Psychological Effects of Fasting on Patients Suffering from Diabetes Type 2

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Abstract

Objective: We conducted this study to compare the psychological effects between diabetic patients taking fast and non-fasting counterparts to better investigate the effects of fasting on mental health of diabetes sufferers.

Materials and Methods: This study was a prospective cohort conducted among diabetic patients. In this study, two types of fasting and non-fasting patients were invited to take part. During One week before and after the Ramadan, all patients were asked to complete 28-scale General Health Questionnaire (GHQ).

Results: In this study, 116 patients who were suffering from diabetes completed the study. They were compared with each other in format of three groups (two fasting and one non-fasting). Mean changes of total and subscales' score were negative in nearly all groups but there were no significant difference between groups. In addition, total and subscale A, B and C scores significantly increased (positive change) but subscale D score didn't change in fasting patients during this month.

Conclusion: The results of present study revealed that fasting during the whole month of Ramadan can exacerbate patients' general health in comparison with non-fasting patients. However, because we can't determine whether this finding is attributed to fasting regardless of diabetes or has been resulted from the co-existence of fasting and the disease, it is recommended to design a study to compare diabetic and healthy fasting individuals.

Keywords: Fasting, Diabetes type 2, General health, Ramadan, Psychological effects

Introduction

Fasting during holy Ramadan has been a rule in Islam and Muslims must abstain from eating, drinking and smoking throughout fasting time from dawn to sunset (1).

Different studies on the effects of fasting on health have demonstrated several benefits for health continuity among healthy subjects (2). In detail, fasting individuals during Ramadan may experience weight reduction at the end of the month. In addition, some biochemical parameters including low density lipoprotein (LDL), total cholesterol (TC) and high density

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lipoprotein (HDL) may improve during fasting period (3).

Moreover, there is some evidence that fasting enhances mental health of individuals in the general population (4). Fasting in Ramadan promotes mental outcomes through enforcing health enhancer behaviors and offering fellowman support and also improving stress management among fasting holders (5,6). However, when an illness affects healthiness of an individual or fasting may be harmful for the health of a person, that person is permitted to avoid fasting (1). Despite such permission, diabetic patients around the world prefer to fast during the holy month (7). This decision may affect physical and mental health of the patients leading to different complications. Several studies have been conducted in the field of physical health to discover the effects of fasting on health outcomes among diabetic population who try to fast in some days or the whole Ramadan. The results of some studies demonstrated that fasting may improve anthropometric and laboratory measurements among patients who had held fasting (1-7).

On the contrary, some other studies report no significant change due to fasting for some health parameters among diabetic patients. According to the results of these studies, weight may not be changed in most patients suffering from diabetes mellitus (8). In addition, blood glucose and HbA1c as the main disturbed parameters in diabetes may not be altered significantly during fasting period (9).

Even worse is 5-fold increase in the risk of severe hyperglycemia requiring inpatient management among patients who get fasting. Moreover, diabetic patients may experience severe hypoglycemia up to 7.5 folds more than non-fasting counterparts (8). Despite several documents on the effect of fasting on physical health of diabetic patients, there is no evidence in the field of mental health. Patients suffering from diabetes mellitus may be at higher risk of mental illnesses. Diabetes can be a risk factor of depression existence or exacerbation due to brain malfunction and impaired quality of life (10).

However, it isn't demonstrated weather fasting in Ramadan can affect patients' mental health. Therefore, we conducted this study to compare psychological effects between diabetic patients taking fast and non-fasting counterparts to better investigate the effects of fasting on mental health of diabetes sufferers.

Materials and Methods

This prospective cohort study was conducted among patients suffering from T2DM who were attended Yazd Diabetes Research Center (placed in Yazd, a city at the center of Iran), through Ramadan 2016. The inclusion criteria were HbA1c <8, systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg and the exclusion criteria were moderate to severe retinopathy and recurrent hypoglycemia. In this study, two types of patients were invited to take part in the study. One of these groups was consisted of patients who had decided to hold fast and the other one was composed of patients didn't intend to fast during Ramadan. Finally, 60 patients were recruited in each group (figure 1). During One week before the beginning of Ramadan, all patients were invited and asked to complete 28-scale General Health Questionnaire (GHQ). They were also reevaluated during one week after the end of Ramadan using the same questionnaire.

The 28-scale General Health Questionnaire is a well-known validated tool to screen mental disorders. It has four 7-item subscales including somatic symptoms (A), anxiety/insomnia (B), social dysfunction (C) and depression and suicidal tendencies (D). Each item gets a score from 0 to 3 and the whole questionnaire rates between 0 and 84. It has been demonstrated that a total score of 24 and higher can be an indicator for mental disorders in Iranian population (11). In addition, a higher score in each subscale and in total indicates a worse mental health in an individual.

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Since all patients couldn't be successful to fast in the whole of Ramadan, we categorized our patients into four fasting groups including non-fasting, fasting less than 10 days, fasting between 10-25 days and fasting more than 25 days, according to the duration of fasting through Ramadan at the end of the month. According to the expert opinions, patients with fasting days under 10 were excluded from the study.

