ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26jan947

Prevalence Effectiveness and CT Presentations of Coronary Artery Disease Amongst Adults Undergoing Coronary Artery Calcium Score at PBS Yaounde

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Publication Date: 2026/01/31

Abstract :

➢ ***Background:***

One of the most common cardiovascular conditions impacting people worldwide is coronary artery disease (CAD). It has been established that this disease is the major cause of death in both developed and developing nations. The CAD prevalence of lowers patient quality of life and raises mortality and morbidity. There is currently a dearth of information on the epidemiology of CAD in Cameroon, despite the region's well-established CAD risk factor load. Therefore, the goal of this research.

➢ ***Objective:***

To assess the prevalence effectiveness and CT presentations of coronary artery disease amongst adults undergoing coronary artery calcium score at Centre Medical «les Promoteurs de la Bonne Santé Yaoundé».

➢ ***Materials and method:***

This was an analytical cross-sectional study, carried on 80 adult participants undergoing coronary artery calcium score, which was calculated using the Cochran formula and a convenience sampling method. A structured form was used to collect data, saved in USB key and later analysed using SPSS version 27.0. This study included participants who gave their consent. An ethical clearance was obtained and an authorization obtained from the delegation of public health and from the director of centre medicale les promoteurs de la bonne santé. Participants' informations were kept private to maintain confidentiality.

➢ ***Results:***

They were 60 participants. 53.3% were female, 33.3% of participants were aged ≥70yrs. The prevalence of CAD was 80%. Age and sex had a statistically significant relationship (p=0.000). Hypertension and low HDL were the dominant risk factors accounting for 58.3% respectively. 43.30% of participants were classified as very low risk according FRS. While 46.70% were classified as low risk using CACS. Agreement between the FRS and the CCS was found in 35 patients (58.3%). Hence there is a statistical significance between FRS and CACS (P value<0.001).

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➢ ***Conclusion:***

The results of this study confirm the coronary artery calcium score's predictive efficacy and its application as a coronary artery disease screening tool. Therefore, proper implementation should be done to improve early diagnosis there by reducing the prevalence of coronary artery disease.

Keywords: *Prevalence, Effectivenesss, CT Presentation, Coronary Artery Disease, Coroscan.*

How to Cite: Kuiate David; Adiele Susan Arrey Eta; Nana Yasmine Laurie; Kougoum Takam Natacha; Fomekong Dieuseul Lothner; Foundikou Vessah Dayib; Apouakone Mefire Aicha; Nanfack Fanny Nadege; Moifo Boniface; Yiagnigni Euloge; (2026) Prevalence Effectiveness and CT Presentations of Coronary Artery Disease Amongst Adults Undergoing Coronary Artery Calcium Score at PBS Yaounde. *International Journal of Innovative Science and Research Technology*, 11(1), 2455-2461. https://doi.org/10.38124/ijisrt/26jan947

I. INTRODUCTION

One of the most common cardiovascular conditions impacting people worldwide is coronary artery disease (CAD) (1). Over 7.4 million people died from CAD worldwide in 2012, making it one of the main causes of death. Sivakanesan & Ramapanawa, 2021 added that coronary artery disease is the leading cause of death and the reduction of Disability Adjusted Life Years (DALYs) worldwide (2). CAD is one of the most common types of cardiovascular disease, which has increased by 44% during the last 20 years in North Africa and the Middle East (12). The incidence of CAD increases in sub-Saharan Africa according to the rising of cardiovascular risk factors (3).

Non-controllable risk factors include things like age, sex, race, and family history, while controllable risk factors include things like obesity, diabetes, high blood pressure, blood lipid levels, smoking, cholesterol, and so on (4) (5) adding that, controllable risk factors include stress, a poor diet, being overweight or obese, and lack of sport.

The coronary artery calcium (CAC) score is a non-invasive radiological diagnostic that uses CT without intravenous contrast to assess the amount of calcified plaque in the coronary arteries. In the asymptomatic population, coronary artery calcification (CAC) is a well-known indicator of subclinical atherosclerosis and a trustworthy predictor of future coronary artery disease (6). The main approaches for quantifying the CAC score are the Agatston method, calcium volume determination, and calcium mass determination (14). A popular and straightforward method for determining the risk level of CAD over a ten-year period is the Framingham Risk Score (FRS). Six coronary risk factors are taken into consideration by the FRS: age, gender, systolic blood pressure, high density lipoprotein cholesterol (HDL), total cholesterol (TC), and smoking behaviors (7).

