

# VITAMIN D DEFICIENCY ASSOCIATION WITH MICROVASCULAR COMPLICATIONS IN TYPE 1 DIABETES

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## INTRODUCTION

Low levels of vitamin D are commonly found in people with type 1 diabetes and recently studies found that vitamin D deficiency (VDD) contributes to the risk of developing diabetic microvascular complications. The aim of the study was to determine the relationship between microvascular complications of diabetes and 25-hydroxyvitamin D (25(OH)D) levels in type 1 diabetic patients.

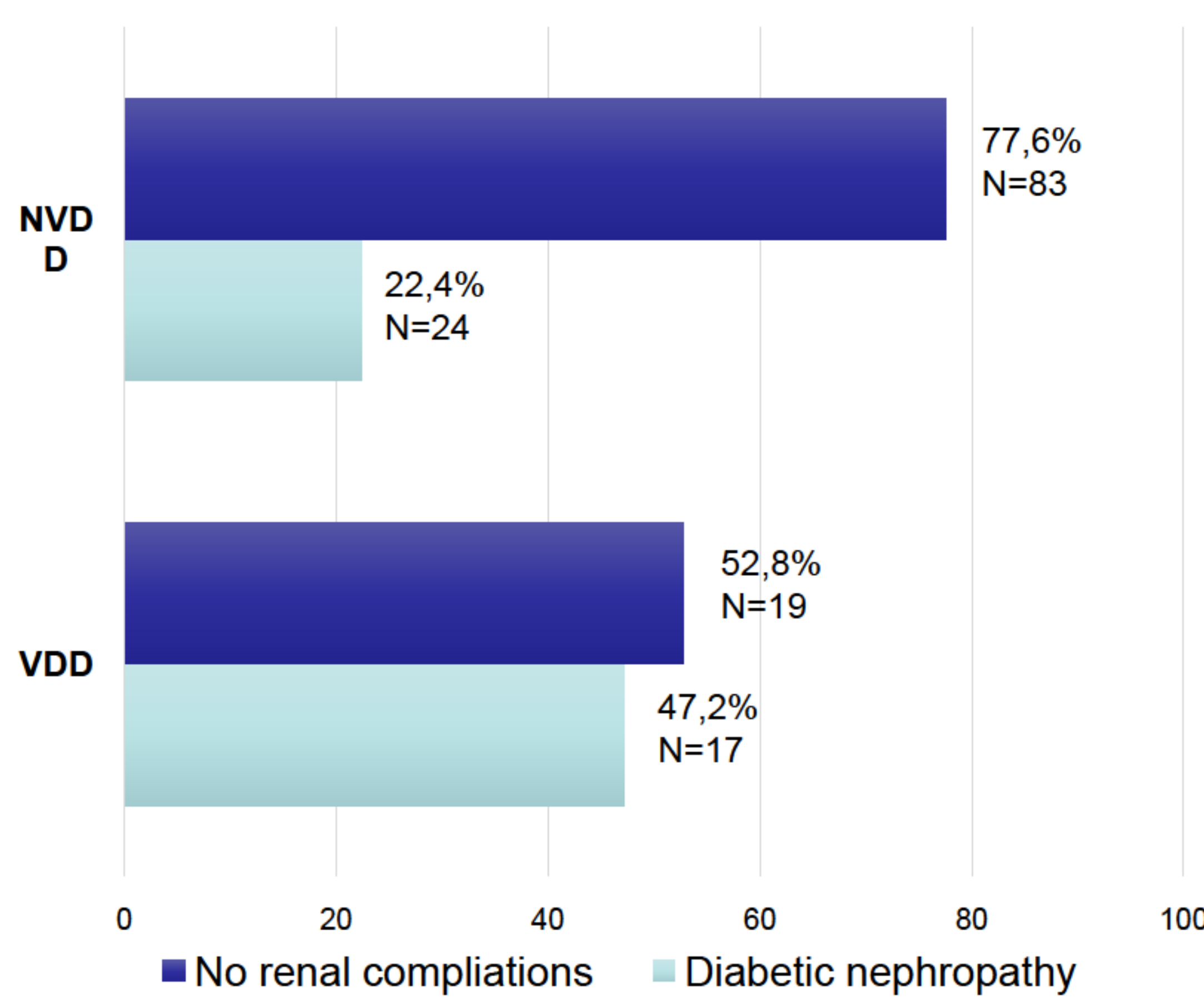
## METHODS

209 type 1 diabetes (DM) patients over 18 years old and duration of DM more than 1 year were examined for VD levels and microvascular complications. 143 (60 male and 83 female) patients with 25(OH)D3 levels measured from October to April, when there are no potential of sunlight to initiate cutaneous production of 25(OH)D3, were enrolled. Patients were divided in 2 groups: 25(OH)D3 deficiency (VDD < 25 pmol/l) and no VD deficiency (NVDD ≥ 25 pmol/l). Patients with GFR < 30 ml/min and with end stage renal disease were excluded from the study.

