



Incidence and long-term outcomes of childhood chronic kidney disease in Taiwanese population

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INTRODUCTION & OBJECTIVES

- Childhood-onset chronic kidney disease (CKD) is associated with significant burden to both family and the healthcare system, yet longitudinal data on CKD progression beginning in childhood are limited.
- The aim of the study was to characterize the incidence and renal outcomes of childhood CKD during a 14-year period in Taiwan pediatric population.

METHODS

- Study population:** Children and adolescents aged < 20 years enrolled in the Taiwan national health insurance program (approximately 10 million youth)
- Data source:** Taiwan's National Health Insurance Research Database (1997-2011)
- Design:** Retrospective cohort study
- Study cohort**
 - Childhood CKD were defined following KDOQI criteria in children and adolescent with ≥ 2 ICD9 codes at different time and apart ≥ 90 days for CKD at age < 20 yrs
 - Baseline clinical conditions, renal replacement therapy (RRT), including maintenance dialysis and renal transplant were identified.
- Statistical analysis**
 - Outcome was a composite endpoint of renal replacement therapy (i.e. chronic dialysis longer than 3 months or renal transplant) and all causes of mortality
 - All patients were followed since the diagnosis of CKD to an outcome event or censored, whichever came first.
 - Kaplan-Meier and Cox proportional hazards methods were used to determine cumulative probability and risks associated with RRT-free survival and all-cause mortality.

RESULTS

- From 1997 to 2011, 51846 newly-diagnosed CKD children and adolescents matched with were analyzed for the prevalence and incidence of CVD risks
- The median annual incidence of childhood CKD was 165.08 ([interquartile range (IQR), 131.23-222.80] per million age-related population.
- 13 years follow-up, 2.26% childhood CKD patients went into RRT and 0.95% died.

Table 1. Childhood CKD in Taiwan population and outcomes

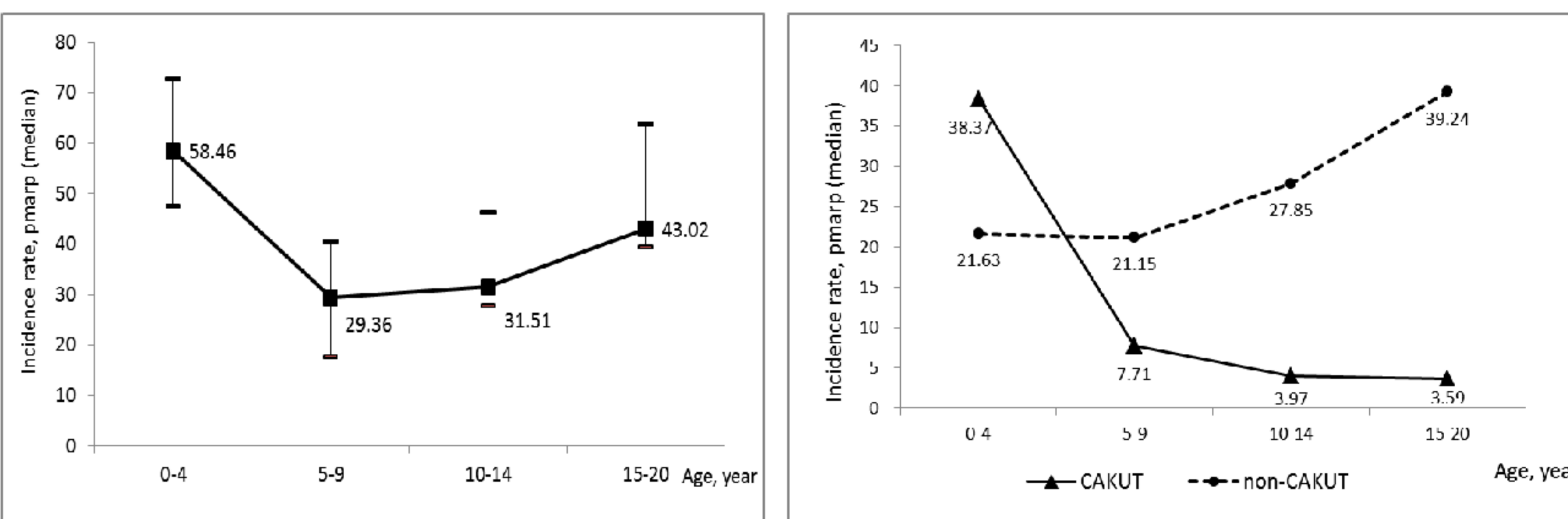
	Number	%	CKD onset age median (IQR), years	Number of male	%
Total patients	51,846		9.75 (2.58, 15.58)	29,081	56.19
CAKUT	14,978	28.89	1.33 (0.58, 6.26)	9,186	61.39
Non-CAKUT	36,868	71.11	12.75 (7.08, 16.68)	19,895	54.08
ESRD ²	1,125	2.17	18.92 (14.26, 21.00)	652	58.01
RT ³	308	0.59	18.92 (15.06, 22.86)	189	61.36
Death ⁴	492	0.95	16.00 (9.76, 20.88)	209	42.57

