Research Article

An Overview of the Glycemic Control of Diabetes Mellitus Patients Before and During the Pandemic

Diabetes Mellitus Hastalarının Pandemi Öncesi ve Pandemi Sırasında Glisemik Kontrolüne Genel Bir Bakış

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Abstract

Aim: Diabetes Mellitus is a chronic disorder characterized by high blood glucose and affects millions of people around the world with its complications. We believe that several factors during the pandemic have negatively affected the glycemic control of the patients. This study aimed to compare the glycemic controls of the patients admitted to the family health clinic of Incesu State Hospital before and during the pandemic.

Material and Methods: Demographic data, HbA1c values, durations between the two admissions, and body mass indices of a total of 203 patients admitted to the family medicine clinic were assessed. Frequency, mean and standard deviation values were used in the analysis of the data.

Results: A total of 203 patients who had HbA1c test before and during the pandemic were included in the study. Mean age of the patients was 60.87±15.24. Of the patients included in the study, 52.7% were female. Mean HbA1c value tested before the pandemic was lower than the mean HbA1c value tested during the pandemic.

Conclusion: Increase in time spent at home, decrease in physical exercises and the presence of forcing psychological factors as a result of the measures taken have caused the glycemic control of the patients to impair. The individuals with chronic diseases can be supported by health authorities, which may help to solve the problems.

Keywords: SARS- CoV-2, diabetes mellitus, pandemic, HbA1c

Öz

Amaç: Diabetes Mellitus kan glukozu yüksekliği ile seyreden, dünya üzerinde milyonlarca insanı etkileyen ve komplikasyonları olan kronik bir hastalıktır. Pandemi döneminde birçok faktörün hastaların glisemik kontrolünü olumsuz yönde etkilediğini düşünmekteyiz. Bu çalışma ile İncesu Devlet Hastanesi aile hekimliği polikliniğine başvuran hastaların pandemi öncesi ve esnasında glisemik kontrollerini karşılaştırmayı amaçladık.

Materyal ve Metot: Aile hekimliği polikliniğine başvuran toplam 203 hastanın demografik verileri, HbA1c değerleri, iki başvuru arasında geçen süreleri, beden kitle indeksleri değerlendirildi. Verilerin analizinde frekans, ortalama ve standart sapma değerleri kullanıldı.

Bulgular: Pandemi öncesi ve esnasında HbA1c değeri bakılan toplam 203 hasta dâhil edildi. Hastaların yaş ortalaması 60,87±15,24 idi. Çalışmaya dâhil edilen hastaların %52,7'si kadındı. Pandemi öncesi bakılan HbA1c değerlerinin ortalaması, pandemi esnasında bakılan HbA1c değerlerinin ortalamasından düşüktü.

Sonuç: Uygulanan tedbirler kapsamında; evde geçirilen sürenin artması, fiziksel egzersizin azalması, zorlayıcı psikolojik faktörlerin olması, hastaların glisemik kontrolünün bozulmasına sebep olduğu düşünülmüştür. Kronik hastalıkları bulunan kişilerin sağlık otoriterleri tarafından desteklenmesi sorunların çözümünde yardımcı olabilir.

Anahtar Kelimeler: SARS- CoV-2, Diabetes mellitus, pandemi, HbA1c

INTRODUCTION

Acute respiratory syndrome Coronavirus-2 (SARS-CoV-2) from the Coronavirus family is an infectious disease first detected in People's Republic of China (1). Affected millions of people and caused a pandemic. Diabetes Mellitus is a chronic disorder characterized by high blood glucose and affects millions of people around the world with its complications (2). Several factors such as age, gender, education, marital status, obesity, smoking, exercises, additional diseases, drugs used, and psychological state affect the glycemic control (3,4). Moreover, the effects of SARS-CoV-2 are more severe in individuals with diabetes

mellitus (5). We believe that several factors have negatively affected the glycemic control of the patients during the pandemic. We aimed to evaluate the glycemic controls of patients who applied to the family health clinic of Incesu State Hospital before and during the pandemic.

MATERIAL AND METHOD

This study was designed as a retrospective and descriptive study. The patients who were diagnosed with diabetes mellitus and admitted to the family medicine clinic of Incesu State Hospital were included in the study. Incesu is distrinct of Kayseri and the first SARS-CoV-2 case in Kayseri emerged on the 16th of March 2020. A total of 203 patients who were re-admitted to the family medicine clinic within one year before the pandemic and one year after the pandemic emerged were assessed. The patients' demographic data, HbA1c values, duration between the two admissions, and body mass index were assessed with file scanning method by using the data of the clinic.

Data Analysis

Frequency, mean and standard deviation values were used in descriptive data analysis.Chi-square test was used in comparison of categorical data. Student T test was used for numerical data in normally distributed two groups and Mann Whitney U test was used in non-normally distributed groups. Before and after data in normally distributed two groups were assessed with Paired Student T test. Spearman's Correlation analysis was used to assess the correlation between numerical data. $p < 0.05$ was accepted as the statistically significant value. The data obtained were analyzed using the computer IBM SPSS 22.0 software program.

Ethics

The institutional consent for the study was obtained from Kayseri Provincial Health Directorate and the ethical approval was obtained from the Ethics Committee of Kayseri city training and research hospital City Training and Research Hospital (Decision Number:438, Date:14/07/2021).

RESULTS

A total of 203 patients who were re-admitted before and during the pandemic were included in the study. Of the patients, 52.7% were female. Mean age of the patients was 60.87±15.24. Mean age of the male patients was 63.03±16.9 and mean age of the female patients was 58.93±13.36. Mean ages by gender were similar (p:0.056). Mean HbA1c value tested before the pandemic was lower than the mean HbA1c value tested during the pandemic (p<0.01) (Table 1).

