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Covid-19 Pandemic and Life Style Modification for People with Diabetes

Ashu Rastogi[1], **Jude EB**[2*]

[1]*Department of Endocrinology, University of PGIMER, Chandigarh, India*

[2] *Department of Diabetes and Endocrinology, NHS Hospital Trust, Lancs, UK*

Correspondence to: *Jude EB, Department of Diabetes and Endocrinology, NHS Hospital Trust, Lancs, UK; Email: ejude99@yahoo.co.uk*

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Abstract

The ongoing SARS-CoV2 pandemic is likely to adversely affect modifiable risk factors for diabetes because of the significant restriction of physical activity that is likely to worsen glycemic control in individuals with diabetes. Moreover, poor glycemic control itself may increase the severity of infection and mortality due to COVID-19. Limited physical activity, lack of nutritional reinforcement, infrequent physician visit and non- compliance to prescribed drugs is likely to worsen glycemic control during the COVID-19 pandemic.This review discusses practical pointers on how to improvise lifestyle measures including exercise, dietary patterns and stress management to improve overall glycemic control in people with diabetes.

Keywords: COVID-19; Diabetes; Lifestyle changes; Exercise; Glycemic Control

Introduction

The present COVID-19 pandemic has affected the lives of millions of individuals with diabetes due to thelockdown and requirement for remaining indoors. In the last few decades, we saw a significant decline in communicable diseases with an increase in non-communicable diseases (NCDs) such as diabetes. The COVID-19 pandemic has turned the clock back with renewed focus on communicable diseases, but people with diabetes are clearly at risk for a poor outcome from a COVID-19 infection [1].

The risk factors in the development of diabetes in many patients is a consequence of a sedentary lifestyle, lack of exercise,excess calorie intake and sleep deprivation. The changing lifestyle patterns over past few decades have resulted in a pandemic of obesity and diabetes. The risk factors of these NCDs include both modifiable and non-modifiable risk factors. Among the most important potentially modifiable risk factors for diabetes are sedentary lifestyles, poor dietary habits, and sleep deprivation. SARS-CoV2 pandemic is likely to adversely affect these modifiable risk factors because of the significant restriction of physical activity that is likely to perpetuate worsening of glycemic control and weight management in individuals with diabetes. Due to restrictions in accessing health care less attention might be given to glucose management and lifestyle guidance resulting in a worsening of glycemic control that may increase the severity of infection and mortality due to COVID-19 [2].

There is no evidence set forth for this presumption except for the experience from past natural disasters which simulate the similar difficulties and limitations. Predictive modelling has shown that the increment in HBA1c at the end of 30 and 45 days lockdown could be 2.26% & 3.68%. However, a recent large study found an overall improvement in glycemic control (ΔHbA1c − 0.41 ± 0.27% (p=0.005)] during lockdown in motivated patients under regular clinic follow up prior to lockdown. Most of the individuals in the study had increased physical activity during lockdown as determined by GPAQ score which increased from 140 (0.0 to 1260) MetS to 840 (0.0 to 1680) MetS (p = 0.014). Therefore it becomes all the more important not to lose focus on life style recommendations but to adapt and individualize current recommendations to the current situation [3].

How COVID-19 has affected the lifestyle guidance?

COVID-19 pandemic has led to a significant curb on outdoor physical activities across the globe. Despite phasing out of current restrictions many patients will limit outdoor activities because of fear of acquiring COVID-19 infection, making it difficult to follow the recommendations of 150 min/week of moderate to vigorous intensity aerobic exercise. Excessive sedentary behavior was otherwise a problem area in management of diabetes due to lack of adherence that is likely to be perpetuated by COVID-19 pandemic. Moreover, life style intervention require follow-up to reinforce adherence which is not possible during COVID-19 pandemic [4].

In addition, there has been a significant anxiety about the pandemic and uncertainty about self-affliction that has altered sleep patterns during these times and even sleep deprivation. The lack of exercise, work-from-home related fatigue, late-night binge television viewing or working at computer has also contributed to lack of sleep.

Effect of COVID-19 on glycemic control.

Limited physical activity, lack of nutritional reinforcement, infrequent physician visit and non- compliance to prescribed drugs is likely to worsen glycemic control during COVID-19 pandemic. The annual predicted percentage increase in complication rates at the end of 30-day lockdown was 2.8% for non-proliferative diabetic retinopathy, 2.9% for proliferative diabetic retinopathy, 1.5% for retinal photocoagulation, 9.3% for microalbuminuria, 14.2% for proteinuria, 2.9% for peripheral neuropathy, 10.5% for lower extremity amputation, 0.9% for myocardial infarction, 0.5% for stroke and 0.5% for infections. SARS-CoV2 may affect insulin release by

binding to Angiotensin-converting-enzyme 2 receptor (ACE2)expressed on beta cells that facilitate virus ingress and direct damage to beta cells. It may increase insulin resistance by causing "cytokine storm" and increasing levels of fetuin thus adversely affecting glycemic control [5].

