

Awareness about hypoglycemia among patients on insulin therapy in a tertiary care hospital: A cross-sectional study

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Received: December 16, 2018; Accepted: January 09, 2019

ABSTRACT

Background: Diabetes is a chronic disease that requires continuous medical care and patient self-management education. For diabetic patients, hypoglycemia is a fact of life. Hypoglycemia is one of the most common acute complications in adolescents with diabetes in both type 1 and type 2. Approximately 90% of all patients who receive insulin have experienced hypoglycemic episodes. Poor awareness among diabetics on hypoglycemic symptoms may lead to increased morbidity and mortality. **Aims and Objectives:** To study the awareness about symptoms, precipitating factors, and prevention of hypoglycemia among patients on insulin therapy. **Materials and Methods:** A cross-sectional study was done in a government tertiary care hospital. The study was conducted among diabetic patients who were on insulin therapy for at least 1 year. A pre-tested semi-structured questionnaire was used. The calculated sample size was 100. **Results:** Nearly 68.6% of the patients had faced at least one hypoglycemic attack. 65% were aware of at least three symptoms of hypoglycemia, but awareness was only 46% among illiterates compared to 86% of literates. 32% were unaware about the precipitating factors whereas 17% of the participants felt that the attacks were caused due to the wrong dosage therefore skipping medication or self-adjustment of dosage was mentioned as a preventing factor by them. **Conclusion:** Awareness of hypoglycemia was found to be average among participants. Diabetics on insulin therapy are more prone for hypoglycemia. Therefore knowing the awareness levels and perceptions is important. It may help to plan the necessary objectives of health education sessions among target population.


KEY WORDS: Insulin; Hypoglycemia; Awareness; Self-management; Diabetes Mellitus

INTRODUCTION

Diabetes, one of the priority non-communicable diseases (NCDs) which the global leaders are fighting, is an important public health problem. It is a serious, chronic disease that occurs either when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. Both the number of cases and the prevalence

of diabetes have been steadily increasing over the past few decades.^[1] The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014. In 2016, an estimated 1.6 million deaths were directly caused by diabetes.^[2] There were over 72,946,400 cases of diabetes in India in 2017 with a prevalence of 8.8%.^[3] India, currently, faces an uncertain future in relation to the potential burden that diabetes may impose on the country. Diabetes requires continuous medical care and patient self-management education to prevent acute complications and reduce the risk of long-term complications.

The overall objective of diabetes's management is to achieve and maintain blood glucose control. Diabetes and its complications place a very heavy burden on health care systems, and for diabetic patients, hypoglycemia is one

Access this article online	
Website: http://www.ijmsph.com	Quick Response code
DOI: 10.5455/ijmsph.2019.1235509012019	

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of the life-threatening complications. Both the American Diabetes Association and the European Medicines Agency have defined hypoglycemia as “any abnormally low plasma glucose concentration that exposes the subject to potential harm” with a proposed threshold plasma glucose value <70 mg/dL. Approximately 90% of all patients who receive insulin would experience hypoglycemic episodes. Patients with type 1 diabetes have an average of two episodes of symptomatic hypoglycemia per week and one episode of severe hypoglycemia once a year. An estimated 2–4% of deaths in diabetics have been attributed to hypoglycemia.^[4] Inadequate awareness is one of the causes for hypoglycemia. Sudden nocturnal deaths also known as “dead in bed” syndrome has been attributed to nocturnal hypoglycemia, which accounts for 5–6% of all deaths among young people with type 1 diabetes. Hypoglycemia can lead to coma and even death, depending on its severity or duration.^[5]

Irrespective of the burden that it imposes on the individual, family and the nation, diabetes is one such condition which has medications of proven efficacy and would never be a life-threatening condition until and unless the blood sugar levels are not maintained. Many studies have been published regarding the poor knowledge on diabetes in the general population and poor self-care practices among diabetics. Hypoglycemia is a preventable and treatable complication of diabetes. There are several studies on the awareness of hypoglycemia but very few on how different components such as knowledge of symptoms, precipitating factors, prevention, and immediate action to be taken during an attack are interlinked with each other. Thus, the study was undertaken to analyze the knowledge of diabetic patients on different components of hypoglycemia and the influence of sociodemographic characteristics on the same.

Objective

The objectives are as follows:

1. To study the sociodemographic profile of participants
2. To study the awareness of hypoglycemia among patients on insulin therapy.

