Power BI Assignment

Buisness Intelligence 2025

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About the Dataset

The dataset we selected is the Heart Patients in Pakistan Dataset.
The dataset contains medical data of heart patients in Pakistan, including demographics, lifestyle habits, medical history, blood test results, diagnoses, and follow-up status. It helps to analyze factors contributing to heart diseases like cholesterol, blood pressure, diabetes, hypertension, and family history, helping improve prevention and treatment efforts.

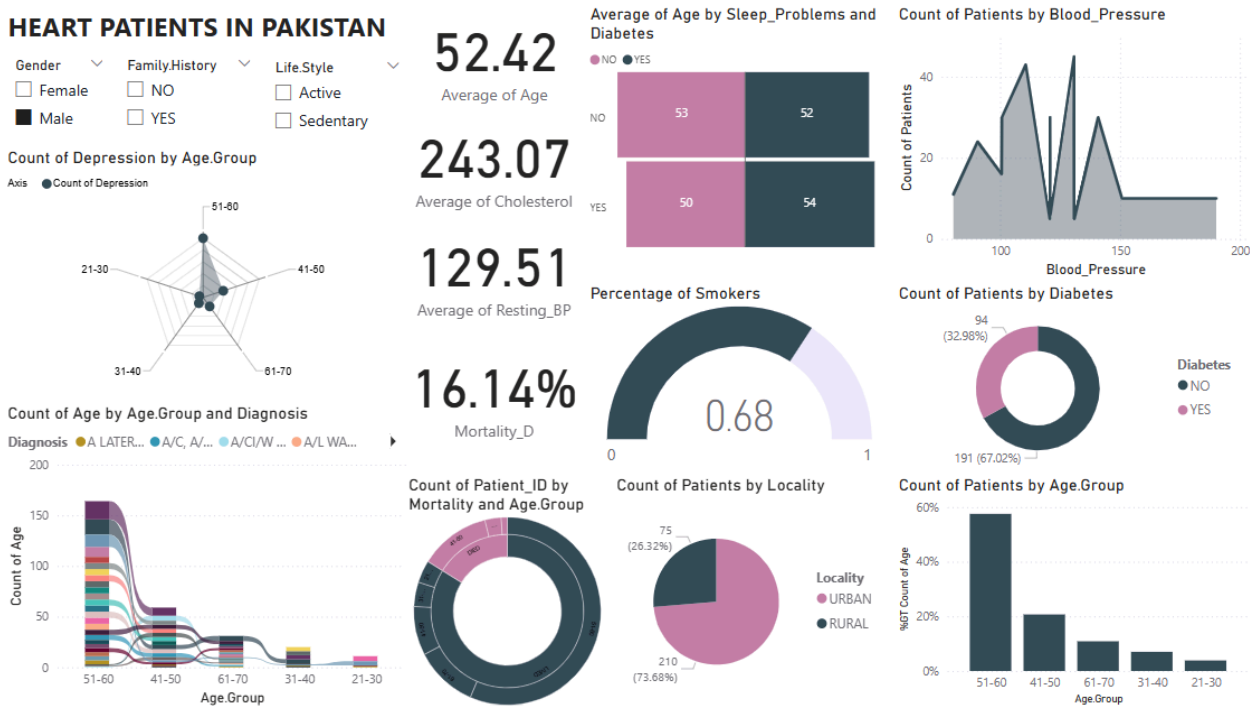
Problem Statement:

The focus of this analysis is to explore the relationship between lifestyle factors, health statistics, and the risk of heart diseases among patients in Pakistan. By examining the dataset, we aim to identify key factors such as cholesterol levels, blood pressure, diabetes, hypertension, and family history, and how they impact heart disease outcomes. The goal is to uncover insights that can help in understanding the prevalence of heart diseases

Work Contribution:

Zuha - 50% Dashboard, 50% Report
Kisa - 50% Dashboard, 50% Report

The Dashboard



This dashboard provides a comprehensive overview of heart disease patients in Pakistan, based on key lifestyle and clinical factors captured in the dataset. It visually summarizes critical health metrics like cholesterol levels, resting blood pressure, presence of diabetes, smoking habits, sleep problems, depression symptoms, and mortality rates across different age groups and genders. Through visualizations like pie charts, donut charts, gauge meters, and matrix comparisons, the dashboard uncovers important patterns, such as the high prevalence of diabetes among heart patients, increased depression and mortality rates after age 50, and lifestyle risk factors like smoking and sedentary behavior that significantly impact patient outcomes.

It is a visual exploration of the heart patients dataset from Pakistan, examining several health and lifestyle-related variables. It covers columns like Gender, Family History, Lifestyle (Active/Sedentary), Age, Cholesterol Levels, Resting Blood Pressure, Smoking Status, Diabetes Status, Sleep Problems, Depression Symptoms, Locality (Urban/Rural), and Mortality.

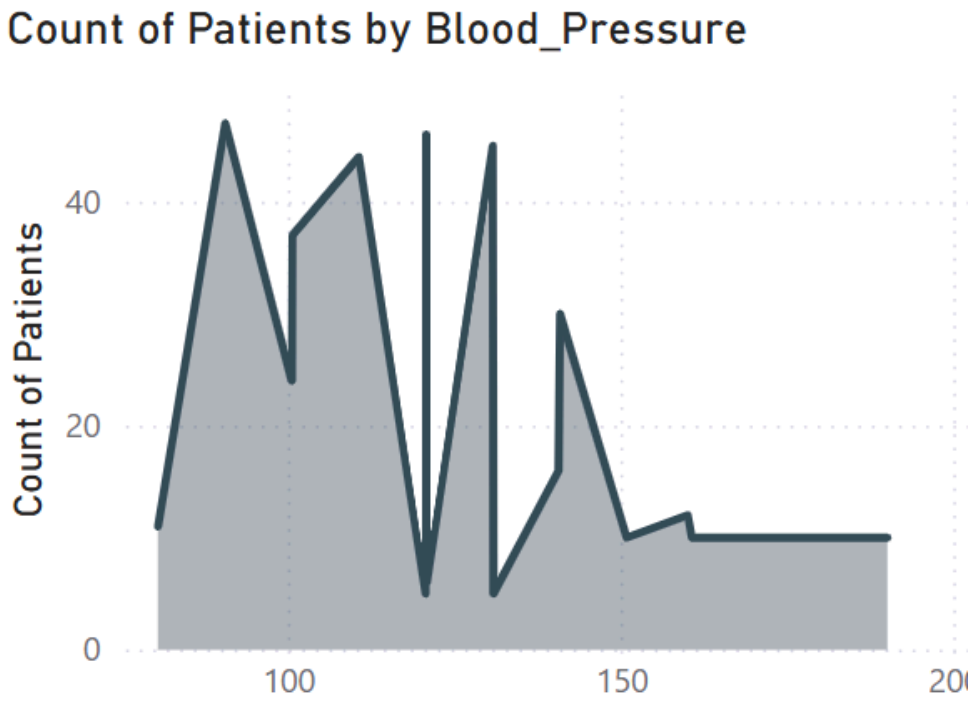
At the top, key indicators show the average age, average cholesterol, average resting blood pressure, and overall mortality percentage across the dataset.

