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Perceived Stress and Preventive Behaviors in Patients with Diabetes during the Outbreak of Coronavirus Disease 2019

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Abstract

Background: Coronavirus disease 2019 (COVID-19) outbreak has adverse effects, including stress, unhealthy lifestyles, and lack of glucose level control on diabetic patients.

Aim: This study aimed to evaluate the preventive behaviors and perceived stress levels in patients with diabetes during the outbreak of COVID-19.

Method: This analytical cross-sectional study was conducted on 427 diabetic patients (types 1 and 2) using a convenience sampling method in Iran from September to December 2020. Perceived stress and preventive behaviors questionnaire was used to collect data by sharing among diabetes-related channels and groups on social networks. The statistical analyses included the independent sample t-test, ANOVA, and multiple linear regression.

Results: The majority of participants were female (66%) with type 2 diabetes (69.3%). The mean scores of the perceived stress and preventive behaviors were 31.69±5.88 and 67.00±8.09, respectively. The perceived stress in patients with type 2 diabetes (32.05±5.7) was higher than that in those with type 1 diabetes (30.87±6.06). Moreover, females (67.69±7.82) obtained a higher mean value in preventive behaviors, compared to males (65.64±8.47). The effective predictors for perceived stress and preventive behaviors were gender, occupational status, and access to medicine. The mean scores of the perceived stress and preventive behaviors were approximately high and moderate. The high perceived stress score referred to the increased stress level and the moderate preventive behaviors indicated adherence to the health protocols.

Implications for Practice: Necessary measures should be taken to reduce psychological stress and enhance healthy lifestyles for the better management of diabetes during the COVID-19 outbreak.

Keywords: COVID-19, Diabetes, Health behavior, Stress

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Introduction

Currently, coronavirus disease 2019 (COVID-19) is one of the major health challenges in the world, leading to significant morbidity and mortality (1). Studies show that COVID-19 infection in older people and underlying diseases, such as diabetes, respiratory and cardiovascular diseases, as well as hypertension due to the complex situation increase incidence, hospitalization, and mortality (2). Diabetes is a significant health problem with an increasing prevalence around the world (3). In Iran, as the second-largest country in the Middle East, diabetes is a significant public health problem due to its high prevalence and mortality (4). The majority of diabetes in Iran among adults aged 25 to 70 was reported at 11.9% in 2011 that shows an increase of 35%, compared to 2005 (5). It is estimated that by 2030, about 9.2 million Iranians will be likely to have diabetes (6). The patients with COVID-19 and diabetes have received more attention, according to the reports of diabetes associated with a poor prognosis of COVID-19. A study showed that about 10% of COVID-19 patients referred to one of the Iranian hospitals had diabetes and showed significantly more complications and mortality than other patients (7). Depending on how the disease is transmitted, the main factor of the virus transmission chain breaking is the preventive behaviors against infection (8). The previous pandemics, such as severe acute respiratory syndrome illustrated that factors, including stress, perceived risk, disease severity, transmission type, and mortality play the leading role in preventive behaviors (9, 10). The government of Iran, as in other countries, informed the people about various methods of prevention, such as wearing a mask, hand washing, and recognizing the symptoms of the disease (11). In addition to the broad role of the government, the observance of preventive behaviors is influenced by various psychological, physical, social, cultural, and political factors (12). The worldwide spread of COVID-19 has also affected general and mental health (13). This leads to problems, such as depression, worry, anxiety, anger, insomnia, and fear across the world (14). Those likely to have more severe symptoms or death due to COVID-19 (e.g., the elderly, diabetics, as well as those with high blood pressure and cardiovascular diseases) are at greater risk for psychological distress during the epidemic (15). An online survey of the nurses' views on the effects of COVID-19 on diabetic patients across Europe showed that it had a significant effect on physical and psychological risks of diabetics; moreover, they reported that the care for diabetics was severely reduced (16). Therefore, during the COVID-19 outbreak with double emphasis, whether through media and cyberspace, diabetes increases the risk of death and important diseases caused by COVID-19. Due to the lack of access to care services, lack of referring to a physician, not communicating remotely, fear of running out of medications (15), and lack of insulin, the stress level of the patients with diabetes should be considered a critical issue; moreover, more attention should be paid to take necessary measures in this regard. Therefore, this study was conducted to evaluate the preventive behaviors and perceived stress levels in patients with diabetes during the outbreak of COVID-19 in Iran.