MATERIALS AND METHODS

The study was done on diabetic patients admitted to a tertiary care hospital in Mysore, who were on insulin. It was a cross-sectional study done from June 2017 to November 2017. A pretested semi-structured pro forma was used to interview the patients. Considering the absolute error of 10% at the level of significance 5% and taking 54% as prevalence the calculated sample size is 100.^[6] Diabetic inpatients who were on insulin therapy for at least 1 year were considered in the study.

Statistics

Percentages and *t*-test for two proportions were done to compute the results.

Ethical Issues

Ethical clearance has been obtained from the Institution Ethical Committee.

RESULTS

The mean age of the participants was 55.8 years. Out of the 100 participants, 69 were females and 31 males. The study population had an almost equal proportion of literates and illiterates. Around 80% of the participants were from rural background, Hindu by religion, and belonged to lower class. Overall, 65% of the participants had knowledge of at least three symptoms of hypoglycemia. Most common symptoms were dizziness, sweating, and tremors. Around 68% of the participants had knowledge about precipitating factors, 72% about immediate action to be taken during an attack, and 57% on the measures to prevent hypoglycemia.

The proportion of participants who had awareness did not vary significantly among males and females. However, there is a statistically significant difference among illiterates and literates on the awareness of symptoms, immediate action during attack and measures to prevent further episodes of hypoglycemia. The participants who hail from urban background had better knowledge on symptoms and precipitating factors than those who belonged to rural, whereas those who received health education had more knowledge on immediate action to be taken and measures to prevent further attacks. History of the previous hypoglycemic attack had indeed a strong impact on knowledge about symptoms, precipitating factors, immediate action to be taken, and how to prevent further attacks [Tables 1-4].

Among the 68%, around 39% of the participants mentioned improper dietary habits such as avoiding timely meals, skipping meals before medication, and food inadequate in quantity and quality, whereas 18% mentioned irregular medication, noncompliance to physicians advise and another 11% both improper diet and irregular medication as the precipitating factors for hypoglycemia. Nearly half of them (48%) mentioned that they would consume sugar water immediately during the hypoglycemic attack, 17% wanted to restore sugar levels by eating whatever is available to them at that time, and 3% stressed on calling up treating physician and following their instructions. As far as the prevention of further hypoglycemic attacks was concerned, 38% suggested following the instructions given by the treating physician strictly and other 19% having an adequate and timely diet.

Table 1: Awareness on symptoms of hypoglycemia

Variables	Distribution		P value
	Frequency	Total	
Gender			
Male	19	31	0.603
Female	46	69	
Education			0.000
Illiterate	22	48	
Literate	45	52	
Residence			0.005
Rural	46	79	
Urban	19	21	
Health education			
Received	41	60	0.389
Not received	24	40	
History of hypoglycemic attack			0.000
Yes	58	67	
No	7	33	

Table 2: Awareness on precipitating factors of hypoglycemia

Variables	Distribution		P value
	Frequency	Total	
Gender			0.337
Male	19	31	
Female	49	69	
Education			0.794
Illiterate	28	48	
Literate	29	52	
Residence			0.012
Rural	40	79	
Urban	17	21	
Health education			0.741
Received	35	60	
Not received	22	40	
History of hypoglycemic attack			0.012
Yes	44	67	
No	13	33	

DISCUSSION

In the current study, the knowledge regarding hypoglycemia was found to be average. Many participants thought they were aware of the immediate action to be taken during the attack, expressed difficulty in recognizing the symptoms of hypoglycemia. Literacy, history of the previous attack, health education given by doctor or nurse and urban background were the factors significantly influencing the knowledge. Gender had no influence on the knowledge.

Around two-third of the participants in our study were females which is similar to another study done in South India

Table 3: Awareness on immediate action during hypoglycemic attack

Variables	Distribution		P value
	Frequency	Total	
Gender			0.667
Male	22	31	
Female	46	69	
Education			0.004
Illiterate	26	48	
Literate	42	52	
Residence			0.880
Rural	54	79	
Urban	14	21	
Health education			0.006
Received	47	60	
Not received	21	40	
History of hypoglycemic attack			0.000
Yes	57	67	
No	11	33	

