International Journal of Research in Medical Sciences
*Hosen MI et al. Int J Res Med Sci. 2025 Dec;13(12):5165-5168*
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20253937

**Original Research Article**

# Association of angiographic severity of coronary artery disease and erectile dysfunction based on IIEF-5 score

**M. Imam Hosen[1]*, M. Monir Hossain Khan[1], Sujit Kumar Ghosh[1], Taslima Binta Belayet[2], M. Azharul Islam[1], Mohammad Atikur Rahman[3], Abdullah-Al-Numan[3], Sadia Arju[3], M. Hasan Zaman[1], Tausif Amim Shadly[1]**

[1]Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh
[2]Department of Paediatric Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh
[3]Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh

**Received:** 29 September 2025
**Accepted:** 05 November 2025

***Correspondence:**
Dr. M. Imam Hosen,
E-mail: imamhosenk63@gmail.com



## ABSTRACT

**Background:** Erectile dysfunction (ED) is common in patients with coronary artery disease (CAD). Atherosclerosis is a shared mechanism for vasculogenic ED and CAD, suggesting a potential correlation. The objective was to evaluate the association of angiographic severity of coronary artery disease & erectile dysfunction based on IIEF-5 score.
**Methods:** This cross-sectional study was conducted at NICVD, Dhaka, on 60 patients with CAD and ED. Patients were divided into Group I (Gensini <20, n=30) and Group II (Gensini ≥20, n=30). ED was assessed using the IIEF-5 questionnaire, and IPA angiography was performed in the same setting.
**Results:** Mean IIEF-5 score was lower in severe CAD (Group II: 13.67±4.17 vs Group I: 15.93±3.14, p=0.021). Significant IPA stenosis (>50%) was more common in Group II (43.3% vs 20%, p=0.042). Spearman's correlation showed a negative correlation between Gensini and IIEF-5 scores (ρ=-0.475, p=0.01) and a positive correlation with IPA stenosis (ρ=0.410, p=0.03). Logistic regression identified severe CAD (OR 9.13, 95% CI 1.37–60.99) and diabetes mellitus (OR 4.75, 95% CI 1.29–46.33) as predictors of IPA stenosis.
**Conclusion:** Severity of CAD is inversely associated with erectile function and positively correlated with IPA stenosis.

**Keywords:** Erectile dysfunction, IIEF-5 score, Coronary artery disease, Internal pudendal artery stenosis

## INTRODUCTION

Erectile dysfunction (ED) is defined as the persistent inability to achieve and maintain an erection sufficient for satisfactory sexual activity. It is one of the most prevalent male sexual health disorders, with an estimated 150 million men affected globally in 1995, projected to rise to 322 million by 2025.[1] Prevalence increases with age, affecting up to 50% of men between 40 and 70 years.[2] In South Asia, including Bangladesh, ED is particularly common among men with diabetes, where nearly 54% report some degree of dysfunction.[3] This reflects not only the aging male population but also the high prevalence of cardiometabolic risk factors in the region.

Coronary artery disease (CAD) remains a leading cause of global morbidity and mortality, affecting over 110 million individuals worldwide.[4] The strong overlap between ED and CAD is explained by common risk factors such as hypertension, diabetes mellitus, dyslipidemia, obesity, and smoking.[5] Both conditions are primarily driven by endothelial dysfunction and atherosclerosis, affecting vascular tone and blood flow.[6]

The "artery size hypothesis" offers a pathophysiological explanation: because the penile arteries (1–2 mm in diameter) are smaller than coronary arteries (3–4 mm), a similar degree of atherosclerotic burden will obstruct penile flow earlier, making ED an early manifestation of systemic vascular disease.[7,8] Indeed, ED may precede symptomatic CAD by 2–5 years, serving as a clinical warning sign for underlying coronary pathology.[9]

The internal pudendal artery (IPA) supplies the penile vasculature, and its stenosis is a direct cause of vasculogenic ED. Angiographic studies have demonstrated that patients with CAD and ED frequently exhibit concomitant IPA stenosis, reinforcing the systemic nature of vascular disease.[10,11] The severity of ED is commonly assessed using the International Index of Erectile Function (IIEF-5), while CAD burden can be quantified using the Gensini score.[12] Several studies have shown a correlation between low IIEF-5 scores and high Gensini scores, suggesting that erectile dysfunction may reflect the extent of coronary atherosclerosis.[13,14]

However, limited data exist linking IPA stenosis directly with CAD severity in South Asian populations. Understanding this association is critical for early cardiovascular risk detection and comprehensive care. This study therefore explores the relationship between angiographic severity of coronary artery disease & erectile dysfunction based on IIEF-5 score in a Bangladeshi cohort.