Despite the extensively acknowledged CAD risk factor burden in SSA, Cameroon still lacks credible data on its epidemiology. Modern diagnostic techniques, such as traditional invasive coronary angiography (CA), employed in the diagnosis of CAD, are still expensive, inaccessible, and overpriced in SSA, particularly in Cameroon. Most of SSA suffers from a shortage of diagnostic facilities and an insufficient number of physicians, which are critical to a thorough diagnosis of CAD. Hence this study was to assess the prevalence, effectiveness and CT presentations of coronary artery disease amongst adults undergoing coroscan using the calcium score at PBS Yaounde.

II. MATERIALS AND METHOD

This study was carried out at radiology and the medical imaging department of the Centre Medical les Promoteurs de la Bonne Santé Yaoundé, equipped with high quality CT-Scan Toshiba Aquilion Prime 80, installed in 2017. It was an analytical cross-sectional study on 80 adult patients that underwent coronary artery calcium score. The inclusion criteria involved all asymptomatic adult patients who came for a coroscan exam and was present during the period of study and who had complete informations (both laboratory results and coroscan results).

The variables were classified into dependent and independent variables. Independent variable effectiveness Refers to the ability of coronary artery calcium score to accurately determine or predict patients at risk of cardiac events and the dependent variable Prevalence of proportion of adult diagnosed with CAD within the study period, while CT presentation refers to the presentation of the artery most at risk of CAD. The data were separated into four sections. Section A: Participants' socio-demographic data, including age, gender, and occupation. Section B; prevalence of CAD: Section C; effectiveness of coroscan. Section D: CT presentations of CAD. A 6thgeneration Toshiba acquillon prime 80 CT scanner was used to carry out the exam. The Framingham risk score (ATP III) risk estimator was used to assess the 10-year probability of developing cardiac events. To ensure accuracy, consistency, and reliability, data was recorded using structured data collection form.

III. RESULTS

➢ *Socio-Demographic Characteristics of Study Participants*

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Table 1 Socio-Demographic Characteristics of the Respondents at Centre Médicale les Promoteurs de la Bonne Santé Yaoundé May 2025

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	32	53.3
	Male	28	46.7
	Total	60	100.0
Age Group	30-39	7	11.7
	40-49	11	18.3
	50-59	8	13.3
	60-69	14	23.3
	≥70	20	33.3
	Total	60	100.0

Table one above shows the total number of participants 60 of which 32 (53.3%) were female. Most of them 20 (33.3%) were aged 70years and above. While the minority 7 (11.7%) were of age group 30-39

➢ *Prevalence of Coronary Artery Disease Among Respondents Undergoing Coronary Artery Calcium Score*

