

## Short Term Outcomes for Adolescents with Diabetes Mellitus during Fasting Ramadan

Nariman Farid<sup>1</sup>, Safy Salah Eldin El-rafay<sup>2</sup>, Hyam Refaat Tantawi<sup>3</sup>

M.Sc<sup>1</sup>, Professor of Pediatric Nursing<sup>2,3</sup> -Faculty of Nursing, Ain Shams University-Cairo-Egypt.

### Abstract

**Background:** Short term clinical outcomes associated with Ramadan fasting for adolescent with uncontrolled diabetes include hypoglycemia, hyperglycemia with or without the risk of impending ketosis, dehydration, and thrombosis. **Aim:** This study aims to assess adolescent knowledge related to diabetes management and short term outcomes during fasting Ramadan **Design:** A descriptive design was used. **Setting:** This study was conducted at the outpatient diabetic Unit, affiliated to Ain Shams University Hospital **Sample:** A purposive sample included 50 adolescent with diabetes mellitus who fasting Ramadan; **Tools:** 1) structured interview questionnaire for adolescents with diabetes during fasting Ramadan. It is composed of Socio-demographic characteristic, Assessment of adolescents' medical health, Knowledge about diabetes and short term outcomes management during Ramadan 2) reported practice checklist. **Results:** The present study revealed that near two thirds of adolescents had an unsatisfactory level of knowledge to all items about diabetes. **Conclusion:** there were statistically insignificant relations between the adolescent's knowledge of diabetes management and short term outcomes during Ramadan. **Recommendations:** Health education programs about disease and its management modalities should be provided for diabetic adolescent using new methods of teaching such as computer assisted instructions and home videos.

**Key words:** Adolescent, Diabetes Mellitus, Short term outcomes.

### Introduction

Diabetes mellitus is a group of metabolic diseases characterised by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The abnormalities in carbohydrate, fat, and protein metabolism that are found with diabetes are due to deficient action of insulin on target tissues. If ketones are present in blood or urine, treatment is urgent, because ketoacidosis can evolve rapidly (*American Diabetes Association, 2017*).

Ramadan is a lunar-based month, and its duration varies between 29 and 30 days. Muslims who fast during Ramadan

must abstain from eating, drinking, use of oral medications, and smoking from predawn to after sunset; however, there are no restrictions on food or fluid intake between sunset and dawn. Most people consume two meals per day during this month, one after sunset and the other before dawn (*Ibrahim et al., 2015*).

Fasting is a religious, spiritual and social activity in our society. Many Muslim adolescents start their fasting trials around the age of 10-11 years, and this is usually a new, challenging and interesting experience for them. However, for the diabetic adolescents, the challenge is even more, as they want to be able to

do what their healthy peers can do, and at the same time, they have to try to maintain a good control of their blood glucose levels as much as possible (*Beshyah et al., 2018*).

Short term clinical outcomes associated with Ramadan fasting for adolescent with uncontrolled diabetes include hypoglycemia, hyperglycemia with or without the risk of impending ketosis, dehydration, and thrombosis. There have not been any published reports of increased hospitalizations due to thrombotic cardiac or cerebral conditions in fasting persons whose diabetes is reasonably well controlled (*Beshyah et al., 2017*).

Management of diabetes during Ramadan is more complicated than many other conditions. It involves a careful balance between lifestyle and medications rather than just changing the times of a given medication. The situation is getting more complicated with the increasing number of anti diabetic drugs with different hypoglycemic potential (*Morris, 2020*).

#### **Significance:**

It is estimated that there are 1.1-1.5 billion muslims worldwide, comprising (18-25%) of the world population fasting during ramadan. Ramadan is the holy month of the Islamic year during which all healthy Muslims. Although children and sick people are exempted from fasting but many of this group, want to fast despite the medical advice against it. This includes a subset of adolescent with diabetes, which carries a considerable risk. Hypoglycaemia and hyperglycaemia are among the main hazards. Majority of Muslims with diabetes can fast safely during Ramadan; however some are placed at a greater risk.

#### **Aim of study**

This study aims to assessing of adolescent knowledge related to diabetes management and short term outcomes during fasting Ramadan.

#### **Research questions**

What is adolescent knowledge about diabetes management and short term outcomes during fasting Ramadan.

#### **Subjects and Methods**

**Design:** A descriptive study design was used to achieve the aim of this study.

**Setting:** This study was conducted at outpatient diabetic clinics affiliated to Ain Shams University Hospitals.

**Subject**A purposive sample of (50) adolescent with diabetes mellitus who fasting Ramadan .

**Criteria of selection:** Age between (13-18) years Diagnosed with diabetes from one year at least regardless their educational level, residence and gender.

**Tools of data collection:** Two tools were used for data collection related to this study:

• **Structured interview questionnaire tool:** It was developed by the researcher based on reviewing of literatures, considering the aim of the study and the data needed to be collected. It was divided into three parts.

• **First part:** Socio-demographic data: were used to describe characteristic of the studied adolescent as regard (age, gender, level of education, Ranking).

