"EXPLORING THE RELATIONSHIP BETWEEN ANTHROPOMETRIC INDICATORS AND THE DEGREE OF CORONARY ARTERY NARROWING"

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Abstract:
This study delves into the connection between anthropometric measurements and the severity of coronary artery stenosis, seeking to understand their potential impact on cardiovascular health. Given the escalating global incidence of coronary artery disease, pinpointing and comprehending adjustable risk factors like specific anthropometric measurements becomes crucial. The investigation assessed various anthropometric indicators within a group diagnosed with different degrees of coronary narrowing, utilizing recognized diagnostic techniques. Initial findings indicate a notable association: participants with distinct anthropometric measurements showed more pronounced coronary artery constriction. This link emphasizes the potential role of these measurements in accelerating atherosclerotic development. Mechanistically, certain anthropometric measurements may lead to direct endothelial damage, compromised endothelial functionality, and increased intima-media thickness. Disruptions in essential metabolic processes due to these measurements could lead to altered gene expressions, heightening cardiovascular risks. However, recognizing coronary artery disease's multifaceted nature necessitates accounting for other elements such as lifestyle, genetics, and concurrent health conditions. In summary, this research underscores specific anthropometric measurements as potential indicators of coronary stenosis severity. Although broader studies are required to validate these results and uncover the underlying mechanisms, the findings hold substantial implications. Targeting these anthropometric

measurements could pave the way for novel cardiovascular risk evaluation and intervention strategies, potentially mitigating the effects of coronary artery disease.

INTRODUCTION :

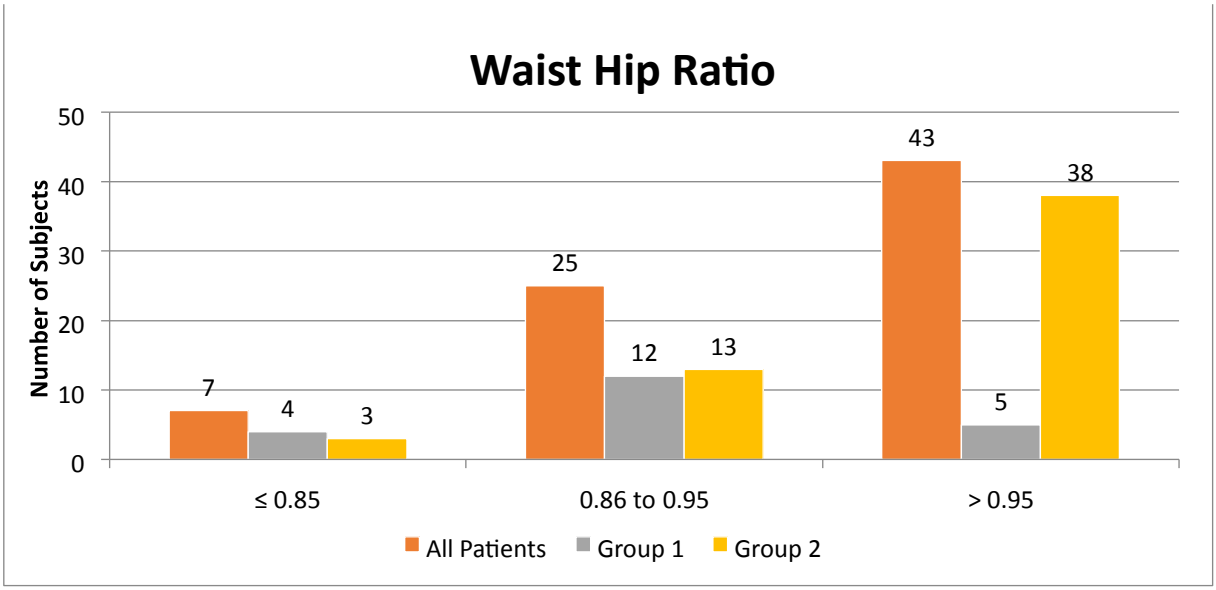
In recent times, the global population is experiencing a growing prevalence of coronary artery disease, posing significant health concerns. This increase can be attributed to various determinants, with some being modifiable while others remain fixed. Modifiable risk factors encompass behaviors such as smoking, excessive alcohol consumption, poor dietary choices, sedentary lifestyles, obesity, and heightened stress levels. Over time, researchers have examined various anthropometric measurements to predict and discern risks associated with metabolic syndromes and coronary artery constriction. Notably, central obesity emerges as a prominent risk factor. Additionally, several studies highlight the significance of specific anthropometric measurements in determining the severity of coronary artery constriction. The aim of our study is to delve into the relationship between diverse anthropometric measurements and their influence on coronary artery stenosis. Various factors contribute to plaque buildup in coronary arteries, including smoking, a sedentary lifestyle, obesity, diabetes, hypertension, specific anthropometric measurements, among others. The diagnosis of coronary artery disease encompasses both invasive and non-invasive methodologies. Invasive techniques include procedures like CT angiography using cardiac catheters and intravascular ultrasound examinations, whereas non-invasive methods involve basic ECG tests, echocardiograms, treadmill stress tests, and cardiac MRI angiography. Specific anthropometric measurements and their interplay with metabolic pathways play pivotal roles in cardiovascular health. These pathways are influenced by specific factors, and disruptions can elevate cardiovascular disease risks. Notably, certain conditions or lifestyle choices that lead to specific anthropometric measurements can accelerate atherosclerosis, impacting coronary arteries and potentially leading to myocardial issues. The link between these measurements and cardiovascular disease risks has been explored through various theoretical models, though none have been definitively established. Some proposed mechanisms linking these measurements to cardiovascular diseases include direct cellular damage, impaired function, increased thickness, enhanced coagulant activity, and compromised protective mechanisms. Disruptions in specific metabolic processes can lead to altered gene products, compromising endothelial function, and elevating cardiovascular risks.

