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Research Article

**DIABETIC COMA AND ITS MANAGEMENT IN SAUDI ARABIA: A
CROSS SECTIONAL COMMUNITY BASED STUDY****Ahmed Eidah Alzahrani ¹, Alhareth Hassan Alsharif ², Alaa Saad Alrehaili ³, Raghda Faisal Al Hatim ², Raghad Abdulaziz AlHazmi ¹, Batoul Farhoun Qari ⁴, Ammar Abdullah Alwan ², Raghad Madani AlFagi ³, Maram Saad AL Rubayyi ⁵, Bayan Nassir Asseri ⁶**¹General physician, Dammam, ²Medical intern Ibn sina national college, ³Medical intern Taibah university, ⁴Medical intern Umm Al-qura university, ⁵Medical Intern Tabuk University, ⁶Medical Intern King Khalid University**Abstract:**

Background: Diabetic coma is one of the most common and life-threatening complications of diabetes. Knowing the symptoms, preventive measures and case management can help in increasing patient safety in this case. Objectives: to evaluate the prevalence of diabetes and the prevalence of diabetic coma among the studied diabetic patients and to illustrate the relationship between type of diabetic coma and type of DM, period of diabetes and to show the place and type of management of such case. Methods:

Methods: A cross-sectional community-based study carried out on 1036 participants, 250 of them were diabetic (both type I and II DM) in different areas of Saudi Arabia, during the period from 1 May to 30 August 2018. Data collected by a pre-designed online self-administered questionnaire which disseminated all over Saudi Arabia

Results: The study included 1036 participants, 72.4% were females and 27.6% were males. Diabetes was recorded in 24.1% of the total number of participants, 53.6% of them had type 2 diabetes and 46.4% had type 1. The type of diabetic treatment was insulin in 28.0%, diet control in 38.8%, tablets in 21.6% and tablets and insulin and diet control. As regards to type of diabetic coma, our study found that in diabetic patients who experienced diabetic coma, 24.8% had hypoglycemic coma and 9.6% had hyperglycemic. As regards the management of diabetic coma, hospital management in the emergency room was reported in 70.6% of the patients and improvement in ER was reported in 85.7% and 14.3% needed a hospital admission.

Conclusion: in Saudi Arabia, our study found that in diabetic patients who experienced diabetic coma, 24.8% had hypoglycemic coma and 9.6% had hyperglycemic. Awareness of the diabetic patients about causes and manifestations of diabetic coma is highly recommended for prevention of this life threatening condition. Also we recommend a large scale and more detailed researches in this topic.

Keywords: Hyper and Hypoglycemic Coma; Diabetes; Diabetes emergency; Saudi Arabia.

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INTRODUCTION:

Diabetes is a group of disorders characterized by high glucose levels that cause unique eye, kidney, and nerve complications and an increased risk for cardiovascular disease [1]. The accepted etiological classification of diabetes is that type 1 and type 2 diabetes are the two main types, with type 2 diabetes accounting for the majority (>85%) of total diabetes prevalence. In 2017, it was estimated that 425 million people (20–79 years of age) suffered from DM, and the number is expected to rise to 629 million by 2045. Moreover, in 2017, the projected national diabetes (20–79) prevalence in Ethiopia estimated by IDF Atlas was 5.2% [2].

Both forms of diabetes can lead to many complications including retinopathy, nephropathy and neuropathy, and macrovascular endpoints including ischemic heart disease, stroke and peripheral vascular disease [3]. The number of people with diabetes worldwide was almost doubled in the past 20 years [4]. The symptoms of uncontrolled diabetes that may lead to development of symptoms of short duration like polyuria, polydipsia, polyphagia, weight loss, vomiting, abdominal pain and fatigue [5].

Diabetic coma is one of the most common and life threatening complications of diabetes. It may be a result of many causes. Severe hypoglycemia, advanced diabetic ketoacidosis and non-ketotic hyperosmolar coma [6]. Diabetic coma can also present itself in a diabetic patient due to precipitating conditions like septicemia, acute myocardial infarction, stroke, acute liver injury and other hypoxic states. The management of Diabetic Coma in the first three hours becomes a medical emergency [7].

We conducted this study to evaluate the prevalence of diabetes and the prevalence of diabetic coma among the studied diabetic patients and to illustrate the relationship between type of diabetic coma and type of DM, period of diabetes and to show the place and type of management of such case.