- The bar chart on the right shows how blood pressure levels are distributed among patients.
- A donut chart displays the proportion of patients with and without diabetes.
- The percentage gauge shows how many patients are smokers.
- The radar chart plots the count of depression symptoms across different age groups.
- A bar chart compares the average age across categories with or without sleep problems and diabetes.
- The pie chart shows the distribution of patients by locality (urban vs rural).
- The ribbon chart breaks down patient diagnoses across different age groups.
- The sunburst chart details the count of deaths and survivors, split by age groups.
- Finally, a simple bar chart shows the count of patients across different age groups.

Each chart highlights one or more columns and helps in understanding how factors like age, lifestyle, health statistics, and family history are spread across the heart patient population.

Overall	Females	Males
54.29 Average of Age	60.73 Average of Age	52.42 Average of Age
248.94 Average of Cholesterol	269.10 Average of Cholesterol	243.07 Average of Cholesterol
132.74 Average of Resting_BP	143.84 Average of Resting_BP	129.51 Average of Resting_BP
21.74% Mortality_D	40.96% Mortality_D	16.14% Mortality_D
A normal blood pressure is 80-100, overall people with heart problems have a very high bp. Good cholesterol levels should be less than 200.	Females get heart problems at a higher age, have higher cholesterol and blood pressure - and a higher death rate.	Males get at a younger age compartiively, and on average have a less bp + cholesterol. Their death rate is half to females.

Area Chart

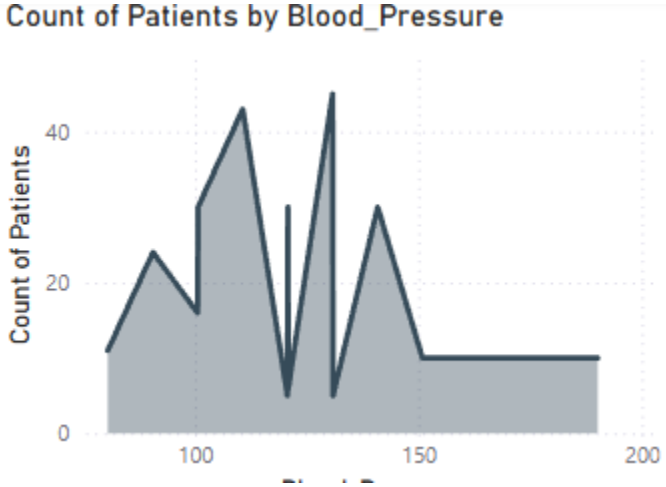


- **Most patients (90-130 range):** The majority of heart patients have blood pressure between 90 and 130, with the highest concentrations occurring at 90 and 130, each having over 40 patients.

- **Dip around 120-140:** There is a noticeable drop in the number of patients with blood pressure around 120 and 140, with fewer than 5 patients in these ranges, suggesting these levels are less common among the patients.

- **Beyond 150:** As blood pressure exceeds 150, the graph levels off, indicating very few patients fall into this range.

- **Overall Trend:** This pattern suggests that most heart patients maintain blood pressure in the lower to mid-range, with significantly fewer patients experiencing extremely high or low blood pressure.



For males: The distribution of blood pressure is similar to the overall trend. There are noticeable peaks at 110 and 130, with fewer patients at 120 and 140, where the graph dips. Beyond 150, the graph becomes constant, indicating that very few male patients have blood pressure above this level.

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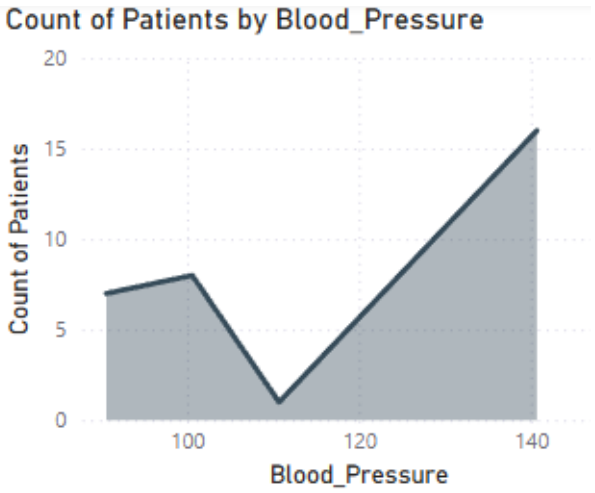
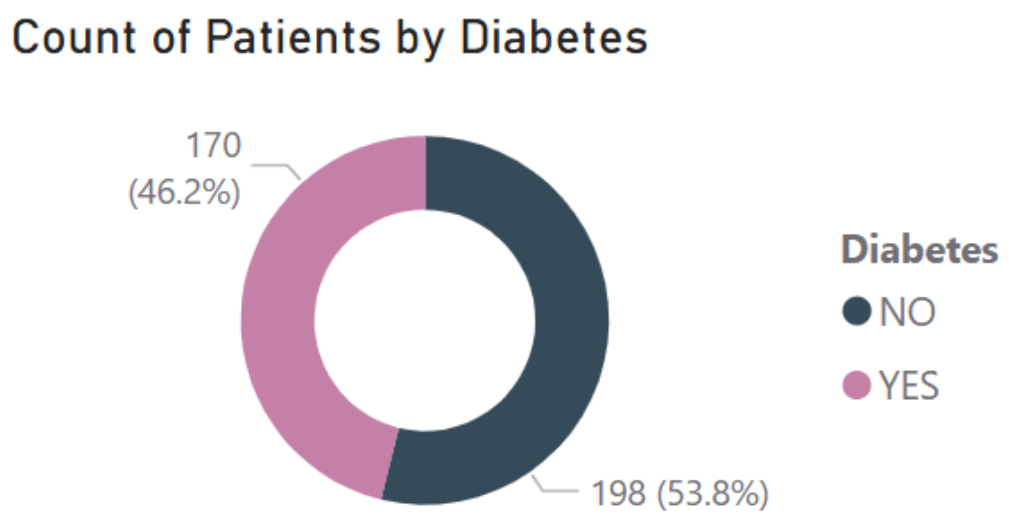
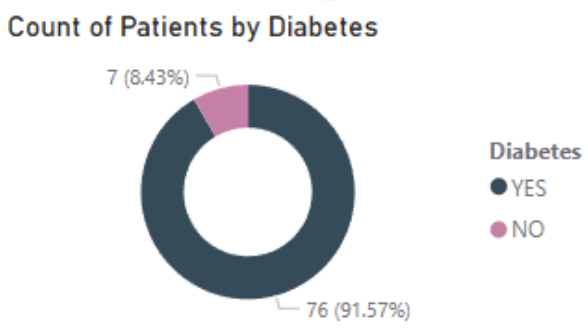


For females: blood pressure steadily increases from 110 to 140, with 110 being the lowest and 140 being the highest. Blood pressure values up to 100 show a balanced distribution of patients.

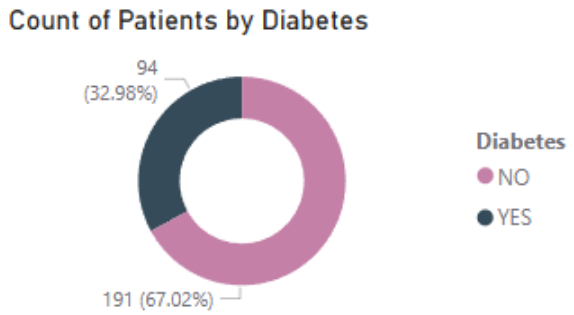
Donut Chart



This is a donut chart of heart patients with and without diabetes. The data shows that **53.8% (198 patients)** do not have diabetes, while **46.2% (170 patients)** are diabetic. This means nearly half of the heart patients also have diabetes, showing a strong link between the two conditions. It highlights the need to manage diabetes to help prevent heart problems.

