

Effect of COVID-19 Pandemic in the Daily Lives of People with Diabetes in India

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Abstract

Objective and Aim: The above study is aimed to understand the effect of COVID-19 pandemic in the daily routine of People with Diabetes (PWD) in Indian population and to find out recommendations and interventions to improve self-management and preventive measures in a pandemic situation.

Methods: The study was a cross-sectional, observational study using a self-reported questionnaire based survey in People with Diabetes (PWD). A survey was conducted using E-Mail, What's app and the people visited diabetic OPDs.

Results: Due to lockdown a majority of patients has changed their food habit (50.3%) but didn't change their medication (68.7%). Due to home isolation during lockdown phase new physical activity like Yoga or Exercise or walking were less in majority of people (64.4%) whereas in house recreation activity were increase in majority of patients (51.3%). Patients who were done at least one blood test daily at home were considered as regular. On the whole, only 32.4% of the participants were checking their blood sugar levels regularly using Self-monitoring blood glucose (SMBG) during the lockdown. When we asked about incapacitated feeling of patients due to diabetes majority of patients denied (65.3%), but 57.7% patients admits about negative thoughts during lockdown period. 21.6% patients were no aware of tele-consultation with doctor if needed and still believed that conventional way to visit the clinic was the only way to consult a clinician.

Conclusion: This is the first study to examining the short-term effects of lockdown on glycemic parameters in diabetes and reveals that several factors plays a crucial role in maintaining sugar level. Psychological stress relief, spending quality time with family, improvement in food habits, taking medicine at prescribed times and faster response to hypoglycemia lead to better control glucose level. We proposed to govt. regarding education level of PWD regarding mask, sanitization and vaccination.

Keywords: Diabetes Mellitus; COVID-19; Pandemic; Self-Management

Introduction

The coronavirus disease 2019 (COVID-19) has nearly threatened the existence of human beings on earth. After its first detection on 30th December 2019 at Wuhan Jinyintan Hospital in China, it has infected more than twelve million people worldwide causing the death of more than five lakhs lives [1]. Even after the pandemic alert by 11th March 2020 by WHO the disease has spread to 215 countries till

writing of this proposal letter [2]. The cases in India is also rising exponentially and as of 06th July 2020, The Govt. has registered a total of 719401 cases which may be lower than the actual no [3]. Lockdown situations and restriction to socialize has physically and psychologically affected the whole population resulting in increased stress level, dietary disturbance and glycemic disturbance in People with diabetes (PWD).

People with diabetes (PWD) with poor glycemic control, as studied in several studies, have two third higher morbidity and mortality than the general population relating it to a poor immunity status in the former group. The experience from the past pandemic of Middle East Respiratory Syndrome coronavirus (MERS-CoV), H1N1 influenza and severe acute Respiratory Syndrome Coronavirus-1 (SARS-CoV-1) poor glycemic control and low immunity level resulted in high morbidity and mortality in PWD [4]. India is inhabited by the second highest diabetic population of the world and the worsening pandemic situation poses a great threat to a large number of populations with limited health care facilities in the country [3].

Considering an overall estimated mortality rate of around 3 to 4% which may vary from country to country and perfect estimation may be difficult due to unreported cases will lead to an overwhelmed health care facility [5]. One early retrospective study by Zhu., *et al.* showed that a good glycemic control in PWD has a much better outcome in comparison to poor control, which included 810 T2DM among 7336 COVID infected persons [6]. In his comparison of 528 poorly controlled diabetes (blood glucose > 180 mg/dl) against 282 well-controlled diabetes (blood glucose between 70 and 180 mg/dl) found some very convincing differences in the investigatory findings. These hematological and biological findings explained why poor glycemic control cohorts had poor prognosis in comparison with well-controlled diabetes. The adjusted hazard ratio (HR) for all-cause mortality was 0.13 (95% CI, 0.04 - 0.44, $p < 0.001$) which suggests an 87% relative lesser mortality rate in patients with well-controlled diabetes.