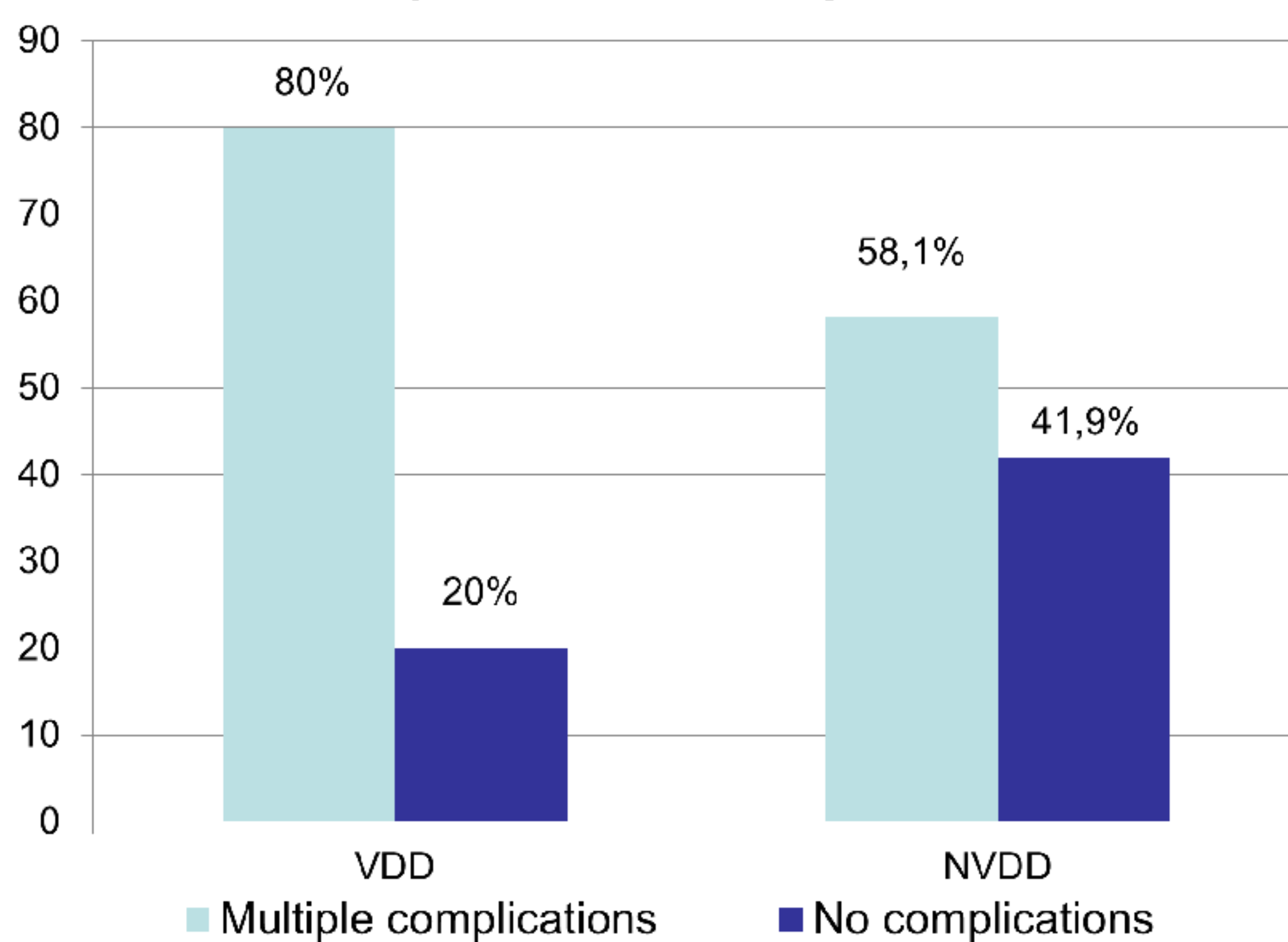
## RESULTS

36 (25.2%) type 1 diabetic patients had VDD and 107 (74.8%) - had no VDD. There were more current smokers (38.9% to 19.0%, p=0.05), patients with GFR 30-59 ml/min (13.9% to 1.9%, p=0.016) and macroalbuminuria >300mg/24h (19.8% to 2.8%, p=0.05) in VDD group. VDD was more frequent in patients with multiple microvascular complications (VDD 80% (N=16), NVDD 41.9% (N=18)) than in those without any complications (VDD 20% (N=4), NVDD 58.1% (N=25)) (p=0.005) and in those with diabetic polyneuropathy (VDD 86.1% (N=33), NVDD 68.3% (N=71)), that in patients without any complications (VDD 13.9% (N=5), NVDD 31.7% (N=31)) (p=0.038). Diabetic nephropathy was associated with VDD (VDD 47.2% (N=17), NVDD 22.4% (N=24)) compared to patients with no renal complications (VDD 52.8% (N=19), NVDD 77.6% (N=83)) (p=0.004). Binary logistic regression analysis revealed that the odds ratio (OR) for diabetic nephropathy independently increases linearly with VDD (OR=3.43; 95% CI 1.47-7.96, p=0.004).

Association between vitamin D deficiency and diabetic nephropathy



