

# **Digital Health Insights:** **A Visualization-Driven Approach**

**Submitted by:**

**Patrick Michael**

Matriculation number: **22402432**

**For:**

**Digital Health**

Master of Science in Global Public Health

**Deliverables:**

**[GitHub Repository](#)**

**[Shiny Application](#)**

**Submitted on:**

Jan. 2025

## Introduction:

This project aims to tackle age old questions of efficiency by using modern technology to assist in every-day decision making. By using RStudio and further use of interactive visual aids via my Shiny app, I hoped to create meaningful, and user-friendly information.

This helps optimize administrative workflow, efficiently manage the workforce, and deliver the best care for patients.

## Context and background:

Every month, a report is generated based on the day-to-day data of patients, cases, revenue, and dentists. That report is always bulky, unoptimized for computer work, and full of typos and mixed data that are very difficult to use as is.

It is in an excel format full of merged cells, unending amounts of rows and columns, and multiple colors that deceive the eye. This makes it impossible to infer any useful information at a glance. It is also in Arabic which hinders any efforts for international exchange of information.

The report contains data relating to the revenue (paid or free cases), specialty breakdown (Restorative Dentistry or Endodontics for example), the amount of lost revenue (referrals or just medicine prescription), and practitioner statistics.

With the help of RStudio, I tackled this task to simplify and optimize the report. And, with the help of Shiny, I use it to prepare multiple meaningful visual aids that convey as much detail and information as possible.

## Key User Persona

- **Role:** Senior dentist and manager of a dental practice in Egypt.
- **Needs:**
  - Simplified tools to monitor the performance of the department.
  - Real time visualizations to aid with decision making.
  - Insights into revenue breakdown and case distribution.
- **Aspired actions:** Use of the tool to identify trends, optimize the workflow, allocate the resources properly, and evaluate employees.

## Visualization Types

### Revenue chart:

A pie chart visualizes revenue distribution, showing total revenue and dentist-specific contributions. This allows the manager to precisely understand how effective each dentist is. This is assisted by our next chart.

### Case Chart:

Another detailed chart that tackles the total number of cases, including paid, free and refers. As charity is an important part of the practice, the manager can't assign performance reviews on revenue alone. Which takes us to the next chart.

### Case Type Breakdown Chart:

A comparative breakdown for each dentist, and the cases they took care of. Not only can the doctors be selected, but the case types as well can be toggled on or off if there is a need to focus on a certain type.

### Specialty Heatmap:

To aid with resource allocation, a heatmap is required to showcase the strengths and weaknesses of each doctor in a different specialty. This aids the manager in assigning the more difficult or specialized cases to properly experienced dentists.

### Income Treemap:

Lastly, to understand how much each dentist is owed for their services, I used a treemap. This ensures easy comparison and detailed information.

**Another notable feature** I use is the integration of “Select All” and “Remove All” buttons to aid with user experience with the charts.

## Conclusion

In this project, I hope to combine efficient data cleaning, meaningful data manipulation, and clear visualization to assist the key user in their mission. By focusing on their needs, I create multiple tools at their disposal and fix multiple fatal flaws in their monthly report. These tools can now be used seamlessly with every monthly report. With minor modifications, similar tools can also be created for other establishments.

