

# Knowledge and practice on prevention of hypoglycemia among diabetic patients in South Gondar, Northwest Ethiopia: Institution based cross-sectional study

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## Abstract

Hypoglycemia is an emergency life threatening condition for diabetic patients who take their medication. Proper hypoglycemia prevention relies on knowledge and self care practice. The objective of this study was to assess knowledge and practice of hypoglycemia prevention and associated factors among diabetic patients in South Gondar, Northwest Ethiopia, 2012. Institution based cross-sectional study was conducted from June-October, 2012 at governmental health institutions in South Gondar. Four hundred sixteen diabetic patients were involved in the study. A pre-tested, structured and interview administered questionnaire was used to collect data and analysis was done using SPSS version 16. Logistic regression was fitted and 95% CI and odds ratio were presented to identify associated factors and to assess the strength of the association. For all statistical significance, the cut-off value was  $P \leq 0.05$ . From the total study participants 105(25.5%) were found to have good knowledge about hypoglycemia prevention. Eighty nine (21.4%) had good practice in hypoglycemia prevention. Educational status and being a member of diabetic association were found to be positively associated with knowledge and practice. Respondents who attained primary education (AOR=2.14, 95%CI: 1.19, 3.84), secondary education (AOR 3.02, 95%CI: 1.53, 5.98), college and above (AOR=2.35, 95%CI: 1.08, 5.13) were found to be more likely to have good knowledge compared with respondents who did not have formal education. Those who were members of Ethiopian diabetic association were about four times more likely to be knowledgeable (AOR=3.91, 95%CI: 2.26, 6.77) and six times more likely to practice hypoglycemia prevention (AOR=6.08, 95%CI: 3.34, 11.05). Knowledge and practice on hypoglycemia prevention are poor. Members of Ethiopian Diabetic Association are very low in this study. Thus the association should design and provide information tailored to patient education level.

## Introduction

Hypoglycemia is an acute medical situation that occurs when blood sugar falls below the recommended level. Individuals taking diabetic medications are at increased risk of experiencing low blood sugar [1,2]. An estimated 2-4% of people with type 1 diabetes mellitus die from hypoglycemia each year. It might explain the “dead in bed syndrome” unexplained death of a person with type 1 diabetes occurring during night time [3]. The symptoms of low blood sugar vary from person to person, and can change over time. During the early stages a person with low blood sugar level may have sweating, trembling, feeling hungry and feeling anxious. The symptoms can become more severe, and can include difficulty of walking, weakness, visual disturbance; bizarre behavior, personality changes, confusion and unconsciousness or seizure may be observed [4].

Knowledge about these symptoms is an important step to self care practice, because informed people are more likely to have better self care practice [5]. It is important for patients with diabetes especially, those receiving insulin to learn about hypoglycemia, and to carry some form of simple sugar with them at all times. Self care practice in diabetes management also includes dietary regulation, medication, physical activity and self monitoring of blood glucose (SMBG) [6]. Additionally, these patients should always wear an identification bracelet or tag [7,8].

Several retrospective studies indicate that risk factors for hypoglycemia in 1,418 type2 diabetes mellitus are of drug- induced and fasting as the major risk factors for sever hypoglycemia and

require hospitalization [9]. 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 [10]. 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 (SMBG) [11,12].

Despite the abundance of studies on self-care practice and knowledge about hypoglycemia, there are no available studies done on knowledge and practice regarding hypoglycemia prevention among diabetic patients. But this study tried to identify determinants of knowledge and practice regarding hypoglycemia among diabetic patients.

## Materials and methods

Institution based cross-sectional study was conducted on public

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health facilities which provide chronic illness follow-up for diabetic patients from June to October 2012 in South Gondar. There is only one zonal hospital and 90 health centers giving medical service for a total of 2,238,737 people in the zone. Diabetes patients aged 18 years and above who were attending government health institutions in south Gondar zone were included in the study. Study subjects were recruited with proportional allocation from 1 Hospital and 9 Health centers. Then final sample was taken by simple random sampling technique from their registration book.

A structured questionnaire was developed and prepared originally in English and translated to Amharic and then translated to English to check consistency. For administering the interview, 10 diploma nurses and 4 trained BSC Nurses were recruited for data collection and supervision respectively. Training was given for data collectors and supervisors for two days about the objective, relevance, confidentiality, respondent's right, informed consent and techniques of interview for the study.

