

Level of awareness of diabetic ketoacidosis among diabetes mellitus patients in Riyadh

Bara'a Ahmad Farran¹, Rayan Ibrahim Bin Elaiwah¹,
Abdullah Thamer Aldarsouny¹, Abdulmalik Mohammed Alshamrani¹,
Abdulrahman Mohammed Almaslamani¹, Bader Faiz Alsubie¹,
Mohammed Mwafaq Zainab¹, Mohammed Othman Alkulaib¹,
Ammar Khalifah²

¹College of Medicine, Al-Maarefa University, ²Al-Maarefa University, Riyadh, Saudi Arabia

ABSTRACT

Background: Diabetic ketoacidosis (DKA) is considered to be a serious acute life-menacing complication of diabetes type (1) and type (2). The study aims to assess the level of awareness regarding DKA among diabetic patients in the Riyadh population. **Methodology:** The study is an institution-based cross-sectional study with a sample size of 150 participants. The participants are chosen through systemic random sampling, who have type (1) or type (2) diabetes mellitus patients and are 18–35 years of age. The medical personnel were excluded from the study. A self-administered, precoded, and pretested questionnaire was developed especially for this study after consulting literature and epidemiologists containing data about the risk factor, management, and complication. Data were analyzed using (SPSS). A *P* value of less than 0.05 was considered significant. **Results:** 38.67% (58) participants have poor awareness regarding complications, 67.34% (101) have poor knowledge regarding management, and 6% (9) participants have a good knowledge, 38% (57) participants have poor knowledge regarding risk factors and 30% (45) of the participants have good awareness. The relation between having a first degree relative with diabetes and awareness regarding management is significant with a *P* value of 0.022; 73% (110) of the participants had no relatives with diabetes mellitus and 71% (79) had a poor level of awareness regarding the management of DKA. However, 55% (22) of respondents who had relatives with diabetes mellitus also had a poor level of awareness regarding treatment. **Conclusion:** The majority of the participants had a poor level of awareness. There is a relationship between having a first-degree relative with diabetic mellitus and the level of awareness regarding DKA.

Keywords: Awareness, complication, diabetic ketoacidosis, management, risk factors, Riyadh

Introduction

Diabetes mellitus (DM) is a group of metabolic disorders caused by elevated blood glucose level due to the diminishing effects of

circulating insulin, insulin resistance, or increased production of counterregulatory hormones.^[1]

Diabetic ketoacidosis (DKA) is considered to be a serious, acute life-menacing complication of diabetes types 1 and 2. The main factors that expedite the development of DKA are the complete lack of insulin or missed insulin doses. Besides, recurrent DKA is counting to be 20% as a result of contributing factors such as

Address for correspondence: Dr. Bara'a Ahmad Farran, Al-Worood District, Najd National School, P.O. Box: 85822 Riyadh 11612, Riyadh, Saudi Arabia.
E-mail: Dr.baraafarran@gmail.com

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socioeconomic disadvantage, age (13–25 years), gender (female more than male) and psychiatric comorbidities like eating disorders and depression.^[1-4]

However, it rarely occurs without precipitating events. The DKA patients presented with different clinical manifestations such as polyuria with polydipsia (98%), weight loss (81%), muscles fatigue (62%), dyspnea (57%), vomiting (46%) and preceding illness (40%). These symptoms may lead to severe complications in the respiratory system and gastrointestinal system and cause respiratory failure and severe abdominal pain, respectively, which may lead to coma and death. The incidence of DKA ranges from 16% to 80% in children newly diagnosed with diabetes depending on the geographic location.^[2,3,5]

In Europe, there is a high incidence of DKA among diabetic patients in the following countries: Romania (67%), Hungary (23%), and Finland (22%). Furthermore, other countries in the Arabian Gulf such as the United Arab Emirates, Kuwait, and Saudi Arabia had DKA incidence of 80%, 20.9% and 44.9%, respectively, during 1990 to 1999. Although there has been an elevation in the incidence rates of DKA between 2011 and 2013, there is a lack of researches and studies about DKA in Riyadh.^[6]

To ensure the safety and well-being of our children, it is almost mandatory to have access to respectful and professional primary care centers as well as having a good primary care physician because it was proven to have much better health outcomes. Multiple evidence around the world proved that spreading and raising awareness about diabetes and DKA was effective in the less likely occurrence rate of DKA when T1DM is first diagnosed. The occurrence of DKA may be due to the parents' lack of awareness regarding the symptoms of hyperglycemia. Having a first-degree relative with diabetes is associated with regressed risk of DKA at diabetes. A study conducted in Poland showed that the children were more prone to DKA and the frequency increased two-fold in children under the age of 3 compared to the general population.^[7,8]

Methodology

This is a hospital-based cross-sectional study, conducted in Riyadh, the capital city of Saudi Arabia, with population around 6,506,700. The study included type 1 and type 2 diabetes mellitus patients of age 18–35 years and excluded medical personnel; the sample size was 150 participants who were chosen through systematic random sampling. Data collected through a precoded and pretested questionnaire was developed specifically for this study after consulting literature and epidemiologist. Descriptive analysis and categorization of data containing frequencies and percentages was performed using SPSS version. 24. A *P* value of 0.05 or less was considered significant. The investigator explained the purpose of study and obtained a verbal consent from the parents or guardians of the children guardians before data collection.

