Higher Nationals in Computing

Unit 13: Computing Research Project

ASSIGNMENT 1

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Assignment due: Assignment submitted:

Unit 16: Computing Research Project

Assignment Brief 1

Unit Number and Title	Unit 16: Computing Research Project
Academic Year	2023 - 2024
Unit Tutor	Nguyen The Lam Tung
Assignment Title	**Proposing and conducting a research project**
Issue Date	01 September 2023
Submission Date	01 August 2023

Submission Format	
Format	The submission is in the form of an individual written report that shows how you have manage the project. This should be written in a concise, formal business style using single spacing and font size 12. You are required to make use of headings, paragraphs and subsections as appropriate, and all work must be supported with research and referenced using the Harvard referencing system. Please also provide a bibliography using the Harvard referencing system.
Submission	Students are compulsory to submit the assignment in due date and in a way requested by the Tutors. The form of submission will be a soft copy in PDF posted on corresponding course of http://cms.greenwich.edu.vn/
Note	The Assignment must be your own work, and not copied by or from another student or from books etc. If you use ideas, quotes or data (such as diagrams) from books, journals or other sources, you must reference your sources, using the Harvard style. Make sure that you know how to reference properly, and that understand the guidelines on plagiarism. *If you do not, you definitely get fail*.

Unit Learning Outcomes
LO1: Examine appropriate research methodologies and approaches as part of the research process.
LO2: Conduct and analyse research relevant for a computing research project
LO3: Communicate the outcomes of a research project to identified stakeholders

Transferable skills and competencies developed
The assignment offers students the chance to explore various aspects of big data from the perspective of computing professionals or data scientists. It also encourages investigations into the applications, benefits, limitations, and responsibilities associated with big data and provides solutions to the problems it aims to solve.

Vocational scenario

Introduction to theme

Big Data

Over the past decade, the term "big data" has gained increasing popularity. Initially, it referred to data generated in massive volumes, such as internet search queries, weather sensor data, and social media information. Nowadays, big data represents large amounts of information from diverse sources that cannot be processed conventionally or without computational intervention. Big data can be stored in structured, unstructured, or semi-structured formats. Many systems and organizations generate massive quantities of big data on a daily basis, some of which are publicly available for analysis. Consequently, machine learning systems have been developed to sift through this data, rapidly identify patterns, and solve problems. This has led to the emergence of data science analytics as a discipline to design, build, and test machine learning and artificial intelligence systems. Leveraging big data requires a broad range of knowledge and skills, creating new opportunities for previously inaccessible organizations. It allows businesses to gain a comprehensive understanding of global trends, enabling more accurate and up-to-date decision-making. Big data can help identify potential business risks earlier and minimize costs without compromising innovation. However, the rapid application of big data raises concerns about security, the ethical storage of personal data from multiple sources, and the sustainability of energy requirements in large data warehouses.

Task

Students are to choose their own research topic for this unit. Strong research projects are those with clear, well focused and defined objectives. A central skill in selecting a research objective is the ability to select a suitable and focused research objective. One of the best ways to do this is to put it in the form of a question. Students should be encouraged by tutors to discuss a variety of topics related to the theme to generate ideas for a good research objective.

The range of topics discussed could cover the following:

- Storage models.
- Cyber security risks.
- Future developments and driving innovation.
- Legal and ethical trade-offs.

The research objective should allow students to broaden their understanding and widen their erspective of being able to explore, argue, prove, and/or disprove a particular objective. The research objective should be feasible, novel, ethical, relevant and ultimately of interest to the student

Assignment activity and guidance

You have to set your own research question in the research proposal base on the previous range of topic. The research question must be specific enough example: the audience of the research (job, age..), kind of devices(personal devices, household appliances, or combination of some kinds).

Recommended Resources

1. **Article: 6V's of Big Data https://www.geeksforgeeks.org/5-vs-of-big-data/**
2. **Article: Business Ethics and Big Data https://www.ibe.org.uk/resource/business-ethics-and-big-**

data.html

3. **Article: What is Big Data Security? Challenges & Solutions** https://www.datamation.com/big-data/big-data-security/

4. **Article: What is Big Data?** https://www.oracle.com/uk/big-data/what-is-big-data/

5. **Magazine: Information Sciences** https://www.sciencedirect.com/journal/information-sciences

6. **Magazine: Big Data Research** https://www.sciencedirect.com/journal/big-data-research

7. **Report: Big Data & Investment Management: The Potential to Quantify Traditionally Qualitative Factors** https://tinyurl.com/yff4uenz

8. **Webinar: Big Data Sources & Analysis Webinar** https://tinyurl.com/2p85d7mb

9. **Video: Big Data In 5 Minutes|What Is Big Data?|Introduction To Big Data|Big Data Explained** https://www.youtube.com/watch?v=bAyrObl7TYE

10. **Video: Challenges of Securing Big Data** https://www.youtube.com/watch?v=3xIuIcPzMVs

11. **Video: The Importance of Data Ethics** https://www.youtube.com/watch?v=gLHMhCtxEYE

12. **Book: A Bite-Sized Guide to Visualising Data** https://tinyurl.com/38d6thsk

13. **Book: Business Intelligence Strategy and Big Data Analytics** https://www.sciencedirect.com/book/9780128091982/business-intelligence-strategy-and-big-data-analytics

14. **Book: Principles and Practice of Big Data Preparing, Sharing, and Analysing Complex Information** https://www.sciencedirect.com/book/9780128156094/principles-and-practice-of-big-data

15. **Book: Systems Simulation and Modelling for Cloud Computing and Big Data Applications** https://tinyurl.com/2s3wkehn

16. **Journal: Big Data in Construction: Current Applications and Future Opportunities** https://www.mdpi.com/2504-2289/6/1/18

17. **Journal: Big Data with Cloud Computing: Discussions and Challenges** https://www.sciopen.com/arti cle/pdf/10.26599/BDMA.2021.9020016.pdf

18. **Journal: Mobile Big Data Solutions for a Better Future** https://tinyurl.com/hpk2zvvw

19. **Journal: The social implications, risks, challenges and opportunities of big data** https://tinyurl.com/yw593svk

20. **Journal: Policy discussion – Challenges of big data and analytics driven demand-side management** https://tinyurl.com/kyb3j6x7

21. **Journal: Explore Big Data Analytics Applications and Opportunities: A Review** https://tinyurl.com/597j8nd3

22. **Journal: What is Big Data?** https://www.oracle.com/cl/a/ocom/docs/what-is-big-data-ebook-4421383.pdf

23. **Journal: Towards felicitous decision making: An overview on challenges and trends of Big Data** https://www.sciencedirect.com/science/article/abs/pii/S002 0025516304868

24. **Journal: Critical analysis of Big Data challenges and analytical methods** https://www.sciencedirect.com/science/article/pii/S014829631630488X

25. **Journal: Big Data Security Issues and Challenges** https://tinyurl.com/wabx7zya

26. Journal: **IoT Big Data Security and Privacy Versus Innovation**
   https://ieeexplore.ieee.org/abstract/document/8643026
27. Journal: **Big Data Security and Privacy Protection** https://www.atlantis-press.com/proceedings/icmcs-18/25904185
28. Journal: **Big data analytics in Cloud computing: an overview** https://journalofcloudcomputing.springeropen.com/articles/10.1186/s13677-022-00301-w

Please note that the resources listed are examples for you to use as a starting point in your research – the list is not definitive.

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
LO1 Examine appropriate research methodologies and approaches as part of the research process		**LO1 & LO2** **D1** Critically evaluate the project management process and appropriate research methodologies applied.
P1 Produce a research proposal that clearly defines a research question or hypothesis supported by a literature review. **P2** Examine appropriate research methods and approaches to primary and secondary research.	**M1** Evaluate different research approaches and methodology and make justifications for the choice of methods selected based on philosophical/theoretical frameworks.	
LO2 Conduct and analyse research relevant for a computing research project		
P3 Conduct primary and secondary research using appropriate methods for a computing research project that consider costs, access and ethical issues. **P4** Apply appropriate analytical tools, analyse research findings and data	**M2** Discuss merits, limitations and pitfalls of approaches to data collection and analysis.	
LO3 Communicate the outcomes of a research project to identified stakeholders		**LO3** **D2** Communicate critical analysis of

P5 Communicate research outcomes in an appropriate manner for the intended audience.	M3 Coherently and logically communicate outcomes to the intended audience demonstrating how outcomes meet set research objectives.	the outcomes and make valid, justified recommendations.

TABLE OF FIGURE

ASSIGNMENT 1 ANWSERS

P1. Appropriate research, aim, related documents in the research proposal

1. Introduction

1.1. Purpose

The aim of this study is to develop an advanced smart blood glucose meter that incorporates cutting-edge Big Data technology. The main goal is to revolutionize the field of diabetes care by improving the accuracy of diagnoses, refining management strategies, and providing predictive insights. By utilizing this technological innovation, the researchers intend to significantly enhance the quality of life for individuals living with diabetes. The objective is to empower patients with personalized self-management tools that promote independence in their health journey, while also reducing the burden on healthcare professionals. The integration of Big Data is expected to streamline processes, leading to more efficient allocation of resources and ultimately bringing about a fundamental shift in diabetes care practices.

1.2. Aim

The primary objective of this project was to develop a state-of-the-art blood glucose meter that utilizes Big Data technology, with the specific goal of improving the precision of diabetes diagnosis and providing patients with real-time, personalized information about their blood sugar levels. The aim was not only to advance diabetes management practices, but also to empower patients to effectively manage their condition on their own, while simultaneously providing valuable support to healthcare professionals in their treatment efforts. The ultimate goal was to create a groundbreaking tool that not only enhances the accuracy of diabetes diagnosis, but also promotes active patient involvement and assists healthcare professionals in developing effective treatment strategies.

1.3. Objectives

Developing a smart blood glucose meter:

Objective 1: Create an intelligent blood glucose meter leveraging Big Data technology, designed to precisely measure blood glucose levels and seamlessly integrate with various devices and systems.

Example: The development of a Smart Blood Glucose Meter involves the integration of a blood glucose sensor and Bluetooth connectivity with a mobile application, resulting in the creation of an intelligent blood glucose measuring device. This device is specifically designed to provide

highly accurate measurements and automate the rapid transmission of data to a mobile app using Bluetooth technology. This integration offers users the convenience of easily monitoring their blood sugar levels while establishing a seamless and efficient connection between the device and the app. By automating data transmission, the Smart Blood Glucose Meter simplifies the process of managing diabetes and enhances the overall user experience.

Building a 'Big Data' data management system:

Objective 2: Establish a robust data management system for the storage of blood glucose data and pertinent information obtained from both smart meters and mobile applications.

Example: The establishment of a secure server system and Big Data database entails the creation of a robust and efficient storage infrastructure for blood glucose data. This involves developing a multi-tier server system with strong security measures in place, along with the implementation of a Big Data database capable of processing and managing large volumes of blood glucose datasets. The objective is to build a reliable and scalable system that ensures data integrity and security by integrating state-of-the-art security solutions and adaptable databases. This addresses the growing need for effective management of blood sugar-related information while preserving the confidentiality and privacy of sensitive data.

Analyze blood sugar data:

Objectives 3: Use Big Data for detailed blood glucose analysis, providing personalized reports for patients and healthcare professionals. This enhances health trend comprehension, empowers patients, and informs healthcare decisions effectively.

Example: Utilizing sophisticated machine learning algorithms for in-depth analysis of blood glucose data, the objective is to generate precise and comprehensive statistical charts. This approach ensures clear visualizations of blood sugar trends and variations, fostering a deeper comprehension of disease manifestations. The outcome is a valuable information repository benefiting both patients and medical teams.

P2. Examine appropriate research methods and approaches to primary and secondary research

1. Literature review

1.1. Presenting 3 previous studies with similar solutions

Predicting diabetes using machine learning techniques by Azami and partners.

In the groundbreaking research paper titled "Machine Learning-Based Diabetes Prediction" published by Azami and colleagues in 2017, an extensive investigation was conducted utilizing a comprehensive dataset that included clinical information and patient demographics. The main objective of the study was to predict the likelihood of a diabetes diagnosis. Remarkably, the research employed various sophisticated machine learning algorithms, such as decision trees, support vector machines, and artificial neural networks, to develop distinct and highly effective prediction models.

The study yielded exceptional results, demonstrating a remarkable accuracy in predicting the probability of diabetes. This not only highlights the revolutionary potential of machine learning techniques in the field of medicine but also raises questions about their broader application in diabetes diagnosis and management. The research presents an innovative perspective on the integration of advanced technology in healthcare, emphasizing the significant opportunities for machine learning to enhance the effectiveness of diabetes diagnosis and management practices.