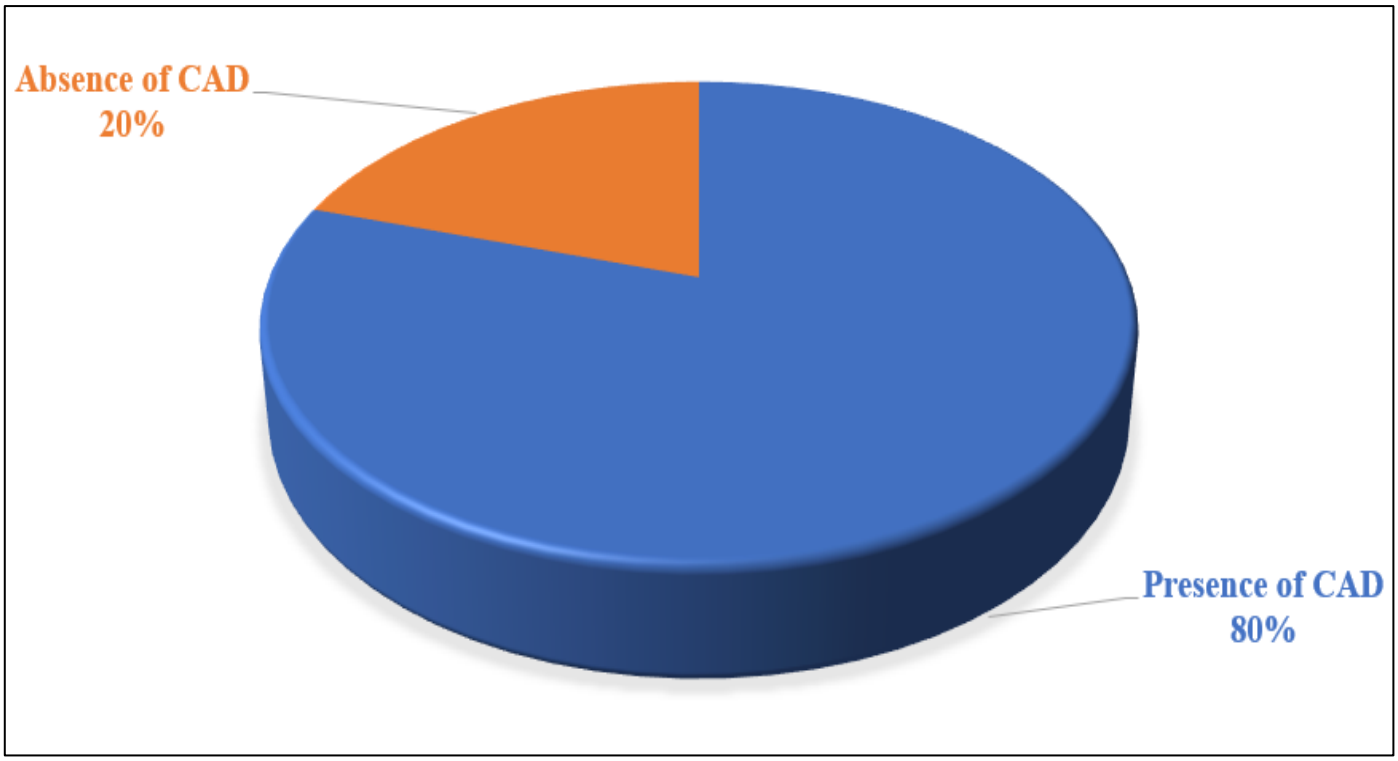

Fig 1 Prevalence of Coronary Artery Disease

With regard to prevalence 48 (80%) of the respondents had asymptomatic coronary artery disease.

➢ *Association Between Socio-Demographic Characteristics and Coronary Artery Disease*

Table 2 Association Between Socio-Demographic Characteristcs and Coronary Artery Disease Among Study Participants at Centre Médicale Les Promoteurs de la Bonne Santé Yaoundé May 2025

Variables	Category	Presence	Absence	Chi square test (x^2)	p-value
Gender	Female	24	8	1.071[a]	.301
	Male	24	4		
Age	30-39	1	6	37.597[a]	.000
	40-49	5	6		
	50-59	8	0		
	60-69	14	0		
	≥70	20	0		

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From table 2 above it is noticed that the p value of age with respect to CAD is . 000, which is less than 0.05. This demonstrates that the correlation between age and was statistically significant. With respect to gender, it shows that the relationship between gender and coronary artery disease is not statistically significant (p value 0.301).

- *Effectiveness of Coronary Artery Calcium Score*

Table 3 Risk Factors of Respondents Undergoing Coronary Artery Calcium Score at Centre Médicale les Promoteurs de la Bonne Santé Yaoundé May 2025

Variable	Category	Frequency	Percentage
Smoking	Yes	6	10.0
	No	54	90.0
	Total	60	100.0
Hypertensive	Yes	35	58.3
	No	25	41.7
	Total	60	100.0
Systolic blood pressure	100-130	16	26.7
	131-160	34	56.7
	161-190	10	16.7
	Total	60	100.0
HDL	10-50	35	58.3
	51-100	24	40.0
	101-150	1	1.7
	Total	60	100.0
CT	50-149	8	13.3
	150-249	21	35.0
	250-349	22	36.7
	>350	9	15.0
	Total	60	100.0

Table 3 describes the risk factors of CAD per respondents. 35(58.3%) were hypertensive. With regard to HDL, majority 35(58.3%) were between the range 10-50.

