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A Statistical Analysis of Risk Factors Associated with Coronary Heart Disease

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Abstract: This study "A Statistical Analysis Of Risk Factors Associated With Coronary Heart Disease" statistically examined demographic, lifestyle, and clinical determinants of ten-year CHD risk using secondary data from 200 individuals obtained from the Kaggle cardiovascular dataset. A quantitative, cross-sectional design was adopted, and analysis was conducted using descriptive statistics, correlation analysis, and multivariate logistic regression. Results showed that the sample consisted mostly of middle-aged adults, with notable prevalence of hypertension, obesity, elevated cholesterol, and smoking. Correlation analysis revealed that age, total cholesterol, blood pressure, BMI, and hypertension were positively associated with CHD risk. Logistic regression analysis demonstrated that total cholesterol was the only statistically significant independent predictor of tenyear CHD risk (p = 0.01), while other factors including smoking status, blood pressure, diabetes, and BMI did not attain statistical significance after adjustment. The model exhibited good fit (Pearson Chi-square p = 0.3868) and strong predictive accuracy (AUC = 0.763). The study concludes that elevated cholesterol remains the most critical predictor of long-term CHD risk in this population. It recommends prioritizing lipid screening, early risk assessment among middle-aged adults, and strengthened public health interventions targeting modifiable cardiovascular risk factors. Further research with larger and more diverse samples is advised to improve generalizability and refine CHD predictive models.

Keywords: *Coronary Heart Disease, Risk Factors, Logistic Regression, Cholesterol, Cardiovascular Epidemiology.*

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I. INTRODUCTION

Coronary artery disease (CAD) continues to be a major global health concern (World Health Organization, 2021). In the United States, coronary heart disease caused over 370,000 deaths in 2022 (American Heart Association, 2023). Globally, cardiovascular diseases with CAD as a leading contributor are responsible for approximately 17.9 million deaths each year (World Health Organization, 2021). Beyond the human toll, CAD also creates a significant economic burden, with healthcare costs related to cardiovascular disease reaching hundreds of billions of dollars annually (American Heart Association, 2023). Despite its prevalence and cost, CAD is largely preventable through early risk assessment, healthy lifestyle choices, and timely medical intervention (Benjamin et al., 2019).

At its core, CAD develops when the coronary arteries, which supply blood to the heart, undergo a gradual narrowing due to the buildup of fatty deposits known as atherosclerotic plaques (Libby, 2021). This narrowing reduces blood flow to the heart muscle. When the heart does not receive enough oxygen-rich blood, it becomes ischemic. Severe or complete blockage of blood flow can lead to a heart attack, where heart muscle cells die due to lack of oxygen (Libby et al., 2019; Björkegren & Lusis, 2022). CAD can present in many forms, including angina pectoris, myocardial infarction, silent ischemia, and, in extreme cases, sudden cardiac death (Libby, 2021).

Atherosclerosis, the main underlying cause of CAD, is a complex process. It involves disturbances in lipid metabolism, chronic inflammation, vascular smooth muscle cell activation, platelet dysfunction, oxidative stress, and changes in the extracellular matrix (Bjorkegren & Lusis, 2022). These processes gradually damage the arteries over decades, often before any symptoms appear.

Research over the years has identified several risk factors that make CAD more likely to develop. High cholesterol, smoking, and high blood pressure are among the strongest contributors (Libby et al., 2019; Framingham Heart Study). Other factors, including diabetes, obesity, physical inactivity, poor diet, and stress, also play a role (Yusuf et al., 2004). Age, sex, and family history further influence risk, and many of these factors can interact, making the disease progress quietly over time (Grundy et al., 2019; Arnett et al., 2019).

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Understanding the mechanisms of atherosclerosis and the long-term risk factors is crucial for preventing and managing CAD. By addressing these factors early through lifestyle changes, monitoring, and medical treatment it's possible to slow disease progression and improve outcomes for individuals at risk (Morrison, 2023).

➤ *Statement of the Problem*

Coronary heart disease (CHD) is a leading cause of death globally and in Nigeria, yet there is limited data on the specific risk factors contributing to its development in the Nigerian population. The rising prevalence of hypertension, diabetes, obesity, and sedentary lifestyles has increased CHD risk, but current studies often focus on single factors or small populations, leaving gaps in understanding how multiple risk factors interact. This study aims to statistically analyze the key risk factors associated with CHD to inform effective prevention and intervention strategies.

