



Demographic and Socio-Economic Impact of Chronic Kidney Disease of Unknown Etiology (CKDu): Based on CKDu patients of Rajanganaya Track 11 hospital, Sri Lanka

Madhavi Bandara

Temporary Assistant Lecturer

Department of Demography, University of Colombo, Colombo, Sri Lanka

Abstract : Chronic Kidney Disease of unknown etiology (CKDu) is one of the major health issues in Sri Lanka that recorded the highest mortality and morbidity rates. In 2016 North Central Province of Sri Lanka was endemic to CKDu, with an estimated one-sixth of its population being affected by CKDu. In this study, the main objective is to examine the impact of CKDu on patients and 52 patients who have registered under the CKDu clinic of Rajanganaya Track 11 hospital is used as the sample. Analysis revealed that the highest number of patients belong to the 60-69 age group and it is 44.2%. The number of males is significantly higher than the number of females; 75% of the sample is males and 25% of them are females. Most of the males are breadwinners of their families and the sickness of the breadwinner has strictly affected them. This study statistically proves that males are more vulnerable to CKDu than females. Disease has impacted on matrimonial relationships. The majority, both males and females the patients, had been farmers. It is 55.8%. This study statistically proves that the etiology of the disease still remains unknown. In addition, this study proves that the disease has had a massive impact on the demographic and socio-economic status of the patients such as age and gender, marital status, occupation and education. It could be noticed that people do not have a proper understanding of the disease. Immediate actions should be taken to educate people on those areas via officers close to the ground level like PHIs and Midwives.

IndexTerms - CKDu, morbidity, impact on patients, Farmers

INTRODUCTION

CKDu was discovered by the Ministry of Health in the 1990s among paddy farmers in the North Central Province of Sri Lanka. The CKDu is a new form of chronic kidney disease (CKD). The National Research Program for Kidney Disease in Sri Lanka 2010 states that a patient is said to suffer from chronic kidney disease of unknown etiology if he or she has no history or current treatment for diabetes mellitus and chronic and/or severe hypertension, snakebites, urological disease of known etiology or glomerulonephritis. (Ranasinghe, 2017)

Today, in Sri Lanka CKDu has become a major health issue that has taken the attention of society at all levels. CKDu has severely affected the provinces such as North Central, Uva, Eastern provinces, North Western and Southern. The true number of CKDu cases and the cause of the disease remain unknown but according to the Ministry of Health, Sri Lanka, it is suspected that in the North Central and Uva provinces minimum of 15% of the population in the age group of 15-70 years have been affected by the disease. (Epidemiology Unit of Ministry of Health, 2017) All of these areas are mainly agricultural and contribute largely to the country's rice production. According to (Elledge, et al., 2014) globally CKDu patients are most often men ages 30 to 60, their most productive working years. Geographic "hot spots" of CKDu have emerged in a number of countries, including El Salvador, Guatemala, Mexico, Nicaragua, Bulgaria, Croatia, Serbia, India, and Sri Lanka.

Here, in this research patients who have registered under the CKDu clinic of Rajanganaya Track 11 hospital have selected as the sample to identify the impact of the disease on patients. According to Ministry of Health in 2016, the North Central Province of Sri Lanka is endemic to CKDu with an estimated one-sixth of its population being affected by CKDu. Most of them are males and farmers. A Healthy labour force is the key to development. Therefore, it is timely important and essential to discuss the Demographic, Social and Economic Impact of CKDu on patients. .

OBJECTIVE

The main objective of this research is to examine the Demographic, Social and Economic Impact of CKDu on patients.

DATA AND METHOD

In this study, both primary and secondary data sources have been utilized. The secondary data sources that have been used can be recognized as hospital clinical records of Rajanganaya track 11 hospital and 52 patients were identified. Data such as Gender, Age, Serum Creatinine Rate, Marital Status, Educational Level, and Occupation were collected from hospital records. As primary data sources, case studies were used. Statistical analysis was performed with the use of SPSS and Excel..

RESULTS AND DISCUSSION

The research findings indicate that CKDu has impacted on patients’ Demographic and socio-economic factors. Findings are discussed in relation to the impact of CKDu on gender and age, impact of CKDu on marital status, impact of CKDu on occupation and finally the impact of demographic, and socio-economic status of CKDu patients on the etiology of the disease.

Impact of CKDu on gender and age

Analysis revealed that the highest number of patients belong to the 60-69 age group and it is 44.2%. The lowest number of patients belongs to the 20-29 and 30-39 age groups and it is 1.9%. The mean age is 61, the median age is 62 and the skewness is negative. The majority of the CKDu-affected patients are in the middle or older age categories.

