

Effect of COVID 19 Lockdown on glycemic parameters in people with type 2 diabetes

Ajoy Tewari¹, Vineeta Tewari², Jay Tewari³

¹Consultant, Jai Clinic and Diabetes Care Centre, Lucknow, ²Department of Anatomy, Era's Lucknow Medical College, Lucknow, ³KGMU, Lucknow, Uttar Pradesh, India

ABSTRACT

Coronavirus disease (COVID-19) is an infectious disease caused by the newly discovered SARS-COV-2. Older people and people with pre-existing medical conditions, such as diabetes and obesity, appear to have the worst outcomes with the COVID-19 virus. In response to the COVID-19 pandemic, many countries enforced stringent lockdowns to prevent the spread of the disease. India had a lockdown of 68 days between 21st March and 31st May 2020. In this background, we undertook this study to assess the effect of the lockdown on the glycemic status and weight of people with diabetes, which was indirectly an opportunity to assess the self-care practices of people with diabetes. **Material and Methods:** The subjects included in the study were people with type 2 diabetes identified from electronic medical records who had attended the Jai Clinic and Diabetes Care Centre in Lucknow and were tested for HbA1c between 20th Feb 2020 and 20th March 2020. A total of 313 people with diabetes were identified meeting the inclusion criteria, out of which 171 were females and 142 were males. They were again tested for HbA1c between 1st June 2020 and 1st July 2020 after lockdown. Their pre- and post-lockdown HbA1c and weight were analyzed statistically. **Results:** HbA1c was increased in 195 patients, which was statistically significant. A total of 151 patients had an increase in weight compared to their prelockdown weights, but it was not statistically significant. Furthermore, an increase in weight correlated with an increase in HbA1c and a decrease in weight correlated with a decrease in HbA1c. Both were statistically significant. **Conclusion:** Optimum diabetes control and adherence to good self-care practices is the need of hour, and contingency plans for medicines and diabetes care supplies are of utmost importance in these testing times.

Keywords: Coronavirus, COVID-19, diabetes, glycemic status, HbA1c, pandemic

Introduction

COVID-19 infection with diabetes is associated with a worst outcome.^[1,2] Obesity is also a determinant of poorer prognosis in patients infected with SARS-CoV-2.^[3] Thus, optimum diabetes control and weight control are of utmost importance in these testing times. The corona epidemic has wide-ranging implications for chronic disease care; the abrupt lockdown and the panic associated with it resulted in the traditional chronic care model going haywire. All tertiary care hospitals in the public sector were converted into COVID care centers.

Address for correspondence: Dr. Vineeta Tewari, Department of Anatomy, Era University, Lucknow, Uttar Pradesh - 226 020, India. E-mail: vineetatewari21@gmail.com

Received: 16-09-2020

Revised: 24-12-2020

Accepted: 30-12-2020

Published: 30-07-2021

People with diabetes were restricted to their homes with little or no access to their physicians, there was nonavailability of drugs due to lack of means of transport, and there were strict restrictions on mobility.^[4]

People with diabetes were left to fend for themselves with consequent, profound effects on their physical and psychological health. During pre- and post-lockdown visits of people with diabetes at our center, we tried to gauge objective signs of glycemic control i.e., HbA1c and weight changes. Weight and HbA1c are the two most objective signs of assessing diabetes self-care.^[5]

India went on absolute lockdown for a total duration of 68 days from 21st March 2020 to 31st May 2020. We undertook the study

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Tewari A, Tewari V, Tewari J. Effect of COVID 19 Lockdown on glycemic parameters in people with type 2 diabetes. J Family Med Prim Care 2021;10:2529-32.

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_1896_20

to assess the effect of lockdown on the glycemic status and weight of people with type 2 diabetes.

Mater approval ial and Methods

The subjects included in the study were people with type 2 diabetes in the age group of 25–76 years identified from electronic medical records who had attended the Jai Clinic and Diabetes Care Centre in Lucknow and were tested for HbA1c between 20th Feb 2020 and 20th March 2020. A total of 313 people with diabetes were identified meeting the inclusion criteria, out of which 171 were females and 142 were males. They were again tested for HbA1c between 1st June 2020 and 1st July 2020, and their vitals and demographics were collected. The exclusion criteria included people with type 1 diabetes, pregnant and sick patients, and those who did not concede to participate in the study. All the participants were explained the nature of the study, an informed consent was obtained from them. The study was duly approved by Institutional ethics committee.