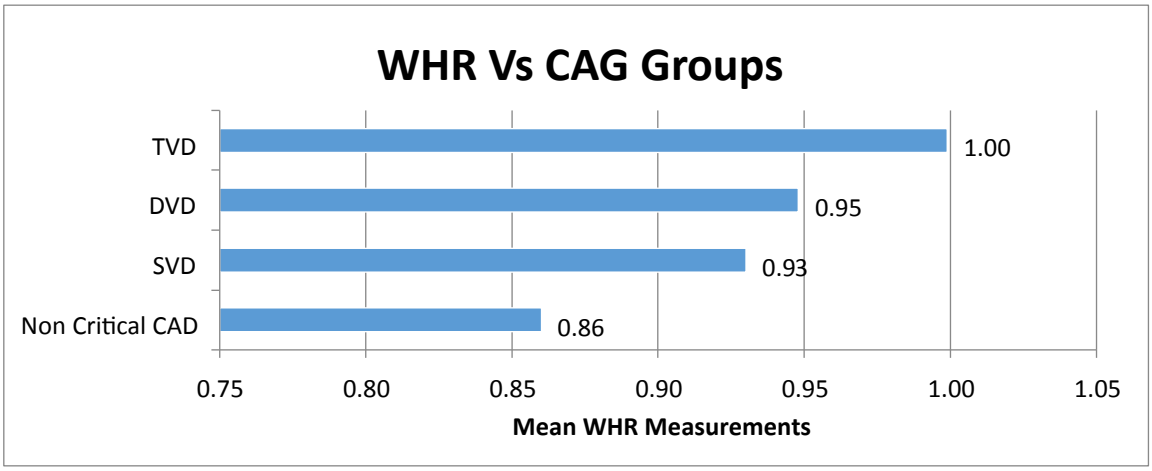
METHODOLOGY :

The research encompassed a total of 75 patients. Information was gathered, and subsequent analyses were conducted.