Methods

This analytical cross-sectional study was conducted on patients with diabetes in Iran during the COVID-19 outbreak to assess the perceived stress and preventive behaviors. An online Persian questionnaire was designed through PORSLINE to collect data. In this study, a convenience sampling method was used, and an online questionnaire was shared among diabetes-related channels and groups on social networks available from September to December 2020. In addition, a questionnaire was sent to friends and colleagues, and they were asked to send it to people they knew. Inclusion criteria were diabetic patients with more than three months of diagnosis and non-pregnancy in female participants.

The minimum sample size with 5% type 1 error and the precision (d=1) was calculated at 310 cases. The standard deviation (SD) of the preventive behaviors was 8.97 based on a study by Moshki et al. (17). It is worth mentioning that a total of 427 questionnaires were completed in the specified time period.

The data collection tool consisted of three parts. The first part sought such demographic characteristics of the patients with diabetes as age, marital status, gender, occupational status, education level, duration of diabetes, type of diabetes, medication, access to medicine, complications of diabetes, and associated comorbidities. In the second part, Cohen's Perceived

Stress Scale (PSS-14) was used to investigate the stress levels in patients with diabetes (18). The PSS, one of the most comprehensive tools used generally, consists of 14 items. It is rated based on a 5-point Likert scale from 0 to 4. The lowest and highest scores are 0 and 56, respectively. Items 4, 5, 6, 7, 9, 10, 13 are scored in reverse, and a higher score indicates a higher stress level (19). The validity of this scale has been confirmed by construct validity and content analysis methods (20, 21). Cronbach's alpha values for the reliability of this scale in three studies were estimated at 0.84, 0.85, and 0.86, respectively (22); moreover, this corresponding value was obtained at 0.78 in this study.

In the third part, the official system questionnaire of Iran's Health Ministry on coronavirus was used to investigate observing preventive behaviors during the COVID-19 outbreak. This questionnaire consists of 24 items that were rated based on a 5-point Likert scale from 0 to 4, and items 1, 4, 12, 15, 17 were scored in reverse. The content of the questionnaire included three areas of daily affairs, personal health, and social affairs. Behaviors surveyed included social distance, mask wearing in public places, washing or disinfecting purchased items, hand washing, covering the mouth and nose during sneezing and coughing, attending parties, leaving the house unless absolutely necessary, and minimizing travel by public transport. The lowest and highest scores are 0 and 96, respectively. A higher score indicates the highest level of observing preventive behaviors. The qualitative content validity of this scale was confirmed, and Cronbach's alpha coefficient for reliability in this study was detremined at 0.82.

The normality assumption and outlier values were assessed using histograms, skewness, and kurtosis. An absolute skewness value larger or smaller than two or a total kurtosis value larger or smaller than seven were used for determining substantial non-normality (23). In descriptive statistics, mean±SD was used for continuous variables (perceived stress and preventive behaviors), and frequency (percentage) was employed for categorical variables. The independent sample t-test and ANOVA were also used to investigate the differences in the continuous variables. The variance inflation factor was checked to test the assumption of multicollinearity (24). The normality assumptions of the residuals were assessed through the histogram and normal probability plot. The closer the dots lie to the diagonal line, the distribution of residuals is closer to the normal.

A multiple linear regression model with backward selection was performed to identify the independent variables associated with perceived stress and preventive behaviors. A p-value less than 0.05 was considered statistically significant. The analyses were performed using SPSS software (version 22.0; SPSS, Inc., Chicago IL, USA).

