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Outcomes in Type II Diabetes Patients through the Covid 19 Pandemic A Retrospective Chart Review

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Outcomes in type II diabetes patients through the COVID-19 pandemic: A Retrospective Chart Review

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Abstract

Context: The COVID-19 pandemic provided a unique opportunity for urgent expansion of telemedicine services as providers continued to supply longitudinal care to patients. Patients with type II diabetes were vulnerable to serious infection with COVID-19 as well as disruption in management of their chronic disease.

Objective: To delineate the outcomes in type II diabetes patients through the COVID-19 pandemic by a retrospective chart review in which disease management was evaluated through HbA1c levels and BMI.

Methods: This retrospective chart review included adult T2DM patients receiving care from five university family medicine offices in NJ. HbA1c levels and BMI values were compared during the pre-pandemic (February 2019-February 2020) and pandemic (March 2020-May 2022) time periods. Data analysis was completed through SPSS.

Results: There was no significant difference in HbA1c levels from before the COVID-19 pandemic compared to during the pandemic, but there was a significant decrease in BMI. There was a greater shift in patients being prescribed multiple anti-diabetic oral drugs compared to insulin during the COVID-19 pandemic.

Conclusions: Despite changes in daily living and healthcare delivery, patients with T2DM were able to maintain or improve their disease status. Patients that were older, female, with a higher BMI, and of African American descent exhibited greater healthcare utilization, with variance in types of visits and associated outcomes. Moving forward, telemedicine could be a potential outlet for alleviating the global health burden associated with T2DM.

Introduction

Type II diabetes mellitus (T2DM) is a disorder characterized by insulin resistance, systemic inflammation, and metabolic dysfunction leading to hyperglycemia.[1] T2DM affects almost 37 million people in the U.S. and is the seventh leading cause of death in this country.[2] In addition to a strong genetic component, this disorder is closely linked with obesity and a sedentary lifestyle. Without sufficient maintenance, T2DM patients are at an increased risk of developing cardiovascular disease, neuropathy, nephropathy, retinopathy, and certain cancers.[3] Impaired glycemic control can also result in cognitive decline and the burden of living with diabetes can exacerbate anxiety, depression, and fatigue.[4] Diagnosis and disease progression rely on glycosylated hemoglobin (HbA1c) values, which depict a longitudinal view of blood glucose levels. Treatment of T2DM includes lifestyle modifications, oral or injectable anti-diabetic agents, and combined insulin therapy.[1]

COVID-19 is a respiratory disease caused by the novel coronavirus that reached pandemic status in March 2020. The onset of COVID-19 associated restrictions marked a drastic change in daily living, including physical activity and eating habits, in addition to healthcare behaviors. Certain populations like the elderly, racial minorities, and those with chronic illnesses, were disproportionately impacted by the nature of the disease and its resulting social consequences.[5] COVID-19 posed an increased risk of worse health outcomes for diabetes patients, not only with serious illness from direct infection, but also with disruption of obtaining maintenance care.[6]

Methods and Materials

Design: A retrospective chart review included type II diabetes patients from five university family medicine outpatient offices in NJ.

Procedure: The time frame of the study included a one-year pre-pandemic period from February 2019 to February 2020 and data from the pandemic beginning in March 2020 through May 2022. Extracted information included age, gender, and race, number of telehealth and in-person office visits, weight, BMI, HbA1c values, and insulin and diabetic medication prescriptions. Abstracted data included 1098 patients and was narrowed to 217 patients based on less than 31 days of difference between pre-pandemic HbA1c and pre-pandemic weight measurements as well as latest HbA1c and latest weight measurements for the time frame indicated.

Data Analysis: De-identified data was entered, coded, and analyzed descriptively using IBM SPSS software.

Results

The participants in this study were aged 31 to 89 years. Of the 217 patients included in the study, 127 patients (58.5%) were male and 90 (41.5%) were female. Ethnicity data was available for 196 patients, of which 129 (65.9%) were white, 52 (26.5%) were black or African American, and 15 (7.7%) were a race other than the former two. There was no significant difference in HbA1c levels from before the COVID-19 pandemic compared to during the pandemic, but there was a significant decrease in BMI (Figure 1). The number of in-person and telemedicine visits were found to be moderately positively correlated. A weak positive correlation was found between HbA1c levels and BMI values measured during the pandemic period. A weak positive correlation also existed between the number of in-person office visits and BMI and between age and number of in-person office visits. The outcomes between sex were not significantly different, despite females exhibiting a higher number of both in-person and telemedicine visits. Black/African American patients exhibited higher HbA1c levels compared with patients with an undetermined race. Apart from this, there was a more dramatic change seen in oral medication usage in patients over time compared to insulin. Out of the 217 patients, 15 (6.9%) required insulin treatment compared to during the pandemic, in which 40 patients (18.4%) were utilizing insulin. Moreover, during the pre-pandemic period, 163 patients (75.1%) did not have any oral diabetes medications listed in their charts. compared to during the pandemic, wherein 76 patients (35%) were prescribed monotherapy and 103 patients (47.5%) were undergoing multitherapy. This distribution was similar across the different races.