disease; RT=renal transplantation

Note: All patients were followed since the first date of CKD diagnosis to the occurrence of outcome of interests, death, or censoring (disenrollment or the last date in the database), whichever comes first (age range 0-34 years).

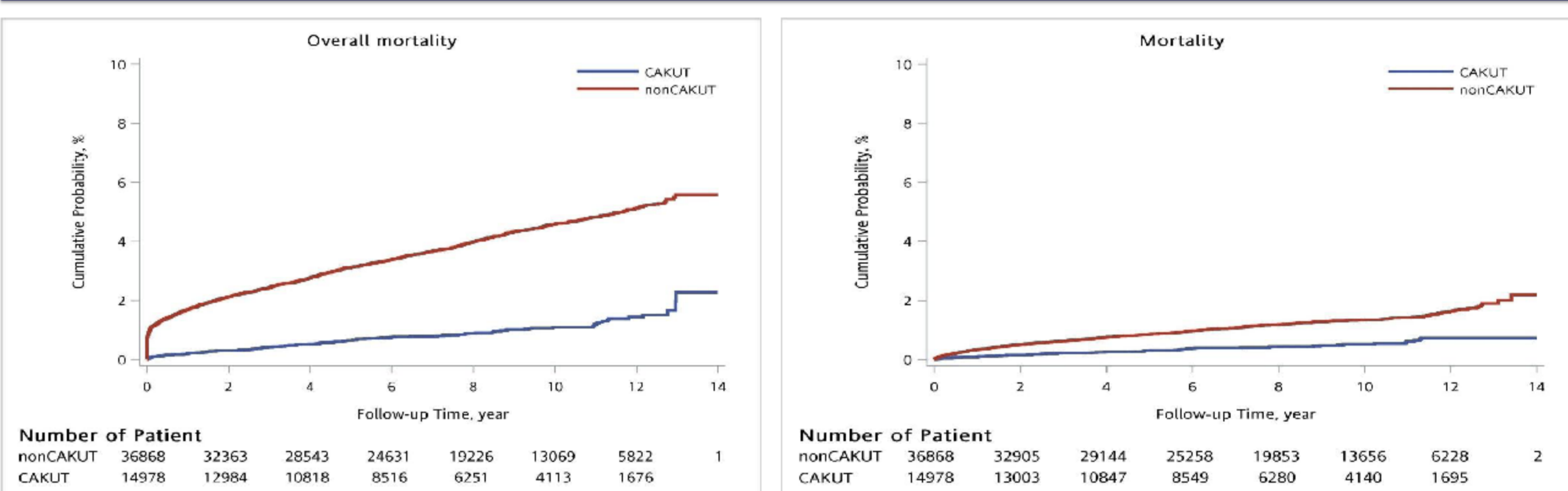
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FIGURE 1. (A) Incidence rate of childhood CKD by age. (B) Incidence rate of childhood CKD by primary disease.