Statistical analysis

ANOVA (for quantitative variables) and chi square tests (for qualitative variables) were used to compare patients' characteristics between three groups at the beginning of the study. In order to evaluate the effect of fasting during Ramadan on general health (in each subscale and in total), ANOVA and also multiple linear regression model were performed. Since the patients' characteristics in 3 groups were heterogeneous, we applied five distinct multiple linear regression model and in each model, one of the GHQ total and each subscale score changes during Ramadan was entered as dependent variables. Age, HbA1c and fasting group as independent variables were entered in the models. It should be noted that because "fasting group" was a nominal variable with three categories, we made dummy variables (10-25 days fasting group and >25 days fasting group) from this variable and used them in the models instead of "fasting group" variable.

Ethical considerations

The study was approved by the ethics committee of Shahid Sadoughi University of Medical Sciences Yazd (17/1395/100).

Results

Finally, 116 patients who were suffering from diabetes completed the follow up and 4 patients didn't stay in the study (2 in fasting and 2 in non-fasting group). Since all patients who had decided to take fast the whole of Ramadan were not successful to do that and the number of fasting days was so diverse, we divided fasting patients into three groups. One group was consisted of 4 patients who had held fast less than 10 days and were excluded

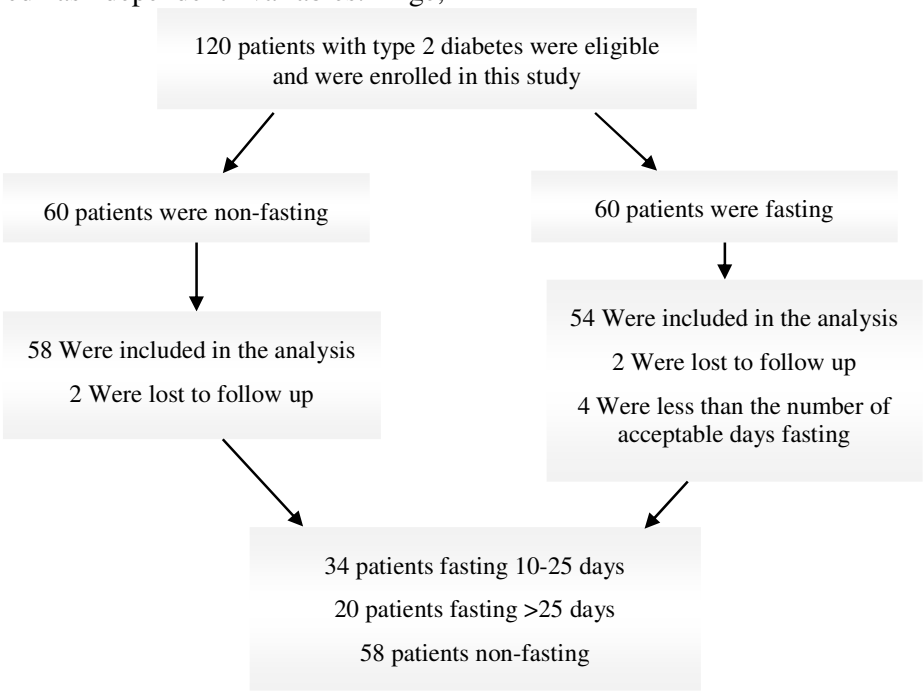


Figure 1. Selection of the study population for analysis

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from the study. The other two groups consisted of 20 patients who took fast 10-20 days of Ramadan and 34 patients who completed minimally 25 fasting days in this month. In non-fasting group, 58 patients stayed in the study until the end.

Demographic and baseline characteristics of participants have been presented in Table 1. According to the results of ANOVA, mean changes of total and subscales' score were negative in nearly all groups but there were no significant differences between groups (Table 2). The results of multiple linear regression analysis revealed that in patients who experienced fasting in nearly the whole Ramadan, total and subscale A, B and C scores significantly increased (positive change) but subscale D score didn't change during this month. In details, patients who had held fasting for more than 25 days experienced 9.47 units increase in GHQ mean total score throughout the month. Moreover, there were 2.77, 2.21 and 2.74 units increment in subscale A, B and C mean scores in this period. In contrast, in patients who experienced intermittent fasting (10 -25 days), not total nor subscales scores significantly changed throughout Ramadan. Detailed results have been shown in Table 3.

