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## **Fasting and diabetic care during Ramadan in Libyan peoples with diabetes in Tripoli Diabetes Endocrine Hospital**

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### **Abstract**

**Background:** The last epidemiological study regarding diabetes in Libya in year 2009 is estimated to reach 16.4%, This study is the up to date study regarding diabetes care during Ramadan in Tripoli.

**Study design:** cross section study. Material and method: we interviewed 300 diabetic patient at outpatient Clinic in Tripoli Diabetes and Endocrine Hospital for the frequency, the Incidence of complication of fasting and diabetic care during fasting Ramadan, the data was collected 4week after Eid Elifitr 1434 Hijri (2013) in structural questionnaire after a verbal consent. **Collected data:** coded and spss software used for analysis. **Results:** from total 300 Libyan diabetic patients 62% were females, 71.3% were type 2 diabetes. Mean age was 51.1±15.4 years, and mean duration of diabetes was 8.7±6.9 years, 85.3% had their HBA1C checked With last three month, mean HBA1C 8.9±3.1%, 73% were complete fasted 29 days , hyper-hypoglycaemia at day time was the most commonly reported Complication especially during the 4<sup>th</sup> week of fasting, there is no significant difference between types of diabetes and gender in self monitoring of blood sugar, late sahour, preramadan education ,changes In dose of treatment( $p > 0.05$ ). **Conclusion:** Most of diabetic patients in Libya mange to fast during Ramadan. Recommendation: pre Ramadan diabetic education is needed to avoid the serious complication.

**Key words:** hypo; hyperglycemia; fasting, Libya, Ramdan.

## Introduction

In the Muslim population in several countries the prevalence of diabetes is increasing by 10% per years as result of urbanization and socioeconomic changes.<sup>(1)</sup> The Islam is increasing worldwide. Fasting is one of the five pillars of Islam. In this year the fasting hours is very long about (16 hours). Therefore the long fasting will effects the health of the faster especially once with chronic disease. But, the kind Islam gives excuse for fasting to those once.<sup>(2,3)</sup> . The metabolic impacts of fasting for people with diabetes are increased risk of hypoglycaemia and postprandial hyperglycaemia with or without diabetic ketoacidosis, dehydration, and Thrombosis.<sup>(4)</sup>. The effect of fasting on type 1 diabetes mellitus result in excessive glycogenolysis, glyconeogenesis, ketogenesis, this may lead to hyperglycemia and ketoacidosis. While in type 2 diabetes treated with oral hypoglycaemic agent drug who were stable and not have any complication . can fasting easy <sup>(5)</sup> . several large epidemiological studies conducted on diabetic fasting as in EPIDIAR study which involved 13 countries ,and 12.243 individuals, showed 79% of type2 and

43% of type 1diabetics fasted at least 15 days during Ramadan.<sup>(5)</sup> and also in Benghazi study (BDEC study) included 97.7% type 2, and 95.8% type 1 fasted at least 15 days .<sup>(6)</sup>Therefore , a preramadan diabetes assessment and education is recommended to aware the diabetic risks, of fasting and to avoid the complication by certain advices .<sup>(4)</sup>

The objective of this study was to define the frequency of fasting , complication, and to assess the diabetic care of patients during fasting .

## Subjects and methods

Across sectional study conducted by patients were interviewed by face to face of 300 diabetic patients , who attended the OPD of Tripoli diabetes and endocrine centre (TDEC)during the four weeks after Eid Elifitr (1434)Hijri (2013), and the specific form sheet was filled by the researcher who enrolled in the study. The following parameters were assessed: age ,sex, type of diabetes, duration of diabetes, type and changing in the dose of treatment during Ramadan, level of HbA<sub>1</sub>C within three months, number of fasted days,

complication of fasting, number of self reported hypo- or hyperglycemia and hospital admission, diabetic care during Ramadan by asking question if receiving any education about excessive fluid intake , meal planning physical activity for fasting smoothly and changes dose of treatment, late sahour, blood sugar the main reason of breaking fast was hyperglycaemia(14.7% of causes) followed by 10% hypoglycaemia while analysis during Ramadan. Hypoglycaemia was defined as that feeling symptoms of the patient as hypoglycemia and urged him \ her to break fasting with or without documented low blood glucose, and it was categorized as sever or mild according the treatment needed by the patients alone or with or without to assistance or hospitalization . The sever hyperglycaemia was defined as reported blood sugar >300 mg/dl by self or by lab.

**Statistical analysis:** SPSS software version 10 was used for data analysis ,

chi-square one way ANOVA test used to study the association between variables difference were considered significant when the p . value was < 0.05.

