PROJECT NAME:

Heart Disease Analysis: Identifying Risk Factors Using Tableau.

1. INTRODUCTION:

1.1 OVERVIEW:

This project titled **"**Heart Disease Analysis: Identifying Risk Factors Using Tableau.**"** was undertaken to identify key patterns and risk factors associated with heart disease using visual analytics.
The project focuses on analysing how factors such as **age, gender, diabetes, stroke history, smoking, alcohol consumption, race, BMI, physical activity, and general health condition** influence heart disease prevalence.
The analysis helps healthcare analysts, researchers, and public health officials make informed decisions for early diagnosis, preventive strategies, and awareness planning through interactive data visualization.

1.2 PROPOSE:

The purpose of this project is to:

- Visualize and interpret heart disease data using Tableau.
- Identify patterns and trends in heart disease occurrence.
- Analyze relationships between lifestyle factors and heart disease.
- Detect high-risk population groups.
- Support data-driven healthcare decision making.

2. IDEATION PHASE:

2.1 PROBLEM STATEMENT:

Healthcare analysts often face difficulty understanding complex medical datasets due to raw and unstructured data formats. There is a lack of clear visualization showing how risk factors such as age, diabetes, smoking, stroke history, and BMI contribute to heart disease.
This project aims to solve this problem by analysing the provided heart disease dataset and visualizing trends through interactive dashboards and story points. The solution provides a clear, data-driven approach to understanding heart disease risk factors.

2.2 EMPATHY MAP:

The empathy map helps understand the perspective of healthcare stakeholders and analysts.

- **Says:** We need to identify high-risk groups for heart disease.
- **Thinks:** Which factors are most responsible for increasing heart disease cases?
- **Does:** Reviews medical reports and statistical data.
- **Feels:** Concerned about rising cases and wants accurate insights.

2.3 BRAINSTORM IDEA:

The team brainstormed potential influencing factors for heart disease.

- Age plays a major role in heart disease prevalence.
- Diabetes and stroke history significantly increase risk.
- Smoking and alcohol contribute to cardiovascular problems.
- BMI and lack of physical activity influence heart health.
- Race and general health condition show varying patterns.

3. REQUIREMENT ANALYSIS:

3.1 CUSTOMER JOURNEY MAP:

The customer journey map tracks how users interact with the housing market data visualization platform — from entry to decision-making.

Stage	**Experience Steps**	**Interactions**	**Goals**	**Positive Moments**	**Areas of Opportunity**
Enter	Open Dashboard	Apply filters (Age, Gender, Race)	Understand heart disease distribution	Clear KPIs & charts	Improve tooltip explanations
Engage	Explore charts	Hover & compare visuals	Identify risk factors	Interactive visuals	Add drill-down options
Exit	Interpret Story	Review 6 story points	Draw conclusions	Clear storytelling	Export insights

3.2 SOLUTION REQUIREMENT:

Functional Requirements:

- Visualize heart disease count and distribution.
- Create comparative charts for risk factors.
- Enable filter interactivity.
- Provide dashboard with KPIs and clear legends.
- Display bar/pie/grouped charts for feature comparison.
- Create a 6-point analytical story.

Non-functional Requirements:

- Dashboard responsiveness.
- Fast rendering in Tableau.
- User-friendly layout and navigation.
- Clear labeling and consistent color coding.

3.3 DATA FLOW DIAGRAM:

The DFD shows how data moves through the system — from loading the dataset to rendering outputs via Tableau dashboards and stories.

Load dataset → Analyze data→ Remove unnecessary data→ Connect dataset to tableau → Create visualizations → Dashboard& story.

3.4 TECHNOLOGY STACK:

The following tools and platforms were used:

- **Tableau Public:** For creating visualizations, dashboard, and story.
- **Microsoft Excel:** For converting and pre-processing the CSV dataset.
- **GitHub:** For storing project files, screenshots, and documentation.
- **YouTube:** For hosting the final video demonstration.

4. PROJECT DESIGN:

4.1 PROBLEM SOLUTION FIT:

The main challenge was understanding complex relationships between various health risk factors and heart disease.
The proposed solution transforms raw medical data into interactive visual dashboards. This makes it easier for healthcare stakeholders to interpret patterns and make data-driven decisions.

4.2 PROPOSED SOLUTION:

Parameter	Description
Problem Statement	Lack of clear visualization of heart disease risk factors
Idea / Solution	Interactive Tableau dashboard with 10 analytical sheets
Novelty / Uniqueness	Combined multi-factor comparison in a single dashboard
Social Impact	Supports preventive healthcare and awareness
Scalability	Can integrate more medical datasets in the future

4.3 SOLUTION ARCHITECTURE:

The architecture for this project follows a simple flow:

- **Data Source:** Provided Heart Disease CSV Dataset.
- **Data Cleaning:** Excel & Tableau preprocessing.
- **Visualization Layer:** Tableau Public.
- **Output:** Dashboard, Story, and shareable Tableau Public or YouTube link.

5. PROJECT PLANNING:

5.3 Project Planning

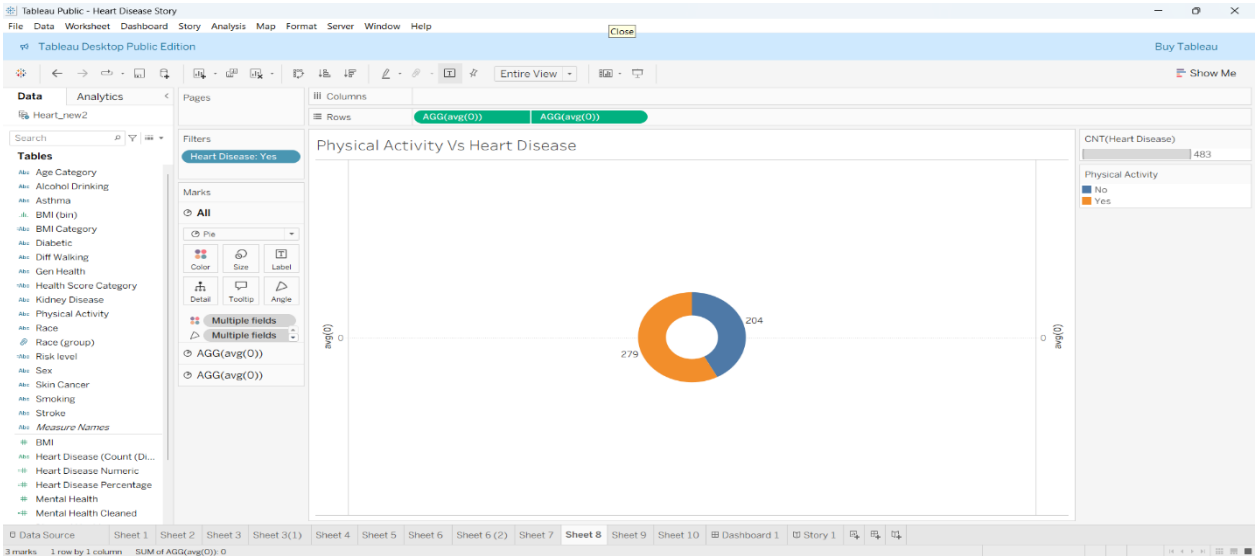
The project was planned using agile-inspired methods, broken into sprints with clear deliverables for each phase. Tasks included data collection, pre-processing, visualization design, dashboard assembly, story creation, and testing.

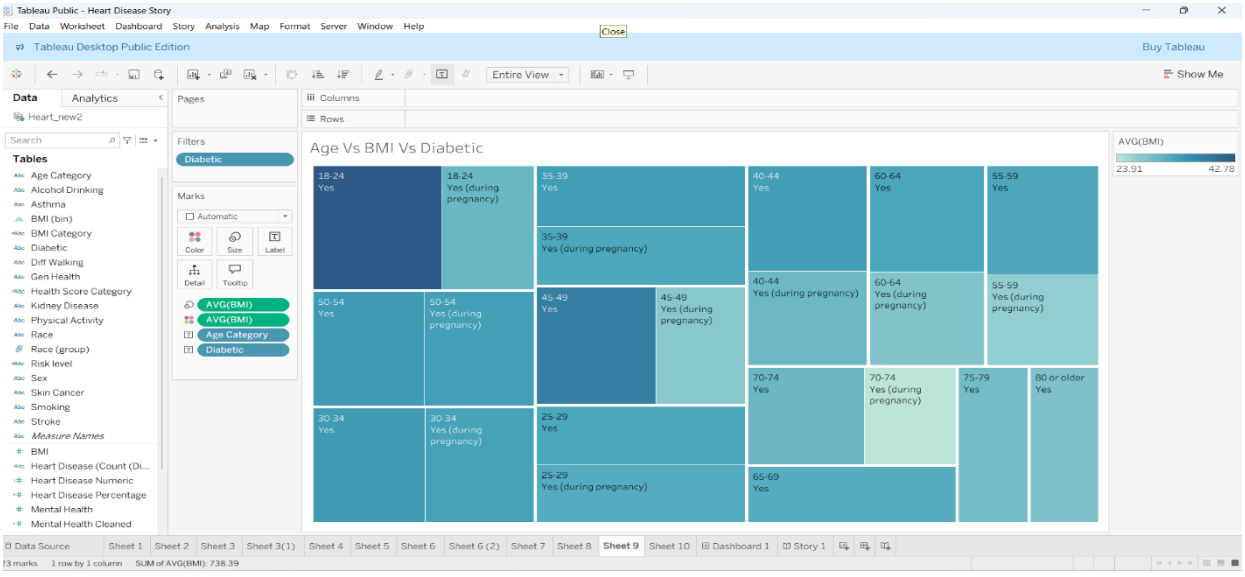
Sprint	Duration	Tasks covered
1	17/2 – 18/2	Data cleaning, structuring, creation of initial visual sheets.
2	19/2– 20/2	Dashboard creation, story development, testing, documentation.

