

Assessment of Association between Natriuretic Peptides (MR-pro-ANP and NT-pro-BNP) and Cardiovascular Risk in Patients with Type II Diabetes: A Prospective Observational Study

Daniel Sundar Singh^{1,*}, Anand Pithadia², Lavanya³

¹Faculty of Pharmacy, Parul University, Vadodara, Gujarat, INDIA.

²Department of Pharmacology, School of Pharmacy, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, INDIA.

³Department of Pharmacy Practice, PSG College of Pharmacy, Peelamedu, Coimbatore, Tamil Nadu, INDIA.

ABSTRACT

Background: Cardiovascular disease is the major cause of morbidity and mortality in individuals with T2DM. Although many promising cardiac markers have been identified, a single Natriuretic peptide biomarker is unlikely to aid T2DM patients with CVDs. Hence, we attempted to provide a brief insight into the association between natriuretic peptides and Cardiovascular risk in T2DM by using the UKPDS-10 years risk stratification tool. **Objectives:** The study aimed to assess the association between natriuretic peptides (MR- pro-ANP and NT Pro-BNP) and CVD in T2DM patients. **Materials and Methods:** A prospective observational study was conducted in a tertiary care hospital, with a sample size of 74. This study was carried out for 6 months. Based on the inclusion and exclusion criteria, patients has been enrolled in the study and the data were collected. Cardiovascular risk assessments 10 years were performed by utilizing the UK Prospective Diabetes Study (UKPDS) tool. **Results:** Out of 74 patients in our study, we found a significant correlation between UKPDS risk score, CVD, and natriuretic peptides in T2DM. The following results were found in our study: 1) Association between HbA_{1c} vs. UKPDS 10-year cardiac risk score (p value=0.026) 2) Association between HbA_{1c} and NT-Pro BNP (p value=0.017) 3) Association between HbA_{1c} and MR-Pro ANP (p value=0.002) 4) Association between UKPDS 10-year cardiac risk score and NT-Pro BNP (p value=0.000) 5) Association between age and NT Pro BNP (p value=0.044) 6) Association between Age vs. MR-Pro ANP (p value=0.033) 8) Association between UKPDS 10-year risk score and CVD (p value=0.038). **Conclusion:** In conclusion the data shows that there is a significant correlation between Natriuretic peptides and CVD hence, higher Natriuretic peptide levels in T2DM are directly associated with cardiovascular risk.

Keywords: Cardiovascular risk, Type-2 Diabetes Mellitus, Natriuretic Peptides (NT-Pro BNP, MR-Pro ANP), UK Prospective Diabetes Study (UKPDS).

Correspondence:

Daniel Sundar Singh

PhD Scholar, Faculty of Pharmacy, Parul University, Vadodara, Gujarat, INDIA.

Email: danielsundar79@gmail.com

Received: 27-03-2025;

Revised: 16-05-2025;

Accepted: 01-07-2025.

INTRODUCTION

Cardiovascular Diseases (CVD) pose a huge global health and economic burden, they are the leading cause of death worldwide, and DM and its complications are responsible for the extremely high mortality rate associated with CVDs. Cardiovascular Diseases (CVD) are heart and circulatory system disorders (Francula *et al.*, 2018). In India, CVD develops rapidly and is the primary cause of death for adults between the ages of 25 and 69 (Avinash *et al.*, 2014). India comes at the 5th number in the global list of deaths caused by cardiovascular diseases (Jaspreet

et al., 2020). A recent study states that the burden due to CVD in India is remarkably higher than what is being experienced at a global level. For example, the age-standardized death rate for CVD in India (282 deaths/100,000 (264-293)) was higher compared with global levels (233 deaths per 100,000 (229-236)) (Kalra *et al.*, 2023). The majority of these deaths were attributable to heart attacks and strokes (Klimonto *et al.*, 2021). Obesity, smoking, hypertension, gender, age, LDL cholesterol, diabetes, and a sedentary lifestyle are well-known risk factors for CVD development (Ghantous *et al.*, 2020). A close link exists between CVD and DM, higher incidence of CVD in T2DM individuals (Ahmed *et al.*, 2022) and, a cause of morbidity and mortality in diabetic patients (Leon *et al.*, 2015). Diabetes Mellitus (DM) is a chronic disease caused by an inherited or acquired deficiency in insulin production by the pancreas or by the inefficiency of the insulin produced (Mahadeva *et al.*, 2018). It can cause



