

## Knowledge, Attitude and Practices of Diabetic Patients with Recurrent Hypoglycaemia towards Prevention of Hypoglycemia and the Effect of Diabetic Education on it

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### Abstract

**Background:** Diabetes mellitus (DM) is a metabolic disorder characterized by elevated blood glucose levels and disturbances in carbohydrates, fats, and protein metabolism. Hypoglycaemia is common complication of DM. American Diabetic Association (ADA) defined hypoglycaemia in DM patient as blood sugar <3.9 mmol/L. There can be a six fold higher incidence of death, increased costs of medical care, and loss of productivity due to hypoglycemia. Majority of hospitalized diabetic patients and their relatives had inadequate understanding of diabetes and its consequences or complications. This study was conducted to assess baseline knowledge, attitude and practice (KAP) and effect of education on it.

**Methods:** This is a prospective interventional study conducted at Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM), Dhaka during the period between April-2016 to April-2017. 200 consecutive diabetic patient more than 18 year of age, admitted into BIRDEM with hypoglycaemia were included into the study. Baseline knowledge, attitude and practice (KAP) toward hypoglycaemia were assessed using a pretested questionnaire. Diabetic education was given to the patient. The KAP was reassessed at follow up visit. Data were analyzed using SPSS 22 version. Paired t test done to test the significance.

**Results:** Out of 180 patients 55% were male and 45% were female. Age of the respondents was  $54.5 \pm 12.02$ . The mean knowledge, attitude and practice score before and after diabetic education were  $2.53 \pm 1.22$  vs  $3.04 \pm 1.15$ ,  $p=0.000$ ;  $2.70 \pm 1.27$  vs  $3.43 \pm 1.49$ ,  $p=0.000$  and  $1.97 \pm 0.893$  vs  $2.1 \pm 0.943$ ,  $p=0.033$  (out of 6).

**Conclusion:** Diabetic patient admitted with hypoglycaemia have low knowledge score about hypoglycemia. Attitude and practice to prevent hypoglycaemia is also poor. Diabetic education improves knowledge and practice behavior to prevent hypoglycaemia.

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**Keywords:** Diabetic education, knowledge, attitude, practice

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## Introduction

Diabetes mellitus (DM) is a metabolic disorder characterized by elevated blood glucose levels and disturbances in carbohydrates, fats, and protein metabolism and associated with metabolic complications that can subsequently lead to premature death.<sup>1</sup> Hypoglycaemia is common complication of DM. American Diabetic Association (ADA) defined hypoglycaemia in DM patient as blood sugar  $<3.9$  mmol/L<sup>2</sup> and further classified hypoglycaemia as level 1 hypoglycaemia when blood sugar is 3-3.9 mmol/L, level 2 hypoglycaemia when blood glucose is  $<3$  mmol/L and level 3 or severe hypoglycaemia when patient require support from 3<sup>rd</sup> person for rescue irrespective of blood sugar level.<sup>3</sup> Frequency of hypoglycaemia varies. A meta analysis<sup>4</sup> showed that the prevalence of hypoglycaemia was 45% for mild/moderate and 6% for severe. Incidence of hypoglycaemic episodes per person-year for mild/moderate and for severe was 19 and 0.80 respectively. Hypoglycaemia was prevalent amongst those on insulin; for mild/moderate episodes the prevalence was 50% and incidence 23 events per person-year, and for severe episodes the prevalence was 21% and incidence 1 event per person-year. Symptoms of hypoglycaemia vary from person to person depending on duration of DM and its treatment, presence of neuropathy etc. The short and long-term complications of hypoglycaemia include neurologic damage, trauma, cardiovascular events and death<sup>5</sup>. There can be a six fold higher incidence of death, increased costs of medical care, and loss of productivity due to hypoglycaemia.<sup>6</sup> Sometimes the hypoglycaemic symptoms are so dreadful that patient may refuse further antidiabetic medications.

