iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** II **Month of publication:** February 2025

DOI: https://doi.org/10.22214/ijraset.2025.66629

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue II Feb 2025- Available at www.ijraset.com

Exploring the Impact of Regular Lifecycle Activities and Habits on Heart Disease Risk

Sumaia Rahman[1], Salma Akter Lima[2], Suraiya Jabin[3], Md Mostafizur Rahman[4]
[1, 2, 4]*Department of Computer Science and Engineering, Varendra University*
[3]*Department of Computer Science and Engineering, Rajshahi University*

Abstract: ***Lifestyle choices have a significant impact on the development and progression of heart disease, which continues to be one of the world's leading causes of morbidity and mortality. This study investigates the link between heart disease risk and routine lifetime activities and habits. It investigates the effects of smoking, drinking, physical activity, sleep habits, and asthma on cardiovascular health. It also takes into account how age, gender, and pre-existing diseases like diabetes interact to influence these risks. The results emphasize the significance of establishing and maintaining healthy lifestyle practices as a foundation for preventing heart disease and enhancing cardiovascular outcomes in general. Public health programs and individuals looking to improve their heart health through wise decision-making can benefit from the practical insights this study offers lifestyle choices have a significant impact on the development and progression of heart disease, which continues to be one of the world's leading causes of morbidity and mortality. This study investigates the link between heart disease risk and routine lifetime activities and habits. It investigates the effects of smoking, drinking, physical activity, sleep habits, and asthma on cardiovascular health. It also takes into account how age, gender, and pre-existing diseases like diabetes interact to influence these risks. The results emphasize the significance of establishing and maintaining healthy lifestyle practices as a foundation for preventing heart disease and enhancing cardiovascular outcomes in general. Public health programs and individuals looking to improve their heart health through wise decision-making can benefit from the practical insights this study offers.***
Keywords: Heart Disease Risk, Lifestyle Factors, Cardiovascular Health, Smoking, Diabetics

I. INTRODUCTION

Heart disease continues to be a leading cause of death worldwide, with its prevalence steadily rising in both developed and developing nations. According to the World Health Organization (WHO), cardiovascular diseases (CVD) account for an estimated 31% of global deaths, with lifestyle factors playing a significant role in this epidemic [2]. While genetic predisposition and environmental factors contribute to the development of heart disease, research consistently highlights the critical role that regular lifecycle activities and habits have in either mitigating or exacerbating cardiovascular risk. Healthy behaviours, including diet, physical activity, stress management, and sleep patterns, are key determinants of heart health, while detrimental habits such as smoking, excessive alcohol consumption, and sedentary lifestyles significantly elevate the risk of cardiovascular disease.

This paper aims to explore the multifaceted impact of regular lifestyle activities and habits across the lifespan on heart disease risk. Drawing on a wide range of epidemiological studies and clinical trials, we will examine how diet, exercise, stress levels, sleep, and substance use contribute to the development of heart disease over time. Additionally, it will address the long-term consequences of poor lifestyle choices, particularly focusing on how early interventions in diet and physical activity can serve as protective factors against cardiovascular disease [1]. Through a comprehensive review of existing literature and empirical evidence, this paper aims to provide a deeper understanding of how regular habits and activities shape cardiovascular health. Ultimately, the goal is to underscore the need for preventive strategies that promote healthier lifestyles across all stages of life, reducing the global burden of heart disease and improving population health outcomes.

II. LITERATURE REVIEW

More than 7,000 harmful chemicals, such as nicotine, tar, and carbon monoxide, are found in cigarette smoke. These chemicals can harm the heart and blood vessels and raise the risk of heart attacks and strokes[3]. Furthermore, even in teenagers and young adults, smoking has been connected to early-onset atherosclerosis, which can lead to an acute myocardial infarction (heart attack)[4]. The risk of cardiovascular illnesses is greatly increased by diabetes, and people with diabetes frequently have coexisting problems including high blood pressure and high cholesterol, which further raises their risk of cardiovascular disease [5]. Previous research suggests that discomfort or shortness of breath when walking or stair climbing may be a sign of underlying heart disease.