Results

The normality assumptions of the dependent variables and residuals were established in this study. The distribution of the residuals for perceived stress (0±0.996) and preventive behaviors (0±0.996) was normal with a mean value of 0 and a constant variance. The descriptive statistics of variables are presented in Tables 1 and 2. The mean value of the perceived stress was found statistically significant regarding demographic characteristics, such as marital status (P=0.027) and occupational status (P=0.010). The mean of preventive behaviors in females (67.69±7.82) was significantly higher than that in males (65.64±8.47, P=0.014; Table 1). The significant clinical variables for perceived stress were the type of diabetes (P=0.050), cardiovascular disease (P=0.009), and access to medicine (P=0.013). The mean of preventive behaviors in patients with diabetic retinopathy (65.94±7.70) was considerably lower than that in non-diabetic retinopathy (67.64±8.27, P=0.037). The mean of preventive behaviors was statistically significant in four medication groups (P<0.001; Table 2). Occupational status (B=0.72, β=0.13, 95% CI:0.20-1.24) and access to medicine (B=-1.12, β=-0.12, 95% CI: -2.04 to -0.21) had significant effects on perceived stress. The students, housewives, and retired participants' perceived stress was 0.13 units higher than that of the employed and unemployed. As the access to medications increased, perceived stress levels decreased by 0.12. In addition, gender (B=1.91, β=0.11, 95% CI: 0.27-3.54) and access to medications (B=1.31, β=0.09, 95% CI: 0.04-2.57) had significant effects on preventive behaviors. The preventive behaviors in females were 1.91 units higher than that in males, and with an increase in access to medications, the preventive behaviors increased by 1.31 (Table 3).

Table 1. Comparison of the mean score of the perceived stress and preventive behaviors regarding demographic characteristics (N=427)

Demographic characteristics		Value n (%)	Perceived stress Mean±SD	P-value[a]	Preventive behaviors Mean±SD	P-value[a]
Gender	Male	145 (34.00)	30.95±5.21	0.064	65.64±8.47	0.014*
	Female	282 (66.00)	32.07± 6.18		67.69±7.82	
Age (year)	< 40	85 (19.90)	30.52±6.10	0.103	66.85±9.03	0.633
	41-50	62 (14.50)	31.59±7.07		67.56±8.48	
	51-60	83 (19.40)	31.30±5.17		67.48±8.08	
	61-70	139 (32.60)	32.69±5.80		66.18±8.120	
	> 70	58 (13.60)	31.67±5.04		67.82±5.96	
Marital status	Single	93 (21.80)	30.50±6.20	0.027*	66.23±9.37	0.308
	Married	334 (78.20)	32.02±5.75		67.21±7.70	
Education level	Illiterate	58 (13.60)	32.50±6.62	0.250	67.59±7.55	0.645
	High school	126 (29.50)	31.96±5.12		66.04±8.24	
	Diploma	130 (30.40)	32.00±6.01		67.44±8.58	
	University degree	112 (26.20)	30.62±6.10		67.26±7.67	
Occupational status	Employed	110 (25.80)	30.54±5.40	0.010*	66.73±8.35	0.120
	Unemployed	64 (15.00)	30.32±7.32		67.77±11.09	
	Housewife	195 (45.70)	32.55±5.99		66.78±6.42	
	Retired	45 (10.50)	33.38±7.84		65.93±8.02	
	Student	13 (3.00)	31.69±5.88		72.58±9.81	

Note: SD=standard deviations; [a] P-values result from independent sample t-test or analysis of variance (ANOVA); *P-value <0.05.

Table 2. Comparison of the mean score of the perceived stress and preventive behaviors regarding clinical characteristics (N=427)

