The imperious need for telemedicine for the care of diabetes during the COVID-19 pandemic. A comprehensive approach study

Rubén Silva-Tinoco* and Viridiana de la Torre-Saldaña

Servicios de Salud Pública, Clínica Especializada en el Manejo de la Diabetes del Gobierno de la Ciudad de México, Mexico City, Mexico

Abstract

Introduction: Patients with diabetes experience difficulties to maintain glycemic control during the confinement due to the COVID-19 pandemic, with the risk of developing diabetes chronic complications and severe COVID-19. **Objective:** The purpose of this study was to evaluate the conversion of an outpatient diabetes primary care center from a face-to-face care modality to a telemedicine care service by telephone. **Methods:** Medical consultations were made by telephone during the initial phase of confinement (April to June 2020), to then continue the follow-up of patients admitted to a multicomponent diabetes care program. **Results:** A total of 1,118 consultations were made by telephone and follow-up was subsequently continued in 192 patients with type 2 diabetes. Different professionals from different health areas participated, including medical care, diabetes education, nutrition, psychology and podiatry. **Conclusions:** Multicomponent diabetes care was successfully transformed from a face-to-face care modality to a telemedicine service. Many primary care patients may be candidates for telemedicine. A re-design of the care model that incorporates telemedicine should be considered to mitigate chronic diseases burden of morbidity and mortality imposed by COVID-19 pandemic, but also for the post-COVID-19 era.

KEY WORDS: Diabetes. Telemedicine. COVID-19. Diabetes care.

La imperiosa necesidad de telemedicina en la atención de diabetes durante la pandemia de COVID-19. Un estudio de abordaje integral

Resumen

Introducción: Los pacientes con diabetes experimentan dificultades para mantener el control glucémico durante el confinamiento por la pandemia de COVID-19, con el riesgo de presentar complicaciones crónicas de la diabetes y COVID-19 grave. **Objetivo:** El propósito de este estudio fue evaluar la conversión de un centro de atención primaria presencial de diabetes a un servicio de telemedicina por llamada telefónica. **Métodos:** Se realizaron consultas médicas por llamada telefónica durante la etapa inicial del confinamiento (abril a junio de 2020), para continuar el seguimiento de pacientes ingresados a un programa de atención multicomponente en diabetes. **Resultados:** Se realizaron 1118 consultas por llamada telefónica para continuar el seguimiento de 192 pacientes con diabetes tipo 2. Participaron diferentes profesionales de distintas áreas de la salud: atención médica, educación en diabetes, nutrición, psicología y podología. **Conclusiones:** La atención multicomponente en diabetes se transformó con éxito de un esquema de atención presencial a un servicio de telemedicina. Numerosos pacientes de atención primaria pueden ser candidatos a telemedicina. Se debe considerar un rediseño del modelo de atención que incorpore la telemedicina para mitigar la carga de morbilidad en enfermedades crónicas impuesta por la pandemia de COVID-19, pero también para la era pos-COVID-19.

PALABRAS CLAVE: Diabetes. Telemedicina. COVID-19. Cuidado en diabetes.

Correspondence:

*Rubén Silva-Tinoco

E-mail: rosilva@sersalud.cdmx.gob.mx

Date of reception: 16-09-2020

Date of acceptance: 29-09-2020

DOI: 10.24875/GMM.M21000563

Gac Med Mex. 2021;157:309-312

Contents available at PubMed

www.gacetamedicademexico.com

0016-3813/© 2020 Academia Nacional de Medicina de México, A.C.. Published by Permanyer. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has disproportionately affected patients with chronic diseases.¹ Patients with type 2 diabetes are at higher risk of complications and death when contracting COVID-19.² Confinement for this disease hampered the provision of general and specialized medical services, because patients were urged to stay at home, whereby they were left without regular medical follow-up. Confined to their homes, patients can experience unfavorable outcomes if they have difficulties for following self-care behaviors and adhering to the treatment of their ailments.^{3,4}

Telemedicine includes the integration of communication technologies to improve health care services for people with difficulties to directly contact health professionals, who in turn have been forced to find innovative ways to treat their patients amidst the COVID-19 pandemic. During this pandemic, incorporation of telemedicine for the care of non-communicable diseases has been globally promoted.^{5,6}

Multicomponent integrated care models for diabetes include strategies to improve the quality of care.⁷ Previous research has shown significant improvements in achieving diabetes care goals with these strategies,^{7,8} but evidence on the telemedicine modality is limited.

As a result of COVID-19 pandemic indefinite temporality, which will require continuing with measures to reduce the risk of transmission and spread of the virus in the population, identification of strategies for the provision of health services that contribute to this may mitigate the impact of the COVID-19 pandemic. The purpose of this study is to evaluate the conversion of conventional multicomponent primary care services to the telemedicine modality during the initial stage of confinement due to COVID-19.

