

Data analysis portfolio project in Excel.

Decoding Health Patterns: Obesity and Demographic Factors in USA

Introduction

In this project, I'm digging into obesity and overweight trends from 2009 to 2021. The investigation extends to exploring the intricate correlations among obesity, inadequate vegetable consumption, and insufficient physical activity. Furthermore, the analysis aims to discern variations in these factors across diverse demographic groups, categorized by gender, age, education level, income, and race/ethnicity. I'm following the usual steps in data analysis: **ask**, **prepare**, **process**, **analyze**, **share**, and **act**.

Ask

Here are the main things I'm curious about:

- 1. How have overweight and obesity rates changed over the examined years?*
- 2. How do obesity rates, low vegetable consumption, and low physical activity vary across different demographic categories such as age groups, genders, education levels, income brackets, and racial/ethnic groups?*
- 3. Top 10 regions with higher prevalence of obesity.*

Prepare

The dataset utilized for this project was sourced from the Centers for Disease Control and Prevention. They have this dataset called "[Nutrition, Physical Activity, and Obesity - Behavioral Risk Factor Surveillance System](#)." Using this platform made it easy to carefully look at the data and get the info I needed for the project. I got the dataset in CSV format and smoothly brought it into Excel to dig deeper.

Process

Upon initial review, the dataset presented a raw and unstructured form:

	A	B	C	D	E	F	G	H	I	J
1	Year/End	Location/Abbr	Location/Desc	Class	Question	Data_Value	Data_Value_Footnote	Sample_Size	Stratification/Category1	Stratification1
2	2020	US	National	Physical Activity	Percent of adults who engage in no leisure-time physical activity	30.6		31255	Race/Ethnicity	Hispanic
3	2014	GU	Guam	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	29.3		842	Education	High school graduate
4	2013	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	28.8		62562	Income	\$50,000 - \$74,999
5	2013	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	26.7		60069	Income	Data not reported
6	2015	US	National	Physical Activity	Percent of adults who achieve at least 300 minutes a week of moderate-intensi	26.6		30904	Income	Less than \$15,000
7	2015	GU	Guam	Physical Activity	Percent of adults who achieve at least 150 minutes a week of moderate-intensi	27.4		125	Race/Ethnicity	Hispanic
8	2012	WY	Wyoming	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	48.5		69	Race/Ethnicity	American Indian/Alaska Na
9	2012	DC	District of Columbia	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	31.6		243	Education	Less than high school
10	2015	PR	Puerto Rico	Physical Activity	Percent of adults who engage in no leisure-time physical activity	38.1		421	Income	\$25,000 - \$34,999
11	2011	AL	Alabama	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	35.2		598	Age (years)	25 - 34
12	2015	GU	Guam	Physical Activity	Percent of adults who engage in no leisure-time physical activity	30.5		559	Education	High school graduate
13	2015	RI	Rhode Island	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	40.2		354	Race/Ethnicity	Hispanic
14	2011	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	35.4		6649	Race/Ethnicity	American Indian/Alaska Na
15	2012	WY	Wyoming	Physical Activity	Percent of adults who engage in no leisure-time physical activity	32.3		484	Income	Less than \$15,000
16	2020	DE	Delaware	Physical Activity	Percent of adults who engage in no leisure-time physical activity	15.3		65	Race/Ethnicity	Asian
17	2015	PR	Puerto Rico	Physical Activity	Percent of adults who achieve at least 150 minutes a week of moderate-intensity aerobic pl	Data not available because sample size is insufficient.			Race/Ethnicity	Non-Hispanic White
18	2015	GU	Guam	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classification	Data not available because sample size is insufficient.			Race/Ethnicity	Other
19	2015	GU	Guam	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	33.7		285	Age (years)	55 - 64
20	2011	RI	Rhode Island	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	32.1		109	Race/Ethnicity	Other
21	2015	PR	Puerto Rico	Physical Activity	Percent of adults who achieve at least 150 minutes a week of moderate-intensity aerobic pl	Data not available because sample size is insufficient.			Race/Ethnicity	Asian
22	2017	NJ	New Jersey	Physical Activity	Percent of adults who engage in muscle-strengthening activities on 2 or more 19.8			59	Race/Ethnicity	Other
23	2012	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	35.1		120032	Education	Some college or technical s
24	2017	WA	Washington	Fruits and Vegetables	Percent of adults who report consuming fruit less than one time daily	36.1		766	Income	Less than \$15,000
25	2013	US	National	Physical Activity	Percent of adults who engage in no leisure-time physical activity	27.9		266452	Gender	Female
26	2015	PR	Puerto Rico	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	42.0		997	Age (years)	55 - 64
27	2011	US	National	Physical Activity	Percent of adults who engage in no leisure-time physical activity	15.9		20923	Age (years)	18 - 24
28	2014	PR	Puerto Rico	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	36.1		2214	Income	Less than \$15,000
29	2014	GU	Guam	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	34.5		333	Income	Less than \$15,000
30	2013	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	31.5		27737	Race/Ethnicity	Hispanic
31	2015	PR	Puerto Rico	Physical Activity	Percent of adults who engage in no leisure-time physical activity	50.4		862	Age (years)	45 - 54
32	2014	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	32.2		62892	Income	\$15,000 - \$24,999
33	2015	PR	Puerto Rico	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	29.5		5154	Total	Total
34	2020	ME	Maine	Physical Activity	Percent of adults who engage in no leisure-time physical activity	21.7		4518	Gender	Male
35	2011	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	31.6		49576	Income	Less than \$15,000
36	2016	US	National	Physical Activity	Percent of adults who engage in no leisure-time physical activity	34.2		66757	Income	\$15,000 - \$24,999
37	2016	MI	Michigan	Physical Activity	Percent of adults who engage in no leisure-time physical activity	21.5		1664	Income	\$50,000 - \$74,999
38	2016	WY	Wyoming	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	29.8		2293	Gender	Female
39	2016	VA	Virginia	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	40.1		951	Age (years)	35 - 44
40	2016	WA	Washington	Physical Activity	Percent of adults who engage in no leisure-time physical activity	18.8		3054	Age (years)	55 - 64
41	2016	CA	California	Physical Activity	Percent of adults who engage in no leisure-time physical activity	13.7		273	Race/Ethnicity	2 or more races

