Diagnosis and Control of Hypoglycemic Disorder in Adult Patients in Asir Region of Saudi Arabia

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ABSTRACT

Study Design: Cross sectional.

Background: Hypoglycemia is the rate-limiting issue in diabetes care when trying to achieve rigorous glycemic control. Hypoglycemia is a rare clinical occurrence that occurs in people who use diabetes medications that lower plasma glucose levels, such as insulin. Most people with type 1 diabetes and many people with type 2 diabetes experience hypoglycemia. Although people with diabetes are not immune to the same hypoglycemia complications as people without diabetes, the great majority of their hypoglycemic episodes are caused by diabetes medication. Aim of study to diagnose diabetic medication related hypoglycemia in Type 2 DM in Asir region, Saudi Arabia.

Methods: In this cross-sectional study, people with Type 2 Diabetes Mellitus aged 18 and up who were treated at diabetic centers made up the study population.

Results: 270 eligible patients mean (SD) of age was 45.2(12.9) 63% were male while 37% were females 67% were married, 41% have primary level of education37% have government job while 20% were un employed. 46% have HTN, 6% have heart problems, 37% have BMI above 30, 15% people were taking sulphonyl urea (SU) and metformin , 48% taking metformin and insulin while 37% were taking metformin alone, 56% taking medication once a day while 44% twice a day, 83% have no hypoglycemia in the last month.

Conclusion: In Asir region Saudi Arabia, Insulin therapy is more commonly causing hypoglycmia in comparison to other lines of therapy. In the other hand inadequate glycemic management is a prevalent and pervasive concern among persons with T2DM. Individuals with type 2 diabetes frequently have insufficient glycemic control partially related to complication of medication like hypoglycemia. To improve glycemic control, a diabetes care strategy should focus on reducing risk factors and complication of diabetic medication. Healthcare practitioners should use a patient-centered approach and tailor management techniques to each patient's specific needs, taking into account all recognized risk factors for poor control.

Keywords: Glycemic control, Management, Patient, Diagnosis

INTRODUCTION

Hypoglycemia is the rate-limiting issue in diabetes care when it comes to achieving rigorous glycemic control. Hypoglycemia is a rare clinical occurrence that occurs in people who use diabetes medications that lower plasma glucose levels, such as insulin[1]. Most people with type 1 diabetes and many people with type 2 diabetes experience hypoglycemia. Although people with diabetes are not immune to the same hypoglycemia complications as people without diabetes, the great majority of their hypoglycemic episodes are caused by diabetes medication.

Glycemic control is inadequate when there are frequent episodes of hypoglycemia and the accompanying hormonal counter-regulatory response. It's also possible that the former is linked to cardiovascular and cerebrovascular morbidity. 1-2 Large trials (intervention to control cardiovascular risk in diabetes, Veterans Affairs diabetes study) have found that people with hypoglycemia had a higher mortality rate (intensively treated arm)[2,3]. As a result, the American Diabetes Association (ADA) recommends tailoring objectives and lowering the risk of hypoglycemia in individuals with long-term diabetes and comorbidities[4].

Hypoglycemia manifests itself in a variety of ways. The symptoms may be generic, and their severity decreases with age. As a result, it is critical that the subjects be able to recognise and identify the development of symptoms at an early stage in order to successfully manage the episode and take efforts to prevent recurrence. Although more than half of the study group had hypoglycemia episodes in the past, many patients were ignorant of the precipitating circumstances or reasons, according to a survey done by the American Association of Clinical Endocrinology among 2530 type 2 diabetes patients in America. There was unquestionably a knowledge gap that needed to be filled[5]. Only over 40% of diabetic individuals in an Erode district research in the Indian state of Tamil Nadu were aware that blood sugar levels can fall below normal when taking medicines[6].

In light of this, understanding and awareness of the many manifestations of hypoglycemia, as well as prospective prevention techniques, would be beneficial to type 2 diabetes care. In the prevention of hypoglycemia, there is a need for shared responsibility.

In 2016, the United States had 49 million old persons (those aged 65 and up), and this number is expected to rise to over 95 million by 2060[7].

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Approximately 25% of Americans aged 65 have diabetes mellitus (diagnosed and undiagnosed), with type 2 diabetes (T2D) accounting for the great majority[7,8]. As the population ages, the number of older persons with diabetes is predicted to rise. People over the age of 65 account for almost 61 % of all diabetes-related health-care spending in the United States ($146 billion out of a total of $237 billion), the majority of which is obtained through the Medicare programme[9].

