DIABETES CONTROL IN TIMES OF COVID-19 PANDEMIC: A CHALLENGE IN THE FACE OF CONFINEMENT MEASURES

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RESUMEN

At the end of 2019 a new disease is detected, named with COVID-19. Bupa Global Panama (2020) defines it as *"COVID-19 is the most recently discovered infectious disease caused by the coronavirus. Both were unknown before the outbreak in Wuhan, China, in December 2019,"* the consequences of which can become fatal. While it is true, the coronavirus family is numerous, the new disease is caused by a hitherto unknown strain of coronavirus, 2019-nCoV, which, in January 2020 was spreading to all continents, causing numerous infected people and causing many deaths, so on March 11, 2020. It is necessary to consider, that currently, Diabetes is a comorbidity closely associated with complications during the period of COVID-19 treatment; that, in turn, these complications are associated with sequelae and death of patients. This article makes an analysis of this problem and how the issue of diabetes control has been addressed in times of pandemic.

Keywords: COVID, Diabetes, comorbidity

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INTRODUCTION

The World Health Organization (WHO), stated *"Coronavirus is now officially a pandemic, the director general reminded again and again that this is a global problem and that all countries will have to do their part to combat the virus"* (Sevillano, 2020).

According to Perez et al. (2020) *"Faced with this global situation, the main task is preventive, the WHO has published measures to reduce the transmission of the virus",* which depend on the particular health situation of each country or government; such as total quarantine or confinement, closure of airports, ports, closure of public and private institutions that were not considered of primary need. However, public and private institutions authorized to work, such as, obviously, health institutions, were strengthened with personal protective equipment and trained in biosecurity measures.

This pandemic confinement, worldwide, resulted in people with chronic diseases being included within the population vulnerable to Covid-19, since Diabetes Mellitus is a metabolic disease that decreases the response of the immune system to infections and causes multiple complications as a result of high blood glucose levels, as indicated by Esparza et al. (2014) *"Since the last century it has been known that patients with Diabetes Mellitus are more susceptible to infectious diseases than subjects who do not suffer from it."*

As health restrictions intensify, including confinement, social distancing; these patients constitute a potential risk to complications inherent to Diabetes, such as complications due to Covid-19, since diabetes, requires a continuity of care that constantly encloses regular access to medications, laboratory tests, appointments with health staff, facilities for physical activity, and eating an adequate diet.

This care is required for both type 1 and type 2 diabetes mellitus, due to the increase of cases in the last decades of type 2 diabetes, which has been affecting the economically active population even before the pandemic. Therefore, the question arises, what measures can be practiced to maintain controlled glycemic levels in diabetic patients, with all the limitations produced during confinement?

It is collective knowledge that the lack or delay of monitoring in Diabetes, and/or failure in the pharmacotherapeutic treatment of patients, can have an irreversible outcome. Gordón (2020) states the following:

Jorge Luis Prosperi Ramirez, physician and, former WHO representative, in an opinion article published in La Estrella de Panama, entitled "NCD and covid-19: deadly duo", argues that diseases of the circulatory system, especially arterial hypertension, together with diabetes mellitus, obesity and smoking, are so far the main concomitant diseases and risk factors present in most of those who die from covid-19. We are not doing enough to detect risk factors, prevent chronic diseases and promote healthy lifestyles," the physician pointed out in the opinion article.

It is necessary to consider that currently, Diabetes is a comorbidity closely associated with complications during the COVID-19 treatment period; that, in turn, these complications are associated with sequelae and death of patients.

Diabetes Mellitus, is associated with an increased risk of presenting some common infections, including lower pulmonary infections. In addition, they are usually more severe and the risk of death is higher. Multiple mechanisms explain this increased susceptibility. The

Chronic hyperglycemia alters humoral and cellular immunity. The microangiopathic changes of Diabetes Mellitus are accompanied by alterations in pulmonary gaseous diffusion, as well as abnormal function of the peripheral airways, which may predispose to the development of respiratory failure.

The most studied respiratory viral infection in Diabetes Mellitus is influenza. It is associated with an increased likelihood of having episodes of severe seasonal infections. In vitro, glucose elevation favors virus infectivity and its ability to replicate in respiratory tract epithelial cells. Additionally, hyperglycemia decreases the antiviral immune response and increases the replicative capacity of bacteria in the respiratory tract. In fact, the majority of people who died during the H1N1 influenza pandemic were from bacterial pneumonias.