©IJRASET: All Rights are Reserved

These activities raise the body's need for oxygen, which the heart may find difficult to supply in those with heart problems, resulting in symptoms like dyspnoea (shortness of breath)[6]. Decreases in sex hormones like testosterone and estrogen are linked to aging. This decrease has been associated with a higher risk of cardiovascular conditions, especially in women who have gone through menopause. Although age is an unchangeable risk factor, prior research indicates People 65 years of age and older account for about 82% of coronary heart disease deaths [7].

III.METHODOLOGY

A secondary dataset is used in this study and the dataset is collected from kaggle.com. The total sample size was 10112 with twelve attributes. The attributes were relevant with heart disease like BMI, smoking, alcohol drinking, difficulty in walking, sleep time, asthma, physical activity, diabetic, stroke, age and gender. No missing value was appeared in the dataset so we did not need to perform any pre-processing technique. A bivariate analysis and binomial logistic regression analysis were performed to check the significant factors affecting the heart disease. At 5% levels of significance, the Chi-square test was employed to evaluate the bivariate relationship among the attributes[8]. In this study, the dependent variable was heart disease with two values 'yes' and 'no'. The dependent variable had two options that's why binomial logistic regression analysis was used to determine the associated significant factors. The binomial logistic regression model was used to compute the odd ratios (OR) with 95% confidence intervals to determine the influencing factors associated with heart disease. We used the first option of each variable as reference category when performed binomial logistic regression analysis. IBM SPSS version 25 was used to perform different types of statistical analyses, including frequency distribution, bivariate analysis, Chi-square tests and binomial logistic regression analysis.

IV.RESULT

From table 1, some common significant factors were found from the bivariate and binomial logistic regression analysis that effects on heart disease at the 5% level of significance. From the bivariate analysis, the significant factors included smoking, alcohol drinking, stroke, difficult in walking, age, diabetic, physical activity, sleep time, asthma were founded. BMI was founded as non-significant factor from this analysis (p=0.116). All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

TABLE I

THE FREQUENCY DISTRIBUTION OF THE ATTRIBUTES RELATED WITH HEART DISEASE

Variable Name	Variable Levels	Frequency (%)
BMI	Under Weight	1.6
	Normal	29.0
	Overweight	35.3
	Obese	19.3
	Extremely Obese	14.8
Smoking	Yes	55.2
	No	44.8
Alcohol Drinking	Yes	93.6
	No	6.4
Stroke	Yes	95.2
	No	4.8
Difficult in walking	Yes	83.1
	No	16.9
Gender	Male	54.8
	Female	45.2
Age	18-39years	20.3
	40-59years	28.6
	60-100years	51.1
Diabetic	Yes	85.1
	No	14.9
Physical Activity	Yes	25.2
	No	74.8
Sleep Time	1-6hours	31.3
	7-8hours	58.9
	9-20hours	9.8
Asthma	Yes	86.0
	No	14.0

From table II, some common significant factors were found from the bivariate and binomial logistic regression analysis that effects on heart disease at the 5% level of significance. From the bivariate analysis, the significant factors included smoking, alcohol drinking, stroke, difficult in walking, age, diabetic, physical activity, sleep time, asthma were founded. BMI was founded as non-significant factor from this analysis (p=0.116).

