



# Hospitalization utilization and multidisciplinary care on chronic kidney disease patients

Yu Yang<sup>1</sup>, Wen-Yu Chou<sup>1</sup>, Shu-Chuan Wang<sup>1,2</sup>, Shu-Ya Chen<sup>3</sup>, Chih-Ying Huang<sup>3</sup>, Sinh-Yi Yang<sup>1</sup>

Division of Nephrology, Internal Medicine, Changhua Christian Hospital, Changhua<sup>1</sup>, School of Public Health, National Defense Medical Center, Taipei<sup>2</sup>, Division of Nephrology and chronic disease education center, Changhua Christian Hospital, Changhua<sup>3</sup>, Taiwan, ROC

## Objective

To evaluate hospitalization utilization on chronic kidney diseases patients under multidisciplinary care (MDC) at three chartered hospital in Taiwan

## Methods

- Study Design and Subjects
  - A cohort study conducted during 2007 and 2010, and this is a preliminary result of the 1st stage study at the year of 2008.
  - Subjects aged 20-80 years old, estimated glomerular filtration rate (eGFR) between 10 and 60ml/min were included.
  - MDC group was purposive sampling (253 patients) and non-MDC group was randomly matched on gender, age and GFR at a ratio of 1:1.
  - Totally, 506 study subjects (253 pairs) were enrolled in our study.

## Data collection

- Socio-demographic characteristics
  - Age, gender, marry and education
- Medical history
  - Diabetes mellitus, Hypertension, Cardiovascular disease and Liver disease
- Laboratory Measurements
  - Creatinine, BUN, Albumin, Uric acid, HDL, LDL, Hematocrit (Hct), Na, intact parathyroid hormone (iPTH), HbA1C, Ca<sup>2+</sup>
- Medical therapy
  - ACEI,ARB, Ca channel blocker,  $\alpha$  blocker,  $\beta$  blocker, Diuretics, Insulin, Statin, Phosphate binders, Uric acid control agent, Blood sugar lowering agents
- Medical utilization
  - Hospitalization rate, Hospital day, Hospitalization frequency

Table 1. General characteristics of non-MDC group and MDC group

Variable	Total (N=506)	Non-MDC (N=253)	MDC (N=253)	p
Gender	n (%)	n (%)	n (%)	
Male	340 (67.2%)	171 (67.6%)	169 (66.9%)	0.58
Female	166 (32.8%)	82 (32.4%)	84 (33.1%)	
Married	286 (56.5%)	142 (56.1%)	144 (56.9%)	0.86
Unmarried	220 (43.5%)	111 (43.9%)	109 (43.0%)	
Education	n (%)	n (%)	n (%)	
Elementary	204 (40.3%)	103 (40.7%)	101 (40.2%)	0.98
Junior	41 (8.1%)	21 (8.3%)	20 (7.9%)	
Senior	46 (9.2%)	18 (7.1%)	28 (11.1%)	
College	20 (4.0%)	7 (2.8%)	13 (5.1%)	
University	29 (5.7%)	12 (4.7%)	17 (6.7%)	
Postgraduate	4 (0.8%)	2 (0.8%)	2 (0.8%)	
Diabetes history	n (%)	n (%)	n (%)	
Diabetes mellitus	247 (48.8%)	132 (52.2%)	115 (45.5%)	0.13
Hypertension	429 (84.6%)	208 (82.2%)	221 (87.0%)	0.14
Cardiovascular disease	123 (24.3%)	61 (23.8%)	62 (24.5%)	<0.001*
Liver disease	20 (4.0%)	17 (6.7%)	3 (1.2%)	0.07
Age (year)	Mean±SD	Mean±SD	Mean±SD	
Total	66.6±13.5	66.5±13.2	66.6±13.8	0.98

Note: Values are expressed as mean ± SD or number (percent) for valid subjects. SD, standard deviation; \*Hypertension was defined as subjects ever having anti-hypertensive agents record. #p<0.05 \*\*p<0.001

Table 2. Laboratory measurement of non-MDC group and MDC group

Variable	Total (N=506)	Non-MDC (N=253)	MDC (N=253)	p			
Creatinine (mg/dl)	Mean±SD	Mean±SD	Mean±SD				
Total	2.4±1.3	2.4±1.0	2.4±1.2	0.07			
eGFR (ml/min/1.73m <sup>2</sup> )	31.1±13.8	31.8±14.1	30.7±13.5	0.28			
BUN (mg/dl)	394	35,117.4	162	36,011.0	232	35,317.8	0.78
Albumin (g/dl)	295	4.1±0.5	74	4.0±0.5	221	4.1±0.5	0.03*
Uric acid (g/dl)	360	7.9±2.2	158	8.2±2.7	202	7.6±1.7	0.14
HDL (mg/dl)	295	48.9±13.2	126	47.0±12.3	169	50.4±13.8	0.03*
LDL (mg/dl)	291	107.5±34.7	120	109.0±34.7	171	106.4±34.8	0.53
Hct (%)	371	34.7±6.7	149	34.8±7.5	222	34.6±6.2	0.82
HbA1c (%)	299	139.4±25	104	139.8±43	195	139.8±22	0.02*
iPTH (pg/ml)	122	66.9±58.1	6	73.5±60.1	116	66.5±56.1	<0.001**
HbA1c (%)	287	7.2±1.8	118	8.0±2.0	169	6.7±1.4	<0.001**
ACT (%)	132	40.8±13.5	47	54.4±19.5	85	35.3±9.9	0.28
Ca <sup>2+</sup>	231	34.6±9	26	33.2±7.7	205	34.7±8.9	0.29