Clinical characteristics		Value n (%)	Perceived stress Mean±SD	P-value[a]	Preventive behaviors Mean±SD	P-value[a]
Duration of diabetes (year)	< 5	52 (12.20)	31.21±5.52	0.596	66.84±8.84	0.579
	5-10	109 (25.50)	31.37±6.22		67.69±7.66	
	> 10	266 (62.30)	31.91±5.82		66.73±8.13	
Type of diabetes	Type 1	131 (30.70)	30.87±6.06	0.050	66.81±9.97	0.751
	Type 2	296 (69.30)	32.05±5.7		67.08±7.11	
Medication	Insulin	109 (25.50)	31.05±6.01	0.076	66.32±8.55	<0.001
	Oral medications	127 (29.70)	31.70±6.35		69.58±7.84	
	Oral medications+Insulin	163 (38.20)	32.44±4.87		65.41±6.92	
	Diet and exercise	28 (6.60)	29.78±7.87		67.21±10.76	
Access to medicine	Low	282 (66.00)	32.29±5.75	0.013	66.44±7.34	0.148
	Moderate	118 (27.60)	30.54±5.84		68.01±8.62	
	Good	27 (6.30)	30.48±6.62		68.29±11.98	
Diabetic Retinopathy	Yes	163 (38.20)	32.05±4.91	0.322	65.94±7.70	0.037
	No	264 (61.80)	31.47±6.41		67.64±8.27	
Cardiovascular disease	Yes	134 (31.40)	32.78±5.36	0.009	67.30±8.22	0.602
	No	293 (68.60)	31.18±6.05		66.86±8.05	

Note: SD=standard deviations; [a] P-values result from independent sample t-test or analysis of variance (ANOVA)

Table 3. Predictors of the perceived stress and preventive behaviors using multiple linear regression

Final model [a]		B	β	95 % CI for B [b]	P-value
Perceived stress	Marital status	1.33	0.09	(-0.01,2.66)	0.052
	Occupational status	0.72	0.13	(0.20,1.24)	0.006
	Access to medicine	-1.12	-0.12	(-2.04,-0.21)	0.016
Preventive behaviors	Gender	1.91	0.11	(0.27 ,3.54)	0.022
	Access to medicine	1.31	0.09	(0.04 , 2.57)	0.043
	Other diseases	-1.57	-0.09	(-3.28,0.13)	0.070

Note: [a] Backward multiple linear regression; B=unstandardized coefficient; β=standardized coefficient [a] P-values result from independent sample t-test or analysis of variance (ANOVA); [b] 95% confidence interval for B; adjusted R-Squared= 0.040,0.030
Note: SD=standard deviations;

Discussion

This study aimed to evaluate the preventive behaviors and perceived stress levels in patients with diabetes during the outbreak of COVID-19**.** The mean score of the perceived stress among patients with diabetes was higher than average, indicating the high level of stress among diabetic patients during the coronavirus outbreak. One of the reasons for this can be the fear of death due to hearing news about the increase in mortality in patients with COVID-19, and other causes can be poor access to oral medications and insulin (15). As the results show, most of the subjects were treated with insulin and oral medications; however, the majority of the subjects reported poor and moderate access to insulin and medicine. Those with chronic diseases generally had more stress, which could be increased by the reasons mentioned above. Such mental stress during the COVID-19 outbreak will have additional costs for the Iranian health care system. In this regard, the results of a study in Iran also showed that during the COVID-19 epidemic, the level of stress in people with chronic diseases was significantly higher than that in others. During outbreaks, the consequences of psychosocial problems in high-risk societies are ignored mainly (25). Another study showed that stress increases hemoglobin A1c, and stress management effectively controls blood glucose levels. A recent study in India also found that the cause of hyperglycemia in most participants was psychological stress as a result of COVID-19 (26). Therefore, psychological stress is the most critical factor in proper blood glucose level control.

The mean score of observing preventive behaviors was moderate, indicating preventive behaviors during the COVID-19 outbreak among patients with diabetes. Appropriate prevention strategies can reduce the risk of infection and mortality. General preventive measures, such as wearing face masks, respecting social distance, hand washing, and paying attention to personal hygiene, as well as specific diabetes preventive measures, including frequent blood glucose level control, healthy lifestyle, and treatment of chronic diseases, especially hypertension, are emphasized in this regard (1).