Data analysis was made by using SPSS version 16 statistical package. For all statistical significance tests, the cut-off value was  $p$ -value  $\leq 0.05$ . Multivariate logistic regression was used to check the effect of each explanatory variable on the dependent variable. Odds ratio and 95% confidence interval were computed to assess the strength of the association and statistical significance.

Knowledge on hypoglycemia is defined as good glycemic control when respondents answered equal to or above the mean score of knowledge questions. Practice on hypoglycemia is defined as good self care practice when respondents answered equal to or above the mean score of practice questions.

Regular exercise means a 30 minute fast walk or riding bicycle daily. Member of Ethiopian diabetic association is diabetic patient who are voluntary to be member of the association and governed on the rule and the regulation of the association.

Ethical clearance was obtained from University of Gondar and permission letter was taken from Amhara Regional Health Bureau and South Gondar zone health department.

## Results

### Socio demographic characteristics of participants

A total of 416 diabetes mellitus patients were included in the study with response rate of 98.6%. The mean age of the respondents was 39.1 with S.D of  $\pm 1.4$  years. One hundred ninety six (47.1%) of them were urban residents. One hundred fifty four (37%) participants did not have formal education; 307 (88.2%) respondents were Orthodox Christian in religion. One hundred forty four (34.6%) of the respondents were unemployed, 201 (53.1%) of respondents were married. From the total participants only 70 (16.8%) were found to be members of the Ethiopian diabetic association (Table1).

### Knowledge regarding hypoglycemia

From all knowledge questions, 105 (25.5%) respondents had good knowledge in hypoglycemia prevention; however in specific question 213 (51.2%) participants had poor knowledge in identifying symptoms of hypoglycemia. With regard to the effect of exercise, majority 365 (87.7%) didn't know that exercise aggravated hypoglycemia, 348 (83%) respondents knew that alcohol intake leads to hypoglycemia (Table 2).

**Table 1.** Socio demographic Characteristic of participants, South Gondar, Northwest Ethiopia, October, 2012.

Variable	Frequency (n=416)	Percent (%)
<b>Age</b>		
18-34	208	50
35-64	196	47.1
$\geq 65$	12	2.9
Total	416	100
<b>Sex</b>		
Male	259	62.3
Female	157	37.7
Total	416	100
<b>Residence</b>		
Rural	220	52.9
Urban	196	47.1
Total	416	100
<b>Religion</b>		
Orthodox	367	88.2
Muslim	49	11.8
Total	416	100
<b>Ethnicity</b>		
Amhara	412	99.0
Tigrie	4	1.0
Total	416	100
<b>Marital status</b>		
Single	114	27.4
Married	221	53.1
Divorced	81	19.5
Total	416	100
<b>Educational status</b>		
No formal education	154	37.0
Primary	145	34.9
Secondary	69	16.6
College and above	48	11.5
Total	416	100
<b>Occupation</b>		
Unemployed	144	34.6
Government	99	23.8
Private	173	41.6
Total	416	100
<b>Economical status</b>		
$\leq 400$ Eth birr	117	28.1
401-700	106	25.5
701-999	42	10.1
$\geq 1000$	151	36.3
Total	416	100
<b>Membership of diabetic association</b>		
No	346	83.2
Yes	70	16.8
Total	416	100

### Practice regarding hypoglycemia

From the total respondents eighty nine (21.4%) study subjects had good practice in hypoglycemia prevention. Three hundred ninety three (94%) of participants take their medication at the right time; 244 (58%) had good practice by taking snack and 151 (36%) carrying table sugar to treat hypoglycemia (Table 3).

**Table 2.** Knowledge regarding hypoglycemia prevention, South Gondar, Northwest-Ethiopia, October, 2012 (n=416).

Variable	Good knowledge n (%)	Poor knowledge n (%)
Symptom of hypoglycemia	203 (48.8)	213 (51.2)
DM diet	373 (89.7)	43 (10.3)
Effect of exercise	51 (12.3)	365 (87.7)
Effect of break fast	231 (55.5)	185 (44.5)
Effect of alcohol on hypoglycemia	348 (83.6)	68 (16.4)
Effect of bean on hypoglycemia	287 (69.0)	129 (31.0)
Effect of wheat on blood sugar	377 (90.6)	39 (9.4)

