Koşuyolu Heart Journal

Koşuyolu Heart J 2024;27(1):3–8
DOI: 10.51645/khj.2024.390

Original Article

Is There a Relationship between Anxiety-depression Level and SYNTAX Score in Patients with Acute Coronary Syndrome Undergoing Percutaneous Coronary Intervention?

Ahmet Ferhat Kaya,[1] Cemalettin Yılmaz,[2] Mehmet Hasan Özdil,[1] Serdar Soner,[3] Mehmet Özbek[4]

[1]Department of Cardiology, Muş State Hospital, Muş, Türkiye
[2]Department of Cardiology, Malazgirt State Hospital, Muş, Türkiye
[3]Department of Cardiology, Diyarbakır Gazi Yaşargil Training and Research Hospital, Diyarbakır, Türkiye
[4]Department of Cardiology, Dicle University Faculty of Medicine, Diyarbakır, Türkiye

Abstract

Objectives: The SYNergy between percutaneous coronary interventions with TAXUS and Cardiac Surgery (SYNTAX) score is a quantitative scoring system used to evaluate the severity and extent of the disease in patients with coronary artery disease. Hospital Anxiety and Depression Scale (HADS) is a scale that measures the anxiety and depression levels of patients. The relationship between psychosocial stress and atherosclerosis is well known. In this study, we aimed to examine the relationship between SYNTAX score and HADS in patients who performed percutaneous coronary intervention due to acute coronary syndrome (ACS).

Methods: A total of 130 subjects with ACS were included in our study. The SYNTAX score, which was calculated by two independent interventional cardiologists, was divided into three groups: 0–22, low; 23–32, moderate; 33 and above, high. In our study, patients' anxiety and depression levels were evaluated with HADS 1 month after ACS.

Results: Of the total subjects, 68, 39, and 23 patients were determined in SYNTAX scores of 0–22, 23–32, and >33 groups, respectively. A significant relationship was observed between the high SYNTAX score and the HADS-depression and anxiety scale ($p<0.001$, $p<0.001$, respectively). In the correlation analysis found that, a moderate positive correlation between the SYNTAX score and depression level, and a weak positive correlation between the SYNTAX and anxiety level ($r=0.642$, $r=0.538$, respectively).

Conclusion: In our study, we found that HADS and SYNTAX scores were significantly correlated in ACS patients who performed percutaneous coronary intervention.

Keywords: Anxiety; coronary artery disease; depression.

Cite This Article: Kaya AF, Yılmaz C, Özdil MH, Soner S, Özbek M. Is There a Relationship between Anxiety-depression Level and SYNTAX Score in Patients with Acute Coronary Syndrome Undergoing Percutaneous Coronary Intervention? Koşuyolu Heart J 2024;27(1):3–8

Address for Correspondence: Cemalettin Yılmaz

Department of Cardiology, Malazgirt State Hospital, Muş, Türkiye

E-mail: cmlddyn@gmail.com

Submitted: July 18, 2023
Accepted: March 04, 2024
Available Online: April 01, 2024

Perkütan Koroner Girişim Uygulanan Akut Koroner Sendromlu Hastalarda Anksiyete-depresyon Düzeyi ile SYNTAX Skoru Arasında Bir İlişki Var Mı?

Özet

Amaç: SYNTAX (PCI with TAXUS ve Cardiac Surgery arasındaki SYNergy) skoru, koroner arter hastalığı olan hastalarda hastalığın ciddiyetini ve yaygınlığını değerlendirmek için kullanılan kantitatif bir skorlama sistemidir. HADS (Hastane Anksiyete ve Depresyon Ölçeği), hastaların anksiyete ve depresyon düzeylerini ölçen bir ölçektir. Psikososyal stres ve ateroskleroz arasındaki ilişki iyi bilinmektedir. Bu çalışmada akut koroner sendrom (AKS) nedeniyle perkütan koroner girişim uygulanan hastalarda SYNTAX skoru ile HADS arasındaki ilişkiyi incelemeyi amaçladık.

Gereç ve Yöntem: Çalışmamıza AKS'li toplam 130 hasta dahil edildi. İki bağımsız girişimsel kardiyolog tarafından hesaplanan SYNTAX skoru 0-22, düşük; 23-32, orta; 33 ve üstü, yüksek olarak üç gruba ayrıldı. Çalışmamızda, hastaların anksiyete ve depresyon düzeyleri AKS'den bir ay sonra HADS ile değerlendirildi.