So, learning from the available evidence, a good glycemic control in a PWD is of at most important but providing a health care facility in a pandemic situation is a big challenge [7,8]. In such a situation Tele-medicine can be of great use in providing health care support using telecommunications such as telephone or video conferencing etc. remotely. The government of India has made tele-consultation a legal process and healthcare professionals can provide online consultations to all OPD based follow up and new consultations with specified norms considering the pandemic situation [9]. The knowledge and attitude largely influences the behavior of a person in taking up the preventive measures against the infection and it is important to assess the knowledge level of PWD in a particular community and geographic location as they are one of the most vulnerable people [10].

It is important to study the various factors affecting a people with diabetes who are at higher risk and specific preventive measures should be worked out in the pandemic situation depending upon their knowledge and attitude.

Objective of the Study

The objective of the study is to understand the effect of COVID-19 pandemic in the daily routine of diabetic patients in the eastern part of Indian population and to find out recommendations and interventions to improve self-management and preventive measures in a pandemic situation.

Methods

The study was a cross- sectional, observational study using a self-reported questionnaire based survey in PWD. A survey was conducted using E-Mail, What's app and the people visiting diabetic OPDs which was recorded by the counselor and diabetes educator Miss

Anjali Vijaya after one to one survey. Rest data was collected by using online mode. Confidentiality of the data was maintained throughout the study period. If the patients were non familiar with English the same was described to him in regional language or in a language the patients are comfortable.

Recruitment and sampling: The sample subjects was selected from the database available from diabetic OPDs using random registration numbers who were at least on one antidiabetic medication. 300 subjects representing age groups above 17 and different geographical locations of eastern India with various ethnicities and socio-economic conditions were initially selected for the analysis who had completed all the criteria.

The sampling frame was randomly selected and had good representation of the general population which ensured good internal and external validity.

Inclusion and exclusion criteria: (i) Persons with a confirmed diagnosis of diabetes according to WHO criteria and are on at least one antidiabetic medication (Who. 2019). (ii) Both T1DM, T2DM and other types will be included in the study. (iii) Person who are willing to give their consent only considered to be a participant, (iv) COVID confirmed cases or hospitalised cases will be excluded from the study. (v) Age below 18 yrs and illiterate persons with diabetes will be excluded from the study. (vi) Persons with known psychiatric disorder will be excluded.

Method of intervention: An open-ended questionnaire containing 15 semi-structured questions was used which started with a consent along with demographic details on it. The survey was targeted to find answers to four major questions related to the effect of COVID-19 pandemic in the lives of a PWD:

1. Changes in lifestyle of a PWD due to COVID-19 pandemic.
2. Effect on glyceemic control.
3. Psychological status like attitude, anxiety, depression related to pandemic situations and the kind of support required for a PWD.
4. Making recommendations for the public and Govt. agencies, based on the finding of study regarding preventive and awareness level in the study population. The study was also trying to fix the responsibility of the above preventive measure at different levels and time required to achieve the target at each level.

Analysis of data: Categorical data were expressed in percentage and mean \pm SD; paired t-test was used to look for the statistical difference at baseline and $P < 0.05$ was considered to be statistically significant. Statistical analysis was done with the SPSS software package (version 17, SPSS Inc., Chicago, IL, USA).

Results

The mean age of the participant were 44.8 ± 22.1 years and 56% patients were male. There was almost same proportion of patients both from urban and rural area. For demographic analysis we had divided the participant in rural and urban population (Table 1).

Characteristics	Urban Population (N = 165)	Rural Population (N = 135)	P Value
Mean Age (years)	44.6 ± 23.1	44.9 ± 21.6	0.452
Male (N%)	91 (55%)	77 (57%)	0.821
Type 1 Diabetes (N%)	12(7%)	5 (4%)	0.691
Type 2 Diabetes (N%)	152 (92%)	130 (96%)	0.738
Others type of Diabetes (N%)	1 (0.3%)	0	-

Table 1: Demographic details of the participants.

