Evaluation and early detection of Chronic Kidney Disease in Sri Lanka using blood and urine parameters: A statistical approach

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Degree of Master of Science in Business Statistics

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DECLARATION

I declare that this is my own work and this Dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text. I retain the right to use this content in whole or part in future works (such as articles or books).

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The above candidate has carried out research for the Master of Science in Business Statistics Dissertation under my supervision. I confirm that the declaration made above by the student is true and correct.

Name of Supervisor: Dr P M Edirisinghe

Signature of the Supervisor: Date: 23/09/2023

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ABSTRACT

There is no requirement for elucidation about the epidemic of kidney disease that has engulfed the north-central province of Sri Lanka. Due to this disease, thousands of patients are suffering very much, and about two thousand deaths occur in Sri Lanka every year. One of the contributing factors to the elevated mortality rates can be ascribed to the failure in timely detection of undiagnosed medical malpractice. This phenomenon arises from the limited sensitivity of the urinary protein test employed for diagnosing chronic kidney disease in its incipient stages within the context of Sri Lanka. Due to this, they are considered as healthy patients and excluded from treatment during kidney disease examination. It is only when the disease worsens that they can be diagnosed as kidney patients. This has become a pressing issue related to chronic kidney disease in our country at present.

The main aim of this study is to find out which test is more suitable for the early detection of kidney disease among urine sample tests and blood sample tests. Appropriate research methods have been adopted to achieve the purpose of the study. Here a study has been done on different levels of chronic kidney disease patients according to the eGFR level and ACR level. A comparative study has been done here between blood sample-related data and urine sample-related conditions. The analysis of the data showed that kidney disease can be diagnosed more accurately at an early stage through the tests conducted on blood samples.

In addition, this study also investigated the main factors affecting the prevalence of chronic kidney disease. It was revealed that hypertension, smoking, farming, BMI and age are causes of this CKD.

Keywords: Estimated Glomerular Filtration Rate, Albumin-To-Creatinine Ratio, Logistic Registration Analysis

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Abbreviations	Definitions
CKD	Chronic kidney disease
CKDu	Chronic Kidney Disease of Unknown Etiology
NCP	North Central Province
CAN	Chronic Agricultural Nephropathy
eGFR	Estimated Glomerular Filtration Rate
ANOVA	Analysis of Variance
WHO	World Health Organization
GH	Girandurukotte
KH	Kandy
GSTM	Glutathione-S-Transferase Mu
GCLC	Glutamate Cysteine Ligase Catalytic
BMI	Body Mass Index
ACR	Albumin-To-Creatinine Ratio
HTN	Hypertension
DM	Diabetes

LIST OF APPENDICES