Bulgular: SYNTAX skoru 0-22, 23-32, >33 grubunda sırasıyla 68, 39 ve 23 hasta saptandı. Yüksek SYNTAX puanı ile HAD-depresyon ve anksiyete ölçeği arasında anlamlı bir ilişki gözlendi (sırasıyla p<0.001, p<0.001). Korelasyon analizinde SYNTAX puanı ile depresyon düzeyi arasında pozitif yönde orta düzeyde, SYNTAX puanı ile kaygı düzeyi arasında pozitif yönde zayıf bir ilişki bulundu (sırasıyla r=0.642, r=0.538).

Sonuç: Çalışmamızda perkütan koroner girişim uygulanan AKS hastalarında HADS ve SYNTAX skorları arasında anlamlı korelasyon saptandı.

Anahtar sözcükler: Anksiyete; koroner arter hastalığı;depresyon.

Introduction

Despite advances in percutaneous coronary interventions (PCIs) and medical treatment, coronary artery disease (CAD) is one of the leading causes of mortality and morbidity in the world.[1] Coronary angiography is still the gold standard method in the diagnosis and treatment of CAD.[2] The SYNergy between PCI with TAXUS and Cardiac Surgery (SYNTAX) score is a quantitative scoring system used to evaluate the severity and extent of the disease in patients with CAD.[3] The SYNTAX score contributes to the determination of treatment after diagnosis. Especially in patients with diabetes, left main coronary disease, or multi-vessel disease, the SYNTAX score helps clinicians in making the decision for PCI or coronary artery bypass grafting.

The relationship between psychiatric disorders and cardiac diseases has been known for many years.[4–6] Depression is three times more common in patients with CAD compared to the general population and is considered an independent risk factor for the development and progression of CAD in healthy people.[7–9] Further, depression is associated with a 2.7-fold increase in mortality in patients with acute coronary syndrome (ACS).[10] Negative mood disorders such as anxiety and depression cause changes in autonomic nervous system activity, catecholamine levels, and inflammatory activity, resulting in endothelial and platelet dysfunction.[11] Psychological distress may lead to increased atherosclerosis.[12] Therefore, the diagnosis and treatment of psychiatric disorders provide significant improvement in the occurrence and progression of CAD.

There are many scales developed to measure depression and anxiety in clinical studies; however, the appropriateness of the specific scale to screen for these disorders in cardiovascular patients is controversial.[7] The Hospital Anxiety and Depression Scale (HADS), which we used in our study, is a method that is frequently used in the evaluation of psychological disorders of patients who do not have psychiatric problems before.[13] HADS is a scale designed to evaluate the symptoms of anxiety and depression in patients with a total of 14 items, seven of which are related to anxiety and seven are related to depression. The purpose of this test is not to diagnose but to identify risk groups by screening for anxiety and depression in a short time in the presence of a physical illness.

In this study, we aimed to examine the relationship between SYNTAX score and HADS in patients who performed PCI due to ACS.

Materials and Methods

Patients over the age of 18 who performed PCI due to ACS in our hospital between 2019 and 2022 were included in our study. In the 1st month after PCI, patients were informed about the study at the outpatient clinic visit, and 130 patients who signed the informed consent form were included in the study. The laboratory parameters of the patients were obtained from the hospital information management system. Patients with a previous diagnosis of depression and anxiety, severe psychiatric disorders, dementia, and mental retardation were excluded from the study.

Lesions with more than 50% stenosis and >1.5 mm in length were evaluated with the SYNTAX score. The SYNTAX score was calculated using the website https://syntaxscore.org/.[14] When calculating the score, right-left dominance, number of lesions (separately for each segment), bifurcation, trifurcation features, presence of an aorto-ostial lesion, presence of severe tortuosity, calcification, thrombus, diffuse-small vessel disease, and lesion length >20 mm have been evaluated. The SYNTAX score was calculated by two independent interventional cardiologists and the calculated values were averaged. The SYNTAX score is divided into three groups: 0–22, low; 23–32, moderate; 33 and above, high.

Anxiety and depression levels were evaluated using the HADS in our study. This questionnaire is an important diagnostic tool for the assessment of anxiety-depressive disorders in different countries and is recommended for the diagnosis of depression-anxiety.[15] HADS is tools approved by the National Institute for Health and Clinical Excellence to measure depression severity and response to treatment in primary care.[7] However, HADS does not include all diagnostic criteria for major depression. For this reason, additional problems related to appetite, sleep, and self-harm/suicidal thoughts should be asked, and risk assessment should be made when appropriate.