• **Second part: Assessment of adolescent medical health** Medical history of adolescent with diabetes as present and past medical history, family health history and treatment regimen. It composed of (8) yes or no with open end questions for question with yes response.

• **Third part:** It include questions to assess patients' knowledge about short term outcomes and management of diabetes during Ramadan

It was included (30) MCQ and yes or no questions, it was covered the following three sections.

**Section 1:** It was concerned with assessment of adolescent's knowledge regarding diabetes such as definition, risk factors, types, signs and symptoms, investigations and complications.

**Section 2:** It was concerned with assessment of adolescent's knowledge about short term out comes during fasting

**Section 3: it was concerned with** adolescent knowledge about management of short term outcomes of diabetes on fasting Ramadan

#### ❖ **Scoring system:**

A scoring system was followed to assess adolescent' knowledge related to diabetes management and short term outcomes during fasting Ramadan. The Questionnaire was contained of 30 questions, the total scores of these questions were 60 grades, the correct answer was scored as two point, the incomplete correct answer was scored as single point and the incorrect answer was scored as a zero point. These scores were summed and were converted into a percent score.

**It was classified into 2 categories:**

- **Satisfactory** level of knowledge if score  $\geq 60\%$ .
- **Unsatisfactory** level of knowledge if score  $<60\%$ .

#### **Tool II- Reported practice:**

It was adopted from Department of Pediatrics All India Institute of Medical Sciences, Nursing Policies and Procedures Committee, (2015). This reported practice was used to assess practices as foot care, glucose monitoring, insulin injection and hygiene.

#### **Content and Face Validity and Reliability:**

- Face and content validity was ascertained by a group of seven experts from pediatric nursing department at faculty of nursing, Ain Shams University, their opinion will be elicited regarding format, accuracy, relevance of the tools to the aim and its appropriateness to achieve the objectives.
- Reliability analysis by measuring of internal consistency of the tool through **Cronbach's Alpha test.**

#### **Pilot Study**

Carried out on 5 adolescents Diagnosed with diabetes those represent 10% of the study sample at outpatient diabetic clinics affiliated to Ain Shams University Hospitals. In order to test the applicability of the constructed tool and the clarity of the included questions related to adolescents' knowledge related to diabetes management and short term outcomes during fasting Ramadan and the reported practice to diabetes management. The pilot has also served to estimate the

time needed for each subject to fill in the questions. According to the results of the pilot, some corrections and omissions of items were performed so the pilot adolescents were not included in the main study sample.

### Fieldwork

An approval was obtained from the director of Children's Hospital affiliated to Ain Shams University Hospitals. A letter was issued to them from the Faculty of Nursing, Ain-Shams University, explaining the aim of the study in order to obtain their permission and cooperation.

### Ethical Considerations

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The research approval was obtained from the Faculty Ethical Committee before starting the study.

**The ethical research considerations include the following:**  
**Results**

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**Table (1):** shows that, the mean age of the study group is  $14.15 \pm 7.5$  year. Regarding to gender, 60% of the study group is females. Regarding to educational level, 44% of the study group have secondary or diploma education. Moreover, 56% of the study group their ranking in the family is the first child, respectively. Also, 60% of the study group have whats app mobile application.

**Table (2):** shows that, (56%) of the study diagnosed with diabetes from symptoms. Also, (40%) of the study discover the disease from 3-6 months. Moreover, (56%) of the study groups have family history of diabetes.

- The researcher was clarified the objectives and aim of the study to adolescents included in the study before starting.
- Verbal approval was obtained from the adolescents before inclusion in the study; a clear and simple explanation was given according to their level of understanding. They secured that all the gathered data was confidential and used for research purpose only.
- The researcher was assuring maintaining anonymity and confidentiality of subjects' data included in the study
- The subjects were informed that they are allowed to choose to participate or not in the study and they have the right to withdrawal from the study at any time.

Meanwhile, (100%) of the study groups treated with insulin

**Table (3):** shows that, 48% of the study group have past history of hypoglycemic coma, 66.7% of them haven't for once. Also, 40% of the control group have past history of hypoglycemic coma, 60% of them have it for once. Moreover, 40% of the study group have past history of hyperglycemic coma, 50% of them have it for once. Also, 32% of the control group have past history of hyperglycemic coma, 75% of them have it for once.

**Table (4)** shows that, there is marked unsatisfactory level of knowledge about diabetes of the studied adolescents.

**Table (1):** Number and percentage distribution of the studied adolescents according to their demographic data.

	Items	No	%
<b>Gender</b>	Male	20	40
	Female	30	60
<b>Age</b>	10<12 year	6	12
	13-<15 year	20	40
	15-18 year	24	48
<b>x̄ S.D</b>		<b>14.15 ± 7.5</b>	
<b>Educational level</b>	Illiterate	2	4
	Read and write	6	12
	Preparatory	16	32
	Secondary or Diploma	22	44
	University education	4	8
<b>Ranking in the family</b>	First	28	56
	Second	6	12
	Third	12	24
	Fourth	4	8
<b>Does your mobile have whats app</b>	Yes	30	60
	No	20	40

