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ORIGINAL ARTICLE

The Incidence of Hypoglycemia in Type 2 Diabetes Mellitus Patients

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ABSTRACT

Aim: To estimate the incidence of hypoglycemia in type 2 diabetes mellitus patients.
Study design: Cross-sectional analytical study.
Place and duration of study: Department of Medicine, Bolan Medical College, Quetta from 1st January 2021 to 30th September 2021.
Methodology: One hundred type 2 diabetic patients were enrolled. Each patient complete detail was documented on a well-structured questionnaire which was also used for assessing the hypoglycemia status using Whipple's triad questionnaire based information. The Whipple triad is an assembly of three criteria named as Whipple's criteria. The most important symptoms which are presented in it are those symptoms which show presentation of hypoglycemia post meal and exercise. Patients were asked for any of the following symptoms or biochemical test results have been noticed in previous 2-3 months and their responses were recorded.
Results: There were 64% patients within the age of 40-60 years while 36% were above the age of 60 years. Within the rural, type 2 diabetic patients 89.3% were those who only checked their glucose once in three months. The treatment method which was adapted by majority of the type 2 diabetic patients was use of metformin.
Conclusion: Hypoglycemia appeared to be the important determinant of diabetes mellitus and sometime even prove more fatal then hyperglycemia.
Keywords: Hypoglycemia; Whipple triad; Diabetes mellitus; Prevalence; Urban areas

INTRODUCTION

Diabetes mellitus is a global endemic which effect many people around the world. There are various types of diabetes mellitus including insulin dependent and non-insulin dependent diabetes mellitus. However non-insulin dependent known as type 2 diabetes has caused an international surge in its frequency over the past decade.[1] There has been no regional scrutinization for developing type 2 diabetes mellitus, therefore effecting developing as well as developed countries worldwide[2]. Peri-urban areas and towns are targeted more for its escalation than urban areas.[3] Although there are many various efficient drugs available for maintaining the glucose levels in blood yet keeping a proper hypoglycemic control seems very challenging among the diabetic population[4,5].

For complete diabetic management a glycemic control is a mandatory protocol. If else not, then the chances of diabetic complication become highly increased. There are different screening tests as well as blood sugar analysis method for proper assessment of blood sugar levels. A random blood sugar is conducted after two hours of mean while fasting blood sugar level can test blood sugar with 8-10 hours fasting. Glycated hemoglobulin A1C (HbA1C) is a test which can show persistence of blood sugar inside the blood for a period of three months. Scientist believes that glycated hemoglobulin level <6.5% as a cutoff which defines a good glycemic control in type 2 diabetic patients[6-8].

Diabetes mellitus has also been linked with cardiovascular diseases especially in the cases where there is a poor glycemic control. High level of sugar is as much dangerous as is the low sugar levels causing hypoglycemia. Studies have elaborated the fact that there is a three-fold increased mortality rate with hypoglycemia than hyperglycemia[9,10]. Such episodes of reduced blood sugar/hypoglycemia are highly associated with cardiovascular events and mortality[11]. American Diabetes Association in its guidelines of preventing hypoglycemia in diabetes patients elaborates that majority of hypoglycemic episodes occurs by mismanaged medication doses and insulin usage[12-15]. The present study was designed to assess the incidence of hypoglycemia in the type 2 diabetic population for better identification of the reasons and causes of such events which can be helpful in better health outcomes and decrease in mortality rate associated with hypoglycemia.

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MATERIALS AND METHODS

The cross-sectional analytical study was conducted at Department of Medicine, Bolan Medical College, Quetta from 1st January 2021 to 30th September 2021 after permission from IRB permission. A total of 100 type 2 diabetic patients which were enrolled after taking as a prevalence of type 2 diabetes as 34% in developing countries. The sample size was calculated by keeping 95% confidence interval and 7% margin of error using WHO sample calculation software. This study was approved from the ethical review board. Each patient was asked for an informed consent before entry as a research participant in this study. The clinical symptoms, biochemical evaluation results for type 2 diabetes were analyzed before including a patient as type 2 diabetic. However, those patients suffering from gestational or type 1 diabetes were excluded from this study. Each patient complete detail was documented on a well structured questionnaire which was also used for assessing the hypoglycemia status using Whipple's triad questionnaire based information. The Whipple triad is an assembly of three criteria named as Whipple's criteria. The most important symptoms which are presented in it are those symptoms which show presentation of hypoglycemia post meal and exercise. Secondly as presentation of decreased levels of plasma-glucose especially in cases where it happens after fasting or strenuous exercise. Thirdly relief in the symptoms as soon as the level of glucose comes back to the normal. Patients were asked for any of the following symptoms or biochemical test results have been noticed in previous 2-3 months and their responses were recorded. All demographics information of each patient was also recorded. Data was entered and analyzed by SPSS-25.

RESULTS

There were 64% patients within the age of 40-60 years while 36% were above the age of 60 years and mean age was 54.4±5.4 years. There were almost equal men and women with type 2 diabetes with a slight increase in percentage of women than men as 55%. There were 33% such patients who were obese and comorbidities were presented in 48% of the cases (Table 1).

