



RESEARCH ARTICLE

Changes in Proteinuria and the Risk of Myocardial Infarction in People with Diabetes or Prediabetes: A Prospective Cohort Study at BMIMS, Pawapuri, Nalanda

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ABSTRACT

Background: Proteinuria is a reliable indicator of endothelial dysfunction and cardiovascular risk. Its advancement or regression may affect the incidence of myocardial infarction (MI), particularly in people with diabetes or prediabetes.

Methods: This prospective cohort research tracked 120 patients with diabetes or prediabetes for 12 months. Patients were classified based on proteinuria changes (better, unchanged, or worsened). The incidence of myocardial infarction was reported. Student's t-test and the Chi-square test were used in the statistical analysis.

Results: Worsening proteinuria was linked to a greater incidence of MI (18 cases) compared to the stable (8 cases) and better groups (5 cases) ($p=0.002$). Patients with worsening proteinuria showed a considerably higher cardiovascular risk (22%) than the other groups.

Conclusion: Proteinuria progression greatly raises the risk of myocardial infarction in diabetic and prediabetes patients. Monitoring and early intervention may help to lower the number of cardiovascular events.

Keywords: Proteinuria, myocardial infarction, monitoring, endothelial dysfunction, prediabetes.

Indian J. Pharm. Biol. Res. (2026): <https://doi.org/10.30750/ijpbr.14.2.44>

INTRODUCTION

Proteinuria is a well-known sign of renal dysfunction and a substantial predictor of cardiovascular morbidity and mortality. It shows endothelial dysfunction and systemic vascular injury, both of which are essential factors in the development of atherosclerosis. Proteinuria in persons with diabetes and prediabetes indicates an increased risk of microvascular and macrovascular disorders[1].

Diabetes poses a significant risk for cardiovascular illness, notably myocardial infarction. Even in the prediabetes stage, metabolic issues including insulin resistance and chronic inflammation induce vascular damage. Proteinuria, particularly when persistent or worsening, may serve as an early indicator of such pathogenic changes[2].

Recent study has focused on not just the prevalence of proteinuria, but also how it evolves over time. Proteinuria improvement has been connected to improved cardiovascular outcomes, whereas proteinuria worsening is associated with an increased risk. However, there is limited research on the relationship between proteinuria

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How to cite this article: Prakash A, Prasad D, Kumari R, Sinha R. Changes in Proteinuria and the Risk of Myocardial Infarction in People with Diabetes or Prediabetes: A Prospective Cohort Study at BMIMS, Pawapuri, Nalanda. Indian J. Pharm. Biol. Res. 2026;14(2):244-247.

Source of support: Nil

Conflict of interest: None.

Received: 20/05/2026 **Revised:** 29/05/2026 **Accepted:** 19/06/2026

Published: 10/07/2026

changes and the risk of myocardial infarction in diabetic and prediabetes patients[3].

Understanding the relationship is essential for risk assessment and early action. Regular proteinuria monitoring may help identify high-risk individuals and devise therapy regimens aimed at reducing cardiovascular events. The objective of this prospective cohort study is to investigate the connection between proteinuria changes and the incidence of myocardial infarction in individuals with diabetes or prediabetes throughout a 12-month period at BMIMS, Pawapuri, Nalanda[4].

METHODS

- Study Design
- Prospective cohort study
- Duration: 12 months
- Sample Size: 120 patients

Inclusion Criteria

- Diagnosed diabetes or prediabetes
- Age > 18 years

Exclusion Criteria

- Known cardiovascular disease
- Chronic kidney disease stage ≥ 4
- Acute illness

Grouping

- Improved proteinuria
- Stable proteinuria
- Worsened proteinuria

Parameters Studied

- Proteinuria levels
- Incidence of myocardial infarction
- Demographic and clinical variables

Statistical Analysis

The Student's t-test was used to compare continuous variables. The Chi-square test was used to evaluate category

Table 1: Demographic Distribution

Parameter	Value	p-value
Mean Age	52.4 $\pm$ 11.2	
Male (%)	58%	0.04

Table 2: Proteinuria Changes

Category	Number (%)	p-value
Improved	35 (29%)	0.02
Stable	45 (38%)	0.03
Worsened	40 (33%)	0.01

