

VOLUME 40, NUMBER 4

April 2023

ISSN 0189 - 160X

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# WAJMJ

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**WEST AFRICAN JOURNAL OF MEDICINE**

ORIGINALITY AND EXCELLENCE IN MEDICINE AND SURGERY



**OFFICIAL PUBLICATION OF**  
THE WEST AFRICAN COLLEGE OF PHYSICIANS *AND*  
WEST AFRICAN COLLEGE OF SURGEONS



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### An Evaluation of Platelet Factor 4, Beta-Thromboglobulin and Mean Platelet Volume in the Assessment of Thrombotic Risks in Subjects with Diabetes Mellitus at Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria

*Évaluation du Facteur Plaquettaire 4, de la Bêta-Thromboglobuline et du Volume Plaquettaire Moyen dans l'Évaluation des Risques Thrombotiques chez les Sujets Diabétiques au Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria*

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#### ABSTRACT

**BACKGROUND:** Beta-thromboglobulin and platelet factor 4 are known platelet-specific proteins that are stored in the platelet alpha-granules and released during platelet activation. The measurement of these proteins can reflect the degree of platelet activation and indirectly suggest a pro-thrombotic state. This study aimed at determining serum levels of Beta-thromboglobulin, mean platelet volume, and platelet factor 4 in diabetes mellitus and control subjects in Lagos, Nigeria.

**MATERIALS AND METHODS:** Using enzyme-linked immunosorbent assay at Lagos State University Teaching Hospital, Ikeja, this study evaluated serum concentrations of Beta-thromboglobulin, and platelet factor 4, the mean platelet volume was also determined from a Full Blood Count of all participants. Data were analyzed using Statistical Package for Social Sciences, Inc., Chicago, Ill; version 26.0. The continuous variables were given as mean  $\pm$  standard deviation. The P-value was considered to be statistically significant when  $\leq 0.05$ .

**RESULTS:** Beta-thromboglobulin concentration was higher and statistically significant ( $7.82 \pm 1.54$  ng/ml and  $6.70 \pm 2.23$  ng/ml;  $P = 0.01$ ), platelet factor 4 ( $39.86 \pm 11.25$  ng/ml and  $47.73 \pm 21.73$  ng/ml,  $P = 0.06$ ) and mean platelet volume ( $10.26 \pm 1.06$  fl and  $10.29 \pm 1.02$  fl  $P = 0.89$ ) were not statistically significant in the diabetes mellitus group compared with non-diabetic participants, platelet factor 4 was higher in the older than younger diabetes mellitus participants.

**CONCLUSION:** Elevated Beta-thromboglobulin may suggest a possible increase in thrombotic risks among diabetes mellitus.

WAJM 2023; 40(4): 357–361.

**Keywords:** Beta-thromboglobulin, platelet factor 4, mean platelet volume.

#### RÉSUMÉ

**CONTEXTE:** La bêta-thromboglobuline et le facteur plaquettaire 4 sont des protéines spécifiques des plaquettes qui sont stockées dans les alpha-granules plaquettaires et libérées lors de l'activation des plaquettes. La mesure de ces protéines peut refléter le degré d'activation des plaquettes et suggérer indirectement un état pro-thrombotique. Cette étude visait à déterminer les taux sériques de bêta-thromboglobuline, le volume plaquettaire moyen et le facteur plaquettaire 4 chez des sujets atteints de diabète sucré et des sujets témoins à Lagos, au Nigéria.

**MATÉRIEL ET MÉTHODES:** En utilisant le dosage immuno-enzymatique au Lagos State University Teaching Hospital, Ikeja, cette étude a évalué les concentrations sériques de bêta-thromboglobuline et de facteur plaquettaire 4, le volume plaquettaire moyen a également été déterminé à partir d'une numération globulaire complète de tous les participants. Les données ont été analysées à l'aide du logiciel Statistical Package for Social Sciences, Inc, Chicago, Ill; version 26.0. Les variables continues ont été exprimées en moyen  $\pm$  écart-type. La valeur P a été considérée comme statistiquement significative lorsqu'elle était inférieure à 0,05.

**RÉSULTATS:** La concentration de bêta-thromboglobuline était plus élevée et statistiquement significative ( $7,82 \pm 1,54$  ng/ml et  $6,70 \pm 2,23$  ng/ml ;  $P=0,01$ ), le facteur plaquettaire 4 ( $39,86 \pm 11,25$  ng/ml et  $47,73 \pm 21,73$  ng/ml,  $P=0,06$ ) et le volume plaquettaire moyen ( $10,26 \pm 1,06$  fl et  $10,29 \pm 1,02$  fl  $P= 0,89$ ) n'étaient pas statistiquement significatifs dans le groupe diabète sucré par rapport aux participants non-diabétiques, le facteur plaquettaire 4 était plus élevé chez les participants diabétiques plus âgés que chez les plus jeunes.

**CONCLUSION:** Un taux élevé de bêta-thromboglobuline peut suggérer une augmentation possible des risques thrombotiques chez les personnes atteintes de diabète sucré. WAJM 2023; 40(4): 357–361.

**Mots-clés:** Bêta-thromboglobuline, facteur plaquettaire 4, volume plaquettaire moyen.

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