The HADS questionnaire contains seven questions for anxiety and seven for depression. Each question is scored between 0 and 3 and a maximum of 21 points can be obtained. It takes about 2–5 min. It is important to evaluate anxiety and depression questions separately. In the HADS, scoring is determined as 0–7 = normal, 8–10 = borderline normal, and 11–21 = abnormal. Cut-off values are available for evaluation.

Statistical Analysis

Statistical analysis was performed using the SPSS (version 20.0, SPSS Inc., Chicago, Illinois) software package. Continuous vari-

Table 1. Baseline clinical, demographic, and laboratory characteristics of patients according to SYNTAX score

Variables	SS=0–22 n=68 (52.3%)		SS=23–32 n=39 (30%)		SS>33 n=23 (17.7%)		p
	n	%	n	%	n	%	
Age (years)	59.4±11.8		66.05±11.4		66.8±11.3		0.05
Gender							0.447
Male	38	55.8	25	64.1	15	65.2	
Female	30	44.1	14	35.8	8	34.7	
Type of MI							0.61
NSTEMI	41	60.2	20	51.2	12	52.1	
STEMI	27	39.7	19	48.7	11	47.8	
MDRD (mL/min/1.73 m^2)	93.3±28.2		85.9±29		80.1±24.1		0.10
HT	42	61	37	94	18	78	**0.001**
DM	15	22	17	51	14	60	**0.002**
History of MI	23	33	16	41	6	69	0.286
HDL (mg/dL)	38.2±9.2		39.4±12.1		36.7±8.4		0.282
LDL (mg/dL)	99.1±32.8		83.1±31.4		97.4±36.1		0.095
Total Cholesterol (mg/dL)	171.0±38.2		151.8±36.7		163±40.1		0.051
Triglyceride (mg/dL)	157.5±96.4		147.7±94.5		139.7±72.1		0.631

p<0.05 values are written in bold. SYNTAX: SYNergy between PCI with TAXUS and Cardiac Surgery; SS: SYNTAX score; MI: Myocardial infarction; NSTEMI: Non-ST elevation myocardial infarction; STEMI: ST-segment elevation myocardial infarction; MDRD: Modification of diet in renal disease; HT: Hypertension; DM: Diabetes mellitus; HDL: High-density lipoprotein; LDL: Low-density lipoprotein.

Table 2. Comparison of HADS depression and anxiety scores with SYNTAX score

HADS scores	SS=0–22 n=68 (52.3%)		SS=23–32 n=39 (30%)		SS >33 n=23 (17.7%)		All patients n=130		p
	n	%	n	%	n	%	n	%	
Depression score									**<0.001**
0–7: Normal	37	54.4	1	3.9	2	8.6	40	30.7	
8–10: borderline	29	42.6	20	51.2	4	17.3	53	40.7	
11–21: abnormal	2	2.9	18	46.1	17	73.9	37	28.4	
Anxiety score									**<0.001**
0–7: Normal	29	42.6	1	2.5	2	8.6	32	24.6	
8–10: borderline	36	52.9	16	41.0	8	34.7	50	38.4	
11–21: abnormal	3	4.4	22	56.4	13	56.5	38	29.2	

p<0.05 values are written in bold. HADS: Hospital anxiety and depressions scale; SS: SYNTAX score; SYNTAX: SYNergy between PCI with TAXUS and Cardiac Surgery.

ables were expressed as mean±standard deviation and categorical variables were expressed as numbers and percentages. Normally distributed variables were expressed as mean and standard deviation. Whether the numerical variables were normally distributed or not was evaluated with subjective methods such as histogram curves and probability curves (Q-Q plots and P-P plots), as well as Lilliefor and Shapiro–Wilk tests, which are objective methods. Normally distributed numerical variables were evaluated with the parametric Student's t-test, and those that did not show normal distribution were evaluated with the non-parametric Mann–Whitney U-test. Chi-square test was used to examine how categorical variables changed between groups. Specificity and sensitivity values were calculated with the receiver-operator characteristic curve to predict interatrial conduction characteristics.

The relationship between the variances and means of more than two groups that were not normally distributed was examined by the Kruskal–Wallis test. A p<0.05 was considered statistically significant.