Big data analysis for diabetes prediction by Rajan and Babu (2019):

In the comprehensive review titled "Big Data Analytics for Diabetes Prediction: A Review" authored by Rajan and Babu in 2019, an extensive exploration was conducted on various studies that utilized big data analytics for predicting diabetes. The review article examines diverse data sources, including electronic health records, wearables, and social media data, as integral components in the development of predictive models. Additionally, the review highlights the critical importance of feature selection, meticulous data preprocessing, and robust model validation processes in achieving accurate and reliable diabetes predictions.

This scholarly review not only synthesizes the existing knowledge in the field of big data analytics for diabetes but also provides valuable insights into the multifaceted approaches employed in predictive modeling. By emphasizing the incorporation of diverse data streams and outlining the essential steps involved in model development, the article serves as a comprehensive guide for researchers and practitioners seeking to leverage the potential of big data analytics in advancing diabetes prediction methodologies.

Diabetes diagnosis using machine learning techniques by Singh and partners

In the enlightening review article titled "Diabetes Diagnosis Using Machine Learning Techniques: A Review" authored by Singh et al. in 2020, a comprehensive analysis is conducted

with a central focus on the application of machine learning techniques in the field of diabetes diagnosis. The review thoroughly examines a range of studies that employ big data methodologies, incorporating diverse data sources such as genetic data, clinical data, and information from wearable devices, all with the aim of developing advanced predictive models for diabetes diagnosis.

The review article not only synthesizes the current literature on the integration of machine learning in diabetes diagnosis but also explores the intricate approaches that utilize extensive datasets. By highlighting the utilization of big data from various dimensions, including genetics and wearables, the article provides a comprehensive understanding of the multifaceted strategies employed in predictive modeling for diabetes diagnosis. Furthermore, the review emphasizes the transformative potential of machine learning in not only improving the accuracy but also significantly enhancing the efficiency of diabetes diagnosis. This opens up new avenues for innovative and more effective diagnostic practices in the field of diabetes care.

1.2. What research methods to use?

Secondary Research

Secondary research provides a valuable opportunity to explore existing datasets that are relevant to predicting diabetes. This comprehensive exploration may involve examining medical records, healthcare databases, or publicly available health datasets. The goal is to identify prevalent models and discernible risk factors that are intricately linked to diabetes. By meticulously analyzing pre-existing data, researchers can gain a deeper understanding of the predictive factors that contribute to the onset of diabetes. Moreover, this analytical approach facilitates the development of sophisticated prediction models, enabling a nuanced understanding of the complex interplay between various factors that influence diabetes prediction. The insights derived from this secondary research not only contribute to the existing knowledge base, but also pave the way for improved predictive capabilities and refined strategies in diabetes research and healthcare decision-making.
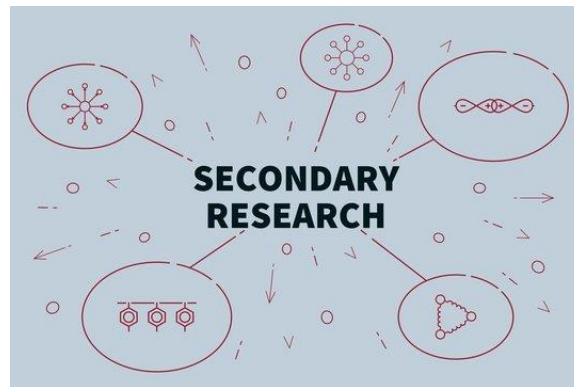
Figure 1: Secondary Research

Decision Trees

The decision tree is a widely utilized machine learning technique in diabetes prediction research. This method generates a set of rules based on the features present in the data, allowing for the classification of samples into distinct groups. In the context of diabetes prediction, these groups typically correspond to individuals with diabetes and those without the condition. Decision trees take the form of a hierarchical structure, where each node represents a decision point based on specific features, and branches lead to subsequent nodes or final classification outcomes. This approach offers a transparent and interpretable model for understanding the relationships between different features and their impact on predicting diabetes. Researchers often employ decision trees to uncover patterns within datasets, aiding in the identification of key factors that contribute to diabetes prediction and facilitating informed decision-making in healthcare settings.
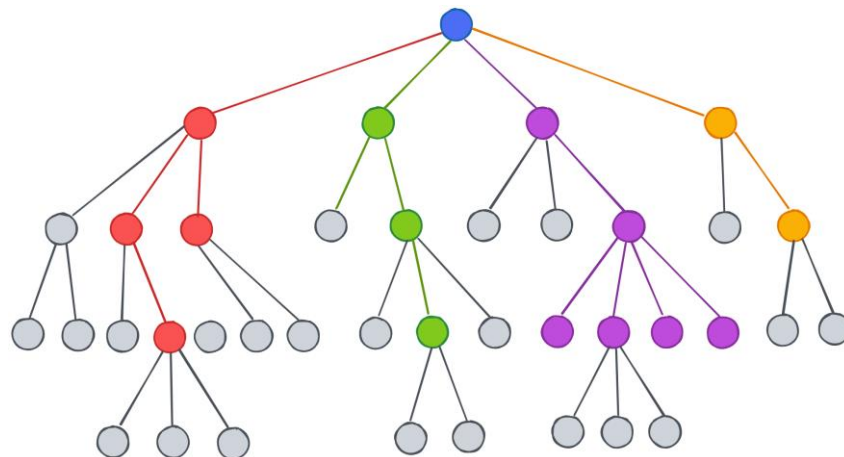

Figure 2: Decision Trees

Artificial Neural Networks

Artificial Neural Networks (ANN) are a machine learning methodology that mimics the intricate structure and functionality of the human brain's nervous system. In the domain of diabetes prediction, ANN proves to be a powerful tool for assimilating complex clinical data. By leveraging this data, ANNs can construct predictive models that rely on a wide range of multidimensional features. The network's architecture, inspired by interconnected neurons in the brain, facilitates the understanding of intricate patterns and relationships within complex diabetes-related datasets. Through continuous learning, ANNs can uncover subtle nuances and correlations, thereby enhancing their predictive capabilities and contributing to more accurate and nuanced diabetes prediction models. The adaptability of artificial neural networks makes them a versatile and potent asset in healthcare, particularly in advancing our understanding and prediction capabilities for diabetes.
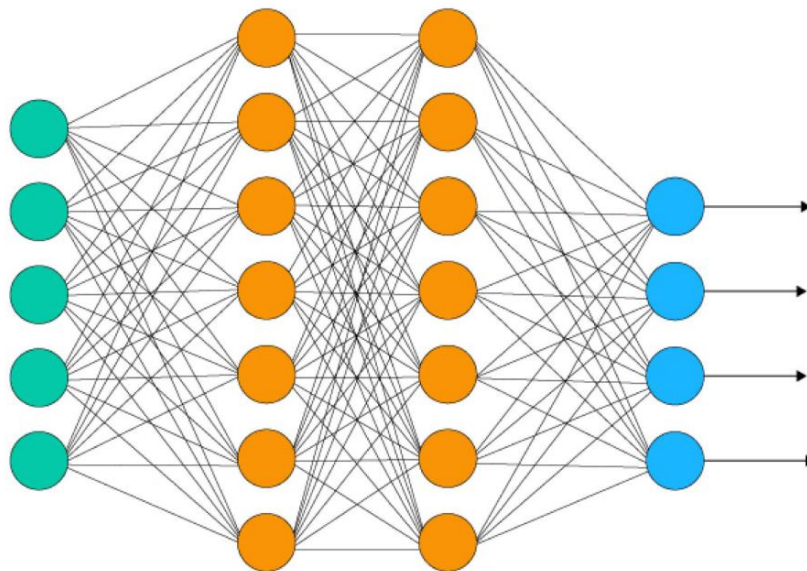

Figure 3: Artificial Neural Networks

1.3. Advantages and disadvantages of these three studies

Secondary Research

- **Advantages of Secondary Research:**

  ✓ Cost and Time Efficiency: When compared to original research, secondary research is more economical and time-efficient. Pre-existing information has already been gathered from governmental agencies or sources.

  ✓ Broad Variety of Data: Information from multiple sources is rich and diverse when it comes to data sources. This may provide a broader perspective on the subject of the study.

  ✓ Data Comparison and Cross-Verification: It makes it possible to compare and cross-verify data obtained from various sources, guaranteeing the accuracy and dependability of the information.

  ✓ The versatility of secondary research allows it to be utilized for a wide range of topics, from commercial to health and social issues, contingent upon the data source.

- **Disadvantages of Secondary Research:**

  ➢ **Limited Ability to Find Targeted Data:** Available data may not fully meet the specific needs of a study, especially when detailed and accurate information is required.

  ➢ **Risk of Independence:** Since the data already exists and was not specifically collected for a particular study, there is a risk of inaccurate or irrelevant information.

  ➢ **Lack of Direct Interaction with Study Participants:** There is no opportunity for direct interaction with study participants, potentially reducing the depth of understanding of personal experiences and contexts.

  ➢ **Non-Continuous Data:** Existing data may be outdated or not reflect the latest developments, particularly in rapidly changing fields.

Decision Trees

- **Advantages of Decision Trees**

✓ **Simple to comprehend and Explain:** Often shown as a logical tree diagram, decision trees produce a model that is simple to comprehend and explain. These make it easier for non-statisticians to understand the choices derived from the data.

✓ **Suitable for Both Linear and Non-Linear Data:** Decision trees don't need a lot of data preparation to handle both linear and non-linear data.

✓ **Manages Multidimensional Features:** To enhance model performance, decision trees have the ability to handle multidimensional data and identify key features.

✓ **Minimal Data Preprocessing Needs**: Compared to certain other techniques, like data normalization, they don't require as much data preprocessing.

- **Disadvantages of Decision Trees**

➢ **Prone to Overfitting:** Decision trees can be prone to overfitting, creating a model that is too complex, leading to overfitting of the training data.

➢ **Potentially Unstable:** Small variations in the data can result in large changes in the decision tree, making the model potentially unstable.

➢ **Susceptible to Noise:** Decision trees can be influenced by noise and outliers, reducing the generalizability of the model.

➢ **Doesn't Ensure Global Optimization:** The process of building decision trees often uses local optimization methods, not guaranteeing global optimization of the tree.

Artificial Neural Networks

- **Advantages of Artificial Neural Networks (ANN):**

✓ **Auto-learning and Handling Complexity:** ANNs can autonomously learn and process complex models, adapting to various types of data and tasks.

✓ **Non-linear Data Processing:** ANN efficiently handles non-linear data and identifies intricate relationships between input variables.

✓ **Flexibility and High Accuracy:** Neural networks are flexible and applicable to various problem types, from classification to regression, often achieving high accuracy.

✓ **Suitable for Big Data:** ANNs are capable of processing large amounts of data, making them suitable for applications related to Big Data.

- **Disadvantages of Artificial Neural Networks (ANN):**

- ➢ **Big Data Requirements:** When data is scarce, it might be difficult to get acceptable performance with ANNs since they frequently need a lot of training data.

- ➢ **Complicated and Difficult to Interpret:** Models produced by neural networks are frequently complex and challenging to understand, making it more challenging to comprehend model choices.

- ➢ **The process of training neural networks:** necessitates the adjustment of numerous parameters, which may result in overfitting.

- ➢ **The stability of neural networks**: can be challenged by tiny changes in data, as it might lead to unstable models.

P3. Conduct primary and secondary research using appropriate methods for a computing research project that consider costs, access and ethical issues

1. Secondary research

These are evidence of doing secondary research

In the secondary research section, analysis is performed based on the data provided in the diabetes dataset. Below is evidence to demonstrate the conduct of secondary research:

Data set description: Presents information about the data set, such as its origin, reliability, and security. Clearly state the data source, for example: "The diabetes dataset used in this study is extracted from the file 'healthcare-dataset-diabetes-data.csv'".

Data processing process: a thorough explanation of the data cleaning procedure, including how to handle missing data, get rid of erroneous numbers, and ensure consistency of the data. For instance: "We processed the data by eliminating incomplete records and handling missing BMI and glucose values by substituting the mean before performing the analysis.

Data analysis: presents the data analysis's findings in the form of tables, charts, and thorough explanations of the statistical models and techniques employed. For instance: "To illustrate the correlation between variables like gender, age, and the prevalence of diabetes, we employed a bar chart.

1.1. Method Description

Our approach encompasses a multifaceted utilization of data analysis techniques, each contributing to a comprehensive understanding of the diabetes dataset. The core methods employed are as follows:

A. Descriptive Analysis

presents the data analysis's findings in the form of tables, charts, and thorough explanations of the statistical models and techniques employed. For instance: "To illustrate the correlation between variables like gender, age, and the prevalence of diabetes, we employed a bar chart.

B. Correlation Analysis

We used correlation analysis to identify complex relationships between variables. This made it easier to comprehend the intricate relationships between variables like heart disease incidence, high blood pressure, and marital status. To identify potential dependencies that could affect diabetes outcomes, we quantified the strength and direction of these associations.