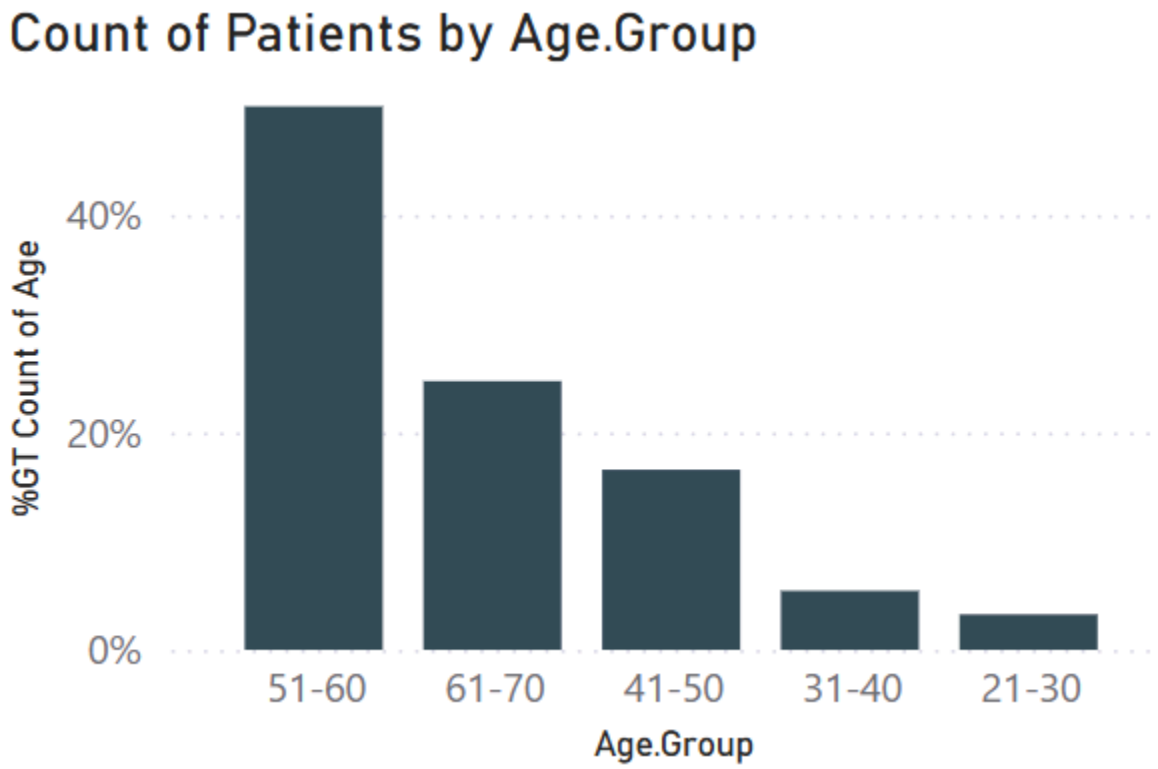


For females: 91.57% have diabetes, while only 8.43% do not. This highlights a high prevalence of diabetes among female heart patients, suggesting a strong correlation between the two conditions in this group.



For males: 34% have diabetes, while 67% do not. This indicates that a majority of male heart patients do not have diabetes, suggesting that heart disease in men may not be as strongly linked to diabetes as it is in females.

Bar Chart



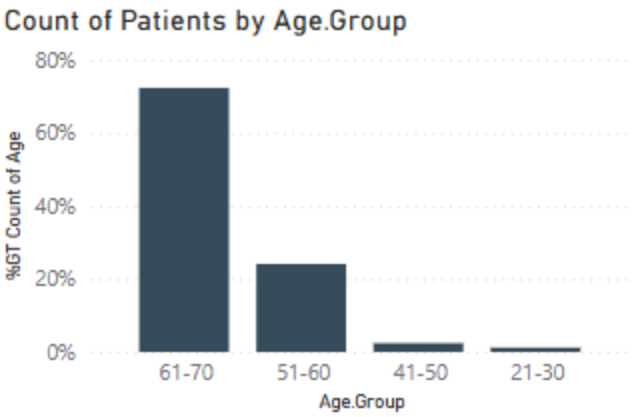
This bar chart shows the distribution of heart patients across different age groups as a percentage.

Analysis:

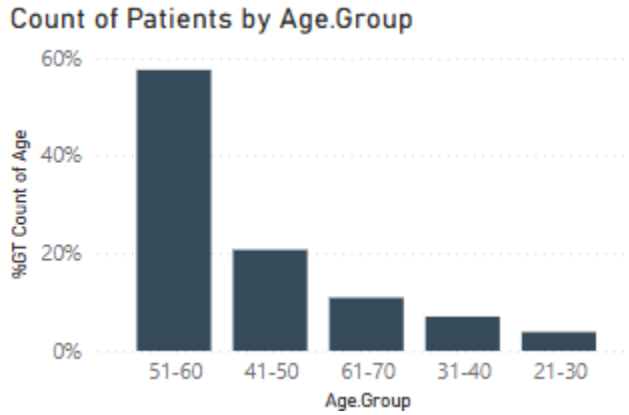
- **51-60** age group forms the largest portion (50%) of total patients.
- Followed by **61-70** (around 25%) and **41-50** (around 18%).
- Very few patients are from **21-30** and **31-40** groups.

Insights:

The majority of heart patients are above 50 years, suggesting that heart disease risk sharply increases with age. Preventative programs should target individuals starting from their early 40s.