➤ *Objectives of the Study*

The Specific Objectives of the study are:

- To examine the association between demographic factors (age, sex, education) and 10-year CHD risk.
- To investigate the relationship between lifestyle behaviors (smoking status, cigarettes per day) and 10-year CHD risk.
- To assess the influence of clinical factors (hypertension, stroke history, diabetes, cholesterol, systolic and diastolic blood pressure, BMI, heart rate, glucose) on 10-year CHD risk.

➤ *Research Questions*

- What is the association between demographic factors (age, sex, education) and 10-year CHD risk?
- Does lifestyle behaviors (smoking status, cigarettes per day) influence 10-year CHD risk?
- Is there any effect of clinical factors (hypertension, stroke history, diabetes, cholesterol, blood pressure, BMI, heart rate, glucose) on 10-year CHD risk?

II. LITERATURE REVIEW

Coronary heart disease (CHD) continues to pose a major public health challenge worldwide, largely because many of its major risk factors remain common and poorly managed. Global evidence shows that CHD is strongly influenced by a combination of metabolic, lifestyle, and environmental factors, many of which are preventable (GBD, 2020). A landmark multinational study the INTERHEART study demonstrated that a relatively small set of modifiable factors, including abnormal lipid levels, smoking, hypertension, diabetes, obesity, poor diet, and physical inactivity, account for most CHD events across different regions of the world (Yusuf et al., 2004). This indicates that although populations differ, the underlying determinants of CHD are broadly consistent.

Among these factors, abnormal cholesterol levels remain one of the strongest predictors of CHD. Large pooled analyses conducted by the Cholesterol Treatment Trialists' Collaboration show that lowering LDL cholesterol significantly reduces the likelihood of major cardiovascular events, supporting the widespread use of lipid-lowering therapies in prevention programs (CTT Collaboration, 2010). Similarly, long-term follow-up studies confirm that elevated systolic and diastolic blood pressure increase CHD risk in a graded manner, with even moderate elevations contributing to a higher likelihood of heart disease (Lewington et al., 2002).

Tobacco use is another well-established contributor to CHD. Research consistently demonstrates that smoking substantially increases the risk of myocardial infarction, and the risk rises with greater exposure. Encouragingly, evidence shows that individuals who stop smoking experience a steady decline in cardiovascular risk over subsequent years (Yusuf et al., 2004). Diabetes also significantly elevates CHD risk. Findings from the Emerging Risk Factors Collaboration indicate that people living with diabetes face nearly double the risk of major vascular events, especially when combined with other cardiometabolic abnormalities such as hypertension and high cholesterol (ERFC, 2010).

Rising rates of obesity have further intensified the global burden of CHD. Excess body weight contributes to dysregulated glucose metabolism, high blood pressure, and lipid abnormalities, all of which collectively increase cardiovascular risk (GBD, 2020). Lifestyle factors including low physical activity, unhealthy dietary patterns, and chronic stress continue to play a substantial role in the progression of CHD.

Risk prediction tools such as the Framingham Risk Score remain widely used to estimate an individual's ten-year risk of CHD. However, several authors note that these models often require recalibration when used outside the populations in which they were originally developed, particularly in regions with different baseline risks (D'Agostino et al., 2001). Current international guidelines emphasize a comprehensive approach that combines early lifestyle modification with pharmacological treatment for individuals at elevated risk (Visseren et al., 2021).

Recent research also highlights that low- and middle-income countries (LMICs) face unique challenges in CHD prevention. Although the major risk factors are similar globally, LMICs often lack widespread screening programs, affordable medications, and strong public-health infrastructures. As a result, the burden of CHD is rapidly increasing in African and Asian regions (GBD, 2020). This underscores the need for context-specific preventive strategies and stronger health system responses in these settings.

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III. METHODOLOGY

This study adopts a quantitative research design, using a cross-sectional approach to analyze secondary data on coronary heart disease (CHD) risk factors. The design is appropriate because it allows for statistical examination of the relationships between demographic, lifestyle, and clinical variables and the ten-year CHD risk. A sample of 200 respondents was purposively selected from the larger Kaggle dataset. The purposive sampling technique was employed to ensure that only individuals with complete data on all relevant variables (demographic, lifestyle, and clinical) were included. This approach guarantees the quality and completeness of data for meaningful statistical analysis.

The study employs quantitative statistical methods using STATA15 to analyze the relationships between demographic, lifestyle, and clinical factors and ten-year CHD risk. The analysis is structured as follows:

Logistic regression, often called binomial logistic regression, is used to predict the probability that an observation falls into one of two categories of a dichotomous dependent variable. This prediction is based on one or more independent variables, which may be either continuous or categorical.