In the case of Diabetes Mellitus and Coronavirus, what is known so far is that, although Diabetes Mellitus predisposes to develop respiratory infections, there seems to be a special link between it and the diseases caused by coronaviruses, since in the zoonotic outbreaks caused by SARS and MERS, a high prevalence of Diabetes Mellitus was identified among those infected, as well as a greater possibility that these people would develop more severe forms of the disease. A high prevalence of diabetes mellitus has also been reported in persons with human coronavirus infection.

In a cohort of SARS patients, people with Diabetes Mellitus or hyperglycemia were three times more likely to die than those without these conditions.

A risk factor is a characteristic that predisposes to the occurrence of a condition. So, are people who have diabetes more likely to have COVID-19? Unfortunately, it is very early, very little time has passed since the onset of the disease and we do not have longitudinal studies that allow us to know the incidence of COVID-19 in people with diabetes.

All the information we have comes from cross-sectional or case-control studies and most of them in hospitalized persons. This only allows us to know the prevalence of diabetes mellitus in people with COVID-19.

On the other hand, a prognostic factor is a characteristic that predicts the evolution of a disease after its onset. So, do people who have diabetes mellitus have a worse prognosis for COVID-19?

Previous studies have evaluated factors both clinical and laboratory tests that are associated with a chance of having a severe form of COVID-19.

Outpatient management of patients with diabetes in times of COVID-19, Ramirez, indicates that the outpatient management of patients with chronic noncommunicable diseases offers interesting challenges in the context of the Covid-19 pandemic, which require an individual analysis of diabetes. He mentions that the implementation of specific models, recommendations for lifestyle changes, orientation in comorbidities, identification of additional risk factors, and even suggestions in each of the pharmacological groups should be carried out. It is appropriate to highlight the benefit of consolidating ambulatory medical controls through the use of virtual health models. In parallel, when necessary, face-to-face consultation and/or confinement situations are progressively released, the recommendations of the World Health Organization (WHO) should be complied with.

The American Diabetes Association recommends a blood glucose target in non-critically ill inpatients between 140 and 180mg/dl. In patients admitted for COVID-19, it has been described that hyperglycemia (glycemia >180 mg/dL), especially when present during the first days of admission, is associated with a worse prognosis in subjects with diabetes mellitus. On the other hand, it has also been reported that hypoglycemia (glycemia <70 mg/dl), a frequent side effect in subjects treated with insulin, is associated with increased

mortality in SARS-CoV2-infected subjects with diabetes mellitus.

In relation to glycemic control prior to admission, several retrospective studies have described that this is related both to the risk of contracting SARS-CoV-2 infection and to its prognosis (need for hospital admission, mortality).

The second aspect highlighted by the COVID-19 pandemic is the importance of telemedicine and telemonitoring as useful tools for optimizing glycemic control in subjects with diabetes mellitus. Telemedicine makes it possible to reduce the number of face-to-face consultations and is very useful for the control of patients who cannot travel, as is the case with the situation of home confinement due to COVID-19. In this regard, it has been described that the use of continuous glucose monitoring devices (CGM) in subjects with type 1 diabetes mellitus confined to their homes during the pandemic period improves glycemic control without increasing the risk of hypoglycemia. In subjects with type 2 diabetes mellitus who have not used CGM systems, the results in relation to glycemic control during confinement are heterogeneous. Thus, in some studies, an increase in glycosylated hemoglobin has been described.

In subjects with type 2 Diabetes Mellitus, medical care during the COVID pandemic19 by teleconsultation (telephone or telematic visit) has increased exponentially in relation to the face-to-face visit.

The use of CGM devices could be a good option for optimizing glycemic control in subjects with diabetes mellitus admitted to hospital.

Therefore, it is significant to analyze the consequences of the Covid-19 pandemic on the control of patients with Diabetes, and thus focus on the search for alternatives for their maximum welfare despite the various intrinsic and extrinsic factors emerging.

Rojas (2020) points out the following:

The Pan American Health Organization urged countries to ensure that diabetes care is fully available to patients during the pandemic. This may mean offering care outside traditional settings or disseminating information and bringing care closer to the population through community health workers. Insulin must also remain accessible and affordable to those who need it.

These statements call the attention of governments to ensure adequate and specialized care, a challenge that is becoming an increasing priority in the field of public health and from this effort favorable results are expected in the Covid-19 statistics.

