

Awareness and Occurrence of Hypoglycemic Episodes among Type 2 Diabetic Patients Under Treatment at a Tertiary Healthcare Center in Chennai

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ABSTRACT

Background

One of the greatest threats to achieving tight glycemic control is hypoglycemia, which can lead to decreased drug compliance, cardiovascular events, and even mortality. This study was conducted to estimate the proportion of diabetic patients who have encountered hypoglycemic episodes and to assess the knowledge and practice regarding hypoglycemia episodes will aid the primary care physician to achieve better glycemic control of the diabetic patients and provide patient education to prevent hypoglycemia.

Methods

This was a cross-sectional study conducted among 196 patients with type 2 diabetes mellitus getting treated in Non communicable disease clinic (NCD clinic) in a tertiary care institution in Chennai. Participants were selected by consecutive sampling and data was collected using a semi structured interview schedule after getting informed consent from the participants.

Results

Prevalence of hypoglycemia was 75.0%. The first reported symptom of hypoglycemia was sweating (80.0%). The most common etiological factor leading to hypoglycemia was missing a meal according to the participants (90.0%). About 80% of the participants felt that hypoglycemia episodes could be prevented by taking the right amount of medication at time.

Conclusions

This study has established the high prevalence of self-reported hypoglycaemia in the urban setting. This urges the need for the physicians to enquire about the hypoglycemia symptoms to all diabetic patients at each visit. It is also important to educate these patients about the symptoms of hypoglycemia and the importance of reporting of such symptoms, which will help in adjusting dose and preventing future attacks.

Keywords: hypoglycemia; prevalence; awareness, diabetics.

INTRODUCTION

The American Diabetes Association Workgroup on Hypoglycemia defined hypoglycemia in diabetes as “all episodes of abnormally low plasma glucose concentration that expose the individual to potential harm.”¹ “Despite the availability of effective antidiabetic drugs and

regimens, achieving glycemic goals remains a great challenge. Individualized therapy and comprehensive disease management strategies are recommended to slow the progression of T2 DM and to achieve glycemic targets.”^{2,3} India, which ranks second in terms of diabetic population in the world,⁴ with more than 72

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million people living with T2DM in 2017,⁵ the problem of hypoglycemia, appears to be a neglected entity. In affluent states of India like Tamil Nadu,⁶ where there is established spread of T2DM to all the socioeconomic classes of the society, there is need for research about hypoglycemia. Randomized controlled trials namely ADVANCE,⁷ VADT,⁸ ACCORD,⁹ revealed a 3-fold increased risk of hypoglycemic episodes while trying to maintain glycemic goals. Such episodes of hypoglycemia are associated with increased incidence of cardiovascular events and mortalities.⁹ Hence this study was conducted with the following objectives: To estimate the proportion of diabetic patients who have encountered hypoglycemic episodes and to assess the awareness regarding hypoglycemia episodes.

METHODS

This was a hospital-based cross-sectional study conducted among Known Type 2 Diabetic patients coming to NCD clinic at a tertiary care hospital in Chennai during a period of 3 months from December 2022 to February 2023. According to study conducted by V. Samya a.et. al¹⁰ "Prevalence of Hypoglycemia Among Patients with Type 2 Diabetes Mellitus in a Rural Health Center in South India", the prevalence comes out to be 57.44%(P). Assuming absolute precision (d) as 7% and with 5% level of significance (α), Sample size was calculated to be 195. Consecutive sampling was used for selecting the study participants, where the first ten eligible participants were selected consecutively on each day for conducting the study till sample size was attained. Data was collected by a preformed semi-structured interview schedule. The interview schedule was framed after a focused literature search. It was designed to obtain information regarding awareness about demographic details, disease, physical activity, safe practices, regular medication as the patients do not have the facility of checking their plasma glucose with glucometer; only patient's clinical history

and symptomatic relief were taken into consideration for the estimation of prevalence of hypoglycemia. In this study hypoglycemic episode is marked to be present when the patient experiences any of the following symptoms during the treatment period - Looking pale, Shakiness, Sweating, Headache, Hunger or nausea, An irregular or fast heartbeat, Fatigue, Irritability or anxiety, Difficulty concentrating, Dizziness or light-headedness, Tingling or numbness of the lips, tongue or cheek, Confusion, unusual behaviour or both, such as the inability to complete routine tasks, Loss of coordination, Slurred speech, Blurry vision or tunnel vision, Nightmares, if asleep, Unresponsiveness (loss of consciousness), Seizures. The data was collected after Institutional ethical committee approval (IEC approval number: 59/ IEC/ GOMC/ 22). Informed consent was obtained from the participants. Necessary permission was obtained from the college authorities to conduct the study and the participants were assured about the confidentiality of personally identifiable information. Data was checked for completeness and consistency. Data was entered and analyzed using MS office excel worksheet. Descriptive statistics like percentages were used.

RESULTS

A total of 196 patients with T2DM were interviewed. The median age was 56 years. Most of the patients were female (73.3%). The family type was nuclear in 54.1% and majority of them were either retired or homemakers (66.7%). Among them, 34.6% of the patients were illiterate, 30% of them had completed only primary school, 30.8% had middle school education, 3.6% had high school education, and only 0.8% were graduates/postgraduates. Among the patients, 32.3% had diabetes for more than 10 years. Mean duration of diabetes was 6.83 years. All patients were either on metformin or on combination of metformin with other oral hypoglycemic drugs. Among the patients 69 (35.0 %) of them were on insulin along with oral drug combinations. Among the diabetic patients, 52.3% had some comorbidities like hy-

hypertension (41.8%), cardiovascular complications (4.4%), or renal problems (0.5%) (Table 1-5).