To enhance its usability, I transformed the data into a table. Then ***sorted columns*** in order to bring it more structure.

Year	Location_abbr	Location	Class	Question	Percentage	Data_Value_Footnote	Sample_Size	Stratification_category	Stratifi
2020	US	National	Physical Activity	Percent of adults who engage in no leisure-time physical activity	30.6		31255	Race/Ethnicity	Hispan
2014	GU	Guam	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	29.3		842	Education	High st
2013	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	28.8		62562	Income	\$50,00
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2015	GU	Guam	Physical Activity	Percent of adults who achieve at least 150 minutes a week of moderate-intensi	27.4		125	Race/Ethnicity	Hispan
2012	WY	Wyoming	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	48.5		69	Race/Ethnicity	Americ
2012	DC	District of Columbia	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	31.6		243	Education	Less th
2015	PR	Puerto Rico	Physical Activity	Percent of adults who engage in no leisure-time physical activity	38.1		421	Income	\$25,00
2011	AL	Alabama	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	35.2		598	Age (years)	25 - 34
2015	GU	Guam	Physical Activity	Percent of adults who engage in no leisure-time physical activity	30.5		559	Education	High st
2015	RI	Rhode Island	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	40.2		354	Race/Ethnicity	Hispan
2011	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	35.4		6649	Race/Ethnicity	Americ
2012	WY	Wyoming	Physical Activity	Percent of adults who engage in no leisure-time physical activity	32.3		484	Income	Less th
2020	DE	Delaware	Physical Activity	Percent of adults who engage in no leisure-time physical activity	15.3		65	Race/Ethnicity	Asian
2015	PR	Puerto Rico	Physical Activity	Percent of adults who achieve at least 150 minutes a week of moderate-intensity aerobic pl	Data not available because sample size is insufficient.			Race/Ethnicity	Non-Hi
2015	GU	Guam	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classification	Data not available because sample size is insufficient.			Race/Ethnicity	Other
2015	GU	Guam	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	33.7		285	Age (years)	55 - 64
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2015	PR	Puerto Rico	Physical Activity	Percent of adults who achieve at least 150 minutes a week of moderate-intensity aerobic pl	Data not available because sample size is insufficient.			Race/Ethnicity	Asian
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2012	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	35.1		120032	Education	Some c
2017	WA	Washington	Fruits and Vegetables	Percent of adults who report consuming fruit less than one time daily	36.1		766	Income	Less t
2013	US	National	Physical Activity	Percent of adults who engage in no leisure-time physical activity	27.9		266452	Gender	Femal
2015	PR	Puerto Rico	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	42.0		997	Age (years)	55 - 64
2011	US	National	Physical Activity	Percent of adults who engage in no leisure-time physical activity	15.9		20923	Age (years)	18 - 24
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2014	GU	Guam	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	34.5		333	Income	Less th
2013	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	31.5		27737	Race/Ethnicity	Hispan
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2014	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	32.2		62892	Income	\$15,00
2015	PR	Puerto Rico	Obesity / Weight Status	Percent of adults aged 18 years and older who have obesity	29.5		5154	Total	Total
2020	ME	Maine	Physical Activity	Percent of adults who engage in no leisure-time physical activity	21.7		4518	Gender	Male
2011	US	National	Obesity / Weight Status	Percent of adults aged 18 years and older who have an overweight classificatio	31.6		49576	Income	Less th
2016	US	National	Physical Activity	Percent of adults who engage in no leisure-time physical activity	34.2		66757	Income	\$15,00
2016	MI	Michigan	Physical Activity	Percent of adults who engage in no leisure-time physical activity	21.5		1664	Income	\$50,00