In view of the above, a study that shows the behavior of glycemic levels in diabetic patients in pre-confinement, confinement and post-confinement periods is considered important, since it is used as a preventive measure worldwide.

Technology is involved in several aspects, because in the first instance, the equipment used to monitor the patients' glycemic levels, continuing with the forms of insulin administration and ending with an evaluation by health staff via remote. Computer equipment, internet, software installation are also required.

From the economic point of view, and based on all the technological requirements, two points of view are also evaluated. The first one, which involves a private level of care, where both the patient, as well as the evaluating party and the health staff in charge of the patients. In the public sector, the costs would be assumed by the health authorities, through the governments of each country.

In the long run, the long-term health implications of COVID-19 in people with diabetes are still unknown; the available data indicate that even a short-term difficulty in care can be catastrophic, mainly in older people, in disadvantaged areas and with less capacity for self-monitoring and treatment surveillance.

At the social level, also, two perspectives can be observed, the first can be interpreted as a decrease in person-to-person interaction; however, and given the confinement measures, it can be increased with the formation of groups that increase interactions between patients among themselves, and others that include the health staff that attends them.

The objective of this study is to demonstrate strategies aimed at achieving glycemic control of diabetic patients used during periods of confinement due to the COVID-19 pandemic.

MATERIALS AND METHODS

The qualitative research method was used for this article, since information was collected from lived experiences, interviews, and a bibliographic review was carried out

where available primary sources and previous studies were consulted, as detailed below, in order to obtain descriptive data.

Design: the population consisted of all adults with a diagnosis of Diabetes Mellitus type I and type II who had previously participated in statistical analyses; therefore, the design is non-randomized. It is a descriptive cross-sectional study since it analyzes a series of events at a specific time worldwide.

Search criteria: the sources of information were extracted from a digital literature review, articles, newspapers, and essays consulted to collect the background of the last five years, the period between 2016 and 2021, which are the most timely and relevant in the area, and then perform the corresponding data analysis, and synthesize the results and conclusions.

At the digital level, Google academic was used as the search engine.

The search strategies used included the terms *"diabetes in times of COVID", "confinement measures", "Appropriate control of diabetes", "Ambulatory management of chronic diseases in times of COVID - 19",* among others.

Likewise, we consulted magazines and official web pages of the WHO, PAHO and Panamanian governmental regulations issued by the current government, such as decrees, resolutions and communiqués.

Inclusion and exclusion criteria: A verification of the quality of the source was carried out through a search of the history of the journal, university and authors to guarantee the quality and reliability of the articles.

Inclusion criteria	Exclusion criteria
➢ Research papers and reviews.	➢ Non-research papers and reviews.
➢ Official websites with global and national information concerning the subject.	➢ Documents that do not specifically address glycemic control and diabetes.
➢ For the topic related to Covid-19, papers published from 2020 to date were selected.	➢ Documents on glycemic control and diabetics dated prior to 2006.
➢ For the topic of diabetes, documents from 2016 to date were selected.	➢ Documents that did not treat adult diabetic patients.
➢ Documents on adult diabetic patients.	

Validity and reliability: A verification of the quality of the source was carried out by searching the history of the journal, university, and authors to ensure the quality and reliability of the articles.

Statistical aspects

Being a combined study, two statistical forms are presented viz:

- In the study on baseline characteristics and glycemic control parameters, SPSS® v.25.0 software was used. Comparison between the 3 periods (pre-, during, and post), was performed using ANOVA or Friedman and Wilcoxon tests, depending on whether or not the normality criteria were met. Statistical analysis was applied to evaluate differences between the 3 groups, statistical significance if $p<0.05$. In the case of a difference, subanalysis was performed to look for differences between the groups, statistical significance if $p<0.017$. In the subgroup analysis (according to sex, age and GMI), it was used, for pre-confinement and confinement comparison, by percentage of change and applying Student's t test..
- In the case that, evaluates Telemedicine as an alternative, the statistical analysis of the study is presented as mean +- standard deviation (SD) if they have a normal distribution or as median and interquartile range (IQR) if they do not have a normal distribution. Categorical variables were presented as percentages. Comparison of variables recorded before and after the Telemedicine visit was performed using Student's paired-tailed t-test. Statistical significance was accepted ap.<0.05.

Ethical aspects

The identity of the persons taken into account in the study was respected.