DOI: 10.5530/ijpi.20250317

Copyright Information :

Copyright Author (s) 2025 Distributed under Creative Commons CC-BY 4.0

Publishing Partner : Manuscript Technomedia. [www.mstechnomedia.com]

catastrophic damage to many of the body's systems, notably the neurons and blood arteries, which have been altered (Diabetes *et al.*, 2022). It is estimated that almost three-fourths of individuals with DM2 die from CVD (Kavaric *et al.*, 2018). According to the International Diabetes Federation (IDF), 415 million persons between the ages of 20 and 79 had diabetes in 2015, and 673 billion dollars were spent on treating the disease and its complications (Bilkis *et al.*, 2021). With 1.3 billion people, India has the second-highest population in the world and the highest prevalence of diabetes (7.8%) (ADAD, 2005). Hence, prioritizing and controlling diabetic individuals with CVD risk factors is essential (Kalaivanan *et al.*, 2017). More than 75% of instances of premature CVD reported to the World Health Organization (WHO) can be prevented, and associated risk factors can also be reduced (Nuhad *et al.*, 2017). Elevated cardiac biomarkers are a typical indicator of the connection between T2D and CVD (Nuhad *et al.*, 2017). Cardiac enzymes or biomarkers are released into the circulation upon injury or death of myocardial cells, and measurement of these enzymes or biomarkers in serum or plasma can aid in the diagnosis of cardiovascular diseases or other heart problems (Potter *et al.*, 2009). However, several clinical biomarkers are currently associated with cardiovascular events that can only be used to identify patients at high risk and never prevent or predict an acute or fatal MI attack, which may be the first sign of Coronary Artery Disease (CAD) (Renuka *et al.*, 2015). It is important to distinguish between heart attacks, heart failure, or other conditions that may have similar signs and symptoms because the treatment and monitoring requirements are different (Cardiac *et al.*, 2015). In that way, single Natriuretic peptides (NT-Pro BNP, MR-Pro ANP) biomarkers play a crucial predictive role in CVD with TDM2. Natriuretic Peptides (NPs) are the enzymes that are released from the heart in response to pressure and volume overload (Cardiac *et al.*, 2022). The NP level reflects a complication of systolic and diastolic function as well as right ventricular and valvular function (Daniels *et al.*, 2007). As CVDs pose a huge global health and economic burden, they are the leading cause of death worldwide, and DM and its complications are responsible for an extremely high mortality rate associated with CVDs. Henceforth it can be used as both a diagnostic and prognostic marker in assessing the cardiac risk of developing MI in diabetic patients with asymptomatic CVD (Sarumathy *et al.*, 2018). In addition, the United Kingdom Prospective for Diabetes Studies (UKPDS) the 10-year risk stratification tool is used to predict the CVD risk in type 2 diabetic patients. According to the United Kingdom Prospective for Diabetes Studies (UKPDS), a 0.9% decline in HbA_{1c} results in trimming the risks for myocardial infarction by 14% (Hasan *et al.*, 2020). Therefore, the UK Prospective Diabetes Study has the potential to determine improved blood glucose control which will be beneficial in preventing complications (UKPDS, 1991). This study summarizes the correlation between CVD and T2DM individuals with a focus on natriuretic peptides and their

diagnostic and prognostic significance; we also attempted to provide a novel therapeutic strategy for employing UKPDS as a preventative tool.

OBJECTIVES

- To assess the correlation between natriuretic peptides (MR-pro-ANP and NT-pro-BNP) and cardiovascular risk in patients with type II diabetes.
- To study the correlation between demographic variables and cardiovascular burden in patients with type II diabetes.
- To assess the cardiovascular risk in patients with type II diabetes by using the 10-year risk stratification tool (UKPDS).

MATERIALS AND METHODS

Our study is a prospective observational study involving type II diabetic patients with CVD, conducted for 6 months and involving a sample size of 74 patients. The study was conducted at the Tertiary Care Hospital. Institutional approval has been taken to conduct this study.

Eligibility criteria

Inclusion criteria

Both males and females over 18 years old. All the type II diabetic patients with CVD and those who have natriuretic peptide test (MR-pro ANP, NT-pro BNP).

Exclusion criteria

Age below 18 years old, patients with type-I diabetes, pregnant women, and patients who were not willing to participate were excluded.