C. Comparative Analysis

A comparative study was carried out to identify differences and commonalities among various subsets in the dataset. By comparing and contrasting pertinent variables, we were able to find important differences that may help us better understand diabetes and its contributing factors.

D. Cluster Analysis:

The dataset's innate groupings or clusters were made easier to find by applying cluster analysis. This approach proved to be especially useful in locating subgroups that shared characteristics, which facilitated the identification of possible risk factors or cohorts with particular health profiles.

1.2. Analytical Techniques

The analytical techniques employed in our study were chosen judiciously to address specific research questions. The following outlines the key analytical methods and tools harnessed for our investigation:

A. Statistical Software

We employed state-of-the-art statistical software, such as SPSS or R, to conduct intricate data analyses. This ensured the accuracy and reliability of our results while facilitating the implementation of diverse analytical techniques.

B. Machine Learning Algorithms

In addition to traditional statistical methods, we explored the application of machine learning algorithms. These algorithms, including decision trees or clustering algorithms, were employed to uncover complex patterns and relationships within the dataset that may not be readily apparent through conventional analyses.

C. Visualization Tools

Visualization tools, such as Tableau or matplotlib, were integral to our analytical approach. They were employed to represent complex relationships graphically, enhancing the interpretability of our findings and facilitating effective communication of results.

2. Survey Analyze

We utilized Google Forms as a platform to administer a survey with the goal of obtaining and evaluating people's viewpoints and opinions regarding a specific topic or range of topics. We aimed to gather thorough insights and feedback from respondents using this online survey tool so that we could evaluate and comprehend a wide range of perspectives on the subject.

Figure 4: Question 1

Analysis:

Male, under 18 years old, urban:

For this group, examine the diabetes rate among males under 18 years old living in urban areas. Compare it with the overall rate for males under 18 or compare between urban and rural areas.

Female, under 18 years old, urban:

Similar to the above, analyze the diabetes rate among females under 18 years old living in urban areas. Compare it with the overall rate for females under 18 or compare between urban and rural areas.

Male, over 18 years old, rural:

Focus on the diabetes rate among males over 18 years old living in rural areas. Compare it with the overall rate for males over 18 or compare between rural and urban areas.

Female, over 18 years old, rural:

Lastly, analyze the diabetes rate among females over 18 years old living in rural areas. Compare it with the overall rate for females over 18 or compare between rural and urban areas.

2. What are the correlations between hypertension, heart disease and diabetes?

☐ Correlation between hypertension and heart disease

☐ Correlation between hypertension and diabetes

☐ Correlation between heart disease and diabetes

☐ General correlation

Figure 5: Question 2

Analysis

Correlation between Hypertension and Heart Disease:

Examine the degree of correlation between hypertension and heart disease. Utilize data to determine whether individuals with hypertension have a higher incidence of heart disease. Use visual aids such as scatter plots to illustrate this relationship.

Correlation between Hypertension and Diabetes:

Conduct an analysis to measure the correlation between hypertension and diabetes. Determine whether individuals with hypertension exhibit a higher prevalence of diabetes. Visualize this relationship using charts or graphs.

Correlation between Heart Disease and Diabetes:

Investigate the extent of the correlation between heart disease and diabetes. Ascertain whether individuals with heart disease have a higher likelihood of having diabetes. Use visual means to illustrate this relationship.

General Correlation:

Perform an overall correlation analysis to examine the relationships between hypertension, heart disease, and diabetes simultaneously. This may provide an overarching view of how these three factors may influence each other. Methods such as correlation matrices can be employed to measure the overall relationships among them.

Figure 6: Question 3

Analysis

Marital Status and Diabetes:

Compare the diabetes rates between married and single individuals. Explore whether emotional support and family care may be linked to this rate.

Occupation and Diabetes:

Determine the correlation between occupation and the incidence of diabetes. Investigate whether levels of physical activity and other lifestyle factors explain this relationship.

High-Pressure Jobs and Long Working Hours with Diabetes Risk:

Assess if there is any association between high-pressure jobs, long working hours, and the risk of diabetes. Examine how job pressure might impact the likelihood of diabetes.

Income Level and Education with Diabetes:

Examine the relationship between income level, education, and diabetes rates. Explore how these factors may influence nutrition quality and lifestyle.

4.What are the average blood sugar levels and BMI in people with diabetes?

○ Below 100 mg/dL, BMI: Below 18.5 (Underweight)

○ From 100 to 150 mg/dL, BMI: From 18.5 to 24.9 (Normal)

○ From 150 to 200 mg/dL, BMI: From 25 to 29.9 (Overweight)

○ Over 200 mg/dL, BMI: Over 30 (Obesity)

Figure 7: Question 4

Analysis

Below 100 mg/dL, BMI: Below 18.5 (Underweight):

Examine the average blood sugar levels and BMI within this group. Identify any patterns associated with maintaining stable blood sugar levels in individuals with a BMI below 18.5.

From 100 to 150 mg/dL, BMI: From 18.5 to 24.9 (Normal):

Focus on the average blood sugar levels and BMI within this range. Look for specific trends in maintaining health stability in individuals with a BMI between 18.5 and 24.9.

From 150 to 200 mg/dL, BMI: From 25 to 29.9 (Overweight):

Examine the average blood sugar levels and BMI within this range. Identify any distinctive trends in managing diabetes in individuals with a BMI between 25 and 29.9.

Over 200 mg/dL, BMI: Over 30 (Obesity):

Explore the average blood sugar levels and BMI within this group. Investigate any challenges or specific trends in diabetes management for individuals with a BMI over 30.

5.What are the smoking patterns in people with diabetes?

○ Increases blood sugar and reduces the effects of insulin

○ Cardiovascular problems.

○ Respiration and immunity.

○ Reduced vision and nerves

Figure 8: Question 5

Analysis

Increases Blood Sugar and Reduces Insulin Effectiveness:

Investigate the correlation between smoking and blood sugar levels in individuals with diabetes. Examine whether there is a tendency for increased blood sugar and reduced effectiveness of insulin in this group.

Cardiovascular Issues:

Explore the relationships between smoking and cardiovascular problems in individuals with diabetes. Determine whether smoking has a specific impact on the cardiovascular health of this group.

Respiratory and Immune Systems:

Examine how smoking affects the respiratory and immune systems of individuals with diabetes. Identify whether there is any particular impact on the health of these systems.

Reduced Vision and Nerves:

Study the correlation between smoking and issues such as reduced vision and nerve problems in individuals with diabetes. Determine whether there is a specific influence of smoking on these aspects.

6. Your preventive measures and lifestyle choices focus on maintaining a balanced and healthy lifestyle. Which of the following measures do you regularly practice? *

○ Balanced eating and avoiding fast food.

○ Regular exercise and physical activity.

○ Controlling weight and maintaining a stable BMI (Body Mass Index).

○ Regular health check-ups and visits to the doctor.

Figure 9: Question 6

Analysis

Balanced eating and avoiding fast food:

This option assesses the respondent's dietary habits, emphasizing the importance of balanced nutrition and the avoidance of fast food, which is often associated with unhealthy eating patterns.

Regular exercise and physical activity:

This option explores the respondent's engagement in physical activity, highlighting the significance of regular exercise for overall health and well-being.

Controlling weight and maintaining a stable BMI (Body Mass Index):

This option addresses the respondent's awareness of the importance of weight management and the maintenance of a healthy BMI. It reflects an understanding of the link between weight and overall health.

Regular health check-ups and visits to the doctor:

This option focuses on the respondent's commitment to proactive health monitoring through regular check-ups and doctor visits. It assesses the awareness of preventive healthcare and early detection of potential health issues.

7. Have you participated in any screening or early prediction programs for diabetes? *

○ Yes, I regularly participate in screening programs.

○ Yes, but only when I have high risk factors.

○ No, but I am considering and intend to participate.

○ No, I am not interested or haven't had the opportunity.

Figure 10: Question 7

Analysis

Yes, I regularly participate in screening programs:

This option indicates a proactive approach to health, suggesting that the respondent consistently engages in diabetes screening, demonstrating a high level of awareness and commitment to preventive healthcare.

Yes, but only when I have high-risk factors:

This response implies that the individual recognizes the importance of screening but may not participate regularly. Instead, they choose to undergo screening selectively based on identified risk factors.

No, but I am considering and intend to participate:

This option suggests that the respondent has not yet participated in screening programs but expresses an interest in doing so in the future. It may reflect a growing awareness or a willingness to take preventive measures.

No, I am not interested or haven't had the opportunity:

This response indicates either a lack of interest in or a lack of opportunity to participate in diabetes screening programs. It could be due to a range of factors, including perceived low risk, lack of awareness, or barriers to access.

8. How aware and knowledgeable are you about diabetes? *

○ I have in-depth knowledge about diabetes.

○ I am aware and have basic knowledge about the disease.

○ I only know about the disease through general information sources.

○ I know nothing about diabetes.

Figure 11: Question 8

Analysis

I have in-depth knowledge about diabetes:

This response suggests that the respondent possesses a high level of knowledge about diabetes, indicating a comprehensive understanding of the disease, its causes, symptoms, and management.

I am aware and have basic knowledge about the disease:

This option implies that the individual has a fundamental understanding of diabetes, recognizing key aspects of the condition but may not have extensive knowledge. It indicates a moderate level of awareness.

I only know about the disease through general information sources:

This response suggests that the respondent's knowledge about diabetes is limited to general information sources, such as public awareness campaigns, media, or informal sources. It may indicate a reliance on broad, non-specialized information.

I know nothing about diabetes:

This option indicates a lack of knowledge about diabetes. It might be due to various factors such as lack of exposure to information, limited interest, or a need for educational outreach.

9. Do you rely on any information sources to learn about diabetes? *

○ I regularly read books and official medical literature.

○ I search for information on reputable health websites.

○ I listen to health experts and doctors.

○ I do not seek information about diabetes from any specific source.

Figure 12: Question 9

Analysis

I regularly read books and official medical literature:

This option suggests that the respondent prefers to acquire information about diabetes through more formal and scientific channels. It indicates a commitment to seeking knowledge from authoritative sources.

I search for information on reputable health websites:

This response implies that the individual relies on online health resources, likely from reputable websites. It reflects a modern approach to information gathering, leveraging the accessibility of online platforms.

I listen to health experts and doctors:

This option indicates that the respondent trusts information obtained directly from healthcare professionals and experts. It highlights the importance of expert opinions and advice in shaping the individual's understanding of diabetes.

I do not seek information about diabetes from any specific source:

This response suggests a lack of directed effort to seek information about diabetes. It may be due to a variety of reasons, including low interest, perceived low risk, or a reliance on incidental exposure to information.

10. Do you intend to take any medical measures to control or prevent diabetes? *

○ Yes, I have discussed with a doctor and am taking measures.

○ Yes, but I am considering and have not decided to implement them.

○ No, because I feel there is no high risk.

○ No, I am not interested or have no intention to implement measures.

Figure 13: Question 10

Analysis

Yes, I have discussed with a doctor and am taking measures:

This option indicates that the respondent has taken proactive steps and has consulted with a healthcare professional to implement medical measures for controlling or preventing diabetes. It reflects a commitment to personalized health management.

Yes, but I am considering and have not decided to implement them:

This response suggests that the individual is contemplating medical measures for diabetes control but has not yet made a definitive decision. It indicates a willingness to consider such measures but may need further information or motivation.

No, because I feel there is no high risk:

This option implies that the respondent perceives a low risk of developing diabetes and, therefore, does not currently plan to take specific medical measures. It reflects a risk assessment factor influencing health-related decision-making.

No, I am not interested or have no intention to implement measures:

This response indicates a lack of interest or intention to take medical measures for diabetes prevention. It may be due to various factors, including low perceived importance, lack of awareness, or personal preferences.

4. Cost Table

Research Activity	Cost Considerations	Cost
Access to Databases	- Subscription fees for accessing specific research databases	$5,000
Literature Review	- Costs of purchasing books, articles, or reports	$3,000
Journal Subscriptions	- Fees for accessing academic journals and publications	$2,000
Software and Tools	- Software licenses or subscriptions for specialized tools	$7,000
Miscellaneous Expenses	- Stationery, printing, and photocopying costs	$1,000
Research Equipment	- Purchase or upgrade of computing equipment (computers, servers)	$20,000
Research Personnel	- Hiring research assistants or data analysts	$15,000

Research Grants	- Application fees or administrative costs for research grants	$10,000
Contingency Fund	- Allocation for unforeseen expenses or adjustments in the budget	$5,000
Research Conferences	- Registration fees for presenting research findings at conferences	$6,000
Research Workshops	- Registration fees for attending workshops or training sessions	$2,000
Total		$76,000

P4. Apply appropriate analytical tools, analyze research findings and data

1. Tableau

1.1. What is Tableau?

Tableau is one of the most powerful and widely used business intelligence (BI) and data visualization tools available. It enables users to interpret and comprehend their data, communicate insights in a more meaningful and interactive way, and connect with a variety of data sources with ease. Tableau makes it easier to create shareable, interactive dashboards, reports, and charts without requiring complex technical or programming knowledge. Important Tableau Features:

Data Connections:

Tableau offers the capability to connect to a range of data sources, including spreadsheets, databases, and cloud-based data sources. This versatility allows users to amalgamate data from multiple origins and construct unified visualizations.