6. FUNCTIONAL AND PERFORMANCE TESTING:

Parameter	Screenshot / Values
Data Rendered	Displayed fields include Age, Gender, Diabetes, Stroke, Smoking, Alcohol Consumption, BMI, Physical Activity, Race, General Health, and heart disease status. Include a screenshot of the complete Heart Disease Dashboard.
Data Preprocessing	Removed blank/null values, verified categorical fields (Yes/No), validated numerical fields (Age, BMI), ensured correct data types, and structured the dataset for accurate visualization.
Utilization of Filters	Applied interactive filters such as Age Category, Gender, and Race in Tableau. Demonstrated filter interactivity within the Dashboard and Story for dynamic comparison of risk factors.
Calculation Fields Used	Count of Records, Count of Heart Disease cases, Percentage distribution, Grouped comparisons, Age category bins, BMI-based comparisons.
Dashboard Design	Created 10 analytical sheets and integrated them into 1 interactive dashboard. Used bar charts, grouped bar charts, comparative visuals, legends, and filters with consistent color coding.
Story Design	Developed 6 story points explaining key insights: Age impact, Gender comparison, Diabetes & Stroke relation, Smoking & Alcohol impact, Race-wise distribution, and Overall health influence on Heart Disease.

7. **Utilization of Filters**:

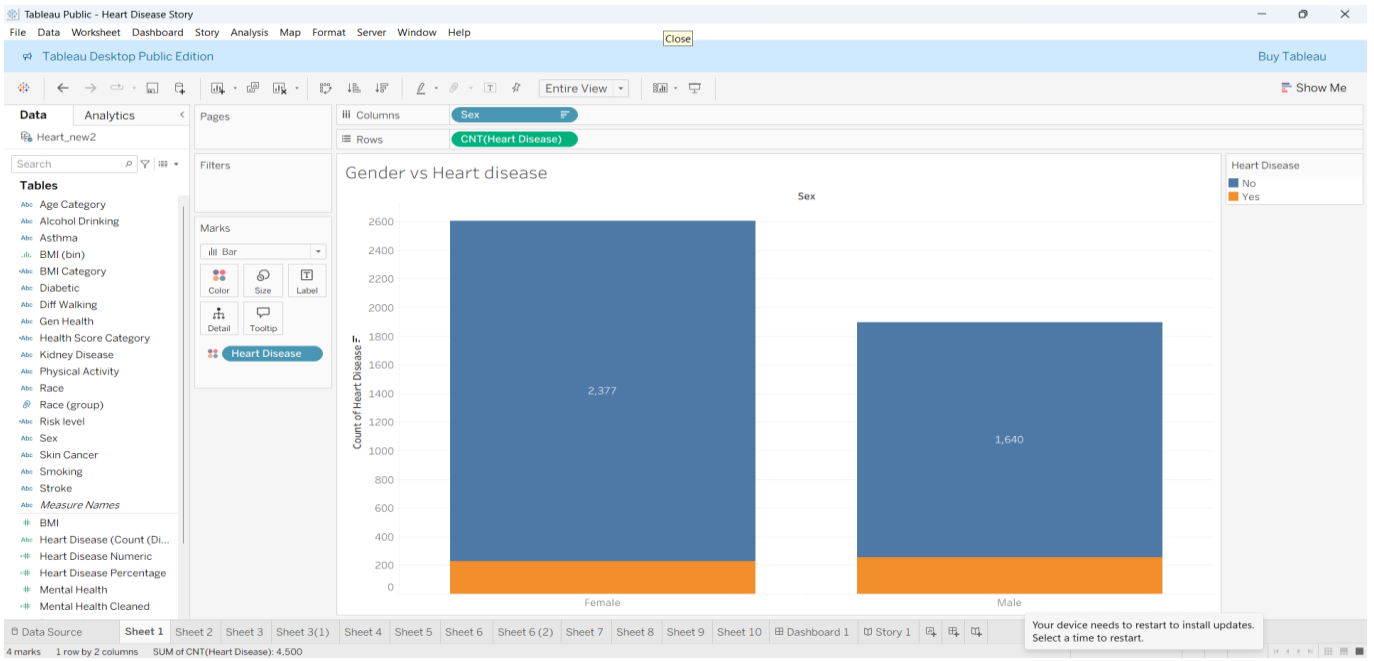


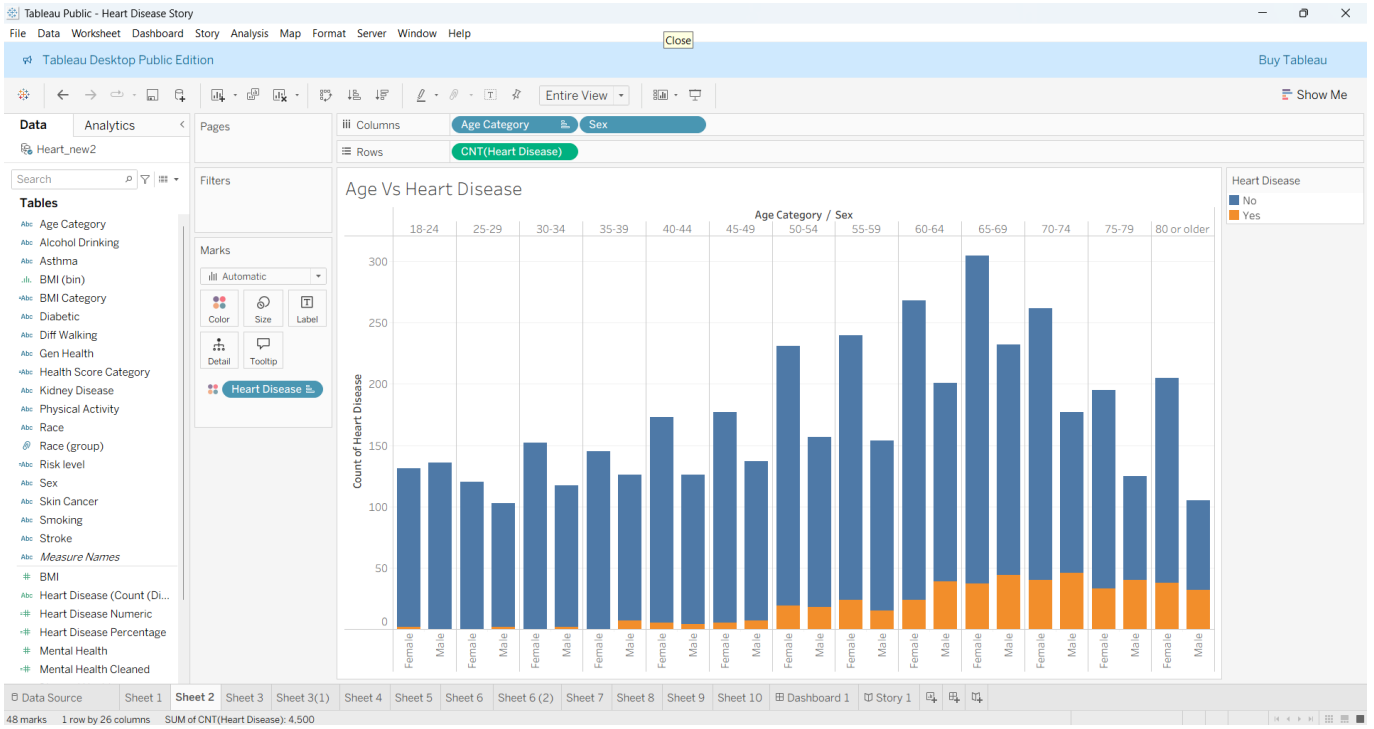


8. RESULTS:

The project successfully transformed raw medical data into meaningful visual insights. The interactive dashboard and story provide clear identification of major heart disease risk factors and help in understanding demographic and lifestyle-based patterns. This analysis supports data-driven healthcare planning and preventive strategies.

SCREENSHOTS OF OUTPUT:





