Explorative Analysis of Physical Health Status of People In USA

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Abstract

Purpose: The project aims to address the problem of the physical health status of people in the USA concerning physical activity behaviour, obesity weight status and Fruit and Vegetable Consumption.

Data: Ten years of data (2011-2021) was gathered from referred to as the nation's primary system of health-related telephone surveys in the US, the Behavioral Risk Factor Surveillance System holds a prominent position. The data includes information on three classes: Physical Activity Behavior, Obesity weight status, and Fruit and vegetable Consumption, represented as percentages. The analysis involved grouping the counts of each question asked across different states and years. Linear Regression was used for building the model.

Result: From the data we found that the questions asked concerning class Physical Activity Behaviour were highest (frequency was 1660) among 3 classes. The most frequently asked questions were with IDs (Q036, Q037, Q047). By correlation matrix we found that the mean Prevalence rates (avg data value) have been varying concerning time (Year). Distribution of Prevalence rates (data value) across different states in the US shows that people in 42 states out of 50 states show obesity weight status behaviour. This certainly implies that the people of those states also lack physical activity. People belonging to the age group (more than 65) show higher prevalence rates concerning different questions asked across different cities. Among different races people belonging to Hispanic show highest prevalence rates and Asian show lowest prevalence rates. The overall trend of prevalence rates over time is decreasing. The change in prevalence rates over the entire time period is: -0.191 which is negligible, hence we can conclude that the prevalence rates have remained constant over time.

Introduction

The dataset contains information related to various health conditions, behaviors, and risk factors, along with demographic and geographic details. It is a comprehensive collection of health-related data, making it a valuable resource for analyzing and understanding health trends, patterns, and disparities across different locations, periods, and demographic groups.

This dataset aims to provide insights into the prevalence and variations of various health conditions, behaviors, and risk factors across different locations and demographic groups. It allows researchers, policymakers, and public health professionals to identify patterns, disparities, and trends in health outcomes, helping them make informed decisions and interventions to improve public health and well-being.

Literature And Survey

[1] The purpose of this study was to quantify the level of FV diversity consumed by adults in the United States. Low, moderate, and high fruit and vegetable (FV) intake levels were identified, with total CE quantities of 1.4, 2.6, and 4.4 cups, respectively. potatoes, 0.2, 0.3, and 0.4; vegetables

(apart from potatoes), 0.3, 0.6, and 1.2; fruit, 0.3, 0.6, and 1.2; mixed dishes, 0.4, 0.4, and 0.5. Percentage of each level reporting intake: fruit - 22%, 49%, and 75%; mixed dishes - 72%, 71%, and 72%; vegetables (excluding potatoes) - 34%, 64%, and 89%; potatoes - 23%, 34%, and 32%. increasing consumption of entire FVs is correlated with increasing FV diversity, underscoring the need of promoting FVs as snacks, salads and side dishes for a larger consumption overall.

[2] The Clinical Practice Statement (CPS) on Nutrition and Physical Activity by the Obesity Medicine Association (OMA) provides healthcare professionals with a thorough knowledge of nutrition and physical activity principles, specifically tailored for the treatment of patients with excess body fat and associated metabolic issues. This invaluable resource incorporates evidence-based references and the clinical expertise of the authors to support healthcare providers in delivering effective patient care.

[3]Physical inactivity is prevalent among individuals with diabetes, leading to unfavorable cardiometabolic health outcomes. However, there is a lack of sufficient evidence regarding the impact of substituting sedentary time (ST) with physical activity on mortality risk for people with prediabetes and diabetes. To address this gap, we conducted a prospective study to examine the association between ST, measured through accelerometers, and mortality in this population. Our analysis adjusted for demographic factors, lifestyle choices, and moderate-to-vigorous-intensity physical activity (MVPA). Additionally, we investigated the potential benefits of replacing ST with different types of physical activities in terms of all-cause mortality. The findings revealed a clear dose-response relationship, indicating that higher ST correlated with an increased risk of premature mortality in adults with prediabetes and diabetes. Encouragingly, replacing ST with light-intensity physical activity (LPA) showed promising potential for improving the health of this high-risk group.

