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Perception and Practice of Diabetic Patients about Hypoglycemia

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ABSTRACT

Background & objective: Diabetes is major global epidemic with an ever-increasing trend. For diabetic patients hypoglycemia is a fact of life. The gravity of the problem demands that the diabetics must be aware about the symptoms of hypoglycemia as well as its immediate corrective measures to overcome the crisis. But, a substantial proportion of diabetic patients is unaware of all the symptoms of hypoglycemia leading to delayed management. This study was intended to assess the diabetic patients' perception about hypoglycemia.

Methods: The study was carried out in the Department of Community Medicine, Rajshahi Medical College, Rajshahi over a period of 2 months from April 2018 to May 2018. The diabetic patients in the rural area of Puthia Upazila were the respondents (study population). A total of 107 diabetic patients were consecutively included in the study. A self-administered questionnaire containing the variables of interest for evaluating perception of the respondents about diabetic hypoglycemia was used. Respondents' level of knowledge about hypoglycemia was measured using Likert Scale Score. Score '1' was assigned for each correct answer and score '0' for each wrong answer. As there were more than one question in assessing respondents' level of knowledge, combined scores were used to measure respondents' perception about hypoglycemia.

Result: Over one-third (36.4%) of the respondents was middle aged (40 – 50 years old) and 29% were upper middle aged (50 – 60 years old) with mean age of the respondents being 51.3 years (range: 30-93 years). Approximately 55% were male with male to female ratio being roughly 11:9 More than two-thirds of the respondents took measures to control diabetes and their compliance to treatment was also commendably high (83%). The proportion of controlled diabetics was no less (57%). But their knowledge about common symptoms and causes of hypoglycemia was poor (no more than 25% on an average). The knowledge about measures to be taken to correct hypoglycemia was even poor (no more than 20% on an average). The perception of the significance of symptoms of hypoglycemia and the importance of their correction were disappointingly low (< 10%). Overall half (49.5%) of the respondents had very poor level of knowledge, over one-third (34.6%) had poor knowledge, 13.1% had average knowledge and only 2.8% had good knowledge about symptoms of hypoglycaemia.

Conclusion: The study concluded that over two-thirds of the diabetic patients of Puthia Upazilla adopt measures to control diabetes and their compliance to treatment is appreciably high. The proportion of controlled diabetes is also appreciable. But their knowledge about symptoms, causes of hypoglycemia, measures to be taken to correct hypoglycemia and the importance of taking immediate measure to correct hypoglycemia are all inappreciably low.

Key words: Perception, practice, hypoglycemia, diabetic patients etc.

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INTRODUCTION:

Diabetes mellitus appears to be a global epidemic & increasingly becoming a major non-communicable disease threatening both affluent and non-affluent society. More than 170 million people worldwide have diabetes, and this figure is projected to more than double by the year 2030, if the current trends continue further.[1] For diabetic patients hypoglycemia is a fact of life.[2] There is now compelling evidence from the Diabetes Control and Complications Trial (DCCT), that good glycemic control delays the development and progression of retinopathy, neuropathy and nephropathy in IDDM (Insulin- dependent Diabetes Mellitus). However, maintenance of strict glycemic control may sometimes lead to hypoglycemia.[3] Approximately 90% of all patients who receive insulin have experienced hypoglycemic episodes sometimes in their lives. The reported incidence of hypoglycemia varies considerably among studies; however in general patients with type 1 diabetes have an average of two episodes of sympotomatic hypoglycemia per week and one episode of severe hypoglycemia once a year. An estimated 2-4% death of this population have been attributed to hypoglycemia.[4] These findings undoubtedly provide further impetus to patients and health care providers to attempt to maintain plasma glucose levels as close to the non-diabetics range as possible.

A cross–sectional study done on 20 outpatients having type 1 diabetes for at least 10 years revealed that hypoglycemia negatively affected their interpersonal relationship.[5] A prospective observational study was conducted among 344 patients with type 2 diabetes mellitus to assess the risk factors for hypoglycemic episodes. Electronically recorded self-monitored blood glucose results were collected during 12 months of routine monitoring. Over half (51.2%) of the subjects documented at least one hypoglycemic reading for a total of 1662 episodes; They attributed that hypoglycemia occurred due to missing a meal (53.3%) orexercise (23.8%). The study also showed that a high proportion of stable, insulin-treated subjects developed hypoglycemic episode.[6] A prospective study conducted in Philadelphia on hypoglycemia in hospitalized diabetic patients receiving antihyperglycemic therapy showed that about 10% of them experienced 484 hypoglycemic episodes. Of these episodes, 72% were in patients receiving only insulin indicating hypoglycemia is common in hospitalized patients taking insulin.[7]