Due to lockdown a majority of patients has changed their food habit (50.3%) but didn't change their medication (68.7%) (Table 2). Due to home isolation during lockdown phase new physical activity like Yoga or Exercise or walking were less in majority of people (64.4%) whereas in house recreation activity were increase in majority of patients (51.3%) (Table 2).

Parameters (Since the pandemic started)	Question	Percentage (N = 300)
Change in eating habit	Yes	160 (53.3%)
	No	140 (46.7%)
Initiation of new physical activity (Yoga/Exercise/walking)	Yes	107 (35.6%)
	No	193 (64.4%)
Initiation of recreation activity	Yes	154 (51.3%)
	No	146 (48.7%)
Frequency of testing blood sugar during the lockdown (SMBG)	Never	42 (14%)
	Rarely	161 (53.6%)
	Regularly	97 (32.4%)
Change in medication (last two month)	Yes	94 (31.3%)
	No	206 (68.7%)

Table 2: Details regarding diabetes control.

SMBG: Self-Monitoring Blood Glucose.

Patients who were done at least one blood test daily at home were considered as regular. On the whole, only 32.4% of the participants were checking their blood sugar levels regularly (Table 2) using Self-monitoring blood glucose (SMBG) during the lockdown.

Body weight and blood sugar level remains unchanged in-between pre and post lockdown (Table 3).

When we asked about incapacitated feeling of patients due to diabetes majority of patients denied (65.3%) (Table 4), but 57.7% patients admits about negative thoughts during lockdown period. 21.6% patients were no aware of tele-consultation with doctor if needed and still believed that conventional way to visit the clinic was the only way to consult a clinician.

Parameters (Since the pandemic started)	Question	Percentage (N = 300)
Change in body weight	Increased	37 (12.3%)
	Decreased	99 (33%)
	Same as before	164 (54.7%)
Change in blood sugar control	Increased	70 (23.3%)
	Decreased	86 (28.7%)
	Same as before	144 (48%)

Table 3: Body weight and blood sugar status.

Parameters (Since the pandemic started)	Question	Percentage (N = 300)
Feeling incapacitated due to diabetes	Yes	104 (34.7%)
	No	196 (65.3%)
Negative thoughts	Yes	127 (42.3%)
	No	173 (57.7%)
Awareness regarding tele-consultation with doctor if needed	Yes	235 (78.4%)
	No	65 (21.6%)

Table 4: Psychological aspects of COVID 19.

It was noticed that when it comes to the awareness regarding safety measures 97.3% diabetic patients were mask whenever they went out of their house and 93.3% frequently wash their hand with soap. 84.7% patients were not vaccinated with Influenza and pneumonia vaccine (Table 5).

Parameters (Since the pandemic started)	Question	Percentage (N = 300)
Habit of using face mask in public places	Yes	292 (97.3%)
	No	8 (2.7%)
Habit of frequent hand washing	Yes	280 (93.3%)
	No	10 (6.7%)
Vaccinated with Influenza and pneumonia vaccine	Yes	46 (15.3%)
	No	254 (84.7%)

Table 5: Awareness regarding safety measures.

The summary of the findings are depicted in figure 1.

Discussion

Though there is no evidence that people with diabetes have high susceptibility to the infection from the Corona virus, people with diabetes are believed to have higher risk of developing complications/severity and death rates due to the infection [11,12]. Diabetic distress

