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### FACTORS ASSOCIATED WITH VITAMIN D DEFICIENCY IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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#### INTRODUCTION

The prevalence of vitamin D deficiency in the general population in Malaysia was estimated to be 67.4%. In other populations, its prevalence was found to be higher in persons with T2DM. However, vitamin D deficiency has not yet been studied among persons with diabetes in Malaysia. Hypovitaminosis D was found to increase the risk of developing T2DM and is associated with an elevated risk of retinopathy and neuropathy.

#### METHODOLOGY

The study aimed to determine the prevalence and factors associated with vitamin D deficiency in patients with T2DM. We conducted a cross-sectional study in patients with T2DM (n=110). The patients were divided into 2 groups; vitamin D deficient (total 25(OH)D<sub>3</sub> <50 nmol/L) and vitamin D non-deficient (total 25(OH)D<sub>3</sub> ≥50 nmol/L). Serum total 25(OH)D<sub>3</sub> was analysed using electrochemiluminescence immunoassay method using Roche Diagnostic laboratory machine.

#### RESULT

The prevalence of vitamin D deficiency in our population with T2DM was 48.2% (53/110). In the remaining non-deficient group, 33.6% (37/110) had levels between 50-75 nmol/L, and 18.2% (20/110) had a level ≥75 nmol/L. The baseline age was 57.8 years, diabetes duration was 12 years, and HbA1c was 7.9%. There were significantly higher BMI (29.54 ± 3.29 vs 28.15 ± 4.11 kg/m<sup>2</sup>, *p*=0.05), HbA1c (8.13±1.19 vs 7.74 ± 0.89%, *p*=0.05), triglycerides (TG) (1.7 (IQR 1.3-2.1) vs 1.3 (IQR 1.15-1.8) mmol/L, *p*=0.05), and LDL-c (2.34 ± 0.96 vs 2.03 ± 0.68 mmol/L, *p*=0.05) in patients with vitamin D deficiency. The vitamin D deficient group showed a larger proportion of patients on insulin ≥0.5 unit/kg/day (58.5 vs 36.8%, *p*=0.02) and triglycerides ≥1.7 mmol/L (58.5 vs 36.8%, *p*=0.02). Insulin ≥0.5 unit/kg/day (OR 2.62; 1.1815-8.17; *p*=0.02) and BMI ≥25 kg/m<sup>2</sup> (OR 4.429; 95%CI 1.311-14.96; *p*=0.02) were independent predictors for developing vitamin D deficiency.

#### CONCLUSION

This study demonstrated a high prevalence of vitamin D deficiency in patients with T2DM. Patients with vitamin D deficiency had a significantly higher BMI, TG, LDL-c, HbA1c, and a higher proportion of patients with insulin ≥0.5 unit/kg. With Insulin ≥0.5 unit/kg and BMI ≥25 kg/m<sup>2</sup>, the odds of having vitamin D deficiency increased by 2-fold and 4-fold respectively.