

ABSTRACT

Background: During the COVID-19 pandemic, research has consistently shown that individuals with elevated glucose plasma levels tend to have a poorer prognosis, as both SARS-CoV-2 infection and hyperglycemia trigger systemic inflammation. To investigate the association between glucose levels and inflammatory response, which contributes to the worsening of COVID-19 infection, C-reactive protein (CRP), one of the well-established markers of inflammation, has been employed in various studies.

Methods: A secondary data study done among severe to critical COVID-19 patients from dr. Sardjito General Hospital is obtained. Those hospitalized and with diabetes mellitus as a morbidity is included. In this retrospective cross-sectional study, the relationship of severe to critical COVID-19 patients, inflammatory status (specifically CRP), and hyperglycemia are analyzed. Severity of COVID-19 patients were determined according to National Institute of Health (NIH) issued guidelines. C-reactive protein (CRP) serves as the dependent variable while random plasma glucose at admission serves as the independent variable. Distribution and frequency are statistically analyzed as confounding variables. Furthermore, bivariate analysis is conducted to assess the strength of the relationship between hyperglycemia on admission and CRP while multiple linear regression test is conducted to estimate the association of hyperglycemia on admission and other factors against CRP.

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

Result: The analysis reveals an association between elevated blood glucose levels (≥ 215) and increased C-reactive protein (CRP), indicating a higher likelihood (OR: 1.945, 95% CI: 1.06-3.57) of having CRP levels ≥ 100 compared to those with lower blood glucose levels. The examination of blood glucose in relation to potential confounding factors, including gender, hypertension, solid cancer, obesity, chronic kidney disease, and others, does not show significant associations. In the multivariate analysis, blood glucose and obesity emerge as independent predictors of elevated CRP levels, with adjusted odds ratios of 2.775 (95% CI: 1.205-6.387) and 2.013 (95% CI: 1.054-3.845), respectively. Solid cancer and cardiovascular disease also exhibit associations with CRP levels. These findings suggest that blood



glucose, obesity, solid cancer, and cardiovascular disease may influence inflammatory responses as measured by CRP levels in the studied population.

Conclusion: There is an association between CRP level in severe and critical COVID-19 patients and blood glucose level during the arrival at the emergency care unit.

Keyword: hyperglycemia, c-reactive protein, COVID-19, blood glucose, association.