In this study, most of the participants were female with type 2 diabetes, and more than half of the patients had hypertension. During this period, the diseases associated with diabetes, especially cardiac and renal functions, should be closely monitored, and the risk factors for COVID-19 should be treated. An essential part of diabetes is blood pressure control (1). The study results showed a statistically significant relationship of perceived stress with marital status, access to oral medications and insulin, as well as occupational status. Accordingly, married people, those who had poor access to oral medicine and insulin, as well as students had higher perceived stress scores, compared to others. Temporary insulin deficiency in Iran has increased anxiety and stress in patients with diabetes. In a study by Al-Sufyan et al., anxiety was reported more among students; however, in that study, single people, unlike those in our study, had more stress (15).

A statistically significant relationship was observed between perceived stress and complications of diabetes. As a result, diabetic patients with cardiovascular disease had a higher mean of perceived stress scores. One of the main reasons for the increase in the stress level in these people is that they are more prone to COVID-19 than others, which is consistent with the results of other studies (15, 27).

Regarding the COVID-19 pandemic considerations, our findings were limited to participants accessing the Internet via an online questionnaire. Due to the lack of access to their mental health status before the COVID-19 pandemic, the accurate effect of COVID-19 on participants' mental

health could not be assessed in this study. It is recommended to design studies to support the health of diabetic patients during pandemics.
The present study showed that the COVID-19 pandemic has led to an increase in the stress of diabetic patients. Therefore, it is necessary to manage healthy lifestyles to reduce mental disorders and control blood sugar in diabetic patients during the COVID-19 pandemic. The results also showed that the observance of preventive behaviors against COVID-19 was at a relatively desirable level among patients with types 1 and 2 diabetes. Since diabetic patients are vulnerable, training programs should be considered to promote preventive behaviors and knowledge related to pandemics.

Implications for Practice
According to the study results on high-stress levels in those with diabetes, special attention should be paid to these people, and necessary measures should be taken in this regard. Special attention to diabetic patients helps minimize the burden of economic and social costs and reduces complications and mortality.

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Conflicts of Interest
The authors declare no conflict of interest.

References
1. Malek M, Hosseinpanah F, Meybodi HRA, Jahed SA, Hadaegh F, Sharghi S, et al. Diabetes Management during the COVID-19 Pandemic: An Iranian Expert Opinion Statement. Arch Iran Med. 2020;23(8):564-7.
2. Rastad H, Karim H, Ejtahed HS, Tajbakhsh R, Noorisepehr M, Babaei M, et al. Risk and predictors of in-hospital mortality from COVID-19 in patients with diabetes and cardiovascular disease. Diabetol metab syndr. 2020;12(1):1-11.
3. Masoompour M, Tirgari B, Ghazanfari Z. The relationship between health literacy, self-efficacy, and self-care behaviors in diabetic patients. Evid Based Care. 2017;7(3):17-25.
4. Nasrabadi H, Nikraftar F, Gholami M, Mahmoudirad G. Effect of Family-centered Empowerment Model on Eating Habits, Weight, Hemoglobin A1C, and Blood Glucose in Iranian Patients with Type 2 Diabetes. Evid Based Care. 2021;11(1):25-34.
5. Mohseni M, Shams Ghoreishi T, Houshmandi S, Moosavi A, Azami-Aghdash S, Asgarlou Z, et al. Challenges of managing diabetes in Iran: meta-synthesis of qualitative studies. BMC Health Serv Res. 2020;20(1):1-12.
6. Mirzaei M, Rahmaninan M. Epidemiology of diabetes mellitus, pre-diabetes, undiagnosed and uncontrolled diabetes in Central Iran: results from Yazd health study. BMC Public Health. 2020;20(1):1-9.
7. Akbariqomi M, Hosseini MS, Rashidiani J, Sedighian H, Biganeh H, Heidari R, et al. Clinical characteristics and outcome of hospitalized COVID-19 patients with diabetes: A single-center, retrospective study in Iran. Diabetes Res Clin Pract. 2020;169:108467.
8. Bai Y, Yao L, Wei T, Tian F, Jin D-Y, Chen L, et al. Presumed asymptomatic carrier transmission of COVID-19. Jama. 2020;323(14):1406-7.
9. Lau J, Yang X, Tsui H, Kim J. Monitoring community responses to the SARS epidemic in Hong Kong: from day 10 to day 62. J Epidemiol Community Health. 2003;57(11):864-70.
10. Lau JT, Kim JH, Tsui H, Griffiths S. Perceptions related to human avian influenza and their associations with anticipated psychological and behavioral responses at the onset of outbreak in the Hong Kong Chinese general population. Am J Infect Control. 2007;35(1):38-49.
11. Tuite AR, Bogoch II, Sherbo R, Watts A, Fisman D, Khan K. Estimation of coronavirus disease 2019 (COVID-19) burden and potential for international dissemination of infection from Iran. Ann