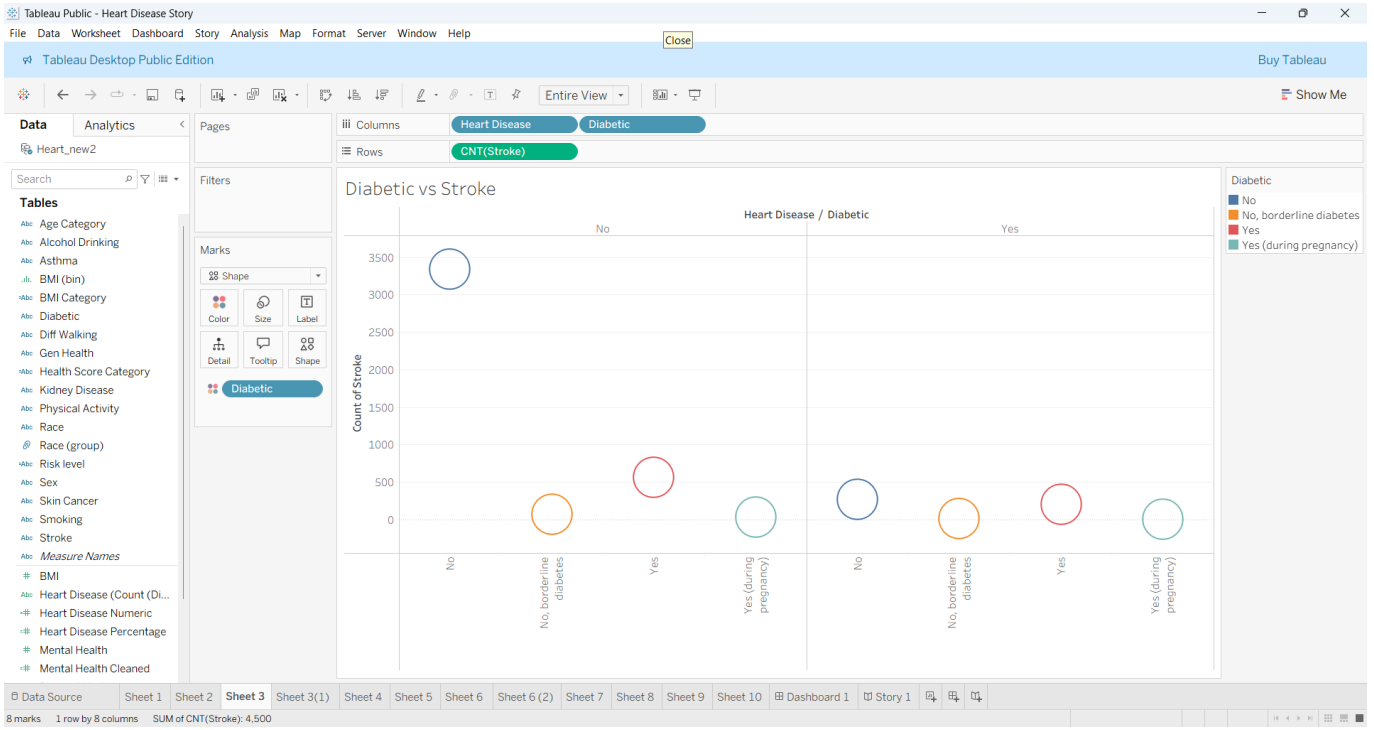
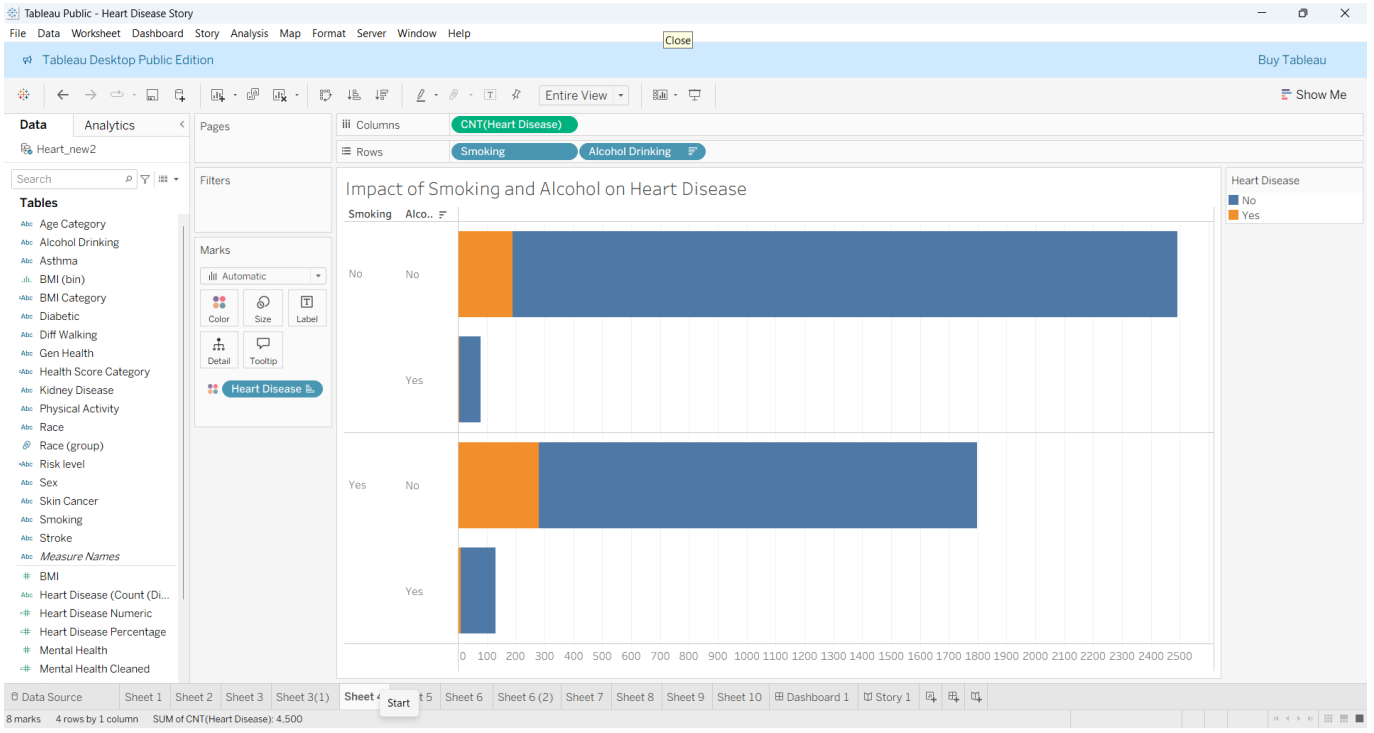