Study Groups	Name of Group	CAG Findings	Number of Subjects
Group A	Non critical CAD	Normal and Non obstructive (without a noncritical coronary Lesion)	21
Group B	Critical CAD	SVD, DVD, TVD (having at least one lesion more than 50% within the main branches of the coronary arteries)	54

STATISTICS: Descriptive statistics were performed on all data, followed by appropriate comparative statistical tests. Continuous variables underwent analysis using the Unpaired t-test, while categorical variables were assessed using the Chi-Square Test and Fisher Exact Test. A significance level was established at $P < 0.05$. The data analysis was conducted utilizing the EpiInfo software. The sample size was established based on a preliminary study where an elevated percentage of homocysteine levels was identified at 5%. Using a two-tailed type 1 error rate of 0.05 and allowing for a 10% margin of error, we determined that a minimum of 73 patients would be needed. Consequently, the finalized sample size chosen was 75. Using the formula: $n = (1.96)^2 \times 0.05(10.95) / (0.05)^2$ .n = 3.8146 x 0.0474 / 0.0025.This yields a value of 73.





Waist Hip Ratio	All Patients	%	Group 1				Group 2	
				%		%		%
0.86 to 0.95	25	33.33	4 12	19.05 57.14	3	5.56	13	24.07
> 0.95	43	57.33	5	23.81			38	70.37
Total	75	100	21	100			54	100

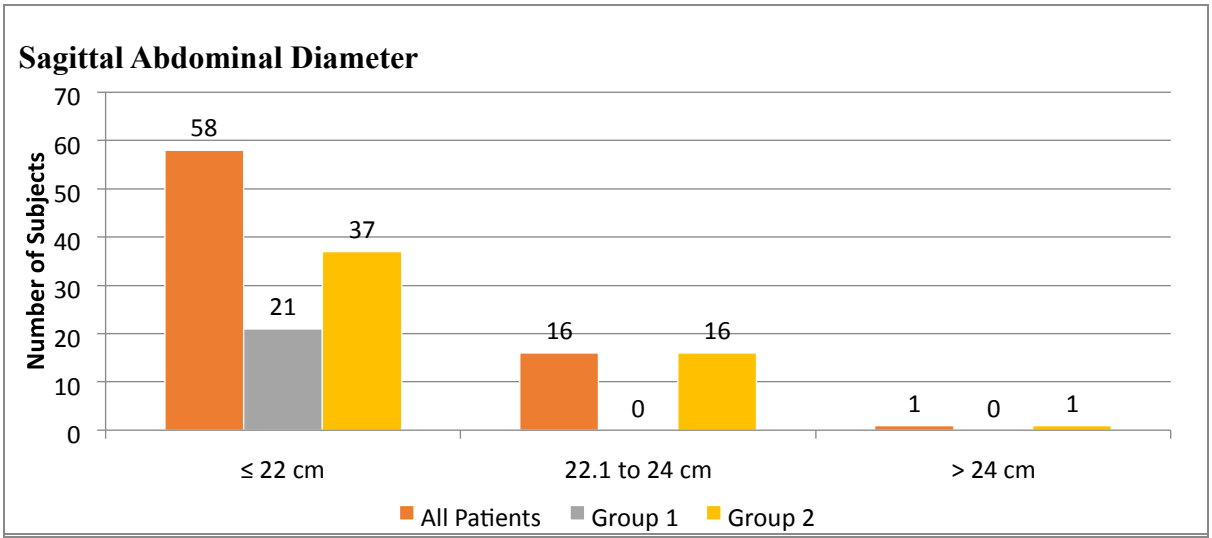
Groups	*Count*	*Mean*	*%*
Non Critical CAD	21	0.86	28
SVD	33	0.93	44
DVD	9	0.95	12
TVD	12	1.00	16
Total	75		100