Variable	Frequency (%)
Age (Years)	
<59	144(73.5)
>60	52 (26.5)
Sex	
Male	52 (26.7)
Female	144 (73.3)
Occupation	
Sedentary	110 (56.3)
Non-Sedentary	86 (43.7)
Duration of diabetes mellitus	
<5	97 (49.7)
5-140	39 (17.9)
>10	60 (32.3)
Comorbidities	
Absent	102 (52.3)
Present	94 (47.7)
Treatment taken	
Insulin	100 (51.0)
Oral Hypoglycemic Agents	27 (14.0)
Both	69 (35.0)
Type of family	
Nuclear	101 (51.4)
Joint	78 (39.7)
Others	17 (5.0)

Presence	Frequency (%)
Yes	147(75%)
No	49(25%)

Reasons (Multiple response)	Percentage
Skipping meals after	90
Overdosage of	35
Inadequate treatment	10
Ineffective Drug	15
Others	5

Symptoms (Multiple response)	Percentage
Shakiness	75
Sweating	40
Headache	30
Nausea	10
Others	10

Table 5. Source of information about hypoglycemic side effects of anti diabetic medications

Source (Multiple response)	Percentage
Doctor	58
Online platforms	19
Family	5
Friends	10
Others	8

Hypoglycemic episodes were reported in 147 of the 196 diabetic patients. The prevalence of hypoglycemia was estimated to be 75%. Among the 147 patients with hypoglycemia, 77.3% were female. A total of 11.6% of the hypoglycemic patients had symptoms daily; 21.9% of them had 2 to 3 episodes in a week, and almost half (48.2%) had 2 to 3 episodes a month, while it was rare among 18.3%. The first symptom of hypoglycemia was sweating, which was reported in 80.0% of the individuals. This was followed by hunger in 75.0%. The most common self-reported etiological factor for the hypoglycemic episode was missing food or delayed food intake, which was seen in 176 (90%) patients. The majority of them (56.7%) ate the missed-out meal and were relieved of the symptoms (Table 6).

Symptoms experienced (Multiple response)	Percentage
Irregular or fast heartbeat	50
Fatigue	25
Hunger	75
Nausea	25
Shakiness	55
Sweating	80
Headache	60
Anxiety	50
Difficulty in concentrating	25
Dizziness	25
Numbness / Tingling	25
Irritability / Confusion	55
Slurred speech	10
Blurry vision	25
Nightmares	15
Loss of consciousness	5
Seizures	20

DISCUSSION

The current study was a part of the project undertaken in a tertiary level urban health center in Tamil Nadu with the objective to find the prevalence of self-reported hypoglycemia and its associated risk factors among all the patients with T2DM who were registered at the center. All patients with T2DM who were undergoing regular treatment at the center who consented were included in the study. The study results can be generalized to any diabetic clinic where patients are receiving treatment. This study was done in a NCD clinic, which is a common setting in the Indian population as it is where the diabetic patients all over the country come for treatment. It was found that 147 patients (75.0%) had hypoglycemic episodes. Marrett et al¹¹ reported that 63 % of patients with T2DM had symptoms of hypoglycemic episodes of which 46% were mild, 37% moderate, 13% severe, and 4% very severe. In another survey done by the American Association of Clinical Endocrinologists, 20% of the diabetic patients required assistance for hypoglycemic episodes and 6% required hospitalization for the same. The first symptom of hypoglycemia was dizziness followed by sweating in the present study. Miller et al¹² conducted a retrospective interview among patients with T2DM and reported a prevalence of 16% hypoglycemia among patients on oral hypoglycemic agents compared with 30% prevalence among those on insulin therapy. In the rural setting, very few people (4.6%) were on insulin, hence the association of hypoglycemia with insulin therapy could not be established. The most common situation where hypoglycemia developed was a missed meal, which was observed in 90.0% of the patients. Similar findings were observed in another study,¹⁰ where 87% of the patients reported a missed meal as the etiological factor. This indicates the importance of education to the patients about consuming meals at the right time that would prevent episodes of hypoglycemia. Women were at a higher risk

of developing hypoglycemia. The reason for this could be that in Indian culture, women in general consume meals only after their spouses complete their meal. It is important to educate patients as well as the family members regarding timely meals in diabetic elderly women, which would help in preventing hypoglycemia. There was no possibility of measuring plasma glucose concentration at the time of the hypoglycemic episode. Therefore, the exact prevalence of these episodes is a challenge to measure. The accuracy of the prevalence of self-reported hypoglycemia may have been affected by patient recall especially when the event has been mild. It could also be affected by the individual's ability to identify the episode as a hypoglycemic event, as it is essential for the patient to differentiate hypoglycemic symptoms and other nonrelated symptoms. There is a possibility of underestimating the exact prevalence. As the most common cause of these episodes is a delayed or a missed meal, there is a possibility of this occurring in normal individuals also. These symptoms are more frequent and much exaggerated in diabetic patients, which require proper preventive measures. This study throws light on the high prevalence of hypoglycemic episodes in the rural population. Even in the near future, it is impossible to document hypoglycemia by glucose measurement in India especially in an urban or rural setting. This is the best way possible to document hypoglycemia.

CONCLUSIONS

Hypoglycemia is highly prevalent among the diabetic patients treated in the rural health center. Only a fifth of the patients reported symptoms to the medical practitioner. This implies that it is essential for the primary care physicians to enquire about the symptoms of hypoglycemia to all the patients at every visit. It is highly essential to educate the diabetic patients about symptoms of hypoglycemia and the importance of reporting such episodes to the doctor, which will help in adjusting dose and preventing fu-

ture attacks. The patients should be emphasized about the importance of carrying glucose in hand to tackle hypoglycemic episodes.

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