When the dependent variable represents counts, Poisson regression is more appropriate. If the dependent variable has more than two categories, multinomial logistic regression is used instead.

Directly modeling probability with a linear equation is problematic because probabilities must lie between 0 and 1. Logistic regression addresses this by applying a logit transformation, which converts probabilities into a continuous scale ranging from $-\infty$ to +. The logit of p is defined as:

$$\text{Logit (p)} = \left(\frac{\log}{1-P}\right)^{P} = \text{Ln}\left(\frac{P}{1-P}\right)$$

Whereas p can only range from 0 to 1, logit(p) scale ranges from negative infinity to positive infinity and is symmetrical around the logit of 0.5 (which is zero). The formula below shows the relationship between the usual regression equation (a + bx … etc.), which is a straight line formula, and the logistic regression equation.

The form of the logistic regression equation is:

$$P = \frac{e^{\alpha+\beta_1 X_1+\beta_2 X_2+\ldots+\beta_k X_k}}{1+e^{\alpha+\beta_1 X_1+\beta_2 X_2+\ldots+\beta_k X^k}}$$

Where: p = the probability that a case is in a particular category, e = the base of natural logarithms, a = the constant of the equation and, b = the coefficient of the predictor variables.

IV. DATA ANALYSIS

Table 1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Male	200	0.385	0.488	0	1
Age	200	49.845	8.907	35	67
Education	200	1.925	1.027	1	4
Current Smoker	200	0.500	0.501	0	1
Cigarettes/Day	200	9.565	12.352	0	43
BP Meds	200	0.020	0.140	0	1
Prevalent Stroke	200	0.000	0.000	0	0
Prevalent Hyp.	200	0.325	0.470	0	1
Diabetes	200	0.025	0.157	0	1
Total	200	236.460	43.006	150	464
Cholesterol					
Systolic BP	200	132.838	22.662	94	212
Diastolic BP	200	82.308	11.729	60	124.5
BMI	200	26.026	4.520	16.75	45.8
Heart Rate	200	75.365	11.481	50	110
Glucose	200	81.610	21.194	45	225
Ten-Year CHD	200	0.190	0.393	0	1

Table 1 presents the descriptive statistics for the demographic, lifestyle, and clinical characteristics of the 200 individuals, alongside their ten-year coronary heart disease (CHD) risk. The demographic analysis shows that 38.5% of the respondents are male, indicating a slightly higher proportion of females. The mean age of the sample is 49.85 years (SD = 8.91), with ages ranging from 35 to 67 years, suggesting that the population is predominantly middle-aged to older adults. Educational attainment ranges from levels 1

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to 4, with a mean of 1.93 (SD = 1.03), implying a generally moderate level of education among participants.

Lifestyle characteristics indicate that exactly half of the respondents (50%) are current smokers, reflecting an equal distribution between smokers and non-smokers. Among those who smoke, the average cigarette consumption is 9.57 sticks per day (SD = 12.35), with values ranging widely from 0 to 43, showing considerable variation in smoking intensity.

Regarding clinical factors, only 2% of respondents reported using blood pressure medication, while none of the individuals had a history of stroke. Prevalent hypertension was observed in 32.5% of participants, and only 2.5% reported diabetes, indicating low occurrence of these conditions in the sample. The average total cholesterol level is 236.46 mg/dL (SD = 43.01), ranging from 150 to 464 mg/dL, which highlights significant variability in lipid profiles. The mean systolic blood pressure is 132.84 mmHg (SD = 22.66), with values between 94 and 212 mmHg, while diastolic blood pressure averages 82.31 mmHg (SD = 11.73), spanning from 60 to 124.5 mmHg. Body mass index (BMI) averages 26.03 kg/m² (SD = 4.52), with values ranging from 16.75 to 45.8, indicating the presence of underweight, normal-weight, overweight, and obese individuals in the dataset. The mean resting heart rate is 75.37 beats per minute (SD = 11.48), ranging between 50 and 110 bpm, while glucose levels average 81.61 mg/dL (SD = 21.19), with a wide distribution from 45 to 225 mg/dL, reflecting diverse metabolic states within the group. Finally, the ten-year CHD risk shows a mean of 0.19 (SD = 0.39), suggesting that approximately 19% of the respondents are at risk of developing coronary heart disease within the next decade.