Results

Given the current situation, diabetic patients have been affected with great changes in their care, and in the last instance it would seem that stress and confinement obstruct any therapeutic strategy, for which reason the associations that manage this type of patients have published a series of pertinent measures for their ambulatory management that serve as a guide for self-care focused on the scourge that has gone around the world, Covid-19.

Table No. 1 **Measures for the management of outpatients with Diabetes Mellitus and Covid-19**	
Prevention of infection	Intensify prevention measures (social distancing, masks, hand hygiene).
Healthy lifestyle	Healthy eating, physical exercise, no smoking
General measures to improve diabetes control	Weight control, adequate hydration, more frequent blood glucose monitoring, inventory of monitoring equipment and drugs, family and psycho-emotional support.
Treatment of hyperglycemia	Improve HbA1c, blood glucose, re-evaluate pharmacological treatment with your doctor, avoid hypoglycemia.
Treatment of comorbidities	Control of blood pressure, cholesterol and triglycerides. Care of the heart, kidney function, feet, eyes
Health support	Timely and permanent contact with their physicians, implement telemedicine or virtual medicine, consult serious and credible sources (WHO, PAHO, ADA, EASD, ALAD, SVEM, etc.). Hospitals only if necessary

Sources: ADA: American Diabetes Association; ALAD: Latin American Diabetes Association; COVID-19: coronavirus disease 2019; EASD: European Association for the Study of Diabetes; HbA1c: glycosylated hemoglobin A1c; WHO: World Health Organization; PAHO: Pan American Health Organization; SVEM: Venezuelan Society of Endocrinology and Metabolism.

In addition, several studies have been cited, including one published by the Endocrinology and Nutrition Service of the Hospital Universitario Central de Asturias, Oviedo, Asturias, Spain, which aimed to assess how confinement affected the glycemic profile of people with DM1.

For this purpose, a random selection was made of 100 FreeStyle® users included in the LibreView® platform of the Endocrinology and Nutrition Service of the Hospital Universitario Central de Asturias with data updated at the time of sample selection. Data were collected for 3 periods of 14 days each: pre-confinement (Pre: February 1-March 15), confinement (Conf: March 15-May 4) and post-confinement (Post: May 4-May 31).

Thirty-two patients were excluded because in some of the periods it was not possible to obtain data with a sensor use higher than 70%.

For each patient, age, sex and glycemic control assessment parameters recommended by ATTD (time in range [TIR]: 70-180mg/dl; time in hypoglycemia: <70mg/dl; time in hyperglycemia: >180mg/dl) were recorded.

SPSS® v.25.0 software was used for statistical analysis. Comparison between the 3 periods was performed using ANOVA or Friedman and Wilcoxon tests, depending on whether or not the normality criteria were met. Statistical analysis was applied to evaluate differences between the 3 groups, statistical significance if $p<0.05$.

In case of differences, subanalysis was performed to look for differences between groups, statistical significance if $p<0.017$. In the subgroup analysis (according to sex, age and GMI).

Table No. 2

Results of the study on baseline characteristics and parameters of glycemic control.

No. of patients	**68**					
Female/Male	**36/32**					
Age	**46,87 (12,46)**					
	Previous	During	Post	p value	p-value Pre vs. Conf.	p-value Conf. vs. Post
GMI (%)	7,3 (1,1)	7,0 (0,77)	7,05 (0,7)	<0,001	0,001	0,351
Variation coefficient (%)	36,17 (10,8)	36,69 (11,5)	36,89 (10,07)	0,61		
Average blood glucose (md /dl)	166,58 (4,03)	160,82 (3,30)	158,0 (2,87)	0,065		
T in range (%)	55,17 (2,28)	61,13 (1,96)	62,34 (1,82)	<0,001	0,003	0,88
T over target (%)	39,42 (2,23)	34,34 (2,08)	32,63 (1,89)	<0,001	0,006	0,59
T under target (%)	3,0 (6)	4,0 (6)	4,0 (7)	0,522		
Data captured (%)	93,37 (11)	94,72 (9)	92,68 (8)	<0,001	0,4	<0,001
Readings/day (N°)	8,0 (5)	9,0 (9)	9,0 (9)	0,572		

Results of the 3 periods expressed as mean and standard deviation. Result of the statistical analysis of comparison between the 3 periods (significant if $p<0.05$).

In case of significance, to the right, comparison between pre-confinement and confinement periods and between confinement and post-confinement (significant if $p<0.017$).