Subsequently, I optimized column names for clarity, eliminating any redundant information.

The "Value" column, denoting the percentage of adults in each category, I converted into numeric values after replacing commas with periods.

A thorough ***check for duplicates*** was conducted (none were found).

The "Questions" column was shortened for conciseness and clarity, encapsulating the most pertinent information.

Now, my data's looking neat, and I'm ready to dive into the analysis.

To make it clearer, the dataset is divided into the following classes, each associated with a set of related questions:

- **Fruits and Vegetables:** I chose the category of individuals who report consuming vegetables less than one time daily.

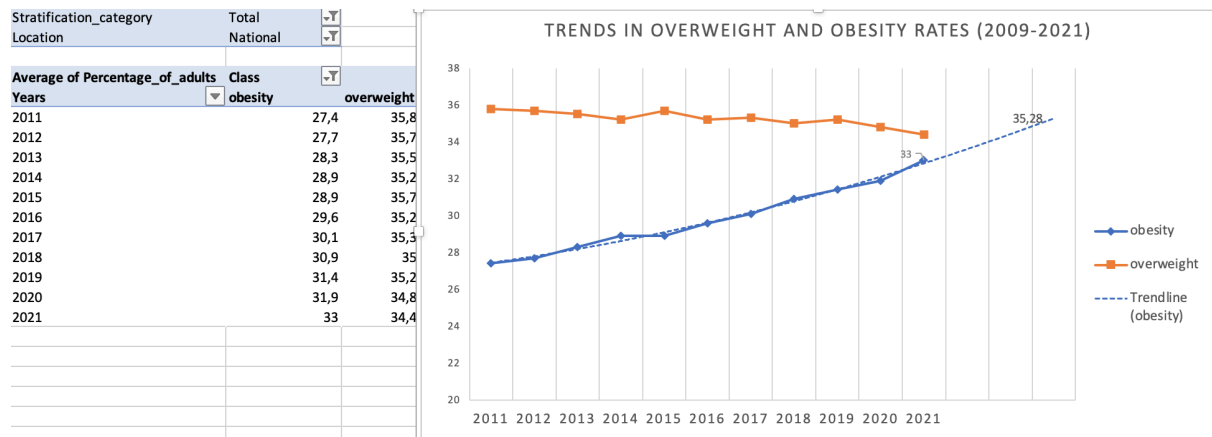
Additionally, the following stratification categories were accessible for analysis:

- **Age (years):**
 - 18 - 24;
 - 25 - 34;
 - 35 - 44;
 - 45 - 54;
 - 55 - 64;
 - 65 or older;
- **Education:**
 - Less than high school;
 - High school graduate;
 - Some college or technical school;
 - College graduate
- **Gender:**
 - Female;
 - Male;
- **Income:**
 - Less than \$15,000
 - \$15,000 - \$24,999;
 - \$25,000 - \$34,999;
 - \$35,000 - \$49,999;
 - \$50,000 - \$74,999
 - \$75,000 or greater;
- **Race/Ethnicity:**
 - American Indian/Alaska Native;
 - Asian;
 - Hawaiian/Pacific Islander;
 - Hispanic;
 - Non-Hispanic Black;
 - Non-Hispanic White;
 - 2 or more races;
 - Other;
- **Total**

Analyse and Share

How have overweight and obesity rates changed over the examined years?

I made a pivot table with "Year" in rows and "Question" in columns. For filters, I selected "National" in Location to focus on the entire country, and under Category, I chose "Total."