Table 2 Correlation Matrix Table

Variable	**age**	**male**	**Currents maker**	**CIGSPE rDay**	**TOTC hol**	**SYS BP**	**dia BP**	**heart Rate**	**Preval Hyp**	**diab etes**	**bp Meds**	**bmi**	**glucose**	**TenYear CHD**
age	1.000	0.222	-0.272	-0.284	0.291	0.422	0.176	-0.038	0.235	0.132	-0.059	0.253	0.178	0.188
male	-0.222	1.000	0.154	0.253	-0.043	0.159	0.050	0.011	-0.066	-0.061	-0.040	0.048	-0.116	0.036
current Smoker	-0.272	0.154	1.000	0.929	-0.099	0.263	0.203	0.020	-0.182	-0.032	-0.071	0.295	-0.170	-0.102
cigsPer Day	-0.284	0.253	0.929	1.000	-0.114	0.245	0.164	0.087	-0.164	-0.045	-0.061	0.278	-0.162	-0.054
totChol	0.291	0.043	-0.099	-0.114	1.000	0.182	0.116	0.023	0.204	0.014	0.153	0.209	-0.011	0.189
sysBP	0.422	0.159	-0.263	-0.245	0.182	1.000	0.780	0.137	0.723	0.130	0.133	0.379	0.170	0.184
diaBP	0.176	0.050	-0.203	-0.164	0.116	0.780	1.000	0.142	0.671	0.096	0.150	0.405	0.067	0.167
heartRate	-0.038	0.011	0.020	0.087	0.023	0.137	0.142	1.000	0.097	0.142	-0.061	0.024	0.081	-0.086
prevalHyp	0.235	0.066	-0.182	-0.164	0.204	0.723	0.671	0.097	1.000	0.094	0.206	0.336	0.152	0.181
diabetes	0.132	0.061	-0.032	-0.045	0.014	0.130	0.096	0.142	0.094	1.000	0.206	0.009	0.164	0.004
bpMeds	-0.059	0.040	-0.071	-0.061	0.153	0.133	0.150	-0.061	0.206	0.206	1.000	0.082	-0.021	0.022

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BMI	0.253	0.048	-0.295	-0.278	0.209	0.379	0.405	-0.024	0.336	0.009	0.082	1.000	0.064	0.132
glucose	0.178	0.116	-0.170	-0.162	-0.011	0.170	0.067	0.081	0.152	0.164	-0.021	0.064	1.000	0.048
TenYearCHD	0.188	0.036	-0.102	-0.054	0.189	0.184	0.167	-0.086	0.181	0.004	0.022	0.132	0.048	1.000

The correlation matrix (Table 2) provides important insights into how demographic, lifestyle, and clinical factors relate to the ten-year risk of coronary heart disease (CHD) among the 200 individuals. Among the demographic variables, age shows a positive correlation with CHD risk (r = 0.188), indicating that older individuals face a higher likelihood of developing CHD within ten years. Male gender exhibits a very weak positive correlation (r = 0.036), suggesting that sex contributes minimally to CHD risk in this sample. Similarly, education shows almost no association with CHD risk, implying that the level of educational attainment does not significantly influence the probability of developing CHD in this dataset.

For lifestyle factors, both current smoking status and the number of cigarettes smoked per day show weak negative correlations with CHD risk (r = –0.102 and –0.054, respectively). Although these results appear counterintuitive, they may reflect the influence of other mediating factors such as age, medication use, or underlying clinical conditions, rather than suggesting a protective effect of smoking.

The clinical variables display clearer patterns, with several showing moderate positive correlations with ten-year CHD risk. Total cholesterol (r = 0.189) is positively associated with higher CHD risk, while systolic blood pressure (r = 0.184) and prevalent hypertension (r = 0.181) also demonstrate meaningful relationships, indicating that elevated blood pressure is an important contributor to cardiovascular risk. Body Mass Index (BMI) exhibits a weaker but positive correlation (r = 0.132), suggesting that higher body weight may slightly increase the likelihood of developing CHD. Diastolic blood pressure (r = 0.167) and glucose (r = 0.048) also show weak positive correlations, indicating small contributions to overall CHD risk. Conversely, heart rate (r = –0.086) and blood pressure medication use (r = 0.022) show very weak associations, implying minimal influence on CHD risk in this dataset. Prevalent stroke could not be analyzed due to its constant value across all respondents.

