

JCHS

Journal of Clinical and Health Sciences

#2
2026

SUPPLEMENTARY ISSUE

Malaysian Obesity Society
MYOS



ND **2 NATIONAL OBESITY SCIENTIFIC CONFERENCE**

ABSTRACT BOOK

11th - 12th April 2026
**Connexion Conference &
Event Centre,**
Kuala Lumpur, Malaysia

Theme
**Obesity as a Treatable
Chronic Disease:
Science, Strategy,
and Success**

Issue **September 2026** | Volume **11** Issue **02 (Supplementary)**
eISSN 0127-984x
jchs-medicine.uitm.edu.my



**UNIVERSITI
TEKNOLOGI
MARA**

PD-41

Obesity-related Anthropometric and Metabolic Factors across Albuminuria Severity in Type 2 Diabetes Mellitus (T2DM)

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Introduction:

Obesity is a known independent risk factor for diabetic kidney disease, leading to albuminuria. Obesity-related metabolic abnormalities, including central adiposity, insulin resistance, and dyslipidaemia, may correlate more closely with albuminuria severity than BMI alone. This study aimed to determine the association between obesity-related metabolic factors and albuminuria severity in patients with T2DM.

Methods:

This cross-sectional study included 192 adults with T2DM and chronic kidney disease (CKD) stages 1–3 from Hospital As-Sultan Abdullah, Universiti Teknologi MARA (UiTM) Sungai Buloh. BMI, waist circumference, blood pressure, fasting lipid profile, glycated haemoglobin (HbA1c), and urine albumin-to-creatinine ratio (UACR) were measured. Albuminuria was categorized as normal/mild (<3 mg/mmol), moderate (3–29 mg/mmol), or severe (≥30 mg/mmol). Differences between groups were analysed using the Kruskal–Wallis test, with $p < 0.05$ considered statistically significant.

Results:

Of the cohort, 46.9% (90/192) had normal/mild albuminuria, 33.9% (65/192) had moderate albuminuria, and 19.3% (37/192) had severe albuminuria. Patients with severe albuminuria had higher systolic blood pressure and a greater proportion of insulin users compared with the moderate and normal/mild groups (SBP: 150.0 [138.0–158.0] vs 139.0 [128.0–150.5] vs 134.5 [120.0–148.5] mmHg, $p < 0.001$; insulin use: 86.5% vs 58.5% vs 53.3%, $p = 0.002$). Patients with severe albuminuria were numerically older (64.0 years [58.5–70.0] vs 62.0 years [54.0–68.0] vs 60.0 years [49.8–69.0], $p = 0.113$) and had a larger waist circumference (98.0 cm [92.0–107.0] vs 94.0 cm [85.5–105.0] vs 95.0 cm [87.8–103.3], $p = 0.126$) compared with the moderate and normal/mild groups, respectively. The proportion of patients with BMI ≥ 27.5 kg/m² was similar across groups (55.6%, 53.8%, and 64.9%; $p = 0.530$). LDL, triglycerides, and HbA1c did not differ significantly between groups.

Conclusion:

In adults with T2DM and CKD stages 1–3, systolic blood pressure and insulin use were significantly associated with albuminuria severity. Waist circumference showed a trend towards increased albuminuria severity, whereas no significant differences were observed across BMI groups. These findings suggest that BMI alone is insufficient for renal risk assessment, supporting the value of central obesity and blood pressure assessment for risk stratification in diabetic kidney disease.