



**Shikshan Prasarak Santha's
Padmabhushan Vasantraodada Patil Mahavidyalaya
Kavathe Mahankal
DEPARTMENT OF STATISTICS**



**Case Study Report on
“Relation between Blood Pressure Level and Age”**

**Submitted to
Department of Statistics,
P. V. P. Mahavidyalaya,
Kavathe Mahankal**

**By
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**As a partial fulfillment of the SEC-I (P): Practical on Data Analysis
Using MS-Excel – I for B.Sc. II (Semester III)**

***Under the guidance of*
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P. V. P. Mahavidyalaya,
Kavathe Mahankal**

2025-2026

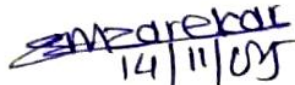
CERTIFICATE

This is to certify that *Miss. More Snehal Sarjerao, Miss. Patil Sanika Ganpati and Miss. Patil Sanjivani Bhaskar* of B.Sc. II (Semester III), P. V. P. Mahavidyalaya, Kavathe Mahankal have successfully completed the case study report entitled “*Relation between Blood Pressure Level and Age*” based on SEC-I (P): Practical on Data Analysis Using MS-Excel – I, as prescribed by the curriculum of Shivaji University, Kolhapur, under my supervision and guidance during the academic year 2025 – 2026.



Guide

Department of Statistics
P. V. P. Mahavidyalaya,
Kavathe Mahankal



Examiner's Signature



Head

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Department of Statistics

P. V. P. Mahavidyalaya,
Kavathe Mahankal

Place: Kavathe Mahankal

Date: 10/11/2025

DECLARATION

We hereby declare that the Case Study Report entitled “*Relation between Blood Pressure Level and Age*” submitted in partial fulfillment of the requirements of SEC-I (P): Practical on Data Analysis Using MS-Excel – I for B.Sc. II (Semester III) is our original work carried out under the guidance of Dr. A. M. Suryawanshi, Assistant Professor, Department of Statistics, P. V. P. Mahavidyalaya, Kavathe Mahankal.

We further declare that this report has not been previously submitted to any other university or institution for any other degree.

Place: Kavathe Mahankal

Date: 10/11/2025

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INDEX

Sr. No.	Content	Page No.
1	Abstract	5
2	Introduction	5
3	Objectives	6
4	Hypotheses	6
5	Methodology	6
6	Statistical analysis	7-9
7	Conclusions	10
8	References	10
9	Questionnaire	10

Abstract:

This study aims to analyze the relationship between blood pressure levels and age among individuals. Blood pressure is an important indicator of cardiovascular health, and its variation with age helps in identifying potential health risks. Data were collected from a group of individuals of varying ages, and statistical analysis was performed using MS Excel. The results indicate a positive correlation between age and blood pressure, showing that blood pressure levels tend to increase with advancing age. This finding highlights the importance of regular monitoring and lifestyle modifications to maintain healthy blood pressure throughout life.

Introduction:

Blood pressure is the force exerted by circulating blood against the walls of arteries. It is a critical parameter of cardiovascular health and an essential indicator of how effectively the heart and blood vessels function. Blood pressure is usually expressed in terms of two components: systolic pressure (pressure during heart contraction) and diastolic pressure (pressure during heart relaxation). Maintaining an optimal balance between these two values is vital for overall well-being.

As people age, several physiological changes occur in the cardiovascular system. The arteries gradually lose their elasticity, and the walls become stiffer, causing the heart to pump harder to circulate blood. This often leads to elevated blood pressure levels. Prolonged elevation of blood pressure, known as hypertension, is one of the most common chronic health conditions worldwide. It significantly increases the risk of heart disease, stroke, kidney failure, and other serious complications. Lifestyle factors such as diet, physical inactivity, stress, smoking, alcohol consumption, and obesity can further influence blood pressure levels. The interplay between these factors and the aging process makes it important to study how blood pressure changes with age.

Understanding the relationship between age and blood pressure is crucial for identifying high-risk individuals, implementing timely preventive measures, and promoting healthy aging. Regular monitoring and early intervention can help reduce the incidence of hypertension and improve the quality of life in older adults.

Objectives:

- ❖ To study the pattern of blood pressure levels among different age groups.
- ❖ To determine the relationship between age and blood pressure levels.
- ❖ To assess whether blood pressure increases significantly with age.