**Table 3.** Practice regarding hypoglycemia prevention, South Gondar, Northwest- Ethiopia, October 2012 (n=416).

Variables	Good practice n (%)	Poor practice n (%)
Self blood glucose monitoring at home	32 (7.7)	384 (92.3)
Taking medication at the right time	393 (94.5)	23 (5.5)
Taking snack	244 (58.7)	172 (41.3)
Taking carbohydrate diets irregularly	153 (36.8)	263 (63.2)
Carry table sugar to treat hypoglycemia	151 (36.3)	265 (63.7)
Coming in regular appointments	388 (93.3)	28 (6.7)
Carrying diabetic identification card	56 (13.5)	360 (86.5)
Regular exercise	123 (29.6)	293 (70.4)
Duration of exercise	74 (17.8)	342 (82.2)
Adjustment of medication	193 (46.4)	223 (53.6)
Hypoglycemia treatment	245 (58.9)	171 (41.1)

**Table 4.** Association of Selected demographic variables with Hypoglycemia Knowledge in South Gondar, Ethiopia, October 2012 (n=416).

Variable	Good	Poor	COR (95%CI)	AOR (95%CI)
<b>Residence</b>				
Rural	47 (21.4)	173 (78.6)	1.00	
Urban	58 (29.6)	138 (70.4)	1.55 (0.99,2.41)	
<b>Age</b>				
18-34	57 (27.4)	151 (72.6)	1.00	
35-64	47 (24)	149 (76)	0.84 (0.53, 1.31)	
≥65	1 (8.3)	11 (91.7)	0.24 (0.03, 1.91)	
<b>Marital status</b>				
Single	29 (25.4)	85 (74.6)	1.00	
Married	55 (24.9)	166 (75.1)	0.97 (0.58, 1.63)	
Divorced	21 (25.9)	60 (74.1)	1.03 (0.54, 1.97)	
<b>Education</b>				
No formal education	23 (14.9)	131 (85.1)	1.00	1.00
Primary	41 (28.3)	104 (71.7)	2.25 (1.27, 3.98)	<b>2.14 (1.19,3.84)</b>
Secondary	26 (37.7)	43 (62.3)	3.44 (1.78,6.65)	<b>3.02 (1.53,5.98)</b>
College and above	15 (31.3)	33 (68.7)	2.59 (1.22, 5.50)	<b>2.35 (1.08,5.13)</b>
<b>Occupation</b>				
Unemployed	37 (25.7)	107 (74.3)	1.00	
Government	33 (33.3)	66 (66.7)	1.45 (0.83, 2.53)	
Private	35 (20.2)	138 (79.8)	0.73 (0.43,1.24)	
<b>Member of DM association</b>				
No	69 (11.3)	277 (88.7)	1.00	1.00
Yes	36 (50.7)	34 (49.3)	4.25 (2.48,7.28)	<b>3.91 (2.26,6.77)</b>

### Determinants of knowledge and practice on hypoglycemia prevention

Multivariate logistic regression showed that, being a member of the Ethiopian Diabetic association, completed their primary school, secondary school, college and above were significantly and

independently associated with knowledge and practice of hypoglycemia prevention.

Diabetic patients who attained primary education were (AOR=2.14, 95%CI: 1.19, 3.84), secondary education (AOR 3.02, 95%CI: 1.53, 5.98) and completed college and above (AOR=2.35, 95%CI: 1.08, 5.13) were more likely to have good knowledge than respondents who had not formal education. Being the member of diabetic association has positively associated with knowledge (AOR= 3.91, 95%CI: 2.26, 6.77) (Table 4).

With regard to practice, those who have primary, secondary and college and above education were (AOR=2.20, 95%CI: 1.07, 4.52), (AOR=5.29, 95%CI: 2.43, 11.52), (AOR=8, 95%CI: 3.17, 17.51) more likely to have good practice than those were not formal education respectively. Being the members of diabetic association were 6 times (95%CI: 3.34, 11.05) more likely to have good practice than who were not member of diabetic association. However residence, occupation, income and sex of respondents were not significantly associated with hypoglycemia prevention knowledge and practice (Table 5).

### Discussion

Knowledge about symptom of hypoglycemia is an important step to self care practice for diabetic patients, because informed people are more likely to have better self care practice [5].The goals in diabetes education consists in improving metabolic control, preventing acute and chronic complications and improving one's quality of life at reasonable cost [13]. Self care practice in diabetic management includes dietary regulation, medication, physical activity self blood monitoring at home (SMBG) and always wearing an identification bracelet or tag (7, 8).

