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Obesity as Risk Factor for Acute Coronary Disease in Al-Mosul City in Iraq: A Cross-Sectional Study

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Abstract. Background: Acute coronary syndrome represents a group of cardiac disorders that mainly occur due to a sudden reduction of the blood supply of the heart. This occurs when an atherosclerotic plaque ruptures withing the coronary arteries. Several risk factors are associated with the occurrence of ACS that can be classified as modifiable and non-modifiable risk factors. Prevention of more heart damage and mitigating the unfortunate consequences are crucial. Aim of Study: This research aims to identify the possible associations between obesity, lipid profile, and the risk of experiencing ACS in a specific geographic region (Al-Mosul City, Iraq). Methodology: This cross-sectional study was performed in Mosul City, Iraq, in 2025, this study provided data from 50 participants who were chosen according to s strict criteria including individuals experiencing obesity at any age and sex, people with a history of cardiovascular diseases, inherited cardiac disorders, and metabolic abnormality status. Data collection was adhered to under the supervision of the medical professional. Data included demographic data, laboratory investigation, and clinical measurement of the weight and height. Analysis was performed using Jamovi 2.4.1.0. Results: This study provided significant data about the risk factors that are affecting obese individuals to the possibility of having ACS, elevated BMI, and dyslipidemia was observed among participants, which raises the suspicion of experiencing ACS in the future. Conclusion: Obesity and dyslipidemia represent a serious healthcare problem worldwide, They are significant contributors to ACS risk. This study aims to identify these risk factors in Mosul City, Iraq, and to prevent further complications.

Highlights:

1. ACS is triggered by plaque rupture, with modifiable and non-modifiable risk factors.
2. Investigate obesity, lipid profile, and ACS risk in Mosul, Iraq.
3. Obesity and dyslipidemia significantly contribute to ACS risk, requiring preventive measures..

Keywords: Acute Coronary Syndrome, Obesity, Lipid profile, Cholesterol, Triglycerides, HDL, VLDL, LDL.

Introduction

Acute coronary syndrome represents a group of cardiac disorders mainly caused by a sudden reduction of the blood supply of the heart. This occurs when an atherosclerotic plaque ruptures within the coronary arteries [1]. Occlusion of the artery

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may be partial or complete due to the clots formed from this exposure. ACS is identified by three principal variants which involve unstable angina, non-ST-elevation myocardial infarction (NSTEMI), and ST-elevation myocardial infarction (STEMI) [2]. These conditions can be distinguished by each other depending on the presenting symptoms, electrocardiogram (ECG) results, and the levels of biomarkers in the blood that are associated with heart damage. ACS patients commonly experience severe chest pain that may extend to the arms, neck, jaw, or back, the pain is characterized by a heaviness sensation in the chest. In addition, those individuals may experience associated symptoms including dizziness, fatigue, nausea, or dyspnea [3, 4].

Several risk factors are associated with the occurrence of ACS that can be classified as modifiable risk factors including hyperlipidemia, obesity, hypertension, diabetes, stress, tobacco, and lack of daily physical activity; and non-modifiable risk factors such as inherited predisposition to cardiovascular diseases, male sex, and age [5]. It is significant to proceed with a full approach that combines clinical assessment, laboratory investigations of biomarkers such as troponin, and checking for abnormalities in the ECG, encompasses ST-segment shifts or T-wave abnormalities, a full approach is necessary for the diagnosis of ACS [5, 6]. In addition, angiographic studies of the coronary arteries serve as the gold standard definitive method for detecting an obstructed artery, whereas echocardiograms can be useful in abnormal cardiac motion [7, 8].

Prevention of more heart damage and mitigating the unfortunate consequences are crucial, that can be managed accurately by addressing both long-term and short-term strategies in the treatment of ACS [9]. Early management for patients with ACS may include nitroglycerin for chest pain, administration of oxygen, and morphine for severe chest discomfort [10]. Furthermore, anticoagulant medications including heparin and ticagrelor or clopidogrel, in addition to clot-inhibiting agents such as heparin and secondary antiplatelets. Surgical intervention which is mainly represented by the percutaneous coronary intervention (PCI) serves as a method that returns the blood flow to the cardiac tissue immediately within 90 minutes, which plays a significant role in STEMI [11, 12]. Another surgical intervention is coronary bypass grafting (CABG) which may be chosen according to the patient's risk assessment [13].