Motivated individuals regularly in contact with their physicians and care providers are likely to have improved glycemic control even during pandemic times as shown in a recent study by Rastogi et al. An additional efforts for intensifying glucose monitoring and achieving good glycemic control is the need of hour. The role of lifestyle modification as the first line treatment strategy for glycemic control amongst people with diabetes cannot be overemphasized.

Lifestyle modifications during the pandemic

A structured exercise intervention may lower HbA1C by as much as 0.66% within 8 weeks, even without a significant change in BMI. It is therefore important to restructure the individualized physical activity goals to activities that are possible indoors.This can be achieved in various ways that can be performed indoors. If available, stationary cycling or treadmill joggingwould be a good choice, but if not then increasing walkingand standing indoors would be a reasonable alternative. At least 10000 steps a day would be preferable, but this goal might be challenging. However, lower levels of aerobic activity can be beneficial and even a single session of low-intensity aerobic exercise for more than 60 min enhances insulin action in obese, insulin-resistant adults. [8]The use of pedometers and step counters will help in self-motivation and self-monitoring of physical activity. The individualized exercise regimen is recommended for at least 5 days per week and its intensity, frequency and duration can gradually be upscaled according to tolerance. In addition to the beneficial effects of these continuous low or moderate level exercises, improved glycaemic control can also be achieved by very brief periods of very high-intensity interval training (HIIT), such as 3 sessions/week of ten one minute bouts of near maximal exercise interspersed with 1 minute of active recovery.

These aerobic exercises can be combined with resistance training as greater improvements in insulin sensitivity and glycaemic control can be achieved through combined regimens. Resistance exercises are possible at home without any equipment including push-ups, sit-ups, squats, lunges or with the help of resistance bands and dumbbells. These exercises are beneficial because they can increase muscle strength, reduce falls and have an A1C-lowering effect.

Finally, the glycaemic response to exercise may be dependent not only on the modality, the duration and intensity but also on the nutritional state, with a stronger impact of moderate exercise in the postprandial state and superior effects of vigorous exercise under fasted conditions. The concrete advice may therefore be to perform the low intensity exercises starting 30 minutes after each meal and the more strenuous exercises before breakfast. The patient will need support to adhere to the exercise regimen, as benefits will be lost within few days without training. In addition, the patient should be advised that these interventions could increase the risk of hypoglycaemia; this risk is lower after low-intensity than high intensity exercise, when energy expenditure is comparable.

Work-from-home is a new normal in these times and increases the sedentary time with adverse effect on glycemic control. It is advisable to interrupt time spent sitting, andevery 30 minutestaking a few steps, even <3 mincan improve glycemic control.Unstructured physical activity like performing house-hold chores also benefits by reducing the total sedentary time, increasing energy expenditureand improving glycaemic control. Increasing standing time with relatively simple measures 3 times a day 30 minutes performing an additional activity standing, has possibly also additional beneficial effects. Other activities that can be practicedat home include yoga and Tai-chei. Yoga can even be performed in a small room, and significantly improves flexibility, muscle strength and balance as well as improving glycaemic and lipid profile. Most homes have internet access making internet-based structured exercise regimens possible in setting individualized goals; social media can increase motivation, peer interaction and offer group exercise programs.

Dietary practices during pandemic

A limited access to healthy food during the pandemic requires an extra effort to significantly curb calorie-dense food and restraining calorie intake is particularly pertinent because of the limited scope for physical activity. A 500- to1000 kcal restriction can result in a reduction in HbA1C of up to 2.0% in type 2 diabetes. Meal portion sizecan be reduced with servings of fruits and vegetables.For many persons, staying at home will increase the temptation of extra snack in between meals, setting concrete goals in this respect may help to limit the extra calorie intake, and to change this habit bycooperation of partners and other members of the household may be needed.

Stress and sleep in COVID-19 pandemic

There is a significant anxiety about the pandemic and uncertainty about self-affliction that can alter sleep patterns and result in sleep deprivation. The lack of exercise, work-from-home related fatigue, late-night binge television or working at the computer may further contribute to lack of sleep and stress. Psychological distress and social problems may itself limit the ability of individuals for diabetes self-care. Frequent communication amongst patients, family members and health-care providers and telemedicine consultation at periodic intervals may be beneficial.

Conclusions

Overall, daily routine and lives of people with diabetes have significantly changed during COVID-19 pandemic. Moreover it is quintessential that our patients need individualized help, reinforcement of modified lifestyle recommendations and advice to better cope with their disease in these times of the restricted access to outdoor activities.

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