[4]. This study assessed 964 respondents, including 227 with BMI ≥30 kg/m2, to explore how obesity influenced nutrition and physical activity during the COVID-19 pandemic. Data from 482 respondents (105 with BMI ≥30 kg/m2) collected from June to August 2020 were compared with a "pre-pandemic" group of 482 individuals matched using propensity score matching. The study highlights the importance of maintaining a healthy body weight to mitigate the severity of COVID-19. A total of 964 participants were assessed, and 227 of them had a BMI under 30 kg/m2. 105 people (21.8%) with a BMI under 30 kg/m2 were among the 482 participants whose data were gathered during the COVID-19 pandemic (1 June–31 August 2020). Another 482 people (who were matched using PSM) provided the information from the pre-pandemic period. The latter group was among the 723 participants in the National Health Program study for whom data were gathered from 2017 to 2019.

[5] Scientific evidence strongly backs the significance of exercise in improving cardiovascular fitness, insulin sensitivity, and glycaemic control. However, its direct effect on weight loss can be inconsistent. Relying solely on exercise may lead to modest outcomes, necessitating personalized approaches and lifestyle adjustments for effective weight management. For individuals with type 2 diabetes, incorporating various forms of physical activity such as aerobic, resistance, and flexibility exercises, while reducing sedentary time, offers clear and multiple health benefits. Therefore, it is essential to include exercise in any lifestyle recommendations for individuals with diabetes. Encouraging longer daily exercise durations may also prove beneficial in enhancing weight loss efforts.

[6] The review identifies current trends and long-term patterns in a number of different areas. While work-related and transportation-related physical activity diminish, leisure-time physical activity is either stable or slightly increasing, resulting in a decrease in overall total physical activity. The tendency to be sedentary is increasing. The amount of walking for transportation varies significantly amongst metropolitan areas. Over the past 50 years, Americans' per-person vehicle miles traveled have steadily climbed along with a significant trend toward suburban living. The built environment has changed, and sedentary behavior has increased, putting a huge section of the American population at risk for physical inactivity.

Methodology

Objectives

- To spread awareness among youths to engage in more physical activities
- To predict the healthy lifestyle of a place

Data Collection and Description

We have collected the data from the US govt website.

It consists of 9 years of data from 2011-2020.

The data set contains 33 attributes and 88630 rows

Data Preprocessing

Replaced all Nan values by

➢Mean: -If the data is normally distributed

➢Median: -If the data is right-skewed or left-skewed.

Attributes with more than 90% Nan values are deleted. Tuples containing redundant values are deleted. After deleting these irrelevant attributes and tuples our dataset is reduced to 27 attributes and 3174 tuples.

Feature Selection

The method that we have used for feature selection is the "Linear Regression" method. This method removes the attributes which have variance less than the given threshold value. The target variable that we have selected for our analysis is "Data Value". After applying the feature selection algorithm, out of 27 attributes 15 attributes were selected.

Analysis

Distribution of classes

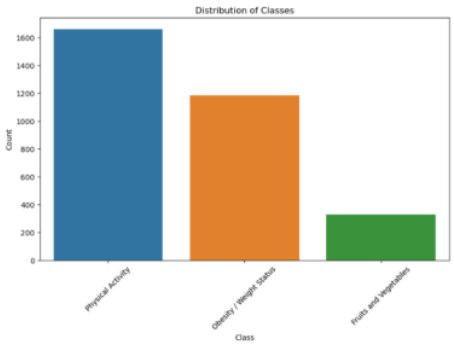

Figure 1: Distribution of classes

Most of the questions asked by the surveillance system across all the 9 years of a survey for all 22 states of the US were related to the Topic of physical activity.

Distribution of Questions with respect to Question Id's.

	Question	QuestionID
0	Percent of adults who engage in no leisure-tim...	Q047
1	Percent of adults aged 18 years and older who ...	Q036
2	Percent of adults aged 18 years and older who ...	Q037
3	Percent of adults who achieve at least 300 min...	Q045
4	Percent of adults who achieve at least 150 min...	Q044
5	Percent of adults who achieve at least 150 min...	Q043
6	Percent of adults who engage in muscle-strengt...	Q046
7	Percent of adults who report consuming fruit l...	Q018
8	Percent of adults who report consuming vegetab...	Q019

Figure 2: Questions with respect to questionId

- **Frequency of the Questions asked**

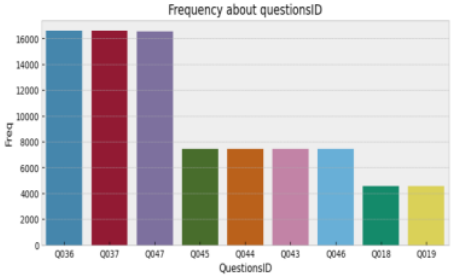

Figure 3: Frequency of the questions asked

The most frequently asked questions had the question IDs Q036 (Percentage of adults aged 18 and older who have obesity), Q037 (Percentage of adults aged 18 and older who have an overweight classification), and Q047 (Percentage of adults who do not participate in leisure-time physical activity).