Methods

The Diabetes Management-Specialized Clinic of the Government of Mexico City is a primary care center located at the Iztapalapa District. Patients participate in the DIABEMPIC program (Diabetes EMPowerment and Improvement of Care, registered at ClinicalTrials.gov with identifier NCT04245267), an initiative designed to improve clinical outcomes through a multi-component intervention that includes interdisciplinary care and self-care education.^{8,9} The patients, who were previously referred from primary care health

centers, are beneficiaries of the Health for Wellbeing Institute (public system), and a high proportion belong to economically disadvantaged social sectors.¹⁰

In Mexico, on April 3, 2020, a health emergency was declared due to the COVID-19 pandemic, and subjects older than 60 years of age and/or with non-communicable diseases were advised to observe confinement in order to reduce the risk of transmission in this vulnerable group. This drove to a significant reduction in the provision of services for the care of chronic diseases due to a decrease in the attendance of patients to medical appointments and due to the allocation of resources for the care of the pandemic. Therefore, the need to convert outpatient care to the telemedicine modality arose at the Diabetes Management-Specialized Clinic.

A cross-sectional, prospective study of patients served within the first 10 weeks after the telemedicine service started operating (April 20 to June 30, 2020) was carried out. Health professionals without confinement indication carried out a strategy of patient consultation by phone, the content of which was focused on diabetes care. All scheduled patients were included in the analysis; there were no exclusion criteria. Patients granted verbal consent for being treated with telemedicine. Efforts were made in order for the addressed contents to be related to barriers or problems documented in previous appointments, and thus provide individualized follow-up through simple messages; not including new contents was sought. Information was also provided about the risks of COVID-19 transmission and issues regarding the epidemic. The interdisciplinary case management team strategy involved an endocrinologist, a nutritionist, a diabetes educator nurse, a psychologist, and a podiatrist. Efforts were made in order for no important changes to be made in pharmacological treatment, and face-to-face appointments were suggested to those who required them. In addition, the pharmacy of the clinic was flexible with the supply of medicines, and family members were able to collect them. Data were obtained from daily appointment records. The study was approved by the medical director's office of the institution.

Results

During the 10 weeks of study, 1,181 telephone consultations were carried out with 192 patients, with an average of 6.1 consultations per patient, distributed between the five health disciplines that were involved. Most patients were females (66.1 %), 50.9 % had hypertension, and 45.8 %, obesity. Mean age was

54.1 ± 10.8 years, and mean diabetes evolution time, 11.3 ± 7.7 years.

Table 1 shows the study population clinical characteristics, the telephonic services provided and the technological resources patients had access to: 98.4 % had access to a telephone, 73.4 % to a computer or smartphone with video chat function, and 69.7 %, to internet. At the clinic's pharmacy, 263 drug prescriptions were dispensed. A high proportion of patients considered this telemedicine strategy useful for the management of their disease (95 %).

Discussion

This study explored the transformation of an interdisciplinary face-to-face diabetes care model into a telemedicine model via telephone, within the primary care setting. The conversion was successful and included a strategy of interdisciplinary follow-up consultations and supply of medicines, with the purpose to give continuity to the care of patients with diabetes at an early stage of the confinement forced by COVID-19 in Mexico. It should be noted that a significant proportion of patients reported not having access to the internet. The results allow proposing strategies for the conversion of conventional care services for non-communicable diseases into telemedicine services; furthermore, they suggest the opportunity to continue with hybrid care approaches (face-to-face and telemedicine) according to the needs of patients and evolution of the pandemic.

To the best of our knowledge, this is the first study on the conversion of multidisciplinary diabetes care to telemedicine care as a result of the COVID-19 pandemic.

Alromaihi et al. reported on successful implementation of telemedicine with exchange of text messages and video calls;¹¹ in our study, care by an interdisciplinary team and medication supply were additionally incorporated.

In a previous report in Mexico, patients decreased self-care activities due to difficulties in executing them during confinement for the COVID-19 pandemic.⁴ There is evidence that patients with diabetes experience COVID-19 greater severity, which may be accentuated in those with poor glycemic control.^{12,13} Therefore, it is necessary for diabetes care to be optimized, both due to the impact it may have on the COVID-19 pandemic and the implication of the public health burden that diabetes can have in the post-COVID-19 era.

Some considerations should be analyzed prior to implementing telemedicine care strategies, such as

Table 1. Study participants clinical characteristics and types of telephone consultation in the telemedicine strategy for diabetes care (n = 192)

Characteristics	Mean ± SD	
Age, years	54.1 ± 10.8	
Diabetes duration (years)	11.3 ± 7.7	
Age at diagnosis (years)	43.4 ± 10.2	
	n	%
Female gender	127	66.1
Primary or lower education	88	45.8
Hypertension	106	50.9
Obesity	88	45.8
Insulin treatment	61.5	128
Access to telephone	189	98.4
Access to internet	134	69.7
Access to computer/smartphone with video chat	141	73.4
Perception of telemedicine care usefulness for the management of diseases	183	95.3
Telemedicine consultations via telephone	1181	100
Medical consultation	465	39.3
Psychology	248	20.9
Diabetes education	232	19.6
Podiatry	200	16.9
Nutrition	36	3.2

the presence of some determinants of health and access to technological resources, since the population with social disadvantages might face barriers to integrating into this care modality, as observed in this study. Therefore, telemedicine interventions should be adapted to these specific barriers and difficulties imposed by COVID-19 confinement on patients with type 2 diabetes mellitus. Our findings support an encouraging proposal for addressing these barriers. Telemedicine is likely to become an integral part of health care provision, especially in chronic diseases, but face-to-face visits will continue and the development of hybrid models emerges as a robust response, even in the post-COVID-19 era. However, a regulatory framework should soon be proposed, as well as the establishment of protocols in order for quality of care and patient safety to be ensured.

