

# Life Style Practice and Awareness during Ramadan Fasting in Bangladeshi Diabetic Population

Amin MF<sup>a</sup>, Afsana F<sup>a</sup>, Jamil SNAA<sup>b</sup>, Sultana R<sup>c</sup>, Hossain FM<sup>c</sup>, Ahmed S<sup>c</sup>, Rehana S<sup>c</sup>, Nazneen N<sup>a</sup>, Afriqeh NH<sup>c</sup>, Ahmed N<sup>c</sup>, Akhter F<sup>c</sup>, Majed S<sup>c</sup>, Pathan F<sup>a</sup>, Latif ZA<sup>d</sup>

## Abstract

**Background:** Observing fast during Ramadan is obligatory for every healthy adult Muslim and a significant number of diabetic patients observe fast during Ramadan in Bangladesh. The objectives of this study were to find out the life style changes and also to assess the patients' awareness during Ramadan fasting.

**Methods:** This non-interventional, cross-sectional study was conducted in the outpatient department of BIRDEM. Total 2272 patients were primarily enrolled but 977 patients fasted at least 15 days or more and fulfilled the inclusion criteria.

**Results:** Mean age of study population was  $49.8 \pm 32$  years, mean duration of diabetes  $8.15 \pm 23$  years and 60% were female. HbA1c done within last six months in 46% patients had a mean of  $8.2 \pm 1\%$ . Out of 977 patients, 29.37% were hypertensive, CKD and IHD were 7.8% and 13.6% respectively. Considering medications 48% were taking oral anti diabetic drug (OAD), 30% were on both OAD and insulin and 22% were only on Insulin. Pre Ramadan counseling was done in only 32% (314) patients though 80.7% (788) patients claimed that they had been particular to doctor's appointment, with an average visit of 3.6 times in a year. Among the 977 patients fasted during Ramadan 63.3% followed the diet chart as pre Ramadan but 44.7% patients took most of allotted meal at Iftar, while 14% patients took the main meal at Sohur. In pre Ramadan, 69% (691) patients were particular in regular exercise but it came down to 1.7% during Ramadan and 43.4% patients hold most of their daily activities. Regarding medications 1.22% patients missed their anti diabetic drug in preceding month of Ramadan but it raised to 23.4% (229) during Ramadan. Minor hypoglycemia was experienced in 14.32% patients during fasting and nearly half of them (6.8%) later needed physician consultation during Ramadan.

**Conclusion:** More than two third of Muslim diabetic patients observes fast, among them only one third consult with their physicians before Ramadan. Due to lack of proper diabetic education most of them increase their daily calorie intake, miss the dose of drug leading to physical weakness and also some of them develop minor hypoglycemia. Therefore, pre-Ramadan counseling and education is necessary for all diabetics planning for fasting.

**Key words:** Diabetic education; diabetes mellitus; Ramadan fasting.

*Birdem Med J 2016; 6(1): 26-31*

## Author Informations

- Dr. Mohammad Feroz Amin, Associate Professor; Dr. Faria Afsana, Registrar; Dr. Noor-E-Nazneen, Senior Medical Officer; Prof. Faruque Pathan, Head; Department of Endocrinology, BIRDEM General Hospital, Dhaka, Bangladesh.
- Dr. Syed Noor Afroze Ashraf Jamil, Deputy Chief Medical Officer, BIRDEM OPD.
- Dr. Syeda Rezina Sultana, Farhana Meher Hossain, Salma Ahmed, Sultana Rehana, Nasreen Ahmed, Nagma H Afriqeh, Fatema Akhter, Saila Majed, SMO, OPD, BIRDEM.
- Prof. Zafar Ahmed Latif, Director, BIRDEM Academy.