Statistical analysis

The data were entered in Microsoft Excel sheet [MS Office 2019, Microsoft Corp] and was analyzed using Statistical Package for Social Sciences [SPSS ver 22.0 Armonk, NY, IBM Corp]. The data were analyzed for descriptive statistics. The scores were found skewed at $P < 0.05$ significance level when checked by using the Kolmogorov-Smirnov test; therefore, we used the nonparametric Wilcoxon signed ranks test to compare pre- and post-HbA1c and weight and nonparametric Spearman Rho to correlate the association between an increase in HbA1c with an increase in weight and a decrease in HbA1c with a decrease in weight.

Results

Table 1 describes the sex distribution of patients enrolled in the study. Out of total 313 subjects, around 171 were females and 142 were males.

Table 2 shows the demographic and clinical features of patients before and after lock down. The mean (SD) duration of diabetes of the subjects was 4.9 (3.36) years and the mean age (SD) was 50.8 (10.62) years, mean (SD) Pre Lockdown HbA1c was 7.9 (1.92) % and Post Lockdown HbA1c was 8.0 (1.87)%, mean Pre Lockdown body weight 70.2 (13.8) kg and Post Lockdown body weight was 70.6 (13.3) Kg.

We tried to examine the difference between pre HbA1c and post HbA1c during lockdown phase. Of about 195 patients had shown an increase in HbA1c which was statistically significant ($Z = -2.535$, asymp sig (2tailed) 0.11) [Table 3].

With regards to body weight, 151 patients had an increase in weight compared to their pre-lockdown weights but it was not statistically significant ($Z = -0.285$ asymp sig(2tailed) .775) [Table 4]

Total 113 patients had a decrease in HbA1c (minimum 0.1% and maximum 6.6%, mean 1.4091, SD 1.4091) and 134 patients had a decrease in weight and it ranged from 0.1 minimum to 10.2 kg mean 2.446, SD 1.98389 [Table 5]. Using non parametric correlation (Spearman's Rho), decrease in HbA1c correlated with decrease in weight (correlation coefficient 0.246) and it was significant at < 0.01 level(2tailed).

Furthermore, 192 patients had an increase in HbA1c (minimum 0.1 and maximum 7.0, mean 1.0 (1.10). Around 149 patients had an increase in body weight with the range of minimum 0.1 kg and maximum 10.3 kg and mean (SD) 2.2 (2.01) kg. [Table 6].

Using non parametric correlation (Spearman's Rho) Increase in HbA1c correlated with increase in weight (correlation coefficient 0.995) and it was significant at < 0.01 level(2tailed).

Table 1: Gender distribution

Gender	Frequency	Percent
Female	171	54.6
Male	142	45.4
Total	313	100

Table 2: Patient demographic characteristics before and after lockdown

Parameters	n	Minimum	Maximum	Mean	Std. Deviation
PreLockdown HbA1c	313	4.9	14.8	7.9	1.9150
PostLockdown HbA1c	313	4.7	15.0	8.0	1.8718
PreLockdown Weight	313	5.6	112.0	70.2	13.8065
PostLockdownWeight	313	44.7	115.7	70.6	13.3562
Duration of diabetes	313	1	15	4.9	3.365
Age	313	25	93	50.8	10.624

Table 3: Changes in HbA1c level in patients before and after lockdown

Parameters	n
Post HbA1c<pre HbA1c (Negative Ranks)	116
Post HbA1c>pre HbA1c (Positive Ranks)	195
Post HbA1c=pre HbA1c (Ties)	2
Total	313

Wilcoxon Signed Ranks Test; b Based on negative ranks.