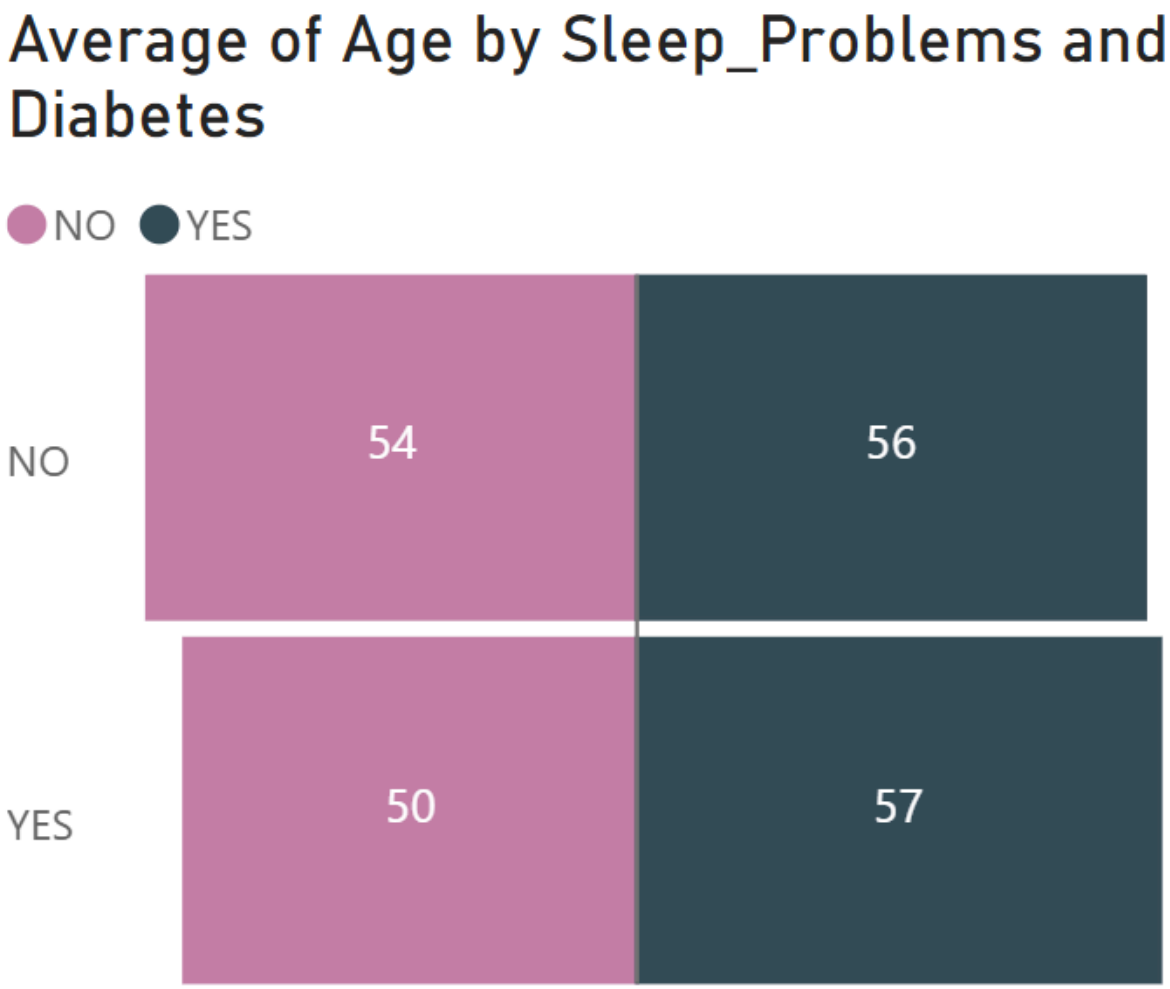
For females: the higher heart problem age group is 61-70.



Whereas for males, it is 51-60 (similar to the total graph above)

The overall graph shape stays same for active, sedentary people, and for people with or without a family history.

Tornado

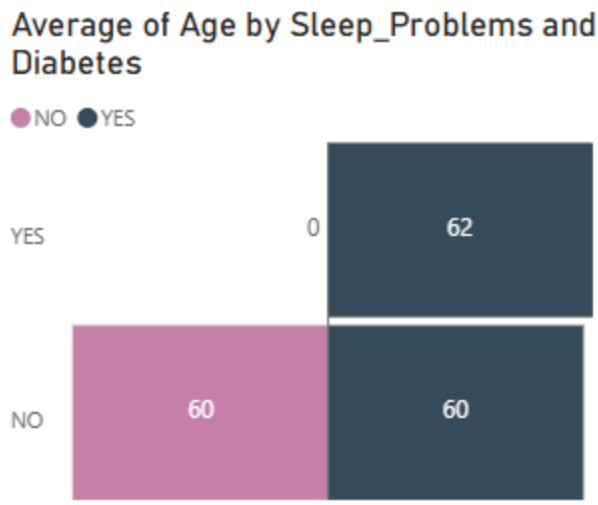


This matrix chart shows the average age of patients based on whether they have sleep problems and/or diabetes. The left side axis is for “SLEEP PROBLEM” and the colors indicate “DIABETES”.

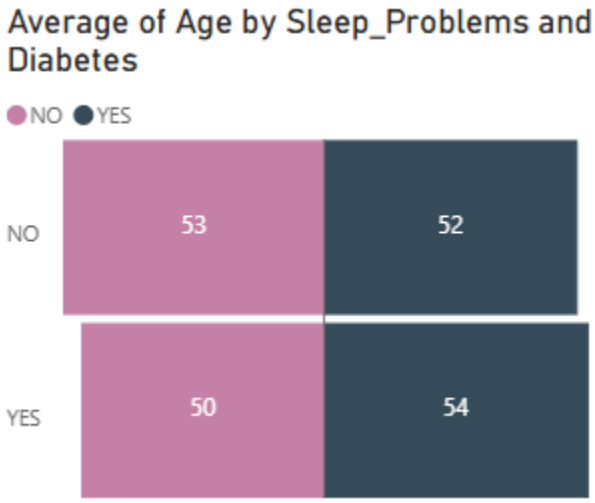
Analysis:

- Patients with no sleep problems and no diabetes have an average age of 54.
- Patients with diabetes but no sleep problems have an average age of 56.
- Patients with sleep problems but no diabetes have an average age of 50.
- Patients with both diabetes and sleep problems have the highest average age of 57.

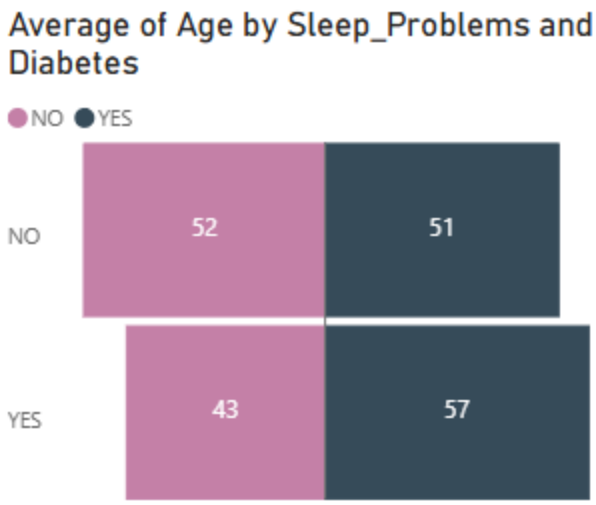
Diabetes tends to affect slightly older patients compared to sleep problems. Patients with both diabetes and sleep issues are generally the oldest, indicating that comorbidities increase with age.



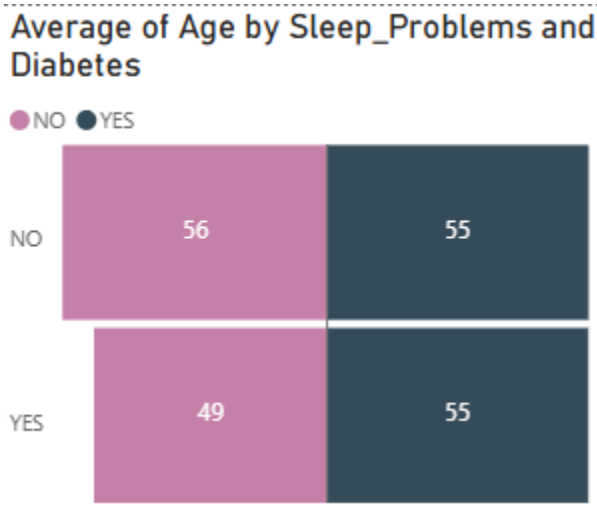
For females we can see that there is no data in the dataset for females who have sleep problems but no diabetes. But we can also see that there is a same age of females who don't have sleep problems have diabetes/dont have diabetes. We can see that people who do have sleep problems, get diabetes at a slightly later age (62) then people who dont (60).



For males: they are having sickness earlier. People have sleep problems at an early age of 50 - and if they dont have sleep problems, they can get diabetes (at 52). We see that males are more sicker quicker in compared to females.