Tableau Public - Heart Disease Story
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Close
Tableau Desktop Public Edition
Buy Tableau
Entire View
Show Me
Data
Analytics
Heart_new2
Search
Tables
Age Category
Alcohol Drinking
Asthma
BMI (bin)
BMI Category
Diabetic
Diff Walking
Gen Health
Health Score Category
Kidney Disease
Physical Activity
Race
Race (group)
Risk level
Sex
Skin Cancer
Smoking
Stroke
Measure Names
BMI
Heart Disease (Count (Di...
Heart Disease Numeric
Heart Disease Percentage
Mental Health
Mental Health Cleaned
Pages
Filters
Marks
Shape
Color
Size
Label
Detail
Tooltip
Shape
Diabetic
Columns
Heart Disease
Diabetic
Rows
CNT(Stroke)
Diabetic vs Stroke
Heart Disease / Diabetic
No
Yes
Count of Stroke
3500
3000
2500
2000
1500
1000
500
0
No
No, borderline diabetes
Yes
Yes (during pregnancy)
Diabetic
No
No, borderline diabetes
Yes
Yes (during pregnancy)
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
8 marks
1 row by 8 columns
SUM of CNT(Stroke): 4,500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Physical Activity
Race
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Risk level
Sex
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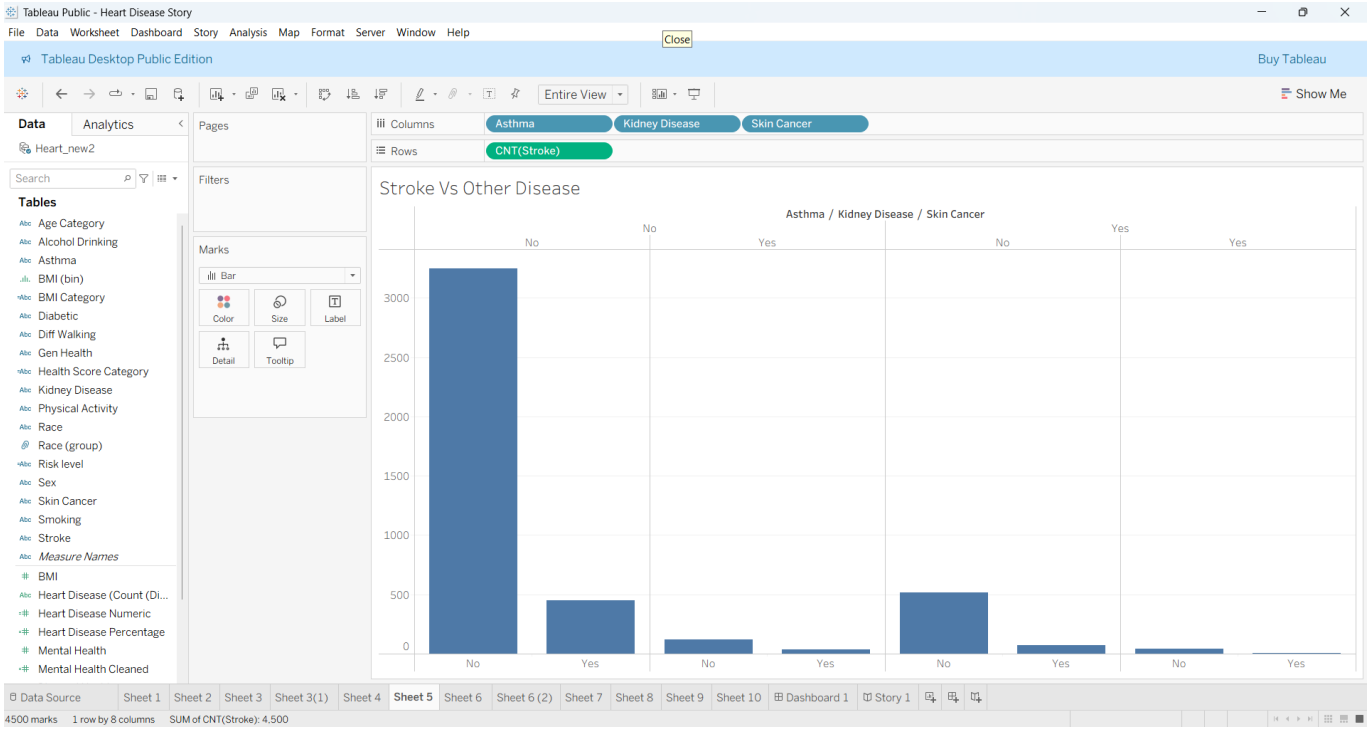
Heart Disease Numeric
Heart Disease Percentage
Mental Health
Mental Health Cleaned
Pages
Filters
Marks
Automatic
Color
Size
Label
Detail
Tooltip
Heart Disease
Columns
CNT(Heart Disease)
Rows
Smoking
Alcohol Drinking
Impact of Smoking and Alcohol on Heart Disease
Smoking
Alco..
No
No
Yes
Yes
No
Yes
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500
Heart Disease
No
Yes
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Start
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
8 marks
4 rows by 1 column
SUM of CNT(Heart Disease): 4,500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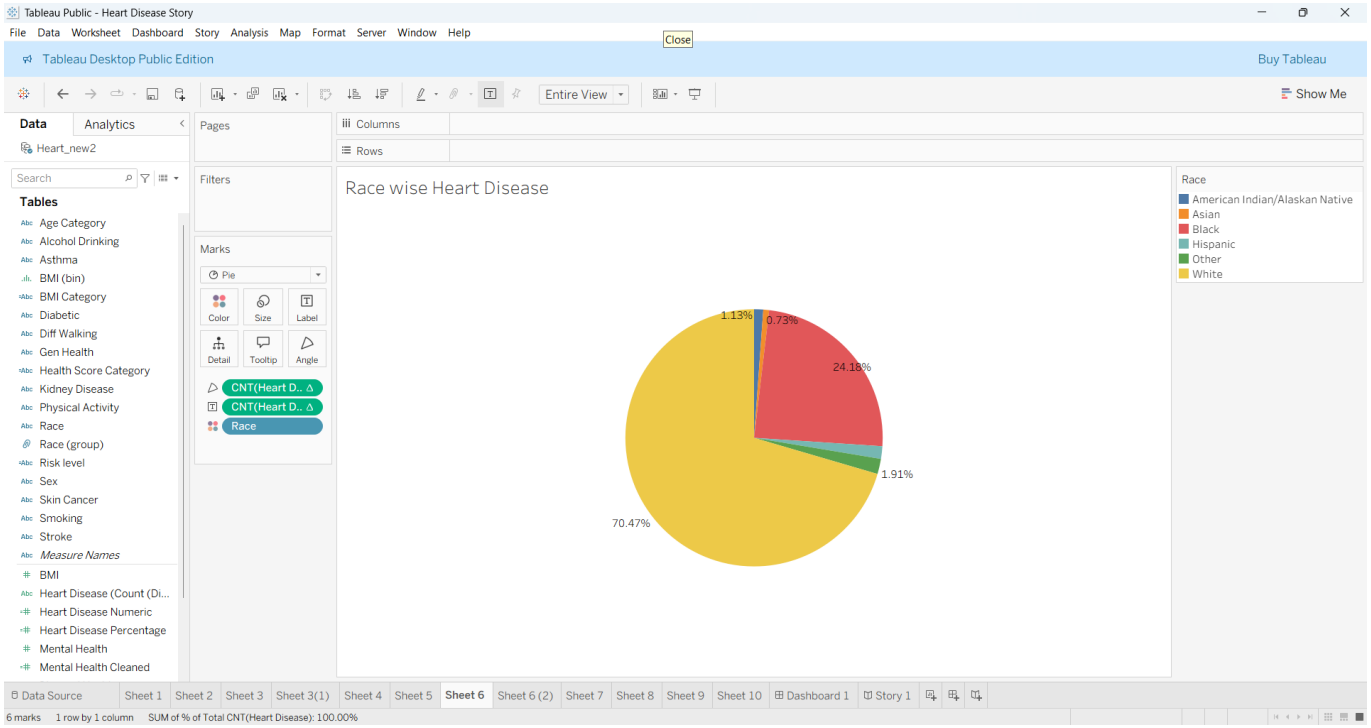
Age Category
Alcohol Drinking
Asthma
BMI (bin)
BMI Category
Diabetic
Diff Walking
Gen Health
Health Score Category
Kidney Disease
Physical Activity
Race
Race (group)
Risk level
Sex
Skin Cancer
Smoking
Stroke
Measure Names
BMI
Heart Disease (Count (Di...
Heart Disease Numeric
Heart Disease Percentage
Mental Health
Mental Health Cleaned
Pages
Filters
Marks
Bar
Color
Size
Label
Detail
Tooltip
Columns
Asthma
Kidney Disease
Skin Cancer
Rows
CNT(Stroke)
Stroke Vs Other Disease
Asthma / Kidney Disease / Skin Cancer
No
Yes
3000
2500
2000
1500
1000
500
0
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
4500 marks
1 row by 8 columns
SUM of CNT(Stroke): 4,500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Smoking
Stroke
Measure Names
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Heart Disease Numeric
Heart Disease Percentage
Mental Health
Mental Health Cleaned
Pages
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Size
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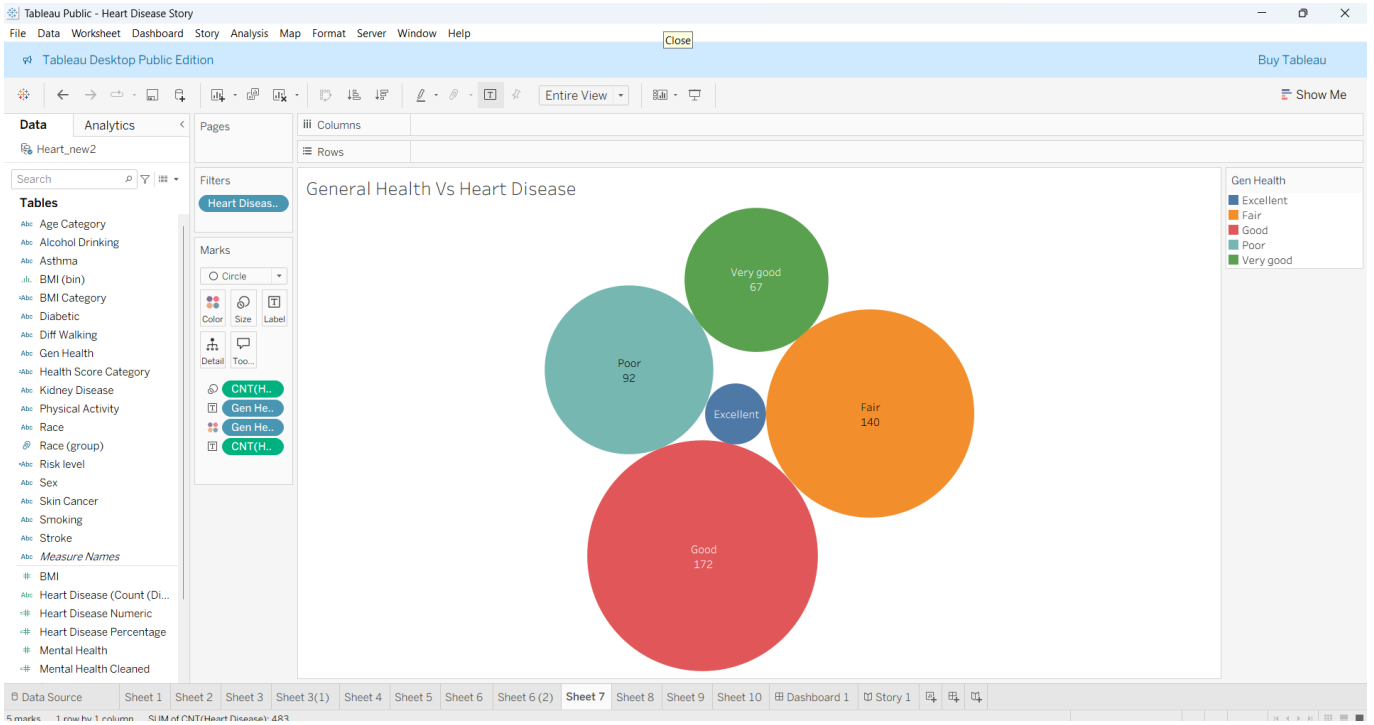
Tooltip
Angle
CNT(Heart D.. Δ
CNT(Heart D.. Δ
Race
Columns
Rows
Race wise Heart Disease
Race
American Indian/Alaskan Native
Asian
Black
Hispanic
Other
White
1.13%
0.73%
24.18%
1.91%
70.47%
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
6 marks
1 row by 1 column
SUM of % of Total CNT(Heart Disease): 100.00%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Health Score Category
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Physical Activity
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Race (group)
Risk level
Sex
Skin Cancer
Smoking
Stroke
Measure Names
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Heart Diseas..
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Gen He..
Gen He..
CNT(H..
Columns
Rows
General Health Vs Heart Disease
Very good
67
Poor
92
Excellent
Fair
140
Good
172
Gen Health
Excellent
Fair
Good
Poor
Very good
Data Source
Sheet 1
Sheet 2
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Sheet 3(1)
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Sheet 6 (2)
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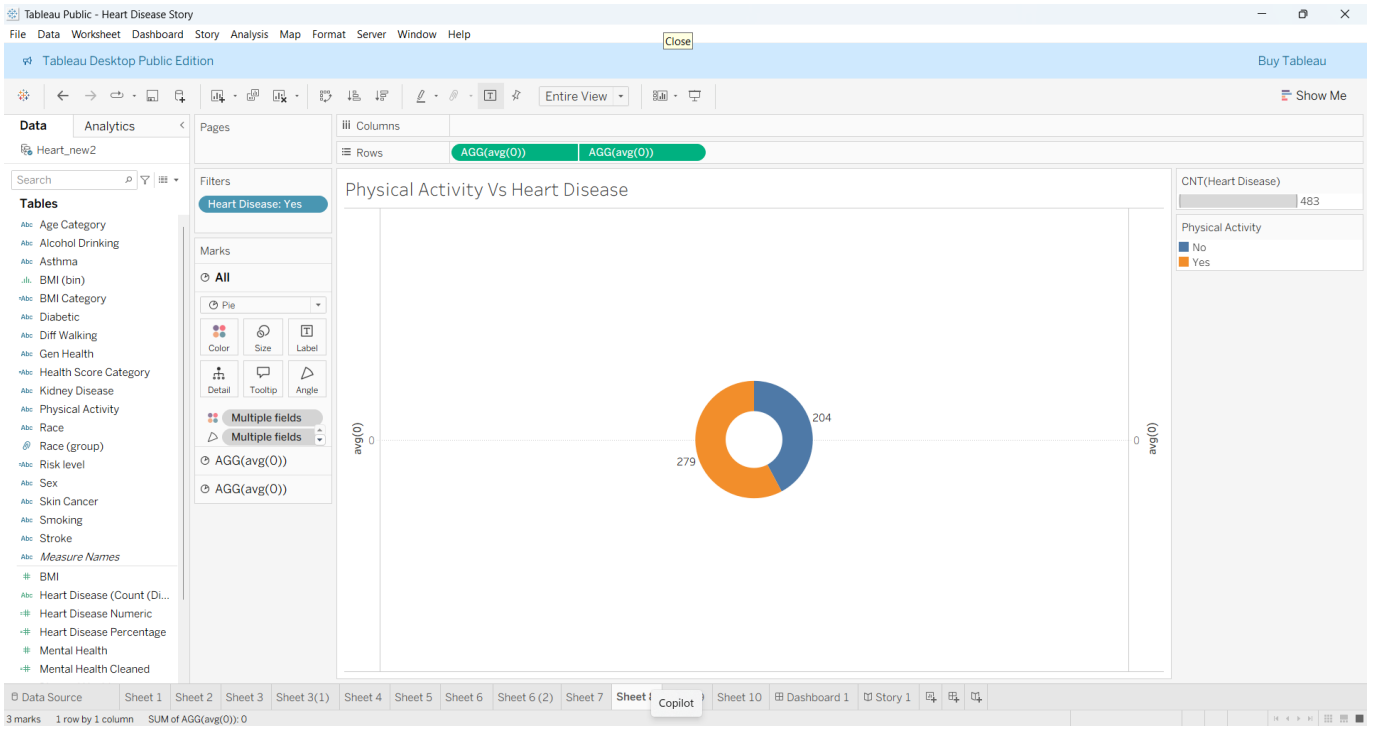
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1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Skin Cancer
Smoking
Stroke
Measure Names
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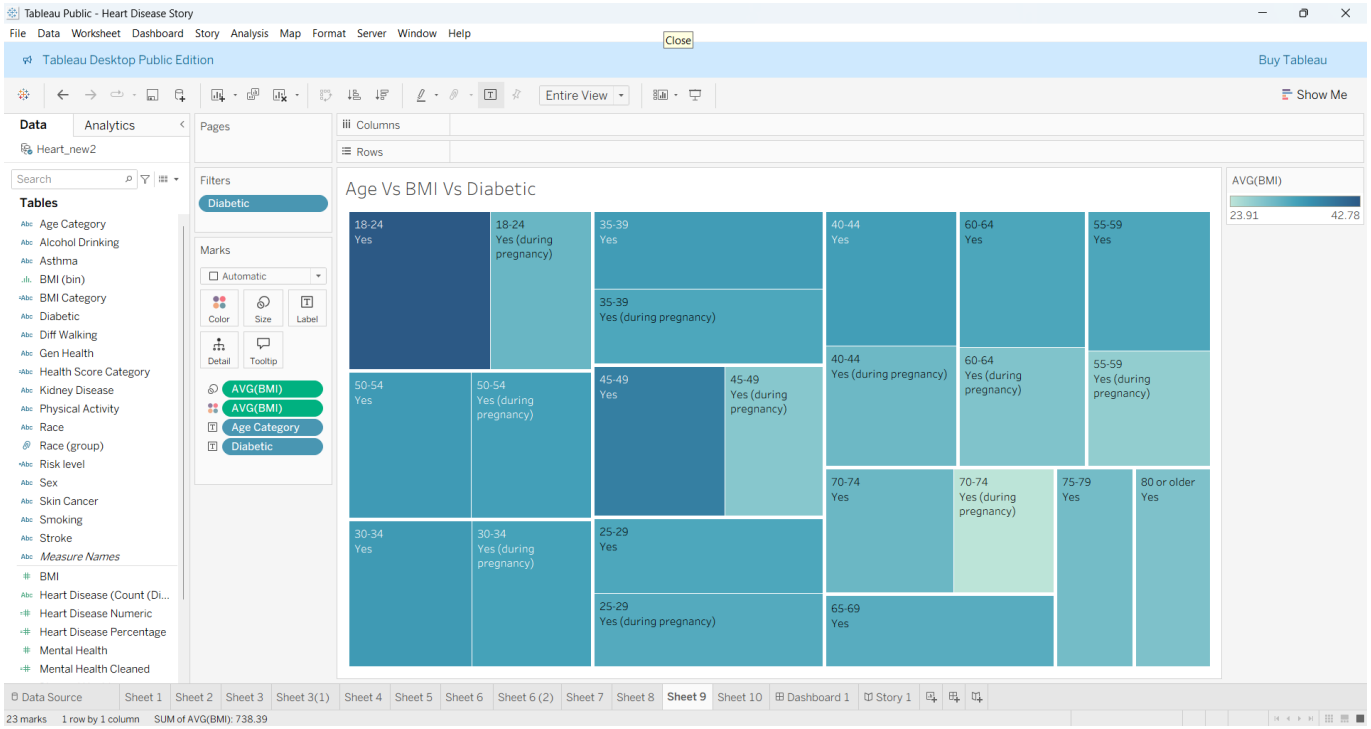
Heart Disease (Count (Di...
Heart Disease Numeric
Heart Disease Percentage
Mental Health
Mental Health Cleaned
Pages
Filters
Heart Disease: Yes
Marks
All
Pie
Color
Size
Label
Detail
Tooltip
Angle
Multiple fields
Multiple fields
AGG(avg(0))
AGG(avg(0))
Columns
Rows
AGG(avg(0))
AGG(avg(0))
Physical Activity Vs Heart Disease
AVG(0)
0
204
279
0
AVG(0)
CNT(Heart Disease)
483
Physical Activity
No
Yes
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Copilot
Sheet 10
Dashboard 1
Story 1
3 marks
1 row by 1 column