Among all the patients, the number of males is significantly higher than the number of females; 75% of the sample is males and 25% of them are females. Most of the males are breadwinners of their families and the sickness of the breadwinner has strictly affected them. It can be seen by the quote below.

“I have been farming for 40 years. Because of this “*karuma lede*” I am suffering. I can’t go farming anymore because my body is very weak now. I cannot even do any hard work. I am worrying about my family. My two brothers are also CKDu patients. We have no any support from anyone” (61 yrs old CKDu patient- Male)

It shows how the disease has impacted on males.

Use of t-test

It is clear from the following descriptive statistics and boxplot that the serum creatinine rate of patients differs by gender.

Table 1: Descriptive Statistics of CKDu patients

Gender		N	Minimum	Maximum	Mean	Std. Deviation
Male	Serum Creatinine	39	1.30	5.73	1.9682	.88976
	Valid N (list wise)	39				
Female	Serum Creatinine	13	1.30	1.91	1.5023	.16589
	Valid N (list wise)	13				

Source: Compiled by author

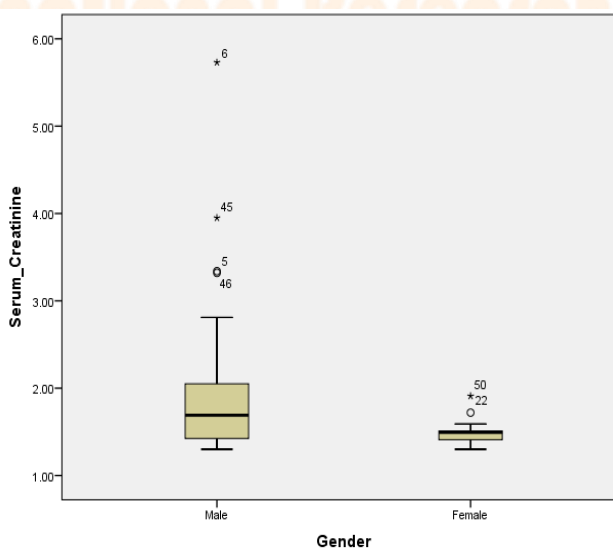


Figure 1: Serum creatinine rate of patients by gender

Source: Compiled by author

Hypotheses:

H0: There is no difference in the average number of serum creatinine rate by gender

H1: There is a difference in the average number of serum creatinine rate by gender

T-test shows whether the differences between the means of two groups are real or statistically significant.

Table 2: Group Statistics of patients by serum creatinine rate

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Serum Creatinine	Male	39	1.9682	.88976	.14248
	Female	13	1.5023	.16589	.04601

Source: Compiled by author

Table 3: Independent Samples Test of patients by serum creatinine rate

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Serum Creatinine	Equal variances assumed	7.092	.010	1.865	50	.068	.46590	.24977	-.03579	.96758
	Equal variances not assumed			3.112	44.796	.003	.46590	.14972	.16431	.76749

Source: Compiled by author

Independent samples t-test enquires the assumption of homogeneity of the variance between the two groups. This is tested here with the use of Levene's test. According to the p-value of the Levene's test, it can be concluded that the homogeneity of variances assumption is violated. Therefore the second row of the table has to be considered. According to the Sig (2-tailed) (p-value) of the t-test the null hypothesis is rejected at a 5% level of significance. In other words, this hypothesis testing statistically proves that there is a difference in the serum rate by gender.

Impact of CKDu on marital status

Research reveals that 94.2% of patients are married and 5.8% are unmarried. Some unmarried patients have not gotten married because of the disease or family history of CKDu. Further, Majority of the affected are parents of grownup children who are already employed and settled. The majority affected are aged members of the families, but the possibility of the disease in damaging the family bonds can be seen.

It was also revealed that many patients affected by the CKDu try to conceal it fearing social stigma. Some patients avoid going to the clinic in their own area or some others stealthily seek private treatment. Patients try to hide their sickness from other villagers. Villagers consider this disease as "karuma Lede, Windawana Lede, pawkara Lede" which means the "bad disease". It was reported that this situation has arisen as some believe that the disease would be a negative factor when entering matrimonial relationships. It can be seen by the quote below.

