes in South Asians. Genetically, associations between single nucleotide polymorphisms (SNPs) and type 2 diabetes illustrate that Asian Indians are more insulin resistant because of a novel gene locus, which impairs the reuptake of glucose in an individual's skeletal muscle (Saxena, Saleheen, Been, Garavito, & Braun, 2013). In addition to specific genetic markers that make it more susceptible for South Asians to be diabetic, this population is more insulin resistant with pancreatic beta cell dysfunction (Shah et al., 2014). Compared to Caucasians, South Asians' beta-cell responsiveness is 28% higher. These predispositions increase the likelihood for South Asians to be diagnosed with diabetes compared to other ethnic groups. There are several lifestyle factors that are associated with type 2 diabetes among the Asian Indian population, among which are immigration to urban locations, a decrease in the amount

of physical activity, and an increase fatty food intake (Shah & Kanaya, 2014). [Add a concluding and/or transition sentence to this paragraph. Concluding sentence wraps up what point you want me to take away at this point. Transition sentence tells me where you're headed next.]

This is a pressing issue because co-morbid diseases like cardiovascular disease and obesity accompany diabetes. Cardiovascular disease has been linked to 31% of deaths in the world and 39% of deaths among Asian Indians (Boparai, Davila, & Chandalia, 2011). Hypertension is highest among ethnic minorities; yet, Asian Indians are one of the most affected cultural groups (Boparai et al, 2011). Even though Asian Indians tend to have a lower body mass index, they still have a higher incidence of diabetes and heart disease (Mohanty, Woolhandler, Himmelstein, & Bor, 2005). According to the 2000 US Census, Cardiovascular disease has become a very important public health issue for Asian Indians because of their cultural risk factors and barriers to receiving care. [add REF]

Roughly, 18.1% of Asian Americans are uninsured compared to 11.7% of uninsured non-Hispanic whites (Clough, Lee, & Chae, 2013). Moreover, South Asian immigrant children are three times more likely to not have health insurance compared to South Asian children born in America. Those who are uninsured are eight times more likely to not see a doctor when they are sick. Ultimately, this decreases the amount of chronic disease screening and learning about ways to prevent chronic diseases. Those who did not have access to health insurance showed poorer health than those who do.

Lack of health insurance contributes to chronic diseases. Some other noted obstacles are income, language, residential segregation, and lack of transportation (Islam et al, 2014).

While there is a small literature on diabetes and South Asian health in the US, there is even less literature on diabetes in the Sikh Punjabi community (Islam et al., 2014), which has distinctive religious, dietary, and ethnic practices from the general Asian Indian population. Additionally, most research on diabetes, and diabetes related diseases in Punjabi communities have been conducted in urban areas.

The current study presents the outcomes of a needs assessment on diabetes and diabetes-related diseases conducted on a Punjabi agricultural community in a non-urban context in order to understand the behaviors related to chronic disease.

Punjabi Sikh immigrants have lived in the San Joaquin Valley for over 100 years (Leonard, 1985). In fact, the first Sikh Temple in the United States was built in Stockton, California and temples in Stanislaus and Merced County were built shortly after. Majority of studies of agricultural communities have focused on Mexican American communities, however, the Punjabi Sikh population have different risks and different cultural practices, which any health intervention aimed at the community needs to address.

Methods

Study setting and participant recruitment

We recruited a convenience sample of 267 Punjabi Sikhs living in Livingston and Turlock, California. Participation in the study required the individuals to be over the age of 18 and be of Punjabi Sikh origin. Sikh Temples were used as the data collection site because the Punjabi Sikh population tends to congregate weekly for spirituality and social support. The Sikh Temples were central to many Punjabi Sikh neighborhoods. This project included the involvement and support from Sikh temple community leaders, however, the Sikh temple did not provide any funding or contributed to any questions of the study. They gave us permission to use the sites to collect data. The research team consisted of professors, graduate students, undergraduate research assistants, community clinics, and community members.

Sample and Procedures

The research team collaborated with three Sikh Temples; two temples were located in Livingston and one temple was located in Turlock. From May to June 2018, research assistants were training on conducting data collection. This included practicing translating the surveys and the consent protocol. The surveys were offered in both Punjabi and English. For those who were not proficient in reading in English or Punjabi, research assistants provided assistance in completing the survey with the participant. All participants were offered a five dollar cash incentive for completing the survey.