**Corresponding Author:** Dr. Mohammad Feroz Amin, Associate Professor, Department of Endocrinology, BIRDEM General Hospital, Dhaka, Bangladesh. Email: feroz\_amin@yahoo.com

Received: May 16, 2015

Accepted: November 30, 2015

## Introduction

Fasting is one of the five pillars of Islam. More than one billion Muslims in the world (18-25% of world population)<sup>1,2</sup> observe an absolute fast (no food or water) between dawn and sunset during a lunar month (the Holy Month of Ramadan). During fasting Muslims abstain from eating, drinking, use of oral medications and smoking from pre-dawn to sunset. Several large epidemiological studies have been performed in Asia<sup>3-5</sup>, Middle East<sup>6,7</sup> and in West African countries<sup>8,9</sup> and none addressed diabetes management during Ramadan and none reported about proportion of diabetic patients who fast during Ramadan. An International Consensus Meeting was held in Morocco in 1995<sup>10</sup> to establish guidelines pertaining to definitions of patient groups

who should be exempted from fasting, as well as recommendations on medication regimens and monitoring of diabetes before, during and after Ramadan. In keeping with this, a large epidemiological study was conducted in 13 Islamic countries comprising of 12,243 individuals with diabetes who fasted during Ramadan showed a high rate of acute complication.<sup>11</sup> However, few studies suggested that complication rates may not be significantly increased.<sup>12,5</sup>

Ramadan fasting entails major changes in dietary pattern and frequency. These changes could potentially induce metabolic alterations in both healthy and diseased Muslims. Despite taking fewer meals this practice is usually compensated by increasing large amounts of sugary food and drinks that are high in carbohydrates and fats. The overall calorie consumption of individuals with type 2 diabetes has been reported to increase during Ramadan. Furthermore, it has been postulated that the act of fasting may increase the risk of poor glycaemic control, which raises question about the safety of Ramadan fasting. As fasting is quite commonly observed by Muslim diabetic patients and they are not following the proper advice during that period of time, our emphasis in this study was to find out the real situation. In our country still no data is available about what percentage of diabetic patients who are in fasting, incidence of hypoglycemia or even food habit during Ramadan. Guidelines emphasize pre-Ramadan screening<sup>11,13</sup> but in true sense the diabetic patients do not undergo this type of screening satisfactorily. Aim of this study was to find out life style practices and knowledge about Ramadan fasting in Bangladeshi population.

### Methods

This non-interventional, cross-sectional study was done in Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) General Hospital, over the succeeding one month following Ramadan in 2014. Type 2 diabetic patients aged 18 years and above of either sex, who fasted for at least 15 days during the month of Ramadan, and those who consented were purposively and consecutively included in this study. Patients who did not have follow up within last six months and unwilling

patients were excluded from the study. The study protocol was approved by Ethical Review Committee of Bangladesh Diabetic Somiti (BADAS). Data were collected from patients in pre-structured questionnaire. The questionnaire used in this study included age of the patient, duration of diabetes, complications of diabetes, anti-diabetic medications, exercise, food habit, health status during Ramadan and diabetic education related to Ramadan.

In this study minor hypoglycemia was defined as an hypoglycaemic event that was self-managed by patients irrespective of the severity of the symptoms and severe hypoglycemia was defined as an event that required assistance of third party for effective treatment.<sup>13</sup> The study patients were also asked if they had documentation of hypoglycemia (blood glucose <3.9 mmol/l) during Ramadan fasting.<sup>14</sup> The data were presented as mean±standard deviation (SD) for continuous variables and percentages for categorical variables. The computations were performed using SPSS for windows version 19.0

### Results

Total patients were 2272, among them 1981 (87.2%) patients fasted for a variable time (table-I). Data from 977 patients were obtained for analysis. Males were 391 (40.03%) and females were 586 (59.97%). Mean age of the study population was 49.8±3.2 years and mean duration of diabetes was 8.15±2.3 years. Common comorbidities were hypertension (287, 29.37%) and diabetes specific complications are presented in table-II. Mean HbA1c, creatinine, alanine aminotransferase (ALT) are presented in table-III.