The gravity of the problem demands that the diabetics must be aware about the symptoms of hypoglycemia as well as the corrective measures that should be taken immediately to overcome the crisis. But, a substantial proportion of diabetic patients, for lack of health education, cannot recognize all the symptoms of hypoglycemia (e.g. dizziness, palpitation, sweating, nausea and vomiting, lack of concentration, visual impairment, abdominal discomfort, tremor, intense hunger, speech disabilities) [8-10] and hence their proper management is delayed[11]. For this reason diabetic patients' perception about hypoglycemia needs to be assessed, which demands a formal study. The present study was, therefore, undertaken to assess the knowledge of diabetic patients about symptoms of hypoglycemia and the measures to be taken to overcome those symptoms.

METHODS:

This descriptive cross-sectional study was carried out in the Department of Community Medicine Rajshahi Medical College, Rajshahi over a period of 2 months from April 2018 to May 2018. During the period a total of the 1001 adult respondents from Puthia Upazila Rajshahi were interviewed for assessing the prevalence of non-communicable diseases (diabetes, hypertension) among them; of them 107(10.7%) were found diabetic (diagnosed by registered physicians or diabetic centers), 246(24.6%) were hypertensive, and the rest 648(64.7%) were free from either conditions. These 107 diabetic patients (sample for the present study) were selected as respondents for studying their demographic variables, control measures for diabetes, knowledge related variables about symptoms of hypoglycemia, opinion about measures to be taken when symptoms of hypoglycemia develop and practice of the respondents when symptoms of hypoglycemia manifested etc. Data were collected on by a structured questionnaire with the help of face to face interview with the respondents. A list of symptoms was presented to the respondents and were asked to encircle those symptoms that were manifested during episodes that they interpret as representing hypoglycemia. The list of symptoms in the questionnaire was based on previous

work that were used to provide validation of the correct allocation of symptoms to either autonomic or neuroglycopenic groups.[12,13] The key variables of interest were operationalized. Hypoglycemia was defined as a condition, which occurs when one's blood glucose level is lower than normal, usually less than 63 mg/dl. Or 3.5 mmol/l.[14] Diabetes referred to individuals suffering from hyperglycaemia (fasting blood glucose level > 126 mg/dl or random blood glucose level >200 mg/dl) resulting from defects in insulin secretion, insulin action, or both.[14] Knowledge, in the present study, meant for having familiarity with symptoms of hypoglycaemia. It refereed to the correct response of diabetic patients to the knowledge questionnaire about hypoglycaemia and its management.

The level of knowledge of the respondents about hypoglycemia was measured using Likert Scale Score. Score '1' was assigned for each correct answer and score '0' for each wrong answer. As there were more than one question in assessing respondents' level of knowledge, combined scores were used to measure respondents' perception about the topic. As stated the levels of knowledge were measured on a 0 – 4 Likert Scale, where 0 meant 'very poor knowledge' and 4 meant 'Excellent knowledge' with 'poor' 1, 'average' 2, and 'good' 3 in between them. First the level of knowledge was assessed separately for responses against each question. Then all these knowledge-related scores were added together to find an overall level of knowledge. As there were 10 knowledge-related questions with highest obtainable score being '10', we divided the scores obtained from the respondents, on a 0 – 4 Likert scale, into five categories: 1) Very poor or grossly dissatisfactory – when 0 – 2 responses were correct, 2) Poor– from 3 – 4 responses were correct, 3) Average – from 5 – 6 responses were correct, 4) Good – from 7 – 8 responses were correct and 5) Excellent – from 9 – 10 responses were correct.

Collected data were processed and analyzed with the help of software SPSS (Statistical Package for Social Sciences) version 17.0. Statistical analyses were done using descriptive statistics. The data presented in categorical scale were expressed as frequency and corresponding percentage, while the data presented on continuous scale were expressed as mean, median and standard deviation from the mean. The summarized data were presented in the form of table and charts with due statistical interpretation.

