and COVID19 infection as incidence reaches 8% over a short period of time while incidence worldwide area range was less than 2 per 1000 person-year for DKA in type 2 diabetes without COVID19. A study reported 20 % of patients who have diabetes and COVID19 presented ketosis developed DKA. We report the incidence of DKA in selected group. The mortality rate was not far from different evidence in the world. The mortality rate was 25% in the present study. In the USA, it reaches 30% of inpatient with hyperglycemia at presentation. **Conclusion:** DKA is a life-threatening complication, and it became worse when it is related to COVID19. The incidence of DKA and mortality related to COVID19 increased when DKA occurs for T2DM subjects. A more prospective study is warranted and a longer duration of the study to establish the accurate incidence and mortality rate.

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Influence of Emergency Declaration Over Coronavirus Disease 2019 on Plasma Glucose Control of Patients With Diabetes Mellitus

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COVID-19 pandemic poses problems that not only concern the economy but also the health of people all over the world. In Japan, despite the declaration of a "state of emergency", no lockdown was implemented, and a request for self-restraint and avoidance of non-essential trips was instead issued. After a month, the state of emergency was lifted. Because patients with diabetes mellitus (DM) were forced to stay during the state of emergency, resulting in a lack of physical activity, concerns about their glycemic control were raised. Therefore, glycated hemoglobin (HbA1c) levels during different time periods were compared (May 2018, March 2019, June 2019, July 2019, May 2019, March 2020, June 2020, July 2020). We analyzed 165 patients with DM. The mean age of subjects was 67.8 + 11.5 years. Male comprised 67.3% of the participants. The mean body weight was 65.6 + 14.6 kg on July 2019 and 66.1 + 15.2 kg on July 2020. The mean body mass index (BMI) was 24.4 + 3.6 kg/ m^2 on July 2019 and 24.4 + 3.6 on July 2020. Patients with Type 2 DM (T2DM) comprised 90% of the participants, while the rest had T1DM. Mean duration of DM was 12.0 + 7.4 years. In order to assess the effect of the self-restraint on plasma glucose control, HbA1c levels during these periods were compared: May 2018, March 2019, June 2019, July 2019 (one year before COVID-19 pandemic.), and May 2019, March 2020, June 2020, July 2020 (The last three months during COVID-19). March 2020 is corresponded to a period before the request for self-restraint, while June

and July 2020 corresponded to the periods right after the end of self-restraint. We also compared HbA1c levels between May 2019 and July 2020 using the Self-Monitoring of Blood Glucose (SMBG) to assess whether SMBG affected plasma glucose control during the period of self-restraint. HbA1c levels in May 2018, March 2019, June 2019, July 2019, May 2019, March 2020, June 2020, July 2020, were 7.32 + 1.23, 7.44 + 1.20, 7.16 + 1.06, 7.01 + 1.05, 7.23 + 1.06, 7.45 + 1.18, 7.15 + 10.7, and 7.11 + 1.17, respectively. Similarly, HbA1c levels between May 2019 without SMBG and May 2019 with SMBG were not statistically different. In this clinical study, we found that the request to avoid non-essential trips as a form of self-restraint during the country's state of emergency did not affect plasma glucose control of patients with DM. We noted that the patients did not have signs of insulin resistance as their BMI on July 2019 and July 2020 were 24.4 + 3.6 and 24.4 + 3.6, respectively. Unexpectedly, the HbA1c levels were not affected by the absence or presence of SMBG. This could explain why HbA1c levels were not elevated, despite a temporarily sedentary lifestyle and a lack of exercise for a month. In addition, due to the self-restraint, the frequency of dining outside the house decreased, which could have contributed to the non-elevation of HbA1c levels.

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Is DPP-4 Use Associated With a Decreased Mortality for COVID-19 Diabetic Patients? A Meta-Analysis

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Introduction: Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Dipeptidyl peptidase-4 (DPP-4) is a multi-expressed glycoprotein that is speculated to be a functional SARS-CoV-2 receptor. Previous studies remain controversial regarding whether DPP-4 use is associated with reduced risk for COVID-19 diabetic patients. Thus, this meta-analysis is performed. **Method:** A comprehensive literature search on PubMed was conducted to identify all relevant studies published prior to October 2020. This meta-analysis was reported in conformity to the Preferred Reporting Project declared by the Systematic Review and Meta-Analysis (PRISMA). The quality assessment was performed by the Newcastle-Ottawa Scale (NOS). The pooled odds ratio (OR) and 95% confidence intervals (CI) were calculated. Random-effect model or fixed-effect model was used based on heterogeneity. Subgroup analyses were performed based on types of diabetes, geographic locations, study designs, and different sample sizes. Sensitivity analysis and publication bias detection were also performed. All statistical analyses were performed using RevMan and STATA 12.0 statistical software, and all P values were two-tailed, the test level was 0.05. **Result:** 69 articles were obtained. 5 articles involving 49,989 participants were