"I got married at age 40. My wife is 16 years younger than me. When I got married I was a CKDu patient. Wife's family completely rejected me because of my disease." (49 yrs old CKDu patient- Male)

Impact of CKDu on occupation

It could ascertain from the study that the patients of CKDu had been engaged in different types of occupations. However, the majority, both males and females, had been farmers. It is 55.8%. In this study almost all CKDu patients had been engaged in hard work such as farming or other laborious manual work under a very hot climate pattern for a long time.



Figure 2: Occupations of CKDu patients
Source: Compiled by author

Moreover disease have had a massive impact on their occupations. Due to the situation of the patient somebody in the family has very often taken over the job and that member of the family continues the cultivation. But after that the production and productivity become less due to reasons such as lack of experience, less interest and poor knowledge of the other family member. This has impacted on their income as well.

Impact of demographic and socio-economic status of CKDu patients on the etiology of the disease

Multiple Regression

It is expected from the regression analysis to find whether there is any significant impact of demographic, and socio-economic status of CKDu patients on the disease by using serum creatinine rate of the patients. The regression line can be written as follows: Serum Creatinine Rate = a + b1 age + b2 gender + b3 marital status+ educational status + occupational status
Model summary table shows that the R square value is only .098. This means that independent variables explain 9.8% of the variability of dependent variables, this means that the demographic and socio-economic status of patients do not explain the variability of the serum creatinine rate among them. This is compatible with the findings that there is an unknown etiology which cannot be explained by the demographic and socio-economic variables to predict CKDu prevalence.

Table 4: Model Summary of multiple Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.313 ^a	.098	.000	.79863

a. Predictors: (Constant), Marital Status, Gender, Occupation, Educational Status, Age

Source: Compiled by author

ANOVA Table further shows that F value is very small (1.001) and it is not significant even at .05 level. This suggests that the regression performed in this study is not a good fit of the model. Within the coefficients table, it can be determined the relative importance of each of the independent variables in accounting for variance in the patients’ serum creatinine level. This study reveals that no variable in this equation explains the significant amount of variance in the serum creatinine level (Sig >0.05). The aetiology still remains unknown.

Table 5: Anova test of multiple regression

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.191	5	.638	1.001	.428 ^b
	Residual	29.339	46	.638		
	Total	32.530	51			

a. Dependent Variable: Serum Creatinine

b. Predictors: (Constant), Marital Status, Gender, Occupation, Educational Status, Age

Source: Compiled by author

CONCLUSION

CKDu has already affected many of the agricultural districts of Sri Lanka. This paper aims to examine the impact of CKDu on patients. The study shows that the disease has had a massive impact on the demographic and socio-economic status of the patients such as age and gender, marital status, occupation, education etc. It was observed that most of the patients with kidney disease are relatively mature in age and almost all CKDu patients had been hard workers engaged in farming or other laborious manual work. This disease which has become a main cause of death then has been named as “karuma Lede, Windawana Lede, pawkara Lede” which means the “bad disease”. By the name it is intelligible it has been a serious disease and rarely anyone who contracted it

survived. Moreover, it could be noticed that people do not have a proper awareness and understanding about the disease. Immediate actions should be taken to educate people on those areas via officers close to the ground level like PHIs and Midwives.

REFERENCE

Athuraliya, N. T., Abeysekera, T. D., Amerasinghe, P. H., Kumarasiri, R., Bandara, P., Karunaratne, U., . . . Jones, A. L. (2011). Uncertain etiologies of proteinuric-chronic kidney disease in rural Sri Lanka. *Kidney International* , 10.

Epidemiology Unit of Ministry of Health, N. a. (2017). *Prevalence and risk factors for CKDu in the district Anuradhapura*. World Health Organization.

Kaur, P., Gunawardena, N., & Kumaresan, J. (2019, January 19). *A review of chronic kidney disease of unknown etiology in Sri Lanka, 2001–2015*. Retrieved from Indian journal of Nephrology: <http://www.indianjephrol.org/preprintarticle.asp?id=260697#ft17>

Ranasinghe, M. (2017). *Chronic Kidney Disease unidentified (CKDu) in Sri Lanka; Towards an Integrated Solution*.

Redmon, J. H., Elledge, M. F., Womack, D. S., Wickremasinghe, R., Wanigasuriya, K. P., Peiris-John, R. J., . . . Levine, K. E. (2014). Additional perspectives on Chronic Kidney Disease of unknown aetiology (CKDu) in Sri Lanka - Lessons learned from the WHO CKDu population prevalence study. *BMC Nephrology* , 10.

World Health Organization, C. o. (2016). *International Expert Consultation on Chronic Kidney Disease of Unknown Etiology*. Colombo: World Health Organization.