### **Results**

Out of the 300 patients 71.3% were type II Diabetes, 62% were female, mean age was  $51.1 \pm 15.4$  years and mean duration of diabetes was  $8.7 \pm 6.9$  years. 72.3% live in Tripoli, 43% were house wives and 24.7% illiterate, 85.3% had their HbA1c checked within the three months preceding the study and their mean HbA1c was  $8.9 \pm 3.1\%$  and 65.7% of them are treated with insulin. The mean number of fasted days was  $25.4 \pm 8$  days, about 73% of patients completed 29 days of fasting, and 16% fasted at least 15 days (tab.1). The other causes contributed to about 3.3% ( chronic renal failure, cerebrovascular events, ischemic heart disease and heart failure) (fig 1).

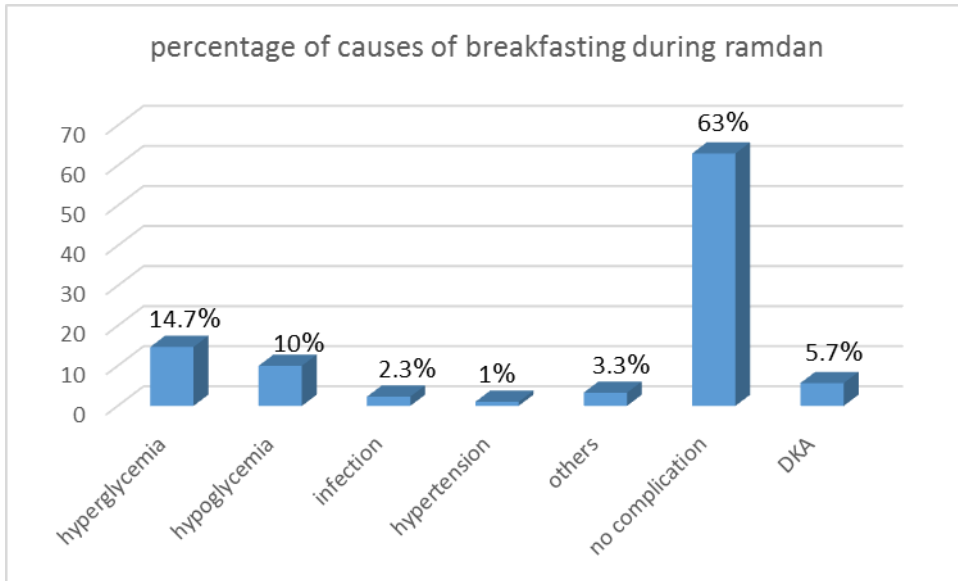


Figure (1). Percentage of causes of breakfasting during Ramadan

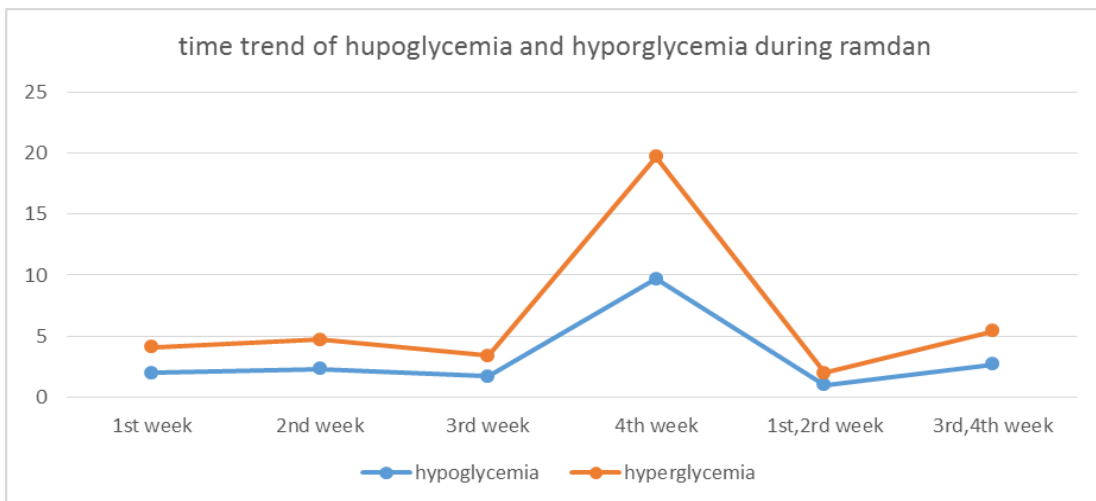


Figure (2). Time trend of hypoglycaemia and hyperglycaemia during Ramadan.

Table (1) general characteristics of the study(N=300).