included. All included studies were considered moderate to high quality. No decreased mortality of COVID-19 diabetic patients was found among DPP-4 users (OR 0.86, 95%CI: 0.22,3.41, P=0.083, I^2=81%). In the subgroup analysis, studies in Asia (OR 3.11, 95%CI: 0.78, 12.34, P=0.001, I^2=70%) did not found reduced mortality, whereas studies in Europe (OR 0.36, 95%CI: 0.23, 0.56, P<0.00001, I^2=0%) were associated with reduced mortality. Based on study designs, the four case-control studies (OR 1.27, 95%CI: 0.27, 5.93, P=0.76, I^2=89%) did not find reduced mortality, but one cohort study (OR 0.13, 95%CI: 0.02, 0.84, P=0.03) showed a reduced mortality. The four studies investigating Type 2 Diabetes Mellitus (T2DM) did found reduced mortality (OR 0.74, 95%CI: 0.13, 4.24, P=0.73, I^2=90%). For sample size >200, reduced risk of mortality (OR 0.28, 95%CI: 0.07, 1.15, P=0.08, I^2=32%) was found, however, for sample ≤200, no statistically significant association (OR 1.44, 95%CI: 0.23, 8.89, P=0.70, I^2=93%) was found. Sensitivity analysis by changing models and omitting each study at a time confirm the stability of the result. Begg's test (z=-0.24, P=1.000) and Egger's test (t=0.56, P=0.618) did not detect a significant risk of publication bias. **Conclusion:** The current meta-analysis did not find reduced mortality for COVID-19 diabetic patients who take DPP-4. However, subgroup-analyses found reduced mortality in Europe. More high-quality original studies are needed to further explore the association between DPP-4 use and the mortality risk of COVID-19.

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Is Metformin Use Associated With a Decreased Mortality for COVID-19 Diabetic Patients? A Meta-Analysis

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Introduction: Coronavirus disease 2019 (COVID-19) has been spreading globally for more than half a year. Previous studies remain controversial regarding whether metformin is associated with reduced risk for COVID-19 diabetic patients. Thus, this meta-analysis is performed. **Method:** A comprehensive literature search on PubMed and Web of Science was conducted to identify all relevant studies published prior to October 2020 according to the established inclusion criteria. This meta-analysis was reported in conformity to the Preferred Reporting Project declared by the Systematic Review and Meta-Analysis (PRISMA). The quality assessment was performed by the Newcastle-Ottawa Scale (NOS). The pooled odds ratio (OR) and 95% confidence intervals (CI) were calculated to estimate the association between metformin use and mortality for COVID-19 patients. A random-effect or fixed-effect model was used based on heterogeneity significance. Subgroup analysis was performed based on in-hospital-use or home-use, and different sample sizes. Sensitivity analysis and publication bias detection were also performed.

All statistical analyses were performed using RevMan software (version 5.3; Cochrane library) and STATA 12.0 statistical software (Stata Corp., College Station, TX), and all P values were two-tailed, the test level was 0.05. **Result:** 97 articles were obtained from the database search, and 5 articles obtained from other sources. 8 articles involving 11,169 participants were included. Most studies were considered moderate quality. A statistically significant association between metformin use and decreased mortality of COVID-19 patients was found (OR 0.53, 95%CI: 0.34, 0.83, P=0.005, I^2=77%). In the subgroup analyses, home-use of metformin was also associated with a reduced risk of mortality (OR 0.54, 95%CI: 0.35, 0.84, P=0.006, I^2=66%), and one study reporting in-hospital use did not find reduced mortality among COVID-19 patients taking metformin (OR 1.65, 95%CI: 0.71, 3.86, P=0.247). For sample size >1,000, no statistically significant reduced risk of mortality (OR 0.84, 95%CI: 0.57, 1.26, P=0.41, I^2=73%) was found, however, for sample ≤1,000, a statistically significant reduced risk of mortality (OR 0.29, 95%CI: 0.19, 0.44 P<0.00001, I^2=0%) was found. Sensitivity analysis by change fixed-effect models to random-effect models and by omitting each study at a time confirmed the relative stability of the result. Begg's test (z=0.37, P=0.711) and Egger's test (t=-1.98, P=0.096) did not detect a significant risk of publication bias. **Conclusion:** The current meta-analysis demonstrates that metformin use is associated with decreased mortality for COVID-19 diabetic patients. However, only one study investigating the in-hospital use of metformin. More high-quality original studies are needed to further explore the association between metformin use and mortality risk of COVID-19.

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Outpatient Diabetic Outcome During the Covid-19 Pandemic: A Retrospective Single Center Analysis

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Background: Previous studies have shown that telemedicine is an effective alternative method for health care delivery. The COVID-19 pandemic has acutely stimulated expansion of telemedicine across the country. This study aimed to determine characteristics of telehealth visit and short term HbA1c outcome in patients with diabetes mellitus in endocrinology clinic during the COVID-19 pandemic. **Methods:** A single center retrospective chart review was conducted in all patients seen in endocrinology clinic for diabetes mellitus between 5/27/2020–7/20/2020. Data were extracted from electronic medical record. The primary research question is percentage of patients who achieved HbA1C ≤ 8% at 3 month follow up. Secondary research questions are characteristic of patients and clinic visits, diabetic technology usage, 3 month follow up mean HbA1c and HbA1c change. This project was approved by