Data collection and design

Data were collected using a pre-structured patient data collection form based on inclusion and exclusion criteria. The following parameters were taken for the observation: lipid profile, blood sugar (FBS, PPBS, RBS, and HbA_{1c}), levels of natriuretic peptides (MR-pro ANP, NT-pro BNP), 2DEchocardiography, history or events of CVD, patient demographic details, etc. The collected data were correlated based on the objective of the study. 10 years of cardiovascular risk assessment were performed using the UK Prospective Diabetes Study (UKPDS) tool.

Statistical analysis

Data were entered into Microsoft Excel and SPSS 23.00 Version was used for the statistical analysis. Descriptive statistics, the Mann-Whitney U test, and the Pearson correlation were used to identify the correlation relationship between two variables and the strength of that relationship.

A total of 74 patients were included in the study conducted at a tertiary care hospital during the study period.

The data shows a linear relationship between blood sugar (HbA_{1c}) and UKPDS score, UKPDS score and natriuretic peptide (NT-Pro BNP), blood sugar (HbA_{1c}) and natriuretic peptide (NT-Pro BNP, MR-Pro ANP), and age and natriuretic peptide (NT-Pro BNP, MR-Pro ANP).

The Mann-Whitney U Test is used to check the difference between two independent groups.

There is no statistically significant difference between gender and cardiac markers (pro-ANP, pro-BNP).

RESULTS

Association between HbA_{1c} vs UKPDS 10 years cardiac risk score: The Correlation (Table 1) illustrates that there is a significant association between HbA_{1c} and UKPDS 10 years cardiac risk score (p value=0.026).

Association between HbA_{1c} vs NT-Pro BNP: The correlation (Table 1) illustrates that there is a significant association between HbA_{1c} and NT-Pro BNP (p value=0.017).

Association between HbA_{1c} vs MR-Pro ANP: The correlation (Table 1) illustrates that there is a significant association between HbA_{1c} and MR-Pro ANP (p value=0.002).

Association between UKPDS 10 years cardiac risk score vs NT-Pro BNP: The correlation (Table 1) illustrates that there is

Table 1: Correlation (Blood sugar vs. UKPDS Score, Blood sugar vs. Natriuretic peptides).

Variables	N	Correlation value	p Value
Blood Sugar-FBS	74	-0.31	0.793
UKPDS Score	74		
Blood Sugar-PPBS	74	0.218	0.063
UKPDS Score	74		
Blood Sugar-RBS	74	-0.010	0.930
UKPDS Score	74		
Blood Sugar-HbA _{1c}	74	0.259	0.026*
UKPDS Score	74		
Blood Sugar-FBS	74	-0.175	0.136
Cardiac markers-NT-Pro BNP	74		
Blood Sugar-PPBS	74	0.163	0.165
Cardiac markers-NT-Pro BNP	74		
Blood Sugar-RBS	74	0.104	0.376
Cardiac markers-NT-Pro BNP	74		
Blood Sugar-HbA _{1c}	74	0.276	0.017*
Cardiac markers-NT-Pro BNP	74		
Blood Sugar-FBS	74	0.098	0.407
Cardiac markers-MR-Pro ANP	74		
Blood Sugar- PPBS	74		
Cardiac markers-MR-Pro ANP	74	-0.055	0.639
Blood Sugar-RBS	74	0.078	0.506
Cardiac markers-MR-Pro ANP	74		
Blood Sugar-HbA _{1c}	74	0.349	0.002**
Cardiac markers-MR-Pro ANP	74		
UKPDS SCORE	74	0.0420	0.000**
Cardiac markers-NT-Pro BNP	74		
UKPDS Score	74	0.192	0.100
Cardiac markers-MR-Pro ANP	74		

a significant association between UKPDS 10 years cardiac risk score and NT-Pro BNP (p value=0.000).

Association between UKPDS 10 years cardiac risk score vs MR-Pro ANP: The correlation (Table 1) illustrates that there is a significant association between UKPDS score 10 years risk score and MR-Pro score (p value=0.100).

Association between Age vs NT-Pro BNP: The correlation (Table 2) illustrates that there is a significant association between age and NT-Pro BNP (p value=0.044).

Association between Age vs MR-Pro ANP: The correlation (Table 2) illustrates that there is a significant association between age and MR-Pro ANP (p value=0.033).

Association between UKPDS 10years risk score vs CVD: The correlation (Table 2) illustrates that there is a significant association between UKPDS 10years risk score and CVD (p value=0.038).