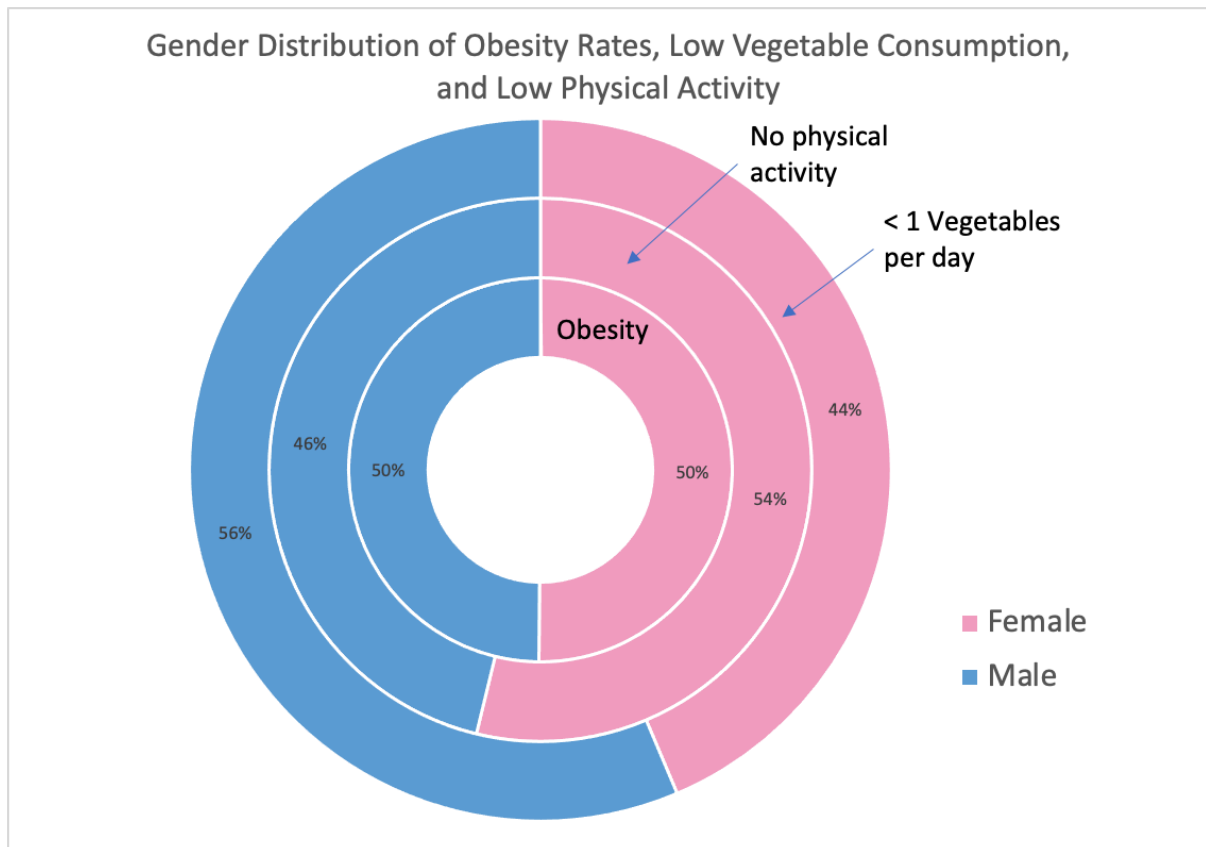
Based on the line chart, it's apparent that overweight rates remained relatively stable with a slight decrease over the years. However, **the trend for obesity shows a gradual increase almost every year**. By creating a trendline for the next three years, it suggests a **potential growth of around 2.3% in 2024**.

How do obesity rates, low vegetable consumption, and low physical activity vary across different demographic categories such as age groups, genders, education levels, income brackets, and racial/ethnic groups?