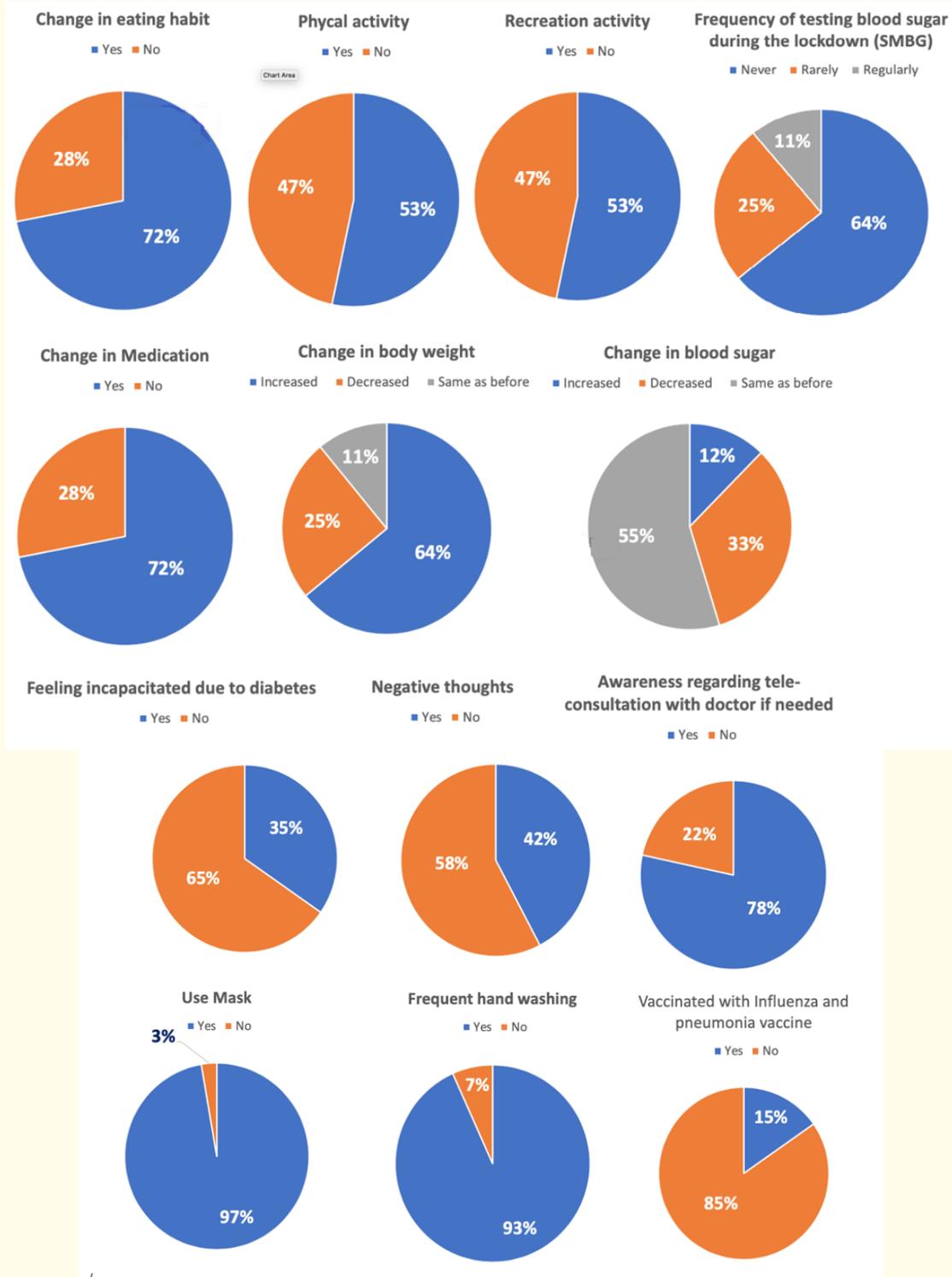


Figure 1: Graphical representation of results.

is generally occurred among the patients with diabetes as in majority of cases they receive less family support to deal with it [13]. This distress was higher during COVID -19 pandemic and has affected the psychological health in diabetic patients. Social distancing and mask as preventive measures have increased the stress and anxiety among the people [14]. In our study, 57.7% of patients complain of negative thoughts as they were frightened after watching the news regarding the pandemic in television or in social media or in newspaper. In similar way result of a study which was conducted in general population reveals that 80% of study population were preoccupied with the thoughts of COVID-19 and 12.5% reported sleep disturbances [15]. Things were worsened when 21.6% patients were not aware that they can seek help from the doctors if needed even through tele-consultation. Our study has pointed that mental health of diabetic patients has to be addressed and if needed they should take help from psychiatrist, as this anxiety and sleepless days can affect their blood sugar in great extent.