- **Prevalence rates (mean Data value) across different years.**

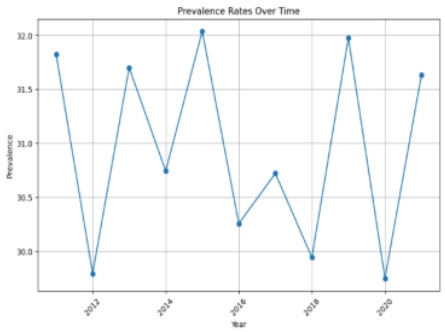

Figure 4: Prevalence rates across different years

From the above plot, it is clear that the prevalence rates have been varying for different years.

- **Distribution of stratification categories**

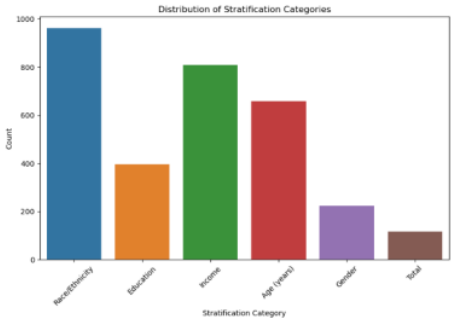

Figure 5: Distribution of stratification categories

We have grouped people according to their race/ethnicity, Education, Income, Age and Gender into different groups. Most of the people were grouped according to the Race/ Ethnicity stratification category.

Distribution of prevalence rates across different age groups

The prevalence rates of the age group (65 or older) were the highest among all the other age groups. We cannot conclude the sample's gender as the corresponding values to the age attribute were missing in our dataset.

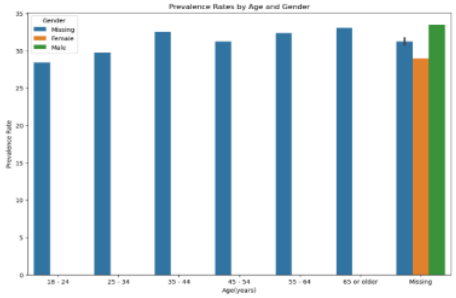

Figure 6: Distribution of prevalence rates across different age groups

- **How does the prevalence rates vary according to different sample sizes across different states.**

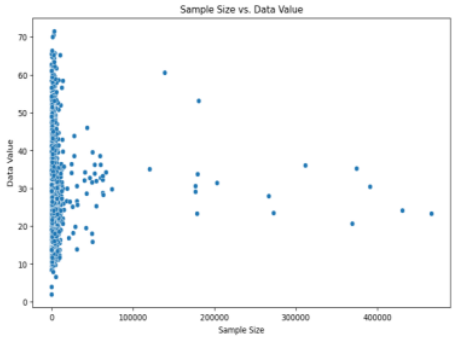

Figure 7: Correlation between sample size and data value

From the plot, we found that there exists a weak negative correlation (-0.0105) between sample size and data value.

- **Questions with highest mean prevalence rates.**

The Top risk factors with the highest prevalence were the questions with the highest prevalence rates. Questions like "percentage of adults who achieve 150 minutes per week of moderate-intensity aerobic physical activity or 75 minutes per week of vigorous-intensity aerobic activity", "percentage of adults who report consuming fruit less than one time daily", and "percentage of adults aged 18 years or older who have overweight classification" are among the top 3 risk factors identified by the surveillance system.

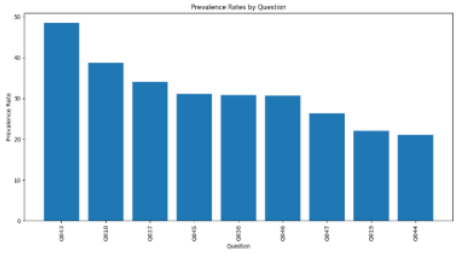

Figure 8: Questions with mean prevalence rates

- **Prevalence Trends across locations and time**

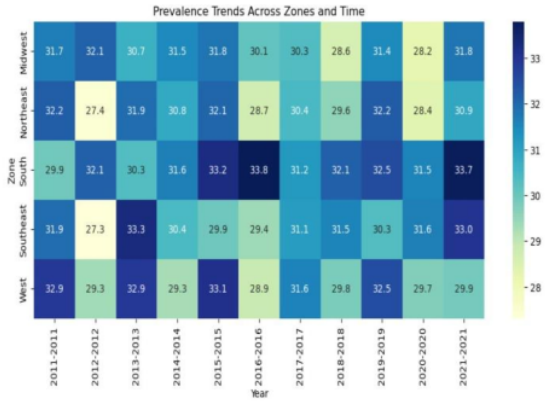

Figure 9: Variation of prevalence rates across different zones over time.