Sixty percent of the patients belonged to rural and village areas while 40% were residing in urban areas. Within the rural type 2 diabetic patients 89.3% were those who only checked their glucose once in three months and 5.3% checked it regularly while 5.4% did not ever check their glucose levels in blood (Fig. 1).

The treatment methods which was adapted by majority of the type 2 diabetic patients was use of metformin such as in 95% it

was opted followed by the glycase usage in 61%. Insulin injection were least prioritized by only 5% of the type 2 diabetic patients (Table 2). In all the type 2 diabetic patients the incidence of hypoglycemia was presented in 22% of the cases. Out of which only 23% carried sugar in form of glucose with them (Fig. 2).

The main symptoms of hypoglycemia in 22 cases of identified type 2 hypoglycemic patients were dizziness as presented in 77% followed by sweating in 44% and weakness or excess hunger in 42% respectively. Loss of consciousness was only reported in 4 cases (Table 3).

Table 1: Demographic information of the patients (n=100)

Variables	No.	%age
Age (years)		
40-60	64	64.0
>60	36	36.0
Gender		
Men	45	45.0
Women	55	55.0
BMI kg/m²		
Normal	46	46.0
Over weight	21	21.0
Obese	33	33.0
Comorbidities		
Present	52	52.0
Absent	48	48.0

Table 2: Frequency of treatment methods

Variable	No.	%
Treatment		
Insulin/oral hypoglycemic agent	5	5.0
Metformin	95	95.0
Glynase	61	61.0
Glibenclamide	7	7.0
HbA1C range		
≤6.5%	67	66.7
>6.5%	33	33.3

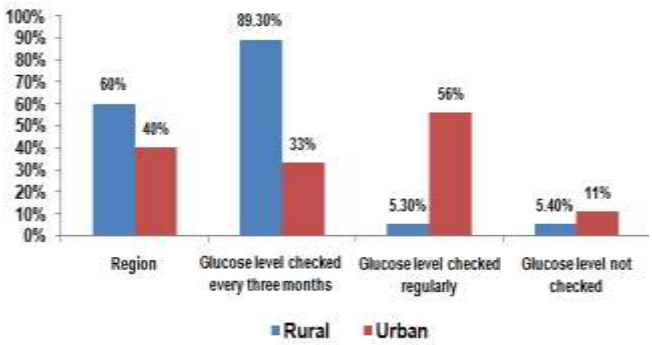

Fig. 1: Glucose level checked and region according to area

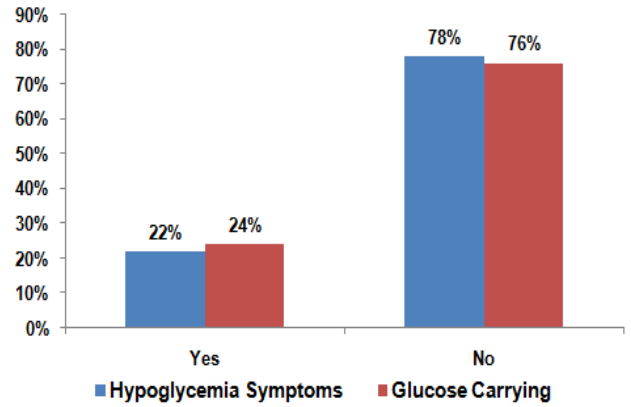

Fig. 2: Incidence of hypoglycemia

Table 3: Frequency of symptoms of hypoglycemia

Symptoms of Hypoglycemia	No.	%age
Dizziness	77	77.0
Sweating	44	44.0
Weakness	42	42.0
Excess Hunger	42	42.0
Shaking	39	39.0
Drowsiness	53	53.0
Loss of consciousness	4	4.0

DISCUSSION

Type 2 diabetes is a major burden for public health and causing number of associated disorders and comorbidities every year. Various treatment and management methods has been proposed to date for diabetes mellitus, still it is main concern for developing and low income countries. Its cases are rising everywhere due to numerous underlying and contributing factors. Hyperglycemia as well as hypoglycemia is directly associated with cardiovascular diseases and metabolic syndromes. Present study designed to determine the frequency of hypoglycemia in cardiovascular patients.[16-18]

Results of the present study showed that, women were more affected than men. Obesity was also appeared to be the common factor. Comorbidities were also reported in 52% of the study participants. Metformin appeared to be the most common treatment method used by majority of the patients. Twenty-two percent of present study participants were suffering from hypoglycemia. Study conducted by American associated proved that, majority of the diabetic patient's needs assistance in maintenance of good glycemic control.[19] Another study reported that, 16% of the diabetic patients who were using oral drugs were hypoglycemic whereas, 30% prevalence was noticed in insulin user patients[20].

Chances of hypoglycemia were quite higher in females especially living in under-developed and South Asian countries. Women have to follow various customs and cultural values that sometime make situation difficult for women who were suffering from different ailments and diseases. Education and awareness are very important for proper management of this disease otherwise, it will lead to deadly consequences.

CONCLUSION

A high incidence of hypoglycemia was found in present study. Majority of the participants were taking metformin as a treatment protocol for diabetes. Nationwide awareness programs need to be conducted for highlighting the importance of this disease management.

Conflict of interest: Nil

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