Prior to gathering the data, there were announcements made during the Sunday services explaining our research and the surveys. A valid response rate was not calculated due to the large number of individuals attending the services on Sunday. Ethics approval was obtained from the University of California, Merced Institutional Review Board (UCM2018-11). It was approved on July 24, 2018.

Instrument and Measures

Data were collected though a 39-question survey on health needs. The survey was created by adapting questions from the Mediators of Atherosclerosis in South Asians Living in America (MASALA) study questionnaire from University of California, San Francisco and the New York University Center for the Study of Asian American Health about demographics, exercise practices, diet, and acculturation. The survey took approximately fifteen to thirty minutes to complete. The survey was manually entered into Stata 16 to analyze the responses. Sociodemographic characteristics included age (categorized into 18-24, 25-44, and over 45), sex (male/female), marital status (married/unmarried), body mass index, education level, underweight, normal, overweight, obese), citizenship status (citizen, green card holder, no response), nativity (born in the United States or born in India/South Asia), income (less than $25,000, $25,000-$50,000, more than $50,000, no response), education (less than high school, more than high school), and insurance (Private, public, don’t have insurance, no response).

In addition, general exercise data asked about how long and what kind of physical activity the participant does. Questions about health care coverage and access were also asked. Several questions about diet, alcohol, and smoking were asked. The end of the survey asked acculturation questions like what languages the participant can read and which ethnic group most of their friends represent. These questions will be analyzed further in future studies.

Analysis

The demographic characteristics of the sample were compared to Census data, in order to understand the representativeness of the sample. Analysis of the Punjabi Sikh data included demographic and diabetes related characteristics of the sample. The first analysis compared demographic characteristics like age, sex, citizenship status, nativity, income, education, and insurance status between the Punjabi Sikh respondents and the Indian category of the American Community Survey.

The second analysis illustrates the Punjabi Sikh demographic and diabetes characteristics were compared to data on Latino and non-Hispanic Whites in Merced and Stanislaus County in 2015, 2016, and 2017. The three years of data were pooled together to make the comparison with the Punjabi Sikh data. The California Health Interview Survey was utilized to understand how the Sikh community outcomes compare to other groups.

Results

Sample

We collected surveys from 267 respondents. Of the total sample (n=267), 33% were under the age of 44 and 67% were over the age 44 (Table 1). Roughly 24% were unmarried and 75% responded they were married. In addition, 75% reported having children. Income was categorized as below 25,000 dollars (27%) and above 25,000 dollars (36%). About 35% did not response to the questions about their yearly income. Respondents reported their health as poor (3%), fair (16%), good (27%), very good (30%), and excellent (20%). A majority of respondents had seen a primary care doctor in the last year (84%) and had a primary care doctor that speaks Punjabi (79%).

Comparisons

First, the Punjabi Sikh data were compared to the Indian data from the American Community Survey (ACS) (Table 2). About 27% of respondents in the ACS data set were over the age of 45, while Punjabi Sikh respondents over 45 represented 67%. There was a gender balance in both of the samples. A distinct difference between the Indian data and Punjabi Sikh data was the education. About 84% of the ACS respondents have more than a high school education, compared to 41% of Punjabi Sikh responders. Furthermore, 35% of Punjabi Sikhs have private health insurance compared to 83% of ACS respondents.

Then, the responses from the Punjabi Sikh health needs assessment was compared to Latinos from Merced and Stanislaus County, Non-Hispanic

Whites from Merced and Stanislaus County, and California state data from the California Health Interview Survey pooled for 2015, 2016, and 2017 (Table 3). Roughly 17% of Punjabi Sikh's reported diagnosis compared to Latinos (10%), Non-Hispanic Whites (16%), and California (10%). Self reported health was good, very good, or excellent in 77% of Punjabi Sikhs, 78% of Latinos, 83% of non-Hispanic Whites, and 83% of Californians. Approximately 68% of Punjabi Sikhs, 89% of Latinos, 97% of non-Hispanic Whites, and 92% of Californians had insurance coverage. However, 29% of Punjabi Sikhs did not respond to the question about insurance coverage. In addition, 75% of Punjabi Sikhs were married compared to 54% of Latinos, 54% of non-Hispanic Whites, and 49% of Californians. Nearly 79% of Punjabi Sikhs, 68% of Latinos, 78% of non-Hispanic Whites, and 73% of California reported having a routine checkup in the last month 12 month. For those who responded in the overweight and obese categories, 62% were Punjabi Sikh, 80% were Latino, 70% were non-Hispanic White, and 62% were the California average.