The prevalence rates have been varying across different locations and times. There is no gradual increase or decrease in prevalence rates across different states and times. The highest prevalence

rate was 46.1% in Puerto Rico in the year 2021. The lowest prevalence rate was 15.5% in New Hampshire in the year 2012. The overall average prevalence rate across all the states was 30.9%.

Prevalence rates of health conditions with respect to different cities/states

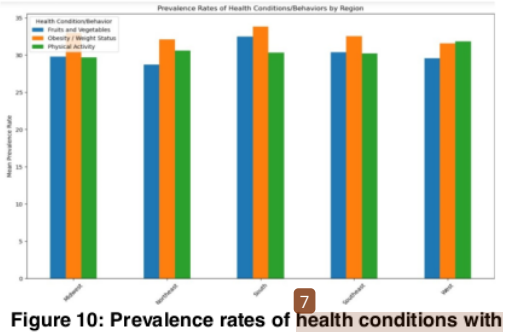

Figure 10: Prevalence rates of health conditions with respect to different cities/states

From the plot, we get the distribution of classes for different states divided into different zones according to prevalence rates. People in the states of Alabama, Guam, Louisiana, Mississippi, New Mexico, Nevada, Puerto Rico, Rhode Island, Tennessee, Texas, Virgin Islands lack fruit and vegetable consumption. People in the states of Alaska, Colorado, Florida, Hawaii, Montana, New Hampshire, New York, Oregon, Utah and Vermont lack Physical Activities. In most of the states, the frequency of obesity is higher which certainly implies that people in those states also lack physical activities. Obesity weight status behaviour is dominating in all the zones of which the highest is in the south zone.

- **Choropleth Map of US states**

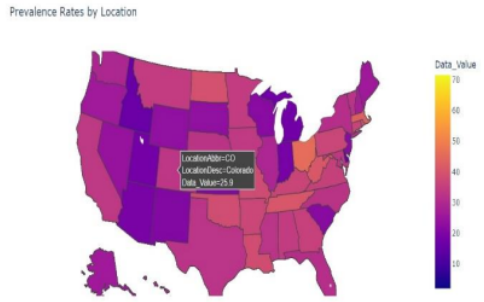

Figure 11: Choropleth Map of US states

The map displays the US states, and the color of each state is based on the prevalence rate of the health condition or behaviour in that state. States with darker colors represent higher prevalence rates, while states with lighter colors have lower prevalence rates. Overall, the choropleth map provides a visual representation of the prevalence rates across different states, helping to identify geographic variations and potential hotspots of the health condition or behaviour of interest.

Conclusion

From the above analysis, we can conclude that people from 42 states in the US show obesity and weight status behaviour. This certainly implies that the population of those states also lack physical activity. People of the remaining 8 states consume fruits and vegetables less than one time daily. There is no gradual increase or decrease in prevalence rates across different states over time. People belonging to the age group (more than 65) have the highest frequency of mean prevalence rates across different cities/states in the USA. Among stratification categories under Race/Ethnicity Hispanic people have highest prevalence rates and Asian people have lowest prevalence rates. The overall trend of prevalence rates over time is decreasing. The change in prevalence rates over the entire time period is: -0.191 which is negligible, hence we can conclude that the prevalence rates have remained constant over time.

Refrences

10.3390/nu14112236. PMID: 35684036; PMCID: PMC9183150.

[5] Hoy MK, Clemens JC, Martin CL, Moshfegh AJ. Fruit and Vegetable Consumption of US Adults by Level of Variety, What We Eat in America, NHANES 2013-2016. Curr Dev Nutr. 2020 Feb 4;4(3):nzaa014. doi: 10.1093/cdn/nzaa014. PMID: 32110770; PMCID: PMC7042609.

[6] Brownson RC, Boehmer TK, Luke DA. Declining rates of physical activity in the United

.

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