Characteristics	Males	Females	P.Value
Number of patients	114(38%)	186(62%)	
Mean age (years)	50.3±17.3	51.6±14	0.02
Mean duration of diabetes (years)	8.8±7.4	8.4±6.6	0.672
Mean number of fasted days	25.4±8.1	25.5±7.9	0.53
Fasted complete months	75.40%	71.50%	0.77
≥ 15 days fasting	13.20%	17.70%	0.77
Mild hypoglycaemia	7.90%	9.10%	0.56
sever hypoglycaemia	2.60%	1.10%	0.56
Mild hyperglycemia	14.90%	17.70%	0.27
hyperglycemia	12.30%	7%	0.27
Required admission			
Admission	13.20%	7%	0.07
Mean HbA1c	9.1±3.1	8.8±3	0.17
HbA1c checked in 3months	84.20%	86%	0.66
Type II diabetes	62.30%	76.90%	0.007
No dose change	58.80%	65.10%	0.37
Late sahour	83.30%	80.10%	0.48
Self monitoring of blood sugar	43.90%	48.90%	0.69
Received pre-Ramadan education	32.80%	67.20%	0.118

Table(2) comparison between type 1 and type 2

Character	Type I	Type II	P value
Number of patients	86(28.7%)	214(71.3%)	
Mean age (years)±SD	35.9±13.8	57.2±11.2	0.000
Mean duration of diabetes (years)±SD	8.6±7.1	8.8±6.9	0.71
Female%	50%	66.80%	0.007
Mean fasting(days)±SD	21.9±10.5	26.9±6.2	0.000
Compleat fasting	52.30%	81.30%	0.000
Fasting≥15 days	26.70%	11.70%	0.000
Mild hypoglycaemia	14%	6.50%	0.000
sever hypoglycaemia	3.50%	9%	0.000
required admission			

<b>Mild hyperglycemia</b>	23.30%	14%	0.000
<b>sever hyperglycemia required admission</b>	20.90%	4.20%	0.000
<b>Admission</b>	22.10%	4.20%	0.000
<b>No dose change during fasting</b>	59.30%	64%	0.85
<b>Mean HbA1c</b>	10±2.4	8.5±3.2	0.007
<b>HbA1c checked in 3months</b>	96.20%	80.80%	0.001
<b>Late sahour</b>	79.10%	82.20%	0.52
<b>Self monitoring of blood sugar</b>	55.80%	43.50%	0.11
<b>Receiving pre- Ramadan education</b>	33.60%	66.40%	0.11

Table (3) comparison between the type of treatment.

	<b>Insulin</b>	<b>Oral antidiabetic drug</b>	<b>Diet</b>	<b>P -value</b>
<b>Number of patients</b>	197(65.7%)	99(33%)	4(1.3%)	0
<b>Mean age (years)±SD</b>	48.9±16	55.9±13	42.2±3.5	0.001
<b>Mean duration of diabetes (years)±SD</b>	10.5±7.0	5.4±5.4	1.2±0.95	0
<b>Mean HbA1c</b>	9.5±2.5	7.8±3.1	8.07±2.7	0
<b>checked HbA1c</b>	87.80%	79.80%	100%	0.13
<b>Mean fasting(days)±SD</b>	24.1±9.4	28.2±2.6	28.0±2	0
<b>Mild hypoglycaemia</b>	9.10%	8.10%	0%	0.911
<b>sever hypoglycaemia</b>	9.10%	10%	0%	0.911
<b>sever hyperglycemia</b>	12.20%	3%	0%	0.001
<b>Admission</b>	13.20%	2%	0%	0.006

Table 4 incidence Glycaemic derangement

Glycaemic derangement	Total No of episodes	Incidence rate
Mild hyperglycemia	50	16.6/100 patients
Required admission	27	9/100 patients
Mild hypoglycaemia	26	8.6/100 patients
Required admission	5	1.6/100 patients

Table( 5) comparison TDEC,BDEC, and EPIDIAR study

Characteristics	TDEC	BDEC	EPIDIAR
Lunar year(Gergorian)	1434Hijri(2013)	1429Hijri(2009)	1422Hijri(2001)
Total number of patients	300	493	12.243
Percentage of typeIIDM	71.30%	95.10%	91.30%
Mean age for typeI±SD	35.9±	38.3±15years	31±12.7years
Mean age for typeII±SD	57.2±11.2	60.1±10.5years	54±11years
Dose change during Ramadan	37.30%	73.20%	27.90%
TypeI Fasting≥ 15 days	26.70%	95.80%	9.4-71.6%
TypeII Fasting≥ 15 days	11.7%days	97.70%	57.8-89.8%
Mean fasting day for TypeI	21.9%days	27.5days	18.1-25.6days
Mean fasting day for TypeII	26.9%days	28.5days	23.9-28.5days
Hypoglycemia requiried admission	1.70%	0.20%	2.60%
Hyperglycemia requiried admissio	9%	1%	4.70%