Table 3 Logistic Regression Model N = 200, Log Likelihood = -83.0177, Pseudo R^2 = 0.1463, LR $Chi^2(14)$ = 28.45, p = 0.0124

Variable	Coefficient	Std. Error	z-value	p-value	95% Confidence Interval
male	0.4731	0.4624	1.023	0.306	[-0.4332, 1.3795]
age	0.0489	0.0279	1.753	0.079	[-0.0057, 0.1035]
Education	0.1829	0.2016	0.907	0.364	[-0.2123, 0.5780]
currentsmoker	-1.0022	0.7185	-1.395	0.163	[-2.4104, 0.4059]
cigsperday	0.0504	0.0281	1.794	0.073	[-0.0046, 0.1054]
Bpmeds	-0.8933	1.3603	-0.657	0.511	[-3.5594, 1.7729]
prevalenthyp	0.2455	0.6196	0.396	0.692	[-0.9689, 1.4600]
Diabetes	-0.8462	2.0006	-0.423	0.672	[-4.7673, 3.0748]
Totchol	0.0122	0.0047	2.578	0.01	[0.0029, 0.0214]
Sysbp	0.0023	0.0171	0.133	0.894	[-0.0313, 0.0359]
Diabp	0.0285	0.0301	0.947	0.344	[-0.0305, 0.0875]
Bmi	0.0137	0.0487	0.282	0.778	[-0.0816, 0.1091]
Heartrate	-0.0337	0.0185	-1.822	0.069	[-0.0700, 0.0026]
Glucose	0.0094	0.0137	0.69	0.489	[-0.0173, 0.0362]
_cons (Intercept)	-8.8834	3.358	-2.645	0.008	[-15.4651, -2.3018]

The table above presents the results of a logistic regression analysis predicting a binary outcome based on multiple independent variables. The key columns are: the coefficient (direction and magnitude of effect), standard error (SE), z-value (coefficient divided by SE), p-value (significance), and the 95% confidence interval (CI).

- Gender (male): The coefficient is 0.4731, suggesting that being male increases the log-odds of the outcome. However, this effect is not statistically significant (p = 0.306) because the confidence interval [-0.4332, 1.3795] includes zero.
- Age: The coefficient is 0.0489, indicating a slight positive effect of age on the outcome. This effect is marginally significant (p = 0.079), and the 95% CI [-0.0057, 0.1035] barely crosses zero, suggesting a weak trend.

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- Education: The positive coefficient (0.1829) indicates higher education might increase the probability of the outcome, but it is not statistically significant (p = 0.364).
- Current smoker: The coefficient is negative (-1.0022), suggesting that being a current smoker decreases the likelihood of the outcome, but this effect is not significant (p = 0.163).
- Cigarettes per day (cigsperday): The coefficient is 0.0504, indicating a slight increase in probability with each additional cigarette per day. This is marginally significant (p = 0.073), and the 95% CI [-0.0046, 0.1054] includes zero.
- Blood pressure medication (bpmeds), prevalent hypertension (prevalenthyp), diabetes, systolic BP (sysbp), diastolic BP (diabp), BMI (bmi), and glucose: All these variables have non-significant effects (p > 0.05), indicating they do not meaningfully predict the outcome in this model.
- Total cholesterol (totchol): This variable is significant (coefficient = 0.0122, p = 0.01). A higher total cholesterol level is associated with an increased probability of the outcome. The 95% CI [0.0029, 0.0214] does not include zero, confirming significance.
- Heart rate: The coefficient is negative (-0.0337), suggesting higher heart rate may slightly reduce the probability of the outcome. This effect is marginally significant (p = 0.069).
- Intercept (_cons): The negative intercept (-8.8834, p = 0.008) indicates the baseline log-odds of the outcome when all predictors are zero.

Table 4 Model Goodness-of-Fit and Predictive Accuracy

Model Assessment	**Value**
Number of observations	200
Number of covariate patterns	200
Pearson Chi-square (df = 185)	189.9100
Probability > Chi-square (p-value)	0.3868
Area under ROC curve (AUC)	0.7630

The Pearson chi-square test was applied to assess the overall goodness-of-fit of the logistic model. The results indicated a Pearson chi-square value of 189.91 with 185 degrees of freedom, yielding a p-value of 0.3868. Since the p-value exceeds the conventional significance threshold of 0.05, we fail to reject the null hypothesis that the model fits the data well. This suggests that the logistic regression model provides an adequate fit to the observed data.

V. DISCUSSION OF RESULTS

This study examined the demographic, lifestyle, and clinical determinants of ten-year coronary heart disease (CHD) risk using descriptive statistics, correlation analysis, and multivariate logistic regression on a sample of 200 individuals. The results provide important insights into the relative influence of various risk factors within the population.