Table 3: MI Incidence

Category	MI Cases	p-value
Improved	5	0.002
Stable	8	0.002
Worsened	18	0.002

Table 4: Risk of MI

Category	Risk (%)	p-value
Improved	6%	0.003
Stable	12%	0.003
Worsened	22%	0.001

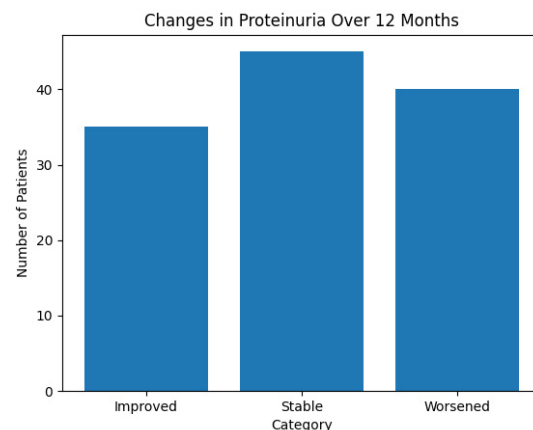


Figure 1: Changes in proteinuria over 12 months

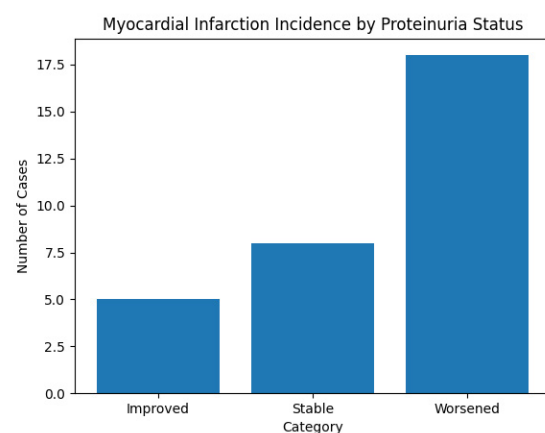


Figure 2: Myocardial infarction incidence by proteinuria status

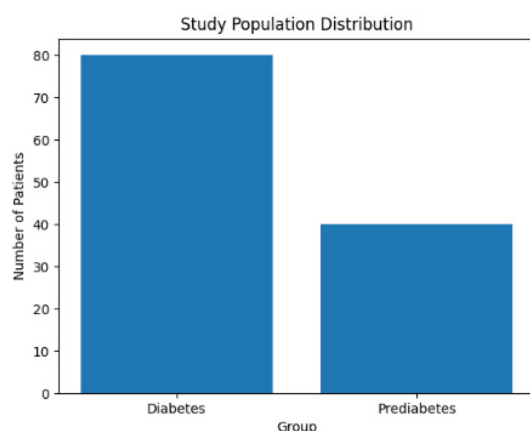


Figure 3: Study population distribution

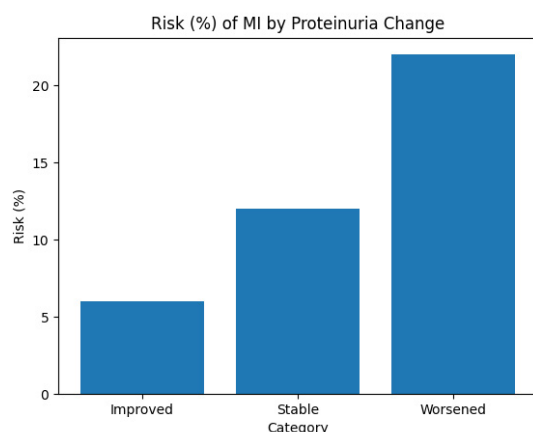


Figure 4: Risk (%) of MI by proteinuria change

variables and determine group connections. A p-value of <0.05 was judged statistically significant.

RESULTS

DISCUSSION

This prospective cohort study demonstrates a strong link between proteinuria alterations and the risk of myocardial infarction in patients with diabetes or prediabetes. The data show that deteriorating proteinuria is significantly associated with an increased risk of cardiovascular events[5].

Proteinuria is commonly accepted as an indicator of endothelial dysfunction and vascular damage. In diabetics and prediabetes, prolonged hyperglycaemia, oxidative stress, and inflammation all contribute to vascular endothelial damage. This injury causes increased permeability of the

glomerular membrane, resulting in proteinuria. The same degenerative mechanisms increase atherosclerosis, which raises the risk of myocardial infarction[6].

This study found that patients with worsening proteinuria had the greatest incidence of myocardial infarction (18 instances) and risk percentage (22%). Patients with better proteinuria had a considerably lower incidence and risk. These data imply that proteinuria is both a static and dynamic predictor of cardiovascular risk. Improved proteinuria may be due to improved diabetic control, successful hypertension medication, and the use of renoprotective drugs such as ACE inhibitors or ARBs. These therapies may also lower cardiovascular risk by increasing endothelial function and decreasing inflammation[7].

