

## Correlation between Mean Platelet Volume and Platelet Distribution Width and HbA1c in diabetic patients

Jemy Adalin R<sup>1</sup>, Issac Richards P<sup>2</sup> and Dhastagir Sultan Sheriff<sup>3</sup>

<sup>1</sup>Department of Physiology, Srinivasan Medical College and Hospital, Samayapuram.

<sup>2</sup>Department of ENT, Meenakshi Hospitals Thanjavur.

<sup>3</sup>Anna Medical College, Mauritius

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### Abstract

Diabetes mellitus is one of the major public health problems. Its major complications include micro and macro vascular problems. The platelet indices are used to measure and estimate the relation between vascular changes and hemoglobin A1 C. In this preliminary study carried out in a local diabetic cases indicated that there was significant correlation between platelet volume, platelet distribution width and glycated hemoglobin. The findings suggest that apart from routine estimations of biomarkers related to diabetes platelet indices can be included in the panel of investigations.

**Key words:** Diabetes mellitus, glycated hemoglobin, platelet volume, platelet distribution width

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### I. INTRODUCTION:

Diabetes Mellitus, a chronic metabolic disorder which is considered as the prothrombotic state has a greater association with systemic inflammation and oxidative stress that paves way for increased platelet reactivity.<sup>1</sup>

Increased platelet activity suggests the thrombotic state in diabetic patients. In this preliminary study, the association between platelet indices Mean Platelet Volume (MPV) and Platelet Distribution Width (PDW) with HbA1c (glycated hemoglobin) were studied in diabetic and non-diabetic individuals.<sup>2</sup> Such a preliminary study will help understand better the susceptibility of diabetics to vascular complications in a particular

### II. MATERIALS AND METHODS:

This cross-sectional study was conducted among subjects at a Thanjavur private hospital. Ethical committee clearance was obtained. After getting informed consent, 80 subjects of both sexes were included. Among them 40 were diabetics (cases) and 40 non-diabetics (controls), as per ADA criteria.<sup>3</sup> They are of age group 25 years and above.

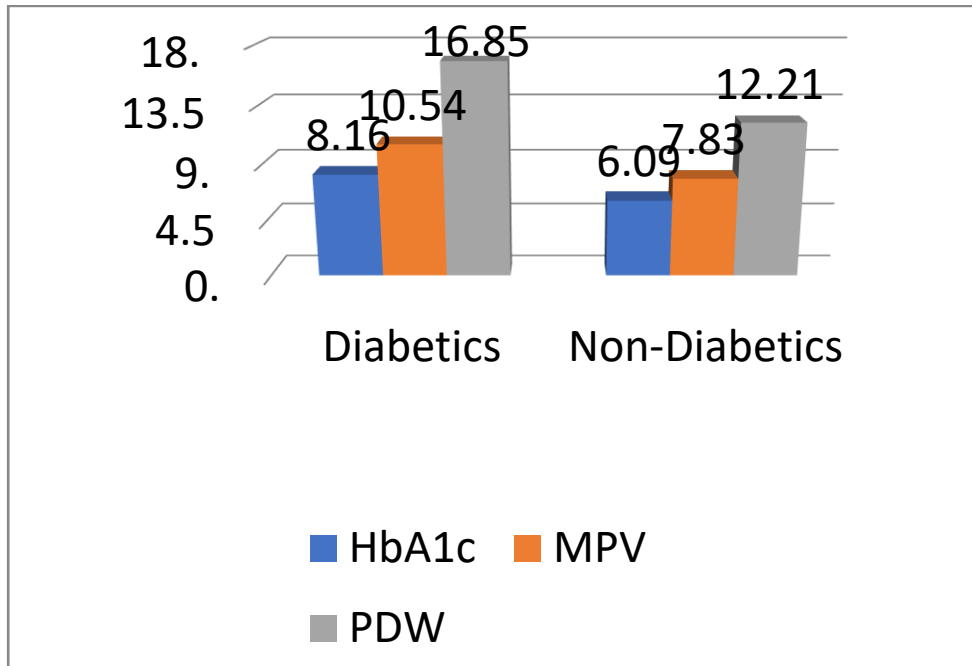
Subjects who were severely ill, with malignancies, infections, liver pathologies, hematological disorders, on dialysis, on drugs (antiplatelets/antihypertensives and statins), pregnant/menstruating women, smokers and alcoholics were excluded from the study.

The Platelet distribution width (PDW) and Mean Platelet volume (MPV) of the subjects were done using fully automated analyser -Model Beckman Coulter AU480 and their HbA1c were determined using Beckman Coulter DxH820. Statistical Analysis was done using student t-test [p value < 0.05 is significant] and Pearson's correlation coefficient (SPSS system version 15.0).