Table 4: Awareness on measures to prevent hypoglycemic attacks

Variables	Distribution		P value
	Frequency	Total	
Gender			0.307
Male	20	31	
Female	37	69	
Education			0.000
Illiterate	16	48	
Literate	41	52	
Residence			0.631
Rural	46	79	
Urban	11	21	
Health education			0.000
Received	44	60	
Not received	13	40	
History of hypoglycemic attack			0.012
Yes	44	67	
No	13	33	

where 76.5% of the subjects were females.^[7] A study done in Mangalore had an equal proportion of males and females.^[6] Almost all the participants belonged to lower class which might be due to the tertiary care hospital where the current study was done since it is a government set up and most of them were hailing from the rural area. In the current study, around two-third of the participants were aware of at least three symptoms of hyperglycemia. Similarly, in other studies, the awareness regarding symptoms varied from 52% to 66%.^[6-8] In the current study, awareness did not vary based on gender but educational status, urban background, previous health education sessions by physician or nurse and a hypoglycemic attack in the past had

significant influence on the knowledge of the study participants regarding symptoms, precipitating factors, immediate measures to be taken during an attack and to prevent further episodes. Similarly, in a study done in Mangalore, it was found that more the patient was literate more was the awareness regarding symptoms.^[6] A study done in South India also revealed that gender was not associated with knowledge on hypoglycemia, however, illiteracy and lower socioeconomic class were associated with poor knowledge.^[7] In contrast, a study done in Coimbatore found that there was no significant association between gender, religion, educational status, occupation, duration of diagnosis, treatment for diabetes mellitus, and information on hypoglycemia.^[9] In the current study, two-third of the patients had a hypoglycemic attack in the past. All the participants were on insulin therapy and the incidence of hypoglycemia is reported to be more common among them^[10] and also the incidence is more among type 1 than type 2 diabetes mellitus.^[8] In the current study, the knowledge was more among those who had a previous hypoglycemic attack. A study done on rural population revealed that awareness of various aspects of diabetes was found to be better among the diabetics in comparison with the general population.^[11] A study revealed patients on insulin therapy have more knowledge as compared to others.^[7] In our study, participants who received health education from either physician or nurse had more knowledge as compared those who did not. An intervention study done on diabetic patients revealed those who received health education had gained more knowledge after the implementation of the program; particularly, in the areas of the nature and signs and symptoms of the disease, signs and symptoms of hypo and hyperglycemia, causes and warning signs of foot problems, foot care, and importance of exercises and hence concluded that health education of diabetic patients is crucial for control of diabetes.^[12] Improper dietary practices and irregular medication were mentioned as the causes for hypoglycemic attack. In a community based study on misconceptions regarding diabetes more than 50% of the respondents felt that drugs can be stopped once diabetes is controlled. About 28.25% felt that diabetes can be treated with all bitter substances. Dietary practice was one of the important factors influencing the achievement of good blood sugars in the participants.^[13] Consuming sugar water during acute attack and following proper diet and medication were the measures mentioned by the participants to prevent complications and manage their blood glucose levels. In a study done in Mangalore, 49% of patients preferred taking glucose powder or sugar with water as an immediate measure. Majority of patients felt going to the casualty or emergency department was the right option for hypoglycemia.^[6] In a hospital-based study on practices of diabetic patients most patients resorted to timely meals (85%) to avert future attacks.^[10] In Coimbatore study participants mentioned regular exercise can prevent the risk of hypoglycemia.^[9]

This study provides a comprehensive knowledge of all the components related to hypoglycemia and how poor

knowledge in one component (e.g., Symptoms) effects though they have adequate knowledge in other components (e.g., Immediate action). This stands out as the main strength of the article. However, community-based study with a larger sample size would have given an accurate snapshot of the situation since patients who have poor knowledge are tend to be hospitalized more.

The main goal of diabetes management is to maintain optimum blood glucose levels. Hypoglycemia being one of the life-threatening complications can be prevented by adopting appropriate self-care practices, providing counseling at every session, being compliant with medication and following appropriate dietary practices. Awareness regarding hypoglycemia was average among the study participants which was further hampered by illiteracy, lack of counseling sessions from treating physicians. Literacy plays a significant role in creating awareness. Counseling sessions at the start of insulin therapy help to act aptly during emergencies. The previous history of similar experiences plays a significant role in enhancing awareness.

Recommendations

- Counseling sessions to the patients on insulin therapy at each visit in the outpatient department regarding the untoward effects and also diabetics to check blood glucose levels at home for better care.
- Workshops on the same can be conducted for NCD patients in hospitals.
- A separate helpline number for NCD patients to get immediate assistance in case of emergencies.

CONCLUSION

Awareness of hypoglycemia was found to be average among participants. Diabetics on insulin therapy are more prone for hypoglycemia. Therefore knowing the awareness levels and perceptions is important. It may help to plan the necessary objectives of health education sessions among target population.

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How to cite this article: Jayashree S, Manjunatha SN. Awareness about hypoglycemia among patients on insulin therapy in a tertiary care hospital: A cross-sectional study. Int J Med Sci Public Health 2019;8(3):200-204.

Source of Support: Nil, **Conflict of Interest:** None declared.