TDEC (Tripoli Diabetic Endocrine &BDEC(Benghazi Diabetic Endoctrine Center)

Hospital admission during Ramadan was mainly due to hyperglycemia with 9%, followed by diabetic ketoacidosis with 5.7%, then 1.7% due to severe hypoglycemia required admission. While 8.7% had mild hypoglycemia. Admission rate of the hospital during Ramadan in

this study was 9.3% (tab.1). Regarding diabetic care during Ramadan, about 41.7% of patients received education pre Ramadan fasting (about dose changes, meal planning, excessive fluid intakes, physical activity etc.....). Most of patients (62.7%) fasted with no changes in their

treatment during Ramadan, 47% of them had their blood sugar self monitored during Ramadan, and 81.3% managed to have their dawn meal (sohour) as late as possible. There was statistically significant difference between type I and type II diabetes regarding number of days fasted, frequency of hypoglycemia or severe hyperglycemia, pre Ramadan checked HbA1c and late sohour, self monitoring of blood sugar and education before Ramadan (tab 2). Among diabetic patients during Ramadan 65.7% were on insulin therapy, 33% were on oral hypoglycemic agents and 1.3% was on diet control only. There was significant difference between those who were treated with insulin or oral anti-diabetic agents in the mean HbA1c ,mean fasted days, severe hyperglycemia, and admission rate (tab.3). The incidence of Hypoglycemia during Ramadan was 10.2 episodes/100patients, while the incidence of severe hyperglycemias was 9/100 patients (tab.4), about 10.2% of hypoglycaemic episodes and hyperglycaemic episodes occurred during the last weeks of Ramadan (fig.2). There was no significant difference between males and females regarding mean number of fasted days, frequency of

hypoglycaemia or severe hyperglycemias or in HbA1c checked last 3 months before Ramadan, admission rate, late sohour, self monitoring of blood sugar during Ramadan or education before Ramadan.

### **Discussion**

This study revealed that both type I and type II diabetic patients in Tripoli can fast more frequently than those in other Muslim counties, with less episodes of hyperglycemias and hypoglycaemia (tab.5). This is could be partially explained due to strong motivation to fast Ramadan among diabetic Libyans than Muslim people in other countries. Most of patients did not change their treatment regimen during Ramadan as compared to those in EPIDIAR study (5), but more than half of the diabetic patients had some treatment adjustment during Ramadan as in BDEC study (6), which probably contributed to the less days of breaking fast during Ramadan. The most common complication in this study that occurred during Ramadan was hyperglycemia followed by hypoglycemia. Both were more noticed in type I than type II these were the main two reasons for breaking fast also



reported by EPIDIAR study (5) and BDEC study (6). However, both hyperglycemia and hypoglycemia were more frequent during the last week of fasting opposite to the first two weeks as reported by the BDEC study (6) perhaps because change in dietary habits of patients is more harmful to their conditions and during the last few days of Ramadan the process of fasting itself become more hard besides desire to eat too much and having late sohor is decreased when compared to the first half of the month. There was a significant difference between type I and type II diabetic regarding fasting rate, admission rate and episodes of hyperglycemia and hypoglycemia during Ramadan the same as in BDEC study (6) and EPIDIAR study (5). In type I diabetes, higher risk of complication during Ramadan fasting (8) is mainly explained by excessive glucogenolysis, gluconeogenesis and ketogenesis which lead to more liability to develop hyperglycemia and ketoacidosis (7). In our study the mean

HbA1c in type I patients was  $10\pm 2.4\%$  while in type II was  $8.5\pm 3.2\%$ , both were above the recommended goal of  $< 7\%$  and exceeded the percentage published in BDEC study (6). In our study it would be more likely that they will get a more frequent of hyperglycemias in type I and hypoglycaemia in type II. and no significant difference between types of diabetes and gender in late sohor and self monitoring of blood sugar pre Ramadan education.

**Conclusion:** Both type I and type II diabetic patients in Tripoli managed to fast more frequently when compared to diabetics in other Muslim countries. Fasting during Ramadan for patients with diabetes carries a risk of complications such as hyperglycaemia, diabetic ketoacidosis, and hypoglycaemia and more liability to hospital admission especially among type I patients. On the other hand, most of type II patients fasted with fewer tendency for complication and less hospital admission rate.

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