The descriptive analysis showed that the sample consisted mostly of middle-aged adults, with a mean age of 49.8 years. The prevalence of established CHD risk indicators such as hypertension (32.5%), overweight/obesity (mean BMI = 26.03), and elevated cholesterol (mean = 236.46 mg/dL) suggests that the sample is positioned within a moderately high-risk cardiovascular profile. Smoking prevalence was also notable, with 50% identified as current smokers and an average of 9.6 cigarettes consumed per day among smokers.

Correlation analysis revealed that age, total cholesterol, systolic and diastolic blood pressure, BMI, and prevalent hypertension had positive associations with ten-year CHD risk. Among these, age and systolic blood pressure showed the strongest correlations, aligning with established epidemiological evidence that increasing age and elevated blood pressure are major contributors to cardiovascular morbidity. Interestingly, smoking status and cigarettes per day exhibited weak negative correlations with CHD risk. This counterintuitive pattern is likely attributable to confounding factors such as age distribution, medication use, or the presence of clinical comorbidities whereby smokers in the dataset may be disproportionately younger or less clinically compromised.

The logistic regression analysis further clarified the independent predictors of CHD. After controlling for all other variables, total cholesterol emerged as the only statistically significant predictor (p = 0.01), indicating that an increase in cholesterol level significantly raises the likelihood of developing CHD within ten years. Age, cigarettes per day, and heart rate were marginally significant predictors but did not reach the 0.05 threshold. Surprisingly, traditional risk factors such as blood pressure, diabetes, smoking status, BMI, and glucose did not attain statistical significance in the multivariate model. This may be due to sample size limitations, low variability in some predictors, or the possibility that cholesterol captured a large share of the explanatory power associated with metabolic risk.

The model's goodness-of-fit indices show strong performance: the Pearson chi-square test (p = 0.3868) indicates no lack of fit, and the ROC value of 0.763 suggests good predictive accuracy. This confirms that the model is reliable for distinguishing between high-risk and low-risk individuals.

Overall, the results highlight the central role of lipid profiles, particularly total cholesterol, in predicting CHD risk in this population. While several traditional risk factors showed associations in preliminary analyses, only cholesterol independently predicted CHD risk after adjusting for other

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variables. This underscores the need for aggressive management of lipid levels as a primary prevention strategy.

VI. CONCLUSION

This study provides empirical evidence on the key demographic, lifestyle, and clinical factors contributing to ten-year coronary heart disease risk. The findings reveal that although many variables such as age, blood pressure, BMI, and hypertension showed positive correlations with CHD, only total cholesterol emerged as a statistically significant independent predictor in the multivariate model. The logistic regression demonstrated good fit and predictive accuracy, reinforcing the robustness of the results.

The results suggest that elevated cholesterol remains a dominant and modifiable cardiovascular risk factor in this population. While other traditional risk factors did not show significant independent effects, their positive correlations with CHD risk indicate that they still contribute meaningfully at the descriptive and bivariate levels.

In conclusion, the study underscores the critical importance of routine lipid monitoring, early detection of dyslipidaemia, and implementation of preventive strategies targeting cholesterol reduction to mitigate long-term CHD risk.

RECOMMENDATION

➢ *Based on the Findings of this Study, the Following Recommendations are Proposed:*

- Since total cholesterol was the only significant independent predictor of CHD, routine lipid testing should be emphasized in primary healthcare settings. Health practitioners should adopt aggressive cholesterol-lowering strategies, including dietary guidance, physical activity promotion, and medication where necessary.
- Even though smoking and physical inactivity did not emerge as significant predictors in the logistic model, their recognized role in cardiovascular disease warrants continuous public health campaigns on smoking cessation, reduced alcohol consumption, and improved physical activity habits.
- Given that age showed a positive correlation with CHD risk, screening programs targeting individuals aged 40 and above should be strengthened. Early risk profiling can facilitate timely interventions and better long-term outcomes.
- Clinical factors such as hypertension, glucose levels, and BMI showed positive relationships with CHD risk. Community based health education should aim to improve awareness of obesity, high blood pressure, and diabetes as contributors to cardiovascular disease.
- Healthcare providers should adopt a holistic cardiovascular risk assessment model that evaluates multiple factors together, rather than focusing on isolated indicators. The use of validated CHD risk calculators is recommended.
- To improve the generalizability of findings, future studies should use larger sample sizes and incorporate longitudinal designs. This will help clarify the temporal relationships between risk factors and CHD development.

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