

# Anti-diabetic therapy in patients with type 2 diabetes & chronic renal impairment

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## INTRODUCTION

- Choices of glucose lowering medication are limited for people with type 2 diabetes (T2DM) and chronic kidney disease.

## AIM

- To investigate choices of anti-diabetic therapy in T2DM with chronic renal impairment.
- To examine glycaemic control and cardiovascular risk factors in relation to CKD stages.
- To examine the use of aspirin, statins, angiotensin converting enzyme inhibitors (ACEI)/angiotensin receptor blocker (ARB) in relation to CKD stages.

## METHODS

- Adults T2DM who were on any glucose lowering therapy, between January and December 2014 in our health board were identified from Secure Anonymised Information Linkage database.
- No/Mild CKD was defined as eGFR  $\geq 60$  mL/min per 1.73 m<sup>2</sup>, Moderate CKD as eGFR  $< 60$  mL/min per 1.73 m<sup>2</sup> and Severe CKD as eGFR  $\leq 15-29$  mL/min per 1.73 m<sup>2</sup> or dialysis.
- Demographic data; anti-diabetic medication, aspirin, statin and ACEI/ARB usage; blood pressure, HbA1c and lipid profile were collected.
- Independent sample t-test was used for continuous data and Chi square analysis for categorical data.