RESULTS:

Age distribution shows that over one-third (36.4%) of the respondents was middle aged (40-50 years old), 29% upper middle-aged (50-60 years old), 18.7% < 40 years and 6.5% > 70 years old. The mean age was 51.3 years and the youngest and the oldest patients were 30 and 93 years old respectively. Approximately 55% were male with male to female ratio being roughly 11:9 (Table I). Majority (90.7%) of the respondents was married. In terms of occupation, 14% were service-holder, 38.3% were housewife, 15% farmer, 29.9% businessman (Table I). The average monthly income of the respondents was Taka 15537 (range: Taka 2000-40000). More than 40% were primary level educated followed by illiterate (24.3%), SSC (17.8%), HSC (10.3%) and graduate plus (4.7%). Two-thirds (67.3%) of the respondents were of normal BMI, 24.3% were overweight and 6.5% were obese (Fig. 1).

Table I: Distribution of patients by their demographic characteristics (n = 107)

Demographic characteristics	Frequency	Percentage	Mean ± SD
Age* (years)			51.3 ± 11.7
(30 – 93)			
<40	20	18.7	--
40 – 50	39	36.4	--
50 – 60	31	29.0	--
60 – 70	10	9.3	--
>70	7	6.5	--
Sex			
Male	59	55	--
Female	48	45	--
Marital status			
Married	97	90.7	--
Unmarried	4	3.7	--
Divorced/widow	6	5.6	--
Occupation			
Service	15	14.0	--
Housewife	41	38.3	--
Farmer	16	15.0	--
Business	32	29.9	--
Others	3	2.8	--
Income (Taka)			15537±9158 (2000-40000)
Education			
Illiterate	26	24.3	--
Primary	45	42.1	--
SSC	19	17.7	--
HSC	11	10.3	--
Graduate plus	6	5.6	--

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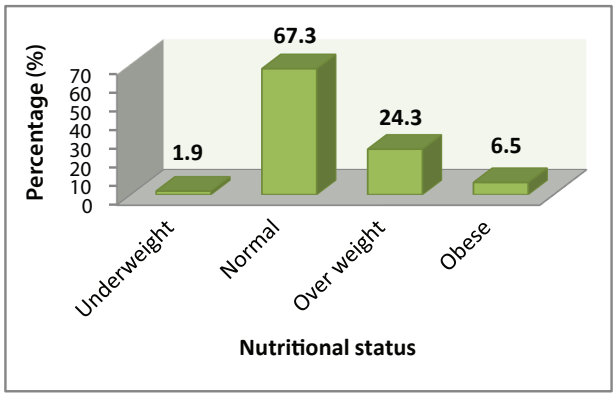

Fig. 1: Distribution of respondents by their nutritional status (n = 107)

Majority (93.7%) of the respondents was suffering from Type-II diabetes. The average duration of diabetes was 6 years and the shortest and longest durations were 1 and 25 years respectively (Table II). As measures of controlling diabetes, most (86%) of the respondents adopted diet control, 68.2% were used to using exercise. Over 70% were taking oral hypoglycemic agent & 27.1% insulin as antidiabetic therapy. Majority (83.2%) was complia to treatment of diabetes. Approximately 58% of the respondents had control over diabetes (Table III). The respondents' knowledge about symptoms of hypoglycemia are illustrated in table IV. Nausea and vomiting were mentioned by more than half (55.1%) of the respondents followed by abdominal discomfort (49.5%), slurring of speech (31.8%), lack of concentration (30.8%), blurring of vision (22.4%), intense hunger (21.5%), tremor of hands and feet (20.6%), palpitation (19.6%), sweating (16.8%) and dizziness the least (6.5%). Asked about the causes of hypoglycemia, around one-third told missed meal (34.6%), over exercise (33.6%) and overdose of insulin or oral hypoglycemic agent (35.5%). About one-quarter (23.4%) mentioned inadequate food intake and 13.1% told delay in taking food (Table V). As respondents were asked what could be done if symptoms of hypoglycaemia occur, over one-quarter (26.2%) told blood sugar to be measured, 17.8% were in favour of taking light meal or snacks, 15% added to seek medical advice and 9.3% told sugar to be ingested (Table VI). Out of total respondents, only 15(14%) ever admitted in the hospital for hypoglycaemic episode. Of them 9(60%) experienced one episode of hypoglycaemia, 3(20%) 2-episodes, 2(13.3%) 3-episodes and only 1(6/7%) 5-episodes (Table VII). Respondents stratified by their opinion about hypoglycaemia and importance of correction of hypoglycaemia are shown in Table VIII. Respondents' level of knowledge about symptoms of hypoglydcemia was categorised based on Likert scale as described earlier in the 'Methodology' section. Accordingly over half (49.5%) of the respondents had very poor level of knowledge, over one-third (34.6%) had poor knowledge, 13.1% had average knowledge and only 2.8% had good knowledge about symptoms of hypoglydcemia. None had excellent level of knowledge (Table IX).