Results

Demographic characteristics and laboratory findings of three different CAD severity groups according to the SYNTAX score are given in Table 1. In our study, of the total subjects, 68 (52.3%), 39 (30%), and 23 (17.7%) patients were determined in SYNTAX scores of 0–22, 23–32, and >33 groups, respectively. Hypertension (HT) and diabetes mellitus (DM) were observed significantly increased in the patient group with high SYNTAX scores (p=0.001, p=0.002, respectively). It was determined that the mean age tended to be higher in the patient group with a high SYNTAX score, but it was not statistically significant (p=0.05).

The relationship between HADS and SYNTAX scores is shown in Table 2. In the study population, 37 (28.4%) patients had an abnormal depression score. A significant relationship was observed between the high SYNTAX score and the HADS-depression scale and the HADS-anxiety scale (p<0.001, p<0.001, respectively). In the correlation analysis, a moderate positive correlation was observed between the SYNTAX score and the

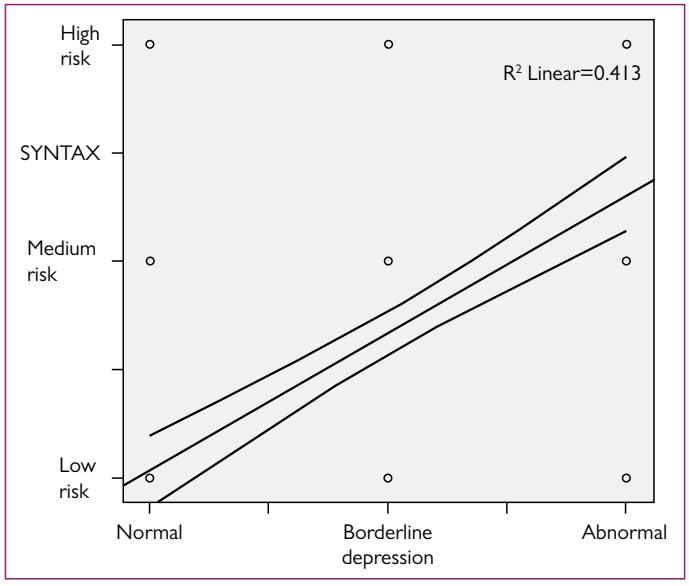

Figure 1. Graph showing the relationship between SYNTAX score and depression level.

SYNTAX: SYNergy between PCI with TAXUS and Cardiac Surgery.

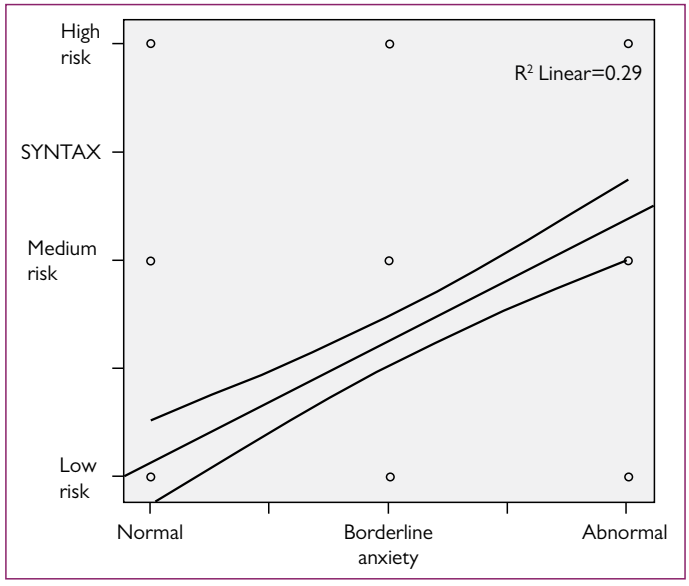

Figure 2. Graph showing the relationship between SYNTAX score and anxiety level.

level of depression (Fig. 1), while a weak positive correlation was found between the SYNTAX score and the level of anxiety (Fig. 2) (r=0.642, r=0.538, respectively).

Discussion

We reached two significant conclusions in our study: (1) We found a significant relationship between the SYNTAX score, which is an indicator of the severity of CAD, and both the anxiety scale and depression scale of HADS. (2) We demonstrated that there was a moderate positive correlation between SYNTAX score and depression level and a weak positive correlation between SYNTAX score and anxiety level.

