Dear Editor:

The COVID-19 pandemic has had an enormous impact around the world. In many countries, a national state of emergency was established at the beginning of the outbreak. During the stricter lockdowns, peoples’ movements outside their homes were restricted to acquiring food or medications, and working at home was encouraged. Restricting movement of individuals is likely to have undesirable effects on exercise, diet, and psychological state. Diabetic patients stood to suffer the most from the limitation of access to outpatient clinics. Diabetes professionals were concerned that glycemic control would worsen due to insufficient exercise, more snacking, and severe psychological stress.

On April 17, 2020, the Japanese government declared a national state of emergency with request-based measures encouraging the populace to stay at home and businesses to limit operations. On May 14, 2020, the Government lifted the state of emergency. We hypothesized that this one-month state of emergency may have given rise to worsening glycemic control in type 2 diabetes patients because of a decrease in exercise exerting a negative impact on glycemic control. To investigate this, we assessed hemoglobin A1c (HbA1c) levels before (March) and after (June) the state of emergency in 913 people with type 2 diabetes (Figure). Considering seasonal variations of HbA1c in Japan, we compared the changes of 2020 with those of 2019 in March and June.

As expected, HbA1c decreased significantly from 7.63 ± 1.56% in March 2019 to 7.22 ± 1.33% in June (mean ± SD) in 913 people with type 2 diabetes (Figure). Considering seasonal variations of HbA1c in Japan, we compared the changes of 2020 with those of 2019 in March and June. As expected, HbA1c decreased significantly from 7.63 ± 1.55% in March 2019 to 7.48 ± 1.41% in June 2019 (Fig. 1A). However, the reduction in HbA1c from March to June was significantly greater in 2020 than in 2019 (median plus interquartile) (–0.2 [–0.7, 1.0] vs. 0 [–0.4, 0.2]%, P < 0.0001; Fig. 1B). Based on the questionnaire, 97% of people who had a habit of eating out daily stopped eating out. Two thirds of the people asserted they got less exercise.

We unexpectedly found that HbA1c was not increased, but instead decreased during the restriction in people with type 2 diabetes, with a greater reduction in HbA1c from March to June 2020 than in 2019. In Japan, it is reported that HbA1c reaches its highest level in February to March and its lowest level in August to September according to seasonal variation. We found the reduction in HbA1c from March to June was significantly greater in 2020 than in 2019. Even considering seasonal variation, we showed for the first time that glycemic control improved in people with type 2 diabetes lived in Tochigi prefecture (a semi-rural area) during the staying-home period due to Covid-19 restrictions.

One possible explanation for this unexpected finding is an avoidance of restaurants during the state of emergency. In this area, the number of automobiles owned per capita is the highest in Japan. The habit of eating out on a daily basis is well established. Restaurant food tends to be high in calories with high fat and carbohydrate contents. Eating every meal at home can allow a more healthy diet, leading to an improvement in glycemic control.

June 2020. All of the subjects gave informed consent to participation in this study and it was approved by the Institutional Review Board of Dokkyo Medical University.

Results are expressed as the mean ± SD or as the median and IQR. Differences between groups were analyzed by Student’s paired t-test or the unpaired t-test, while differences in non-parametric data were assessed by the Mann-Whitney U test.

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Another possible explanation is that people with type 2 diabetes had more time to concentrate on glycemic control and had a more regular lifestyle, including the timing and composition of meals, while not being exposed to workplace stress. In fact, several recent reports have demonstrated no deleterious effects of the lockdown due to Covid-19 pandemic on short-term glycemic control evaluated by continuous glucose monitoring in people with type 1 diabetes.4,5 These reports suggest that staying at home, with a more regular and convenient schedule, provided people with type 1 diabetes the opportunity to take better care of glycemic control.

This is the first study to demonstrate an improvement in short-term glycemic control while staying home for people with type 2 diabetes, although people with type 1 diabetes had similar findings in some reports.4,5

AUTHOR CONTRIBUTIONS

Y.A. and T.I. contributed to the study design and analysis and interpretation of data. All authors contributed to drafting the article and approved the final version to be published.

REFERENCES