PARTICIPANTS AND METHODS:

A cross-sectional community-based study carried out on 1036 participants, 250 of them were diabetic (both

type I and II DM) in different areas of Saudi Arabia, during the period from 1 May to 30 August 2018.

Data collection: by a pre-designed online questionnaire which was distributed among the population. It was self-administered by participants after a brief introduction or explanation of the idea of the research. The questionnaire included the relevant questions to collect data about:

- Socio-demographic characteristics of the participants including age, marital status and educational status
- If the patient has DM or previous diabetic coma or both.
- Questions about risk factors, symptoms and complications of diabetic coma.

Statistical analysis: Collected data were coded and analyzed using Statistical Package for Social Sciences (SPSS, version 15). Descriptive statistics for the prevalence and quantitative variables was used. Relationship between type of diabetic coma, type of DM, period of diabetes and place of management of coma was determined using the chi-square test. P-value of less than 0.05 was considered statistically significant.

Ethical considerations: Data collector gave a brief introduction to the participants by explaining the aims and benefits of the study. Informed written consent was obtained from all participants. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest.

RESULTS:

From the study tables it was clear that, the study included 1036 participants, 72.4% were females and 27.6% were males. Diabetes was receded in 24.1% of the total number of participants, 53.6% of them had type 2 diabetes and 46.4% had type 1. the type of diabetic treatment was insulin in 28.0%, diet control in 38.8%, tablets in 21.6% and tablets and insulin and diet control. As regards to type of diabetic coma, our study found that 24.8% had hypoglycemic coma and 9.6% had hyperglycemic. As regards the management of diabetic coma, hospital management in the emergency room was reported in 70.6% of the patients and improvement in ER was reported in 85.7% and 14.3% needed a hospital admission.

Table (1): Socio demographic characteristics among studied diabetic patients, KSA (N=1036)

Sex	No.	%
Female	750	72.4
Male	286	27.6
Age group		
<21	177	17.1
21-30	272	26.3
31-40	230	22.2
>40	357	34.5
Total	1036	100.0
Basic education		
High school	233	22.5
University or more	721	69.6
Widow/divorced		
Single	290	28.0
Married	684	66.0
Working status		
Employed	387	37.4
Retired	84	8.1
Student or not employed	565	54.5
Economic status		
Good	274	26.4
Very good	290	28.0
Within average	323	31.2
Excellent	103	9.9
Low	46	4.5
Diabetes		
No	786	75.9
Yes	250	24.1

Table (2): diabetes related characteristics, other chronic diseases, Smoking, obesity and receiving health education about diabetic coma among studied diabetic patients, KSA (N=250)

Type of DM	Frequency	Percent
Type II	134	53.6
Type I	116	46.4
Period of diabetes		
< 1	24	9.6
1-	67	26.8
5-10	55	22.0
> 10	86	34.4
Don't know	18	7.2
History of diabetic coma		
Hyperglycemic coma	24	9.6
Hypoglycemic coma	62	24.8
No history of coma	164	65.6
Type of diabetes treatment		
Tablets	54	21.6
Tablets and insulin and diet control	11	6.4
Diet control	97	38.8
Tablets and diet control	13	5.2
Insulin and diet control	65	28.0
Health education about DM coma		
No	176	70.4

Yes	74	29.6
Diabetes Complications		
No	181	72.4
Yes	69	27.6
Other Chronic disease		
No	191	76.4
Yes	59	23.6
Smoking		
No	216	86.4
Yes	34	13.6
Obesity		
No	187	74.8
Yes	63	25.2

Table (3): Symptoms preceded the diabetic coma and its management in diabetic coma cases (N=119)

Symptoms preceded the diabetic coma	No.	%
Feeling hungry, sweating, dizziness	38	32.0
Feeling hungry, sweating, dizziness, rapid heartbeat	48	.8
Feeling hungry, blurring of vision, shaking, sweating, dizziness	21	2.5
Dizziness	12	10.1
Hospital treatment of coma (in ER)		
No	35	29.4
Yes	84	70.6
Improvement of the case		
Improved in ER and discharged	102	85.7
Needed hospital admission	17	14.3
Frequency of diabetic coma		
1-2	25	21.0
3-10	12	10.1
>10	82	68.9

DISCUSSION:

A diabetic coma is a common diabetic complication which could happen when the blood sugar gets too high (600 milligrams per deciliter (mg/dL) or more) causing the patient to become very dehydrated, it usually affects people with type 2 diabetes that isn't well-controlled. Diabetic coma is a serious condition, and if it isn't spotted soon and treated quickly, it could be fatal. Knowing the symptoms, preventive measures and case management can help in increasing patient safety in this case.