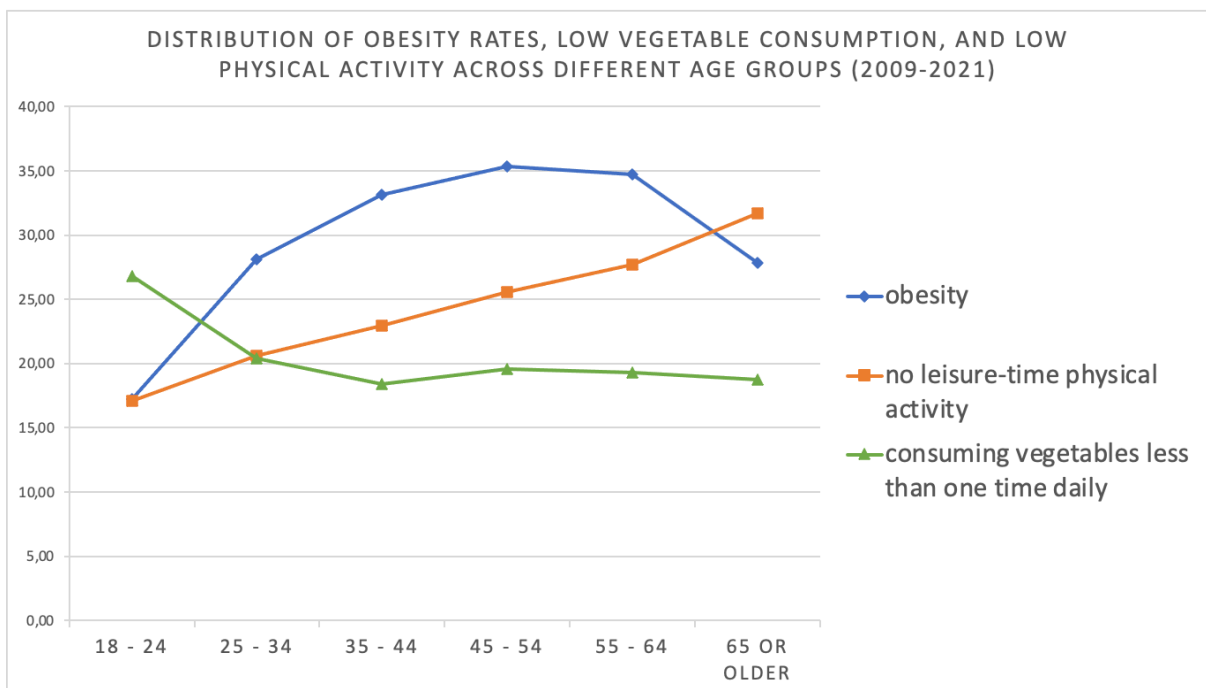
For the subsequent analysis, I maintained the filters, examining data for the entire population but within distinct categories.

In the classification, I concentrated on three criteria:

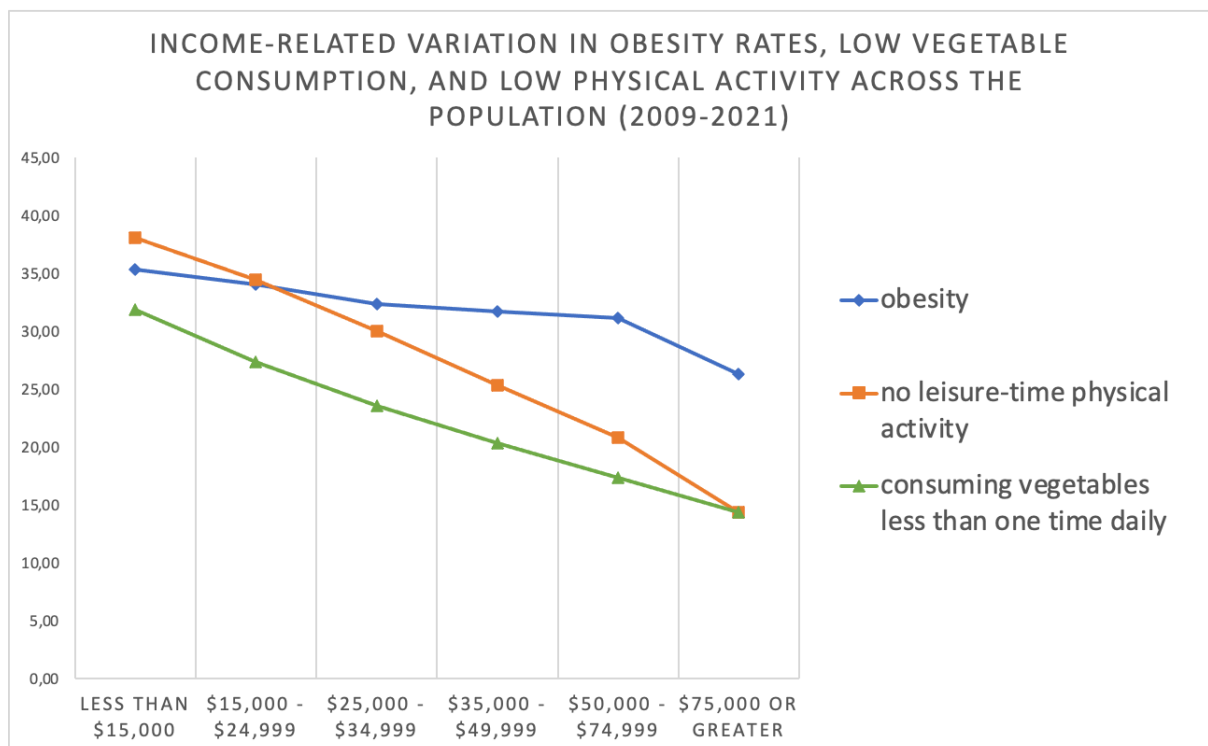
1. obesity,
2. absence of leisure-time physical activity, and
3. daily vegetable consumption less than once.