**Table (2):** Number and percentage distribution of the studied adolescent according to their clinical data. (n=50).

	Items	No	%
<b>Method of detection of the disease</b>	From symptoms	28	56
	From complications	16	32
	Routine checkup	6	12
<b>How you behave when disease discovered?</b>	Going to hospital	36	72
	Go to the doctor	14	28
	Consult your neighbors	0	0.0
	Going to the mosque or the church	0	0.0
	Taking medical herbs	0	0.0
<b>Time of discover the disease</b>	Less 3 months	8	16
	3-6 months	20	40
	6-9 months	12	24
	9-12 months	10	20
<b>Family history of diabetes</b>	Yes	28	56
	No	22	44
<b>Medical history from other disease</b>	Yes	8	16
	No	42	84
<b>Surgical history</b>	Yes	6	12
	No	44	88
<b>Type of medication you taking for diabetes</b>	Insulin	50	100
	Tablets	0	0.0
<b>Taking treatment for any other disease</b>	Yes	8	16
	No	42	84

**Table (3):** Number and percentage distribution of the studied adolescent according to their clinical data. (n=50).

Items	Study group (n=50)	
	No	%
<b>Past history of hypoglycemic coma</b>		
Yes	24	48
No	26	52
<b>Number of times you have hypoglycemic coma</b>	(n=24)	
One	16	66.7
Two	6	25
Three	2	8.3
<b>Past history of hyperglycemic coma</b>		
Yes	20	40
No	30	60
<b>Number of times you have hyperglycemic coma</b>	(n=20)	
One	10	50
Two	6	30
Three	4	20
<b>Did you have any other complications</b>		
Yes	6	12
No	44	88

**Table (4):** Number and percentage of the study group regarding to their knowledge about diabetes (n=50).

Items	Study group					
	Correct		Incomplete correct		Incorrect	
	N	%	N	%	N	%
Definition of diabetes	4	8	10	20	36	72
Normal range of blood sugar	8	16	0	0.0	42	84
Diabetes is a controlled disease	12	24	0	0.0	38	76
Signs and symptoms of diabetes mellitus	6	12	12	24	32	64
Causes of diabetes mellitus.	4	8	10	20	36	72
Complications of diabetes.	6	12	10	20	34	68
Signs of hypoglycemic coma.	4	8	8	16	38	76
Symptoms that appear during fasting	6	12	14	28	30	60
When fasting is broken	0	0.0	10	20	40	80
When you have to measure blood sugar	4	8	14	28	32	64

## Discussion

Fasting during the holy month of Ramadan is one of the five pillars of Islam and is obligatory on all adult Muslims. Although the Quran states that, the sick are exempt from fasting there is a lack of consensus on the definition of "the sick". Many people with diabetes do

not view themselves as "sick" and are indeed able to fast. In pathophysiological terms fasting can pose significant risks to adolescents with diabetes and therefore health care professionals have debated for many years whether or not to consider diabetes as an absolute contraindication to fasting in Ramadan (Beshya, 2012).

The current study showed that, two thirds of the studied adolescents were

females, the mean age of the studied adolescents was (14.15  $\pm$ 7.5), and less than half of them had secondary or diploma as an educational level. Moreover two thirds of them had whats-App mobile application (**table 1**).

This was in agreement with (**Beshya et al., 2011**), who studied “Practical management of diabetes during Ramadan Fasting “revealed that, two thirds of the studied group were females, less than half of them were in the age group (15-20 years old) with secondary educational level, and almost two thirds of them were the first child in their families and had whats-app mobile application.

The current work mentioned that, more than half of the studied adolescents had family history of diabetes and the disease was detected in them from symptoms, less than half of them discovered the disease for 3-6 months, and all of them treated with insulin (**table 2**).

This was supported by the study of (**Ahmedani et al., 2014**), which was about “ Implementation of Ramadan-specific diabetes management recommendations: a multi-centered prospective study from Pakistan” reported that, more than half of the studied group discovered their disease from symptoms with positive family history of having diabetes, and all of them were taking insulin as a treatment.

Also the current study reported that, less than half of the studied adolescents had previous attacks of hypoglycemia which in more than two thirds of them it occurred once. Moreover, more than one third of them had previous attacks of hyperglycemia which in half of them it occurred once, (**table 3**).

In the study of **Rewers et al. (2012)**, which was about “Predictors of

acute complications in children with type 1 diabetes.”, regarding the clinical data of the study group, less than half of them had past history of hypoglycemic attack which happened for one time, and more than one third of them had hyperglycemic attack that occurred once.

The current work revealed that, near two third (64%) of the studied adolescents had unsatisfactory knowledge about (diabetes, its complications, and its treatment) (**table 4 & figure 1**).

This was in agreement with (**Sullivan-Bolyai et al., 2012**), whose study was about “Development and pilot testing of education intervention for type 1 diabetes clarified that, there was unsatisfactory level of the total knowledge of the studied group about diabetes, its complications and how to treat it.

## Conclusion

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Near two thirds of the studied adolescents had unsatisfactory knowledge regarding short term outcomes and diabetes management during fasting Ramadan.

## Recommendation

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Training programs for diabetic adolescents using new methods of teaching such as computer assisted instructions and home videos

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