From all study subjects 105(25.5) participants had good knowledge in hypoglycemia prevention. Forty three (41%) female participants

**Table 5.** Association of Selected demographic variables with Hypoglycemia Practice in South Gondar, Ethiopia, October 2012.

Variable	Good	poor	COR (95%CI)	COR (95%CI)
<b>Address of respondent</b>				
Rural	28 (12.7)	192 (87.3)	1.00	
Urban	61 (31.1)	135 (68.9)	3.10 (1.88,5.10)	
<b>Religion</b>				
Orthodox	73 (19.9)	294 (80.1)	1.00	
Muslim	16 (32.7)	33 (67.30)	1.95 (1.02, 3.74)	
<b>Education</b>				
Illiterate	14 (9.1)	140 (90.9)	1.00	1.00
Primary	28 (19.3)	117 (80.7)	2.39 (1.20,4.76)	<b>2.20 (1.07,4.52)</b>
Secondary	26 (37.7)	43 (62.3)	6.05 (2.90,12.60)	<b>5.29 (2.43,11.52)</b>
College and above	21 (43.8)	27 (56.2)	7.78 (3.52,17.17)	<b>8.1 (3.53,18.95)</b>
<b>Occupation</b>				
Unemployed	30 (20.8)	114 (79.2)	1.00	
Government	39 (39.4)	60 (60.6)	2.47 (1.40, 4.37)	
Private	20 (11.6)	153 (88.4)	0.50 (0.27,0.92)	
<b>Income</b>				
≤ 400 birr	21 (17.9)	96 (82.1)	1.00	
401-700	15 (14.2)	91 (85.8)	0.75 (0.36, 1.55)	
701-999	9 (21.4)	33 (78.6)	1.25 (0.52, 2.99)	
≥ 1000 birr	44 (29.1)	107 (70.9)	1.88 (1.04, 3.38)	
<b>Member of Dm association</b>				
No	53 (15.3)	293 (84.7)	1.00	1.00
Yes	36 (51.4)	34 (48.6)	5.85 (3.37,10.17)	<b>6.08 (3.34,11.05)</b>

were knowledgeable in hypoglycemia prevention. This is relatively low when compared to study conducted in Kuwazulu Natal, South Africa were 66.9% had good knowledge [14]. This might be due to time variation and Sociodemographic differences.

Two hundred three (49.8%) of participants could identify symptom of hypoglycemia, but study conducted on type 2 diabetics in Kampala, Uganda showed that only 36% of study subjects could identify symptoms of hypoglycemia [15].

The higher knowledge in this study might be due to accessibility of health services recently giving chronic follow up for diabetic patients, so participants might get more information to hypoglycemia and diabetic complication.

Being a member of diabetic association create chance to get information about diabetic complication, and acquiring knowledge and practice on hypoglycemia prevention. Only 70 (16.8%) patients were member of Ethiopian Diabetic Association. This is low compared to study conducted in Bangladesh 87.50% diabetes patients were member of diabetes association [16,17]. The reason of this higher difference might be Ethiopian diabetic association not still decentralized to far urban areas.

Self care practice was early warning method for diabetes emergency conditions. In this study only 7.7% practiced self blood glucose test at home which is lower than study conducted in Qatar, where 60.5% of respondents reported that they were monitoring their blood glucose at home. This might be due to financial barrier to self monitoring of blood glucose test (SBGT) apparatus, fear of pain related to finger prick and health professionals focus only dietary advice than self blood monitoring [18].

Even though wearing an identification band is need for diabetic patient, only 13.5% had practice of carrying identification card in this study. It is lower with the study conducted in Pakistan (18%) [19]. The difference might be healthcare providers and patients were not giving attention for the benefit of carrying ID cards to prevent hypoglycemia and hyperglycemia related complication.

In conclusion, knowledge and practice of hypoglycemia prevention among diabetic patients were low as revealed by this study. At least primary education and being the member of diabetic association were associated significantly with both knowledge and practice of hypoglycemia prevention. Lack of knowledge in identification of symptoms of hypoglycemia and in carrying of identification band and self blood glucose monitoring at home, to treat and to prevent hypoglycemia was poor.

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