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Association between kidney disease and COVID-19 in diabetes mellitus patients: A meta-analysis of observational studies

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Objectives: The mortality and severity of COVID-19 is increased in diabetic mellitus (DM) patients with kidney diseases such as chronic kidney disease (CKD) and acute kidney injury (AKI). Aim of this study was to conduct a meta-analysis of observational studies to evaluate the association between COVID-19 and kidney diseases in patients with DM.

Methods: The Pubmed/MEDLINE and Embase databases were searched for identification of eligible observational studies. Random effects model was used to calculate the pooled estimates of odds ratio (OR) and 95% confidence interval (CI). Pairwise meta-analysis was carried out using Review Manager 5.3 and the quality assessment of included studies were measured by Newcastle-Ottawa Scale (NOS).

Results: A total of 8 studies including 2,089 individuals without DM and 804 with DM were included in the meta-analysis. CKD events were reported by n=75 patients and n=23 patients reported AKI events. Among the included studies, fever and cough followed by fatigue and diarrhoea were the most commonly reported symptoms. Patients age were ranged from 57-64 years and all included studies were conducted in China.

Results from the pooled meta-analysis showed that AKI [OR 3.59, 95% CI 1.46, 8.84, p=0.005] was significantly associated with DM in COVID-19 patients compared with non-DM patients, however CKD was not significantly associated with DM in COVID-19 patients compared with non-DM patients. In addition, significant heterogeneity (53%, p=0.04) was observed among CKD and non-significant heterogeneity (0%, p=0.64) was reported in the AKI patients. The NOS results showed average score 7.5 (range 6-9) for all included studies.

Conclusions: Current pairwise meta-analysis shows that AKI was significantly higher among DM patients with COVID-19 compared with non-DM patients, however no significant association was observed with CKD. Due to low number of studies and small sample size, further long-term, multinational and large sample size clinical studies are warranted to justify the current findings.