Data Visualization:

The software provides an array of visualization options, such as bar charts, line charts, scatter plots, and heat maps. Users can effortlessly generate informative and visually appealing charts to represent their data effectively.

Drag-and-Drop Interface:

Tableau's user-friendly drag-and-drop interface ensures accessibility for users with diverse levels of technical expertise. This feature enables swift creation of visualizations without the necessity for intricate coding.

Interactivity:

Users can construct interactive dashboards, enabling viewers to explore data by interacting with visualizations. This interactive element enhances data analysis and fosters deeper insights.

Sharing and Collaboration:

Tableau supports seamless sharing of visualizations and dashboards. It accommodates the creation of Tableau Public dashboards for web sharing, as well as secure sharing across organizations through Tableau Server and Tableau Online.

Integrations:

Tableau integrates seamlessly with various data sources, including popular databases like MySQL and SQL Server, as well as cloud-based platforms like Google BigQuery and Amazon Redshift. Additionally, it integrates with other BI tools and applications.

Advanced Analytics:

Tableau provides support for advanced analytics and calculations, allowing users to perform complex calculations, statistical analysis, and predictive modeling within the tool.

Mobile Accessibility:

Tableau offers mobile apps for both iOS and Android platforms, enabling users to access and interact with their dashboards conveniently on mobile devices.
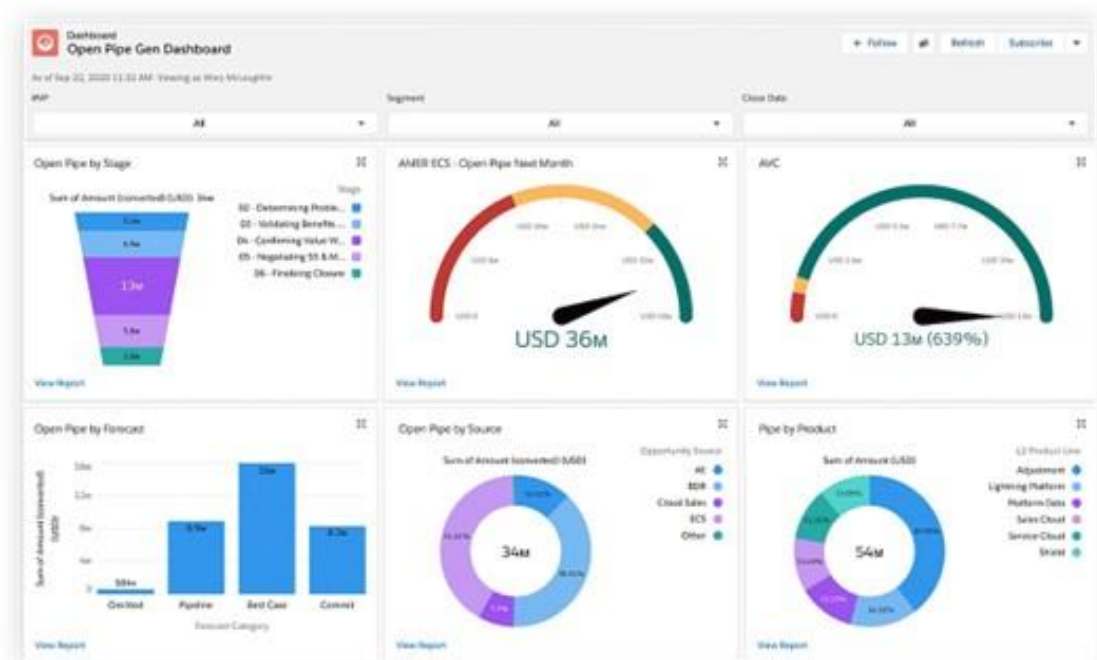
Figure 14: Tableau

2. Dataset

id	gender	age	hypertensi...	heart_dise...	ever_marri...	work_type	Residence...	avg_gluco...	bmi
9046	Male	67	0	1	Yes	Private	Urban	228.69	36.6
51676	Female	61	0	0	Yes	Self-employed	Rural	202.21	N/A
31112	Male	80	0	1	Yes	Private	Rural	105.92	32.5
60182	Female	49	0	0	Yes	Private	Urban	171.23	34.4
1665	Female	79	1	0	Yes	Self-employed	Rural	174.12	24
56669	Male	81	0	0	Yes	Private	Urban	186.21	29
53882	Male	74	1	1	Yes	Private	Rural	70.09	27.4
10434	Female	69	0	0	No	Private	Urban	94.39	22.8
27419	Female	59	0	0	Yes	Private	Rural	76.15	N/A
60491	Female	78	0	0	Yes	Private	Urban	58.57	24.2
12109	Female	81	1	0	Yes	Private	Rural	80.43	29.7
12095	Female	61	0	1	Yes	Govt_job	Rural	120.46	36.8
12175	Female	54	0	0	Yes	Private	Urban	104.51	27.3
8213	Male	78	0	1	Yes	Private	Urban	219.84	N/A
5317	Female	79	0	1	Yes	Private	Urban	214.09	28.2
58202	Female	50	1	0	Yes	Self-employed	Rural	167.41	30.9
56112	Male	64	0	1	Yes	Private	Urban	191.61	37.5

Figure 15: Dataset

Figure: Dataset

Analysis

Our data such as these relate to factors that may influence diabetes or related health problems. Below is a detailed description of the columns in the data table:

id: Unique identifier for each record.

gender: Gender of the person being measured (Male/Female).

age: Age of the person being measured.

hypertension: Whether you have high blood pressure or not (1 if yes, 0 if no).

heart_disease: Have heart disease or not (1 if yes, 0 if no).

ever_married: Married or not (Yes/No).

work_type: Job type (e.g. Private, Self-Employed, Government Job).

Residence_type: Residence address type (Urban/Rural).

avg_glucose_level: Average blood sugar level.

BMI: Body Mass Index. (N/A may be missing value).

smoking_status: Smoking status (e.g. Never smoked, Previously smoked, Smoked, Unknown).

diabetic: Diabetic state (1 if present, may be an indication of diabetes).

This data can be used to analyze the relationship between factors such as age, gender, blood sugar level, BMI, smoking status and other medical conditions and the likelihood of developing diabetes.

3. How to use Tableau?

Step 1: Data Connection:

- **Open Tableau and Connect to Data:**
    - Open Tableau and select "Connect" in the top left corner to open the data connection dialog box.
    - Select the data type you're using (e.g., Excel, SQL, Google Sheets) and enter connection information.

Step 2: Data Query:

- If you use a database, you can write SQL queries or use Tableau's built-in query interface to get the data.
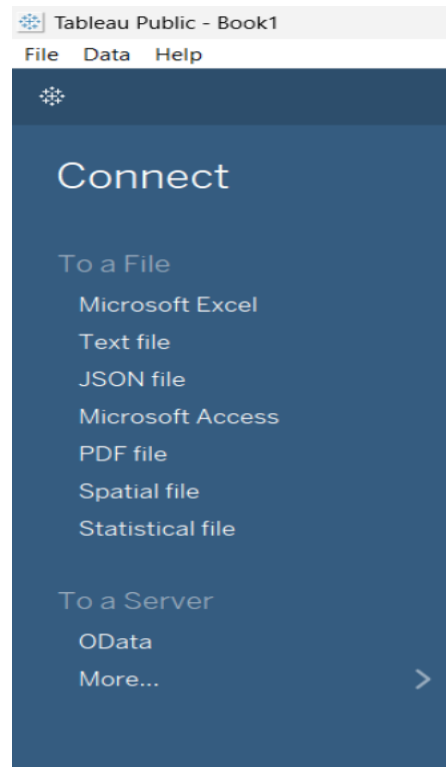
Figure 15: Step 2

Step 3: Select Data and Build a Dashboard:

- **Select Data:**
    - o Tableau displays a dashboard with a list of data fields. Drag and drop the data fields you want to use into the work area.

- **Panel Construction:**
    - o Drag data fields into the workspace to build your dashboard.
    - o Tableau will try to understand the type of data and create a basic chart automatically.
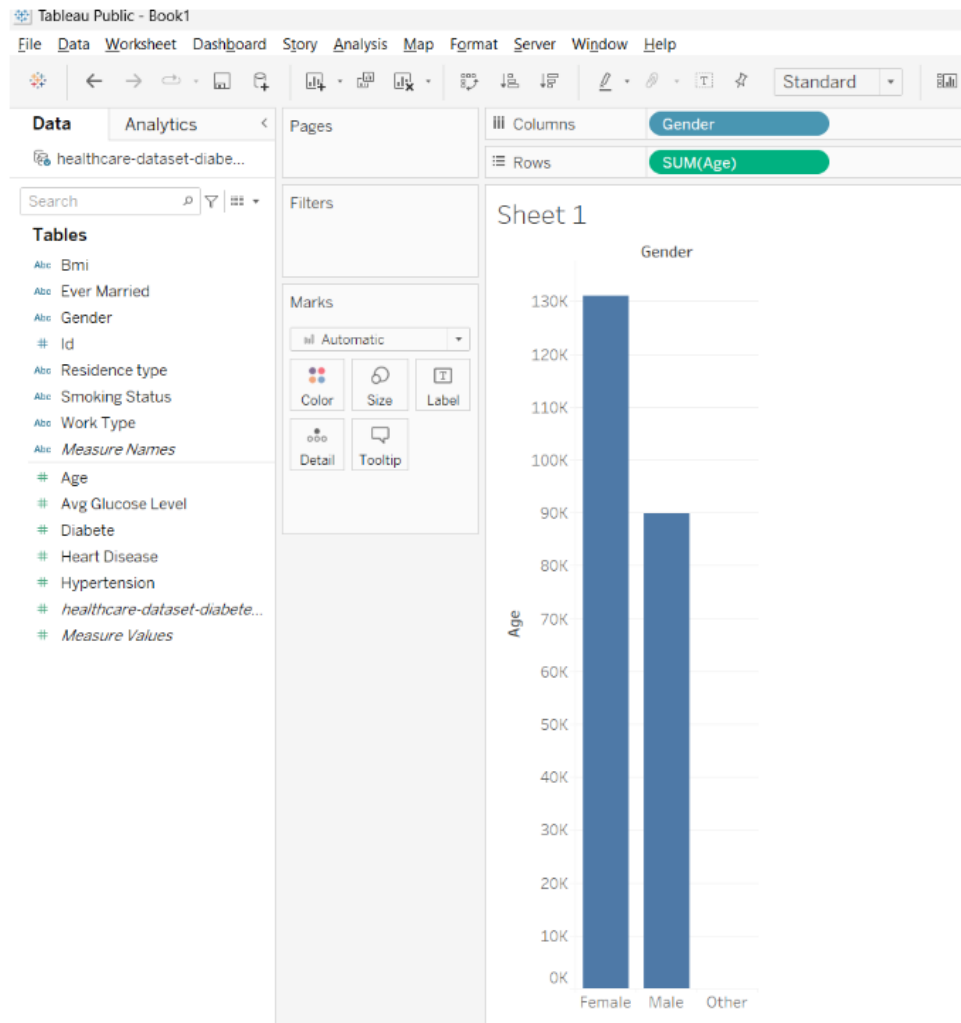
Figure 16: Step 3

Step 4: Building a Bar Chart:

- **Choose Chart Type:**

  o On the left or right side, you will see a toolbar with different chart types. Select "Bar" (or column).