## METHODS

This was a cross-sectional observational study conducted at the Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh, from January 2020 to December 2020. A total of 60 male patients (aged 40–70 years) with CAD on coronary angiography (CAG) and ED (IIEF-5 score <22) were enrolled. Patients with prior revascularization, aorto-iliac disease, pelvic surgery, or psychogenic ED were excluded.

Patients were divided into two groups: Group I (Gensini score <20) and Group II (Gensini ≥20). Clinical data, risk factors, and laboratory investigations were recorded. ED was assessed using the IIEF-5 questionnaire. IPA angiography was performed during the same session as CAG, with ≥50% stenosis considered significant. Data were analyzed using SPSS v23. Student's t-test, Chi-square test, Spearman's correlation, and multivariate logistic regression were applied. A p-value <0.05 was considered significant.

## RESULTS

Sixty patients were studied (30 in each group). Mean age was 54.22±8.4 years, with no significant differences between groups. Risk factors (hypertension, diabetes, smoking, dyslipidemia, obesity) were similarly distributed. IIEF-5 scores were lower in severe CAD (13.67±4.17 vs 15.93±3.14, p=0.021). Moderate to severe ED was more common in Group II (43.3%) compared to Group I (13.3%, p=0.016). Significant IPA stenosis (>50%) was found in 43.3% of Group II and 20% of Group I patients (p=0.042). Spearman's correlation showed a moderate negative correlation between Gensini score and IIEF-5 score (ρ=-0.475, p=0.01), and a positive correlation with IPA stenosis (ρ=0.410, p=0.03). Logistic regression analysis identified severe CAD (OR=9.13, 95% CI 1.37–60.99, p=0.022) and diabetes mellitus (OR=4.75, 95% CI 1.29–46.33, p=0.017) as predictors of significant IPA stenosis.