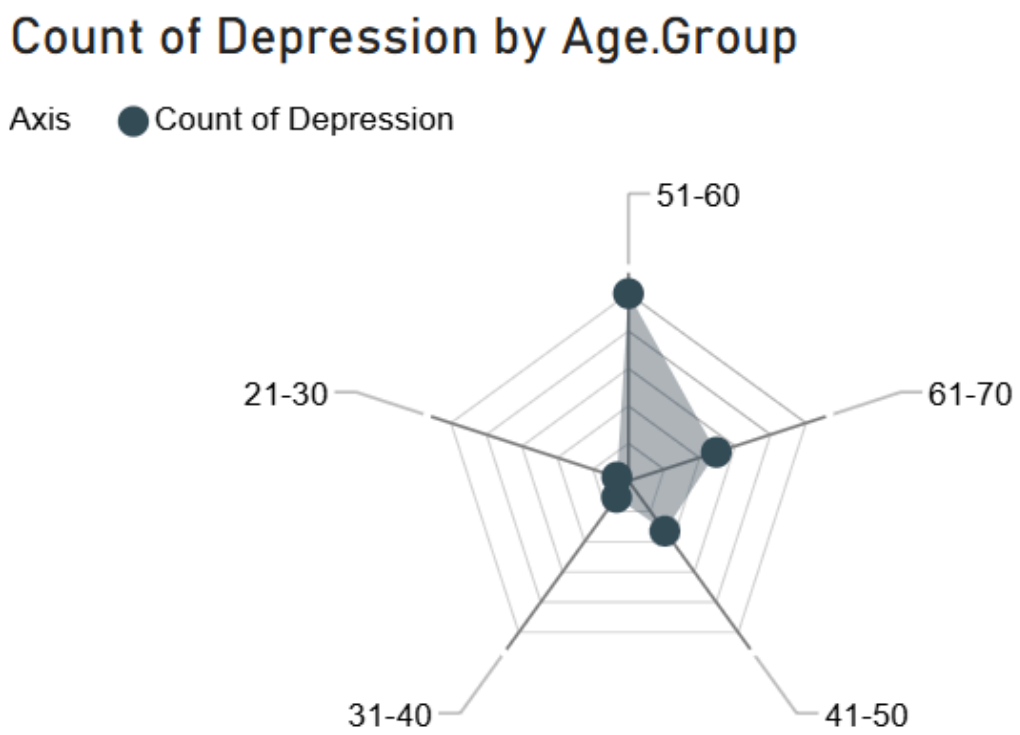


People with family sickness: they have sleep problems at a very young age of 43. But then dont have diabetes until the average age of diabetes as the total, which is 57.



People who are sedentary (lazy/lack of physical activity), they get diabetes at 55 - regardless of sleep problems. Sedentary people develop diabetes earlier (around age 55) because lack of movement makes the body struggle to control blood sugar, regardless of sleep issues. This suggests inactivity is a stronger risk factor than sleep problems alone.

Radar Chart

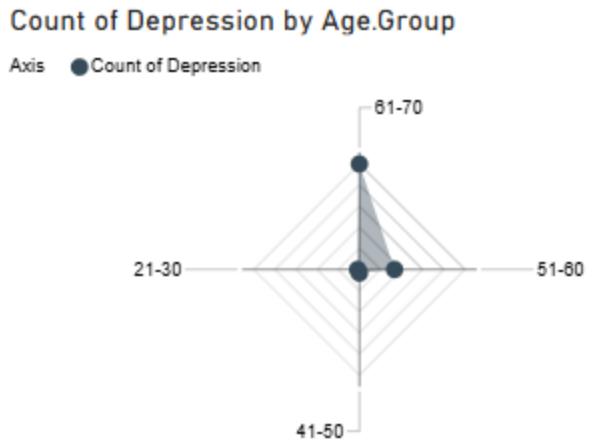


This radar chart displays how many patients in different age groups reported depression symptoms.

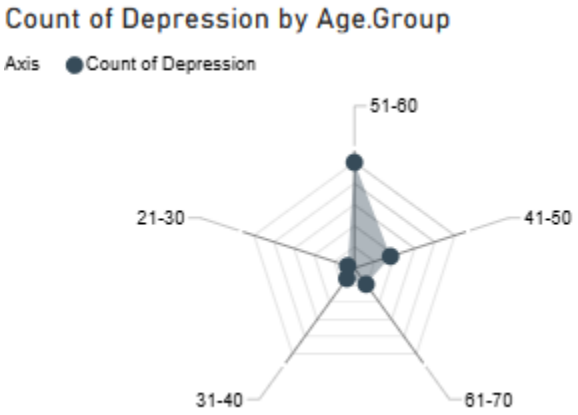
Analysis:

- Highest depression count is seen in the **51-60** age group.
- The **61-70** group also has a notable number of depression cases.
- Younger groups like **21-30** and **31-40** show fewer depression cases.

Older patients, especially those aged 51–60, are more prone to depression, possibly due to deteriorating health or lifestyle changes. Mental health support should be focused more on middle-aged and older patients in healthcare programs.

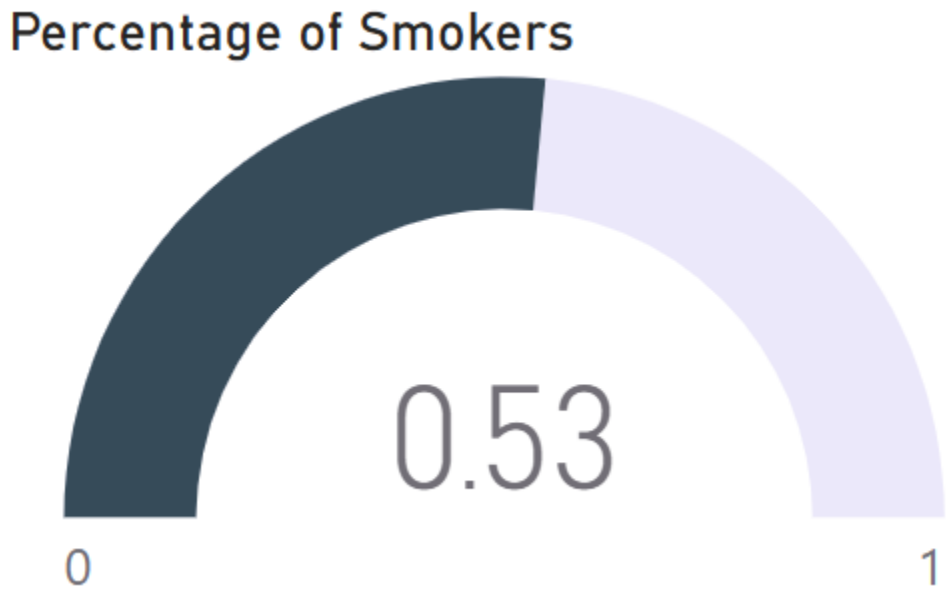


For females: depression is higher in 61-70 ages and 51-60 ages

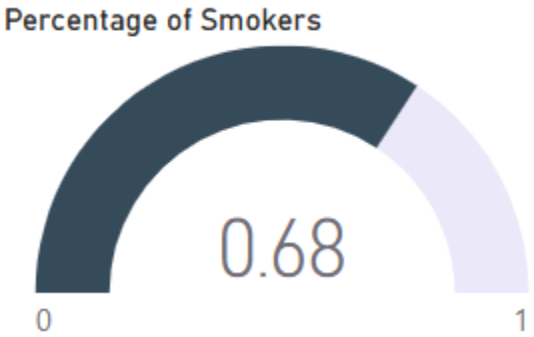


Whereas for males, the depression is higher in the 51-60 and 41-50 age bracket, significantly less in the 61-70 bracket.