Hypotheses:

The null and alternative Hypotheses are:

H_0 : There is no significant relationship between age and blood pressure level.

H_1 : There is significant relationship between age and blood pressure level.

Methodology:

Sample Size: 50 individuals of varying age groups.

Data Collection: Data were collected using a questionnaire including age and measured blood pressure levels (systolic and diastolic).

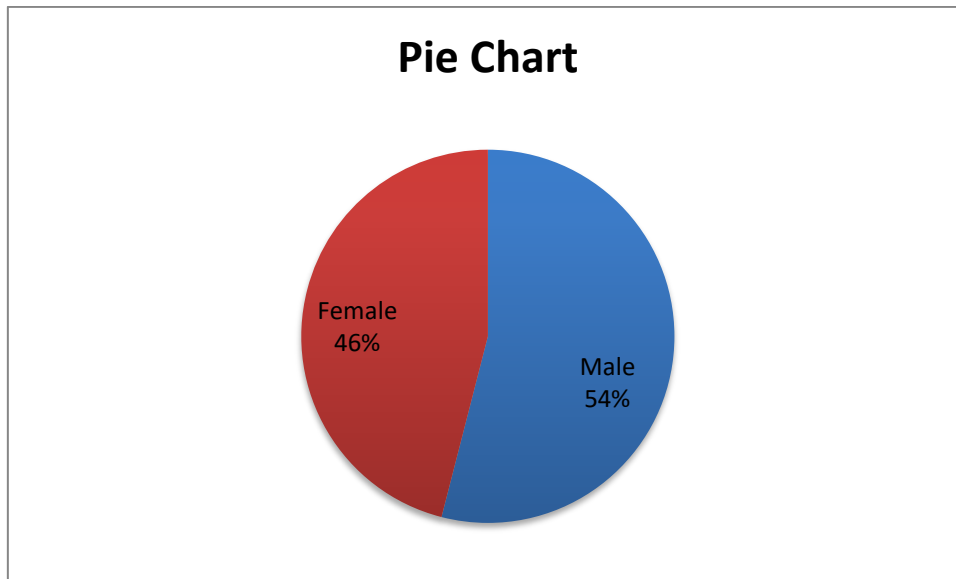
Tools Used: Microsoft Excel for data entry, graph plotting, and statistical analysis.

Statistical Techniques: Correlation and regression analysis were used to determine the relationship between age and blood pressure

Statistical Analysis:

1) Graphical representation:

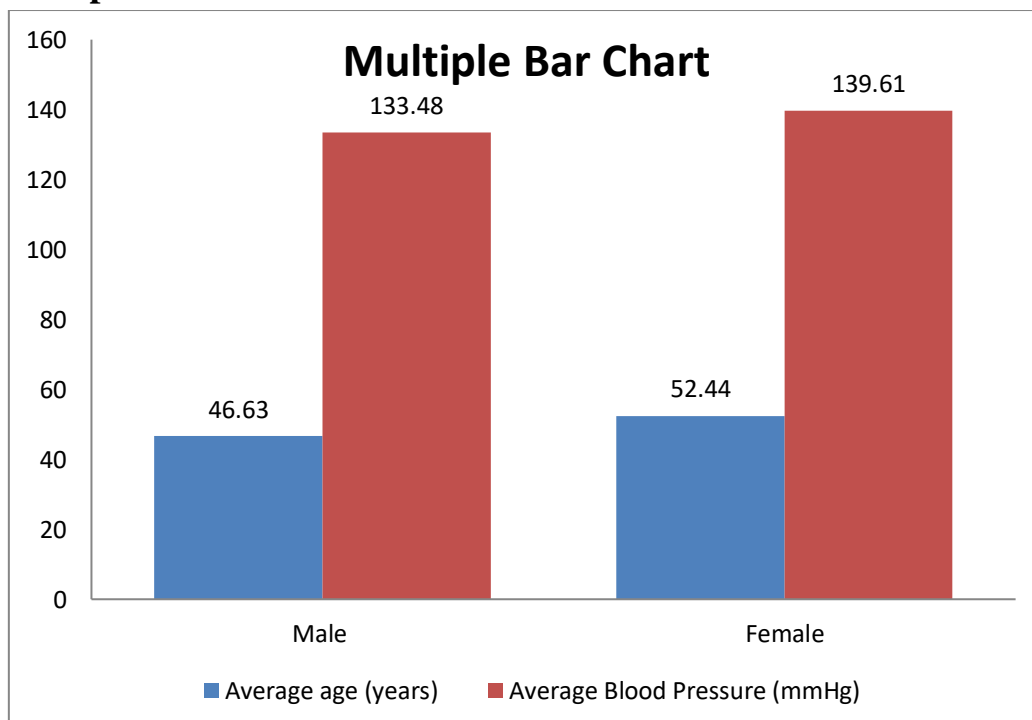
A. Pie chart



Interpretation:

The pie chart represents the gender wise distribution of the patients in the study. It shows that 54% are male and 46% are female patients, indicating a nearly balanced sample with a slightly higher proportion of males. This suggests that the data collected provides a fairly equal representation of both genders for analyzing the relationship between blood pressure and age.

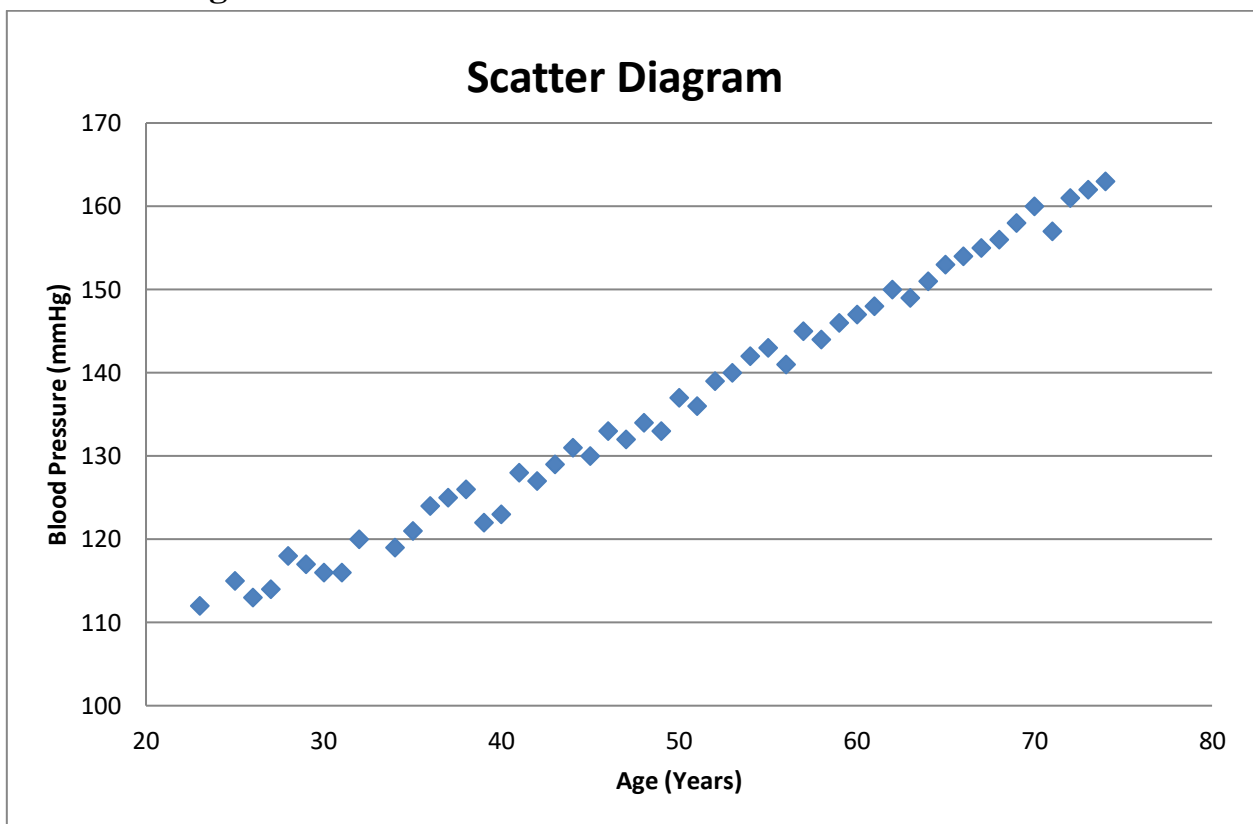
B. Multiple Bar charts



Interpretation:

The multiple bar chart compares the average age (years) and average blood pressure (mmHg) between males and females. The chart shows that males have an average age of 46.63 years with an average blood pressure of 133.48 mmHg, while females have an average age of 52.44 years and an average blood pressure of 139.61 mmHg. This indicates that females in the sample are slightly older and have a higher average blood pressure than males, suggesting a possible trend of increased blood pressure with advancing age.