Knowledge about hypoglycaemic symptoms is an important step to self-care practice, because informed people are more likely to

have better self-care practice.<sup>7</sup> Majority of hospitalized diabetic patients and their relatives had inadequate understanding of diabetes and its consequences or complications, and they had lack of confidence in own ability to manage diabetes effectively. Patients' knowledge about various aspect of the disease together with the understanding of the aims and objectives of various treatment outcomes have tremendous impact on patients self-care practice, skills necessary to control of self blood glucose.<sup>8,9</sup> This study was conducted to assess baseline knowledge, attitude and practice (KAP) and effect of education on it. The ultimate target to reduce the incidence of hypoglycaemia.

## Methods

This is a prospective interventional study conducted at Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM), Dhaka during the period between April-2016 to April-2017. The study was conducted after getting ethical clearance from Institutional Review Board, BIRDEM general hospital. 200 consecutive diabetic patients more than 18 year of age, admitted into BIRDEM with hypoglycaemia were included into the study. The study was primarily designed to see the effect of diabetic self management education and support (DSME and DSMS) on reducing the incidence of hypoglycaemia (will be published elsewhere). Concomitantly patient's baseline knowledge, attitude and practice (KAP) toward hypoglycaemia were assessed using predesigned and pretested questionnaire. The questionnaire made with the help of article published by Buthni et al, 2015,<sup>10</sup> had 20 questions to assess the knowledge (7), attitude (7) and practices (6) of the diabetic patients toward prevention of hypoglycaemia (Appendix: 1). The knowledge part of the questionnaire was to assess the knowledge of the possibility of hypoglycaemic episodes in the diabetic patients and its

common symptoms. Attitude part of the questionnaire was to evaluate the beliefs of the patient regarding simple preventive measures for avoiding hypoglycemia. The practice part of the questionnaire was to judge how the knowledge and attitudes of the patients are practically put into action. Each correct response was given a score of "one" and each wrong answer or unsure response was given a score of "zero". After taking the information patient and care giver (where applicable) were educated about diabetes, its pathology, treatment plan, glycaemic goal, importance of SMBG, self-adjustment of own diabetic medication, potential risk of treatment including hypoglycaemia, hypoglycaemic symptoms, its risk factor, how to prevent them, how to recognize symptoms early and take early intervention to prevent severe hypoglycaemia, how to manage diabetes in sick days. Education was given one to one by the investigator as well as diabetic educator in repeated session during hospital stay. Feedback was taken to ensure that information has been received.

The patient was provided investigator's cell phone number so that they can contact with the investigator any time when confusion arise. Also patient's cell phone number was taken so that the investigator can contact with the patient if needed. They are advised to come for follow up twice, once at 3 month and the second at 6 month, when same information taken at follow up. The mean scores for each parameter were calculated. The baseline scores and the follow-up scores were compared by paired *t*-test using SPSS version 22 to assess the effect of diabetes care education on prevention of hypoglycemic episodes and improvements in KAP of diabetic patients toward hypoglycemia.

### Results

Out of 200 patients who attended at least one follow up visit were included in final analysis. So Total 180 patient were included in final analysis. Those who attended at both follow up visit, best score at follow up visit were analyzed. Out of 180 patients 55% were male and 45% were female (baseline characteristics are given in Table I.

Table I: Baseline characteristics of the respondents (N=180)

Characteristics		Frequency	Percentage
Age (in year)	(Mean $\pm$ SD)	54.5 $\pm$ 12.02	
Sex	Male	99	55%
	Female	81	45%
Residence	Urban	112	62.2%
	Rural	68	37.8%
Education	Illiterate	6	3.3%
	Undergraduate	99	55%
	Graduate and above	75	41.7%
Activity level	Bedridden	10	5.6%
	Sedentary worker	90	50%
	Moderate worker	60	33.3%
	Heavy worker	20	11.1%

The mean knowledge score before diabetic education is 2.53 $\pm$ 1.22 out of 7. Attitude toward hypoglycaemia score was 2.70 $\pm$ 1.27 (out of 7) and practice score was 1.97 $\pm$ 0.893(out of 6). All of them improved significantly after education (Table II).