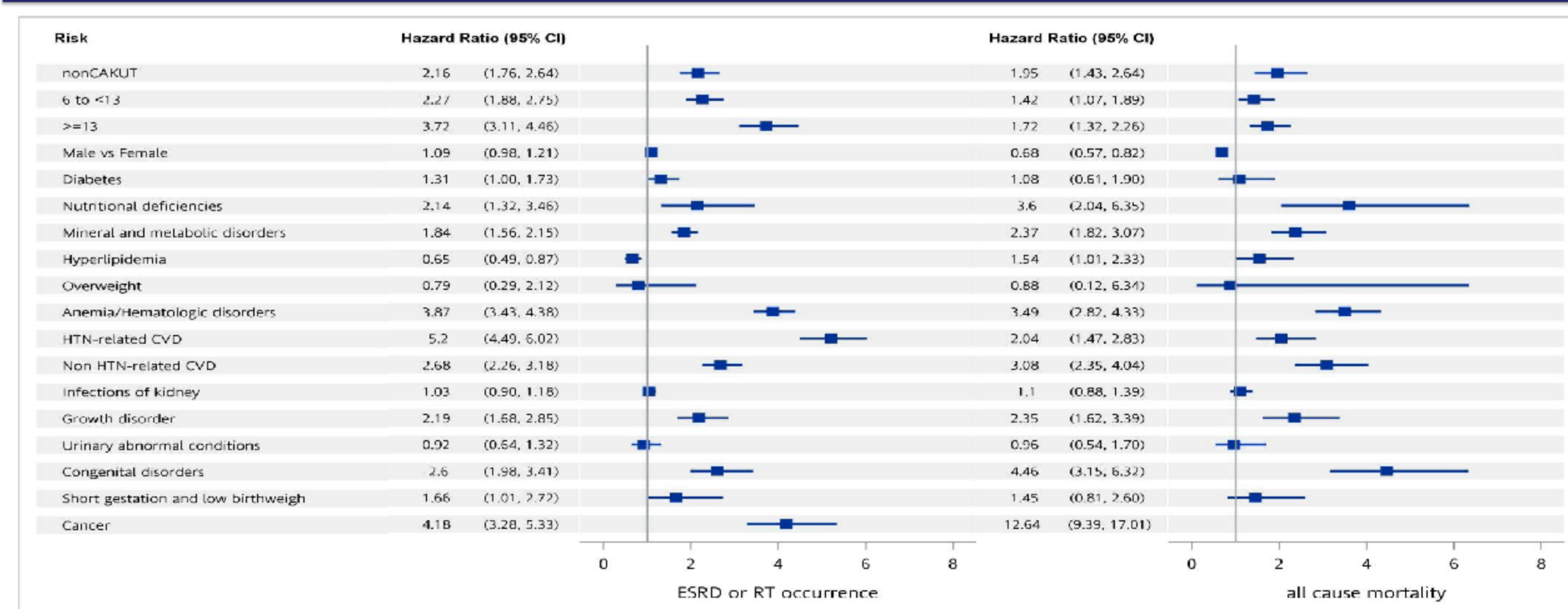
- The incidence rate of childhood CKD at age of onset varied by primary diagnosis of CKD.

FIGURE 2. (A) Cumulative probability of RRT or death in childhood CKD patients; (B) Cumulative probability of all-cause mortality in childhood CKD patients by primary disease.



- Of 1,171 patients with RRT, 6.49% of them (n=76) were primarily diagnosed with CAKUT.
- Adjusting for patient's demographic characteristics and baseline clinical conditions, patients with non-CAKUT had a 2-time greater risk of RRT-free survival (HR=2.16, 95%CI, 1.76-2.64) and a 1.95-time risk of all-cause mortality (HR=1.95, 95%CI, 1.43-2.64) than CAKUT.

Figure 3. (A) Factors associated with receiving RRT or death. (B) Factors associated all-cause of mortality. The effect of individual factor was analyzed by Cox proportional hazards regression controlling for each other.



CONCLUSIONS

- Taiwan has a high incidence rate of ESRD (21.1 per million) in young adulthood (≤ 30 years) compared to world rates. These results indicated that childhood CKD in Taiwan pediatric population still poses a substantial CKD burden to the society.
- Following the implementation of government supported kidney disease programs for adults, the incidence of ESRD decreased from 421 (2008) to 367 (2009), and 361 per million population (2010).
- It is urgent to develop a nationwide age- and cause-specific program for early kidney disease detection and management of childhood CKD to prevent progressive renal function deterioration and premature death in Taiwanese youth.