TABLE IIIII

THE CROSS TABLE OF HEART DISEASE RELATED ATTRIBUTES WITH P-VALUE

Variable Name	Variable Levels	Heart Disease		Row Total (%)	P value
		No (%)	Yes (%)		
BMI	Under Weight	1226(91.8%)	194(8.2%)	1420(100.0%)	0.116
	Normal	2675(91.2%)	258(8.8%)	2933(100.0%)	
	Overweight	3219(90.1%)	352(9.9%)	3571(100.0%)	
	Obese	1737(89.2%)	211(10.8%)	1948(100.0%)	
	Extremely Obese	1341(89.3%)	160(10.7%)	1501(100.0%)	
smoking	No	5192(93.1%)	387(6.9%)	5579(100.0%)	0.000
	Yes	3926(86.6%)	607(13.4%)	4533(100.0%)	
Alcohol Drinking	No	8514(89.9%)	952(10.1%)	9466(100.0%)	0.003
	Yes	604(93.5%)	42(6.5%)	646(100.0%)	
Stroke	No	8807(91.5%)	822(8.5%)	9629(100.0%)	0.000
	Yes	311(64.4%)	172(35.6%)	483(100.0%)	
Difficult in walking	No	7801(92.8%)	603(7.2%)	8404(100.0%)	0.000
	Yes	1317(77.1%)	391(22.9%)	1708(100.0%)	
Age	18-39	2028(98.8%)	24(1.2))	2052(100.0%)	0.000
	40-59	2727(94.4%)	162(5.6%)	2889(100.0%)	
	60-100	4363(84.4%)	808(15.6%)	5171(100.0%)	
Diabetic	No	7976(92.7%)	629(7.3%)	8605(100.0%)	0.000
	Yes	1142(75.8%)	365(24.2%)	1507(100.0%)	
Physical Activity	No	2161(84.6%)	392(15.4%)	2553(100.0%)	0.000
	Yes	6957(92.0%)	602(8.0%)	7559(100.0%)	
Sleep time	1-6hours	2841(89.8%)	324(10.2%)	3165(100.0%)	0.000
	7-8hours	5426(91.1%)	529(8.9%)	5955(100.0%)	
	9-20hours	851(85.8%)	141(14.2%)	992(100.0%)	
Asthma	No	7892(90.8%)	800(9.2%)	8692(100.0%)	0.000
	Yes	1226(86.3%)	194(13.7%)	1420(100.0%)	

Table III presents a summary of the binomial logistic regression of the heart disease and its associated factors. People who were smoking cigarette were suffering from heart disease than those who were not smoking. People with heart disease are more likely to have a stroke (p=0.000) than those without heart disease. People with heart disease have difficulty walking (P=0.000), people with diabetes are more likely to have heart disease (P=0.000), and people with asthma are more likely to have heart disease, where P value = 0.000. People aged 40-100 (p=0.000) are more likely to be affected by heart disease than those aged 18-39.

TABLE IVVVI

BINARY LOGISTIC REGRESSION ANALYSIS WITH HEART DISEASE AND ITS ASSOCIATED FACTORS

Dependent Variable →	Heart Disease		
Independent Variable ↓	P value	Exp(B)	95% CI
Smoking	0.000	0.563	0.488-0.650
Alcohol Drinking(1)	0.177	1.260	0.901-1.762
Stroke(1)	0.000	0.312	0.251-0.388
Difficult in walking(1)	0.000	0.564	0.479-0.665
Age(1)	0.000	0.107	0.070-0.162
Age(2)	0.000	0.381	0.317-0.457
Diabetic(1)	0.000	0.402	0.344-0.470
Physical Activity(1)	0.002	1.278	1.095-1.492
Sleep time(1)	0.151	0.845	0.671-1.063
Sleep time(2)	0.066	0.816	0.657-1.013
Asthma(1)	0.026	0.809	0.671-0.975