Micro- and macrovascular problems, such as heart disease and heart failure (HF), peripheral vascular disease, stroke and chronic kidney disease (CKD), are more common in older persons with diabetes[10]. Improvements in glycemic control, on the other hand, have corresponded with an increase in the prevalence of hypoglycemia, which is one of the most common nonfatal consequences in older diabetic patients[11] and has a large economic burden[12]. In the United States, the direct medical expenses of hypoglycemia hospitalizations are significant and have risen in recent years[13] with hypoglycemia hospitalizations now surpassing those for hyperglycemia[14]. Between 1999 and 2011, an estimated 1.5 million individuals were admitted to the hospital for hypoglycemia, according to data from the Healthcare Cost and Utilization Project National Inpatient Sample. Hypoglycemia hospitalisation cost $1.6 billion in 2011, up from $1.2 billion in 2001, with an average cost of $10,139 per stay[13-19].

Despite the importance of hypoglycemia and its negative implications among diabetics during Ramadan, further study is needed because few studies on the subject have been undertaken in Saudi Arabia. To our knowledge, not enough studies on this topic has been conducted in the southern region of Saudi Arabia. The goal of this study is to look at the awareness regarding the diabetic medication related hypoglycemia in adult patient with T2DM in Asir region of Saudi Arabia.

METHODS

Patients with diabetes (T1DM and T2DM) who were 18 years or older and on diabetic control drugs were eligible to participate. Prior to any study procedures, all patients signed an informed consent form. Patients with additional confounding conditions, pregnant and breastfeeding women, and patients who were enrolled in other clinical trials at the same time were excluded.

The study requires participants to have a verified diagnosis of T2DM, be at least 18 years old, and have had diabetes for at least one year. Participants who were pregnant or who had not had a HbA1c test in the previous year were eliminated. Between May 2021 and February 2022, participants were chosen at random from a group of diabetic centers' regular visitors. Participants were questioned using a pre-tested structured electronic questionnaire after being told about the study and providing written informed consent. The survey asks questions about socio demographics, lifestyle, medical history, cognitive performance, anxiety and depression. Gender, date of birth, marital status, education and income are examples of socio-demographic data. Smoking status and physical activity are examples of lifestyle data. Data was entered in the SPSS ver20 software for analysis. For numerical data, the data were summarized and given as a mean (standard deviation), whereas categorical data were presented as frequency and % age.

RESULTS

As per table 1 out of 270 eligible patients mean (SD) of age was 45.2 (12.9) 63% were male while 37% were females 67% were married, 41% have primary level of education 37% have government job while 20% were un employed.

Table 1: Demographics

Variable	Classification	Frequency	%
Age	18-35	150	56%
	36–60	50	19%
	> 60	70	26%
Sex	Male	170	63%
	Female	100	37%
Residence	Urban	200	74%
	Rural	70	26%
Marital status	Unmarried	75	28%
	Married	180	67%
	Divorced	10	4%
	Widowed	5	2%
Educational status	Illiterate	20	7%
	Primary education	110	41%
	Secondary education	50	19%
	College and above	90	33%
Occupation	Unemployed	55	20%
	Private	45	17%
	Government	100	37%
	Student	50	19%
	House wife	20	7%
Income per month	Up to 5000 SAR	75	28%
	5000-15000 SAR	100	37%
	Above 15000 SAR	95	35%

As per table 2 46% have HTN, 6% have heart problems, 37% have BMI above 30,37% and 37% people were taking Insulin and metformin alone, 56% taking medication once a day while 44% twice a day, 83% have no hypoglycemia in the last month.

Table 2: Practices and Clinical Findings

Variable	Classification	Frequency	%
BMI	< 18.5	55	20%
	18.5–24.5	45	17%
	25–29.9	70	26%
	>30	100	37%
Types of diabetes	Type I	150	56%
	Type II	120	44%
Duration with illness (DM) in year	1–2	70	26%
	3–5	102	38%
	>5	98	36%
Types of treatment	Insulin	100	37%
	Metformin	100	37%
	Metformin + Other medicine	35	13%
	Insulin + metformin	35	13%
Frequency of taking medication	Once a day	150	56%
	Twice a day	120	44%
History of hypoglycemia in the last month	yes	45	17%
	No	225	83%
Co-morbid condition	Hypertension	125	46%
	Dyslipidemia	50	19%
	Hypertension and dyslipidemia	20	7%
	Heart Problems	15	6%
	Other	10	4%
	None	50	19%

As per table 3 demographical variable and family history have significant impact on poor glycemic control.