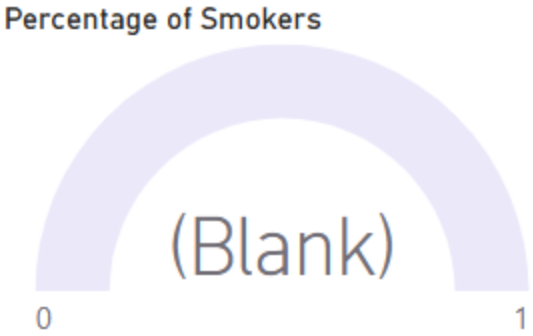
Gauge



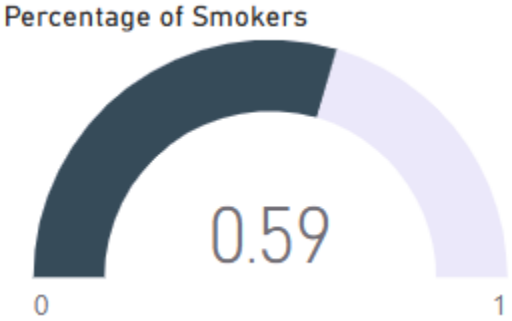
The chart titled **"Percentage of Smokers"** shows that approximately **53%** of the heart patients in the dataset are smokers. This means that more than half of the individuals in the sample population have a history of smoking. Smoking is a well-known risk factor for heart diseases, and this high percentage highlights a strong correlation between smoking habits and heart-related health issues in Pakistan.



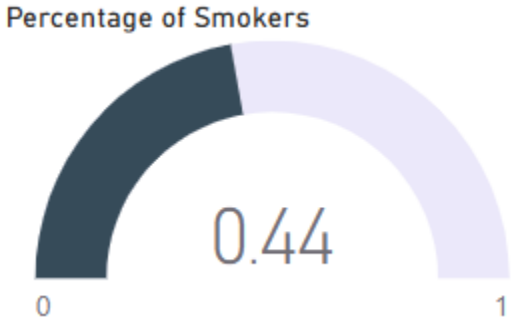
For **males**: they have a higher smoking rate (68%)



For **females**: there is not enough data to show that females smoke or not.

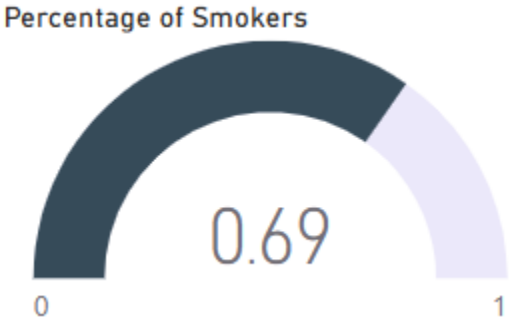


Active people are smoking more, whereas



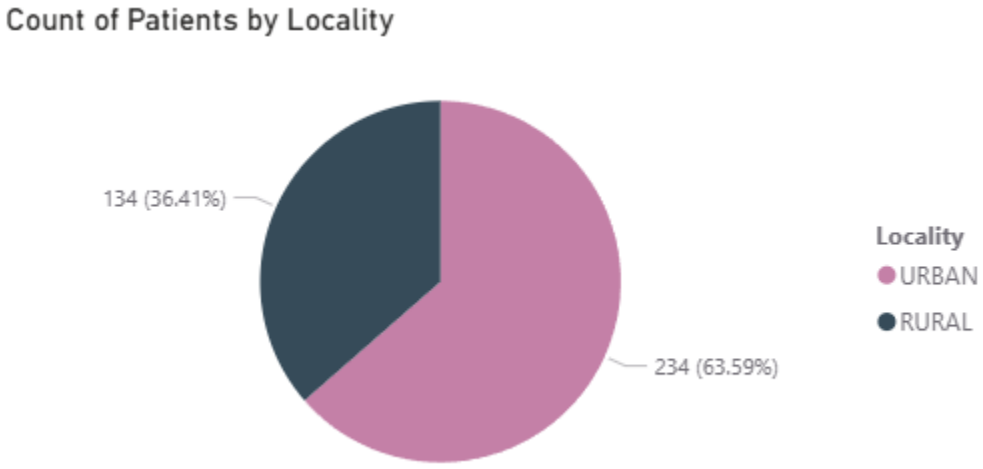
Sedentary (lazy people) are smoking less

Yet both people have heart problems.

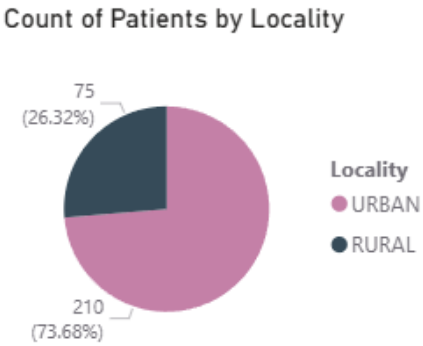


People with a family history however, smoke the most.

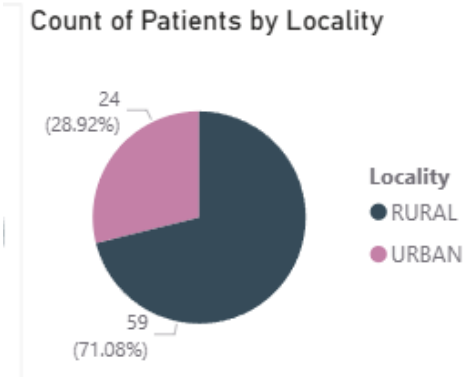
Pie Chart



The pie chart shows the distribution of heart patients by locality. 28.92% of the patients are from urban areas, while 71.08% are from rural areas. This indicates that a significantly higher percentage of heart patients come from rural areas compared to urban areas.

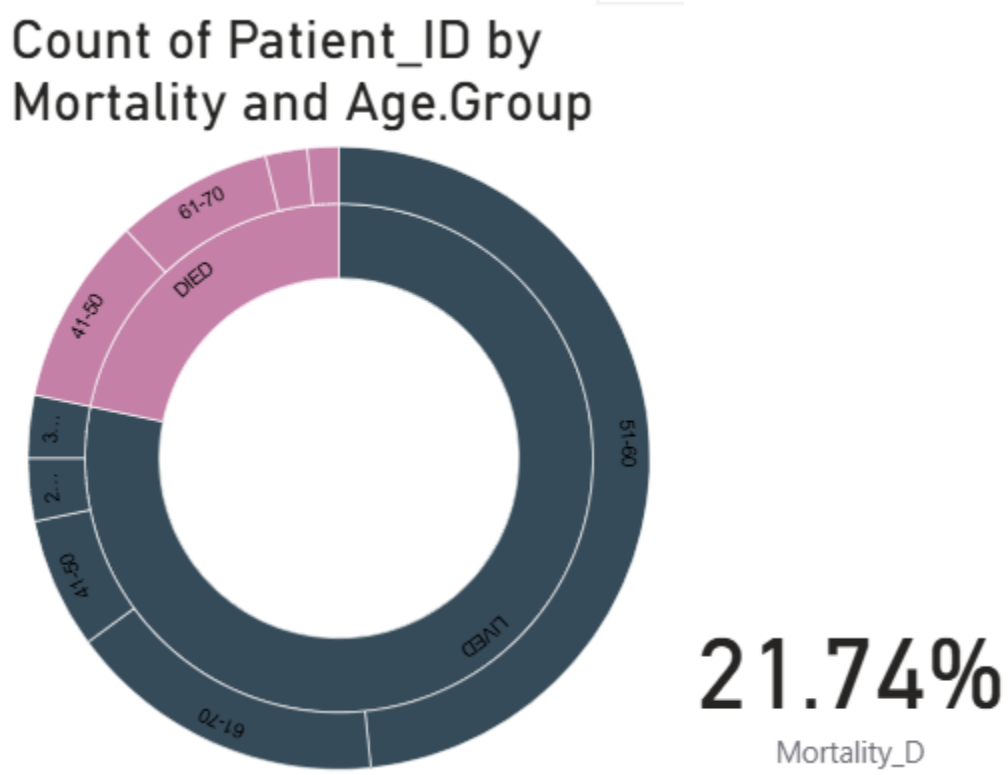


For males, 26.32% are from rural areas, while 73.68% are from urban areas. This indicates that a significant majority of male heart patients are from urban areas.