Table 1. Characteristics of Sikh Punjabis Surveyed in 2018 (n=267)

Variable	Percent
Diabetes	
Yes	17%
No	83%
Age	
0 - 44	33%
45 or older	67%
Sex	
Male	46%
Female	54%
Married	
Yes	75%
No	24%
Have children	
Yes	75%
No	24%
Income	
Income is < $25,000	27%
Income is >= $25,000	36%
No response to income	35%
Self reported health	
Poor	3%
Fair	16%
Good	27%
Very good	30%
Excellent	20%
Insurance	
HMO	15%
Private Insurance	20%
Medicare	27%
Medicaid	6%
Health Savings Account	1%
Don't have health insurance	3%
Primary care doctor	
Yes	84%
No	10%
Primary care doctor speaks Punjabi	
Yes	79%
No	15%

n=267

* Some of the percentages do not add up to 100% due to no response.

Table 2: Demographics compared to National Census (Indians)

Variables	**Stanislaus & Merced County**	**Indian- US Census**
Age		
18-24	16%	8%
25-44	19%	42%
45+	67%	27%
Sex		
Female	46%	48%
Male	54%	52%
Citizenship		
Citizen	55%	61%
Green card	25%	39%
No immigrant response	17%	-
Nativity		
Born in the United States	16%	29%
Born in India/Asia*	68%	31%
Income		
Less than $25,000	27%	-
$25,000 to $55,000	12%	-
More than $55,000	24%	-
No Response	35%	-
Education		
High school or less	48%	17%
More than high school	41%	84%
Insurance		
Private Insurance	35%	83%
Public Insurance	32%	16%
Don’t have health insurance	3%	5%
No response	21%	-

Table 3: Diabetes Related Variables compared among Punjabi Sikhs from Stanislaus and Merced County; Latino and Non-Hispanic Whites from Merced and Stanislaus County (2015, 2016, 2017); and California Average (2015, 2016, 2017)

Variable	**Punjabi Sikh**	**Latino**	**Non-Hispanic White**	**California**
Diabetes Diagnosis	17%	10%	16%	10%
Self Reported Health				
Poor	3%	5%*	5%*	4%
Fair	16%	17%	12%	14%
Good	27%	34%	29%	28%
Very Good	30%	23%	33%	30%
Excellent	20%	21%	21%	25%
Insurance Coverage				
Yes	68%	89%	97%*	92%
No	3%	11%	3%	8%
No Response	29%	-	-	-
Marital Status				
Single	19%	25%	18%	28%
Married	75%	54%	54%	49%
Routine Checkup in Last 12 Months	79%	68%*	78%*	73%
Body Mass Index (BMI)				
0-18.49 (Underweight)	2%	1%*	2%*	2%
18.5-24.99 (Normal)	36%	20%	28%	36%
25.0-29.99 (Overweight)	39%	40%	32%	35%
30.0 or higher (Obese)	23%	40%	38%	27%

*Statistically unstable estimates
** Frequency represents 2005 only

Discussion

Framework

The goal of a health needs assessment is to understand the issues that affect a local community. This project included the involvement and support from Sikh temple community leaders. The research team consisted of professors, graduate students, undergraduate research assistants, community clinics, and community members. Although there is literature on South Asian communities, there are limited data about the underserved Punjabi community.

Using a clear and concise survey questionnaire, we better understood the health outcomes, health disparities, and health barriers in this specific population. The findings of this study highlight the strengths and weaknesses in the South Asian Sikh community. The needs assessment usually does not have a hypothesis, but analyzed information on behaviors and other risk factors that contribute to type 2 diabetes. There if very little known about the Punjabi Sikh community of the rural San Joaquin Valley. This study aims to address a significant gap in the literature on chronic diseases among rural Punjabi Sikh populations.

