Investigating Typhoid Fever Patterns in Bangladesh

Course: Python Essentials for Women in Life Science

Introduction

Typhoid fever, a potentially life-threatening illness caused by the bacterium Salmonella Typhi, remains a significant public health concern in Bangladesh. Unfortunately, the effectiveness of traditional medicines against this disease is decreasing in Bangladesh due to growing antimicrobial resistance (AMR). This project aims to utilize Python to analyze data on typhoid cases, particularly focusing on antimicrobial resistance, a growing challenge in treating disease.

Data Source

"CHRF_typhoid"- This dataset contains demographic details of children under 18 years of age diagnosed with typhoid at the Bangladesh Shisu Hospital in Dhaka, collected since 1999 to 2022.

Questions

1. **Yearly Trends:**
   How many typhoid cases were reported each year? (Visualize with a bar chart). How does the distribution of cases vary based on patient type throughout the years. (Use a stacked/clustered bar chart)

2. **Age and Sex Distribution:**
   Calculate the percentage of children with typhoid categorized by sex. (Present using a pie chart). Additionally, investigate the age distribution of the affected children through a histogram. Determine the average (mean and median) age of children based on gender. Also, determine the variability (SD).

3. **Antibiotic Usage and Effectiveness:**
   Ciprofloxacin and Azithromycin are two common antibiotics used to treat typhoid fever. Now, we want to investigate the year-wise resistance percentage for ciprofloxacin and azithromycin in typhoid treatment. Analyze if there are any patterns in resistance for each variable. Present the findings using year-wise bar charts for the 'resistance' category (resistance percentage), firstly for 'Ciprofloxacin', then for 'Azithromycin' and provide an interpretation of the results.

4. **Multi- Drug Resistance (MDR):**
   While Ampicillin, Cotrimoxazole and Chloramphenicol are first-line antibiotics used to combat typhoid, the emergence of Multi-Drug Resistance (MDR) typhoid strains poses a significant challenge, as bacteria exhibit resistance to all three medications. Now, plot a trend line for MDR prevalence over time and interpret the findings.