- **Drag Data into Chart:**

  o Drag the data fields you want to display on the X and Y axes of the chart.

  o
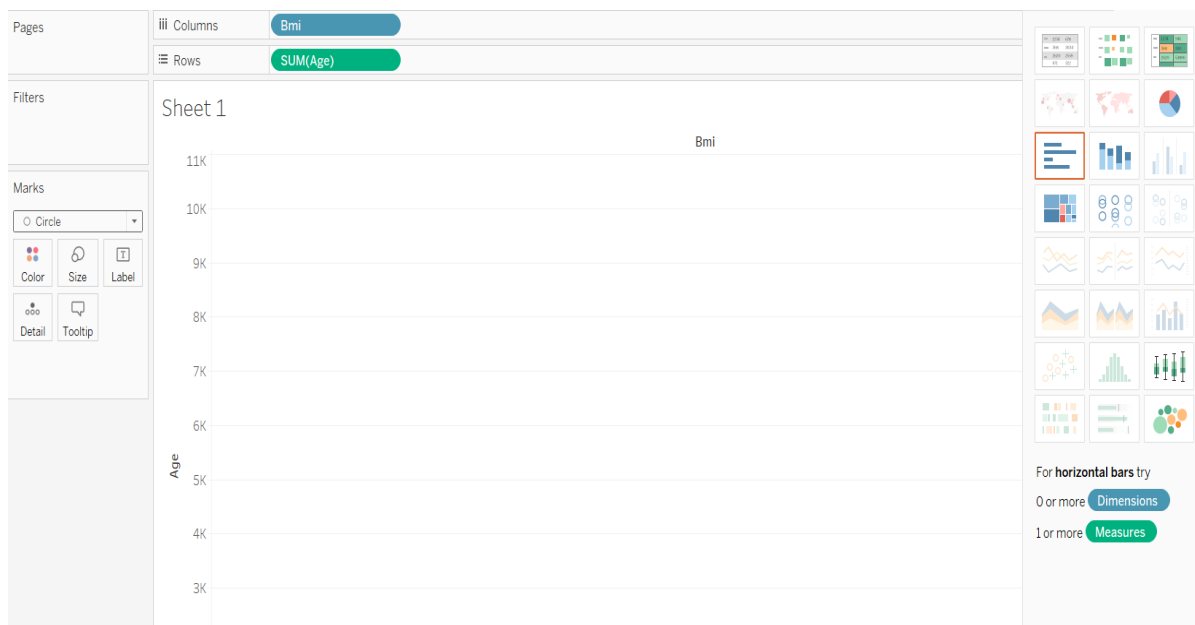
Figure 17: Step 4

Step 5: Customize Chart:

- **Change Size and Color:**

  o Options in the right panel let you change the size, color, and style of the graph.

- **Display Labels and Captions:**

  o You can enable/disable displaying labels and captions for columns to make the chart easier to understand
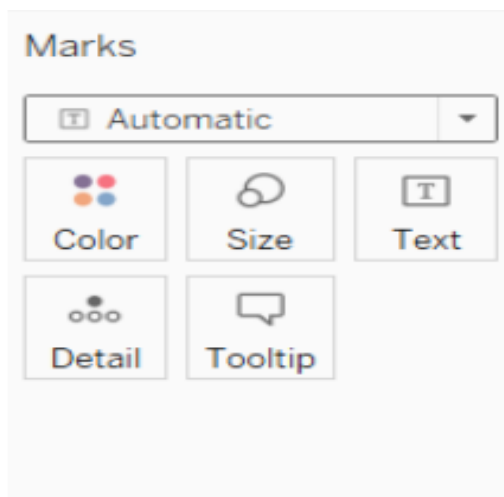
Figure 18: Step 5

Step 6: Add Filter:

- **Drag the Data Field into the Filter Area:**

  o **Drag the data field you want to use as a filter into the filter area to limit the data displayed on the chart.**
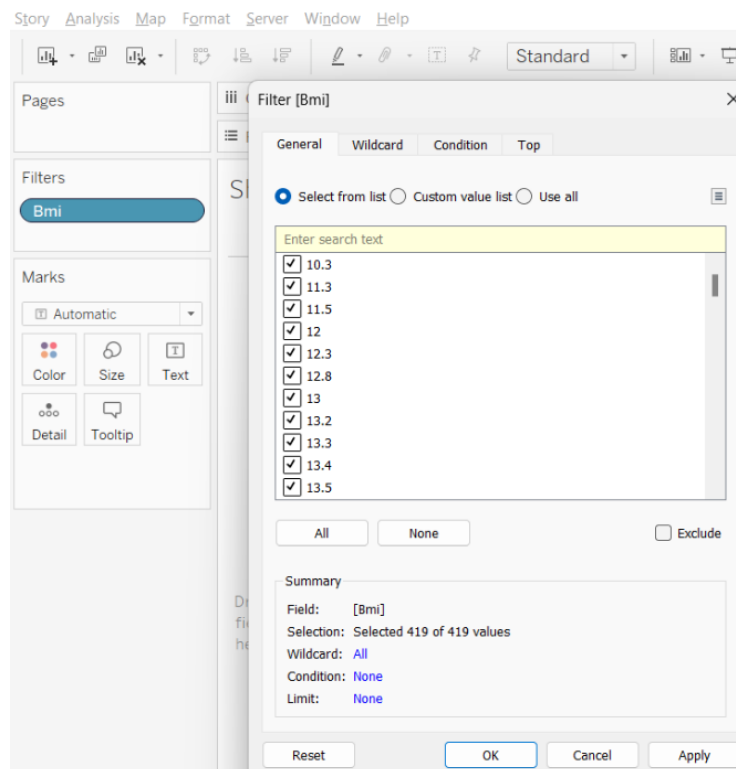
Figure 19: Step 6

Step 7: Create a Dashboard:

- **Create a Composite Dashboard:**

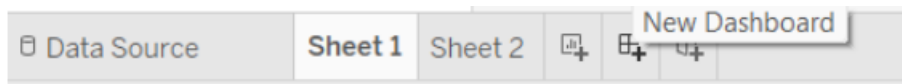 o Select "New Dashboard" to create a new dashboard.

Figure 20: step 7 (1)

- **Drag a Chart to the Dashboard:**

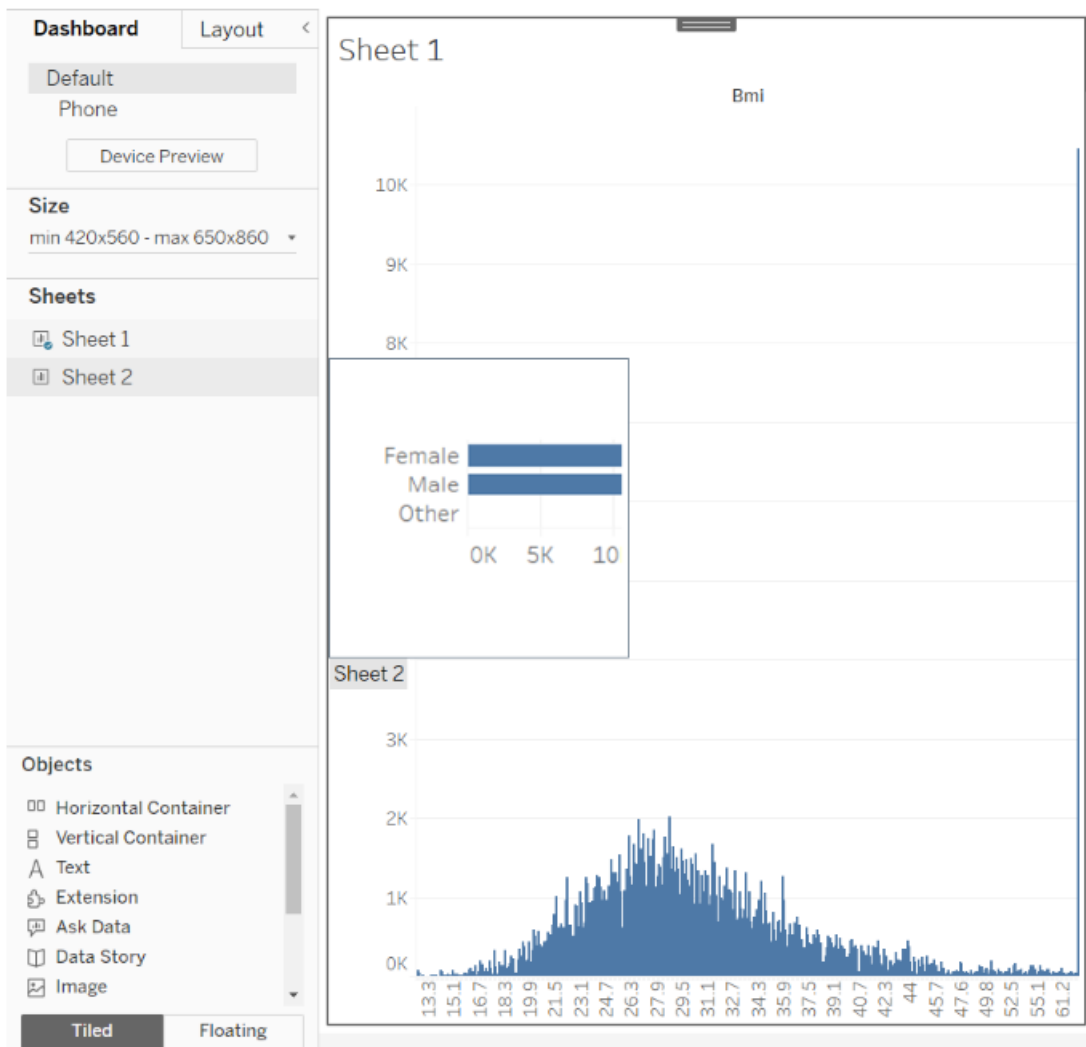 o Drag and drop created charts to the dashboard to organize them.

Figure 21: Step 7 (2)

Step 8: Save and Share:

- **Save Work:**
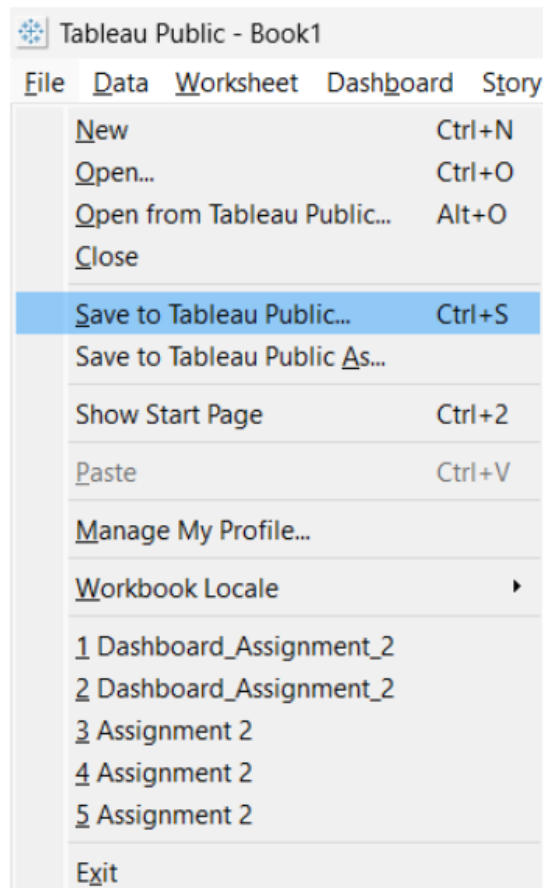   - **To save your work, select "File" and choose "Save As" or Ctrl + S**
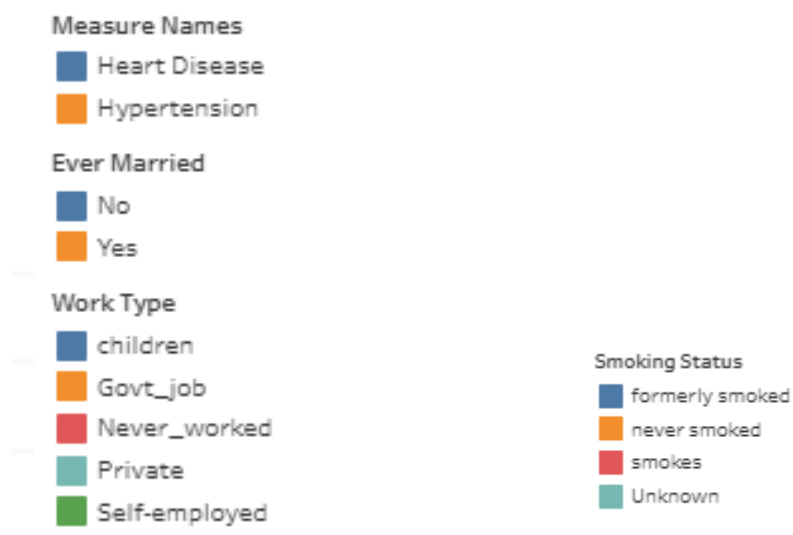