SUM of AGG(avg(0)): 0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Physical Activity
Race
Race (group)
Risk level
Sex
Skin Cancer
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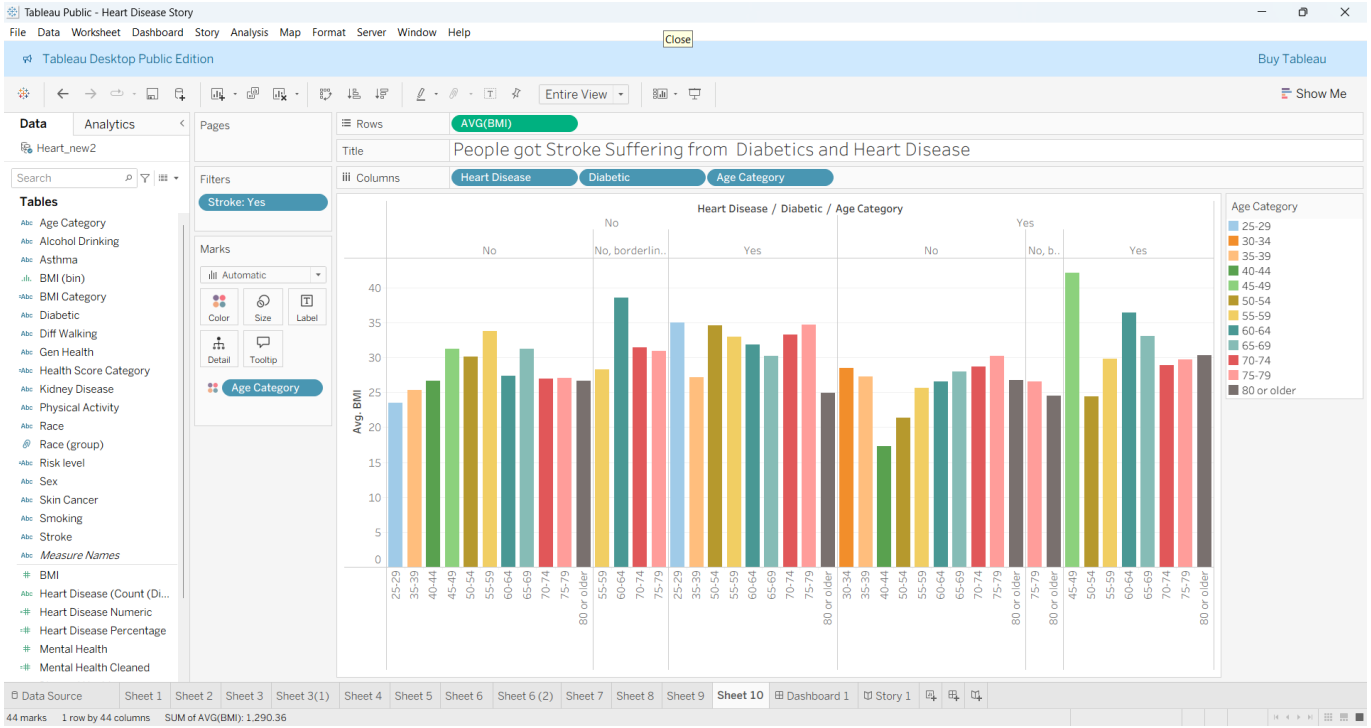
Stroke
Measure Names
BMI
Heart Disease (Count (Di...
Heart Disease Numeric
Heart Disease Percentage
Mental Health
Mental Health Cleaned
Pages
Columns
Rows
Filters
Diabetic
Marks
Automatic
Color
Size
Label
Detail
Tooltip
AVG(BMI)
AVG(BMI)
Age Category
Diabetic
Age Vs BMI Vs Diabetic
18-24 Yes
18-24 Yes (during pregnancy)
35-39 Yes
35-39 Yes (during pregnancy)
40-44 Yes
40-44 Yes (during pregnancy)
60-64 Yes
60-64 Yes (during pregnancy)
55-59 Yes
55-59 Yes (during pregnancy)
50-54 Yes
50-54 Yes (during pregnancy)
45-49 Yes
45-49 Yes (during pregnancy)
70-74 Yes
70-74 Yes (during pregnancy)
75-79 Yes
80 or older Yes
30-34 Yes
30-34 Yes (during pregnancy)
25-29 Yes
25-29 Yes (during pregnancy)
65-69 Yes
AVG(BMI)
23.91
42.78
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
23 marks
1 row by 1 column
SUM of AVG(BMI): 738.39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Physical Activity
Race
Race (group)
Risk level
Sex
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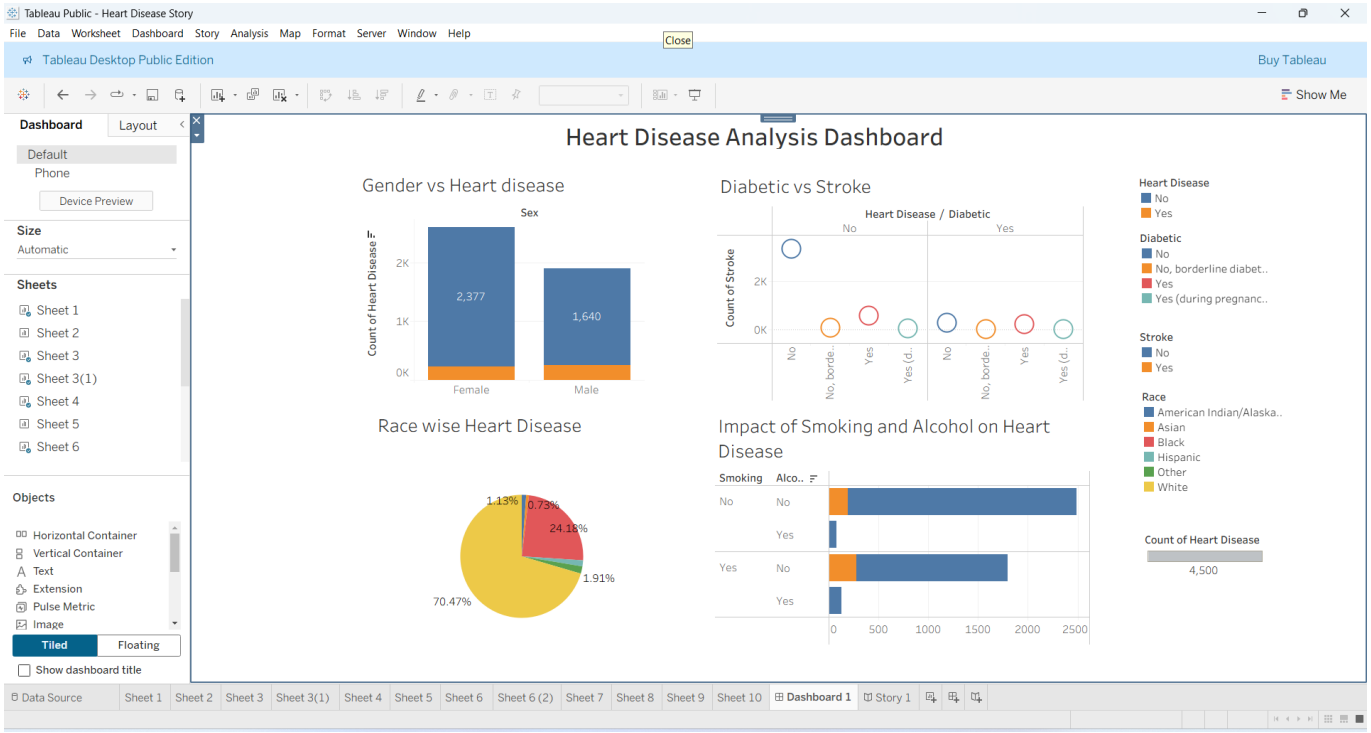
Smoking
Stroke
Measure Names
BMI
Heart Disease (Count (Di...
Heart Disease Numeric
Heart Disease Percentage
Mental Health
Mental Health Cleaned
Pages
Rows
AVG(BMI)
Title
People got Stroke Suffering from Diabetics and Heart Disease
Columns
Heart Disease
Diabetic
Age Category
Filters
Stroke: Yes
Marks
Automatic
Color
Size
Label
Detail
Tooltip
Age Category
Heart Disease / Diabetic / Age Category
No
Yes
No
No, borderlin..
Yes
No
No, b..
Yes
Avg. BMI
0
5
10
15
20
25
30
35
40
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80 or older
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
44 marks
1 row by 44 columns
SUM of AVG(BMI): 1,290.36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Show Me
Dashboard
Layout
Default
Phone
Device Preview
Size
Automatic
Sheets
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Objects
Horizontal Container
Vertical Container
Text
Extension
Pulse Metric
Image
Tiled
Floating
Show dashboard title
Heart Disease Analysis Dashboard
Gender vs Heart disease
Sex
Count of Heart Disease F..
2K
1K
0K
2,377
1,640
Female
Male
Diabetic vs Stroke
Heart Disease / Diabetic
No
Yes
Count of Stroke
2K
0K
No
No, borde..
Yes
Yes (d..
Heart Disease
No
Yes
Diabetic
No
No, borderline diabet..
Yes
Yes (during pregnanc..
Stroke
No
Yes
Race
American Indian/Alaska..
Asian
Black
Hispanic
Other
White
Count of Heart Disease
4,500
Race wise Heart Disease
1.13%
0.73%
24.18%
1.91%
70.47%
Impact of Smoking and Alcohol on Heart Disease
Smoking
Alco..
No
Yes
0
500
1000
1500
2000
2500
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
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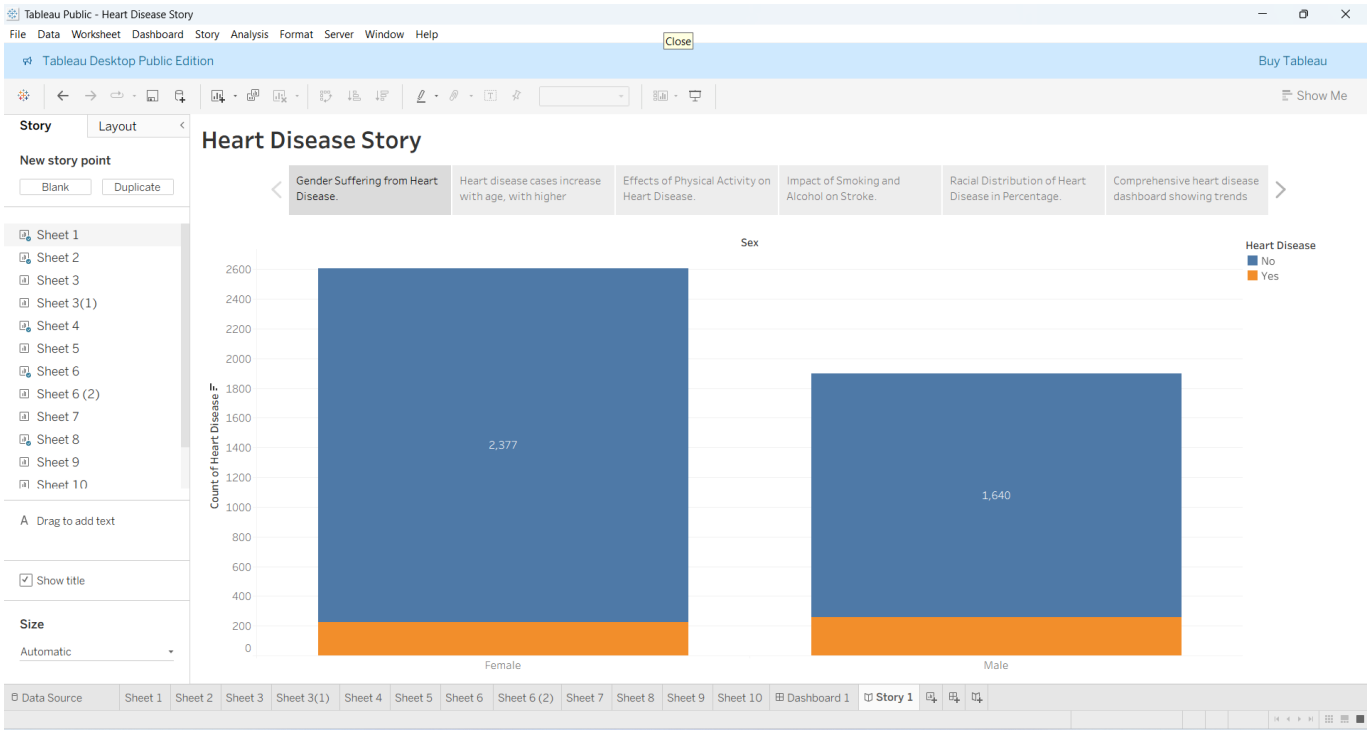
Sheet 10
Dashboard 1
Story 1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File Data Worksheet Dashboard Story Analysis Format Server Window Help
Close
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Buy Tableau
Show Me
Story
Layout
New story point
Blank
Duplicate
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Drag to add text
Show title
Size
Automatic
Heart Disease Story
Gender Suffering from Heart Disease.
Heart disease cases increase with age, with higher
Effects of Physical Activity on Heart Disease.
Impact of Smoking and Alcohol on Stroke.
Racial Distribution of Heart Disease in Percentage.
Comprehensive heart disease dashboard showing trends
Sex
Heart Disease
No
Yes
Count of Heart Disease F..
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
2,377
1,640
Female
Male
Data Source
Sheet 1
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Sheet 3(1)
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Sheet 6 (2)
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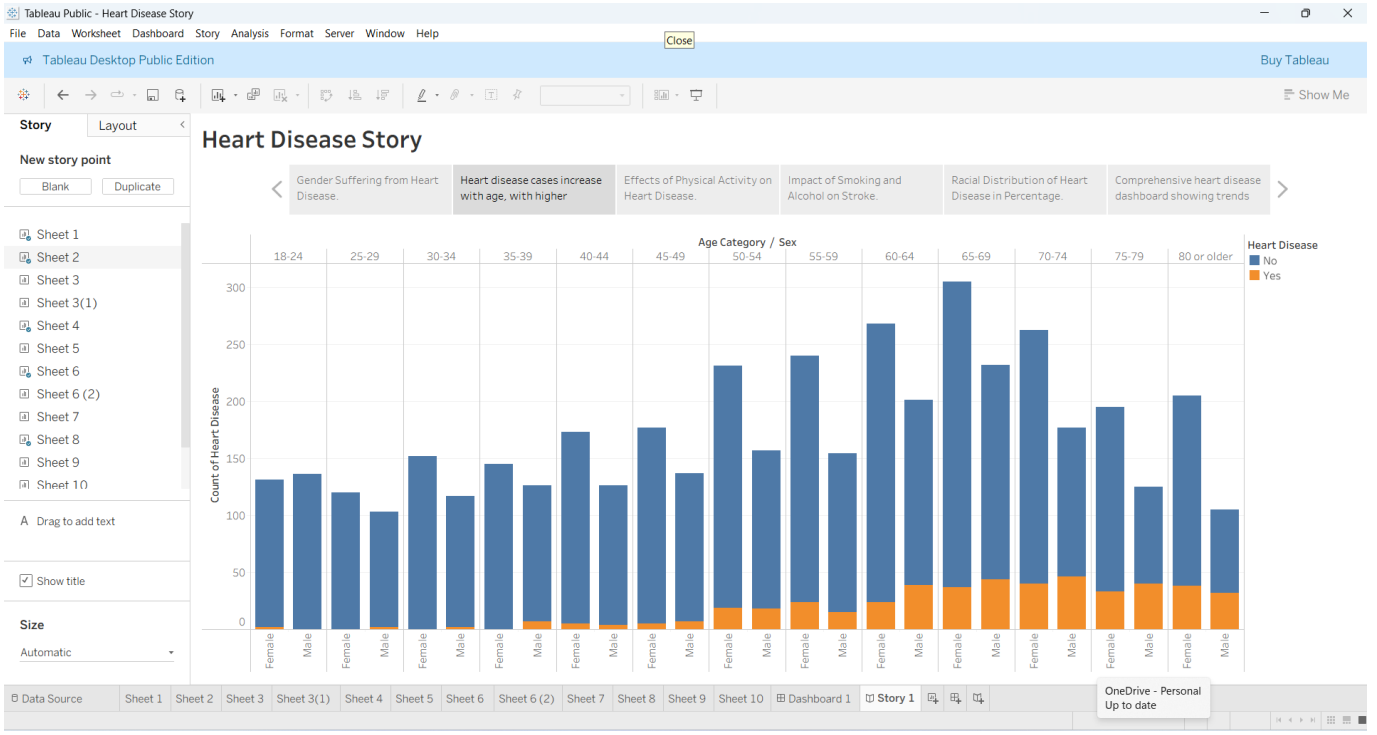
Dashboard 1
Story 1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File Data Worksheet Dashboard Story Analysis Format Server Window Help
Close
Tableau Desktop Public Edition
Buy Tableau
Show Me
Story
Layout
New story point
Blank
Duplicate
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Drag to add text
Show title
Size
Automatic
Heart Disease Story
Gender Suffering from Heart Disease.
Heart disease cases increase with age, with higher
Effects of Physical Activity on Heart Disease.
Impact of Smoking and Alcohol on Stroke.
Racial Distribution of Heart Disease in Percentage.
Comprehensive heart disease dashboard showing trends
Age Category / Sex
18-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80 or older
Heart Disease
No
Yes
Count of Heart Disease
300
250
200
150
100
50
0
Female
Male
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
OneDrive - Personal
Up to date