**Table I.** Distribution of diabetic patients according to fasting status during Ramadan (N=2272)

	Frequency	Percentage
Patients	1981	87.2
who fasted 30 days	1146	57.85
in Ramadan > 15 days	483	24.38
<15 days	352	17.77
Did not fast in Ramadan	291	12.8

**Table II.** Age distribution and complications of the study population (N=977)

Patient characteristics	n (%)
Age	
18-30	33 (3.40)
31-60	784 (79.83)
60+	160 (16.37)
Associated complications	
no	494 (49.5)
yes	483 (49.4)
CKD	76 (7.8)
Retinopathy	77 (7.9)
IHD	123 (12.6)
Others	207 (28.24)

**Table III.** Available investigations of study population within last six months (N=977)

Available investigations	N (%)	M ± SD
HbA1c	453 (46.3)	8.2±1
Creatinine	921 (94.3)	1.1±3
ALT	590 (60.4)	38±4

### Diet and physical activity

Out of 977 patients, 675 (69.1%) reported to do daily physical exercise in pre-Ramadan period but in Ramadan it was found that 17 (1.74%) participants did daily exercise (Table IV). It was also observed that, patients not only stopped exercise during fasting, 425 (43.5%) participants restricted their most of the daily activities except essential ones. During Ramadan 351 (36.7%) participants did not feel to restrict their food rather thought it would be harmful and also timing of food consumption was different among participants. The dietary pattern of the study population is presented in Table-V.

**Table IV.** Physical activities of the study population in pre-Ramadan and Ramadan (N=977)

Habit of physical activities/exercise	n (%)
Daily	675 (69.1)
Infrequent	247 (25.3)
Weekly	40 (4.1)
Never	15 (1.5)
Exercise in Ramadan	
Night	6 (0.61)
Day	11 (1.12)
Restriction of normal activities	
Most activity	425 (43.5)
Limited	552 (56.5)

**Table V.** Food habit during Ramadan (N=977)

Question	n (%)
Percentage of the patients do not feel about importance of calorie restriction in Ramadan	351 (36.7)
Food habit in Ramadan	
Mostly Iftar	437 (44.73)
All the night (ifter, mid-night, sahur)	162 (16.58)
Mostly mid-night food	143 (14.64)
Mostly Sohur	137 (14.02)
Erratic	98 (10.02)

### Diabetes management

The anti-diabetic agents as the patients were using, presented in table-VI. A significantly high number of patients missed anti-diabetic drugs during Ramadan (table-VI). The practices of the study population regarding consultation is shown in table-VII.

**Table VI.** Treatment in study population (N=977)

Drug	n(%)
<b>Insulin</b>	505 (51.69)
Insulin with sensitizer/metformin	290 (29.68)
Only insulin	215 (22.01)
<b>OAD</b>	472 (48.31)
OHA with sensitizer/DDP4	394 (40.32)
Only metformin	60 (6.14)
Both metformin and DDP4	11 (1.13)
Only DDP4	7 (0.72)
Patients who missed dose before Ramadan (within previous month)	12 (1.22)
Patients who missed dose in Ramadan	229 (23.4)

**Table VII.** Doctor consultation before and during Ramadan

Question	Response
Particular about doctor appointment as per date	
Always/strict	788 (80.7)
Infrequent	176 (18)
Very irregular	13 (1.3)
Pre-Ramadan visit	
Yes	314 (32.1)
No	663 (67.9)
Physician visit during Ramadan	
Yes	66 (6.76)
No	911 (93.24)

### Hypoglycemia

In this study, no major hypoglycemia was reported by the patients and 140 (14.32%) patients need to break the fast due to minor hypoglycemia and out of them 66 (6.76%) patients later consulted treating physician. The knowledge of hypoglycaemia of the study population is shown in table-VIII.

**Table VIII.** Knowledge and experience of hypoglycemia in study population

Question	n (%)
Knowledge about hypoglycemia symptom and sugar level	359 (36.74)
Knowledge only on symptom of hypoglycemia	270 (27.64)
No knowledge about hypoglycemia	348 (35.62)
History of previous hypoglycemia (before Ramadan)	
Yes	124 (12.69)
No	853 (87.31)
Experience in hypoglycemia in Ramadan	
Yes	140 (14.32)
no	837 (85.68)
Asymptomatic	638 (66.74)
Symptomatic (weakness, vertigo)	339 (33.26)

### Discussion

This was the first descriptive study in BIRDEM OPD to observe real-life experience about influence of Ramadan on diet and life style changes. The observations provide comprehensive understanding of fasting in our patients.