## RESULTS

Figure 1. Flow chart describing number of patients

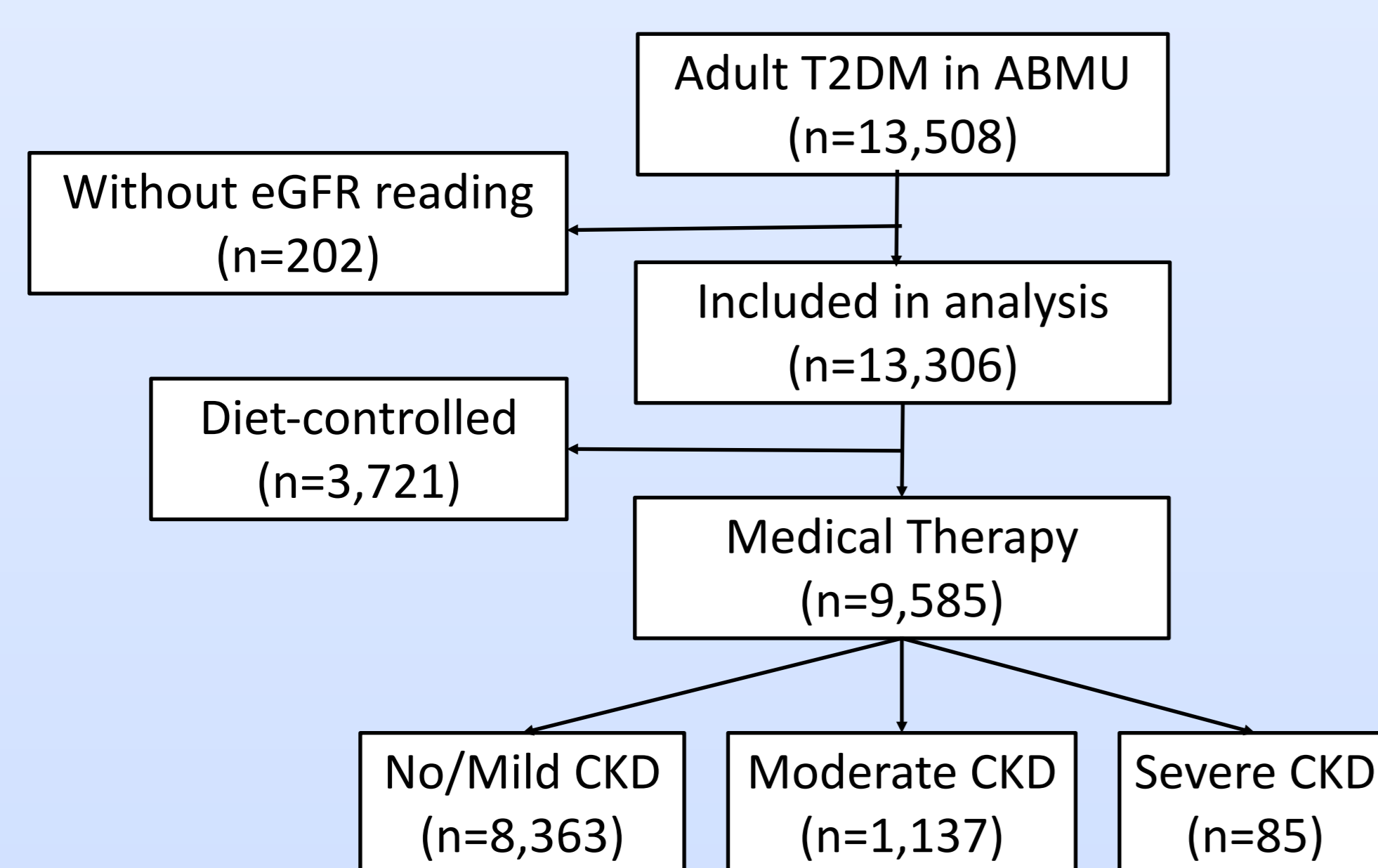


Table 1. Demographic, glycaemic control, blood pressure and lipid profile of patients grouped by three CKD stages

	No/Mild	Moderate	Severe	p <sup>1</sup>	p <sup>2</sup>	p <sup>3</sup>
	n=8363	n=1137	n=85			
Sex (M; %)	4931 (59)	494 (43)	47 (55)			
Age (years)	63.7 $\pm$ 12.7	75.0 $\pm$ 10.6	69.0 $\pm$ 14.9	<0.001	<0.001	<0.001
Duration of T2DM (years)	10.6 $\pm$ 7.0	13.9 $\pm$ 7.9	14.9 $\pm$ 7.9	<0.001	<0.001	0.244
IHD (%)	1636 (19.6)	378 (33.2)	31 (36.5)	<0.001	<0.001	NS
RRT (%)	0	0	39 (45.9)			
Nephrologist (%)	136 (1.6)	134 (11.8)	48 (56.6)			
Endocrinologist (%)	1719 (20.6)	284 (25)	43 (50.6)			
HbA1c (mmol/mol)	61.9 $\pm$ 16.9	60.4 $\pm$ 16.0	60.8 $\pm$ 13.6	0.009	0.602	0.858
SBP (mmHg)	134 $\pm$ 13	135 $\pm$ 14	135 $\pm$ 12	0.036	0.415	0.88
DPB (mmHg)	75 $\pm$ 8	72 $\pm$ 8	73 $\pm$ 7	<0.001	0.009	0.578
Weight (kg)	88.8 $\pm$ 21.4	82.9 $\pm$ 20.0	84.2 $\pm$ 20.9	<0.001	0.085	0.602
BMI (kg/m <sup>2</sup> )	32.0 $\pm$ 6.6	31.1 $\pm$ 6.6	31.0 $\pm$ 6.7	<0.001	0.243	0.897
TC (mmol/L)	4.2 $\pm$ 1.0	4.0 $\pm$ 1.0	4.4 $\pm$ 1.3	<0.001	0.236	0.012
LDL (mmol/L)	2.1 $\pm$ 0.8	1.9 $\pm$ 0.8	2.2 $\pm$ 1.0	<0.001	0.613	0.114
HDL (mmol/L)	1.2 $\pm$ 0.4	1.3 $\pm$ 0.4	1.2 $\pm$ 0.4	0.288	0.125	0.095
TG (mmol/L)	1.9 $\pm$ 1.3	1.9 $\pm$ 1.0	2.8 $\pm$ 2.6	0.238	<0.001	<0.001