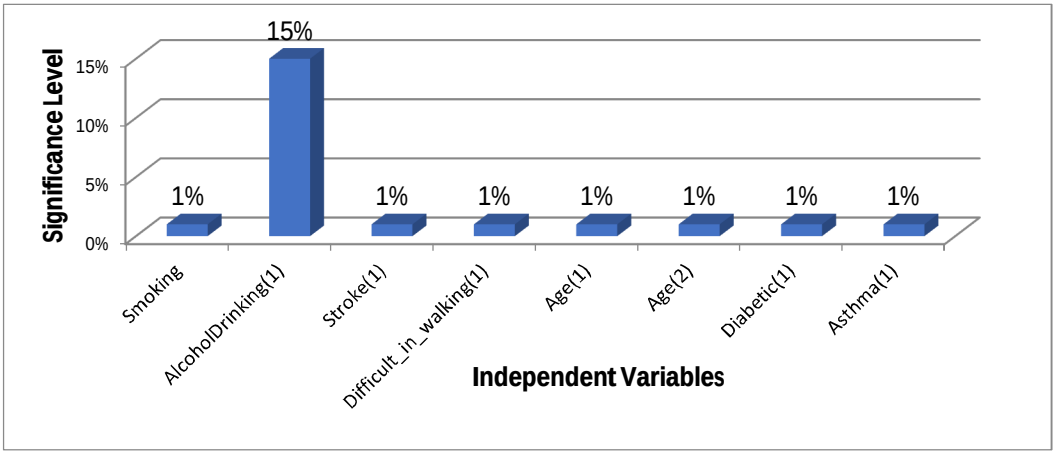


Fig. 1 Significant factors associated with heart disease

V. DISCUSSION

The primary objective of this study was to investigate the impact of regular lifestyle activities and habits on heart disease. We have investigated and found some statistically significant factors those have significant impact on causing heart disease.

Smoking raises fibrinogen and platelet activity, which enhances the blood's propensity to clot. The risk of acute cardiac disease is increased by these alterations[9][10]. In our study it was found that people who were smoking cigarette were suffering from heart disease(OR=0.563, p=0.000). Heart problems such myocardial damage, arrhythmias, and abrupt cardiac death can result from an acute stroke[11][12][13]. According to our study, people with heart disease are more likely to have a stroke (OR=0.312, p=0.000). Some studies found that patients with asthma are at a higher risk of dying from coronary heart disease and from all causes[14][15]. In