C. Scatter diagram



Interpretation:

The scatter plot shows the relationship between Age and Blood Pressure. The upward trend of the data points indicates a positive correlation, meaning that as age increases, blood pressure also tends to rise. This suggests that older individuals generally have higher blood pressure levels, which aligns with physiological changes in blood vessels and heart function that occur with aging.

2) Category wise Systolic Blood Pressure (mmHg) analysis:

Category	Systolic Blood Pressure (mmHg)	Count	Percentage
Normal	<120	9	18%
Elevated	120–129	10	20%
Hypertension Stage 1	130–139	9	18%
Hypertension Stage 2	≥ 140	22	44%

Interpretation:

The table represents the distribution of individuals based on their systolic blood pressure levels. Out of the total sample, 44% of individuals fall under Hypertension Stage 2 (≥ 140 mmHg), indicating a significant portion of the population is at high risk for cardiovascular diseases. 20% of individuals have elevated blood pressure (120–129 mmHg), suggesting a tendency toward developing hypertension if preventive measures are not taken. 18% fall under Hypertension Stage 1 (130–139 mmHg), showing moderate risk that requires lifestyle modification and regular monitoring. Only 18% of individuals have normal blood pressure (<120 mmHg), representing a small proportion with healthy cardiovascular status.

Overall, the results indicate that most individuals in the study have blood pressure levels above the normal range, emphasizing the need for health awareness, lifestyle changes, and early intervention to prevent hypertension-related complications.

3) Correlation Analysis:

The Excel function = CORREL(Age, Blood Pressure) calculate correlation between age (years) and blood pressure (mmHg).

The value of correlation coefficient is: $r = 0.9943$

Degrees of freedom for correlation = $n-2 = 50- 2 = 48$

Significance level (α) = 0.05

Critical value of r at 48 degrees of freedom with 5% significance level = 0.279

Interpretation:

The value of r (0.9943) is greater than critical value of r (0.279). Hence we reject null hypothesis at 5% level of significance and conclude that there is a significant positive relationship between age in years and blood pressure among college patients. The analysis indicates a strong and significant positive correlation between age and blood pressure, suggesting that as age increases, blood pressure also tends to rise.

4) Regression analysis:

The simple linear regression, blood pressure (mmHg) on age (years) is fitted to predict blood pressure:

The Excel function = INTERCEPT(Blood Pressure, Age) calculate the value of y-intercept and = SLOPE(Blood Pressure, Age) calculate the value of slope coefficient.

Therefore , y-intercept =85.9358 and Slope = 1.0216

Thus, the simple linear regression, blood pressure (mmHg) on age (years) is:

$$\text{Blood Pressure} = 85.9358 + 1.0216 * \text{Age}$$

The fitted regression equation indicates that, for every one-year increase in age, blood pressure increases by approximately 1.0216 mmHg on average. This reinforces the conclusion that age is a strong predictor of blood pressure levels.

Conclusions:

The study concludes that age has a significant and strong positive impact on blood pressure. As individuals grow older, their blood pressure tends to increase, with a large proportion of the population showing elevated or hypertensive levels. These findings underline the importance of regular monitoring, early diagnosis, and adoption of healthy lifestyle practices to manage and prevent hypertension, particularly in older adults. This study recommends maintaining a healthy lifestyle through regular medical check-ups, a balanced diet, adequate physical activity, and effective stress management to help regulate blood pressure with advancing age.

References:

1. Fuchs FD, Whelton PK. High blood pressure and cardiovascular disease. *Hypertension*. (2020) 75:285–92.
2. Lee D-T, Lee Y-S. The age-related trend in blood pressure and the prevalence of hypertension in Korean adults. *J Life Sci*. (2012) 22:148–55
3. Reckelhoff JF. Gender differences in the regulation of blood pressure. *Hypertension*. (2001) 37:1199–208.

Questionnaire:

1. Name of the Patient: _____
2. Gender: Male Female
3. Age: _____ years
4. Systolic Blood Pressure (mmHg): _____
5. Diastolic Blood Pressure (mmHg): _____