Table 4 Framingham Risk Scores and Coronary Artery Calcium Scores of Respondents at Centre Médicale les Promoteurs De La Bonne Santé Yaoundé May 2025

Variable	Category	Frequency (n)	Percentage (%)
FRS	<5%	26	43.30%
	6-10%	11	18.30%
	11-20%	10	16.70%
	>20%	13	21.70%
	Total	60	100.0%
CACS	0	11	18.30%
	1-99	28	46.70%
	100-399	11	18.30%
	≥400	10	16.70%
	Total	60	100.0%

Table 4 above classifies participants' risk of cardiac events using both Framingham risk scoring and coronary artery scoring. Majority 26(43.30%) of study participants were at very low risk of cardiac events defined as FRS<5%. While the minority 10 (16.70%) had intermediate risk defined as FRS11-20%. With regard to CACS, low risk CAD defined as 1-99, was detected in 28 (46.70%) of participants. While high risk CAD defined as CAC ≥400, was detected in 10 (16.70%).

- *Association Between FRS and CACS*

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Table 5 Association Between Framingham Risk Score and Coronary Artery Calcium Score at Centre Médicale les Promoteurs De La Bonne Santé Yaoundé May 2025

Framingham risk score	(n)/ (%)	Coronary calcium score	(n) / (%)	Chi square test (X)	P value
Very Low risk	26 (43.30%)	Very low risk	11(42.30%)	62.822	<0.001
		Low risk	13 (50%)		
		Intermediate risk	1 (3.85)		
		High risk	1 (3.85)		
Low risk	11 (18.30%)	Low risk	10 (91.0%)		
		Intermediate risk	1 (9.0)		
Intermediate risk	10 (16.70%)	Low risk	5 (50%)		
		Intermediate risk	5 (50%)		
High risk	13 (21.70%)	Intermediate risk	4 (30.77%)		
		High risk	9 (69.23%)		

Table 5 shows the relationship between FRS and CACS in study participants. 26, 11, 10 and 13 participants were classified as very low, low, intermediate, and high risk, respectively, according to the FRS. However, risk classification according to CACS showed different results. The CACS identified 42.30% of patients with very low FRS as very low risk, 91.0% of patients with a low risk FRS as low risk. Intermediate and high risks in only 50% and 69.23% of patients with intermediate and high risk FRS, respectively. Thus, agreement between the FRS and the CCS was found in 35 patients (58.3%). Hence there is a statistical significance between FRS and CACS (P value<0.001)

IV. DISCUSSION

A total of 80 structured forms were submitted, only 60 met up with the inclusion criteria for further analysis, giving a respondent rate of 75%.

➢ *Socio-Demographic Characteristics of Study Participants*

Of the 60 participants who took part in the study, the majority 53.3% were female this could be due to increase female patients' inflow in the study area. This in contrast with a cross-sectional study conducted by Imoh *et al* (8) in Jos, North Central Nigeria 2020 on Subclinical atherosclerosis and associated risk factors among HIV-infected adults. Where majority 63.6% were males. This may be because of different study area.

With regard to age, most 33.3% of the participants were aged 70years and above. This could be because the study area is known for cardiac related issues. This is in contrast to a retrospective cross-sectional study conducted by Park et al (9), which found that the triglyceride glucose index is a good measure for predicting subclinical coronary artery disease in the absence of established risk factors in 2020. The majority

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26jan947

of participants (63.04%) were over the age of 65. This may be related to differences in the research population.

- *Prevalence of Coronary Artery Disease Among Respondents Undergoing Coronary Artery Calcium Score*

The overall prevalence of coronary artery disease was 80%. This high prevalence rate is because most of the participants were diagnosed of coronary artery disease. This is consistent with a retrospective observational study conducted by Chaikriangkrai et al (10) on the prevalence and implications of subclinical coronary artery disease in patients with atrial fibrillation in 2015**.** The overall prevalence of positive CACS was 68%. This similarity could be due to similar exclusion criteria (participants with known CAD), also both populations had similar age distributions.