Conclusions

Multicomponent face-to-face diabetes care services were successfully converted to the telemedicine

modality. At primary care, many patients with type 2 diabetes mellitus may be candidates to join this and other types of telemedicine strategies in health contingency scenarios. A redesign of the model of care should be considered with incorporation of technologies and telemedicine in order to mitigate morbidity and mortality of chronic diseases during the COVID-19 pandemic, as well as in the post-COVID-19 era.

Conflict of interests

The authors declare that they have no conflicts of interest.

Funding

There was no public or private funding for this research.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this research.

Confidentiality of data. The authors declare that they followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

References

1. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA*. 2020;323(13):1239-1242.
2. Hernández-Galdamez DR, González-Block MÁ, Romo-Dueñas DK, Lima-Morales R, Hernández-Vicente IA, Lumbreras-Guzmán M, et al. Increased risk of hospitalization and death in patients with COVID-19 and pre-existing noncommunicable diseases and modifiable risk factors in Mexico. *Arch Med Res*. 2020;51:683-689.
3. Banerjee M, Chakraborty S, Pal R. Diabetes self-management amid COVID-19 pandemic. *Diabetes Metab Syndr*. 2020;14:351-354.
4. Silva-Tinoco R, González-Cantú A, de la Torre-Saldaña V, Guzmán-Olvera E, Cuatecontzi-Xochitiotzi T, Martínez-Castillo L, et al. Effect in self-care behavior and difficulties in coping with diabetes during the COVID-19 pandemic. *Rev Mex Endocrinol Metab Nutr*. 2020;8:13-19.
5. Faradji-Hazán RN, Garnica-Cuellar JC, Hernández-Arizepe LM, León-Suárez A, Mancillas-Adame L, Márquez-Rodríguez E, et al. Recomendaciones de la Sociedad Mexicana de Endocrinología SMNE ante el COVID-19 para el tratamiento de personas que viven con DM2. *Rev Mex Endocrinol Metab Nutr*. 2020;7:4395.
6. Hartmann-Boyce J, Morris E, Goyder C, Kinton J, Perring J, Nunan D, et al. Diabetes and COVID-19: risks, management, and learnings from other national disasters. *Diabetes Care*. 2020;43:1695-1703.
7. Lim LL, Lau ESH, Kong APS, Davies MJ, Levitt NS, Eliasson B, et al. Aspects of multicomponent integrated care promote sustained improvement in surrogate clinical outcomes: a systematic review and meta-analysis. *Diabetes Care*. 2018;41(6):1312-20.
8. Silva-Tinoco R, Cuatecontzi-Xochitiotzi T, de la Torre-Saldaña V, León-García E, Serna-Alvarado J, Guzmán-Olvera E, et al. Role of social and other determinants of health in the effect of a multicomponent integrated care strategy on type 2 diabetes mellitus. *Int J Equity Health*. 2020;19:75.
9. Silva-Tinoco R, Cuatecontzi ETC, De la Torre-Saldaña V, et al. 1178-P: multicomponent integrated care program benefits on cardiovascular risk factors for adults with diabetes and high cardiovascular risk: the DIA-BEMPIC Program. *Diabetes*. 2020;69:1178-P.
10. Silva-Tinoco R, Cuatecontzi-Xochitiotzi T, de la Torre-Saldaña V, León-García E, Serna-Alvarado J, Orea-Tejeda A, et al. Influence of social determinants, diabetes knowledge, health behaviors, and glycemic control in type 2 diabetes: an analysis from real-world evidence. *BMC Endocr Disord*. 2020;20:130.
11. Alromaihi D, Alamuddin N, George S. Sustainable diabetes care services during COVID-19 pandemic. *Diabetes Res Clin Pract*. 2020;166:108298.
12. Apicella M, Campopiano MC, Mantuano M, Mazoni L, Coppelli A, del Prato S, et al. COVID-19 in people with diabetes: understanding the reasons for worse outcomes. *Lancet Diabetes Endocrinol*. 2020;8:782-792.
13. Zhu L, She Z-G, Cheng X, Quin JJ, Zhang XJ, Cai J, et al. Association of blood glucose control and outcomes in patients with COVID-19 and pre-existing type 2 diabetes. *Cell Metab*. 2020;31:1068-1077.