BUN, blood urea nitrogen; HDL, high-density lipoprotein cholesterol; LDL, low-density lipoprotein cholesterol; Hct, hematocrit; iPTH, intact parathyroid hormone; ACT, Activated Cholinesterase. \*p<0.05 \*\*p<0.001

Table 3. Medicine therapy between non-MDC group and MDC group

Variable	Total (N=506)	Non-MDC (N=253)	MDC (N=253)	p
ACEI	n (%)	n (%)	n (%)	
Total	68 (13.4%)	27 (10.7%)	41 (16.2%)	0.07
ARB	289 (57.1%)	144 (56.9%)	145 (57.3%)	0.32
ACEI/ARB	348 (68.9%)	182 (71.9%)	167 (65.9%)	0.02*
Ca channel	274 (54.2%)	145 (57.3%)	129 (51.0%)	0.16
$\alpha$ blocker	117 (23.1%)	51 (20.2%)	66 (26.1%)	0.15
$\beta$ blocker	147 (29.1%)	88 (34.4%)	59 (23.2%)	0.01*
Diuretics	159 (31.4%)	88 (34.4%)	71 (28.0%)	0.51
Insulin	78 (15.4%)	37 (14.6%)	41 (16.2%)	0.80
Statin	168 (33.2%)	104 (41.1%)	64 (25.3%)	0.03*
Phosphate	51 (10.1%)	15 (5.9%)	36 (14.2%)	<0.001**
Uric acid control	152 (30.0%)	54 (21.3%)	98 (38.7%)	<0.001**
Blood sugar	138 (27.3%)	78 (30.8%)	60 (23.7%)	0.08

ACEI, Angiotensin converting Enzyme inhibitor; ARB, Angiotensin Receptor Blocker; Ca channel blocker; Calcium Channel Blocker. \*p<0.05 \*\*p<0.001

Table 4. Hospitalization utilization between non-MDC group and MDC group

Variable	Total (N=506)	Non-MDC (N=253)	MDC (N=253)	p			
Hospital day	Mean±SD	Mean±SD	Mean±SD				
Total	232±4.08	233	233	1.26±4.07	0.07		
Hospitalization frequency	506	0.2±0.64	253	0.32±0.71	253	0.19±0.56	0.07*
Hospitalization rate (%)	86	(17.0%)	53	(21.0%)	33	(13.0%)	0.07*

Note: Values are expressed as mean ± SD or number (percent) for valid subjects. \*p<0.05 \*\*p<0.001

## Results

- The mean age was 65.2 years and 67.2% of subjects were men. There were 75.0% subjects married and 64.2% less educated. The prevalence of cardiovascular diseases was higher in non-MDC group.
- MDC group had higher creatinine, albumin, high-density lipoprotein cholesterol (HDL) and serum Na level. MDC group had lower HbA1c significantly (p<0.05).
- MDC group had higher significantly prescription rate of ACEI/ARB, phosphate binders and uric acid control agents than non-MDC group (p<0.05).

- During 1st year follow up, lower hospital day (1.26±4.70 vs. 3.38±1.89), hospitalization frequency (0.19±0.56 vs. 0.32±0.71) and hospitalization rate (13.04% vs. 20.95%) were noted in MDC group significantly (p<0.05).

## Conclusion

Among chronic kidney diseases patients, MDC is associated with superior biochemical outcomes, better medicine therapy and fewer hospitalization utilization especially significantly benefit in high economic burden caused by end-stage renal diseases (ESRD) in Taiwan.

## Connection

Corresponding author: Dr. Yu Yang  
Tel: 886-4-7238595, ext. 1325  
Fax: 886-4-7277982  
e-mail: 22119@cch.org.tw

## Acknowledgments

Our study was authorized by Bureau of Health Promotion, Department of Health, R.O.C. (Taiwan), and our contents didn't represent any opinions expressed by Bureau of Health Promotion, Department of Health, R.O.C. (Taiwan).

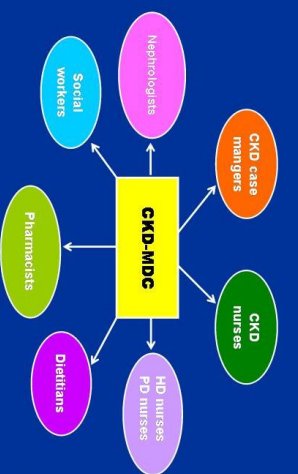


Figure 1. CKD multidisciplinary care members