For females, 28.92% are from urban areas, while 71.08% are from rural areas. This shows that, like the overall trend, a larger proportion of female heart patients come from rural than urban areas.

Sunburst

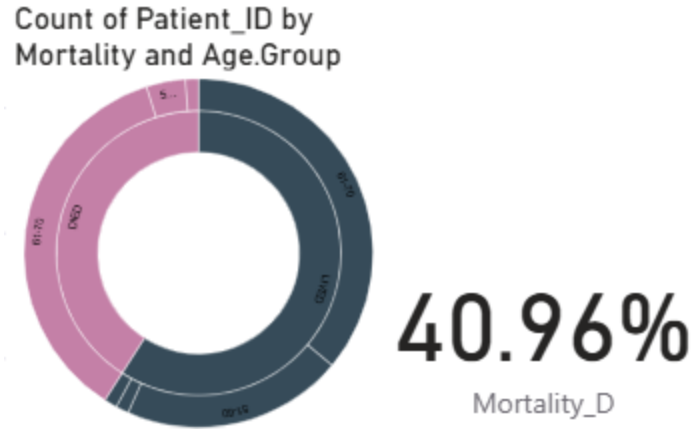


This sunburst chart shows the number of patients who lived or died, broken down by age group. The overall mortality rate was less.

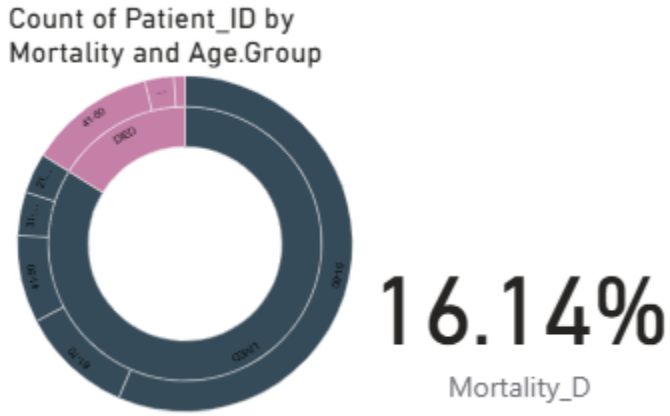
Analysis:

- Most of the deaths occurred in the 41–60 and 61–70 age groups.
- The higher surviving age group was 51-60.
- Majority of patients survived across all groups, but survival rates drop slightly with increasing age.

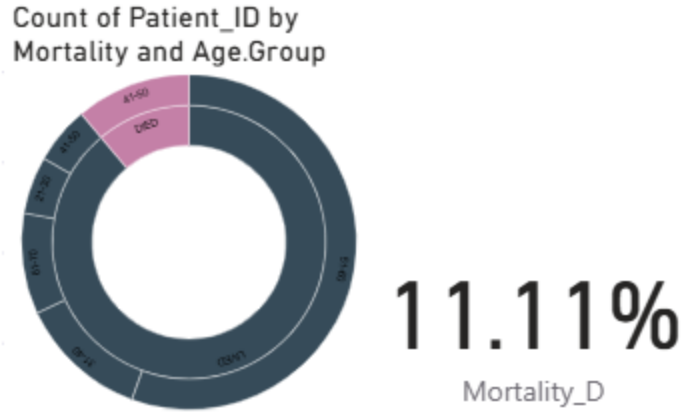
Mortality rates increase with age, especially after 50 years old. Special care and follow-up are critical for older patients to reduce mortality risk in heart-related conditions.



For females, the mortality rate was very high - nearing 50% which means any female suffering from heart probelms, has only 50% chance to live. Especially the 61-70 age group, almost all the deaths are from that age group, and we can see that the surviving ratio of 61-70 is lesser than the deaths.

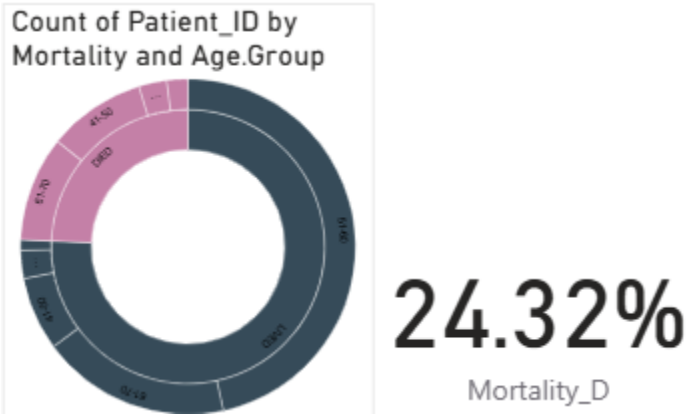


In males however, the death rate is very less. Even in that death count - people of the 41-50 age bracket died more. Younger Pakistani men face work stress, high smoking rates, and poor dietary habits (fried/oily foods), accelerating heart disease early. Many also ignore symptoms until a critical event (e.g., heart attack).