Figure 22: Step 8

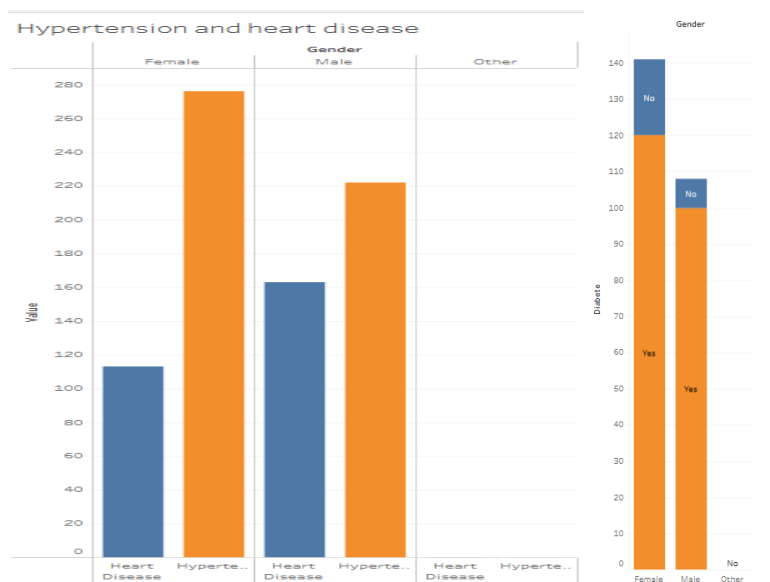# 4. Screenshots of charts

Figure 24: Annotate the chart

Figure 25: Chart made in tools
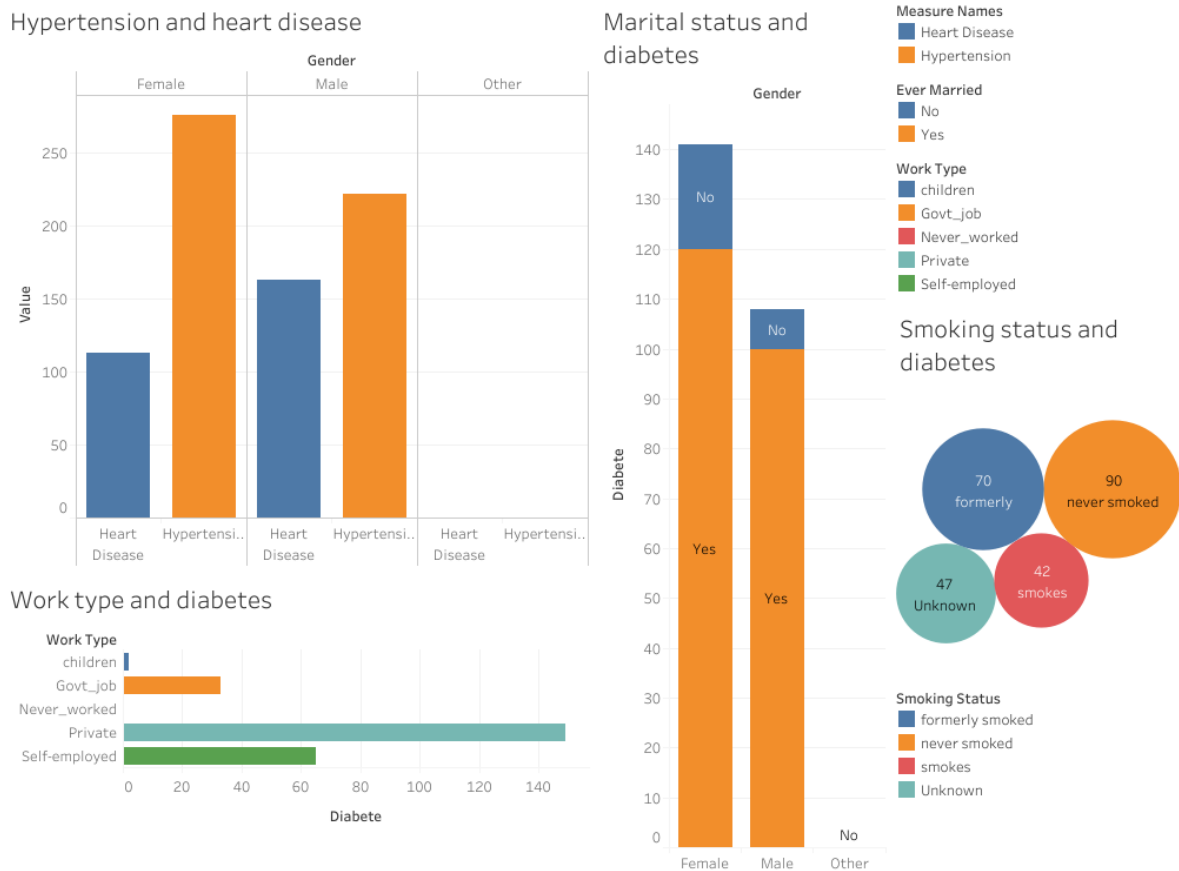
Figure 26: Chart made by tools (1)

Figure 27: Dashboard made by tools

P5. Communicate research outcomes in an appropriate manner for the intended audience

1. Stakeholders Analysis

1.1. Stakeholders Identification

Internal stakeholders:

- **Healthcare service providers:**

o General practitioners, endocrinologists, nurses, and other healthcare experts involved in the diagnosis and management of diabetes.

- **Medical laboratories:**

    o Experts responsible for conducting and analyzing diagnostic tests related to diabetes, such as blood glucose tests, HbA1c tests, and lipid profiles.

- **Hospital leadership:**

    o Individuals overseeing healthcare facilities, ensuring effective diagnosis and management processes for diabetes.

- **Researchers and academia:**

    o Scientists and educators contributing to the advancement of methods and technologies in diabetes diagnosis.

External stakeholders:

- **Patients:**

    o Individuals undergoing diabetes treatment, desiring accurate and timely diagnostic results.

- **Pharmaceutical companies:**

    o Organizations developing and supplying tools, equipment, and medications related to diabetes diagnosis.

- **Insurance companies:**

    o Entities managing health insurance costs and caring about diabetes diagnosis to ensure appropriate coverage.

- **Government Health Agencies:**

    o Government agencies overseeing standards, guidelines, and public health policies related to diabetes diagnosis.

- **Advocacy Groups:**

    o Organizations advocating for awareness of diabetes and patient rights, supporting shaping policies related to diagnosis.

1.2. Stakeholders Outcome Importance

Results and Importance of diagnosing diabetes:

Critical Criteria for Outcomes:

- **Accuracy of Diagnosis:**

- o Key stakeholders emphasize the importance of accurate and reliable diagnostic outcomes for diabetes.

- **Timeliness of Results:**
  - o Concerns of stakeholders revolve around the speed at which diagnostic results are achieved.

- **Patient Education and Empowerment:**
  - o Emphasis is placed on educating patients about their diagnosis and empowering them to take control of their condition.

- **Cost Effectiveness:**
  - o Concerns about the economic impact of diagnosis, including the cost of diagnostic tests and subsequent treatment.

- **Research and Innovation:**
  - o The significance of promoting diagnostic technologies and methods through research and innovation is acknowledged.

Assessment of Stakeholder Importance:

- **Healthcare Service Providers:**
  - o High importance due to their pivotal role in accurate diagnosis and patient management.

- **Patients:**
  - o High importance as they are directly affected by the diagnosis and subsequent treatment.

- **Pharmaceutical Companies:**
  - o Moderate to high importance for their contribution to diagnostic tools and medications.

- **Government Health Agencies:**
  - o High importance in establishing diagnostic standards and ensuring community health.

- **Insurance Companies:**
  - o Importance varies from moderate to high, depending on the emphasis on accurate and cost-effective diagnosis.

- **Advocacy Groups:**
  - o High importance in enhancing awareness, education, and patient rights.

2. Survey method outcome

1. What is the distribution of diabetes cases by gender, age and type of residence?   Sao chép
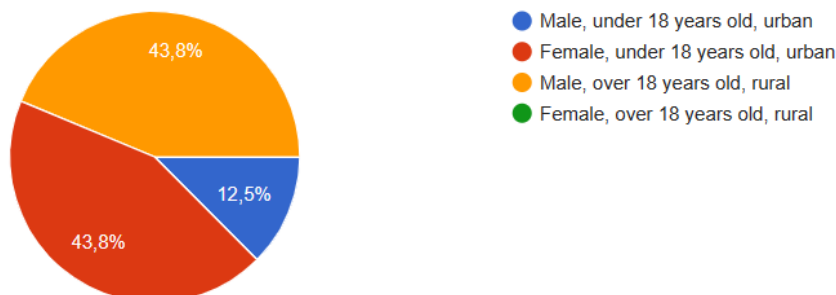
16 câu trả lời

- 43,8% Male, under 18 years old, urban
- Female, under 18 years old, urban
- Male, over 18 years old, rural
- Female, over 18 years old, rural

12,5%

43,8%

Figure 23: Outcome 1

Based on the results of the above survey, I will analyze and explain the results.

Gender Distribution:

- The data shows a clear gender disparity among respondents with diabetes.
- 12.5% of cases are reported in males, whereas 43.8% are reported in females.

Age Distribution:

- The age breakdown indicates that a significant proportion of diabetes cases are found in individuals under 18 years old.
- Specifically, 12.5% of cases are in males and 43.8% in females within this age group.
- For those over 18 years old, the majority of cases are reported in males (43.8%).
- Notably, there are no reported cases of females over 18 years old with diabetes in the provided data.

Residence Type:

- The survey distinguishes between urban and rural residences.
- Among males, 12.5% of cases are reported in urban areas, while 43.8% are in rural areas.
- Among females, 43.8% of cases are in urban areas, and there are no reported cases in rural areas.

Overall Observations:

- The prevalence of diabetes appears to be higher in females across both age groups.
- Diabetes cases in males are more evenly distributed between urban and rural areas.

- There is a notable absence of reported diabetes cases among females over 18 years old in rural areas, according to the provided data.

2. What are the correlations between hypertension, heart disease and diabetes?　　Sao chép
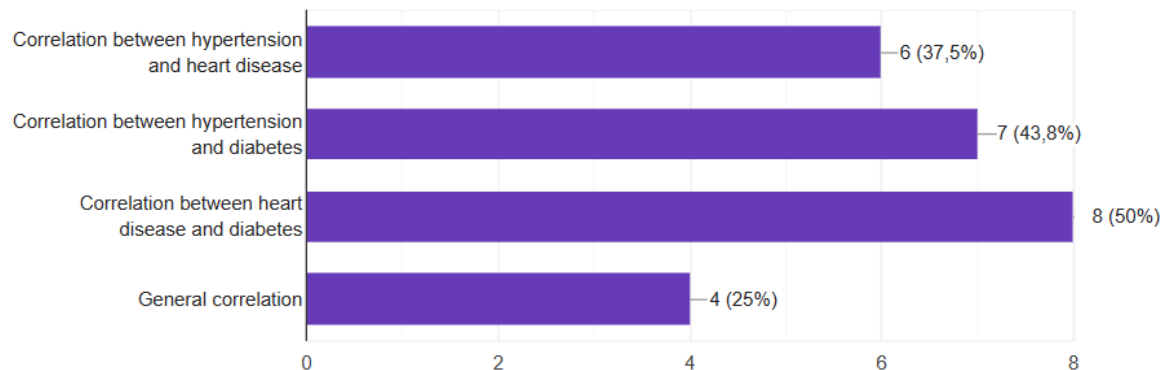
16 câu trả lời

Figure 24: Outcome 2

Based on the results of the above survey, I will analyze and explain the results.

Correlation between Hypertension and Heart Disease (37.5%):

- This indicates that 37.5% of the respondents with either hypertension or heart disease also have the other condition.

- There is a moderate correlation observed between hypertension and heart disease in the surveyed population.

Correlation between Hypertension and Diabetes (43.8%):

- A higher correlation of 43.8% is reported between hypertension and diabetes.

- This suggests that a significant proportion of individuals with hypertension also have diabetes, or vice versa.

Correlation between Heart Disease and Diabetes (50%):

- The highest correlation, at 50%, is reported between heart disease and diabetes.

- This indicates that half of the respondents with heart disease also have diabetes, or vice versa.

General Correlation (25%):

- The 25% general correlation might represent an overall association between the three conditions.

- This could include cases where individuals have either one, two, or all three of the health conditions (hypertension, heart disease, and diabetes).

Overall Observations:

- The highest correlation is observed between heart disease and diabetes, indicating a stronger association between these two conditions in the surveyed population.

- The correlation between hypertension and diabetes is also substantial but slightly lower than that between heart disease and diabetes.

- There is a moderate correlation between hypertension and heart disease, suggesting a connection between these two health conditions.

3. How are marital status and occupation related to diabetes incidence?   Sao chép
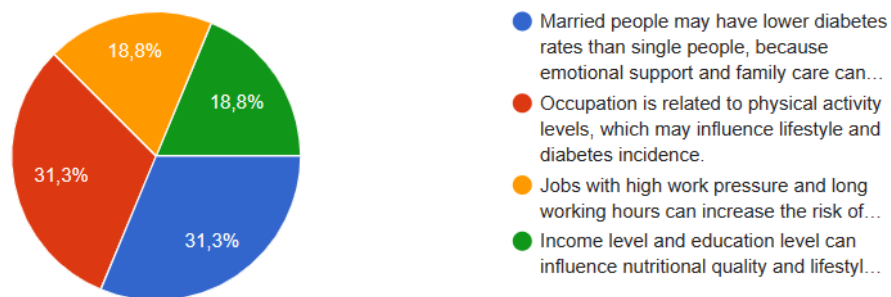
16 câu trả lời

Figure 25: Outcome 3

Based on the results of the above survey, I will analyze and explain the results.