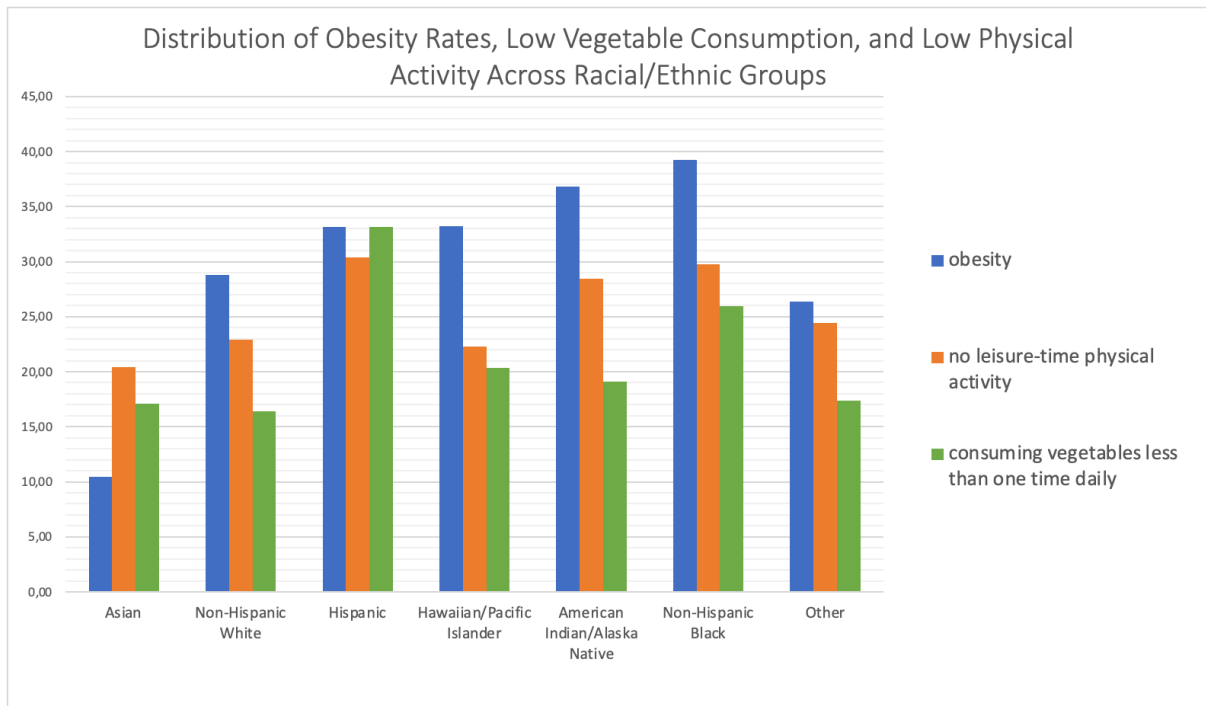
- Between the genders, there is ***no correlation in obesity; both are equal.***
- A slight correlation is observed in the ***absence of leisure-time physical activity, where women tend to be less active.***
- In other criteria, such as vegetable consumption, ***men tend to eat fewer vegetables.***