Anxiety and depression are known to be associated with increased cardiac mortality and recurrent cardiovascular events in ACS patients.[16,17] However, there are limited studies examining the relationship between mood disorders and the severity of CAD.[18] HADS, which has different sensitivity and specificity for each calculated cut-off value, is a valuable scale used in the detection of anxiety and depression. For example, a score of 8 or higher for anxiety has a specificity of 0.78 and a sensitivity of 0.9 and a specificity of 0.79 and a sensitivity of 0.83 for depression.[15] There are not enough studies in the literature comparing HADS and SYNTAX scores in ACS patients undergoing PCI. Therefore, we think that our study will contribute to the literature.

The prevalence of depressive symptoms in ACS patients is around 30–40%.[19,20] Murphy et al.[21] reported the rate of depression seen in the early period after an acute cardiac event as 17%. In 2003, Rudisch and Nemeroff reported that 17–27% of patients with CAD had major depression, while the rate of patients with depressive symptoms was higher, and depression, which is frequently comorbid with ACS, was associated with poor outcomes.[22] Since previous studies have shown that even minor depressive symptoms have a significant effect on cardiac prognosis, a scoring system that evaluates depressive symptoms was used in our study instead of the diagnosis of major depression.[23] In the present study, 37 (28.4%) of 130 patients with ACS who underwent PCI had abnormal depression scores. The abnormal depression score rate of the group with a high SYNTAX score (SS >33) was 73.9%, while the rate of abnormal depression score in the group with a low SYNTAX score (SS: 0–22) was 2.9%. These findings show that depressive symptoms are more common in patients with high SYNTAX scores. In people with depression, increased C-reactive protein levels indicating increased inflammatory response and altered platelet aggregation due to changes in serotonergic pathways may induce atherosclerosis.[21] Besides, Frasure–Smith et al.[24] defined diabetes as a risk factor for depression. The higher prevalence of depression in the diabetic population may explain the relationship between CAD severity and depression. In addition, behavioral and personality features of depressed patients, including unsanitary diet, sedentary lifestyle, poor medication adherence, use of tobacco products, and chronic life stress may also contribute to the development and progression of CAD.[25] In particular, smoking is an independent risk factor for CAD and depression.[26]

Anxiety is also common after ACS.[27] Murphy et al.[21] found the rate of anxiety seen in the early period after an acute cardiac event as 28%. Similarly, 38 (29.2%) of 130 patients with ACS who underwent PCI had abnormal anxiety scores in our study. The abnormal depression score rate of the group with a high SYNTAX score (SS >33) was 56.5%, while the rate of abnormal depression score in the group with a low SYNTAX score (SS: 0–22) was 4.4%. These findings demonstrate that anxious symptoms are more common in patients with high SYNTAX scores. Impairment of neuronal noradrenaline re-uptake in cardiac neuronal cells may explain the acute cardiovascular events seen in patients with anxiety.[28] In addition, patients with anxiety are more prone to HT, which is a risk factor for atherosclerosis.[29] Sudden chest pain, fear of death, and unpredictability may cause mood disor-

ders in ACS patients. Therefore, patients were included in the study 1 month after ACS so that depression and anxiety susceptibility caused by the acute situation would not affect the results.

Depression and anxiety may contribute to the development and progression of CAD due to their association with CAD risk factors. Several studies found that DM and hyperlipidemia were associated with extensivity and complexity of CAD.[30] Tanaka et al.[31] found that age, male gender, and DM were significant and independent risk factors for a higher SYNTAX score. Similarly, in our study, DM and HT were found to be associated with the SYNTAX score. Patients with a high SYNTAX score were found to be older, but statistical significance could not be reached in our study.

Finally, anxiety and depression symptoms are common in patients with CAD. As the severity of CAD increases, the severity of anxiety and depression levels also increases. Evaluation of anxiety and depression symptoms in ACS patients with diffuse CAD and treatment of these patients' symptoms should be considered.

Study Limitation

Our study has some limitations. First is the small sample size of this study. Second, we evaluated the symptoms of anxiety depression rather than the clinical diagnosis of any anxiety-depression disorder. Third, our results cannot be applied to patients with chronic coronary syndrome, as only ACS patients were included in our study.

Conclusion

In our study, we found that HADS and SYNTAX scores were correlated in ACS patients who performed PCI. As the severity of CAD increases, the tendency to have symptoms of anxiety and depression also increases. Physicians should pay attention to the importance of anxiety-depressive disorder evaluation, especially in patients with ACS with high SYNTAX scores. It should be noted that lowering the anxiety-depression level may increase the patient's compliance with treatment and may reduce the need for repetitive interventions in these patients.