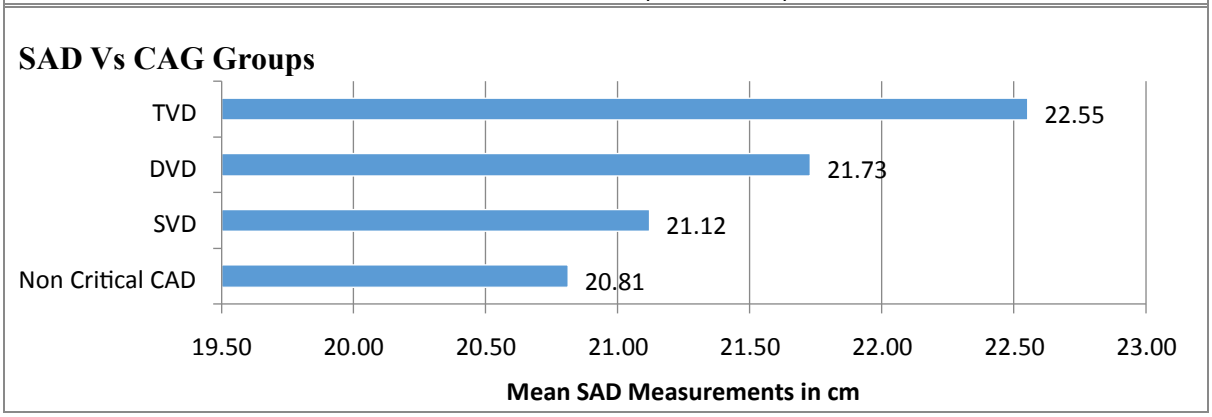
Waist Hip Ratio	**Group 1**	**Group 2**
N	21	54
MEAN	0.91	1.04
SD	0.04	0.06
t test	0.0001	

Based on traditional standards, the relationship between the study groups and waist-hip ratio among participants is deemed statistically significant, given that the p-value is less than 0.05.

Statistical Significance: This underscores a genuine and significant distinction among the groups. Put simply, when analysing the link between various anthropometric measures, serum homocysteine levels, and coronary stenosis severity, the waist-hip ratio in Group 1 (0.91) notably differs, being lower than that in Group 2 (1.04). Similarly, within the non-critical CAD group, the waist-hip ratio is notably reduced compared to the SVD (0.93), DVD (0.95), and TVD (1.00) categories. This distinction is of statistical significance, evidenced by a p-value of 0.0001 from an unpaired t-test.

Clinical Significance: The waist-hip ratio in Group 1 is significantly lower than in Group 2 by a factor of 1.12, equating to a mean difference of 0.13 measurement units. Within the non-critical CAD cohort, comparisons reveal that this ratio is notably diminished compared to the SVD group by 1.08 times, resulting in a mean difference of 0.07 measurement units. Similarly, when contrasted with the DVD group, the ratio within the non-critical CAD category decreases by 1.10 times, reflecting a mean difference of 0.09 measurement units. Furthermore, in relation to the TVD group, the ratio in the non-critical CAD group is reduced by 1.16 times, with a mean difference of 0.14 measurement units. Importantly, this observed difference is both genuine and significant, not arising merely by chance





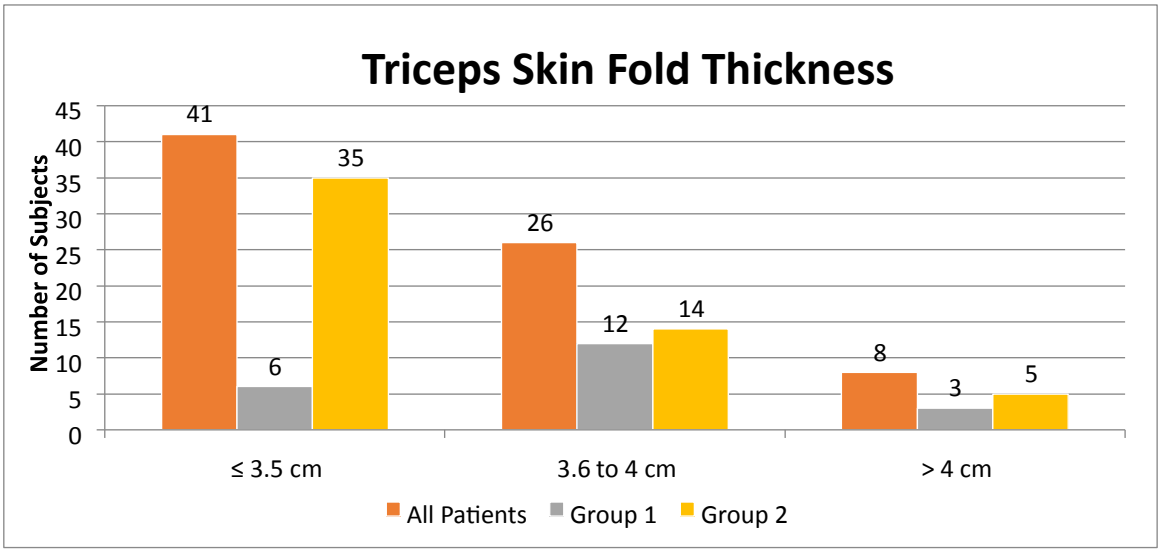
Sagittal Abdominal	All	%	Group 1	%	Group 2	%
≤ 22 cm	58	77.33	21	100.00	37	68.52
Total	75	100	21	100	54	100
Patients Diameter						
22.1 to 24 cm	16	21.33	0	0.00	16	29.63
> 24 cm	1	1.33	0	0.00	1	1.85

