EUROPEAN CAMPUS ROTTAL-INN

DEGGENDORF INSTITUTE OF TECHNOLOGY DIT

Trauma Injury Analysis Using an Interactive Shiny Application

Submitted by: Mujeeb Rehman
Matriculation No. 22518708
Program: MSc Global Public Health
Course: Digital Health
Software: R version 4.5.2, RStudio, Shiny
Shiny App: https://mujeeb.shinyapps.io/M1-Shiny/
Repository: GitHub

Submission 28th January 2026

Introduction

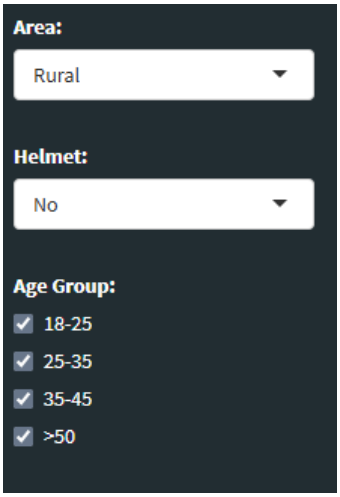
Road traffic injuries represent a significant public health burden in Pakistan, particularly in urbanizing cities where traffic density and safety compliance vary widely. Helmet use, speed at the time of accident, and accident location are key determinants of trauma severity. This project presents an interactive Shiny application developed to analyze trauma-related data from a trauma centre in Hyderabad, Pakistan, focusing on adults aged 18 years and above.

Context and Objective

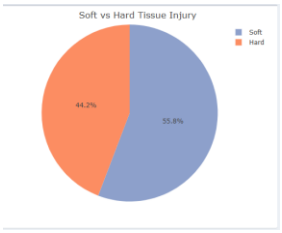
The dataset belongs a trauma centre in Hyderabad city, Pakistan, and includes patients categorized by age group, residence (urban or rural), helmet usage, injury type (soft tissue or hard tissue), and estimated speed at the time of accident (>20, >40, >60, >80, >100 km/h, and unknown).
The objective of this project is to convert hospital-based trauma data into an interactive digital tool that enables rapid visualization, comparison, and public health interpretation.

Key Visualizations and Analysis

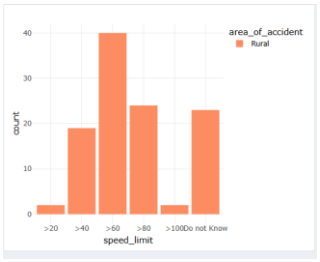
- Urban vs Rural Trauma Patterns:
  Comparison across age groups demonstrates differences in trauma distribution between urban and rural populations.



- Helmet Use and Injury Severity:
  Non-helmeted patients show a higher proportion of hard tissue injuries, highlighting the protective role of helmets.
- Soft and Hard Tissue Injuries:
  Visualizations illustrate injury-type variation in relation to helmet use and speed.



- Speed-Based Trauma Severity:
  Higher speed categories are associated with increased injury severity, particularly among individuals not wearing helmets.



Interactive filters allow users to explore specific age groups, injury types, and speed ranges.

Conclusion

This Shiny application demonstrates the value of **digital health visualization tools** in trauma surveillance within the Pakistani context. By integrating helmet use, speed, injury type, and urban–rural differences, the application supports evidence-based road safety interventions and trauma prevention strategies. The approach can be scaled to other trauma centres across Pakistan.