P<sup>1</sup>: P value comparing No/Mild vs Moderate; P<sup>2</sup>: P value comparing No/Mild vs Severe; P<sup>3</sup>: P value comparing Moderate vs Severe; IHD: ischemic heart disease; RRT: renal replacement therapy; SBP: systolic blood pressure; DPB: diastolic blood pressure; BMI: body mass index; TC: total cholesterol; LDL: low density lipoprotein; HDL: high density lipoprotein; TG: triglyceride

Figure 2. Anti-diabetic medication usage among three CKD groups

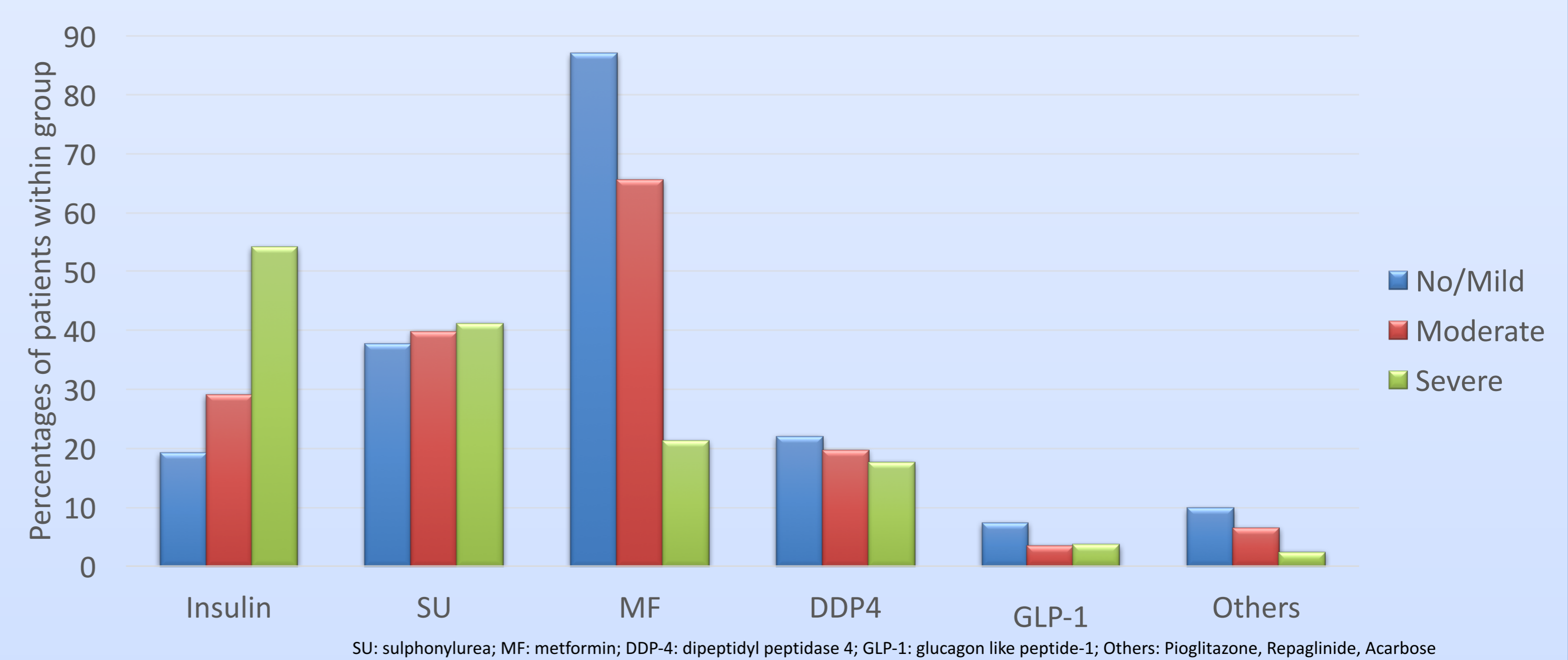


Figure 3. Distribution of DDP-4 inhibitor usage

