Hypothesis to understand factors contributing to rising obesity rates in the USA

Main Hypothesis:

Our hypothesis posits that the rising obesity rates in the United States stem from a complex interplay of various underlying factors. We contend that understanding these multifaceted determinants is pivotal for formulating effective obesity prevention and management strategies. Specifically, we propose that lifestyle choices, dietary habits, genetic predispositions, socioeconomic status, and environmental influences collectively contribute to the escalating obesity epidemic across diverse age groups. By comprehensively analyzing these interconnected factors, we aim to provide novel insights and evidence-based recommendations to combat the obesity crisis, addressing its health and socioeconomic ramifications comprehensively.

Specific Hypothesis:

Unhealthy dietary habits are hypothesized to positively correlate with obesity rates. Increased consumption of processed foods, high-calorie beverages, and sugary snacks is anticipated to significantly contribute to the escalating prevalence of obesity.

Sedentary lifestyles, characterized by **low levels of physical activity**, are expected to be positively associated with obesity rates. Factors such as decreased physical education in schools, heightened screen time, and diminished engagement in outdoor activities are likely to exacerbate the obesity epidemic.

Socioeconomic factors, including income level, education, and access to healthcare and nutritious food options, are hypothesized to play a crucial role in obesity prevalence. Individuals from lower socioeconomic backgrounds are anticipated to face a higher risk of obesity due to limited resources and opportunities for healthy living.

Genetic predispositions are expected to influence individual susceptibility to obesity, with certain genetic traits interacting with environmental factors to augment the likelihood of weight gain and obesity development.

Environmental factors, such as neighborhood walkability, availability of parks and recreational facilities, food deserts, and exposure to advertising of unhealthy foods, are projected to contribute to regional disparities in obesity rates. These factors are likely to shape individuals' behaviors and choices, impacting their risk of obesity.

Psychological factors, such as stress levels, mental health conditions, and coping mechanisms, may also influence obesity rates. Increased stress and poor mental health are hypothesized to contribute to unhealthy eating habits and sedentary behaviors, thereby exacerbating the obesity epidemic.

Societal and cultural attitudes toward body image, food consumption, and physical activity can significantly influence obesity rates. Cultural practices that prioritize large portion sizes, frequent eating out, or sedentary leisure activities may contribute to higher obesity prevalence. Moreover, social norms that stigmatize obesity or promote unrealistic body ideals can impact individuals' self-esteem and behaviors related to diet and exercise. Understanding how social and cultural factors interact with individual choices and environmental influences is crucial for developing effective obesity prevention strategies.

Novelty and Contribution to Literature:

Our research addresses a gap in the existing literature by comprehensively analyzing the interplay of various factors contributing to rising obesity rates in the United States. While previous studies have explored individual aspects such as dietary habits, physical activity, and genetic predispositions, our research aims to integrate these factors into a holistic understanding of obesity trends across different age groups. Furthermore, by providing evidence-based recommendations for obesity prevention and management strategies targeting individuals, policymakers, healthcare professionals, and drug developers, our research contributes to addressing the obesity epidemic from multiple angles and proposes novel solutions for combating this pressing public health issue.

Description of data:

➔ The data collected is centered around individuals' BMI across various states in the USA, with individuals having a BMI exceeding 35 are classified as obese.

➔ This meticulously curated dataset, inclusive of its results, has undergone thorough organization and analysis, whereby individuals are grouped according to various parameters such as gender, household income, age, education, and ethnicity.

➔ The data utilized in this research has been sourced from the BRFSS (Behavioral Risk Factor Surveillance System), recognized as the nation's premier system of health-related telephone surveys. BRFSS gathers state data on U.S. residents concerning their health-related risk behaviors, chronic health conditions, and utilization of preventive services, operating under CDC (Centers for Disease Control and Prevention) guidance.

➔ BRFSS operates in adherence to CDC guidelines, ensuring the collection of data meets the highest standards and accuracy.

