ACE agency for care effectiveness

Tan Tock Seng HOSPITAL — National Healthcare Group

Micral-Test® strip to detect albuminuria among patients with chronic kidney disease risk factors

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BACKGROUND

- The prevalence of chronic kidney disease (CKD) in Singapore is projected to rise to a staggering 24.3% by 2035.
- Progressive CKD is associated with development of end stage kidney disease (ESKD) and significant morbidity and mortality. Singapore ranks 1st in the world for diabetes-induced ESKD.
- A significant proportion of CKD remains undiagnosed as it is asymptomatic in its early stages.
- Screening and early identification of CKD allows implementation of treatment to delay progression and prevent adverse outcomes.

OBJECTIVES

- To determine the incidence of undiagnosed albuminuria in individuals with risk factors for CKD.
- To identify the positive predictive value of urine Micral-Test® strips in the population screened.

STUDY DESIGN

To improve screening uptake and decrease screening cost in primary care, we piloted a 2 stage-screening strategy: pre-screening using microalbuminuria (Micral-Test®) strips and confirmatory laboratory testing for positive results.

METHODS

- We provided urine Micral-Test® strips to 15 General Practitioners.
- Individuals with following risk factors for CKD were offered screening: diabetes mellitus (DM), hypertension, BMI≥27.5 kg/m², age>60 years old, cardiovascular/cerebrovascular disease, family history of kidney disease, or smoking history.
- Individuals with a positive test were offered a specialist review for confirmation of albuminuria and further evaluation for kidney disease.
- We calculate a minimum sample size of 97 is required to achieve 10% margin error and 95% confidence interval.

STUDY POPULATION

235 patients were recruited between April 2022 to June 2023.
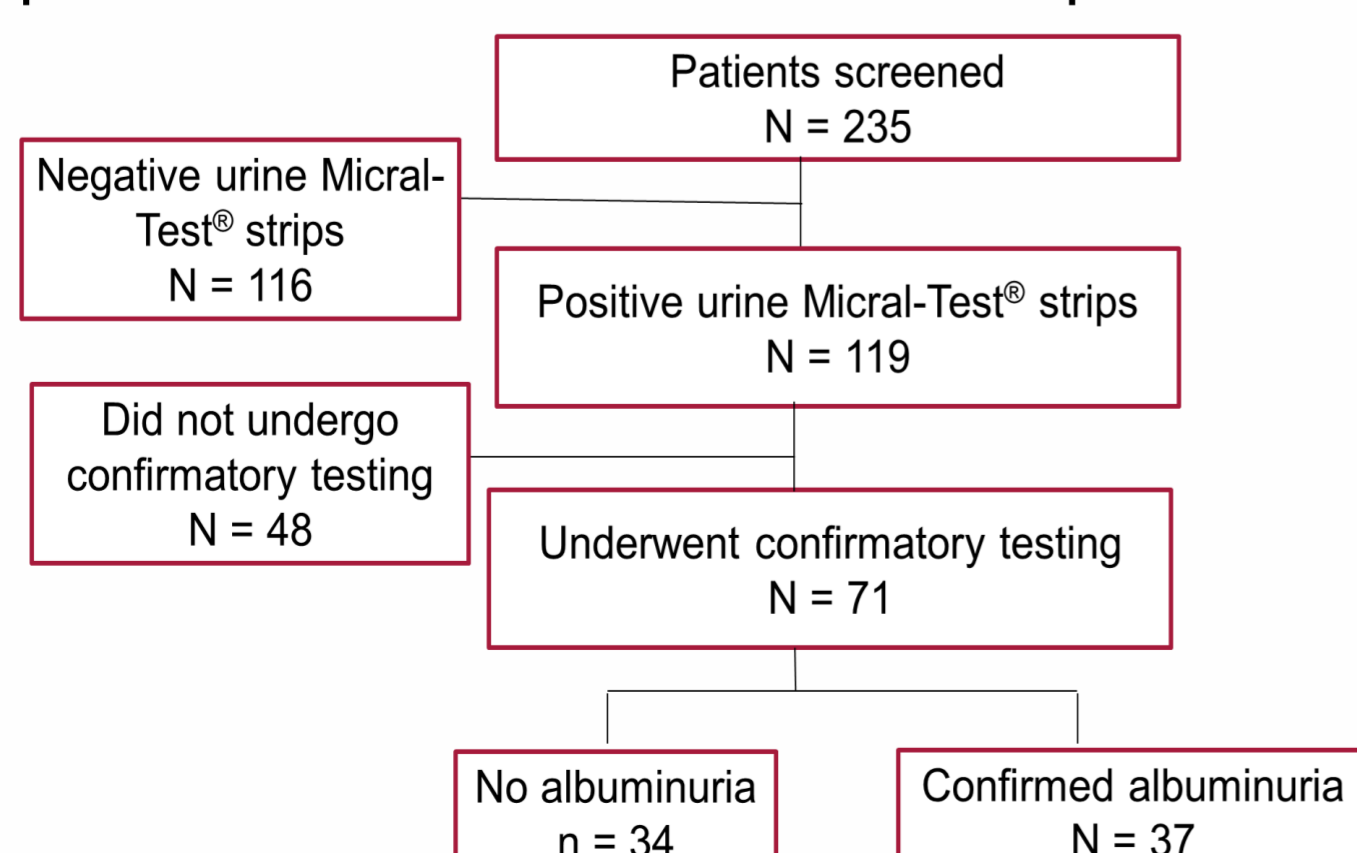
RESULTS - DEMOGRAPHICS

Characteristic	Mean	Standard Deviation
Age, years	65.8	11.7
BMI, kg/m²	25.0	4.49

Characteristic	Number	Percentage (%)
Race		
Chinese	197	83.8
Malay	26	11.1
Indian	11	4.7
Others	1	0.4
Gender		
Male	117	49.8
Female	118	50.2
Hypertension	170	72.3
DM	52	22.1
Past or active smoker	28	11.9
BMI ≥ 27.5 kg/m²	53	22.6

RESULTS – TEST CHARACTERISTICS IN DIFFERENT SUBPOPULATIONS

Population	Screen positive (%)	Positive predictive value (%)
All	50.6	62.0
DM	76.9	81.5
Hypertension	51.2	62.1
DM without hypertension	88.2	100
DM and hypertension	71.4	81.0
DM, hypertension and age >60 years old	73.3	79.0
Age > 60 years old	28.6	50.0

DISCUSSION

The positive predictive value of Micral-test was highest in patients with DM, with or without other comorbidities, and is relatively low in patients without any comorbidities (age>60 only).

CONCLUSION

- Majority of patients with risk factors for CKD have undiagnosed albuminuria.
- Our study suggests that urine Micral-test® strip can be used as an effective screening tool for albuminuria especially in patients with DM, thus providing an important opportunity for early intervention to slow progression of CKD.
- There remains a large proportion of patients with screen positive results that declined further follow-up.
- Further education and screening strategy should target this group for better CKD identification.

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