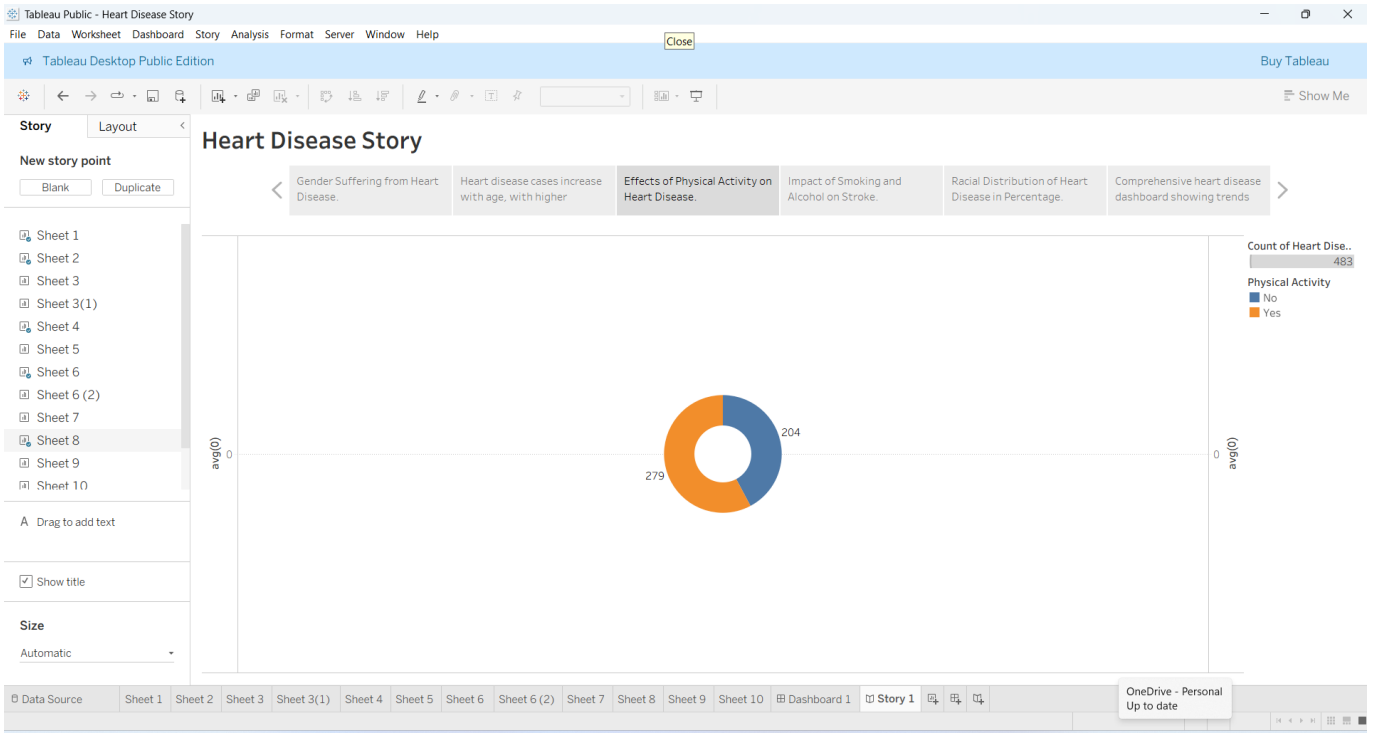
Tableau Public - Heart Disease Story
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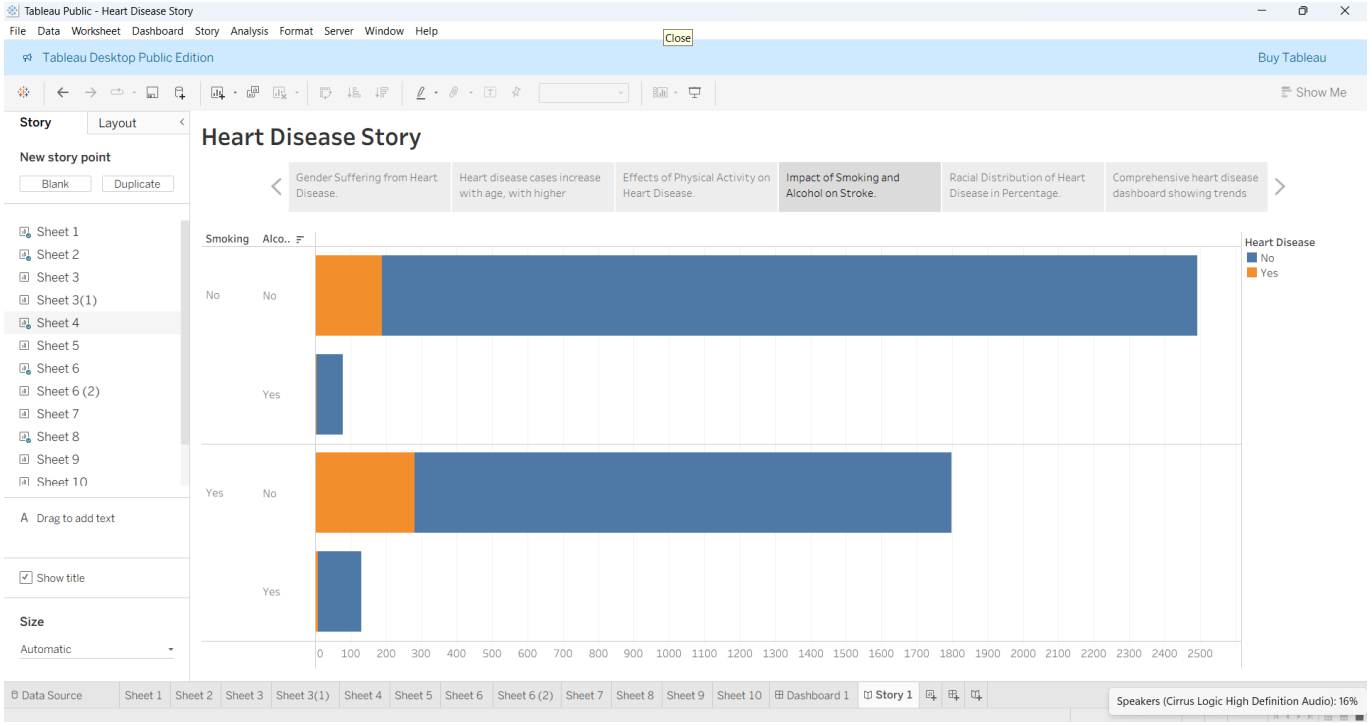
Impact of Smoking and Alcohol on Stroke.
Racial Distribution of Heart Disease in Percentage.
Comprehensive heart disease dashboard showing trends
Count of Heart Dise..
483
Physical Activity
No
Yes
avg(0)
0
204
279
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
OneDrive - Personal
Up to date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Show title
Size
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Gender Suffering from Heart Disease.
Heart disease cases increase with age, with higher
Effects of Physical Activity on Heart Disease.
Impact of Smoking and Alcohol on Stroke.
Racial Distribution of Heart Disease in Percentage.
Comprehensive heart disease dashboard showing trends
Smoking
Alco..
No
No
Yes
Yes
No
Yes
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500
Heart Disease
No
Yes
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1
Speakers (Cirrus Logic High Definition Audio): 16%