Marital Status and Diabetes Incidence (31.3%):

o This suggests that 31.3% of the respondents believe that married individuals may have lower diabetes rates compared to single individuals.

o The rationale provided is that emotional support and family care in a married setting may contribute to healthier lifestyle choices, potentially lowering the risk of diabetes.

Occupation and Physical Activity Levels (31.3%):

o Another 31.3% of respondents acknowledge a relationship between occupation and diabetes incidence.

o The explanation is that occupation influences physical activity levels, and this, in turn, may impact lifestyle choices and the incidence of diabetes. Occupations with higher physical activity levels may be associated with lower diabetes rates.

Job Pressure and Long Working Hours (18.8%):

- o According to 18.8% of respondents, jobs characterized by high work pressure and long working hours are associated with an increased risk of diabetes.
- o This implies that occupational stress and extended working hours may contribute to unhealthy lifestyle habits, potentially elevating the risk of diabetes.

Income and Education Levels (18.8%):

- o The same percentage, 18.8%, suggests that income and education levels can influence nutritional quality and lifestyle choices, impacting diabetes incidence.
- o This highlights the socio-economic factors that may play a role in determining the risk of diabetes based on income and educational background.

Overall Observations:

- o The survey respondents recognize multiple factors related to both marital status and occupation that may influence diabetes incidence.
- o The emphasis on emotional support in marital relationships and the impact of occupation on physical activity levels and stress levels are notable themes.

4.What are the average blood sugar levels and BMI in people with diabetes?   Sao chép
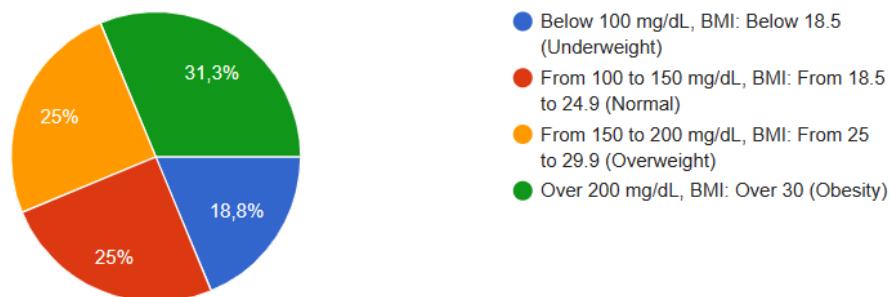
16 câu trả lời

- ● Below 100 mg/dL, BMI: Below 18.5 (Underweight)
- ● From 100 to 150 mg/dL, BMI: From 18.5 to 24.9 (Normal)
- ● From 150 to 200 mg/dL, BMI: From 25 to 29.9 (Overweight)
- ● Over 200 mg/dL, BMI: Over 30 (Obesity)

Figure 26: Outcome 4

Based on the results of the above survey, I will analyze and explain the results.

Blood Sugar Levels Below 10 mg/dL, BMI Below 18.5 (Underweight) - 18.8%:

- o This category represents 18.8% of respondents who reported average blood sugar levels below 10 mg/dL and a BMI below 18.5, indicating that they are underweight.
- o Extremely low blood sugar levels in individuals with diabetes may raise concerns about inadequate glucose control and potential nutritional deficiencies.

Blood Sugar Levels from 100 to 150 mg/dL, BMI from 18.5 to 24.9 (Normal) - 25%:

- o A quarter of respondents reported average blood sugar levels ranging from 100 to 150 mg/dL and a BMI in the normal range (18.5 to 24.9).
- o This suggests that a significant portion of individuals with diabetes maintain blood sugar levels within a moderate range and have a normal BMI.

Blood Sugar Levels from 150 to 200 mg/dL, BMI from 25 to 29.9 (Overweight) - 25%:

- o Another 25% of respondents reported average blood sugar levels ranging from 150 to 200 mg/dL and a BMI classified as overweight (25 to 29.9).
- o This indicates that a considerable proportion of individuals with diabetes have higher blood sugar levels and fall into the overweight BMI category.

Blood Sugar Levels Over 200 mg/dL, BMI Over 30 (Obesity) - 31.3%:

- o The largest percentage (31.3%) reported average blood sugar levels over 200 mg/dL, coupled with a BMI over 30, indicating obesity.
- o This suggests a significant association between elevated blood sugar levels and obesity in this subset of individuals with diabetes.

Overall Observations:

- o The majority of respondents with diabetes in the survey exhibit blood sugar levels above 100 mg/dL, indicating a need for attention to glucose control.
- o There is a notable correlation between higher blood sugar levels and elevated BMI, with a substantial proportion falling into the overweight or obese categories.

5.What are the smoking patterns in people with diabetes?
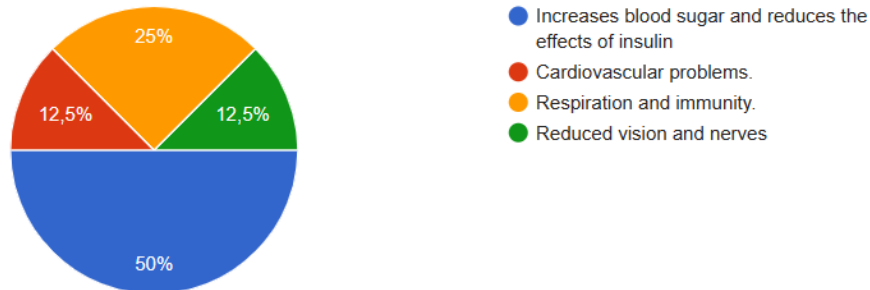
Sao chép

16 câu trả lời

- Increases blood sugar and reduces the effects of insulin
- Cardiovascular problems.
- Respiration and immunity.
- Reduced vision and nerves

Figure 27: Outcome 5

Based on the results of the above survey, I will analyze and explain the results.

Smoking Increases Blood Sugar and Reduces the Effects of Insulin - 50%:

- o Half of the respondents, 50%, believe that smoking is associated with an increase in blood sugar levels and a reduction in the effects of insulin.

- o This suggests a widespread understanding that smoking may have direct negative effects on glucose control and insulin sensitivity in individuals with diabetes.

Smoking and Cardiovascular Problems - 12.5%:

- o A smaller percentage, 12.5%, associate smoking with cardiovascular problems in individuals with diabetes.

- o This highlights awareness of the potential link between smoking and cardiovascular complications, which are already heightened risks for individuals with diabetes.

Smoking, Respiration, and Immunity - 25%:

- o A quarter of respondents, 25%, connect smoking with issues related to respiration and immunity in people with diabetes.

- o This indicates an understanding that smoking may impact respiratory health and weaken the immune system, which can be particularly concerning for individuals managing diabetes.

Smoking, Reduced Vision, and Nerves - 12.5%:

- o Another 12.5% of respondents associate smoking with reduced vision and nerve problems in individuals with diabetes.

o This suggests a recognition of the potential adverse effects of smoking on sensory and neurological aspects, which can be crucial considerations in diabetes management.

Overall Observations:

o The majority of respondents recognize the negative impact of smoking on blood sugar control and insulin function in individuals with diabetes.

o Various respondents also highlight the association of smoking with cardiovascular issues, respiratory problems, weakened immunity, and complications related to vision and nerves in the context of diabetes.

6. Your preventive measures and lifestyle choices focus on maintaining a balanced and healthy lifestyle. Which of the following measures do you regularly practice?

20 câu trả lời

● Balanced eating and avoiding fast food.
● Regular exercise and physical activity.
● Controlling weight and maintaining a stable BMI (Body Mass Index).
● Regular health check-ups and visits to the doctor.
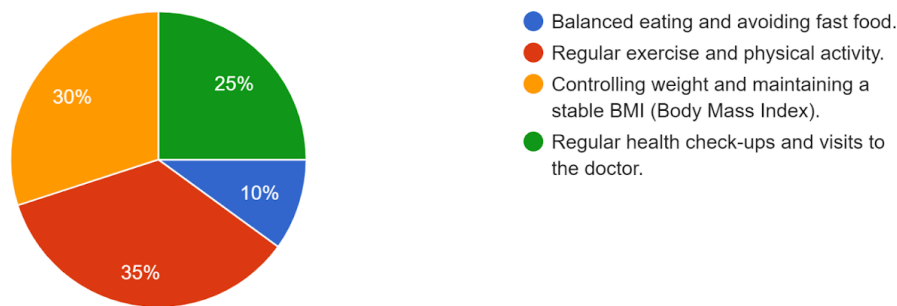
Figure 28: Outcome 6

Based on the results of the above survey, I will analyze and explain the results.

Balanced Eating and Avoiding Fast Food - 10%:

o A relatively smaller percentage, 10%, of respondents reported regularly practicing balanced eating and avoiding fast food.

o This suggests that a portion of the surveyed population places less emphasis on dietary choices as a primary preventive measure.

Regular Exercise and Physical Activity - 35%:

o The majority of respondents, 35%, prioritize regular exercise and physical activity as part of their preventive measures and lifestyle choices.

o This indicates a strong awareness and commitment to maintaining an active lifestyle for overall health and well-being.

Controlling Weight and Maintaining a Stable BMI - 30%:

- A significant percentage, 30%, regularly practice controlling their weight and maintaining a stable BMI.
- This underscores the recognition of the importance of weight management in preventive health measures.

Regular Health Check-ups and Visits to the Doctor - 25%:

- One-fourth of respondents, 25%, reported regularly attending health check-ups and visiting the doctor as part of their preventive measures.
- This highlights the acknowledgment of the role of regular medical check-ups in monitoring and maintaining overall health.

Overall Observations:

- Exercise and physical activity emerge as the most commonly practiced preventive measure among the surveyed population.
- Weight control and maintaining a stable BMI are also significant priorities for a substantial portion of respondents.
- Regular health check-ups and visits to the doctor are valued by a noteworthy proportion of the surveyed individuals.

7. Have you participated in any screening or early prediction programs for diabetes?
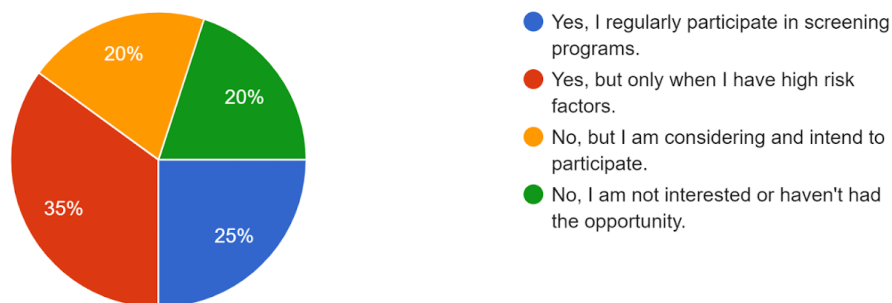20 câu trả lời

Figure 29: Outcome 7

Based on the results of the above survey, I will analyze and explain the results.

Yes, I Regularly Participate in Screening Programs - 25%:

- o A quarter of the respondents indicated that they regularly participate in screening programs for diabetes.

- o This suggests a proactive approach to health, with a consistent commitment to regular screening as part of their healthcare routine.

Yes, But Only When I Have High Risk Factors - 35%:

- o The largest percentage, 35%, reported participating in screening programs but specifically when they perceive themselves to have high risk factors.

- o This indicates a more selective approach to screening, where individuals may engage in testing when they believe they are at an elevated risk of developing diabetes.

No, But I Am Considering and Intend to Participate - 20%:

- o A fifth of the respondents expressed that they have not participated in screening programs but are considering and intend to do so in the future.

- o This suggests an openness to engaging in preventive measures, indicating potential future participation.

No, I Am Not Interested or Haven't Had the Opportunity - 20%:

- o Another 20% of respondents reported not being interested in participating in screening programs or not having had the opportunity to do so.

- o This group may have reasons ranging from a lack of interest to external barriers preventing participation.

Overall Observations:

- o The majority of respondents have engaged in or are open to participating in diabetes screening programs, either regularly or selectively based on perceived risk factors.

- o A notable portion of respondents has not participated in screening, either due to lack of interest or external constraints.

8. How aware and knowledgeable are you about diabetes?
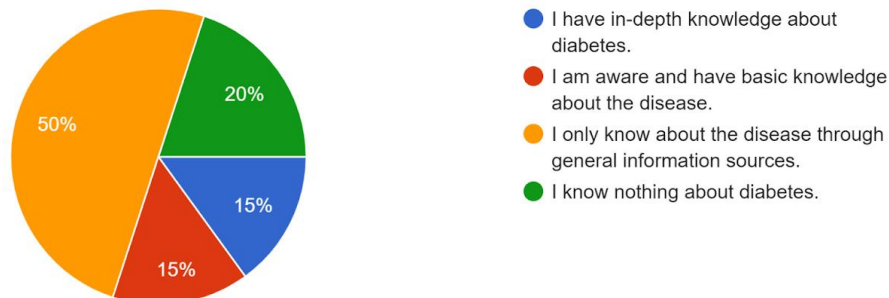20 câu trả lời

Figure 30: Outcome 8

Based on the results of the above survey, I will analyze and explain the results.