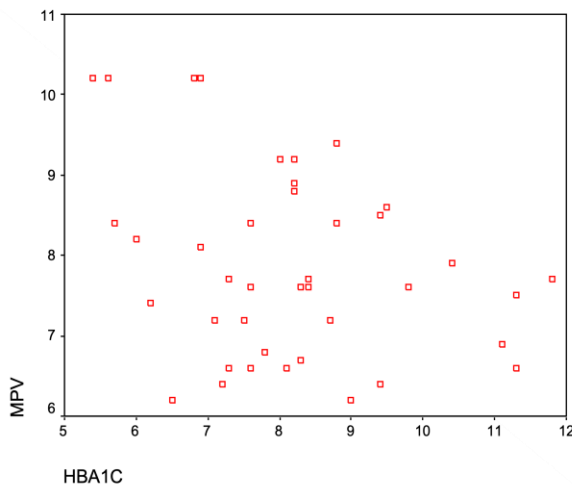
### III. RESULT AND CONCLUSION

In diabetic individuals there is significant increase in PDW (Mean=16.85, p=0.006) and MPV (Mean=10.54, p=0.18) with increase in glycated hemoglobin levels-Fig:1 (Mean=8.16), whereas there is no such change among control groups. No significant correlation was found between HbA1c with MPV and PDW with HbA1c (Fig:2) among cases.

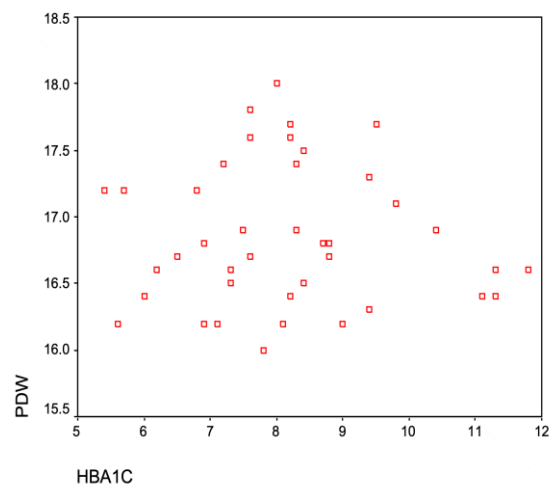
**Fig1: Comparison between PDW, MPV with HbA1c among cases and control:**



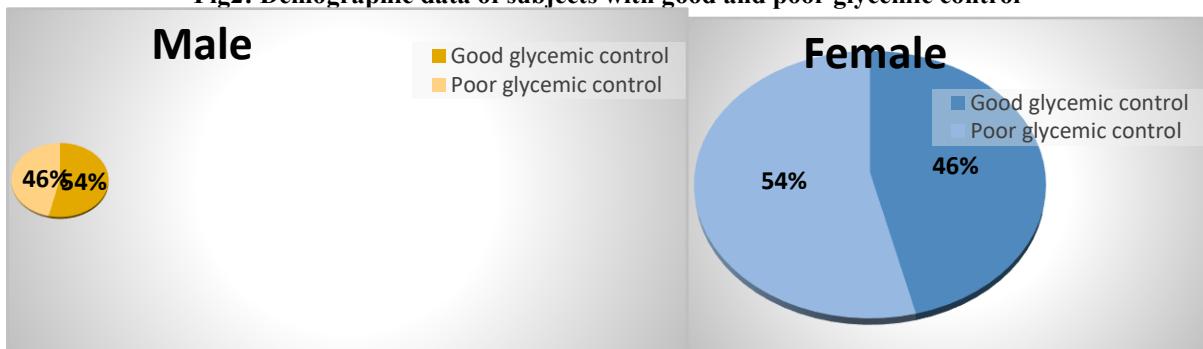
**Fig.2.1**Correlation between MPV and HbA1c



**Fig2.2**Correlation between PDW and HbA1c



**Fig2: Demographic data of subjects with good and poor glycemic control**



#### **IV. DISCUSSION:**

Diabetes Mellitus, a global health problem has a heightened risk for micro and macrovascular complications<sup>4</sup>. Hyperactive platelet production is being found in subjects with poor glycemic control. This increased reactivity of platelets is accompanied by an increased production of thromboxane A<sub>2</sub>, serotonin and osmotic swelling due to raised blood glucose level<sup>5</sup>. In our preliminary study MPV and PDW were significantly higher in diabetic group than controls as reported in other studies. There was no significant correlation between MPV and HbA1c in diabetics.

**CONCLUSION:** This preliminary study showed that platelet indices can be used as early predictors of thrombotic events in diabetic individuals, thereby preventing complications.

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