Intern Med. 2020;172(10):699-701.
12. Wise T, Zbozinek TD, Michelini G, Hagan CC, Mobbs D. Changes in risk perception and self-reported protective behaviour during the first week of the COVID-19 pandemic in the United States. R Soc Open Sci. 2020;7(9):1-13.
13. Motamedzadeh M, Pazokian M, Molaee H. Adaptation to the New World: Experiences of Bereaved Families of the Patients with Coronavirus Disease 2019. Evid Based Care. 2021;11(2):7-15.
14. Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. Int J Soc Psychiatry. 2020;66(4):317-20.
15. Al-Sofiani ME, Albunyan S, Alguwaihes AM, Kalyani RR, Golden SH, Alfadda A, et al. Determinants of mental health outcomes among people with and without diabetes during the COVID-19 outbreak in the Arab Gulf Region. J Diabetes. 2021;13(4):339-52.
16. Forde R, Arente L, Ausili D, Ausili D, De Backer K, Due-Christensen M, et al. Amanda Epps. The impact of the COVID-19 pandemic on people with diabetes and diabetes services: A pan-European survey of diabetes specialist nurses undertaken by the Foundation of European Nurses in Diabetes survey consortium. Diabet Med.2020;38(5):e14498.
17. Moshki M, Dehnoalian A, Alami A. Effect of precede–proceed model on preventive behaviors for type 2 diabetes mellitus in high-risk individuals. Clin Nurs Res. 2017;26(2):241-53.
18. Cohen S, Cohen S, WillIamson G, Spacapam S,Oskamp S, Williamson G, S Spacapan S, et al. Perceived stress in a probability sample of the United States. Health. 1988:31-67.
19. Huang F, Wang H, Wang Z, Zhang J, Du W, Su C, et al. Psychometric properties of the perceived stress scale in a community sample of Chinese. BMC Psychiatry. 2020;20(1):1-7.
20. Asghari F, Sadeghi A, Aslani K, Saadat S, Khodayari H. The survey of relationship between perceived stress coping strategies and suicide ideation among students at University of Guilan, Iran. Int J Educ Res. 2013;1(11):1-8.
21. Kashani AK, Kooshki S, Kazemi AS, Khoshli AK. Perceived Stress, Self Efficacy and Quality of Life in Patients with Heart Failure: A Structural Equation Model. Int J Health Res. 2020;6(4):23-28.
22. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983;24(4):385-96.
23. Kim H-Y. Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. Restor Dent Endod. 2013;38(1):52-4.
24. Miles J. Tolerance and variance inflation factor. Wiley StatsRef : statistics reference online. 2014.
25. Maarefvand M, Hosseinzadeh S, Farmani O, Safarabadi Farahani A, Khubchandani J. Coronavirus outbreak and stress in Iranians. Int J Environ Res Public Health. 2020;17(12):1-11.
26. Khare J, Jindal S. Observational study on Effect of Lock Down due to COVID 19 on glycemic control in patients with Diabetes: Experience from Central India. Prim Care Diabetes. 2020;14(6):1571-4.
27. Joensen LE, Madsen KP, Holm KA, Nielsen MH, Rod AA, Petersen NH, et al. Diabetes and COVID-19: psychosocial consequences of the COVID-19 pandemic in people with diabetes in Denmark-what characterizes people with high levels of COVID-19-related worries? Diabet Med. 2020;37(7):1146-54.