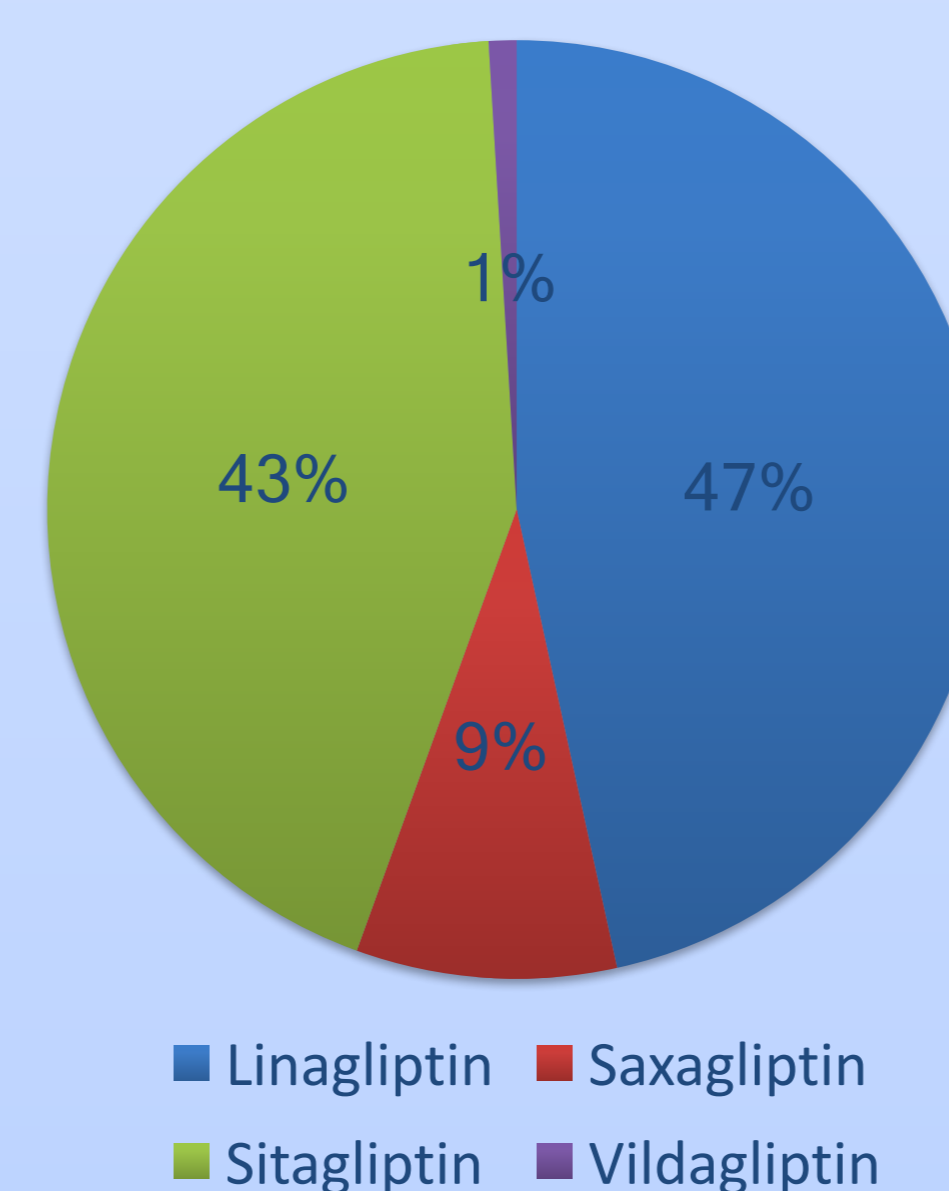
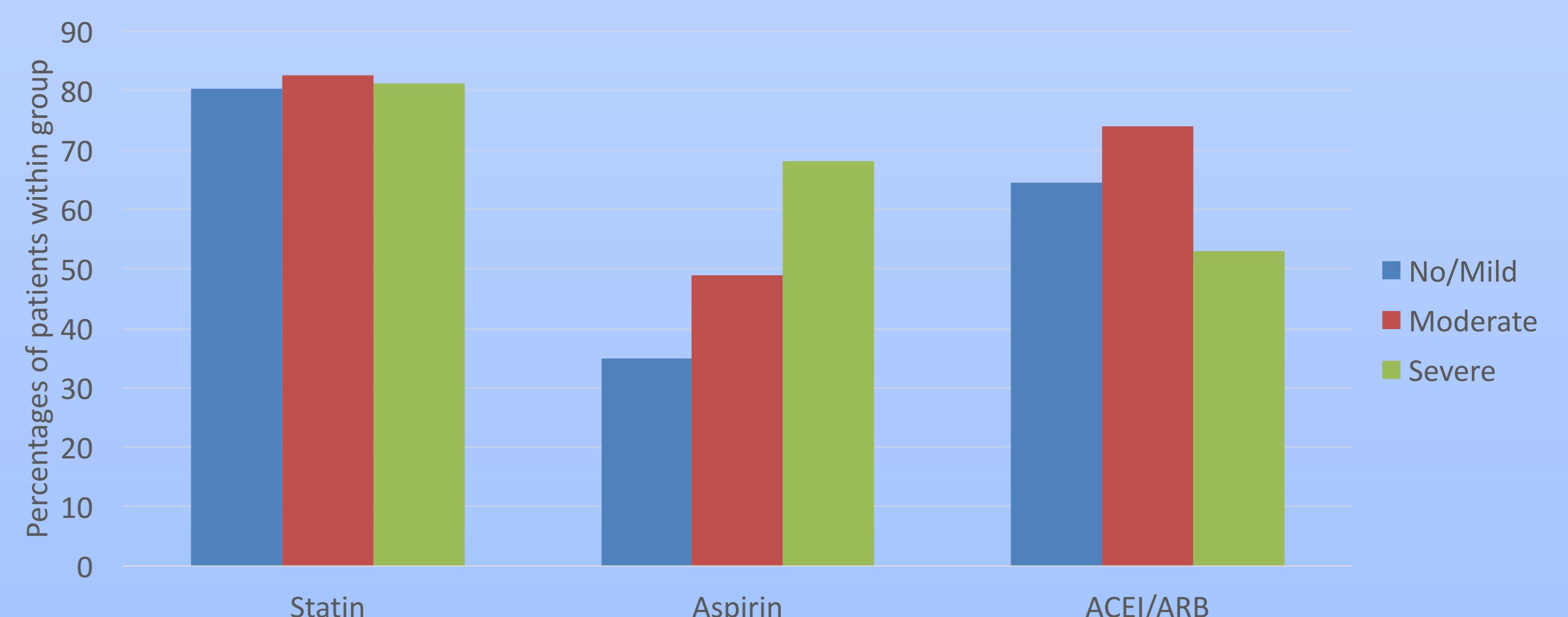


Table 2. Distribution of DDP-4 inhibitor usage in different eGFR cut-offs

DDP-4 inhibitor	eGFR >50	eGFR 30-50	eGFR <30
Sitagliptin (n=228)			
100mg	108	64	4
50mg	24	21	1
25mg	0	3	3
Saxagliptin (n=47)			
5mg	18	16	
2.5mg	3	10	

Figure 4. Aspirin, Statin, ACEI/ARB usage among three CKD groups



## SUMMARY

- The longest duration of T2DM and the highest prevalence of IHD were seen in the Severe CKD group comparing to those with the No/Mild and Moderate groups.
- The HbA1c in all the groups was higher than the NICE recommended target (58 mmol/mol).
- Higher prevalence of insulin usage and lower prevalence of metformin usage were observed in the Severe CKD group.
- Metformin was prescribed in approximately 20% of the Severe CKD group.
- Dose adjustment of DDP-4 inhibitor was done in about 70% of patients receiving DDP-4 inhibitor.
- The Severe CKD group had the highest prevalence of aspirin usage but the lowest prevalence of ACEI/ARB usage among three groups.
- Statin usage was comparable among three groups.