It was found that nearly 90% of study population fasted in Ramadan. This finding showed similar worldwide trend of fasting in Muslim patients. Epidemiology of Diabetes and Ramadan 1422/ 2001 (EPIDIAR) study showed that about 79% of patients with type 2 diabetes fasted during Ramadan.<sup>11</sup>

Pre-Ramadan counseling is recommended for every patient<sup>10</sup> but nearly 70% of our patients did not come for pre-Ramadan visit. Awareness about diabetes and Ramadan is needed for improvement of present situation.<sup>14</sup> During Ramadan over one-fifth of participants missed their anti-diabetic regimen though it was not their normal practice. In one study it was found that mean adherence to hypoglycemic agent was 79.8%<sup>15</sup> but our study population showed better compliance to the drug in pre-Ramadan period.

Exercise is an integral part of diabetes management and nearly 70% of our patients were on regular exercise before Ramadan, which came down to below 2% patients during

Ramadan. In EPIDIAR study, physical activity was unchanged in approximately half of the study population.<sup>11</sup> In our study, almost all the patients not only stopped exercise but also restricted some of their usual activities and over two-fifth patients restricted most of the daily activities in fear of hypoglycemia. One prospective study done in Singapore showed that most patients did not report any change in their physical activities during Ramadan<sup>16</sup> and it was also observed in some studies that glycaemic control was not affected by physical activity during Ramadan.<sup>17,18</sup> Haouari-Oukerroot al.<sup>19</sup> found that overall calorie consumption remained unchanged during Ramadan though the number of meals was reduced to twice daily. We also observed that the number of meals reduced in Ramadan irrespective of calorie consumption. In EPIDIAR study, about 20% of the patients' food habit was found to be changed<sup>11</sup> in terms of calorie consumption and consumption of sweet drinks.

From the current study it was found that knowledge of hypoglycemia was very poor in our patients and one-third were not aware of blood glucose level or symptoms of hypoglycemia. In this study, one-third patients developed various physical symptoms of hypoglycemia like weakness and vertigo during Ramadan and minor hypoglycemia was reported in 14.32% cases. In EPIDIAR study, during the year preceding Ramadan, 4% of patients with type 2 diabetes had experienced at least one episode of severe hypoglycemia requiring hospitalization but in Ramadan, these frequencies were 2%.<sup>11</sup> In our study no patient developed severe hypoglycemia but 13% had history of hypoglycemia in previous year. During Ramadan, lower rate of hypoglycemia in our study might be due to more omission of anti-diabetic drugs, more calorie consumptions and food intake at night time. In our study hospitalizations were not increased during Ramadan as reported in some other studies.<sup>20,21</sup>

#### Limitations and recommendation

This study had a number of limitations. The subjects participated may not be representative of all the diabetic patients in country. The study relied on patients' self-reported information such as dietary pattern, physical activities and incidence of hypoglycemia. Quality of data might be affected by recall only. Further studies should compare role of pre-Ramadan counseling about fasting and with various type of anti-diabetic regimen in relation to their risk of hypoglycemia.

#### Conclusions

From the current study, it can be concluded that pre-Ramadan visit and counseling was poor in the study population. Most patients gave up their physical exercises and majority restricted usual physical activities. Frequency and pattern of food intake varied and number of omission of anti-diabetic drugs increased during Ramadan. No major hypoglycaemia occurred but over one-tenth experienced minor hypoglycaemia. It is assumed that pre-Ramadan counseling will improve the overall situation.