Table 1- Baseline characteristics of participants in the study

Variables		0 days	10-20 days	> 25 days	*P*-value
Age (year)	Mean (± SD)	55.62 (± 9.6)	49.01 (± 7.8)	51.64 (± 9.4)	0.006
Disease duration (year)	Mean (± SD)	8.78 (± 6.6)	4.08 (± 3.2)	3.65 (± 3.6)	0.001
Sex (female)	N (%)	37 (63.8)	18 (90)	6 (17.6)	0.001
Education N (%)	Illiterate	10 (17.2)	1 (5)	1 (2.9)	-
	Under diploma	39 (67.2)	16 (80)	21 (61.8)	
	College	9 (15.5)	3 (15)	12 (35.3)	
HbA1c	Mean (± SD)	7.16 (± 0.6)	7.05 (± 0.6)	7.02 (± 0.74)	0.617
GHQ total score	Mean (± SD)	35.84 (± 15.8)	28.05 (± 12.0)	17.26 (± 9.2)	0.001
GHQ subscale A score	Mean (± SD)	10.17 (± 4.8)	8.45 (± 3.8)	4.64 (± 3.5)	0.001
GHQ subscale B score	Mean (± SD)	9.18 (± 4.7)	7.30 (± 3.8)	4.35 (± 3.1)	0.001
GHQ subscale C score	Mean (± SD)	9.74 (± 4.1)	8.45 (± 2.8)	6.61 (± 2.7)	0.001
GHQ subscale D score	Mean (± SD)	6.74 (± 6.0)	3.85 (± 4.5)	1.64 (± 2.5)	0.001

Table 2. Comparison of GHQ scale's and subscales' before-after differences between 3 groups

Variables	Group	N	Mean	*P*-value
Diff*.GHQ.A	0 day	48	-2.06 (4.54)	0.220
	10-25 days	20	-1.50 (4.81)	
	>25 days	34	-.2059 (2.73)	
Diff.GHQ.B	0 day	48	-1.79 (4.38)	0.126
	10-25 days	20	-1.90 (3.32)	
	>25 days	34	-.20 (2.92)	
Diff.GHQ.C	0 day	48	-1.54 (4.20)	0.235
	10-25 days	20	-1.50 (3.87)	
	>25 days	34	.11 (2.87)	
Diff.GHQ.D	0 day	48	-2.12 (5.62)	0.514
	10-25 days	20	-.75 (5.64)	
	>25 days	34	-.70 (2.03)	
Diff.GHQ_total	0 day	48	-7.52 (14.65)	0.064
	10-25 days	20	-5.65 (13.29)	
	>25 days	34	-1.00 (6.78)	

* Diff is "after value – before value"

Table 3. Multiple linear regression model results

Variables	10-20 days fasting		Nearly complete fasting	
	B	*P*-value	B	*P*-value
GHQ.A score change	1.28	0.255	2.32	0.014
GHQ.B score change	0.42	0.683	1.92	0.026
GHQ.C score change	0.36	0.725	1.87	0.032
GHQ.D score change	0.91	0.099	1.73	0.076
GHQ.total score change	4.23	0.208	8.05	0.004

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Discussion

The results of present study revealed that fasting during the whole month of Ramadan can exacerbate patients' general health in comparison with non-fasting patients. In detail, physical symptoms, sleeping and social activities got worse in patients who fasted nearly one month in comparison with non-fasting patients but depression and suicidal tendency did not change significantly through the month of Ramadan.

At the time of present study, Ramadan coincided with the first month of summer with almost hottest days of the year in Yazd. In addition, this period of time included the longest days in the year in which people must bear 16-17 hours abstinence from consuming anything and therefore diabetic patients would encounter with some problems in regular and suitable eating and drinking and also taking medication to control the level of blood glucose. These events could induce adverse effects to physical and also mental health.

Despite scant research projects in the field of general health and Ramadan fasting, the results of them indicated that fasting healthy people got improved in terms of general health at the end of the month (4,12). In our study, similar to other studies, people in each group experienced improvement in general health during Ramadan like in other studies but when we compared two fasting and non-fasting groups suffering from diabetes the final result indicated the adverse effects of fasting on general health. In this regard, we should consider that previous researches worked on one group of people (fasting people), assessing their general health before and after the month of Ramadan and there wasn't a control group.

This fact should also be kept in mind that most of the results we found in this study had been proved in other previous studies evaluated the effects of fasting on different parameters in the population regardless of being healthy or not. For example, In Ramadan people who decide to fast are forced to alter the time of eating and also sleeping. These changes could affect the health of an individual from different aspects including physical, mental and social, leading to negative effects on daily personal and social activities (13).

Meanwhile, the results of previous studies have demonstrated that the time of going to bed at night mostly delays while the time of wake up doesn't change significantly in Ramadan. Therefore the sleeping duration decreases leading to increased fatigue during day time through the holly month (14,15).

In addition, sleep time reduction has some effects on muscles activity on one hand and can alter consciousness and mental function on the other hand. These events lead to neuromuscular coordination disturbance and impaired physical performance (16). In result, social activities may be affected significantly during Ramadan due to disturbed physical and mental status.

Therefore we can't determine whether the main finding of present study (exacerbation of general health in fasting patients) is attributed to fasting regardless of diabetes or has been resulted from the co-existence of fasting and the disease. To resolve this problem, it is recommended to design a study to compare diabetic and healthy fasting individuals.

Conclusions

The results of present study revealed that fasting during the whole month of Ramadan can exacerbate patients' general health in comparison with non-fasting patients. However, because we can't determine whether this finding is attributed to fasting regardless of diabetes or has been resulted from the co-existence of fasting and the disease, it is recommended to design a study to compare diabetic and healthy fasting individuals.

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Conflict of Interest

None.

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