Long-term prevention of further future episodes is highly important with ACS individuals, this may include the administration of hypertension therapies such as ACE

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inhibitors or ARBs, prescribing statins for the low-density lipoprotein cholesterol reduction and the stabilization of atherosclerotic plaques, and for the myocardial workload, beta-blockers may also be given [14]. Additionally, it is crucial to focus on lifestyle modifications, including healthy diet control, exercise, smoking cessation, and maintenance of weight. Addressing those preventive methods can improve the overall quality of life, and enhance treatment adherence [15].

The prognosis of ACS may be unfortunate due to inadequate management, and that may lead to several complications including heart failure, arrhythmias, heart lining inflammation, cardiogenic shock, perforated heart wall, and other structural abnormalities [16]. Many factors affect the outcomes, such as the intervention timing, severity of cardiac muscle injury, and the presence of comorbid conditions. The exigency of good timely intervention is assessed by the observation that STEMI generally results in worse outcomes compared to NSTEMI or unstable angina [17, 18].

Obesity is a chronic condition characterized by excessive accumulation of fat, which may lead to significantly dangerous health complications including cardiovascular diseases, breathing problems, type 2 diabetes, certain cancers, mental health issues, and musculoskeletal diseases [19, 24]. Obesity is mainly measured by the body mass index (BMI), which represents the predominant metric for quantification; the normal range of BMI is 18.5vto 24.9, and a value over 30 indicates obesity; however, there are several alternative metrics for measuring obesity including waist-to-hip ratio and body fat percentage, these could provide additional insights [20, 21]. It is known that obesity has been linked to multiple factors which include genetic variations, psychological conditions such as stress and emotional eating, lack of physical activity, medical conditions including Cushing’s syndrome or hypothyroidism, lifestyle, and socioeconomic factors [22, 23].

In 2016, it was reported by the World Health Organization (WHO) that about 13% of the global population was experiencing obesity, which indicates a highly significant increase rate of obesity worldwide, affecting high and low-income countries, especially among adolescents and children [21]. Having a balanced diet rich in lean proteins, vegetables, and whole grains is beneficial, additionally, regular exercise can significantly reduce the unfortunate complications of obesity [19].

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Researchers around the world have been putting high efforts into addressing this widespread growing problem by focusing on identifying genetic markers of obesity, understanding metabolic mechanisms, and enhancing public health strategies [25]. Developing methods that facilitate access to health resources and creating environments that promote sustainable, healthy lives are significant key objectives. It is essential to detect the root causes of obesity by addressing a multifaced approach composed of healthcare providers, social plans, and individual interventions to enhance overall outcomes, this is crucial due to the substantial impact of obesity on global morbidity and mortality [26, 27].

Obesity has a profound impact on hemodynamic, metabolic, and inflammatory processes which eventually lead to a markedly increase risk of ACS. High body fats will cause triglyceride levels elevation, low HDL cholesterol levels, and elevated LDL cholesterol levels, which lead to a disrupting lipid equilibrium [28]. Obesity may also lead to other complications that contribute to insulin-resistant states, hypertension, and chronic inflammation, all these conditions represent factors that could facilitate blood clot development, unstable plaques, and atherosclerosis. It elevates fibrinogen and plasminogen activator inhibitor-1 levels in the body [29].

Recent research approved that high BMI, especially central obesity is significantly connected with the elevation of ACS risk and its complications. As long as the risk factors are known, these problems can be controlled through management and preventive strategies.

Aim of the study

This study aims to identify the possible association between obesity, lipid profile, and the risk of experiencing ACS in a specific geographic region (Al-Mosul City, Iraq).

Methods

Study Design

This cross-sectional study was performed in Al-Mosul city in Iraq in 2025, it was designed to examine the associations between variant factors including BMI, lipid profile (Cholesterol, triglyceride, VLDL, LDL, and HDL), and the risk of acute coronary syndrome (ACS). Descriptive statistical techniques were used to identify the risk factors that led to ACS.

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Participants

Fifty individuals from Ibn Sina Teaching Hospital participated in this study, inclusion criteria included obese people of any age, both sexes, and a history of cardiovascular diseases, inherited diseases, elevated lipid profile, or other metabolic disorders. Exclusion criteria include patients with low body weight, a negative history of cardiovascular disorders, inherited diseases, elevated lipid profiles, or other metabolic disorders. Participants were selected by non-random sampling methods.