Table 4: Changes in body weight in patients before and after lockdown (Wilcoxon Signed Ranks Test)

Body weight	n
Post Weight<Pre Weight (Negative Ranks)	137
Post Weight>Pre Weight (Positive Ranks)	151
Post Weight=Pre-Weight (Ties)	25
Total	313

Wilcoxon Signed Ranks Test; b Based on negative ranks.

Table 5: Correlation between decrease HbA1c -Decrease in Weight

Parameters	n	Minimum	Maximum	Mean	Std. Deviation
Decrease in HbA1c	113	0.1	6.6	1.4	1.4091
Decrease Weight	134	0.1	10.2	2.4	1.9838

Table 6: Correlation between Increase in HbA1c-Increase in Weight

Parameters	n	Minimum	Maximum	Mean	Std. Deviation
Increase in HbA1c	192	0.1	7.0	1.0	1.10242
Increase Weight	149	0.1	10.3	2.2	2.01230

Discussion

Summarizing the findings:

There was a significant increase in Hba1c after lockdown. The increase in Hba1c correlated significantly with weight gain. There was a nonsignificant numerical increase in weight. The decrease in Hba1c correlated significantly with weight loss.

Our study found that there was a statistically significant increase in HbA1c after lockdown, signifying a deterioration in glycaemic control during the lockdown, and this may be attributable to poor self-care practices. Similar studies in South and North India, though in normal times, showed poor diabetes self-care practices in India.^[6,7] A similar study from Central India reported deterioration in glycaemic parameters using self-monitoring of blood glucose when comparing pre and during lockdown fasting and postprandial sugars.^[8] Another study with type 1 people with diabetes in India also reported worsening glucose control, increased incidence of diabetic ketoacidosis, and a significant increase in HbA1c.^[9] The reasons could be restrictions in physical activity,^[10] nonavailability of medicines, and no contact with their treating physicians. Poor penetration of teleconsultation services in India and lack of its regulatory guidelines at the start of the epidemic led to a void in patient-physician contact.^[11]

Furthermore, there was a numerical increase in weight, but it was not statistically significant, lack of exercise and nonadherence to dietary guidelines could be the reason attributable to this.

The association between an increase in HbA1c and weight was statistically significant, showing that those patients who gained weight had poorer glycaemic control, a systematic review showed a linear relationship between weight loss and HbA1c, showing a mean 0.1% reduction for HbA1c with 1 kg body weight.^[12,13] Moreover, a large number of patients were able to have a decrease in their HbA1c values showing improvement in glycaemic control, it correlated significantly with decreased weight, showing a large number of patients took it in their stride to use lockdown to focus on their health standards. A similar study from Italy with continuous glucose monitoring showed similar ambulatory glucose

profiles to prelockdown in insulin-treated patients initially, but a decrease in hypoglycemia rates with the progression of lockdown.^[14] Another study in people with type 1 diabetes showed improved glycaemic profile using a flash continuous glucose monitoring system.^[15]

Self-monitoring of blood glucose is an important aspect of diabetes care, and lack of glucometers or availability of glucose testing strips during lockdown could contribute to nontesting and maintaining optimum glucose levels. Concomitant diseases, nonadherence to medicines, and fear associated with pandemic could have possibly contributed to poorer glycaemic goals. Some people achieve better glycaemic control, which could be because of their personal commitment to health, availability of time, and family support as in situations of stress family support acts as a safety valve.^[16]

Our study compared pre- and post-HbA1c and the weight of people with type 2 diabetes, which are the two most important parameters to assess glycaemic control; the strength of the study was the large sample size.

The limitations of the study were that it catered to a limited geographical area and predominantly urban people with type 2 diabetes, with access to good diabetes care and on regular follow-up.

Conclusion

With a new highly infective strain of the coronavirus emerging and universal vaccination being a distant reality, the need of the hour is as follows:

Imparting self-care management skills to the patients.

Prepare them for contingencies.

Inculcating the importance of good diabetes control and weight management.

Prescribing simple exercises such as skipping, static cycling, and jogging in the compound to stay active.

Increasing the reach of teleconsultation.

Stocking medicines and glucose testing supplies.