Table 3: Univariate analysis of demographicfactors associated with poor glycemic control

	Variables	OR	P- value
Gender	Male	1.84	0.0001
	Female	0.8	
Age	18-35	0.56	0.004
	36–60	0.48	
	> 60	0.74	
BMI	< 18.5	1.2	0.001
	18.5–24.5	1.4	
	25–29.9	0.84	
	>30	0.84	
Family History	Yes	1.84	0.002
	No	0.4	

DISCUSSION

The importance of health care staff such as doctors, nurses, diabetes educators, and lab technicians in giving health education to patients at every visit is highlighted in this study. Diabetes mellitus management requires an inter professional approach that includes both lifestyle changes such as diet and exercise as well as pharmacologic therapies as needed to meet individualized glycemic goals. For optimal glycemic control, healthcare practitioners must encourage patients to combine lifestyle changes with oral pharmacologic agents, especially as type 2 diabetes mellitus progresses with continued loss of pancreatic beta-cell function and insulin production.

Despite the huge variety of anti-diabetic medicines currently accessible in clinical practice, sulfonylureas are nevertheless widely used, maybe because of their cheaper cost, the ability to mono-dose, and the inclusion of a metformin association in the same tablet.

When used with metformin, sulfonylureas and or insulin can quickly improve glycemic control in patients with poor blood sugar control.20 Insulin therapy has its consequences mainly hypoglycemia more than the therapies tested in our study.

In patients with T2DM, co-morbidity does not appear to be a barrier to adequate glycemic control. Patients with more than one diabetes complication appeared to have better glycemic control than patients with only one complication, but the difference was not statistically significant. Gender (female), age, HDL level, duration of diabetes illness and type of medication were all found to be associated with poor glycemic control in univariate analysis[20-23].

Diabetes' high rates of morbidity and death, as well as its long-term sequelae, can pose considerable healthcare issues for both families and society[24]. Gender, age, BMI, length of illness, type of medicine and blood pressure are all factors that can affect glycemic control[25]. Because HbA1c is the gold standard test for glycemic management, it was used in this investigation. In diabetic patients, excellent glycemic control is defined as HbA1c values of less than 7%, and poor glycemic control is defined as HbA1c values of more than 7%20 the majority of the patients had poor glycemic control.

Glycemic control and age were found to have a significant relationship in this study. The majority of patients with poor glycemic control were between the ages of 50 and 70, which was similar to the findings of other researches[22] who investigated the effect of being overweight or obese, and occupation in T2DM, found a significant link between glycemic control in diabetic persons and BMI.

Other characteristics that were found to have a significant relationship with non-glycemic control in this study included a person's history of hypertension or hyperlipidemia, as well as the length of time they had been diabetic.

Insulin metabolism disturbance and poor glycemic control were linked in a study to a longer duration of diabetes, as well as hypertension and dyslipidemia. A strong connection between glycemic control and type of medication history ($p = 0.007$) was discovered after evaluating the patients' medication history and drugs provided at discharge. Emphasize the necessity of lifestyle changes. Diabetes prevention techniques, such as active screening and rigorous management of those at risk, should be prioritized by the healthcare system. Special steps should be taken by the health system to improve glycaemic management for patients with diabetes who live in rural areas. Future research should look into the effectiveness of diabetes education programs as well as the challenges to sticking to lifestyle changes[26,27].

Glycemic control was also linked to diabetes medication and the amount of diabetic medicines on prescription at discharge (Other research have shown similar results)[26,27].

CONCLUSION

In Asir region Saudi Arabia, Insulin therapy is more commonly causing hypoglycmia in comparison to other lines of therapy. In the other hand, inadequate glycaemic management is a prevalent and pervasive concern among persons with T2DM. Healthcare.

practitioners should use a patient-centered approach and tailor management techniques to each patient's specific needs, taking into account all recognized risk factors for poor control. In Air region Saudi Arabia, individuals with type 2 diabetes frequently have insufficient glycemic control which may be due to medication induced hypoglycemia leading to withdrawing them from their appropriate dosing of their regimen. To improve glycemic control, a diabetes care strategy should focus on reducing risk factors. Healthcare practitioners should use a patient-centered approach and tailor management techniques to each patient's specific needs, taking into account all recognized risk factors for poor control.

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