Disclosures

Ethics Committee Approval: The study was approved by the Dicle University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (no: 193, date: 14/06/2023).

Authorship Contributions: Concept – A.F.K., M.H.Ö., C.Y.; Design – A.F.K., M.H.Ö., C.Y.; Supervision – A.F.K., S.S., M.Ö.; Funding – A.F.K., M.H.Ö., C.Y.; Materials – A.F.K.; Data collection and/or processing – A.F.K., S.S., M.Ö.; Data analysis and/or interpretation – A.F.K., M.H.Ö., C.Y.; Literature search – C.Y., A.F.K.; Writing – C.Y., A.F.K.; Critical review – S.S., C.Y., M.H.Ö.

Conflict of Interest: All authors declared no conflict of interest.

Use of AI for Writing Assistance: The authors declared that they did not use artificial intelligence for writing assistance.

Financial Disclosure: The authors declared that this study received no financial support.

Peer-review: Externally peer-reviewed.

References

1. Malakar AK, Choudhury D, Halder B, Paul P, Uddin A, Chakraborty S. A review on coronary artery disease, its risk factors, and therapeutics. J Cell Physiol 2019;234(10):16812–23. doi: 10.1002/jcp.28350.
2. Nakamura M. Angiography is the gold standard and objective evidence of myocardial ischemia is mandatory if lesion severity is questionable. Indication of PCI for angiographically significant coronary artery stenosis without objective evidence of myocardial ischemia (Pro)-. Circ J 2011;75(1):204–10. doi: 10.1253/circj.cj-10-0881.
3. Thuijs DJ, Kappetein AP, Serruys PW, Mohr FW, Morice MC, Mack MJ, et al. Percutaneous coronary intervention versus coronary artery bypass grafting in patients with three-vessel or left main coronary artery disease: 10-year follow-up of the multicentre randomised controlled SYNTAX trial. Lancet 2019;394(10206):1325–34. doi: 10.1016/S0140-6736(19)31997-X.
4. Okasha T, Radwan AS. The bidirectional relation between psychiatric disorders with selected cardiovascular and endocrinal diseases: An Egyptian perspective. Curr Psychiatry Rep 2015;17(1):528. doi: 10.1007/s11920-014-0528-y.
5. De Hert M, Detraux J, Vancampfort D. The intriguing relationship between coronary heart disease and mental disorders. Dialogues Clin Neurosci 2018;20(1):31–40. doi: 10.31887/DCNS.2018.20.1/mdehert.
6. Lotufo PA. Mental disorders and heart diseases: From William Harvey to today. Sao Paulo Med J 2017;135(4):321–2. doi: 10.1590/1516-3180.2017.1354110717.
7. Morys¨ JM, Bellwon J, Adamczyk K, Gruchala M. Depression and anxiety in patients with coronary artery disease, measured by means of self-report measures and clinician-rated instrument. Kardiol Pol 2016;74(1):53–60. doi: 10.5603/KP.a2015.0116.
8. Wulsin LR, Singal BM. Do depressive symptoms increase the risk for the onset of coronary disease? A systematic quantitative review. Psychosom Med 2003;65(2):201–10. doi: 10.1097/01.psy.0000058371.50240.e3.
9. Carney RM, Rich MW, Freedland KE, Saini J, TeVelde A, Simeone C, et al. Major depressive disorder predicts cardiac events in patients with coronary artery disease. Psychosom Med 1988;50(6):627–33. doi: 10.1097/00006842-198811000-00009.
10. Meijer A, Conradi HJ, Bos EH, Thombs BD, Van Melle JP, De Jonge P. Prognostic association of depression following myocardial infarction with mortality and cardiovascular events: A meta-analysis of 25 years of research. Gen Hosp Psychiatry 2011;33(3):203–16. doi: 10.1016/j.genhosppsych.2011.02.007.
11. Carney RM, Freedland KE. Depression and coronary heart disease. Nat Rev Cardiol 2017;14(3):145–55. doi: 10.1038/nrcardio.2016.181.
12. Kawachi I, Sparrow D, Vokonas PS, Weiss ST. Symptoms of anxiety and risk of coronary heart disease. The normative aging study. Circulation 1994;90(5):2225–9. doi: 10.1161/01.cir.90.5.2225.
13. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67(6):361–70. doi: 10.1111/j.1600-0447.1983.tb09716.x.
14. SYNTAX Score. Available from: https://syntaxscore.org. Accessed May 14, 2023.
15. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the hospital anxiety and depression scale. An updated literature review. J Psychosom Res 2002;52(2):69–77. doi: 10.1016/s0022-3999(01)00296-3.
16. Roest AM, Martens EJ, Denollet J, De Jonge P. Prognostic association of anxiety post myocardial infarction with mortality and new cardiac events: A meta-analysis. Psychosom Med 2010;72(6):563–9. doi: 10.1097/PSY.0b013e3181dbff97.
17. Celano CM, Millstein RA, Bedoya CA, Healy BC, Roest AM, Huffman JC. Association between anxiety and mortality in patients with coronary artery disease: A meta-analysis. Am Heart J 2015;170(6):1105–15. doi: 10.1016/j.ahj.2015.09.013.
18. Cerit L, Cerit Z, Duygu H. The non-negligible association between SYNTAX score and anxiety-depressive disorders. Cardiovasc J Afr 2022;33:30–4. doi: 10.5830/CVJA-2022-022.