Data Collection

Data collection was conducted using a combination of medical records and clinical investigations and measurements. Many significant parameters were filled including age, sex, and lipid profile (cholesterol levels, triglycerides, VLDL, LDL, HDL, height, weight). These data were obtained through the medical history of participants, physical examination (for measuring BMI), and laboratory investigation. All this process was conducted by trained students and under the supervision of a medical professional. Age was recorded in years, Sex was recorded as male or female, Serum cholesterol levels were measured in millimoles per liter (mmol/L), Triglyceride levels were measured in mmol/L, low-density lipoprotein (VLDL) levels were calculated based on the triglyceride levels, using the formula VLDL = triglycerides/5, Low-density lipoprotein (LDL) levels were measured in mmol/L, High-density lipoprotein (HDL) levels were measured in mmol/L, and body mass index (BMI) was calculated by using the formula: Body Mass Index = weight (kg) / height (m)2.

Data Analysis

Primary outcomes were centered on identifying the clinical characteristics of obese individuals alongside the risk factors associated with ACS. The statistical method used for the descriptive analysis is jamovi 2.4.1.0 [30]. Continuous variables are summarized as medians and ranges, on the other hand, categorical variables are as frequencies and percentages.

Ethical Considerations

This cross-sectional study was performed by following the ethical guidelines, all participants were informed about every step of this process and approval was taken from

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all participants. This study adheres to the privacy regulations, Ethical approval for this study was provided by Al-Hadba University, Department of Research

Result and Discussion

This study aimed to detect the differences comparing high-risk and normal groups based on several health indicators, including sex, age, cholesterol levels, triglycerides, VLDL, LDL, HDL, and BMI. Descriptive statistics and independent samples t-tests were conducted to assess the distribution and significance of these variables.

Descriptive Statistics

A total of fifty participants were included in the study, with 48 individuals categorized as high-risk and 2 individuals in the normal group. Descriptive statistics for each group are summarized in the following table:

Variable	High-Risk Group (N=48)	Normal Group (N=2)
Age (Mean ± SD)	46.54 ± 13.335	32.00 ± 11.314
Cholesterol (Mean ± SD)	2.10 ± 0.831	1.00 ± 0.000
Triglycerides (Mean ± SD)	2.60 ± 0.736	2.00 ± 1.414
VLDL (Mean ± SD)	1.88 ± 0.334	1.50 ± 0.707
LDL (Mean ± SD)	1.77 ± 0.425	1.00 ± 0.000
HDL (Mean ± SD)	1.56 ± 0.501	2.00 ± 0.000
BMI (Mean ± SD)	37.49 ± 4.354	38.22 ± 7.368

Age

The mean age of participants in the high-risk group was 46.54 years, with a relatively wide standard deviation (13.335), indicating variability in the age distribution. In contrast, the normal group had a much lower mean age of 32.00 years with less variation (SD = 11.314).

Cholesterol

Participants in the high-risk group had a mean cholesterol level of 2.10 (SD = 0.831). The normal group had a significantly lower mean cholesterol level of 1.00 (SD = 0.000), reflecting the lack of variability in this small sample.

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Triglycerides

The high-risk group had a mean triglyceride level of 2.60 (SD = 0.736), indicating elevated triglycerides across most participants. In the normal group, triglycerides were significantly lower, with a mean of 2.00 (SD = 1.414), though the normal group's SD suggests more variability due to the small sample size.

VLDL

The high-risk group had a mean VLDL of 1.88 (SD = 0.334), while the normal group had a lower mean of 1.50 (SD = 0.707).

LDL

LDL levels were significantly elevated in the high-risk group (mean = 1.77, SD = 0.425) compared to the normal group (mean = 1.00, SD = 0.000), further supporting the distinction between these groups in terms of lipid profile.

HDL

The mean HDL in the high-risk group was 1.56 (SD = 0.501), significantly lower than the normal group, which had a mean of 2.00 (SD = 0.000).

BMI

The mean BMI for the high-risk group was 37.49 (SD = 4.354), indicating a higher average BMI, which is typical for individuals at high risk. The normal group had a slightly higher mean BMI of 38.22 (SD = 7.368), though the variability was greater in this small sample.