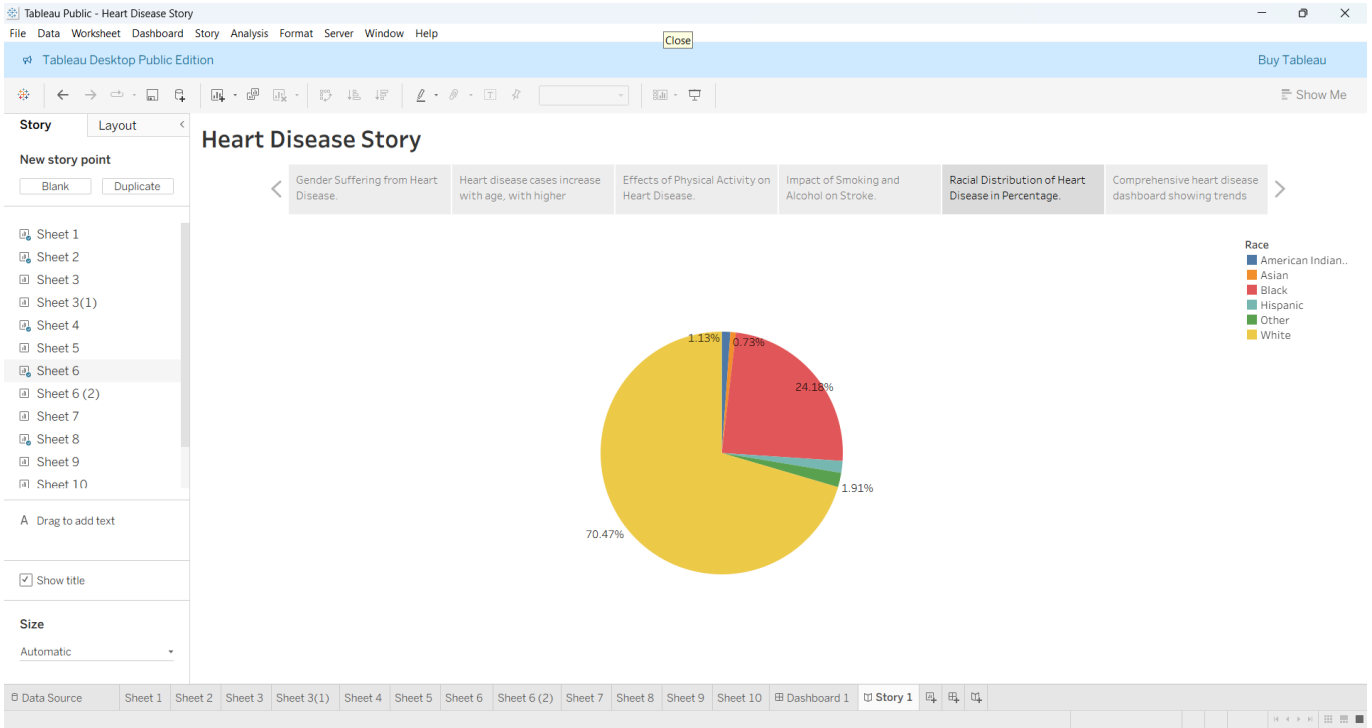
Tableau Public - Heart Disease Story
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Sheet 9
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Drag to add text
Show title
Size
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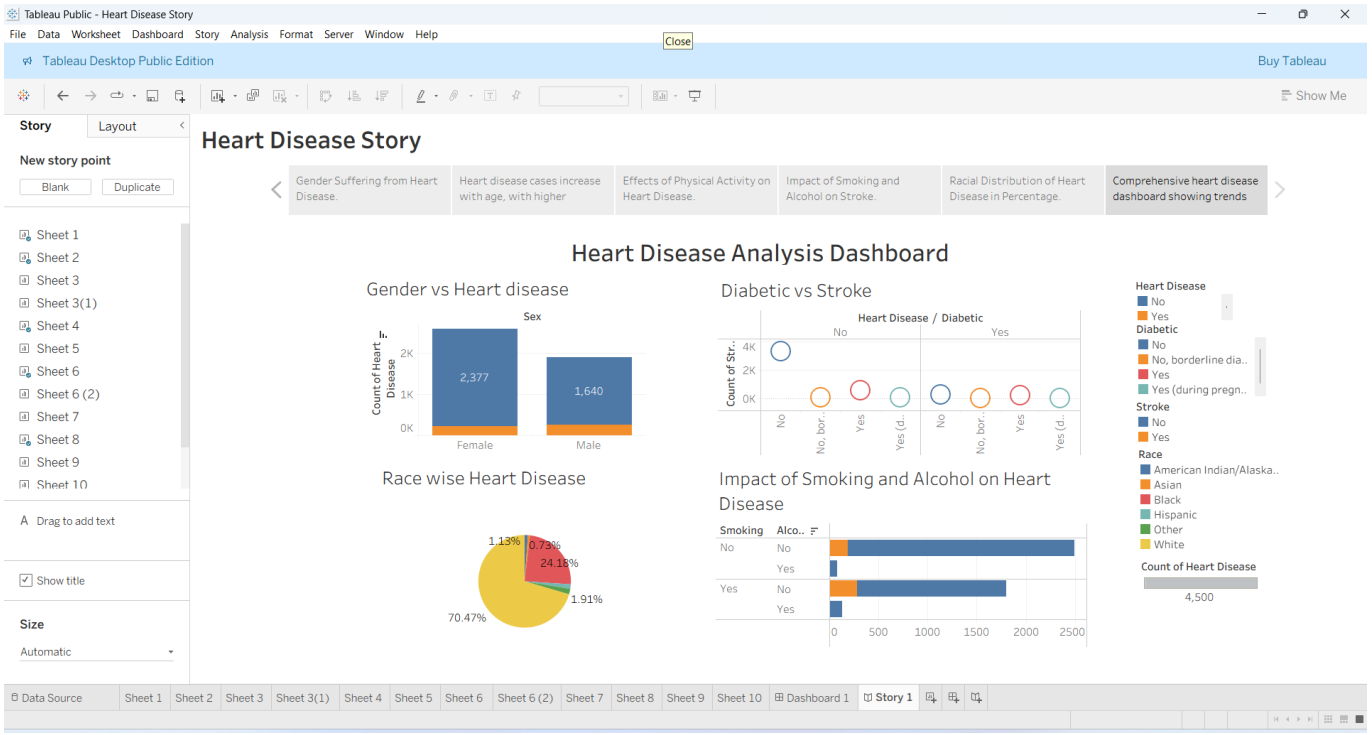
Heart Disease Story
Gender Suffering from Heart Disease.
Heart disease cases increase with age, with higher
Effects of Physical Activity on Heart Disease.
Impact of Smoking and Alcohol on Stroke.
Racial Distribution of Heart Disease in Percentage.
Comprehensive heart disease dashboard showing trends
Race
American Indian..
Asian
Black
Hispanic
Other
White
1.13%
0.73%
24.18%
1.91%
70.47%
Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 3(1)
Sheet 4
Sheet 5
Sheet 6
Sheet 6 (2)
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Dashboard 1
Story 1