➔ The percentage of obese individuals in different states across the USA is categorized based on varying factors, including gender, household income, age, education, and ethnicity. Analyzing patterns within this dataset facilitates the identification of common characteristics among obese individuals, providing invaluable insights for recommendations to individuals, drug manufacturers, healthcare professionals, and policymakers. These insights aid in the formulation of effective strategies aimed at eradicating the obesity problem at its core and preventing its recurrence in the future.

➔ Our analysis focuses on identifying the characteristics of obese individuals based on various factors, aggregated by states within the USA. Consequently, the states of the USA serve as the units of observation in our dataset.

➔ The aggregation of data based on diverse parameters, particularly by state within the USA, facilitates the identification of correlations and insights into the characteristics of obese individuals. However, categorizing individuals with a BMI above 35 as obese may not universally apply when considering characteristics based on different factors.

➔ The grouping of data may lead to the generalization of results, potentially resulting in less accuracy that may not be applicable in every situation. Therefore, we adopt statistical methods and sampling algorithms in our approach to minimize uncertainty associated with generalized data inputs.

Preprocessing and Scaling of Variables used in Research:

➔ The data collected for the aggregated obese individuals, based on their BMI state-wise in the USA, considers gender as a factor, with two values: 'Male' and 'Female'. Similarly,

the race factor has eight unique values: 'White', 'Black', 'Asian', 'American Indian and Alaskan Native', 'Hispanic', 'Multiracial', 'Native Hawaiian or other Pacific Islander', and 'Other'. The education factor has four unique values: 'less than H.S', 'H.S or G.E.D', 'Some post-H.S', and 'College graduate'.

➔ To group age and household as these are measured columns, we have considered $2^k \geq n$, which divides age into six groups: 18-24, 24-34, 35-44, 45-54, 55-64, and 65+. Household income has seven groups: 'less than $15,000', '$15,000-$24,999', '$25,000-$34,999', '$35,000-$49,999', '$50,000-$99,999', '$100,000-$199,999', and '$200,000'.

➔ To identify patterns, understand the common characteristics and habits of obese people, groups are created for every factor based on BMI data collected from individuals state-wise in the USA. **All factors are equally important in identifying patterns and understanding the characteristics of obese people.**

➔ The percentage of obese people aggregated for every unique value of factor is dependent variable on those different values of variables. Different factors contributing to obesity are independent variables.

The approach used in testing hypothesis:

A discrete choice model is employed to test the hypothesis because it exclusively incorporates the essential factors contributing to obesity in individuals within the research data. The identified patterns, which hold significant importance concerning higher BMI in individuals, are pivotal for providing appropriate recommendations to individuals, health professionals, and policymakers to effectively address obesity in the future.

- Considering that the states of the USA serve as the unit of observation in the data under research, it is crucial to pinpoint states with severe obesity problems compared to others.
- To gauge the severity of obesity problems across different states of the USA based on various factors, which are sourced from different datasets, the mean value of the percentage of obese individuals aggregated based on different groups of those factors is considered.
- If the percentage of obese individuals surpasses the mean value, then that state is classified as having serious obesity problems. For instance, for the gender factor, states with a percentage of obese individuals greater than 33% are regarded as facing serious obesity problems, while for the education factor, it is 34%, for the age factor, it is 33%, for the race factor, it is 20%, and for the income factor, it is 34%.
- Identifying the severity of this issue in different states will aid in pinpointing the characteristics more precisely that lead to obesity in individuals.
- Additionally, the aggregated percentage of obese individuals calculated based on different groups in the considered factors is further grouped based on the state of the USA using the average function. This combined percentage of obesity, based on all factors for the different states, is computed by assigning 20% weightage to all the factors. The average percentage of obese individuals in different states, calculated after considering all the factors, is found to be 31%.
- Furthermore, to discern the underlying reasons contributing to severe obesity issues in those states, we revisit the initial datasets to identify patterns based on the groups of different factors.