this study, we also found that people with asthma are more likely to have heart disease, where p = 0.000 and OR = 0.809. According to previous study Peripheral Artery Disease is prevalent among patients with coronary artery disease, often contributing to walking impairments [16][17][18]. Additionally, our study revealed that walking is difficult for those with heart problems (OR=0.564, p=0.000). However, our study has some limitation. Based on previous study, it was revealed that diabetic patients exhibit more extensive and severe coronary artery disease compared to non-diabetics[19][20][21]. Our study also found the same concept.

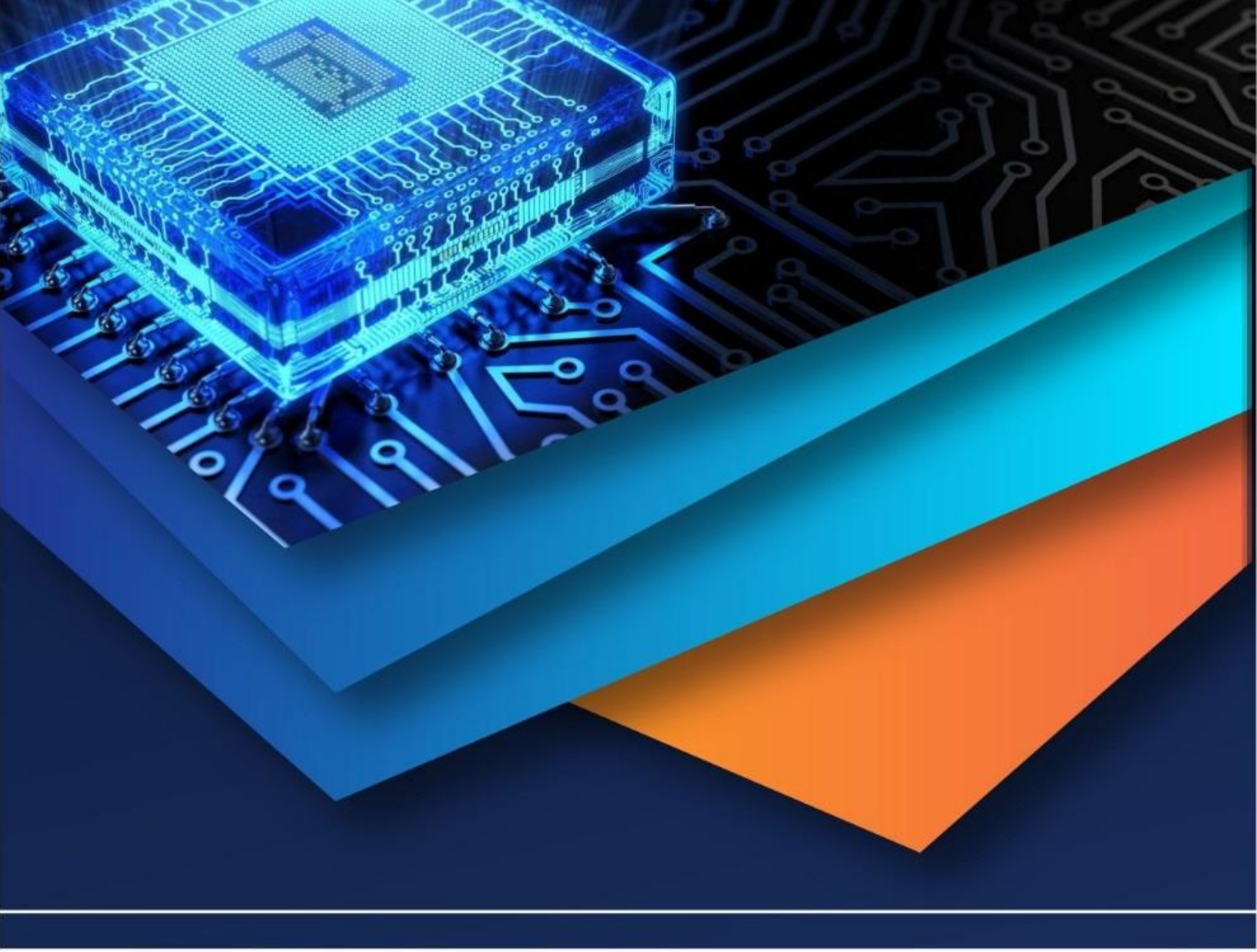
Therefore, our research did not identify additional important characteristics associated with heart disease. That's why others significant factors on heart disease were not highlighted through our research. So it is recommended that future investigation be conducted with different attribution on heart disease with large sample size.