Outcomes

The Punjabi Sikh Health Needs Assessment in the San Joaquin Valley is the first health needs assessment that focuses on the Punjabi Sikh community to examine chronic diseases. The needs assessment successfully gathered demographic information and the current health status of

respondents. Although only frequencies are reported, this study is the first to report on the overall status of the Punjabi Sikh community. In addition, the frequencies will inform future research.

A large majority of the participants had health insurance and had access to a primary care doctor that speaks Punjabi. In addition, the vast majority of the respondents reported their health as “good,” “very good,” or “excellent,” yet, they continue to experience negative health outcomes. About one third of respondents did not respond to the question about their income and almost half of respondents reported having less than a high school education. This could be important for future research about the impacts of income and education on health in this population. The body mass indexes of the Punjabi Sikhs are consistent with the literature. Although the respondents were less likely to be obese, they still are at risk for chronic diseases.

Placing the outcomes in a historical perspective

A historical understanding of social inequality and injustices that have affected the Punjabi community syndemically informs the existing interactive health outcomes. Syndemics is a term coined by Merill Singer that recognizes that health inequities are contributed through historical and political factors, which synergistically affect co-morbid health problems (Willen, Knipper, Abadla-Barrero & Davidovitch, 2017). The syndemic theory argues that structural injustices could contribute to health more than biological factors or personal health choices (Willen et al., 2017). Specifically,

cardiovascular disease and diabetes have greatly affected the Punjabi immigrant community in the Untied States, which synergistically ties to the political, economic, and structural hardship endured throughout history (Hasnain et al., 2017). Today, South Asians immigrants are generally highly educated individuals (Budiman, Cilluffo & Ruiz, 2019). However, the Punjabi Sikhs that moved to the United States in the early twentieth century were mostly unskilled and usually did not have formal education (Gibson, 1989). Those who immigrated to he San Joaquin Valley have historically worked low-skilled agricultural jobs that provided limited financial mobility (Gibson, 1989).

When US immigration laws allowed for family reunification, the Sikh population in the US, and the Central Valley in particular, this community sponsored the immigration of family members who were also unskilled and uneducated (Gibson, 1989), which perpetuated the historical disadvantage of first generation Punjabi Sikh immigrants. In addition to historical economic disadvantage, Punjabi Sikhs have also faced significant discrimination that persists today. In particular, hate crimes against Sikhs in California and the US have been on the rise since September 11, 2001, and numerous instances of physical attacks and property damage have occurred in San Joaquin Valley (Ahluwalia & Pellettiere, 2010). A syndemic viewpoint argues that the synergistic interaction of vulnerable populations dealing with generations of oppression and discrimination often intensify co-morbid health issue (Willen et al., 2017), and improving the health of the Punjabi

Sikh community will mean address both the historical and current economic disadvantage and discrimination this community has endured.

Limitations

There are several methodological limitations that are present in the study. First, the convenience sample is not representative of the whole Punjabi Sikh community in the San Joaquin Valley. The sample size (n=267) is fairly small and the population age was mainly over the age of 45 (67%). Second, the findings of the study are mainly descriptive and provide some inferences about the health of this specific population. Third, the surveys were collected only at Sikh Temples, which may exclude a subset of Punjabi Sikhs from the San Joaquin Valley who do not attend Sunday services. Fourth, it was difficult to record the overall response rate of the people who were asked to take the survey. Due to the busy environment during Sunday service, it was difficult to implement a protocol to record the response rate. As in, since the survey is convenience drawing comparisons with ACS and CHIS data percentages has to be interpreted cautiously. Despite the limitations of the study, this research illustrates a picture of a group has been historically understudied.

Conclusion

The Punjabi Sikh population of the San Joaquin Valley is a unique population, with high levels of diabetes. Although there is some literature on South Asian populations, it is important to disaggregate South Asian data to truly understand the social determinants of health of the Punjabi Sikh

community. General Asian Indian data is not representative of specific segmented communities who are more impacted by negative health outcomes. There is a distinctive immigration pattern and history of racism that has affected the health of the Punjabi Sikh community over time. Since the San Joaquin Valley has a large enclave of Punjabi Sikhs, there is a need for local health departments to implement interventions that are culturally tailored. In addition, the health needs of Punjabi Sikhs need to be discussed on local and state policy agendas, with an understanding of their historical disadvantages.

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