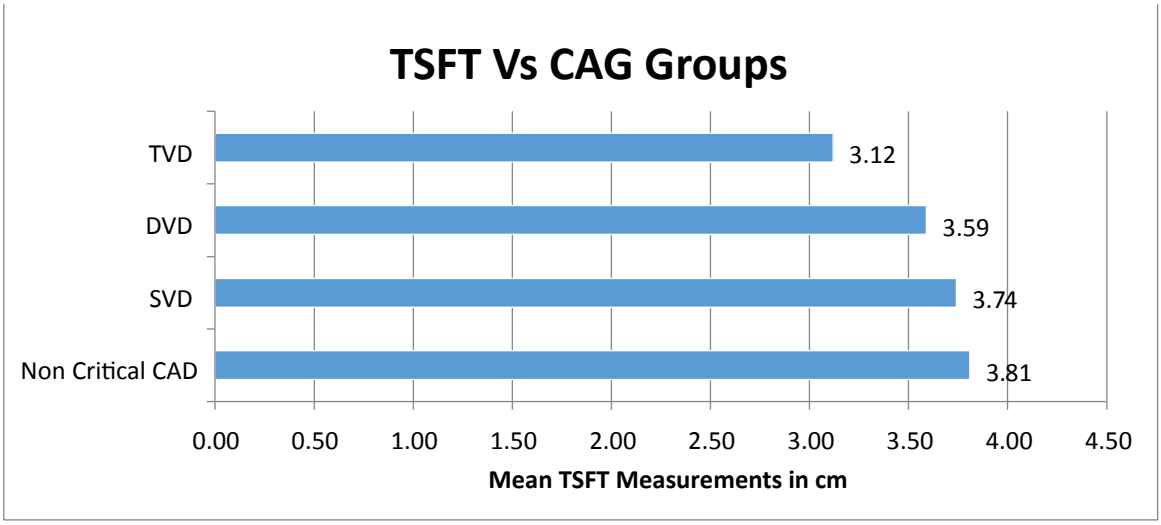
Groups	*Count*	*Mean*	*%*
Non Critical CAD	21	20.81	28
SVD	33	21.12	44
DVD	9	21.73	12
TVD	12	22.55	16
Total	75		100

Sagittal Abdominal Diameter	Group 1	Group 2
N	21	54
MEAN	20.81	21.80
SD	0.87	1.33
t test	0.0004	

Statistical Significance:
By traditional standards, the relationship between the study groups and the sagittal abdominal diameter among participants holds statistical significance, given that the p-value is less than 0.05. To simplify, when exploring the connection between different anthropometric measures, serum homocysteine levels, and coronary stenosis severity, the sagittal abdominal diameter for Group 1 (20.81 cm) is notably smaller than that of Group 2 (21.80 cm). Similarly, within the non-critical CAD group, this diameter is notably less compared to the SVD (21.12 cm), DVD (21.73 cm), and TVD (1.00) groups, demonstrating statistical significance with a p-value of 0.0001 and 0.0004 from unpaired t-tests.

Clinical Significance:
The sagittal abdominal diameter in Group 1 is significantly lower than in Group 2 by a factor of 1.05, equivalent to a mean difference of 0.98 cm. When contrasting the non-critical CAD group with the SVD group, the diameter is reduced by 1.01 times, resulting in a mean difference of 0.31 cm. Similarly, compared to the DVD group, the non-critical CAD group's diameter decreases by 1.04 times, reflecting a mean difference of 0.92 cm. Furthermore, against the TVD group, the non-critical CAD group exhibits a reduction by 1.08 times, with a mean difference of 1.74 cm. Emphasizing its importance, this observed variance is both genuine and significant, not attributable to chance alone.