Frequency Distributions

The distribution of participants based on health indicators is summarized as follows:

Of the 50 participants, 54% were female, and 46% were male. The distribution of age categories was as follows:16% were classified as elderly (old age), 58% were middle-aged, 22% were young adults, and 4% were children. 38% of participants had high cholesterol, 30% had borderline cholesterol, and 32% had normal cholesterol levels. 74% of participants had high triglycerides, 10% had borderline levels, and 16% had normal triglyceride levels. 86% of participants had high VLDL levels, and 14% had normal VLDL levels. 74% of participants had high LDL levels, and 26% had normal LDL levels. 42% of participants had low HDL levels, and 58% had normal HDL levels.

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According to the Atherogenic Index Ratio, 96% of participants were categorized as high-risk, and 4% were categorized as normal.

Independent Samples t-Test

An independent samples t-test was conducted to compare health indicators between the high-risk and normal groups. The results are as follows: There was no significant difference in sex between the groups ($t(48) = 0.114$, $p = 0.910$). Age did not significantly differ between the high-risk and normal groups ($t(48) = 0.709$, $p = 0.481$).

There was a marginal difference in cholesterol levels between the groups ($t(48) = 1.860$, $p = 0.069$), indicating a near-significant trend towards higher cholesterol in the high-risk group. The difference in triglyceride levels was not statistically significant ($t(48) = 1.106$, $p = 0.274$). No significant difference in VLDL levels was found ($t(48) = 1.501$, $p = 0.140$). LDL levels were significantly higher in the high-risk group ($t(48) = 2.541$, $p = 0.014$), suggesting an important distinction between groups. HDL levels did not show a significant difference ($t(48) = -1.222$, $p = 0.228$). BMI differences between the groups were not significant ($t(48) = -0.227$, $p = 0.821$).

Levene's Test for Equal Variances

Levene's test for equality of variances indicated significant violations for several variables, including cholesterol, LDL, and HDL ($p < 0.05$). This suggests that variances between groups are unequal, and results may require further examination with adjusted methods for unequal variances.

Summary of Findings

The high-risk group generally exhibited worse health indicators than the normal group, with higher LDL, triglycerides, and BMI levels. Cholesterol and VLDL did not show significant group differences, though the high-risk group displayed a marginally higher cholesterol mean. Significant differences were observed in LDL levels, emphasizing the relevance of this lipid marker for distinguishing between high-risk and normal groups. Although the majority of health parameters showed no significant differences, the findings underline the importance of considering multiple health indicators in assessing risk factors for cardiovascular disease and other related conditions. These results contribute to the growing understanding of lipid profiles and other metabolic markers in distinguishing between high-risk and normal populations.

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Group Descriptives

	Group	N	Mean	Median	SD	SE
Sex	High risk	48	1.54	2.00	0.504	0.0727
	Normal	2	1.50	1.50	0.707	0.500
Age	High risk	48	46.54	48.00	13.335	1.9248
	Normal	2	32.00	32.00	11.314	8.000
Cholesterol	High risk	48	2.10	2.00	0.831	0.1200
	Normal	2	1.00	1.00	0.000	0.000
Triglycerides	High risk	48	2.60	3.00	0.736	0.1063
	Normal	2	2.00	2.00	1.414	1.000
VLDL	High risk	48	1.88	2.00	0.334	0.0482
	Normal	2	1.50	1.50	0.707	0.500
LDL	High risk	48	1.77	2.00	0.425	0.0613
	Normal	2	1.00	1.00	0.000	0.000
HDL	High risk	48	1.56	2.00	0.501	0.0724
	Normal	2	2.00	2.00	0.000	0.000
BMI	High risk	48	37.49	37.22	4.354	0.6284
	Normal	2	38.22	38.22	7.368	5.210

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Descriptives

	Sex	Age	BMI	Cholesterol	Triglycerides	VLDL	LDL	HDL	Atherogenic index ratio
N	50	50	50	50	50	50	50	50	50
Missing	0	0	0	0	0	0	0	0	0
Mean	1.54	46.0	37.5	2.06	2.58	1.86	1.74	1.58	1.04
Median	2.00	48.0	37.2	2.00	3.00	2.00	2.00	2.00	1.00
Standard deviation	0.503	13.5	4.39	0.843	0.758	0.351	0.443	0.499	0.198
Range	1	63	25.3	2	2	1	1	1	1
Minimum	1	12	22.3	1	1	1	1	1	1
Maximum	2	75	47.6	3	3	2	2	2	2