- *Association Between Socio-Demographic Characteristics and Prevalence of Coronary Artery Disease*

A significant relationship was observed between age and prevalence of CAD (P=.000). This relates to a retrospective study by Brakohiapa et al. on the spectrum of computed tomography calcium score values of patients tested for coronary artery disease in Accra 2023. There was a significant connection between coronary artery calcium score and age (p = 0.001). This is because both studies were carried out on similar age distributions and risk factors.

- *Effectiveness of Coronary Artery Calcium Score*

Table 3 shows the risk factors of participants, the most common risk factors were hypertension and low HDL both 58.3%. Which were seen to be associated with CAC scoring (p=0.02). This is because both hypertension and low HDL cholesterol can contribute to the progression of atherosclerosis, which is reflected in increasing CAC scores. This is in contrast with a cross sectional study carried out by Lichtenstein et al (13) on Correlation between coronary artery calcification by non-cardiac CT and Framingham score in young patients in US 2018 where smoking was the only risk factor associated with increase CAC scoring (p=0.045). Which may be due to the fact that the study was carried out among younger individuals.

- *Association Between FRS and CACS*

With respect to the association between FRS and CACS, there was a statistical significance between FRS and CACS (P value<0.001). Lichtenstein et al. (13) found a strong positive link between coronary artery calcification by non-cardiac CT and Framingham score in young patients in the United States in 2018. This may be due to similar study design used.

- *presentations of Coronary Artery Disease*

Most 43.3% participants presented with more than one artery disease. This is because higher CAC score tend to have a higher area and density of calcification, a more dispersed pattern of calcification in their coronary artery tree this is in contrast with a retrospective multicenter clinic cohort study carried out by Peng *et al* (11) on Long-Term All-Cause and Cause-Specific Mortality in Asymptomatic Patients 2020 most 52.4% had 4-vessel disease (11). This discrepancy is due to difference in study design, sampling method and study area.

V. CONCLUSION

Majority of the participants were female with age range 70yrs and above. There was a high prevalence of coronary artery disease in the study area. There was concordance between the Framingham risk score and coronary artery calcium score. The Framingham risk score provides an indication of the likely benefits of prevention. It can be useful for both patients and clinicians in deciding whether lifestyle modification and preventive medical treatment are appropriate, as well as for patient education by identifying men and women at increased risk for future cardiovascular events. However, Coronary Artery Calcium Score still remains the best screening test for estimating cardiac event risk. Our results confirm the predictive significance of the coronary artery calcium score and its application as a screening tool for coronary artery disease. Therefore, proper implementation should be done to improve early diagnosis there by reducing the prevalence of coronary artery disease.

RECOMMENDATIONS

Though our study reveals that CAC diagnosed with coroscan significantly linked with a validated cardiovascular risk score, further studies investigating the relationship between CAC and cardiovascular events over a long-term follow-up are needed.

Our results also show that whereas some people with elevated cardiovascular risk exhibit obvious CAC, others do not. More study is required to improve our understanding of the elements that contribute to the progression of coronary calcification. In addition to the known and established factors affecting the development of CAC, there are likely to be other external and environmental factors, as well as endogenous factors, which may include genetic factors.

A study should be conducted in different areas with different CT scanner.

REFERENCES

[1]. Malakar, A. Kr., Choudhury, D., Halder, B., Paul, P., Uddin, A., & Chakraborty, S. (2019a). A review on coronary artery disease, its risk factors, and therapeutics. *Journal of Cellular Physiology*, *234*(10), 16812–16823. https://doi.org/10.1002/jcp.28350

[2]. Ralapanawa, U., & Sivakanesan, R. (2021). Epidemiology and the Magnitude of Coronary Artery Disease and Acute Coronary Syndrome: A Narrative Review. Journal of Epidemiology and Global Health, 11(2), 169–177. https://doi.org/10.2991/jegh.k.201217.001.