19. The Nature and Course of Depression Following Myocardial İnfarction. Available from: https://pubmed.ncbi.nlm.nih.gov/2788396. Accessed Apr 16, 2023.
20. Carney RM, Freedland KE, Miller GE, Jaffe AS. Depression as a risk factor for cardiac mortality and morbidity: A review of potential mechanisms. J Psychosom Res 2002;53(4):897–902. doi: 10.1016/s0022-3999(02)00311-2.
21. Murphy B, Le Grande M, Alvarenga M, Worcester M, Jackson A. Anxiety and depression after a cardiac event: Prevalence and predictors. Front Psychol 2020;10:3010. doi: 10.3389/fpsyg.2019.03010.
22. Rudisch B, Nemeroff CB. Epidemiology of comorbid coronary artery disease and depression. Biol Psychiatry 2003;54(3):227–40. doi: 10.1016/s0006-3223(03)00587-0.
23. Bush DE, Ziegelstein RC, Tayback M, Richter D, Stevens S, Zahalsky H, et al. Even minimal symptoms of depression increase mortality risk after acute myocardial infarction. Am J Cardiol 2001;88(4):337–41. doi: 10.1016/s0002-9149(01)01675-7.
24. Frasure-Smith N, Lespérance F, Gravel G, Masson A, Juneau M, Talajic M, et al. Social support, depression, and mortality during the first year after myocardial infarction. Circulation 2000;101(16):1919–24. doi: 10.1161/01.cir.101.16.1919.
25. Everson-Rose SA, Lewis TT. Psychosocial factors and cardiovascular diseases. Annu Rev Public Health 2005;26:469–500. doi: 10.1146/annurev.publhealth.26.021304.144542.
26. Stafford L, Berk M, Jackson HJ. Tobacco smoking predicts depression and poorer quality of life in heart disease. BMC Cardiovasc Disord 2013;13(1):35. doi: 10.1186/1471-2261-13-35.
27. Moser DK, Dracup K. Is anxiety early after myocardial infarction associated with subsequent ischemic and arrhythmic events? Psychosom Med 1996;58(5):395–403. doi: 10.1097/00006842-199609000-00001.
28. Alvarenga ME, Richards JC, Lambert G, Esler MD. Psychophysiological mechanisms in panic disorder: A correlative analysis of noradrenaline spillover, neuronal noradrenaline reuptake, power spectral analysis of heart rate variability, and psychological variables. Psychosom Med 2006;68(1):8–16. doi: 10.1097/01.psy.0000195872.00987.db.
29. Lim LF, Solmi M, Cortese S. Association between anxiety and hypertension in adults: A systematic review and meta-analysis. Neurosci Biobehav Rev 2021;131:96–119. doi: 10.1016/j.neubiorev.2021.08.031.
30. Keymel S, Heinen Y, Balzer J, Rassaf T, Kelm M, Lauer T, et al. Characterization of macro-and microvascular function and structure in patients with type 2 diabetes mellitus. Am J Cardiovasc Dis 2011;1(1):68–75.
31. Tanaka T, Seto S, Yamamoto K, Kondo M, Otomo T. An assessment of risk factors for the complexity of coronary artery disease using the SYNTAX score. Cardiovasc Interv Ther 2013;28(1):16–21. doi: 10.1007/s12928-012-0112-5.