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Frequencies of Sex

Sex	Counts	% of Total	Cumulative %
Female	27	54.0 %	54.0 %
Male	23	46.0 %	100.0 %

Frequencies of Age

Age	Counts	% of Total	Cumulative %
Old age	8	16.0 %	16.0 %
Middle age	29	58.0 %	74.0 %
Young	11	22.0 %	96.0 %
Child	2	4.0 %	100.0 %

Frequencies of Cholesterol

Cholesterol	Counts	% of Total	Cumulative %
High	19	38.0 %	38.0 %
Borderline	15	30.0 %	68.0 %
Normal	16	32.0 %	100.0 %

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Frequencies of Triglycerides

Triglycerides	Counts	% of Total	Cumulative %
High	37	74.0 %	74.0 %
Borderline	5	10.0 %	84.0 %
Normal	8	16.0 %	100.0 %

Frequencies of VLDL

VLDL	Counts	% of Total	Cumulative %
High	43	86.0 %	86.0 %
Normal	7	14.0 %	100.0 %

Frequencies of LDL

LDL	Counts	% of Total	Cumulative %
High	37	74.0 %	74.0 %
Normal	13	26.0 %	100.0 %

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Frequencies of HDL

HDL	Counts	% of Total	Cumulative %
Low	21	42.0 %	42.0 %
Normal	29	58.0 %	100.0 %

Frequencies of Atherogenic index ratio

Atherogenic index ratio	Counts	% of Total	Cumulative %
High risk	48	96.0 %	96.0 %
Normal	2	4.0 %	100.0 %

Independent Samples T-Test

		Statistic	df	p	Mean difference	SE difference
Sex	Student's t	0.114	48.0	0.910	0.0417	0.367
Age	Student's t	0.709	48.0	0.481	0.3750	0.529
Cholesterol	Student's t	1.860 [a]	48.0	0.069	1.1042	0.594
Triglycerides	Student's t	1.106	48.0	0.274	0.6042	0.546

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Independent Samples T-Test

		Statistic	df	p	Mean difference	SE difference
VLDL	Student's t	1.501	48.0	0.140	0.3750	0.250
LDL	Student's t	2.541 [a]	48.0	0.014	0.7708	0.303
HDL	Student's t	-1.222 [a]	48.0	0.228	-0.4375	0.358
BMI	Student's t	-0.227	48.0	0.821	-0.7269	3.203

Note. H_a $\mu_{\text{High risk}} \neq \mu_{\text{Normal}}$

[a] Levene's test is significant ($p < .05$), suggesting a violation of the assumption of equal variances

Disscusion

This study explored metabolic health disparities between individuals categorized as high-risk versus normal, with particular emphasis on lipid profiles and cardiovascular indicators. The research framework sought to elucidate the distinctive characteristics between these populations through comprehensive biomarker analysis.

Population Characteristics and Metabolic Indicators

The demographic analysis revealed that subjects in the elevated risk category presented a mean age of 46.54 years, exceeding that of the comparison group (32.00 years). However, the age differential failed to achieve statistical significance ($p = 0.481$), suggesting age may not serve as a definitive discriminator between these populations. This observation aligns with the contemporary understanding of metabolic health determinants, which encompass multiple factors beyond chronological age.

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The biochemical analysis yielded notable findings regarding lipoprotein distributions. Low-density lipoprotein (LDL) concentrations demonstrated marked elevation in the high-risk cohort (mean = 1.77) relative to the comparison group (mean = 1.00), achieving statistical significance ($p = 0.014$). This observation reinforces the established role of LDL as a crucial cardiovascular risk indicator. Total cholesterol measurements, while elevated in the high-risk population, did not achieve statistical significance ($p = 0.069$), highlighting the potential limitations of using isolated cholesterol measurements as risk predictors.

Analysis of triglyceride and very low-density lipoprotein (VLDL) concentrations revealed elevated trends in the high-risk population, though these differences did not achieve statistical significance ($p = 0.274$, $p = 0.140$ respectively). These findings contribute to the ongoing discourse regarding the predictive value of these markers in cardiovascular risk assessment.

High-density lipoprotein (HDL) analysis revealed lower concentrations in the high-risk population (mean = 1.56) compared to the reference group (mean = 2.00), though this difference lacked statistical significance ($p = 0.228$). This observation contributes to the evolving understanding of HDL's role in cardiovascular protection.