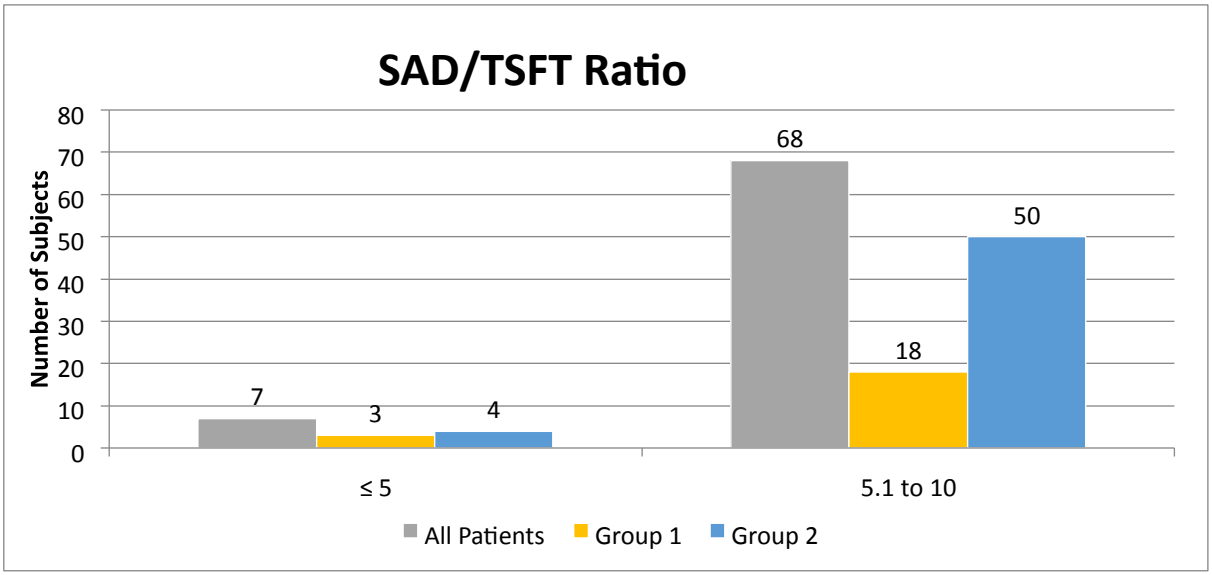


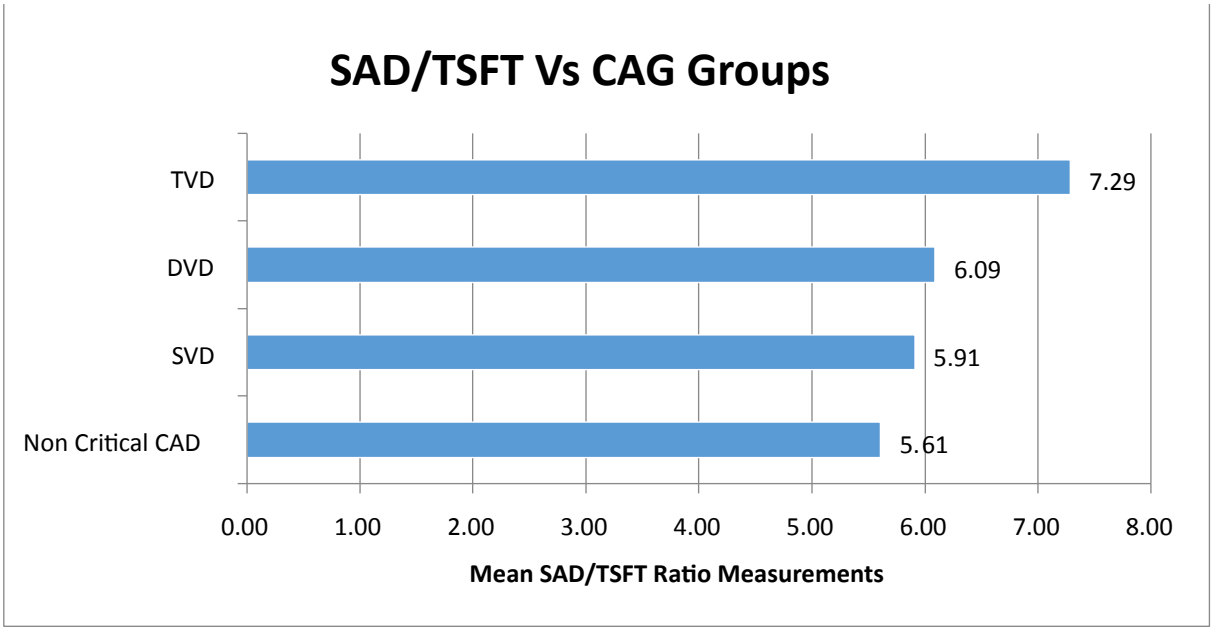
Triceps Skin Fold Thickness	All Patients	%	Group 1	%	Group 2	%
		54.67	6	28.57	35	64.81
≤ 3.5 cm	41	26 34.67	12	57.14	14	25.93
Total	75					
3.6 to 4 cm						
> 4 cm	8	10.67	3	14.29	5	9.26
		100	21	100	54	100