I Have In-depth Knowledge About Diabetes - 15%:

o A small percentage, 15%, of respondents reported having in-depth knowledge about diabetes.

o This group likely possesses a comprehensive understanding of the disease, its causes, symptoms, and management.

I Am Aware and Have Basic Knowledge About the Disease - 15%:

o Another 15% indicated being aware and having basic knowledge about diabetes.

o This suggests a moderate level of familiarity with the disease but not necessarily an extensive understanding of all its aspects.

I Only Know About the Disease Through General Information Sources - 50%:

o The majority, 50%, mentioned that they only know about diabetes through general information sources.

o This group relies on common knowledge available in the public domain rather than having specialized or detailed information.

I Know Nothing About Diabetes - 20%:

o A fifth of respondents, 20%, reported having no knowledge about diabetes.

o This group may lack awareness or understanding of diabetes, indicating a potential need for education and information dissemination.

Overall Observations:

o A significant portion of respondents falls into the category of having limited knowledge about diabetes, relying on general information sources for their awareness.

o The distribution indicates a diversity in the depth of understanding, with some individuals having in-depth knowledge and others having only basic or no knowledge about the disease.

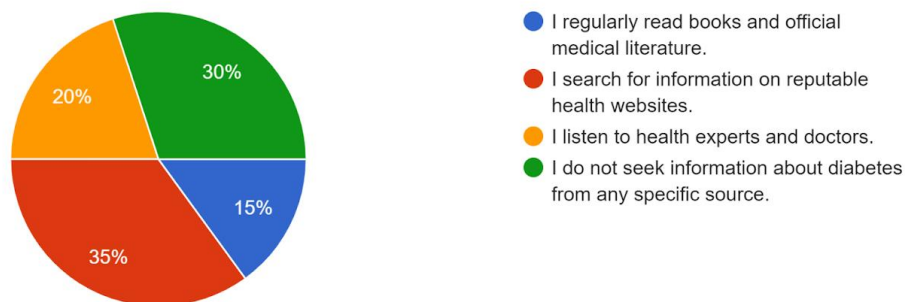9. Do you rely on any information sources to learn about diabetes?
20 câu trả lời

Figure 31: Outcome 9

Based on the results of the above survey, I will analyze and explain the results.

I Regularly Read Books and Official Medical Literature - 15%:

o A small percentage, 15%, reported regularly reading books and official medical literature to acquire information about diabetes.

o This group likely seeks in-depth, authoritative information from academic and medical sources.

I Search for Information on Reputable Health Websites - 35%:

o The largest percentage, 35%, indicated that they search for information on reputable health websites.

o This suggests that a significant portion of respondents prefers online sources, likely seeking information from reputable and trustworthy health platforms.

I Listen to Health Experts and Doctors - 20%:

o One-fifth of respondents, 20%, rely on information obtained by listening to health experts and doctors.

o This group values information provided by professionals in the field, possibly through consultations, lectures, or other expert sources.

I Do Not Seek Information About Diabetes from Any Specific Source - 30%:

- o The remaining 30% stated that they do not seek information about diabetes from any specific source.
- o This group may rely on incidental or general information, or they might not actively seek out information about diabetes.

Overall Observations:

- o A diverse range of information sources is utilized by respondents, including books, online health websites, and advice from health experts or doctors.
- o The majority of respondents actively seek information about diabetes, with a substantial portion relying on reputable health websites.

10. Do you intend to take any medical measures to control or prevent diabetes?
20 câu trả lời

Legend:
● Yes, I have discussed with a doctor and am taking measures.
● Yes, but I am considering and have not decided to implement them.
● No, because I feel there is no high risk.
● No, I am not interested or have no intention to implement measures.
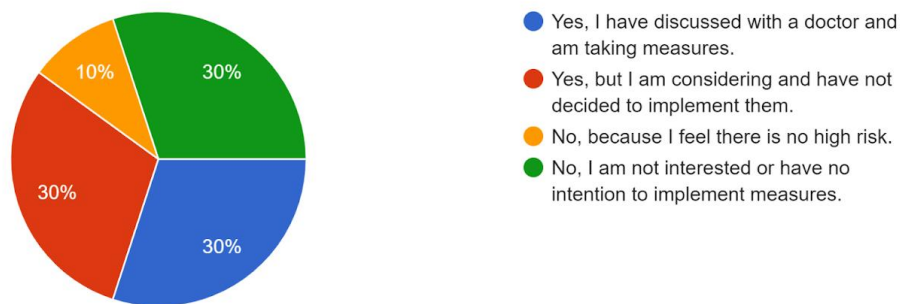
Figure 32: Outcome 10

Based on the results of the above survey, I will analyze and explain the results.

Yes, I Have discussed with a Doctor and Am Taking Measures - 30%:

- o A third of respondents, 30%, have actively discussed with a doctor and are currently implementing medical measures to control or prevent diabetes.
- o This indicates a proactive approach to health, with individuals actively engaging in preventive measures under professional guidance.

Yes, But I Am Considering and Have Not Decided to Implement Them - 30%:

- o Another 30% expressed the intention to take medical measures but are currently in the consideration phase and have not made a final decision.
- o This suggests a willingness to explore and potentially adopt medical interventions but a need for further evaluation or information.

No, Because I Feel There Is No High Risk - 10%:

- o A smaller percentage, 10%, indicated that they do not intend to take medical measures because they feel there is no high risk.

- o This group may perceive a lower risk or may rely on lifestyle and other non-medical measures for prevention.

No, I Am Not Interested or Have No Intention to Implement Measures - 30%:

- o The remaining 30% reported not being interested or having no intention to implement medical measures for diabetes prevention.

- o This group may prefer alternative approaches or may have different priorities regarding health management.

Overall Observations:

- o The distribution reflects a variety of attitudes and intentions toward medical measures for diabetes prevention, with a significant portion actively engaging or considering such measures.

- o A portion of respondents expresses a lack of interest or perceives a low risk, potentially relying on other strategies for prevention.

3. Observation method outcome
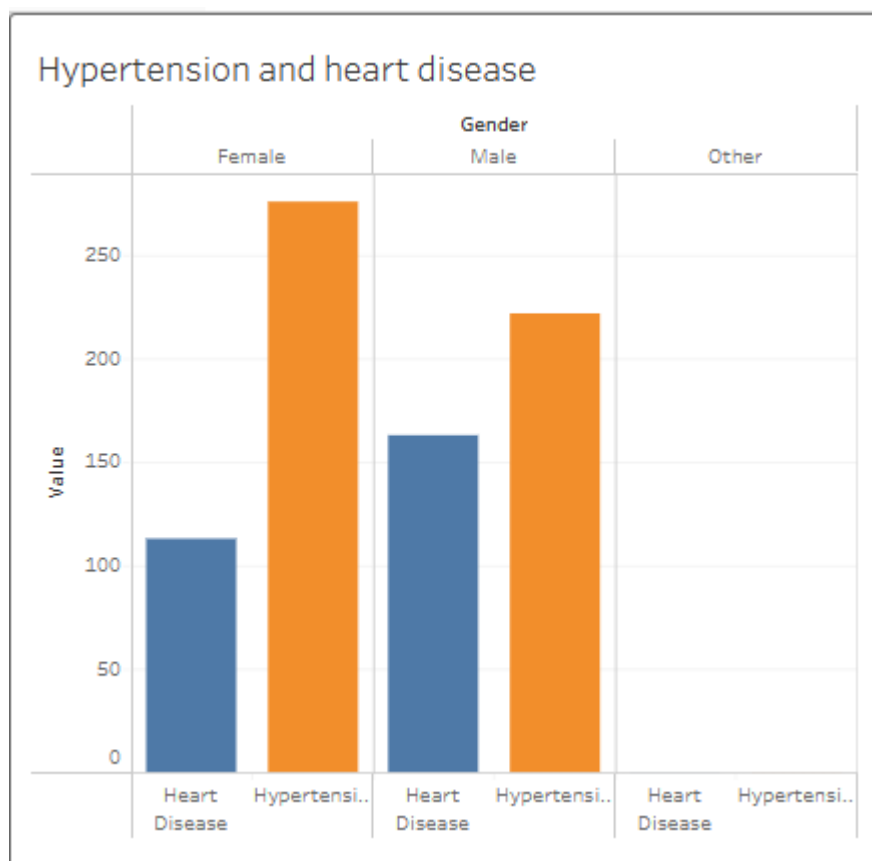
Figure 33: Chart 1

The relationship between cardiovascular disease and hypertension is depicted in the first chart. Examining it, we find that the proportion of patients with hypertension is higher in women than in men, but the number of patients with cardiovascular disease is lower in both genders. Heart disease is more common in men than in women when women have 280 patients while men only have 220. Similarly, when women have 100 patients while men have 160, cardiovascular disease is more common in men.
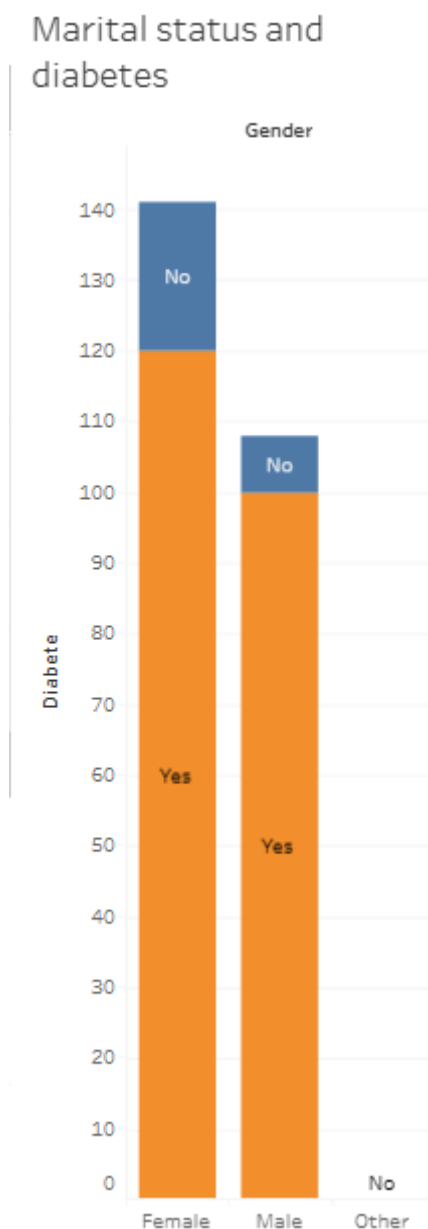
Figure 34: Chart 2

Based on marital status, the second chart examines the number of diabetes patients. The analysis chart shows that women, married or single, have a significantly higher rate of diabetes than men do (20 women are single, 120 women are married). We can deduce from the chart that women are substantially more likely than men to have diabetes.
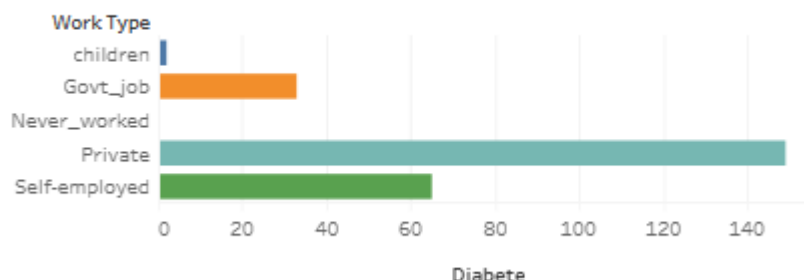
Figure 35: Chart 3

The third chart, which illustrates the risk of developing diabetes based on employment, is the next one. Upon first glance, it is evident that those who have direct employment have a higher risk of developing diabetes. highest, with the following three categories: self-employed, government employees, and finally those with 150, 67, and 32, respectively. Furthermore, the characters we did not anticipate were kids, albeit a relatively small number of 2.

Figure 36: Chart 4

In conclusion, the graph illustrates diabetes according to smoking status. Nonsmokers have the highest number of diabetes (90), followed by former smokers with 72, smokers with 42, and non-identifiers with 47.

Figure 37: Dashboard

All of the charts that I previously described are displayed on this dashboard. All of the aforementioned charts generally indicate that women will experience higher levels of hypertension and cardiovascular disease than men. These factors determine the state of diabetes. Children will have the lowest job types and people with personal job types will be higher than those with other job types. In the case of smokers, the proportion of non-smokers will be high, and the proportion of ex-smokers will be high as well, almost matching that of non-smokers. Smokers will ultimately make up the lowest percentage.

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