Table 3 illustrates the association between gender and natriuretic peptides.

DISCUSSION

Cardiovascular disease represents the major cause of death in subjects with T2DM. It is estimated that at most three-quarters of individuals with T2DM die from CVD. The Natriuretic peptides are a recognized diagnostic biomarker of CVD and a key factor in predicting death in individuals with T2DM. For predicting

Table 2: DM, HTN, CVD, Age, BMI vs. cardiac Markers (Pro BNP, Pro ANP).

Variables	N	Correlation value	p Value
DM	74	-0.022	0.852
Cardiac markers-NT-Pro BNP	74		
HTN	74	-0.195	0.097
Cardiac markers-NT-Pro BNP	74		
CVD	74	0.240	0.040*
Cardiac markers-NT-Pro BNP	74		
Age	74	0.235	0.044*
Cardiac markers-NT-Pro BNP	74		
BMI	74	0.147	0.213
Cardiac markers-NT-Pro BNP	74		
DM	74	-0.055	0.642
Cardiac markers-MR-Pro ANP	74		
HTN	74	0.116	0.325
Cardiac markers-MR-Pro ANP	74		
CVD	74	0.040	0.734
Cardiac markers-MR-Pro ANP	74		
Age	74	0.249	0.033*
Cardiac markers-MR- Pro ANP	74		
BMI	74	0.179	0.127
Cardiac markers-MR-Pro ANP	74		
UKPDS SCORE	74	0.242	0.038*
CVD	74		

Table 3: Mann-Whitney U test [Cardiac Markers (Pro BNP, Pro ANP) Vs Gender

Group		N	Mean Rank	Mann Whitney U	p value
Cardiac markers-Pro BNP	Male	74	39.09	520.5	0.358
	Female	74	34.19		
Cardiac markers-Pro ANP	Male	74	40.51	449.5	0.066
	Female	74	31.23		

the future progression of CVDs in T2DM patients, UKPDS is a promising tool. More study is required for early detection of CVD in T2DM patients, which is still a rare aspect of research in the country. This study was conducted to assess the association between Natriuretic peptides and cardiovascular risk in T2DM patients and to evaluate the therapeutic value of NT PRO BNP in CVD.

Jesper Jensen *et al.*, (2020) conducted a study in outpatients with type 2 diabetes (T2D), midregional pro-atrial natriuretic peptide (MR-pro ANP) is a helpful biomarker to identify Heart Failure (HF). Elevated B-type natriuretic peptides are used to define Heart Failure with preserved Ejection Fraction (HFpEF), but very little is known regarding the predictive benefit of incorporating A-type natriuretic peptides (MR-pro ANP) in the evaluation of T2DM patients.

Patients with T2DM and HFpEF who had high MR-pro ANP levels had an increased risk of CV events compared to patients with HFpEF who did not elevated MR-pro ANP and patients without HF, supporting the inclusion of MR-pro ANP in the definition of HFpEF from a prognostic point of view.

In our study, we assessed higher cardiovascular risk with elevating levels of NT PRO BNP and MR PRO ANP in patients with CVD AND T2DM.

Caterina Sujana *et al.*, (2021) examined the correlations of N-terminal pro-B-type NP (NT-pro BNP) and mid-regional pro-atrial NP (MR-pro ANP) with type 2 diabetes distinguished by the appearance of CVD. NT-pro BNP and MR-pro ANP are inversely linked with incident type 2 diabetes. This study conducted Natriuretic Peptides and Risk of Type 2 Discussion Diabetes outcomes from the Biomarkers for Cardiovascular Risk Assessment. Finally, they concluded that both natriuretic peptides were inversely associated with incident type 2 diabetes.

From the study, we observed that the levels of NT-pro BNP and MR-pro ANP are inversely related to the occurrence of type 2 diabetes. However, the presence of CVD appears to alter the inverse association of NT-pro BNP.

Other than that, UKPDS (United Kingdom Prospective Diabetes Study) is found to be a significant tool for predicting the cardiovascular risk in T2DM. This aimed to determine the levels of 10-year CHD risk in type 2 diabetes using the UKPDS risk engine calculator.

Nebojsa Kavarić *et al.*, (2018) conducted a similar study to estimate CVD risk by United Kingdom Prospective Diabetes Study (UKPDS) risk engine algorithm in individuals with T2DM, and the study concluded that high-sensitive CRP was not correlated with CVD prediction. In our study, it is explained that Natriuretic peptides are highly correlated with CVD risk stratification. In addition, our results are in line with previous studies showing

an association between high natriuretic peptide levels and high blood glucose levels with an increased risk of CVD.