According to this reference table, the results are opposite to studies that show worsening of control in patients with Diabetes Mellitus during confinement since an improvement in glycemic control is observed. Another study found the intervention of Telemedicine as a strategy to be considered in diabetic patients in times of confinement.

The same, is a single-center observational retrospective study conducted at the Metabolic Diseases Unit of the University of Padova, between March 9 and May 11, 2020, when regular visits were replaced by a structured telephone colloquium (Telemedicine) with data on continuous or flash glucose monitoring systems shared through different cloud-based systems during lock-in by patients with type 1 diabetes, to which data obtained 4 weeks before and 4 weeks after the structured telephone visit were compared.

Variables considered were mean glucose, time on target (70-180mg/dl), hypoglycemia (<70mg/dl) and hyperglycemia (> 180mg/dl), coefficient of variation and duration of sensor use. The enrolled patients used continuous glucose monitoring (CGM) or flash glucose monitoring (CGM) equipment, whose data can be visualized using specific web platforms. Likewise, during Telemedicine, the physician evaluated the glucose data accessible through the platforms and recorded all blood and instrumental tests sent by e-mail.

Table No. 3. Baseline characteristics of patients

Parameter	Total	MDI	CSII
Patients, n (%)	71 (100)	39 (54.9)	32 (45.10)
Men, n (%)	32 (45.10)	21 (53.80)	11 (34.40)
Average age (years) (ME)	41.90 (14.30)	36.6 (13.9)	48.2 (12.30)
Time with diabetes (years), mean (SD)	25.90 (13.80)	20.7 (13.8)	31.9 (11.30)
BMI (Kg/m2), mean (SD)	23.70 (3.70)	22.9 (3.50)	24.7 (3.60)
HbA1c (%) during the last year- average	7.5 (0.90)	7.5 (1.0)	7.4 (0.60)
HbA1c (mmol/mol), during the last year, mean (SD)	58.30 (9.30)	59.1(11.10)	57.7(6.7)
FGM, n (%)	52 (73.20)	35 (89.7)	17 (53.1)
CGM, n (%)	19 (26.8)	4 (10.3)	15 (46.9)

BMI: body mass index. MDI: multiple daily injection. CSII: continuous subcutaneous insulin infusion. FGM: flash glucose monitoring. CGM: continuous glucose monitoring.

Table No. 4. Glycemic control before and after the telemedicine visit

Parameter	4 weeks before TM	4 weeks after TM	pg.
Mean glucose (mg/ dl), mean (SD)	161.1 (23.1)	156.3 (21.5)	0.001
GMI (%), mean (SD)	7.16 (0.56)	7.05 (0.53)	0.002
CV (%), mean (SD)	33.9 (4.8)	33.9 (5.5)	0.9
Time on target (%) mean (SD)	63.6 (15.3)	66.3 (15.1)	0.0009
Time in hypoglycemia (%), mean (SD)	3.0 (2.7)	3.2 (3.4)	0.6
Time in hyperglycemia (%), mean (SD)	33.4 (15.7)	30.5 (15.3)	0.002
Sensor usage (% per period), mean (SD)	92.6 (14.3)	92.3 (15.1)	0.9

GMI: Glucose Management Indicator, CV: coefficient of variation

Table No. 5. Glycemic control before and after the telemedicine (TM) visit in MDI and CSII patients.

Parameter	4 weeks before TM	4 weeks after TM	pg.
Mean glucose (mg/dl), mean (SD)			
MDI	163.7 (28.4)	159.3 (25.7)	0.05
CSII	157.9 (14.0)	152.6 (14.4)	0.003
Coefficient of Variation (%), mean (SD)			
MDI	33.2 (5.5)	32.9 (5.0)	0.6
CSII	35.0 (4.1)	35.2 (6.1)	0.7
Time on target (%) mean (SD)			
MDI	61.5 (18.1)	64.7 (18.2)	0.008
CSII	66.1 (10.7)	68.4 (10.3)	0.05
Time in hypoglycemia (%), mean (SD)			
MDI	3.0 (2.6)	2.8 (2.6)	0.6
CSII	3.0 (2.9)	(3.7 (4.2)	0.1
Time in hyperglycemia (%), mean (SD)			
MDI	35.5 (18.9)	32.6 (18.69	0.03
CSII	30.8 (10.2)	27.9 (9.8)	0.01
Sensor usage (% per period), mean (SD)			
MDI	90.4 (16.7)	90.4 (18.3)	0.9
CSII	95.2 (10.3)	94.6 (9.7)	0.8

MDI: Multiple daily injection. CSII: continuous subcutaneous insulin infusion.