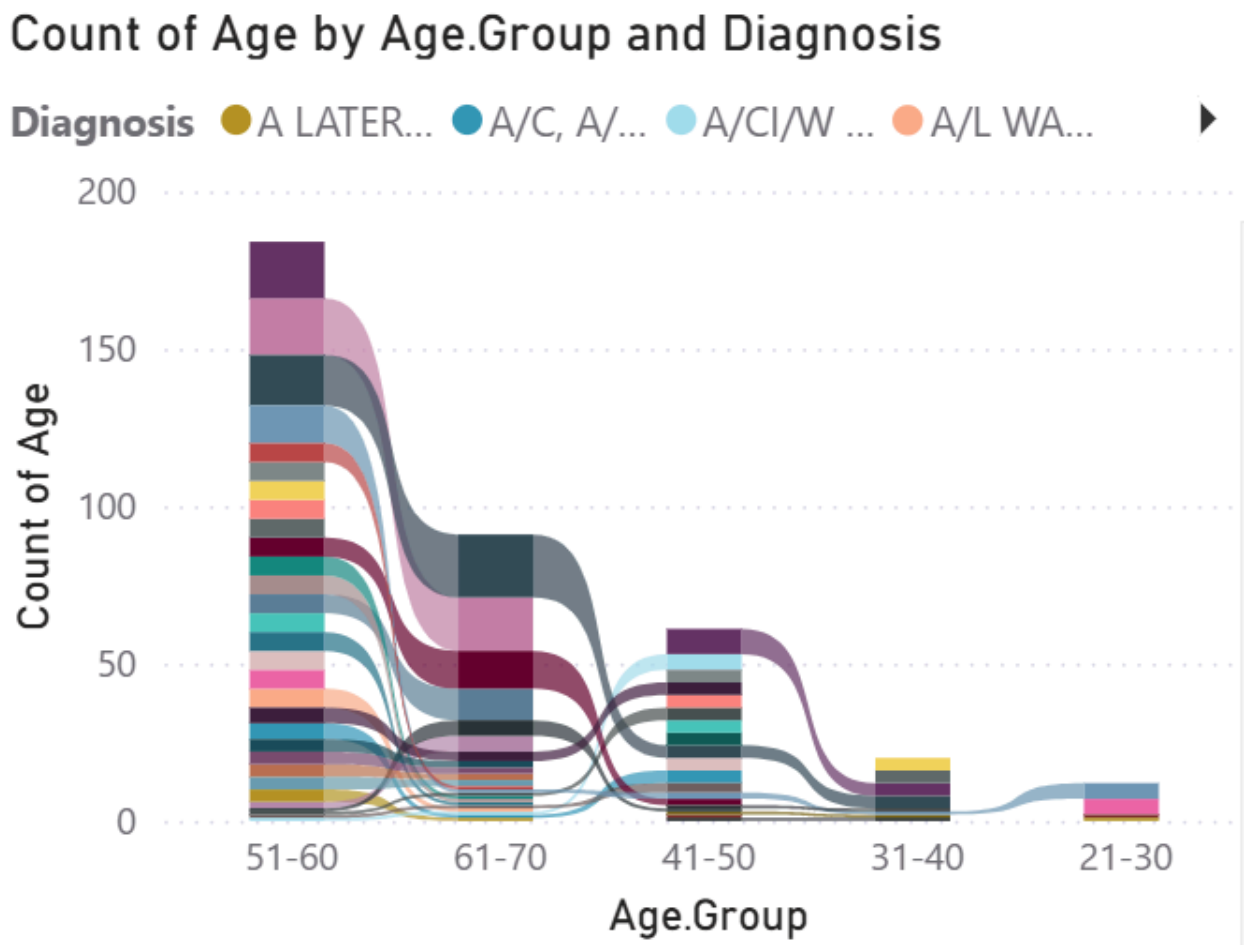
People who DO have a family history have surprisingly less death rate - maybe because they have a better idea of how to tackle the sickness and how to prevent it. The age group of deaths is 41-50 in majority.

Whereas,



People who DONT have a family history have more of a higher death rate. More on the average side.

Ribbon Chart



Age Groups:

- The age groups are divided into 21-30, 31-40, 41-50, 51-60, and 61-70 years.
- The largest groups are 51-60 and 61-70, indicating most patients are older adults.

Diagnosis Distribution:

- Different diagnoses are represented by color-coded bands.
- The 51-60 age group shows a high variety of diagnoses, with more diverse colors.
- The number of diagnoses decreases as the age groups get younger (41-50, 31-40, 21-30).

Insights

1. **Targeted Diabetes Management Programs:** Nearly half of the heart patients also have diabetes. Targeting diabetes management could significantly reduce heart disease risks.

2. **Focus on Female Patients:** With 91% of female heart patients also having diabetes, there is a need for gender-specific healthcare programs that address both conditions simultaneously.

3. **Rural Healthcare Improvements:** A significant portion of heart patients, particularly females, are from rural areas. Increasing healthcare access and awareness in rural regions could help reduce heart disease prevalence.

4. **Blood Pressure Monitoring and Control:** Since most heart patients have blood pressure between 90 and 130, improving early detection and control of blood pressure could help manage and prevent heart disease.

5. **Lifestyle Interventions for Active Individuals:** Even among active individuals, diabetes remains a concern. Promoting balanced diets and regular health checkups for active people could help prevent diabetes-related heart problems.

6. **Gender-Specific Prevention Strategies:** The higher incidence of heart disease in rural females calls for gender-targeted preventive strategies, with an emphasis on education, lifestyle changes, and early diagnosis.

7. **Urban vs. Rural Disparity:** While more heart patients are from rural areas, urban males have a higher proportion. This suggests that heart disease is a widespread issue, and both urban and rural populations require tailored interventions.

Knowledge

1. Heart Disease is an Age-Driven Problem, Intensifying After 50

- Across all charts (Area, Bar, Sunburst, Radar), age 51-60 consistently appears as the highest-risk group for heart disease, depression, and mortality.
- Risk sharply rises after age 50, with most heart patients concentrated between 51–70 years.
- Preventive strategies (like screenings, health checks, lifestyle coaching) should begin aggressively at 40, not wait until symptoms emerge at 50+.

2. Diabetes and Sleep Problems are Major Comorbidities, Especially for Females

- The Donut and Tornado charts show that almost all female heart patients have diabetes (91%) compared to males (34%).
- Sleep issues plus diabetes are linked to an even higher average age and poorer outcomes, and females develop diabetes later but with greater severity.
- Programs targeting diabetes prevention and management need to focus more heavily on women and older adults in heart health campaigns.

3. Smoking Remains a Major, Gender-Skewed Risk Factor

- Over 53% of all patients are smokers, with 68% of male patients smoking (gauge chart).
- Despite sedentary people smoking less, both active and sedentary individuals still show heart issues, meaning smoking independently worsens heart health.
- Male-targeted anti-smoking campaigns would significantly help reduce early heart issues, especially for younger men (41–50) already facing high mortality rates.

4. Rural Patients, Especially Females, Face Severe Heart Risks

- 71% of female patients are from rural areas, where access to healthcare is limited.
- Rural females have higher mortality rates, and fewer resources for diabetes management.
- This shows a need for mobile healthcare units, rural clinics, and heart-disease education programs, specifically focused on female patients in rural Pakistan.

5. Family History Lowers Mortality — Possibly Due to Awareness and Early Management

- Surprisingly, patients with a family history of heart problems have lower mortality (Sunburst chart).
- It’s possible that family history patients are more vigilant, better educated, and adhere to early interventions.
- Healthcare initiatives should educate everyone like they would a "high-risk family history" patient, empowering broader awareness to prevent silent progression of heart disease.

Action

1. Launch Targeted Heart Health Programs for 40+ Age Group

- Since heart disease risk dramatically increases after age 50, early detection programs should start from age 40.
- Focus areas: regular blood pressure and cholesterol screenings, early diabetes detection, and educational seminars about lifestyle changes.

2. Create Diabetes + Heart Disease Management Packages, Especially for Women

- With an extremely high rate of diabetes in female heart patients (91%), offer combined management programs targeting both conditions.
- These should include diet plans, lifestyle coaching, and free rural health camps focused on female patients.

3. Aggressive Smoking Cessation Campaigns for Males (Urban Focus)

- Since 68% of male heart patients are smokers, build male-focused anti-smoking campaigns.
- Specially target younger urban males (41–50 age group) who are dying earlier, highlighting smoking-heart attack linkages in a culturally relevant way.

4. Expand Rural Heart Health Infrastructure and Outreach

- Since most female heart patients come from rural areas and face higher mortality, prioritize rural healthcare expansion.
- Launch mobile heart clinics, rural telemedicine, and community health worker programs to increase screening, education, and early intervention.

5. Promote Preventive Screening Even for Those Without Family History

- Data shows that patients *without* family history actually have higher death rates.
- Public health messaging should stress that everyone is at risk, not just those with family history, and encourage yearly checkups for all adults.