

UNIVERSITI TEKNOLOGI MARA

**ESTIMATING GLOMERULAR
FILTRATION RATE:
COMPARISON OF CHRONIC KIDNEY
DISEASE EPIDEMIOLOGY
COLLABORATION (CKD-EPI) AND
MODIFICATION OF DIET IN RENAL
DISEASE (MDRD) EQUATIONS WITH THE
EFFECT OF AGE IN A TERTIARY
HOSPITAL IN TERENGGANU MALAYSIA**

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ABSTRACT

The CKD-EPI equation was developed to address the underestimation of the estimated glomerular filtration rate (GFR) by the Modification of Diet in Renal Disease (MDRD) equation at a level >60 mL/min/1.73m². The inclusion of diverse population in the development of the CKD-EPI equation has led to better eGFR estimation hence Ministry of Health Malaysia recommends the use of the CKD-EPI equation in their Clinical Practice Guideline 2018. The objective of this study is to evaluate the performance of CKD-EPI equation in our population focusing on the effect of age and inter-rater agreement between both equations particularly in elderly. Serum creatinine results was extracted from the lab information system (LIS) for a 1-year duration in a patient more and equal to 18 years old (≥ 18 years old). The first available creatinine result from 69,329 people were used to estimate GFR using both equations. The mean eGFR, prevalence of CKD and agreement between those two equations were compared. In comparison with MDRD equation, CKD-EPI equation revealed lower mean eGFR (82.63 vs 85.42 mL/min/1.73m², $p < 0.001$) and reduced prevalence of chronic kidney disease (CKD) (25.7% vs. 28.4%). When subdivided by age, the prevalence of CKD reduced in age group 18-79 years but increased in elderly age >80 years. Numerical agreement of eGFR was excellent (ICC = 0.883) and categorical agreement of CKD was almost perfect in all age groups ($\kappa = 0.932$). CKD-EPI is an appropriate alternative for the MDRD equation in all ages including in the elderly. However further validation studies involving a large multiethnic and adequate elderly population in Malaysia are much needed.

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CHAPTER ONE

INTRODUCTION

1.1 Chronic kidney disease in Malaysia

Chronic kidney disease (CKD) has become one of the leading public health issues in Malaysia because of the increasing number of patients with CKD, risk of progression to end-stage renal disease (ESRD), and high morbidity and mortality. The prevalence of CKD in Malaysia has increased from 9.07% in 2011 [1] to 15.48% [2] in 2018. The Malaysian Dialysis and Transplant Registry reported that 7,967 new patients received dialysis in 2015 and by the end of 2016, there were 39,711 patients on dialysis [3]. This growing figure will impose enormous socio-economic burdens on the healthcare system.

The higher incidence of non-communicable disease, notably diabetes and hypertension has led to an increase in the number of CKD patients. In Malaysia, diabetes is the leading cause of established kidney failure, accounting for 65% of all cases [4]. CKD is a common but silent illness and often under-recognized until detected in later stages. Therefore, there is an urgent need to detect the disease early.