Pre-pandemic HbA1c	Pandemic HbA1c	Pre-pandemic BMI	Pandemic BMI
7.38	7.45	33.06*	32.48*

Figure 1. Mean values of HbA1c and BMI before and during the pandemic show no significant difference in A1c and a significant decrease in BMI (N=217). *p<0.05, paired t-test.

Conclusions and Discussion

- Despite the dramatic shift in healthcare delivery during the COVID-19 pandemic, type II diabetes patients did not experience worsening of health outcomes.
- A potential contributing factor is the continuation of provider-patient communication, allowing for interventions such as changes in oral medication regimen as disease progression occurred.
- Patients receiving in-person care more frequently resorted to using telemedicine in a similar way.
- Older patients tended to have a higher number of in-office visits overall, which may be due to technological gaps in obtaining telemedicine care.
- Patients with a higher BMI exhibited greater healthcare utilization to maintain their health.
- African American patients had the highest number of both telemedicine and in-office visits, yet they exhibited the highest HbA1c values.

Although the health of many type II diabetes patients was maintained or improved through the pandemic, the long-term goal for patients remains to continue improving the HbA1c and BMI levels to within recommended levels. Future work is required to assess the impact of telemedicine and improve its accessibility and efficacy.

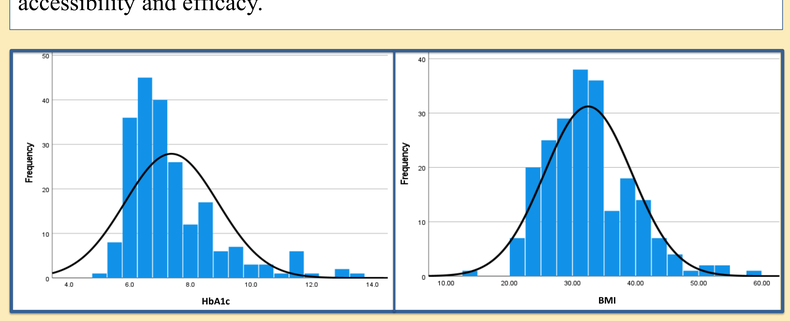

Figure 2. Distribution of HbA1c and BMI values of Rowan Family Medicine patients with T2DM during the COVID-19 pandemic.

References

1. DeFronzo RA, Ferrannini E, Groop L, et al. Type 2 diabetes mellitus (primer). *Nature Reviews: Disease Primers*. 2015;1(1). http://ezproxy.rowan.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Ftype-2-diabetes-mellitus-primer%2Fdocview%2F2711091168%2Fse-2%3Faccountid%3D13605. doi: https://doi.org/10.1038/nrdp.2015.19.
2. Type 2 diabetes. Centers for Disease Control and Prevention. https://www.cdc.gov/diabetes/basics/type2.html. Published December 16, 2021. Accessed December 26, 2022.
3. Wu Y, Ding Y, Tanaka Y, Zhang W. Risk factors contributing to type 2 diabetes and recent advances in the treatment and prevention. Int J Med Sci. 2014 Sep 6;11(11):1185-200. doi: 10.7150/ijms.10001. PMID: 25249787; PMCID: PMC4166864.
4. Hörnquist, J. O., Wikby, A., Stenström, U., Andersson, P.-O., & Akerlind, I. (1995). *Type II Diabetes and Quality of Life. PharmacoEconomics, 8(Supplement 1), 12–16.* doi:10.2165/00019053-199500081-00004
5. Butler MJ, Barrientos RM. The impact of nutrition on COVID-19 susceptibility and long-term consequences. *Brain, Behavior, and Immunity*. 2020;87:53-54. doi:10.1016/j.bbi.2020.04.040
6. Jamie Hartmann-Boyce, Elizabeth Morris, Clare Goyder, Jade Kinton, James Perring, David Nunan, Kamal Mahtani, John B. Buse, Stefano Del Prato, Linong Ji, Ronan Roussel, Kamlesh Khunti; Diabetes and COVID-19: Risks, Management, and Learnings From Other National Disasters. *Diabetes Care* 1 August 2020; 43 (8): 1695–1703. https://doi.org/10.2337/dc20-1192
7. Aubert, C.E., Henderson, J.B., Kerr, E.A., Holleman, R., Klamerus, M.L., Hofer, T.P., 2022. Type 2 Diabetes Management, Control and Outcomes During the COVID-19 Pandemic in Older US Veterans: an Observational Study. Journal of General Internal Medicine.. doi:10.1007/s11606-021-07301-7
8. Onishi, Y., Yoshida, Y., Takao, T., Tahara, T., Kikuchi, T., Kobori, T., Kubota, T., Shimmei, A., Iwamoto, M., Kasuga, M., 2021. Diabetes management by either telemedicine or clinic visit improved glycemic control during the coronavirus disease 2019 pandemic state of emergency in Japan. Journal of Diabetes Investigation.. doi:10.1111/jdi.13546
9. Bennett G, Young E, Butler I, Coe S. The Impact of Lockdown During the COVID-19 Outbreak on Dietary Habits in Various Population Groups: A Scoping Review. Review. Frontiers in Nutrition. 2021-March-04 2021;8doi:10.3389/fnut.2021.626432
10. Khunti, K., Valabhji, J. & Misra, S. Diabetes and the COVID-19 pandemic. *Diabetologia* (2022). https://doi.org/10.1007/s00125-022-05833-z