Groups	*Count*	*Mean*	*%*
Non Critical CAD	21	3.81	28
SVD	33	3.74	44
DVD	9	3.59	12

TVD	12	3.12	16
Total	75		100

Triceps Skin Fold Thickness	**Group 1**	**Group 2**
N	21	54
MEAN	3.74	3.52
SD	0.33	0.58
t test	0.0457	





SAD/TSFT	All Patients	%	Group 1	%	Group 2	%
≤ 5	7	9.33	3	14.29	4	7.41
5.1 to 10	68	90.67	18	85.71	50	92.59
Total	75	100	21	100	54	100

Groups	*Count*	*Mean*	*%*
Non Critical CAD	21	5.61	28
SVD	33	5.91	44
DVD	9	6.09	12
TVD	12	7.29	16
Total	75		100

SAD/TSFT Ratio	Group 1	Group 2
N	21	54
MEAN	5.61	6.32
SD	0.55	0.96
t test	0.0001	

Statistical Significance:
Based on conventional benchmarks, the correlation between the study groups and Triceps Skin Fold Thickness in participants is statistically significant, as evidenced by a p-value less than 0.05. Simply put, when examining the link between different anthropometric measures, serum homocysteine levels, and coronary stenosis severity, the Triceps Skin Fold Thickness for Group 1 (3.74 cm) tends to be greater than that of Group 2 (3.52 cm). Likewise, within the non-critical CAD group, this thickness exceeds that of the SVD (3.74 cm), DVD (3.59 cm), and TVD (3.21 cm) groups, with a statistical significance indicated by a p-value of 0.0457 from an unpaired t-test.
Clinical Significance: The Triceps Skin Fold Thickness in Group 1 surpasses that of Group 2 by a factor of 1.06, translating to a mean difference of 0.22 cm. Comparatively, within the non-critical CAD category, this thickness is greater than the SVD group by 1.02 times, resulting in a mean difference of 0.07 cm. Furthermore, when juxtaposed with the DVD group, the thickness within the non-critical CAD group increases by 1.06 times, reflecting a mean difference of 0.22 cm. Most notably, when compared to the TVD group, the non-critical CAD group's thickness is elevated by 1.22 times, with a mean difference of 0.69 cm. Emphasizing its significance, this observed distinction is genuine and not merely by chance.

CONCLUSION:

In an analysis encompassing 75 patients below 50 years of age, distinct anthropometric measures, including the Waist-Hip Ratio (WHR), sagittal abdominal diameter (SAD), triceps skinfold thickness (TSFT), and the ratio of SAD to TSFT, displayed a stronger correlation with the severity

of coronary artery stenosis. Particularly, the combined assessment of SAD to TSFT and WHR stood out as the most prominent predictors. However, Body Mass Index (BMI) presented a less robust association, as indicated by a p-value that surpassed 0.05.

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