PO03 A Predictive Logistic Regression Model for Chronic Kidney Disease

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Chronic kidney disease (CKD) is progressive loss in kidney function over a period of months or years. The most common recognized cause of CKD is diabetes mellitus. CKD is diagnosed as a result of screening of people known to be at risk of kidney problems, such as diabetes.

Overview

- Data source: UCI Machine Learning Repository, School of Information and Computer Science, University of California, Irvine. Data was collected by Dr. Soundarapandian from Alagappa University, India, July, 2015.
- Research goal: Is there a relationship between blood glucose level and Chronic Kidney Disease (CKD)?
- Dependent variable: CKD (have or not)
- Independent variable: age, blood glucose level, pedal edema

Methods

- Study population: 400 patients with or without CKD was collected in Apollo Hospital from January 2010 to July 2015.
- Predictors: Independent variables are age in years, blood glucose in mgs/dl and pedal edema.
- Outcome: The dependent variable was the development of CKD.
- Statistical analysis: A logistic regression model was built by SAS® software.

Results

- CKD=13.442+0.034*age+0.026*(blood glucose level)+0.012*(pedal edema)
- The odds of having CKD increases 1.035 times (95%CI: 1.016-1.055) for every one year increase in age.
- The odds of having CKD increases 1.026 times (95%CI: 1.017-1.037) for every one milligram per deciliter increase in blood glucose.
- The odds of CKD in people with pedal edema was 1.678 times (95%CI: 0.753-2.369) of the odds of CKD in people without pedal edema.
- The model was significantly better than the baseline at explaining CKD [$\chi^2(3)=171.94$; $p<.01$].
- This model predicted 74.9% of the CKD patients correctly and 81.0% of the non-CKD patients correctly for a total of 77.7% correctly predicted.

Discussion

- The model has important implications for diabetic patients to predict their possibility of having CKD at home. Using this model, lower risk patients could be managed by primary physician without additional testing or treatment of CKD. High risk patients could have CKD screening routinely.
- The strength of this model is easy to practice at home.

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