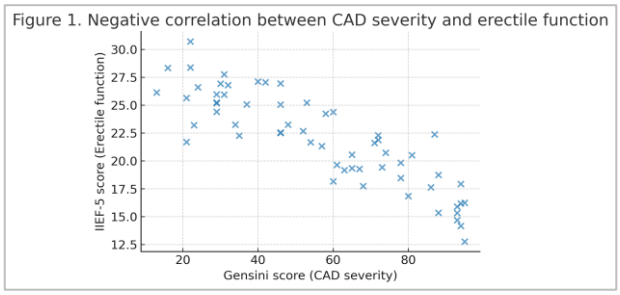


**Figure 1: Negative correlation between Gensini score and IIEF-5 score.**

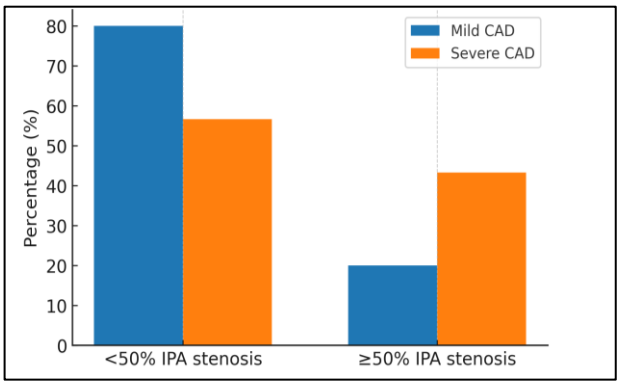


**Figure 2: Prevalence of IPA stenosis in mild vs severe CAD groups.**

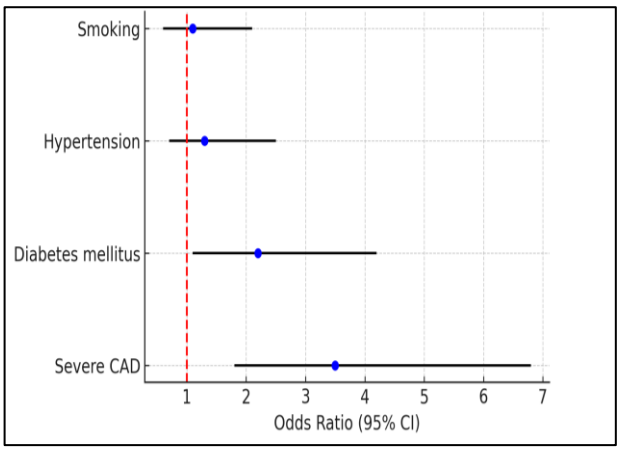


**Figure 3: Logistic regression forest plot of predictors of IPA stenosis (severe CAD, diabetes mellitus).**

**Table 1: Baseline characteristics of study participants.**

| Characteristics | Group I (n=30) | Group II (n=30) |
|---|---|---|
| **Age (in years, mean±SD)** | 53.3±8.6 | 55.1±8.3 |
| **Hypertension (%)** | 46.7 | 50.0 |
| **Diabetes mellitus (%)** | 36.7 | 43.3 |
| **Smoking (%)** | 40.0 | 43.3 |
| **Dyslipidemia (%)** | 26.7 | 30.0 |
| **Obesity (%)** | 20.0 | 23.3 |

**Table 2: Erectile dysfunction severity by IIEF-5 score.**

| ED severity | Group I (n=30) | Group II (n=30) |
|---|---|---|
| **Mild (17–21) (%)** | 40.0 | 20.0 |
| **Mild-to-moderate (12–16) (%)** | 46.7 | 36.7 |
| **Moderate-to-severe (≤11) (%)** | 13.3 | 43.3 |

**Table 3: Association of CAD severity with IPA stenosis.**

| IPA stenosis | Group I (n=30) | Group II (n=30) |
|---|---|---|
| <50% | 80.0% | 56.7% |
| ≥50% | 20.0% | 43.3% |

## DISCUSSION

The study demonstrated that patients with severe CAD, as defined by higher Gensini scores, had significantly lower IIEF-5 scores and a greater prevalence of IPA stenosis compared to those with less severe disease. These findings are consistent with the artery size hypothesis and strengthen the role of ED as an early clinical marker for systemic atherosclerosis.[7,9]

Several epidemiological and clinical studies corroborate our results. Montorsi et al showed that the onset of ED preceded CAD symptoms by an average of three years in more than two-thirds of men.[13] Similarly, a Chinese cohort study of 248 men reported that ED severity correlated with both the number of diseased coronary vessels and overall CAD burden.[14] A large-scale meta-analysis further confirmed that ED is an independent predictor of future cardiovascular events, including myocardial infarction and stroke.[15]

The underlying mechanism involves endothelial dysfunction, characterized by impaired nitric oxide bioavailability and reduced vasodilation, which is common to both ED and CAD.[6,16] Non-invasive vascular assessments such as flow-mediated dilation and carotid intima–media thickness have also shown abnormalities in ED patients, supporting the systemic vascular dysfunction hypothesis.[17]

In our study, diabetes mellitus emerged as a strong independent predictor of IPA stenosis, alongside severe CAD. This aligns with prior research showing that chronic hyperglycemia accelerates microvascular and macrovascular complications, leading to impaired penile perfusion and higher ED prevalence.[3,10] The combination of diabetes and CAD therefore significantly increases the risk of IPA disease and vasculogenic ED.

Therapeutically, revascularization of penile arteries, including angioplasty of the IPA, has shown promise in patients with vasculogenic ED refractory to phosphodiesterase-5 inhibitors.[11] Clinical studies report improved erectile function scores in 60–75% of patients following endovascular intervention, though restenosis—particularly in distal IPA segments—remains a challenge.[11] These findings emphasize that ED, especially when linked to IPA stenosis, is not merely a quality-of-life issue but an indicator of advanced systemic vascular disease.

From a clinical perspective, our findings highlight the importance of routinely screening for ED in male CAD patients, as its presence may indicate more severe underlying coronary and peripheral vascular disease. Early detection provides an opportunity for aggressive management of cardiovascular risk factors through lifestyle modification, pharmacotherapy, and—in selected cases—vascular interventions.

The clinical implications are significant: ED may serve as an early warning sign for CAD. Routine screening with IIEF-5 in CAD patients can help detect vasculogenic ED, guiding both cardiovascular and sexual health management. Given the limited sample size and single-center design, larger multicenter studies are needed to validate these findings.

However, our study has limitations. The cross-sectional design precludes causal inference, and the relatively small single-center cohort limits generalizability. Moreover, psychogenic and mixed etiologies of ED were excluded, which may not reflect the broader patient population. Future multicenter, longitudinal studies incorporating endothelial biomarkers and advanced vascular imaging are warranted to validate and expand these findings.