**Conflict of interest:** None.

#### References

1. The Canadian Society of Muslims: Muslim population statistics [article online], 2000. available from <http://muslimcanada.org/muslimstats.html>. (Accessed 14 April 2005)
2. An analysis of the world Muslim population by country/region [article online]. Available from [http://www.factbook.net/muslim\\_pop.php](http://www.factbook.net/muslim_pop.php). (Accessed 14 April 2005)
3. Cheah JS, Wang KW, Sum CF. Epidemiology of diabetes mellitus in the Asia-Pacific region. *Ann Acad Med Singapore* 1990; 4:501-5.
4. Cockram CS. The epidemiology of diabetes mellitus in the Asia-Pacific region. *Hong Kong Med J* 2000;1:43-52.
5. Mafauzy M, Mohammed WB, Anum MY, Zulkifli A, Ruhani AH. A study of the fasting diabetic patients during the month of Ramadan. *Med J Malaysia* 1990;1:14-17.
6. Salti IS, Khogali M, Alam S, Nassar N, Haidar NA, Masri A. The epidemiology of diabetes mellitus in relation to other cardiovascular risk factors in Lebanon. *East Mediterr Health J* 1997; 3:462-71.
7. Kadiki OA, Roaeid RB, Bhairi AM, Elamari IM. Incidence of insulin-dependent diabetes mellitus in Benghazi, Libya (1991- 1995). *Diabetes Metab* 1998;5:424-27.
8. Bessaoud K, Boudraa G, Deschamps I, Hors J, Benbouabdallah M, Touhami M. Epidemiology of juvenile insulin-dependent diabetes in Algeria (Wilaya of Oran). *Rev Epidemiol Sante Publique* 1990;2:91-99.
9. Belkhadir J, el Ghomari H, Klocker N, Mikou A, Nasciri M, Sabri M. Muslims with non-insulin dependent diabetes fasting during Ramadan: treatment with glibenclamide. *BMJ* 1993; 6899: 292-95.
10. International Meeting on Diabetes and Ramadan Recommendations: Edition of the Hassan II Foundation for Scientific and Medical Research on Ramadan. Casablanca, Morocco, FRSMR, 199.

11. Salti I, Benard E, Detournay B, Bianchi- Biscay M, Le Brigand C, Voinet C, et al. The EPIDIAR Study Group: A population-based study of diabetes and its characteristics during the fasting month of Ramadan in 13 countries: results of the Epidemiology of Diabetes and Ramadan 1422/2001 (EPIDIAR) study. *Diabetes Care* 2004;27:2306–11.
12. Laajam MA. Ramadan fasting and non-insulin-dependent diabetes: effect on metabolic control. *East Afr Med J* 1990;67:732–36.
13. Lee JY-C, Tsou K, Lim J, Koh F, Ong S, Wong S. Symptom-based Insulin adjustment for Glucose Normalization(SIGN) algorithm: a pilot study. *Diabetes Technol Ther* 2012;14:1145–48.
14. Pinelli NR, Jaber LA. Practices of Arab American type 2 diabetes mellitus during Ramadan. *Journal of Pharmacy Practice* 2011;24:211–15.
15. Richard G, Alyce S, Connie M, Trianty F, Zhang P. Relationship between Patient Medication Adherence and Subsequent Clinical Inertia in Type 2 Diabetes Glycemic Management. *Diabetes care* 2007;30:808-12.
16. Melanie Y, Daniel E, Rinkoo D, Shaikh A. Evaluating the Effect of Ramadan Fasting on Muslim Patients with Diabetes in relation to Use of Medication and Lifestyle Patterns: A Prospective Study. *Int J of Endocrinol* 2014;308546. (accessed April 30, 2015)
17. Rahman MAA, Manssor AJ, Marbut MM. The effect of Ramadan fasting & moderate exercise on body weight, serum glucose & lipid profile in healthy fasting subjects. *Medical Journal of Tikrit* 2006;2:26–30.
18. Khan N, Khan MH, Shaikh MZ, Khanani MR, Rasheed A. Effects of Ramadan fasting and physical activity on glucose levels and serum lipid profile among type 2 diabetic patients. *Pakistan Journal of Medical Sciences* 2012;28:91–96.
19. Haouari-Oukerro F, Ben-Attia M, Ka<sup>^</sup>abachi N, Haouari M. Ramadan fasting influences on food intake consumption, sleep schedule, body weight and some plasma parameters in healthy fasting volunteers. *African Journal of Biotechnology* 2013;12:3327–32.
20. Alghadyan AA. Retinal vein occlusion in Saudi Arabia: possible role of dehydration. *Ann Ophthalmol* 1993;25:394–98.
21. Temizhan A, Donderici O, Ouz D, Demirbas B. Is there any effect of Ramadan fasting on acute coronary heart disease events? *Int J Cardiol* 1999;70:149–53.