[3]. Nzina Toupendi, Z., Magny Tiam, E., Temgoua Ngou, M., Boombhi, J., Kingue, S., & Moifo, B. (2024). Relationship between cardiovascular risk factors and coronary artery disease assessed by CAD-RADS. Archives of Cardiovascular Diseases, 117(1,

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26jan947

Supplement), S26–S27. https://doi.org/10.1016/j.acvd.2023.10.046

[4]. Ullah, M., Wahab, A., Khan, S. U., Zaman, U., Rehman, K. ur, Hamayun, S., Naeem, M., Ali, H., Riaz, T., Saeed, S., Alsuhaibani, A. M., & Refat, M. S. (2023). Stent as a Novel Technology for Coronary Artery Disease and Their Clinical Manifestation. Current Problems in Cardiology, 48(1), 101415. https://doi.org/10.1016/j.cpcardiol.2022.101415

[5]. Hajar, R. (2017). Risk Factors for Coronary Artery Disease: Historical Perspectives. Heart Views, 18(3), 109. https://doi.org/10.4103/HEARTVIEWS.HEARTVIEWS_106_17

[6]. Osawa, K., Nakanishi, R., & Budoff, M. (2016). Coronary Artery Calcification. Global Heart, 11(3), 287–293. https://doi.org/10.1016/j.gheart.2016.08.001

[7]. Jahangiry, L., Farhangi, M. A., & Rezaei, F. (2017). Framingham risk score for estimation of 10-years of cardiovascular diseases risk in patients with metabolic syndrome. Journal of Health, Population and Nutrition, 36(1), 36. https://doi.org/10.1186/s41043-017-0114-0

[8]. Imoh, L. C., Ani, C. C., Iyua, K. O., Odo, A. I., Amusa, G. A., Osaigbovo, G. O., Isichei, C. O., Agbaji, O. O., Imade, G., Zoakah, A. I., Okeahialam, B. N., & Sagay, A. S. (2020). Subclinical atherosclerosis and associated risk factors among HIV-infected adults in Jos, North Central Nigeria : A cross-sectional study. Pan African Medical Journal, 37(1), Article 1. https://www.ajol.info/index.php/pamj/article/view/232466

[9]. Park, G.-M., Cho, Y.-R., Won, K.-B., Yang, Y. J., Park, S., Ann, S. H., Kim, Y.-G., Park, E. J., Kim, S.-J., Lee, S.-G., Yang, D. H., Kang, J.-W., Lim, T.-H., Kim, H.-K., Choe, J., Lee, S.-W., & Kim, Y.-H. (2020). Triglyceride glucose index is a useful marker for predicting subclinical coronary artery disease in the absence of traditional risk factors. Lipids in Health and Disease, 19(1), 7. https://doi.org/10.1186/s12944-020-1187-0

[10]. Chaikriangkrai, K., Valderrabano, M., Bala, S. K., Alchalabi, S., Graviss, E. A., Nabi, F., Mahmarian, J., & Chang, S. M. (2015). Prevalence and Implications of Subclinical Coronary Artery Disease in Patients With Atrial Fibrillation. The American Journal of Cardiology, 116(8), 1219–1223. https://doi.org/10.1016/j.amjcard.2015.07.041

[11]. Peng, A. W., Mirbolouk, M., Orimoloye, O. A., Osei, A. D., Dardari, Z., Dzaye, O., Budoff, M. J., Shaw, L., Miedema, M. D., Rumberger, J., Berman, D. S., Rozanski, A., Al, -Mallah Mouaz H., Nasir, K., & Blaha, M. J. (2020). Long-Term All-Cause and Cause-Specific Mortality in Asymptomatic Patients With CAC ≥1,000. JACC : Cardiovascular Imaging, 13(1_Part_1), 83–93. https://doi.org/10.1016/j.jcmg.2019.02.005

[12]. Álvarez-Álvarez, M. M., Zanetti, D., Carreras-Torres, R., Moral, P., & Athanasiadis, G. (2017). A survey of sub-Saharan gene flow into the Mediterranean at risk loci for coronary artery disease. *European Journal of Human Genetics*, *25*(4), 472–476. https://doi.org/10.1038/ejhg.2016.200

[13]. Lichtenstein, G., Perlman, A., Shpitzen, S., Durst, R., Shaham, D., Leitersdorf, E., & Szalat, A. (2018). Correlation between coronary artery calcification by non-cardiac CT and Framingham score in young patients. PLOS ONE, 13(3), e0195061. https://doi.org/10.1371/journal.pone.0195061

[14]. Neves, P. O., Andrade, J., & Monção, H. (2017). Coronary artery calcium score: Current status. *Radiologia Brasileira*, *50*, 182–189. https://doi.org/10.1590/0100-3984.2015.0235