Results

As shown in Table 1, 75.3% were males and the remaining were female. 78% were of the age 30–35, 13.3% were of the age 26–30, and the remaining were of the age 18 to 25. Regarding marital status, 70.7% were married, 15.3% were single, and 10% were divorced and the remaining were widowed. Regarding occupation, 52.7% were employed, 30.7% were unemployed, and the remaining were self-employed. Regarding education, 46% had secondary education, 32.7% went to university, 13.3% have only taken primary education, and the remaining were illiterate. 48% owned a villa, 26.7% were living in a rented apartment, 15.3% were living in the owned apartment, and the remaining were living in rented villas.

As shown in Table 2, 38% %, 32%, and 30% of the participants have poor, moderate, and good DKA risk factor awareness, respectively.

As shown in Table 3, 67.34%, 26.66%, and 6% of the participants have poor, moderate, and good knowledge regarding DKA management, respectively.

Table 1: Demographic data

Variable	Number	Percentage
Gender		
Male	113	75.3
Female	37	24.7
Total	150	100%
Age		
18-25 years old	13	8.7
26-30 years old	20	13.3
30-35 years old	117	78
Total	150	100%
Marital status		
Single	23	15.3
Married	106	70.7
Widow	6	4
divorced	15	10
Total	150	100%
Occupation		
Employed	79	52.7
Unemployed	46	30.7
Self employed	25	16.7
Total	150	100%
Education		
Illiterate	12	8
Primary	20	13.3
Secondary	69	46
university	49	32.7
Total	150	100%
housing		
Rented apartment	40	26.7
Owned apartment	23	15.3
Rented villa	15	10
Owned villa	72	48
Total	150	100%

n=150

Table 2: The level of awareness regarding DKA risk factor

Question	Yes	No	Total
Missing the dose	99	51	150
	66%	34%	100%
Uncontrolled diet	98	52	150
	65.3%	34.7%	100%
Person with low BMI	56	94	150
	37.3%	62.7%	100%
poor	moderate	Severe	total
57	48	45	150
38%	32%	30%	100%

n=150

Table 3: The level of awareness regarding DKA management

Question	Yes	No	Total
Oral fluid	97	53	150
	64.7%	35.3%	100%
Treating the infection	76	74	150
	50.7%	49.3%	100%
Resting the patient	108	42	150
	72%	28%	100%
Poor0-0.33	Moderate0.66	Good1	total
101	40	9	150
67.34%	26.66%	6%	100%

n = 150

As illustrated in Table 4, 38.67% of our participants have a poor awareness regarding DKA complications.

Table 5 shows that among 73% (110) of the participants who had no relative with diabetes mellitus, 71% (79) had a poor level of awareness regarding the management of DKA and 55% (22) of respondents who had relatives with diabetes mellitus had a poor level of awareness regarding treatment. A P value of 0.022 was considered significant and shows that the hypothesis of the relationship between having a first-degree relative with diabetes and awareness regarding management of (DKA) is true.

Discussion

The majority of participants have poor knowledge about the DKA risk factors and only a few had good knowledge, which is in line with a study by Mirsadraee in Iran.^[9] We recommend the health department authorities to emphasize the main risk factors that have a direct relation with DKA.

The majority of the participants have poor knowledge regarding the management of DKA while only a few have good knowledge. This is in line with the results of a study done by Singh H, in India,^[10] that shows half of the participants did not have knowledge about the clinical features and management of DKA. We recommend MOH to invest more in health education regarding DKA management.

Table 4: The level of awareness regarding DKA complication

Question	Yes	No	total
Respiratory	60	90	150
Failure	40%	60%	100%
Death	110	40	150
	73.3%	26.7%	100%
Coma	89	61	150
	59.3%	40.7%	100%
Poor0-0.33	Moderate0.66	Good1	total
58	45	47	150
38.67%	30%	31.33%	100%

n=150

Table 5: The relation between having a first degree relative with diabetes and awareness regarding management of (DKA)

Poor 0-0.33	Management of DKA		Total		
	Moderate 0.67	Good 1.00			
Do you have a relative (brother, sister or parents) had (DKA) before?	no	79	28	3	110
	yes	22	12	6	40
Total		101	40	9	150

P value=0.022

The majority of the participants have poor knowledge about DKA complication and a few have moderate knowledge, similar to the findings of a study conducted by Ullah F in Peshawar, Pakistan. It found that 46.75% of diabetic patients had poor knowledge regarding DKA as a complication of diabetes.^[11] We recommend the MOH to establish effective health education regarding DKA complications.

In this research, the results show that there is a relationship between having a first degree relative with diabetes and awareness regarding management of DKA, which is in line with a study done by L. de Vries in Tel Aviv^[12] In this research, we encourage the health authorities to provide a more effective way to teach society about DKA management.

Conclusion

In conclusion, the majority of the participants have a poor level of awareness and there is a relationship between having a first-degree relative with diabetic mellitus and the level of awareness regarding DKA. The MoH should invest more in health education among diabetic patients. Besides, we encourage other researchers to publish more studies about the DKA.

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Conflicts of interest

There are no conflicts of interest.

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