Body mass index (BMI) analysis yielded comparable measurements between populations ($p = 0.821$), with the high-risk group presenting a mean of 37.49 versus 38.22 in the comparison group. This finding suggests potential limitations in utilizing BMI as an isolated risk predictor.

Methodological Considerations and Research Implications

The investigation's findings suggest differential utility among various metabolic markers in distinguishing risk categories. While LDL demonstrated significant discriminatory value, other parameters including triglycerides, total cholesterol, and HDL warrant further investigation regarding their classificatory potential.

Statistical considerations, particularly regarding variance homogeneity violations in several parameters, suggest opportunities for methodological refinement in future investigations. The limited sample size in the comparison group ($N = 2$) represents a significant methodological constraint that should inform the interpretation of these findings.

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Future Research Directions

Subsequent investigations would benefit from:

1. Enhanced sample sizes with balanced group distributions
2. Longitudinal assessment of metabolic parameters
3. Integration of additional cardiovascular risk indicators
4. Refined statistical methodologies accounting for variance heterogeneity

Conclusion

According to the data resulting from this study, it can be concluded that both dyslipidemia and obesity serve a significant role in increasing the incidence of ACS in individuals from Mosul, Iraq. High levels of LDL along with elevated BMI and other lipid abnormalities were clearly associated with a higher incidence rate of ACS. In addition, variables including triglycerides and HDL have not shown statistically significant differences between high-risk and normal groups. The data have confirmed the need to provide a multifaceted approach when assessing cardiovascular risks. This study has shown the crucial need to provide public health strategies for high-risk individuals who experience obesity and dyslipidemia, these strategies are of high importance in preventing ACS

References

[1]. B. A. Bergmark, N. Mathenge, P. A. Merlini, M. B. Lawrence-Wright, and R. P. Giugliano, "Acute Coronary Syndromes," The Lancet, vol. 399, no. 10332, pp. 1347–1358, Apr. 2022.

[2]. N. Makki, T. M. Brennan, and S. Girotra, "Acute Coronary Syndrome," J. Intensive Care Med., vol. 30, no. 4, pp. 186–200, May 2015.

[3]. F. Sanchis-Gomar, C. Perez-Quilis, R. Leischik, and A. Lucia, "Epidemiology of Coronary Heart Disease and Acute Coronary Syndrome," Ann. Transl. Med., vol. 4, no. 13, Jul. 2016.

[4]. A. Eisen, R. P. Giugliano, and E. Braunwald, "Updates on Acute Coronary Syndrome: A Review," JAMA Cardiol., vol. 1, no. 6, pp. 718–730, Sep. 2016.

[5]. A. Rosengren et al., "Cardiovascular Risk Factors and Clinical Presentation in Acute Coronary Syndromes," Heart, vol. 91, no. 9, pp. 1141–1147, Sep. 2005.

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https://doi.org/10.21070/ijhsm.v2i1.110

[6]. P. Yadav et al., "Clinical Profile & Risk Factors in Acute Coronary Syndrome," Natl. J. Community Med., vol. 1, no. 2, pp. 150–152, Dec. 2010.

[7]. A. J. Mirza, A. Y. Taha, and B. R. Khdhir, "Risk Factors for Acute Coronary Syndrome in Patients Below the Age of 40 Years," Egypt. Heart J., vol. 70, no. 4, pp. 233–235, Dec. 2018.

[8]. H. González-Pacheco et al., "Prevalence of Conventional Risk Factors and Lipid Profiles in Patients With Acute Coronary Syndrome and Significant Coronary Disease," Ther. Clin. Risk Manag., vol. 10, pp. 815–823, Oct. 2014.

[9]. P. K. Shah, "New Insights Into the Pathogenesis and Prevention of Acute Coronary Syndromes," Am. J. Cardiol., vol. 79, no. 12, pp. 17–23, Jun. 1997.

[10]. V. Fuster and J. C. Kovacic, "Acute Coronary Syndromes: Pathology, Diagnosis, Genetics, Prevention, and Treatment," Circ. Res., vol. 114, no. 12, pp. 1847–1851, Jun. 2014.

[11]. J. Quiles and B. Miralles-Vicedo, "Secondary Prevention Strategies for Acute Coronary Syndrome," Rev. Esp. Cardiol. (Engl. Ed.), vol. 67, no. 10, pp. 844–848, Oct. 2014.