HbA1c values increased significantly in both genders. (p<0.001, p<0.001) (Table 2).

Body Mass Index (BMI) significantly increased in both genders before and during the pandemic (p<0.001,

p<0.001) (Table 3).

Table 1. Assessment of HbA1c Values Before and During the Pandemic

	HbA1c before Pandemic	HbA1c during Pandemic	p
Mean	6.41	7.36	<0.001
Std. deviation	1.75	1.98	

Table 2. HbA1c Values according to Gender

Gender		Mean	Std. Deviation	p
Male	HbA1c before pandemic	6.31	1.65	<0.001
	HbA1c during pandemic	7.22	1.85	
Female	HbA1c before pandemic	6.49	1.83	<0.001
	HbA1c during pandemic	7.48	2.09	

Table 3. Assessment of BMI Before and During the Pandemic according to Gender

Gender		Mean	Std. Deviation	p
Male	BMI before pandemic	27.41	4.17	<0.001
	BMI during pandemic	27.81	4.34	
Female	BMI before pandemic	24.08	3.86	<0.001
	BMI during pandemic	24.76	3.89	

Patients' mean duration until the follow-up was 7.67±1.95 months. The duration until the follow-up was longer in women than in men (p:0.005) (Table 4).

Table 4. Comparison of Durations until Follow-up according to Gender

	Gender	Mean	Std. Deviation	p
Duration until Follow-up (Month)	Male	7.27	2.15	0.005
	Female	8.03	1.68	

While mean difference between the HbA1c values of the patients aged under 65 before and after the pandemic was 0.76±2.09 it was 1.57±1.84 in patients aged 65 and above. The increase in HbA1c values was higher in patients aged 65 and above (p:0.004).

There was no correlation between HbA1c values and BMI before the pandemic (r:-0.065, p:0.355). There was a positive but weak correlation between HbA1c values and BMI during the pandemic (r:0.140, p:0.046).

Table 5. Correlation between HbA1c and BMI

		BMI before pandemic
HbA1c before pandemic	r	-0.065
	p	0.355
		BMI during pandemic
HbA1c during pandemic	r	0.140
	p	0.046

DISCUSSION

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia caused by abnormalities in insulin release and/or insulin metabolism. Long-lasting hyperglycemia causes chronic organ damage and dysfunction (6).

As known, the infectious diseases impair glycemic regulation (7). Although SARS-CoV-2 is a viral infectious disease the only reason for the impaired glycemic control is not that it is an infectious disease, it also brings about several forcing factors. In addition, SARS-CoV-2 is known to be more fatal in patients with diabetes mellitus (8,9).

In a study on glycemic control during the pandemic in our country, 56% of the patients were male while most of the patients in our study were female (10). Another study was similar to this literature. Mean age of the patients was 55 in the mentioned study and 45 in the study by Fernandez et al. (11). Mean age was 57 in our study, which is similar to the findings in literature.

HbA1c levels of the patients during the pandemic were higher compared with the values before the pandemic. In the study by Onmez et al., HbA1c values of the patients increased compared with the period before the pandemic.10 According to a study performed in France, postprandial blood glucose levelof the individuals and insulin dose used during the pandemic were higher compared with the period before the pandemic (12). Moreover, HbA1c values of female patients and patients at the age of ≥65 in our study increased more. In a study performed in Japan, HbA1c values significantly increased in women and patients at the age of ≥65 and similar results with our study were obtained (13). We considered that their glycemic controls could be more impaired because the institution where we carried out the study was in a more rural area, women participated in the work life less and had to spend longer time at home due to the restrictions.

In the follow-up of the patients with diabetes mellitus, HbA1c values should be followed up at least 3 to 6-month intervals if the decision of the physician is not different (14) In our study, the patients' mean duration until the follow-up was 7.72 months. The studies have revealed that the longer the duration until the follow-up the more impaired the glycemic control (15).

Due to the pandemic, physical activity and dietary habits of the individuals have changed (16). For instance, high calorie fast food products were ordered more and the consumptions of convenience food increased more (17,18). Physical activity decreased as the individuals had to stay at home for a long time. All of these have resulted in weight gain (19,20). In our study, there was a significant increase in BMI before and during the pandemicin both genders. In addition, the individuals could not see even their relatives due to the long-lasting restrictions, which resulted in the increased psychological stress load and impaired glycemic regulation (21). There are also studies revealing that glycemic regulation was maintained in individuals who were followed up with remote access and who continued their physical activity at home during the pandemic (22,23).

Difficulties occurring in health systems, absence of outpatient service or limited service or giving importance to critical patients due to the pandemic may have extended the durations of patients' visits to a health institution for follow-up (24).

It has been observed that using web-based systems to contact the individuals helps to maintain the regulation better (25,26). A fine glycemic control and physical activity will contribute to the immune system (27). Therefore, regularly following up the patients with chronic diseases such as diabetes mellitusis is crucial.

Limitations

The limitations of the study were as follows: It was a retrospective study and fasting blood glucose measurements of the individuals were not included in the study.

CONCLUSION

Increase in time spent at home, decrease in physical exercises and forcing psychological factors experienced as a result of the measures taken due to the pandemic have caused the glycemic control of the patients to impair. The individuals with chronic diseasescan be supported by health authorities in terms of giving psychological support, increasing their exercises and providing their medicines on time, which may help to solve this problem.

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