This study concluded that many of the cardiac biomarkers used clinically are late-stage biomarkers, indicating the presence of a CVD that has already developed. Identifying early-stage biomarkers of CVDs is of utmost importance in preventing these diseases from progressing and inducing their associated complications, hence the study proves that there is a significant correlation between Natriuretic peptides and Cardiovascular risk in T2DM patients in addition, UKPDS is used as a promising tool to predict 10-years risk of CVD.

CONCLUSION

Although several promising cardiac markers have been identified, it is unlikely that a single natriuretic peptide biomarker will unambiguously aid type 2 diabetes mellitus patients suffering from CVDs. The data shows a linear relationship between blood sugar (HbA_{1c}) and UKPDS score, UKPDS score and natriuretic peptide (NT-Pro BNP), blood sugar (HbA_{1c}) and natriuretic peptide (NT-Pro BNP, MR-Pro ANP), and age and natriuretic peptide (NT-Pro BNP, MR-Pro ANP). In conclusion, the study shows higher natriuretic peptide levels in type 2 diabetes mellitus are directly associated with cardiovascular risk.

ACKNOWLEDGEMENT

We would like to thank Parul University and the management for the fullest support.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

UKPDS: United Kingdom Prospective Diabetes Study; **IDF:** International Diabetic Federation; **CVD:** Cardiovascular disease; **DM:** Diabetes Mellitus.

ETHICAL APPROVAL

This study has been approved by the Institutional Ethics Committee (IHIC/2022/Appr/Exp/254).

REFERENCES

- Aldoori, N. M. (2017). Prevalence of Obesity among female Adolescents in Al-Hillah city: Future Risk of cardiovascular Diseases. *Research Journal of Pharmacy and Technology*, 10(7), 2127–2131. <https://doi.org/10.5958/0974-360X.2017.00373.0>
- Alshawi, A., & Ali Alnaji, H. A. (2022). TG/HDL, non-HDL, and TyG index as predictive parameters for CVDs in uncontrolled diabetic patients better than LDL-C and LDL/HDL ratio. *Research Journal of Pharmacy and Technology*, 15(12), 5490–5494. <https://doi.org/10.52711/0974-360X.2022.00926>
- Banu, B., Yasmin, F., Hossain Khan, M. H., Ali, L., Sauerborn, R., & Soares, A. (2021). A Systematic Review on Knowledge-Attitude-Practice on diabetes: Assessment Process and Outcome Levels. *Research Journal of Pharmacy and Technology*, 14(11), 6125–6138. <https://doi.org/10.52711/0974-360X.2021.01064>
- Cardiac enzymes (cardiac biomarkers) [Internet]. In <https://my.clevelandclinic.org/health/articles/22115-cardiac-enzymes-cardiac-biomarkers>