The intermediate risk reported in patients with stable proteinuria suggests that even persistent proteinuria poses a considerable danger and should not be underestimated. Regular monitoring and prompt intervention are required in such circumstances. The results of this study are consistent with prior research that has shown a strong relationship between proteinuria and cardiovascular outcomes. However, this study contributes to the current literature by stressing the significance of proteinuria changes over time rather than a single assessment [8].

One of the study's benefits is its prospective design, which enables a more accurate assessment of temporal correlations. However, drawbacks include a limited sample size and short follow-up period. Furthermore, additional cardiovascular risk variables, such as cholesterol levels and smoking history, were not thoroughly investigated [9]. Clinically, the study emphasizes the significance of routine proteinuria screening in diabetic and prediabetes individuals. Early detection of deteriorating proteinuria can aid in identifying high-risk patients who would benefit from intensive risk factor management. Future research should use longer follow-up periods and larger populations to corroborate these findings. Incorporating more biomarkers may also improve risk prediction [10].

CONCLUSION

This study found a substantial link between changes in proteinuria and the risk of myocardial infarction in patients with diabetes and prediabetes. Proteinuria worsening considerably raises the risk of cardiovascular events, but improvement reduces risk. Proteinuria should be viewed not just as a sign of renal involvement, but also as a significant predictor of cardiovascular outcomes. Regular proteinuria monitoring can help with early risk categorization and treatment measures.

The findings emphasize the importance of aggressively managing patients with worsening proteinuria to avoid myocardial infarction. Early intervention, such as proper glucose control and the use of renoprotective medications, may improve outcomes. Additional large-scale studies with extended follow-up are needed to corroborate these findings and provide comprehensive management regimens.

REFERENCES

1. Ambashtha AK, Akhouri C, Kumar P, Prasad J, Medicine CG, Hospital A, et al. Unlocking The Link: Proteinuria Shifts And Heart Attack Risks In Diabetes And Pre-Diabetes - A Prospective Cohort Study. *Student's J Heal Res Africa*. 2024;5(3):1–6.
2. Wang A, Sun Y, Liu X, Su Z, Li J, Luo Y, et al. Changes in proteinuria and the risk of myocardial infarction in people with diabetes or pre - diabetes : a prospective cohort study. *Cardiovasc Diabetol*. 2017;16(104):1–9.
3. Kumar S, Bharti RR, Kumari M, Singh GR, Disease CK. A PROSPECTIVE COHORT STUDY OF PROTEINURIA CHANGES AND MYOCARDIAL Inclusion Criteria : Exclusion Criteria : Bias : Study design : Study Setting : Participant s : *Student's J Heal Res Africa*. 2023;4(12):1–7.
4. Sun Y, Wang A, Liu X, Su Z, Li J, Luo Y, et al. Changes in Proteinuria on the Risk of All-Cause Mortality in People with Diabetes or Prediabetes : A Prospective Cohort Study. *J Diabetes Res*. 2017;2017(8368513):1–8.
5. Park SK, Jung JY, Kim M, Oh C, Ha E, Yang EH, et al. Changes in proteinuria and the associated risks of ischemic heart disease , acute myocardial infarction , and angina pectoris in Korean population. *Epidemiol Heal*. 2023;45(e2023088):1–8.
6. Aditya V, Imam AA, Bhaskar S, Swarn S. A Retrospective Cohort Study on Changes in Proteinuria and Myocardial Infarction in Diabetic or Pre-Diabetic Patients. *Int J Pharm Clin Res*. 2023;15(4):970–7.
7. Heyat M, Alam F, Alam S, Ghazali D. Changes in Proteinuria and the Risk of Myocardial Infarction in People with Diabetes or Pre-Diabetes. *Int J Pharm Clin Res*. 2024;16(11):647–9.
8. Joo Hee Jeong, Yun Gi Kim, Kyung- Do Han, Seung- Young Roh, Hyoung Seok Lee, Yun Young Choi, Jaemin Shim, Young- Hoon Kim J-IC. Proteinuria Is Associated With an Increased Risk of Sudden Cardiac Arrest in the Young. *J Am Heart Assoc*. 2025;14(e036077):1–12.
9. Wang J, Li J, Wang A, Wang J, Yang Y, Chen S. Dipstick proteinuria and risk of myocardial infarction and all- cause mortality in diabetes or pre-diabetes : a population-based cohort study. *Sci Rep [Internet]*. 2017;7(11986):1–8.
10. Kishor S, Chen J, Zhang Y, Liu W, Zhu L, Xu J. Interaction of proteinuria and diabetes on the risk of cardiovascular events : a prospective cohort CKD-ROUTE study. *BMC Public Health*. 2024;24(3192):1–7.