Association between vitamin D deficiency and multiple diabetes complications



Variable	VDD - VD concentration <25pmol/l	NVDD - VD concentration ≥25pmol/l.	P mean
Sex (male/female)	18/18	42/65	p=0.258
Age	35.53±12.87	35.76±12.13	p=0.091
BMI kg/m <sup>2</sup>	24.24±4.65	25.05±3.61	p=0.281
HbA1C%	9.44±2.37	8.59±1.69	p=0.062
Urinary albumine secretion (mg/24h)	610.47±1444.19	51.11±169.81	p=0.05
Serum creatinine (μmol/l)	85.19±39.92	75.78±18.06	p=0.055
Duration of diabetes (years)	17.53±11.38	15.32±10.38	p=0.246
GFG	97.22±29.77	100.68±18.14	p=0.409
Vitamin D concentration (pmol/l)	19.9±3.64	42.3±13.73	p=0.000

DM Complication	Category	Odds ratio (OR)	95 % PI	P mean
Diabetic polyneuropathy	Vitamin D (<25/≥25 pmol/l)	3.85	1.15-12.82	0.028
Diabetic retinopathy	Vitamin D (<25/≥25 pmol/l)	1.59	0.52-4.86	0.420
Diabetic nephropathy	Vitamin D (<25/≥25 pmol/l)	3.67	1.36-9.86	0.01

OR adjusted for age, duration of diabetes, HbA1c.

## CONCLUSIONS

Vitamin D deficiency was more common in type 1 diabetic patients with multiple microvascular complications and especially in those with diabetic nephropathy.