9. ADVANTAGES & DISADVANTAGES:

Advantages:

- Tableau dashboards are highly interactive and easy to use for analyzing medical data.
- Filters and comparison features allow customized exploration of heart disease risk factors such as age, gender, diabetes, stroke, smoking, and BMI.
- Visualizations help healthcare analysts quickly identify high-risk groups and health patterns.
- Interactive dashboard and story improve clarity in presenting complex medical data.
- The solution is scalable and can easily incorporate additional health-related datasets in the future.
- Easy sharing through Tableau Public enables wider accessibility for academic and research purposes.

Disadvantages:

- Tableau Public requires an internet connection for publishing and sharing dashboards.
- Large healthcare datasets may affect performance and rendering speed.
- The dashboard accuracy depends on proper data cleaning and preprocessing.
- Limited customization features compared to Tableau Desktop Professional version.
- The analysis is limited to the provided dataset and does not include real-time medical data.

10. CONCLUSION:

This project successfully achieved its objective of analysing heart disease risk factors using Tableau. Through interactive dashboards and a structured story, the project highlighted how demographic factors (age, gender, race) and lifestyle factors (smoking, alcohol, physical activity), along with medical conditions (diabetes, stroke, BMI, general health), influence heart disease prevalence. The visual insights help identify high-risk populations and support data-driven healthcare decisions. Overall, this project demonstrates how visual analytics can transform raw medical data into meaningful, actionable health intelligence for preventive planning and awareness.

11. FUTURE SCOPE:

In the future, this project can be expanded with additional features and datasets to further enhance its value:

- Integrate real-time healthcare datasets for continuous monitoring of heart disease trends.
- Apply machine learning models to predict heart disease risk probability.
- Incorporate advanced statistical analysis for deeper correlation studies.
- Develop a web-based healthcare analytics platform for broader accessibility.
- Expand the dataset to include additional medical parameters such as blood pressure, cholesterol levels, and ECG results.
- Enable automated periodic data refresh for continuous updates.

These improvements would strengthen predictive analysis capabilities and increase the project's impact in healthcare decision-making and preventive strategies.

12. APPENDIX:

➔ Dataset link: https://drive.google.com/file/d/190Qmq27LeZZ_nWricP3Obl7ys_5otEsp/view
➔ GitHub link: https://github.com/singamgithub/Heart-Disease-Analysis