The objective of the study was to understand the response of people with diabetes in response to a catastrophic situation. The study lays emphasis on the need to promote diabetes self-management education and empowering our patients in primary practice. The unpreparedness of our people with diabetes and the resultant deleterious effect on their glycaemic profiles emphasizes shifting from the traditional instructional model of patient care to an empowerment model of diabetes care where people with diabetes are in control of their diabetes management and the role of care provider is of just a facilitator. Furthermore, it emphasizes the importance of weight loss in overall glycaemic control.

Key Messages

The study highlights the importance of promoting self-care management practices in primary care and the need for contingency planning in chronic disease management.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Fadini GP, Morieri ML, Longato E, Avogaro A. Prevalence and impact of diabetes among people infected with SARS-CoV-2. *J Endocrinol Invest* 2020;43:867-9.
- Maddaloni E, Buzzetti R. Covid-19 and diabetes mellitus: Unveiling the interaction of two pandemics. *Diabetes Metab Res Rev* 2020:e33213321. doi: 10.1002/dmrr. 3321.
- Tamara A, Tahapary DL. Obesity as a predictor for a poor prognosis of COVID-19: A systematic review. *Diabetes Metab Syndr* 2020;14:655-9.
- Nachimuthu S, Vijayalakshmi R, Sudha M, Viswanathan V. Coping with diabetes during the COVID-19 lockdown in India: Results of an online pilot survey. *Diabetes Metab Syndr* 2020;14:579-82.
- American Diabetes Association. 3. Prevention or delay of type 2 diabetes: Standards of medical care in diabetes—2020. *Diabetes Care* 2020;43(Suppl 1):S32-6.
- Rajasekharan D, Kulkarni V, Unnikrishnan B, Kumar N, Holla R, Thapar R. Self-care activities among patients with diabetes attending a tertiary care hospital in mangalore karnataka, India. *Ann Med Health Sci Res* 2015;5:59-64.
- Aggarwal M, Gautam SR, Yadav A, Khurana T. To assess medication compliance and self care practices in patients with diabetes mellitus. *Int Arch Biomed Clin Res* 2018;4:22-6.
- Khare J, Jindal S. Observational study on effect of lock down due to COVID 19 on glycemic control in patients with diabetes: Experience from Central India. *Diabetes Metab Syndr* 2020;14:1571-4.
- Verma A, Rajput R, Verma S, Balania VK, Jangra B. Impact of lockdown in COVID 19 on glycemic control in patients with type 1 Diabetes Mellitus. *Diabetes Metab Syndr* 2020;14:1213-6.
- Hall G, Laddu DR, Phillips SA, Lavie CJ, Arena R. A tale of two pandemics: How will COVID-19 and global trends in physical inactivity and sedentary behavior affect one another? *Prog Cardiovasc Dis* 2020. doi: 10.1016/j.pcad. 2020.04.005.
- Razvi DS. Why Telemedicine Won't Help India's Ailing Out-Patient Consultations Much-The Wire Science [Internet]. 2020 [cited 2020 Sep 06]. Available from: <https://science.thewire.in/health/why-telemedicine-wont-help-indias-ailing-out-patient-consultations-much/>.
- Wilding JP. The importance of weight management in type 2 diabetes mellitus. *Int J Clin Pract* 2014;68:682-91.
- Gummesson A, Nyman E, Knutsson M, Karpefors M. Effect of weight reduction on glycosylated haemoglobin in weight loss trials in patients with type 2 diabetes. *Diabetes Obes Metab* 2017;19:1295-305.
- Maddaloni E, Coraggio L, Pieralice S, Carlone A, Pozzilli P, Buzzetti R. Effects of COVID-19 lockdown on glucose control: Continuous glucose monitoring data from people with diabetes on intensive insulin therapy. *Diabetes Care* 2020;43:e86-7.
- Fernández E, Cortazar A, Bellido V. Impact of COVID-19 lockdown on glycemic control in patients with type 1 diabetes. *Diabetes Res Clin Pract* 2020;166:108348.
- Griffith LS, Field BJ, Lustman PJ. Life stress and social support in diabetes: Association with glycemic control. *Int J Psychiatry Med* 1990;20:365-72.