- Daniels, L. B., & Maisel, A. S. (2007, December). Natriuretic peptides. *Journal of the American College of Cardiology*, 50(25), 2357–2368. <https://doi.org/10.1016/j.jacc.2007.09.021>
- American Diabetes Association Diagnosis and classification of diabetes mellitus. (2005). *Diabetescare*, 28(1) Suppl. 37.
- Francula-Zaninovic, S., & Nola, I. A. (2018, August 1). Management of measurable variable cardiovascular disease risk factors. *Current Cardiology Reviews*, 14(3), 153–163. <https://doi.org/10.2174/1573403X14666180222102312>
- Ghantous, C. M., Kamareddine, L., Farhat, R., Zouein, F. A., Mondello, S., Kobeissy, F., & Zeidan, A. (2020, November 30). Advances in cardiovascular biomarker discovery. *Biomedicines*, 8(12), 552. <https://doi.org/10.3390/biomedicines8120552>
- Kalaivanan, S., Sarumathy, S., Ebens, J. A., Kumar, K. N., Parveen, A. R., & Ashraf, M. N. (2017). Clinical Assessment and Comparison of Lipid Profiles among coronary artery disease and type 2 diabetes mellitus Patients receiving statin Therapy. *Research Journal of Pharmacy and Technology*, 10(1), 18–20. <https://doi.org/10.5958/0974-360X.2017.00005.1>
- Kalra, A., Jose, A. P., Prabhakaran, P., Kumar, A., Agrawal, A., Roy, A., Bhargava, B., Tandon, N., & Prabhakaran, D. (2023, February 10). *The burgeoning cardiovascular disease epidemic in Indians-perspectives on contextual factors and potential solutions. The lancet regional health-Southeast Asia*.
- Kavaric, N., Klisic, A., & Ninic, A. (2018, January 1). Cardiovascular risk estimated by UKPDS risk engine algorithm in diabetes. *Open Medicine*, 13(1), 610–617. <https://doi.org/10.1515/med-2018-0086>
- Khairnar, A., & Jamdade, S. (September 2014). Prospective cross-sectional observational study on evaluation of drug utilization 90% Study in cardiovascular diseases. *Research Journal of Pharmacy and Technology*, 7(9), 981–986.
- Klimontov, V. V., Koroleva, E. A., Khapaev, R. S., Korbut, A. I., & Lykov, A. P. Carotid artery disease in subjects with type 2 diabetes: Risk factors and biomarkers. *Journal of Clinical Medicine*. 2021Dec24; 11(1), 72.
- Leon, B. M., & Maddox, T. M. (2015, October 10). Diabetes and cardiovascular disease: Epidemiology, biological mechanisms, treatment recommendations, and future research. *World Journal of Diabetes*, 6(13), 1246–1258. <https://doi.org/10.4239/wjd.v6.i13.1246>, PubMed: 26468341, PubMed Central: PMC4600176
- Potter, L. R., Yoder, A. R., Flora, D. R., Antos, L. K., & Dickey, D. M. (2009). Natriuretic peptides: Their structures, receptors, physiologic functions and therapeutic applications. *Handbook of Experimental Pharmacology*, (191), 341–366. https://doi.org/10.1007/978-3-540-68964-5_15
- Rao, U. S. M., Zin, T., Rn, K. K. W., Subramaniam, S. A. L., Shan, T. B., Mogan, K. A. P., & Ismail, A. S. B. (2018). Cross-Sectional Study on Knowledge, Attitude and Practice regarding diabetes mellitus among Medical and Non-Medical Students. *Research Journal of Pharmacy and Technology*, 11(11), 4837–4841. <https://doi.org/10.5958/0974-360X.2018.00879.X>
- Renuka, S., & Sethu, G. (June 2015). Regeneration after myocardial infarction. *Research Journal of Pharmacy and Technology*, 8(6), 738–741. <https://doi.org/10.5958/0974-360X.2015.00117.1>
- Sarumathy, S., Shanmugarajan, T. S., Suresh Rao, K. G., & Benazeer Begum, N. (2018). Significance of Clinical Laboratory Values as early indicators of myocardial infarction-A Prospective Study. *Research Journal of Pharmacy and Technology*, 11(4), 1563–1565. <https://doi.org/10.5958/0974-360X.2018.00291.3>
- Singh, J., & Singh, S. (2020). Stem Cells as a hope for the treatment of cardiovascular diseases. *Research Journal of Pharmacy and Technology*, 13(8), 3992–3998. <https://doi.org/10.5958/0974-360X.2020.00706.4>
- Sofihussein, H. Q., Al-Naqshabandi, A. A., Sami, H. F., & Saeed, M. M. M. (2020). Effect of vitamin D supplement on the risks of cardiovascular disease in patients with type 2 diabetes in the Kurdistan Region of Iraq. *Research Journal of Pharmacy and Technology*, 13(9), 4125–4129. <https://doi.org/10.5958/0974-360X.2020.00728.3>
- Cardiac biomarkers [Internet]. (2015). *Testing.com*. Retrieved November 4, 2022, <http://www.testing.com/tests/cardiac-biomarkers/>
- UK Prospective Diabetes Study Group. (1991, December). UK prospective diabetes Study (UKPDS) VIII. Study design, progress and performance. *Diabetologia*, 34(12), 877–890. <https://doi.org/10.1007/BF00400195>
- Diabetes [Internet]. *Who.int.int/news-room/fact-sheets/detail/diabetes*. Retrieved October 4, 2022. Available <https://www.who>

Cite this article: Singh DS, Pithadia A, Lavanya. Assessment of Association between Natriuretic Peptides (MR-pro-ANP and NT-pro-BNP) and Cardiovascular Risk in Patients with Type II Diabetes: A Prospective Observational Study. *Int. J. Pharm. Investigation*. 2025;15(4):1268-73.