Original Research Paper Statistics

On Estimation of Kidney Infection Parameters

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ABSTRACT

To know proper functioning of kidney, serum creatinine is the most commonly used screening test. Serum creatinine is caused by many factors such as Blood Pressure, Blood Sugar, Urea, Uric Acid, Sodium, Potassium, Haemoglobin etc. The regression lines for predicting the different factors by serum creatinine have been obtained in this paper. It is observed that predicted values and observed values are close and they have been tested by chi-square test. Also the Glomerular Filtration Rate (GFR) has been calculated separately.

KEYWORDS : kidney, serum creatinine, regression line, Glomerular Filtration Rate (GFR), chi-square test

1. Introduction

Creatinine is a chemical waste molecule that is generated from muscle metabolism. A creatinine blood test measures the level of creatinine in the blood. Creatinine levels in the blood can provide the information about how well kidneys are working. High levels of creatinine may indicate that the kidney is damaged and not working properly. Some of the authors have discussed about kidney functioning and statistical analysis of the data. e.g. Finney, D.J. (1978), Atkinson, A.C. (1985), Altman, D.G. (1992). Walser, M. (1998) has discussed the renal function from creatinine measurements in adults with chronic renal failure.

Giuseppe P Mario S Barbara PG et al. (1996) , Jungers PC hauveau P Deschamps-Latscha B et al. (1996) have observed that the end-stage renal disease (ESRD) is increasing at an alarming rate and elderly patients have the highest incidence rates of ESRD, and their proportion of the population undergoing long-term dialysis is increasing. Mendelssohn DC Barrett BJ Brownscombe LM et al. (1999) published clinical practice guidelinesand acknowledge the facts by addressing the evaluation and referral of patients with elevated levels of serum creatinine. Rule AD et.al. (2004) have estimate glomerular filtration rate and accuracy in good health and in chronic kidney disease.

The determination of dialysis of kidney depends on many factors. Serum Creatinine being the main factor the decision about dialysis will be taken on the basis of these factors which are responsible for Creatinine and the computed GFR decides about the dialysis. The general condition of the patient is also considered in this respect. According to the consultation with Nephrologists doctor it is regressed the Creatinine on different factors such as uric acid, sodium, Haemoglobin, total serum protein and some values calculated for GFR in this paper.

2. Material and Methods

Collected secondary data for kidney functioning from some Urological Hospitals of Nadiad and Anand city of Gujarat.

The regression lines for predicting the different factors by serum creatinine have been obtained. The predicted values are compared with the observed data. The predicted values are close to the observed ones and they have been tested by Chi-square test. Similarly the regression lines are suitable can be tested by Bartlet test.

3. Statistical Analysis and Results

By regression method the different factors were analysed by using the regression on serum creatinine and they have been predicted. The predicted values and the observed values are compared and closeness factor is obtained by utilizing Chi-square test.

(a) The regression line of uric acid on serum creatinine is

y = -2.2982+1.2019x

where y = weight in mg/dl of uric acid

x = weight in mg/dl of serum creatinine

The difference between the observed and the predicted value is noted and the closeness of them is arrived at Chi-Square value as = **0.163002371** which being less than table at 5% level so that the regression line is appropriate.

(b) The regression line of sodium on serum creatinine is

y = 143.5663-0.8017x

where y = weight in mg/dl of sodium

x = weight in mg/dl of serum creatinine

The difference between the observed and the predicted value is noted and the closeness of them is arrived at Chi-Square value as = **3.675774053** which being less than table at 5% level so that the regression line is appropriate.

(c) The regression line of Haemoglobin on serum creatinine is

y = 10.9914-0.2597x

where y = weight in mg/dl of Hemoglobin

x = weight in mg/dl of s-creatinine

The difference between the observed and the predicted value is noted and the closeness of them is arrived at Chi-Square value as = 1.216564 which beingless than table at 5% level so that the regression line is appropriate.

(d) The regression line of Calcium on serum creatinine is

y = 6.4366+0.1382x

where y = weight in mg/dl of Calcium

x = weight in mg/dl of serum creatinine

The difference between the observed and the predicted value is noted and the closeness of them is arrived at Chi-Square value as = 1.299768 which beingless than table at 5% level so that the regression line is appropriate.

(e) The regression line of Total Protein on serum creatinine is

y = 6.5238-0.0103x

where y = weight in mg/dl of Total Protein

x = weight in mg/dl of serum creatinine

The difference between the observed and the predicted value is noted and the closeness of them is arrived at Chi-Square value as = 0.815745

Which being less than table at 5% level so that the regression line is appropriate.

Also the GFR is worked out by the following formula

$$\mathrm{GFR} = \frac{(140-\mathrm{age}).\mathrm{weight}}{72\times\mathrm{Creatinine}}$$

Some of GFR values are 7.03, 5.21, 9.21, 9.36, 7.92 etc.

4. Conclusion

The positive value of β in regression line shows that as serum creatinine is increasing, the corresponding factor increases whereas the negative value of β creates decrease in the corresponding factor. However considering log of the serum creatinine values will give positive β. Thus either the value of serum creatinine or log value of serum creatinine will have positive effect and ultimately as GFR being inversely proportional to serum creatinine GFR falls down and if its value falls down below10, dialysis is essential.

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