Discussion

The findings found in the study of the Hospital Universitario Central de Asturias in Spain on glycemic control in times of confinement indicate that rest from work activities has allowed diabetic patients to invest more time in their self-care, thus in a greater use of corrective doses of insulin, with greater stability in meal times, all this mainly as a result of the freedom of time, and despite being with less access to the health system. Comparing these data with the control measures provided in the scientific article carried out by the associations related to Diabetes Mellitus, such as lifestyle, glycemic control, self-knowledge, confirm the importance of these measures in the control of this disease in times of confinement. It is limiting for the researchers of this study, and as a subject for future research to know if this improvement persists in time beyond the post-confinement or if the patients return to their previous glycemic control values with the restart of their usual activity, it can also be considered to use this research in a rural population with extreme poverty, since the daily activities vary in these groups, and if so merits to continue applying the same methodology.

In the study conducted at the Metabolic Diseases Unit of the University of Padua, data indicate that a structured telemedicine visit, including discussion of glycemic data and provision of written suggestions, had a positive impact on glycemic control of type 1 diabetes, and also show that during the blockade glycemic control improved in patients who interrupted work, This is in agreement with the study presented by the Hospital Universitario Central de Asturias where the improvement is related to time freedom and self-care, so that these scientific data are important in view of the Covid-19 emergency by presenting many alternatives for a remote approach to this disease, and contribute with the blocking measures to reduce the mobilization of patients unnecessarily, and to reduce the loss of working days. Likewise, it agrees with the results obtained by Paz-Ibarra, José; who in his study, “Management of diabetes mellitus in times of COVID-19”, mentions that telemedicine, whether interactive, additional or as a total or partial alternative to conventional care showed a reduction in glycosylated hemoglobin by -0.31%, compared to the group that was given only conventional care.

Obviously there are limitations that can be contemplated in the development of future research, since only patients using continuous blood glucose monitoring devices were evaluated.

CONCLUSIONS

Diabetes mellitus is a disease considered a risk factor for developing COVID-19 with serious complications if not treated in time.

Since the beginning of this pandemic, strict measures have been applied to achieve a decrease in the number of cases and thus favor the common good where the patient with chronic diseases has had many limitations in their care.

This descriptive, qualitative research article has collected data through reliable and significant sources that have yielded results that support preventive measures of glycemic control and a more serene lifestyle.

Telemedicine is an effective strategy, which was implemented during the time of confinement; however, it could be an alternative to the regular visit, since, with strict monitoring, appropriate glycemic levels can be obtained. Likewise, it was demonstrated that the efficacy of Telemedicine is not related to the type of insulin therapy, since the improvement was similar in subjects with IDDM and CSII.

In this way, evidence has been provided of studies that serve as worldwide strategies for the control of diabetic patients during COVID-19 confinement, by providing information on studies already carried out in this regard, with good results.

In the same way that international health organizations implement preventive measures against COVID-19, such as confinement, they should provide strategies in all countries under their responsibility in order not to worsen the health condition of patients with chronic non-communicable diseases, such as diabetes. It is important to train health staff in the diagnosis and management of diabetes as well as in the implementation of technologies as a point of reference to the community, the promotion of community actions based on improving access to health and integrality.

The studies were carried out in diabetic patients; however, their benefit can be extended to other chronic diseases, such as hypertension, cardiac conditions, since they are diseases that require frequent individualized monitoring, depending on the particular case.

Several lines of research are proposed for future contributions to the subject, such as the use of a methodology that includes a more economically vulnerable population.

Undoubtedly, it is evident that any person with a chronic pathology exposed to infectious agents is vulnerable, and the progress of such disease can lead to its severity. Moreover, the severity of the disease is rarely reversed, with the consequent mortality. But the different studies focused on these issues have allowed us to have more and better tools, that is to say, more hope and quality of life.

International health organizations must respond to the challenge imposed by COVID-19, since their commitment is to guarantee the health of humanity, for which serious adjustments must be made to methods and forms using technological tools. Hard work is needed and each government must use its good offices to achieve these objectives. It is worth noting that other countries have begun to act by implementing new ideas and have not only acted but have developed a very particular guide for action against such vulnerability suffered by people with diabetes, taking into consideration the level of control and comorbidities for each individual involved, in other words, more can be done if people unite based on the experience accumulated in other periods of history with such a pandemic.

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