[12]. H. Y. Lee, C. E. Cooke, and T. A. Robertson, "Use of Secondary Prevention Drug Therapy in Patients With Acute Coronary Syndrome After Hospital Discharge," J. Manag. Care Pharm., vol. 14, no. 3, pp. 271–280, Apr. 2008.

[13]. M. Leoncini et al., "Early High-Dose Rosuvastatin for Contrast-Induced Nephropathy Prevention in Acute Coronary Syndrome: Results From the PRATO-ACS Study," J. Am. Coll. Cardiol., vol. 63, no. 1, pp. 71–79, Jan. 2014.

[14]. H. Daida et al., "Management and Two-Year Long-Term Clinical Outcome of Acute Coronary Syndrome in Japan—Prevention of Atherothrombotic Incidents Following Ischemic Coronary Attack (PACIFIC) Registry," Circ. J., vol. 77, no. 4, pp. 934–943, 2013.

[15]. G. Gallone et al., "Medical Therapy for Long-Term Prevention of Atherothrombosis Following an Acute Coronary Syndrome: JACC State-of-the-Art Review," J. Am. Coll. Cardiol., vol. 72, no. 23, pp. 2886–2903, Dec. 2018.

[16]. M. Piironen et al., "Trends in Long-Term Prognosis After Acute Coronary Syndrome," Eur. J. Prev. Cardiol., vol. 24, no. 3, pp. 274–280, Feb. 2017.

ISSN 3063-8186. Published by Universitas Muhammadiyah Sidoarjo

https://doi.org/10.21070/ijhsm.v2i1.110

[17]. A. Goldberg et al., "Coronary Dominance and Prognosis of Patients With Acute Coronary Syndrome," Am. Heart J., vol. 154, no. 6, pp. 1116–1122, Dec. 2007.

[18]. F. Ye et al., "Assessing Prognosis of Acute Coronary Syndrome in Recent Clinical Trials: A Systematic Review," Clin. Med. Res., vol. 17, no. 1–2, pp. 11–19, Jun. 2019.

[19]. P. G. Kopelman, "Obesity as a Medical Problem," Nature, vol. 404, no. 6778, pp. 635–643, Apr. 2000.

[20]. C. J. Brewer and A. H. Balen, "Focus on Obesity," Reproduction, vol. 140, no. 3, pp. 347–364, 2010.

[21]. Y. C. Chooi, C. Ding, and F. Magkos, "The Epidemiology of Obesity," Metabolism, vol. 92, pp. 6–10, Mar. 2019.

[22]. G. A. Bray, "Medical Consequences of Obesity," J. Clin. Endocrinol. Metab., vol. 89, no. 6, pp. 2583–2589, Jun. 2004.

[23]. X. Pi-Sunyer, "The Medical Risks of Obesity," Postgrad. Med., vol. 121, no. 6, pp. 21–33, Nov. 2009.

[24]. P. B. Goldblatt, M. E. Moore, and A. J. Stunkard, "Social Factors in Obesity," JAMA, vol. 192, no. 12, pp. 1039–1044, Jun. 1965.

[25]. M. Komaroff, "For Researchers on Obesity: Historical Review of Extra Body Weight Definitions," J. Obes., vol. 2016, no. 1, p. 2460285, 2016.

[26]. J. A. Yanovski and S. Z. Yanovski, "Recent Advances in Basic Obesity Research," JAMA, vol. 282, no. 16, pp. 1504–1506, Oct. 1999.

[27]. B. J. George et al., "Common Scientific and Statistical Errors in Obesity Research," Obesity (Silver Spring), vol. 24, no. 4, pp. 781–790, Apr. 2016.

[28]. K. M. Gadde, C. K. Martin, H. R. Berthoud, and S. B. Heymsfield, "Obesity: Pathophysiology and Management," J. Am. Coll. Cardiol., vol. 71, no. 1, pp. 69–84, Jan. 2018.

[29]. C. M. Salome, G. G. King, and N. Berend, "Physiology of Obesity and Effects on Lung Function," J. Appl. Physiol., vol. 108, no. 1, pp. 206–211, Jan. 2010.

[30]. The Jamovi Project, Jamovi (Version 2.5) [Computer Software], 2024. Available: https://www.jamovi.org.