

KSN 2016 Abstract Submission

CKD & associated complications

The Impact of the ABC Clinical Targets on Progression of Chronic Kidney Disease in Thai Patients with Type 2 Diabetes Mellitus

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Background: Type 2 diabetes mellitus (T2DM) is a leading cause of chronic kidney disease (CKD) in developing and developed countries. CKD is a major problem because it is associated with a substantial burden of mortality, morbidity and health care costs. The prevalence of CKD among T2DM patients is rapidly increasing worldwide, including countries like Thailand. Improving the quality of care in T2DM patients is a strategy to attenuate the CKD problem. The present study aims to investigate the impact of achieving T2DM clinical targets on the progression of CKD in T2DM patients.

Methods: This study was a retrospective cohort study from the DMHT data set which was a national survey in Thai patients with T2DM visiting in 595 hospitals across the country. Patients who were observed at least 2 times in the 3 years follow up (between 2011-2013) were included in our study. Ordinal logistic mixed effect regression modeling was used to investigate the association between the quality of care and CKD progression. The targets of care was defined to achieve ABC goal in diabetes (A: HbA1C \leq 7%, B: BP \leq 130/80 mmHg, C: LDL-C $<$ 100 mg/dL). CKD diagnosis was based on albuminuria and estimated GFR (eGFR) with the categories of CKD classified based on the KDIGO 2012. The progression of CKD was defined by declining of eGFR to the next stage of CKD.

Results: The data of 3,133 T2DM patients were analyzed. The prevalence of CKD was 69% (38.6% moderately increased risk, 23% high risk and 7.2% very high risk). The proportion of patients achieving target in BP, LDL-C and HbA1C were 53.49%, 53.49% and 33.93%, respectively. After adjusting for covariates, we found that the achievement of HbA1C target (\leq 7%) was the only target protective factor against CKD progression (OR_{adj}= 0.76, 95%CI: 0.59 - 0.98; $p<$ 0.05). The achievement of BP and LD-C targets could not be shown to be associated with CKD progression (OR_{adj}= 0.94, 95%CI: 0.75-1.19 and OR_{adj}= 0.88, 95% CI: 0.65-1.19; both $p>$ 0.05, respectively).

Conclusion: We showed that achievement of HbA1C \leq 7% was protective against progression of CKD. Therefore, we suggest that measures should be taken to help patients with T2DM and CKD, without risk of hypoglycemia, to control their HbA1c levels.

Keywords: Type2 Diabetes mellitus, T2DM, Chronic kidney disease, CKD

Table 1 Baseline of characteristics of patients with T2DM

Variables	n (%)
Chronic kidney disease	
Low CKD	676(31.28)
Moderately increased risk	833(38.55)
High risk	497(22.99)
Very high risk	155(7.17)

Study effect, Clinical target of care

HbA1c target, yes	837(33.93)
Blood Pressure target, Yes	1,740(53.65)
LDL-C target, Yes	1,174(43.11)
All ABC target, Yes	206(6.33)

Covariates

Female	2,351(70.96)
Agriculture	1,458(46.22)
Buddhism	2,955(96.22)
Universal coverage scheme	2,545(77.21)
Community hospital	1,997(65.11)
Region of residence, North-Eastern	1,159(34.98)
BMI(kg/m2), ≥ 27.5	902(29.20)
Smoking, Yes	170(6.18)
Hypertension	2,277(68.73)
Neuropathy(>12months)	37(1.11)
Retinopathy(>12months)	103(3.11)
Anti-hypertensive agents, Yes	2(0.06)
Diabetes medication, OHA	2,478(76.18)
Anticoagulation, Yes	1,987(61.71)

Continuous variables

	mean(sd.)
Age (year)	59.69(10.35)
Duration of DM.(year)	6.81(4.63)
Total cholesterol	187.83(45.14)
HDL-C	45.09(11.89)
Triglyceride	175.00(93.94)

Table 2 Multivariate ordinal logistic mixed model for clinical target of care and progression of CKD in patients with T2DM