This is why we conducted this cross-sectional community based study to evaluate the prevalence of diabetes and diabetic coma in KSA, the prevalence of diabetic coma among the studied diabetic patients and to illustrate the relationship between type of diabetic coma and type of DM, period of diabetes and place of management of coma and the management of such case.

The study included 1036 participants, 72.4% were

females and 27.6% were males. Diabetes was receded in 24.1% of the total number of participants, 53.6% of them had type 2 diabetes and 46.4% had type 1. In study by Bacchus et al. [8] studied a small number of patients and included only male civil service subjects from a small rural area outside Riyadh in the Central region. The study showed a prevalence of 2.5%. Another study was published in the same research area involved a small group of male and female subjects in the Western part of Saudi Arabia [9] indicated the rising rate of diabetes, quoting a prevalence of 4.3%, and these results are much lower than ours. In a study published in 2004 by Al-Nozha et al. in 16817 male and female subjects [10], the prevalence of Diabetes was found to be 23.7%, which is relatively similar to our results. In another study done in Saudi Arabia by Khalid A. Alqurashi et al. [11], prevalence of diabetes was 30%, which is higher than our results. Reported prevalence data from the Gulf region also revealed high rates in Bahrain (25.7%) and Oman (16.1%) [12, 13].

Another two studies reported the prevalence rates of T1DM in Dhahran, Eastern KSA [14] and in Al Madina, North West KSA [15]; the prevalence rates of T1DM were very similar, 27.52 and 26.7 per 100,000 respectively. Long-term continuous subcutaneous insulin infusion was associated with an increased incidence of diabetic ketoacidosis, and intensive therapy may cause more severe hypoglycemic reactions.

In the current study we reported that, the type of diabetic treatment was insulin in 28.0%, diet control in 38.8%, tablets in 21.6% and tablets and insulin and diet control. In Singaporean perspective [16], the patients who received insulin, the most common mode of insulin therapy was the sliding scale insulin therapy (27.4%), basal insulin therapy (11.1%) and basal-bolus combination therapy (15.3%) were less common. In our study diabetic complications were found in 27.6% and history of diabetic coma was found in 34.4% of the diabetic patients.

As regards to type of diabetic coma, our study found that 24.8% had hypoglycemic coma and 9.6% had hyperglycemic. In a study done in Arar, KSA by Nada Kareem S Alruwaili. et al. [17] the prevalence of diabetic coma was higher than our findings, they found that 57.5% of patients had diabetic coma from them 70.7% had hypoglycemic coma and 29.2% had hyperglycemic coma. Another study reported, hyperglycemia was present in 38% of the patients and hypoglycemia in 12% [18]. Also P.H.WangMD. et al. [19] found that the incidence of severe hypoglycemia increased by 9.1 episodes per 100 person-years (95% CI - 1.4 to + 19.6) in the intensively treated patients. The incidence of diabetic hyperglycemia increased by 12.6 episodes per 100 person-years (95% CI, 8.7-16.5) in the patients on continuous subcutaneous insulin infusion.

As regards the management of diabetic coma, hospital management in the emergency room was reported in 70.6% of the patients and improvement in ER was reported in 85.7% and 14.3% needed a hospital admission. In Nada Kareem S Alruwaili's [17], only 7.7% of the patients were admitted to the hospital, 30.8% were managed in the emergency room and 61.5% had their management at home. To conclude, the prevalence of hyperglycemia among the Asian patients in our study was high, while the prevalence of hypoglycemia was relatively low. This suggests that the current quality of inpatient glycemic control is suboptimal.

CONCLUSION AND RECOMMENDATIONS:

In Saudi Arabia, our study found that in diabetic patients who experienced diabetic coma, 24.8% had hypoglycemic coma and 9.6% had hyperglycemic. Awareness of the diabetic patients about causes and manifestations of diabetic coma is highly recommended for prevention of this life threatening condition. Also we recommend a large scale and more detailed researches in this topic.

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