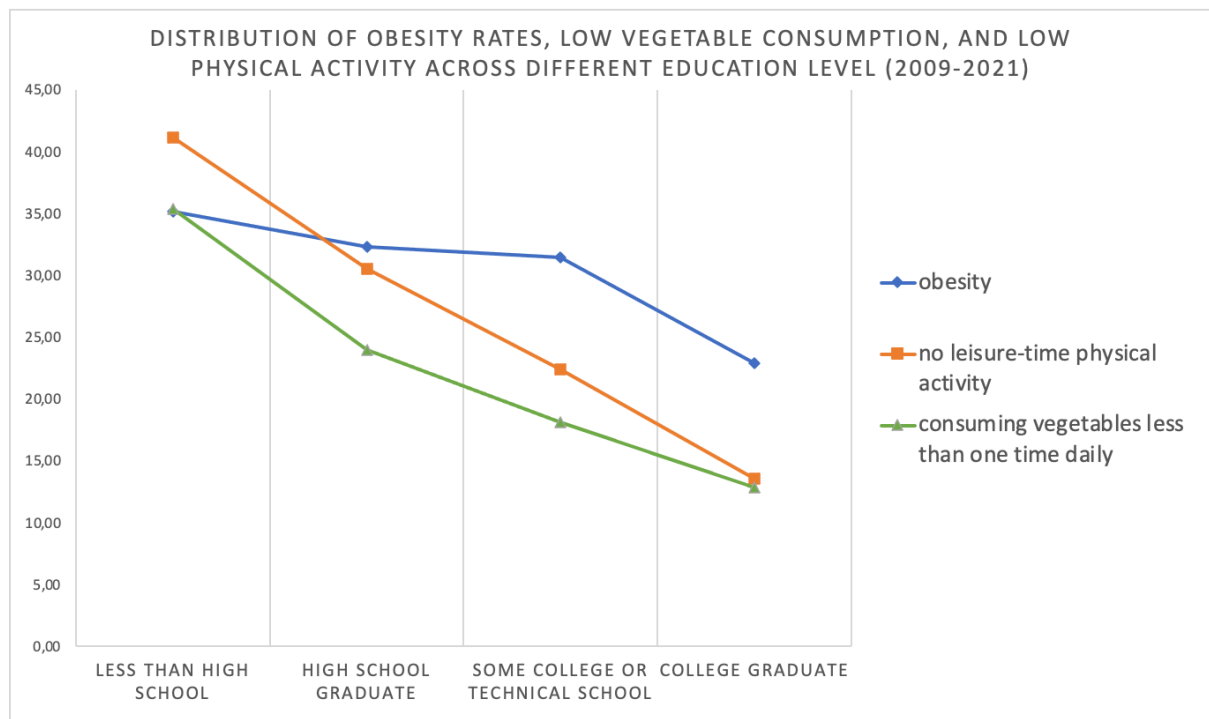
- The following line chart illustrates that the **prevalence of obesity increases with age**, with the **group aged 45-64 showing the highest tendency toward** the condition.
- However, this trend **decreases by approximately 7% among individuals aged 65 and older**.
- The lack of leisure-time physical activity gradually increases with age.
- Additionally, the age group of **18-24 exhibits the highest occurrence of low vegetable consumption**, while the rest of the population shows less pronounced correlation in this aspect.



- The graph clearly illustrates a trend of **decreasing obesity with increasing income**.
- A similar correlation is evident in other criteria: individuals with **higher income tend to engage in more leisure-time physical** activities and
- **consume vegetables more frequently** compared to groups with lower income.



- The bar chart depicts the Racial/Ethnic groups based on the increase in obesity rates, with a higher tendency towards the right.
- It highlights that the **Asian group has the least inclination towards obesity**, almost one-third of the rating observed in the next group (Non-Hispanic White). Conversely, the group with the highest tendency is Non-Hispanic Black.
- When comparing the two groups with the lowest and highest propensity for obesity, it becomes evident that other criteria correlate with the same pattern.
- However, no evident correlation among obesity rates, low vegetable consumption, and low physical activity is discernible from the graph.