Factors	Available case (6,731 obs.)	Complete case (2,588 obs.)		
	OR Unadjusted	OR Unadjusted	OR Adjusted	95%CI
Clinical target of care				
HbA1c target, Yes	0.72**	0.66**	0.76*	0.59 to 0.98
Blood pressure target, Yes	0.81*	0.75*	0.94	0.75 to 1.19
LDL-C target, Yes	0.80*	0.69**	0.88	0.65 to 1.19

Covariates				
Gender, Female	1.09	1.30	-	-
Age (in10years)	3.19***	3.44***	2.70***	2.27 to 3.22
Duration of DM.(in5years)	2.65***	2.87***	-	-
Occupation, Government(ref.)	$\chi^2=79.84^{***}$	$\chi^2=71.27^{**}$	$\chi^2=16.11$	
Housekeeper	5.09***	10.31***	3.03***	1.63 to 5.63
Other	1.89	2.47*	1.99	0.97 to 4.10
Agriculture	3.75***	4.91***	2.87***	1.59 to 5.19
Labor	1.30	1.88	2.15*	1.14 to 4.06
Religion, other	1.14	0.97	-	-
Health insurances , UC(ref.)	$\chi^2=20.73^{***}$	$\chi^2=13.41^{**}$		-
Government	0.84	0.80	-	-
Social security	0.25***	0.22***	-	-
Other	2.59	1.10	-	-
Hospital type, Region(ref.)	$\chi^2=25.13^{***}$	$\chi^2=11.30^{**}$		-
Provincial hospital	2.54***	2.19**	-	-
Community hospital	2.49***	2.33**	-	-
Region, Central(ref.)	$\chi^2=43.74^{***}$	$\chi^2=19.37^{**}$		$\chi^2=8.00^*$
North	2.11***	2.10**	1.30	0.87 to 1.94
South	1.57*	1.34	1.22	0.78 to 1.90
North-Eastern	2.94***	2.68***	1.71**	1.15 to 2.53
BMI(kg/m2), 18.5to22.9(ref.)	$\chi^2=10.23^*$	$\chi^2=7.04$		-
<18.50	1.10	1.61	-	-
23.0 to 27.4	0.65**	0.69*	-	-
≥ 27.5	0.70*	0.65	-	-

Table2 Multivariate ordinal logistic mixed model for clinical target of care and progression of CKD in patients with T2DM (continue)

Factors	Available case (6,731obs.)	Complete case (2,588 obs.)		
	OR Unadjusted	OR Unadjusted	OR Adjusted	95%CI
Smoking History, No(ref.)	$\chi^2=1.08$	$\chi^2=0.97$		-

Previous	0.89	0.72	-	-
Yes	1.22	1.12	-	-
Total cholesterol	1.004 ***	1.005**	1.003	0.999 to 1.006
HDL-C	0.98 ***	0.97 ***	0.98 ***	0.97 to 0.99
Triglyceride	1.002***	1.003 ***	1.002**	1.000 to 1.003
Hypertension, Yes	2.31***	2.67***	1.67**	1.22 to 2.28
Neuropathy(>12months), Yes	5.13 ***	6.02***	3.29*	1.31 to 8.25
Retinopathy(>12months), Yes	2.43**	1.32	-	-
Anti-hypertensive agents	$\chi^2=16.56$ ***	$\chi^2=15.62$ ** *		$\chi^2=6.32$ *
No(ref.)				
Previous	1.00	1.20	0.94	0.72 to 1.24
Yes	3.27 ***	5.33***	2.38*	1.13 to 5.00
Diabetes medication, No(ref.)	$\chi^2=289.51$ ***	$\chi^2=173.14$ ***		$\chi^2=162.48$ ***
OHA	0.30 **	0.90	1.17	0.46 to 2.94
Insulin sensitizer	7.70 ***	29.60***	22.63***	8.12 to 63.08
Both of oral & insulin	0.58	1.62	2.00	0.75 to 5.32
Anticoagulation, yes	1.54***	1.67**	-	-

OR, odds ratio; CI, confidence interval; DM, diabetes mellitus; BMI, body mass index; HbA1c, glycosylated hemoglobin; HDL-C, high density lipoprotein cholesterol; OHA, oral hyperglycemic agent; LDL-C, low density lipoprotein cholesterol; ref., reference; UC, universal coverage; *** $P<0.001$, ** $P<0.01$, * $P<0.05$

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