In summary, our data support the close interplay between CAD severity, IPA stenosis, and erectile dysfunction. ED should be recognized as a sentinel symptom of systemic vascular disease, offering clinicians a valuable window for early cardiovascular risk assessment and holistic patient management.

## CONCLUSION

Severity of coronary artery disease is inversely correlated with erectile function (IIEF-5 score) and positively associated with internal pudendal artery stenosis. Severe CAD and diabetes mellitus were found to be independent risk factors for IPA stenosis.

***Recommendations***

Cardiologists should routinely assess erectile function in CAD patients using the IIEF-5 questionnaire. Evaluation for IPA stenosis may be considered in CAD patients with ED, as revascularization may benefit selected cases. Larger multicentre prospective studies are warranted to confirm these associations and improve management strategies.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Aytac IA, McKinlay JB, Krane RJ. The likely worldwide increase in erectile dysfunction between 1995 and 2025. BJU Int. 1999;84(1):50–6.
2. Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study. J Urol. 1994;151(1):54–61.
3. Selim S, Chowdhury SH, Chowdhury MAJ, Rahaman FR. Frequency and risk factors of erectile dysfunction in Bangladeshi diabetic men. J Endocrinol Diabetes Obes. 2015;3(3):1075.
4. Roth GA, Mensah GA, Johnson CO. Global burden of cardiovascular diseases and risk factors, 1990–2019. J Am Coll Cardiol. 2020;76(25):2982–3021.
5. Vlachopoulos C, Jackson G, Stefanadis C, Montorsi P. Erectile dysfunction in the cardiovascular patient. Eur Heart J. 2013;34(27):2034–46.
6. Kaiser DR, Billups K, Mason C, Wetterling R, Lundberg JL, Bank AJ. Impaired brachial artery endothelium-dependent and -independent vasodilation in men with erectile dysfunction and no other clinical cardiovascular disease. J Am Coll Cardiol. 2004;43(2):179–84.
7. Montorsi P, Montorsi F, Schulman CC. Is erectile dysfunction the “tip of the iceberg” of a systemic vascular disorder. Eur Urol. 2003;44(3):352–4.
8. Vlachopoulos C, Ioakeimidis N, Terentes-Printzios D, Stefanadis C. The triad: erectile dysfunction–endothelial dysfunction–cardiovascular disease. Curr Pharm Des. 2008;14(35):3700–14.
9. Montorsi F, Briganti A, Salonia A. Erectile dysfunction prevalence, time of onset and association with risk factors in 300 consecutive patients with acute chest pain and angiographically documented CAD. Eur Urol. 2003;44(3):360–4.
10. Zaki T, Nammas W, Shawky A, Mortada A, Zaki H. Prevalence of internal pudendal artery disease in diabetic patients with erectile dysfunction and CAD. J Saudi Heart Assoc. 2013;25(2):1–7.
11. Rogers JH, Goldstein I, Kandzari DE. ZEN trial: zotarolimus-eluting stent for treating erectile dysfunction in men with suboptimal response to PDE5 inhibitors. J Am Coll Cardiol. 2012;60(25):2618–27.
12. Rosen RC, Cappelleri JC, Smith MD, Lipsky J, Peña BM. Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5). Int J Impot Res. 1999;11(6):319–26.
13. Montorsi P, Ravagnani PM, Galli S. Association between erectile dysfunction and coronary artery disease: angiographic and clinical evidence. Eur Urol. 2005;47(1):144–8.
14. Dong JY, Zhang YH, Qin LQ. Erectile dysfunction and risk of cardiovascular disease: meta-analysis of prospective cohort studies. J Am Coll Cardiol. 2011;58(13):1378–85.
15. Dong J, Fan Y, Zhang H. Severity of erectile dysfunction and its relationship with coronary heart disease characteristics in Chinese patients. Medicine (Baltimore). 2019;98(7):14464.
16. Vlachopoulos C, Aznaouridis K, Ioakeimidis N. Unfavorable endothelial and inflammatory state in erectile dysfunction patients with or without CAD. Eur Urol. 2006;50(4):795–802.
17. Gandaglia G, Briganti A, Jackson G. A systematic review of the association between erectile dysfunction and cardiovascular disease. Eur Urol. 2014;65(5):968–78.

**Cite this article as:** Hosen MI, Khan MMH, Ghosh SK, Belayet TB, Islam MA, Rahman MA, et al. Association of angiographic severity of coronary artery disease and erectile dysfunction based on IIEF-5 score. Int J Res Med Sci 2025;13:5165-8.