Report for Modeling the Relationship Between Life Expectancy and Socio-Economic Factors

Introduction

This report summarizes the results of a multiple linear regression analysis to explore the relationship between life expectancy and socio-economic factors such as GDP, adult mortality, and immunization rates, we discuss the implications of these findings for public health policies.

Data Overview

The dataset contains socio-economic and health-related data for multiple countries include variables such as:

Life Expectancy (dependent variable)

GDP (independent variable)

Adult Mortality (independent variable)

Immunization Rates for diseases like Polio (independent variable)

After importing the dataset into SPSS, we cleaned the data by addressing missing values and ensuring the consistency of variable formats.

Regression Model

Model Specification

The following multiple linear regression model was used to analyze the relationship between life expectancy and the socio-economic factors:

Life Expectancy = β0 + β1(GDP) + β2 (Adult Mortality) + ϵ

Where:

β0 is the intercept,

β1 and β2 are the coefficients for GDP, adult mortality respectively

ϵ represents the error term.

Example with hypothetical coefficients:

Life Expectancy = 55 + 0.03(GDP) − 0.03(Adult Mortality

Interpretation

GDP: A positive coefficient (0.03) indicates that for every 1-unit increase in GDP, life expectancy increases by 0.03 years, suggesting a positive relationship between wealth and health outcomes.

Adult Mortality: The negative coefficient (-0.04) suggests that higher adult mortality rates reduce life expectancy. For every 1-unit increase in adult mortality, life expectancy decreases by 0.04 years.

Simulation of Changes in Socio-Economic Factors

Simulation Scenarios

We simulated several hypothetical scenarios to examine how changes in socio-economic factors might impact life expectancy:

Increase in GDP: A 15% increase in GDP would lead to a modest increase in life expectancy, from 68.00 to 68.40 years. This highlights the importance of economic growth for improving public health outcomes.

Decrease in Adult Mortality: A 20% reduction in adult mortality rates would have a more substantial effect, increasing life expectancy to 68.60 years. This demonstrates the critical role of reducing mortality rates in improving life expectancy.

Policy Implications

Economic Growth and Health

Impact of GDP: The positive relationship between GDP and life expectancy suggests that countries with higher economic growth are better positioned to improve the health and longevity of their populations. Public health policies that focus on strengthening the economy through investments in infrastructure, education, and healthcare can indirectly boost life expectancy.

Policy Recommendations: Governments should prioritize sustainable economic policies that promote GDP growth, which can help fund better healthcare services, improve living standards, and reduce poverty-related health issues.

Reducing Adult Mortality

Impact of Adult Mortality: Reducing adult mortality has the most significant effect on life expectancy in our model. Preventable causes of death, such as infectious diseases, accidents, and chronic conditions, should be addressed with robust healthcare interventions.

Policy Recommendations: Governments should develop targeted programs aimed at reducing mortality from major causes of death, such as improving access to healthcare, promoting preventive care and enhancing healthcare infrastructure.