SUMMARY

In this logistic regression analysis, I aimed to predict whether a person has heart disease using three factors: age, systolic blood pressure, and cholesterol level. I started by loading the dataset and reviewing its structure to ensure the variables were suitable for analysis. After confirming that the outcome variable was binary (heart disease: 0 or 1), I built a logistic regression model to examine how each predictor influenced the likelihood of heart disease.

Once the model was fitted, I calculated the predicted probabilities of having heart disease for everyone in the dataset. The model results showed that only age had a statistically significant impact ($p < 0.001$). This means that as a person gets older, the chances of having heart disease increase. On the other hand, systolic blood pressure and cholesterol were not statistically significant in this model, meaning they did not show a clear influence on heart disease risk in this dataset. This suggests that while these two factors are medically relevant, they may not be strong predictors in this sample or could be influenced by other variables not included in the model.

I also visualized the results using a scatter plot, which shows the relationship between age and the predicted probability of heart disease. Each dot represents a person, and the color indicates whether they had heart disease or not (red = no, blue = yes). The plot clearly shows an upward trend: as age increases, the predicted probability of heart disease also increases. People under 40 mostly had low probabilities, while people over 60 had much higher probabilities. Most of the individuals with heart disease are found in the higher age range with higher predicted probabilities.

This visual pattern supports what the model showed, age is strongly related to heart disease risk, while the other two factors don't show a strong effect in this case. Based on this analysis, age stands out as the most important and reliable predictor of heart disease in the given dataset. This highlights the importance of age as a risk factor and suggests that early screening and lifestyle changes in older adults may help in preventing or managing heart disease more effectively.