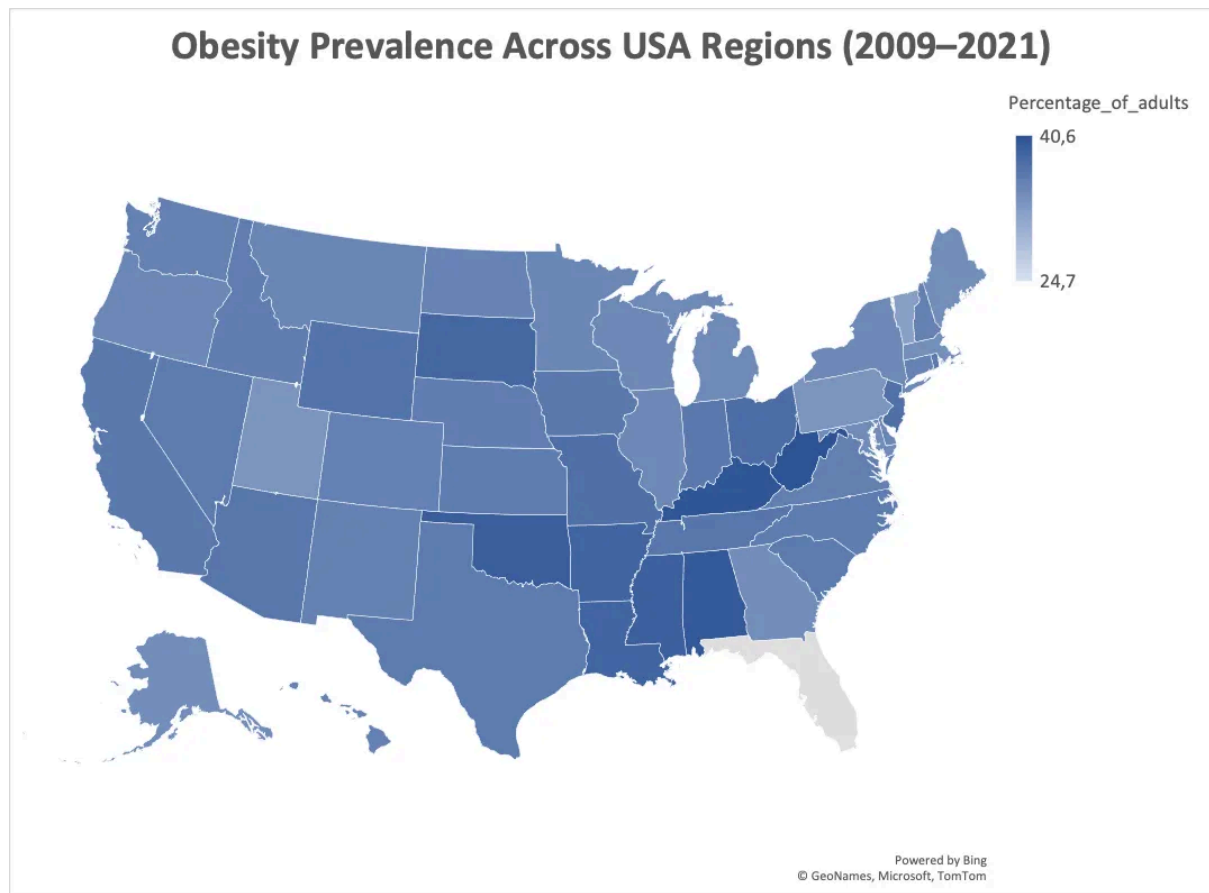
- The graph demonstrates a clear correlation between the three criteria and education level: ***individuals with higher education levels exhibit a lower propensity for obesity, engage in more physical activity during leisure, and consume more vegetables.***

Top 10 regions with higher prevalence of obesity

In the initial table, employing conditional formatting and sorting the data based on the percentage of adults with obesity in the "Total" category, I identified the top 10 regions with the highest prevalence of obesity:

1. West Virginia
2. Kentucky
3. Alabama
4. Oklahoma
5. Mississippi
6. Arkansas
7. Louisiana
8. South Dakota
9. Ohio
10. New Jersey

You can visualize the distribution of obesity levels on the map-graph:



Conclusion

In this project, I conducted a thorough analysis of obesity and related factors spanning the years 2009-2021. By exploring trends in obesity rates, vegetable consumption, and physical activity levels, I aimed to uncover patterns across various demographic categories such as age groups, genders, education levels, income brackets, and racial/ethnic groups.

Notable Observations:

- **Obesity Trend:** The trendline projects a potential 2.3% growth in obesity rates by 2024.
- **Gender and Obesity:** There is no correlation observed between gender and obesity.
- **Age and Obesity Prevalence:** Obesity prevalence correlates positively with age, peaking in the 45-64 age group and decreasing among those aged 65 and older. Age also influences leisure-time physical activity and vegetable consumption.

- **Income Level and Lifestyle Choices:** Individuals with higher income levels demonstrate lower obesity rates, higher engagement in leisure physical activity, and more frequent vegetable consumption, suggesting a link between socio-economic status and healthier lifestyles.
- **Race/Ethnicity and Obesity:** Significant variations are observed by race/ethnicity, with the Asian group exhibiting the lowest tendency for obesity and the Non-Hispanic Black group showing the highest.
- **Education Level and Lifestyle:** Higher education levels correlate with lower obesity rates, increased physical activity, and higher vegetable consumption, indicating an association between education and healthier behaviors.

Understanding these patterns is crucial for tailoring effective public health interventions and targeted strategies to address the diverse health needs of different age groups.