Table II. Distribution of respondents by diabetic-related profile (n = 107)

Diabetes related profile	Frequency	Percentage	Mean ± SD
Type of diabetes			
Type I	7	6.5	--
Type II	100	93.5	--
Duration of Diabetes	--	--	6.0 ± 4.6 (1-25)

Table III. Respondents' distribution by diabetes control measure taken

Diabetes control measures taken	Frequency	Percentage
Diet control	92	86.0
Regular exercise	73	68.2
Oral hypoglycemic agent	75	70.1
Insulin	29	27.1
Reported compliance to treatment		
Compliant	89	83.2
Non-compliant	18	16.8
Diabetes under control		
Yes	62	57.9
No	17	15.9
Don't know	28	26.2

Table IV. Respondents' knowledge about symptoms of hypoglycemia (n = 107)

Symptoms of hypoglycaemia	Frequency	Percentage
Dizziness		
Yes	7	6.5
No / Don't know	96/4	89.7/3.7
Palpitation		
Yes	21	19.6
No / Don't know	73/13	68.2/12.1
Sweating		
Yes	18	16.8
No / Don't know	77/12	72.0/11.2
Nausea & vomiting		
Yes	59	55.1
No / Don't know	37/11	34.6/10.3
Lack of concentration		
Yes	33	30.8
No / Don't know	43/31	40.2/29.0
Blurring of vision		
Yes	24	22.4
No / Don't know	73/10	68.2/9.3
Abdominal discomfort		
Yes	53	49.5
No / Don't know	35/19	32.7/17.8
Tremor		
Yes	22	20.6
No / Don't know	75/10	70.1/9.3
Intense hunger		
Yes	23	21.5
No / Don't know	77/7	72.0/6.5
Slurring of speech		
Yes	34	31.8
No / Don't know	51/22	47.7/20.6

Table V. Respondents' perception about causes of hypoglycaemia (n = 107)

Causes of hypoglycaemia	Frequency	Percentage
Inadequate food intake		
Yes	25	23.4
No/Don't know	50/32	46.7/29.9
Delay in taking food		
Yes	14	13.1
No / Don't know	59/34	55.1/31.8
Missed meal		
Yes	37	34.6
No / Don't know	35/35	32.7/32.7
Over exercise		
Yes	36	33.6
No / Don't know	22/49	20.6/45.8
Overdose of insulin or OHA		
Yes	38	35.5
No / Don't know	16/53	15.0/49.5

Table VI. Knowledge about measures to be taken if symptoms of hypoglycemia occur

Measures to be taken	Frequency	Percentage
Sugar ingestion /Intake of CHO		
Yes	10	9.3
No / Don't know	68/29	63.6/27.1
Light meal / Snacks intake		
Yes	19	17.8
No / Don't know	61/27	57.0/25.2
Measure blood sugar		
Yes	28	26.2
No / Don't know	39/40	36.4/37.4
Seek medical advice		
Yes	16	15.0
No / Don't know	68/23	63.6/21.5

Table VII. Distribution by hypoglycaemic episode related variables

Hypoglycaemic episode related variables	Frequency	Percentage
Ever admitted to hospital for hypoglycaemia		
Yes	15	14.0
No	92	86.0
How many times did that happen (n=15)		
1	9	60.0
2	3	20.0
3	2	13.3
5	1	6.7

Table VIII. Distribution respondents by opinion about hypoglycaemic and glycaemic control

Opinion	Frequency	Percentage
Perception of the symptoms of hypoglycemia		
Nothing serious	25	23.4
It may happen, but should be prevented	44	41.1
Very serious, it should never happen	29	27.1
Life-threatening emergency	9	8.4
Importance of correction of hypoglycaemia		
Not important	7	6.5
Important but not so emergency	17	15.9
Very important	74	69.2
Urgent and life-saving measure	9	8.4

Table IX. Respondents' level of knowledge about hypoglycemia (n=107)