VI. CONCLUSION

The result of this study suggests that smoking is dangerous for health and it can cause heart disease. Diabetic is one of the important reasons of heart disease so we need to maintain a healthy life besides maintain optimal blood sugar levels to get rid of diabetics. To avoid heart disease, asthma patient should take proper medication, need to changes lifestyle like balanced diet, regular exercise and so on. To avoid heart disease, people should monitor blood pressure regularly and control cholesterol levels because these are significant risk factors associated with heart disease. Heart disease and stroke are closely related, as they share many common risk factors and can affect each other. People with heart disease have problems walking and climbing stairs. To get rid of this problem, they should do some things like focus on breathing while walking, take rest for a while when walking, walk on flat surfaces to reduce the effort needed and avoid uneven terrain that may be harder to navigate and so on.

REFERENCES

[1] Lavie, C. J., Milani, R. V., & Mehra, M. R. (2019). Impact of physical activity, exercise, and fitness on cardiovascular disease and overall health. Progress in Cardiovascular Diseases, 62(2), 1–10.
[2] World Health Organization. (2020). Cardiovascular diseases (CVDs). https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases
[3] H. V., Er, R., Sahu, S., & Davalgi, S. (2023). A systematic review of the effects of smoking on the cardiovascular system and general health. Cureus, 15(4), e38073. https://doi.org/10.7759/cureus.38073
[4] Parmar, M. P., Kaur, M., Bhavanam, S., Mulaka, G. S. R., Ishfaq, L., Vempati, R., C, M. F., Kandepi, Gallucci, G., Tartarone, A., Lerose, R., Lalinga, A. V., & Capobianco, A. M. (2020). Cardiovascular risk of smoking and benefits of smoking cessation. Journal of thoracic disease, 12(7), 3866–3876. https://doi.org/10.21037/jtd.2020.02.47
[5] Alinejad, H., & Kamiab, Z. (2023). Cardiovascular risk factors in diabetic patients with and without metabolic syndrome: a study based on the Rafsanjan cohort study. Scientific Reports, 13(1), 559. https://doi.org/10.1038/s41598-022-27208-5
[6] Kim, M. K., Kim, C. Y., Baek, C. Y., Kim, S. W., Je, H. D., Jeong, J. H., & Kim, H. D. (2024). The effects of various stair-climbing exercises on functional mobility and trunk muscle activation in community-dwelling older adults: A pilot randomized controlled trial. Medicine, 103(23), e38446.
[7] Rodgers, J. L., Jones, J., Bolleddu, S. I., Vanthenapalli, S., Rodgers, L. E., Shah, K., Karia, K., & Panguluri, S. K. (2019). Cardiovascular risks associated with gender and aging. Journal of Cardiovascular Development and Disease, 6(2), 19. https://doi.org/10.3390/jcdd6020019
[8] Rahman, S., Munam, A. M., Hossain, A., Hossain, A. S. M. D., & Bhuiya, R. A. (2023). Socio-economic factors affecting the academic performance of private university students in Bangladesh: a cross-sectional bivariate and multivariate analysis. SN Social Sciences, 3(2), 26. https://doi.org/10.1007/s43545-023-00614-w
[9] Ambrose, J. A., & Barua, R. S. (2004). The pathophysiology of cigarette smoking and cardiovascular disease: an update. Journal of the American college of cardiology, 43(10), 1731-1737.
[10] Wichman, C. L., Moore, K. M., Lang, T. R., Sauver, J. L. S., Heise Jr, R. H., & Watson, W. J. (2009, January). Congenital heart disease associated with selective serotonin reuptake inhibitor use during pregnancy. In Mayo Clinic Proceedings (Vol. 84, No. 1, pp. 23-27). Elsevier.
[11] complications following stroke. Stroke; a Journal of Cerebral Circulation, 53(5), 1759–1763. https://doi.org/10.1161/STROKEAHA.121.037316
[12] Scherbakov, N. (2021). Ischemic stroke and heart failure: Facts and numbers. An update. Journal of Clinical Medicine, 10(5), 1146. https://doi.org/10.3390/jcm10051146
[13] stroke incidence in people with cardiac disease: A linked data cohort study. Clinical Epidemiology, 15, 203–211. https://doi.org/10.2147/CLEP.S390146
[14] Official Journal of the European Society for Clinical Respiratory Physiology, 62(5), 2301788. https://doi.org/10.1183/13993003.01788-2023
[15] Zhang, B., Li, Z.-F., An, Z.-Y., Zhang, L., Wang, J.-Y., Hao, M.-D., Jin, Y.-J., Li, D., Song, A.-J., Ren, Q., & Chen, W.-B. (2022). Association between asthma and all-cause mortality and cardiovascular disease morbidity and mortality: A meta-analysis of cohort studies. Frontiers in Cardiovascular Medicine, 9, 861798. https://doi.org/10.3389/fcvm.2022.861798
[16] Hiatt, W. R., Hirsch, A. T., Regensteiner, J. G., & Brass, E. P. (1995). Clinical trials for claudication: assessment of exercise performance, functional status, and clinical end points. Circulation, 92(3), 614-621.
[17] Zafrir, B., Aker, A., & Saliba, W. (2023). Extreme lipoprotein (a) in clinical practice: A cross sectional study. International Journal of Cardiology Cardiovascular Risk and Prevention, 16, 200173.
[18] Steinberg, B. A., Li, Z., O'Brien, E. C., Pritchard, J., Chew, D. S., Bunch, T. J., ... & Piccini, J. P. (2021). Atrial fibrillation burden and heart failure: data from 39,710 individuals with cardiac implanted electronic devices. Heart Rhythm, 18(5), 709-716.
[19] Jia, G., Hill, M. A., & Sowers, J. R. (2018). Diabetic cardiomyopathy: an update of mechanisms contributing to this clinical entity. Circulation research, 122(4), 624-638.
[20] Zinman, B., Marso, S. P., Poulter, N. R., Emerson, S. S., Pieber, T. R., Pratley, R. E., ... & Buse, J. B. (2018). Day-to-day fasting glycaemic variability in DEVOTE: associations with severe hypoglycaemia and cardiovascular outcomes (DEVOTE 2). Diabetologia, 61(1), 48-57.
[21] Zinman, B., Marso, S. P., Christiansen, E., Calanna, S., Rasmussen, S., Buse, J. B., & LEADER Publication Committee on behalf of the LEADER Trial Investigators. (2018). Hypoglycemia, cardiovascular outcomes, and death: the LEADER experience. Diabetes Care, 41(8), 1783-1791.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)