Results were surprising and against our hypothesis of deleterious effects of lockdown in diabetic population. In the search for silver linings from the COVID-19 pandemic, adults with type 1 and type 2 diabetes confined at home during quarantine were better able to keep their blood glucose levels in target range. When we had interaction with patients we have noticed that there is significant improvements of eating patterns (increased consumption of homemade food) and for working people significant decrease in workloads. Most of the patients had confusion during consultation that during lockdown they had to utilise the increased time to cope with the daily challenges of diabetes management which was difficult before lockdown periods. Subgroup analysis further reveals that in realty patients had a faster response to hypoglycemia and also increased time to better control glucose trends. Patients with diabetes may safely face the ongoing restrictions as revealed in our study result. It has been already proven that diabetes itself may worsen COVID-19 prognosis. Thus, on non-COVID-19 diabetic patients, the COVID-19 outbreak impact on glucose control needs a deeper understanding and our data represent a first step towards this direction. Patients must be educated more on this aspect to keep their diabetes under control and avoid any hypoglycaemia [16-18].

Conflicting information are emerging regarding COVID 19 both in public media and as well as various internet platforms [19]. This information overload coupled with mild to moderate depression among patients and people needs consultation with medical experts. Telemedicine is a professional and reliable information platform which can provide appropriate authentic and reliable information and consultation and considered as safe, trustworthy, cost saving and convenient [20]. We as author in this peculiar period suggest to create the awareness and maximum use of telemedicine to avoid close contact and decrease the latent COVID-19 infection chance.

Herd immunity in a community against COVID-19 can easily be achieved by a vaccine and this is a well-known fact. Provided there is high coverage of the vaccine we have seen this effect with implementation of the pneumococcal, measles, Hib and polio vaccines. Even though vaccines like pneumococcal vaccine and rotavirus vaccine can prevent severe forms of diseases pneumonia and diarrhea, 200,000 children under five continue to die due to severe forms of these diseases in India [21]. Even in our study only 155 patients were vaccinated with Influenza and pneumonia vaccine. Thus, there is need of more awareness regarding vaccination. We must ensure that all children are fully immunized against vaccine-preventable diseases, to protect our children, families, and communities.

Major drawback of the study was it was dependent on the literacy level of the population and it was not reflected the effect of the pandemic on illiterate PWD. The responses were subjective and many factors could not be ascertained. Large scale needed to establish the fact.

Conclusion

This is the first study to examine the short-term effects of lockdown on glycemic parameters in diabetes and reveals that several factors play a crucial role in maintaining sugar level. Psychological stress relief, spending quality time with family, improvement in food habits, taking medicine at prescribed times and faster response to hypoglycemia lead to better control of glucose level.

As a conclusion of the above observational study, we proposed the following recommendation for PWD:

1. Inculcate habit of daily self-monitoring of glucose level.
2. Use teleconsultation whenever needed specially for medicine dose and diet adjustment by the consulting doctor rather follow up visit of clinic in this pandemic situation.

3. Daily indoor exercise to maintain sugar level.
4. Adequate storage of diabetic medicine to avoid unavailability of medicine during lockdown phase.
5. We proposed to govt. regarding education level of PWD regarding mask, sanitization and vaccination.

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Contributors

SK conceived the study and edited the questionnaire and manuscript. SK, AG formulated the questionnaire and wrote the manuscript, AV collected responses, SK analysed and Shivam Kumar contributed to discussion.

Declaration of Competing Interest

The authors do not mention any conflict of interest regarding this article.

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