Table II: Mean score at baseline and after education

	Mean score at baseline (Mean±SD)	Mean score after education (Mean±SD)	p
Knowledge about hypoglycaemia	2.53±1.22	3.04±1.15	0.000
Attitude toward hypoglycaemia	2.70±1.27	3.43±1.49	0.000
Practice to prevent hypoglycaemia	1.97±.893	2.1±0.943	0.033

## Discussion

Hypoglycaemia is a common and preventable endocrine emergency. With increasing incidence of diabetes, there is a risk for an increase in the incidence of hypoglycemia though with various treatment modalities available to control blood glucose level. The goals in diabetes education consist in improving metabolic control, preventing acute and chronic complications and improving one's quality of life at reasonable cost.<sup>11</sup> This study shows mean KAP score about hypoglycaemia is 2.53±1.22 out of 7, 2.70±1.27 (out of 7) and 1.97±.893 (out of 6) respectively. Study conducted by Bhutani et al (2015) showed this knowledge score were 1.24±0.20, 2.11±0.11 and 1.57±0.09 respectively.<sup>10</sup> Girma Nega Gezie et al<sup>12</sup> defined knowledge on hypoglycemia is as good when respondents answered equal to or above the mean score of knowledge questions. In that study they found 25.5% respondents had good knowledge in hypoglycemia prevention; however in specific question 51.2% participants had poor knowledge in identifying symptoms, 87.7% didn't know the effect of exercise. Then Mozhi P and Vijayalakshmi<sup>13</sup> showed that 63.33% had inadequate knowledge, 20% of them had moderately adequate knowledge, and 16.67% of them had adequate knowledge. Though current study did not categorize knowledge score in category either inadequate or adequate, overall knowledge score was low, perhaps, similar to other studies.

Only knowledge and positive attitude toward hypoglycaemia is not enough to prevent

hypoglycemia unless they are brought into practice. As shown earlier, practice to prevent hypoglycaemia even worse than knowledge and attitude. Apart from a lack of awareness, forgetfulness and busy job schedule of the patients are the most common reasons, which did not allow a large number of patients to be self-disciplined regarding timely intake of meals and medicines.<sup>10</sup> Some people are not able to implement it due to lack of resources and education.

With diabetic education, there is a significant improvement both in KAP score of the patients, which were 3.04±1.15 (p=0.000); 3.43±1.49 (p=0.000) and 2.1±0.943, (p=0.033), quite similar to an Indian study.<sup>10</sup>

Thus, proper diabetic education provides us with a ray of hope of improving the knowledge and attitude of the patients and decreasing the hypoglycemic episodes in diabetics. Repeated education and support may motivate patient to translate the knowledge and attitude into practice.

## Limitation

Since scores were assessed on a questionnaire with yes or no answer, in some cases answer might have been given by guessing.

### Conclusions

Knowledge regarding hypoglycemia is relatively low among the respondent. Practice to prevent hypoglycemia is even poorer. Diabetic education improved KAP score

significantly. Repeated education and motivation may translate knowledge into practice, thus may prevent serious hypoglycemia.

### Appendix: 1

Questions to assess knowledge attitude and practice of hypoglycemia

Knowledge about hypoglycaemia	
	Can hypoglycemia occur in diabetics? Can hypoglycemic episodes prove to be dangerous? Can hypoglycemia be precipitated by skipping of meals or excessive exercises? Is morning headache one of the symptoms of hypoglycemia? Is shakiness or weakness one of the symptoms of hypoglycemia? Is intense hunger one of the symptoms of hypoglycemia? Is passing out one of the symptoms of hypoglycemia?
Attitude toward hypoglycaemia	
	Importance of hypoglycaemic symptoms Importance of regular meal Importance of timely medicine Importance of avoiding excessive exercise Importance of keeping toffee Importance of SMBG Importance of diabetic education
Practice toward hypoglycaemia	
	Regular intake meal Timely taking medicine Avoiding excessive exercise keeping toffee Attention to warning symptoms Self-monitoring of BG

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