Level of knowledge (Likert scale score)	Frequency	Percentage
Very poor (0 – 2)	53	49.5
Poor (3 – 4)	37	34.6
Average (5 – 6)	14	13.1
Good (7 – 8)	03	2.8
Excellent (9 – 10)	00	0.0

DISCUSSION:

In the present study nearly two-thirds (65.4%) of the diabetics were middle-aged and nearly 60% were primary or secondary level educated. Majority (93.7%) of the respondents was suffering from Type-II diabetes. El-zubier[15] demonstrated that majority of subjects in their sample was beyond middle aged, of low level of literacy, and suffering from type 2 diabetes mellitus. The findings of the present study revealed that half (49.5%) of the diabetics had very poor knowledge about symptoms of hypoglycemia, one-third (34.6%) poor knowledge, 13.1% had average level of knowledge. Only 2.8% had good knowledge with none having excellent knowledge. Consistent with these findings, El-zubier's[15] study revealed that only half of the diabetic subjects can recognize a few symptoms of hypoglycaemia.

The low level of perception about hypoglycaemia is common, even among medical staff[16] and it reflects on the quality of care offered to diabetic patients. These findings can be partially explained by the fact that the major proportion of the sample is composed of subjects with low educational status. But equally important would be the problem of lack of health education and doctor-patient communication gap.[17] Studies have shown that problem of inadequate knowledge about symptoms of hypoglycaemia is not uncommon as is found in Saudi Arabia[18] as well as elsewhere in the world.[19,9] Apart from directly leading to death, one of the indirect hazards of hypoglycaemia is that it may endanger the life of a diabetic patient, particularly if it occurs during a risky activity like motor car driving.[20] Hypoglycaemia may cause many symptoms like dizziness, palpitation, sweating, nausea and vomiting, lack of concentration, loss of consciousness, abdominal discomfort, and intense hunger. In the present study the symptoms that are answered correctly by around 25% (average) of the patients were sweating, lack of concentration, slurring of speech & tremor which are lower from those found in other studies.[17,21] Hypoglycaemic episodes pose both acute and chronic risks. Transient hypoglycaemia can cause various acute cognitive-motor deficits[22,24], which in turn can lead to industrial and automobile accidents & fear & embarrassment.[24,25] Chronic cognitive-motor impairments have previously been reported after frequent severe hypoglycaemic episodes.[26-28] It is, therefore, imperative that patients recognize hypoglycaemia early so that immediate corrective action can be taken. The importance of strict glycemic control to limit the risk of diabetic vascular complications is indisputable, but many barriers obstruct its attainment. Hypoglycemia is recognized to be a major limitation in achieving good control.

Subjective recognition of the symptoms of hypoglycaemia is fundamental to its effective self-management and to prevent its progression in severity.[29] Symptoms are generated when arterial blood glucose concentrations is around 2.8–3.2 mmol/l (50–58 mg/dl) and in young adults have been classified as neuroglycopenic, autonomic, & malaise.[13] Hypoglycaemic symptoms are idiosyncratic and age specific.[44] Recognition of low blood glucose is possible both through self-monitoring of blood glucose (SMBG) and detection of hypoglycaemic symptoms. SMBG is not a completely satisfactory method because it is performed too infrequently to recognize the rapid development of many hypoglycaemic episodes. The cognitive motor impairments associated with hypoglycaemia also may interfere with the accurate performance of SMBG.[28]

The present study, like any other scientific studies was not without limitations. The following

limitations deserve mention:

1. The selection of study population was not based on stringent criteria. As type1 diabetics under insulin therapy are more prone to develop hypoglycaemia, inclusion of type1 diabetics alone could have better reflected perception of the diabetic patients about hypoglycaemia.
2. The study was done in a conveniently selected rural area, which may not reflect the actual situation of the entire rural areas in Bangladesh.

CONCLUSION:

The study concluded that over two-thirds of the diabetic patients of Puthia Upazilla take measures to control diabetes and their compliance to treatment is also appreciably high and proportion of controlled diabeticsis no less. But their knowledge about common symptoms and causes of hypoglycemia is poor (no more than 25% on an average). The knowledge about measures to be taken to correct hypoglycemia is even poor (no more than 20% on an average). The level of perception about symptoms of hypoglycemia and the importance of their correction are disappointingly low. As one in every seven patients suffered at least one episode of hypoglycemia since then they are suffering from diabetes, it highlights the importance of health education for diabetic subjects in order to make them able to recognize the symptoms of hypoglycemia and deal with it in an effective way.

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