Original Article

# Platelet Indices as a Predictor of Microvascular Complications in Type 2 Diabetes

Aisha Rabel[1], Irfan Siddiqui[2] and Maria Abid[3]

## ABSTRACT

**Objective:** The study's main goal is to look at platelet indices as an indicator of microvascular complications in people with type 2 diabetes.

**Study Design:** Cross-Sectional Study

**Place and Duration of Study:** This study was conducted at the Jinnah Postgraduate Medical Centre in Karachi from Jan, 2019 to June, 2019 for a period of six months.

**Materials and Methods:** A total of 200 diabetic patients, both male and female, were surveyed. The information was gathered using a Performa that included all demographic information, medical background, blood transfusion history, and other relevant information.

**Results:** The information was obtained from 200 patients of both sexes. In total, 200 participants were found to be diabetic, resulting in a 24.6 percent (95 percent CI 21.90 - 27.49) prevalence of the disease in the study population. 31.5 percent of participants (P 0.001) said they had a history of the disease.

**Conclusion:** Adjustments in platelet files are thought to be measurably linked to diabetes and its complexities, according to the findings.

**Key Words:** Platelet, Microvascular Complications, Type 2 Diabetes

## INTRODUCTION

Type 2Diabetes Mellitus is an endocrine condition characterized by due to impairment of secretion of insulin by the pancreas and insulin resistance in body tissues. In patients with T2DM, hyperglycemia causes less microvascular and macrovascular complications than expected; diabetic retinopathy (DR) is the most frequently seen microangiopathy.[1]

It affects 40022 million people, and it is spreading rapidly in middle- and low-income countries. By 2025, efforts must be made all over the world to halt the rise of diabetes. Diabetes causes endothelial and pericyte damage as a result of hyperglycemia, dyslipidemia, and insulin resistance, making it a prothrombotic disease. [2] Hyperglycemia is a form of diabetes that results in a clustering of major entrapments of varying lengths. [3]

1. Postgraduate Resident at Jinnah Postgraduate Medical Center Karachi

2. Department of Medicine, Zaiuddin Hospital, Karachi.

3. Department of Internal Medicine, Chiniot General Hospital Korangi Creek, Karachi

Correspondence: Dr. Aisha Rabel, Postgraduate Resident at Jinnah Postgraduate Medical Center Karachi.
Contact No: 03403952113
Email: mayesha2211@gmail.com

They have a strikingly similar effect on the patient as they do on society, as pollution usually affects people during their prime working years. Hyperglycemia's adverse effects are often limited to macrovascular problems (CAD, Peripheral Arterial Disease, Stroke) and mild vascular complications (Diabetic Retinopathy, Diabetic Neuropathy& Nephropathy)[4]. This greater reactivity has also been used to assess diabetes-related fragmentation in microvascular disarrays. Mean platelet volume (MPV), reflects changes between platelet records in the impeller or platelet formation. Platelet spread width (PDW) is a measure of platelet heterogeneity that can be a fast result of platelet formation or heterogeneous megakaryocyte division. Platelet large cell degree (PLCR), the third platelet record, is the degree of more prominent platelets. [5]

## MATERIALS AND METHODS

The Jinnah Postgraduate Medical Center in Karachi conducted this cross-sectional analysis. From Jan, 2019 to June, 2019. The information was gathered from 200 diabetic patients, both male and female. The information was obtained using a performa, which included all demographic information, disease history, blood transfusion history, and other pertinent information. The participants were subjected to a rigorous clinical examination. Diabetic patients were treated specifically for microvascular problems. Tactile perception of light contact with a 10-g monofilament, torment sensation with a pinprick, vibration sense with

a 128 Hz tuning fork and a biothesiometer from Genesis clinical frameworks, temperature sense, and lower leg snap were all used to test neuropathy. The glucose levels were tested twice, once after at least 8 hours of fasting and again 2 hours after supper, using the colorimetric technique of Randox Biosciences' semi-robotized analyzer RX Imola.

**Statistical Analysis:** SPSS version 19 was used to collect and analyze the data. The mean and standard deviation were used to express all of the results.

## RESULTS

The information was gathered from 200 patients of both sexes. In total, 200 participants were found to be diabetic, resulting in a 24.6 percent (95 percent CI 21.90 - 27.49) prevalence of the disease in the study population. 31.5 percent of participants (P 0.001) said they had a history of illness.

**Table No.1: Distribution of participants according to disease**

| Status | Total (%) | P-value |
|---|---|---|
| Diabetic | 24.6 | <0.001 |
| Type-2 | 32 | <0.001 |
| Non diabetic | 68.5 | <0.001 |

In our study, 385 (77 percent) patients had microvascular complications (Table 2).

**Table No.2 Characterizes diabetes microvascular complications**

| HbA1c | Patients | Percentage |
|---|---|---|
| <8.0% | 19 | 16 |
| >8.0% | 96 | 84 |
| Total | 115 | 100 |

Of the 115 patients without microvascular confusions, 95 (83%) had an HbA1c of less than 7.0. (Table 5). Of the 115 patients without microvascular entanglement, 80 (70%) had a period of < 5 years (table 03).

**Table No.3: Patients based on HbA1c differentiate (hemoglobin A1c). Micro-vascular complication-free patients**

| Duration of Diabetes | No. of Patients | Percentage |
|---|---|---|
| < 5 years | 80 | 70 |
| > 5 years | 35 | 30 |
| Total | 115 | 100 |

**Table 04: Two study groups comparing the platelet indexes**

| Platelet index | Normal range | Std. deviation | *t* | *P* |
|---|---|---|---|---|
| MPV (fL) | 8.6-15.5 fL | 1.63 | 12.47 | 0.0001 |
| PDW (fL) | 9.0-14 fL | 3.15 | 9.82 | 0.0001 |
| PCT (%) | 0.22-0.24% | 0.056 | 3.21 | 0.0001 |

## DISCUSSION

Hyperglycemia damages retinal endothelial narrow cell, renal mesangial cell, and the fringe Schwan cells as the major microvascular harm pathogenesis. [6] Similarly, maliciousness in these endothelial cells causes microvascular irritation. [7] as we found in our study, current evidence supports an evident link between hypertension and glycemic control impairments and microvascular disorders. [8]

Hyperglycemia in macrovascular and microvascular complications characterizes diabetes mellitus, a metabolic condition characterized by hyperglycemia. Neurotic cycles and a high risk of vascular disease have been linked to altered platelet morphology and capacities.[9] Aydinli et al. advanced the notion of no connection between MPV and T2DM complications. We found a genuinely massive MPV separation in patients with T2DM and HCs in the current study. Looking at the unquestionable collections of diabetic patients, we found a clear distinction for both PDR patients and those with no DR. [10-11]

## CONCLUSION

It is concluded that changes in platelet files are thought to be measurably related to diabetes and its complications. They are easily accessible, straightforward, helpful, non-invasive, and simple to understand the strategy for determining platelet brokenness and thus predicting the presence of microvascular complications.

**Author's Contribution:**

| | |
|---|---|
| Concept & Design of Study: | Aisha Rabel |
| Drafting: | Irfan Siddiqui |
| Data Analysis: | Maria Abid |
| Revisiting Critically: | Aisha Rabel, Irfan Siddiqui |
| Final Approval of version: | Aisha Rabel |

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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