

ABSTRACT

Background: IL-6 is a cytokine released by immune cells that plays an important function in immune response regulation. It has been shown to be high in severe to critical COVID-19 patients, implying a possible role in disease development. Stimulating the glucose uptake in tissues and can stimulate gluconeogenesis in the liver, IL-6 has also been related to glucose metabolism. In severe to critical COVID-19 patients, the immune system is frequently dysregulated, resulting in hyperinflammation and cytokine storm. This hyperinflammatory condition can lead to insulin resistance and high blood glucose levels.

Aim: To assess the association between blood glucose plasma levels and Interleukin-6 (IL-6) in severe to critical COVID-19 patients admitted at dr. Sardjito General Hospital, Yogyakarta.

Methods: A secondary study utilized existing data from individuals with severe to critical COVID-19 cases and comorbid diabetes at dr. Sardjito Hospital. Employing a retrospective cross-sectional design with a determined sample size, the study investigated the relationship between random plasma glucose levels upon admission (independent variable) and Interleukin-6 (dependent variable) while considering confounding variables. Statistical methods included univariate and multivariate analyses, incorporating various tests such as T-test, Mann-Whitney U-test, Fischer's Exact test, or Chi-square test. The study applied two cut-offs (optimal and extreme) alongside blood glucose cut-off and reference levels.

Results : The study identified an IL-6 cut-off of 80.3 with a sensitivity of 48%. Despite non-normally distributed blood glucose levels ($p=0.02$), the Mann-Whitney U-test found no significant difference between IL-6 groups ($p > 0.05$). CKD increased blood glucose levels by 58.057, and ulcus decubitus decreased levels by 84.939. There is no significant mean difference was observed in blood glucose levels between groups using the optimal interleukin-6 cut-off of 80.3 ($p > 0.05$). In multivariate analysis with an extreme interleukin-6 cut-off of 281.95, only interleukin-6 exhibited a significant impact on glucose levels ($p < 0.05$, OR = 1.981). Logistic regression showed varied associations between blood glucose levels and IL-6 concentrations, highlighting the complex interplay. At a BGL cut-off of 239, IL-6 lacked significance ($P > 0.05$) for reference BGL value of 200 with an 80.3 cut-off, but at 281.95, an association is found ($P < 0.05$), suggesting a potential role for elevated IL-6 in promoting glucose levels.

Conclusion : There is no association between blood glucose level during the arrival at the emergency care unit and IL-6 level in severe and critical COVID-19 patients using the optimal cutoff point of 80.3. There is an association between blood glucose level during the arrival at the emergency care unit and IL-6 level in severe and critical COVID-19 patients using the extreme cutoff point of 281.95

Keyword : Hyperglycemia, COVID-19, Blood Glucose, Interleukin-6, Association