ISSN 2564-324X

RESEARCH ARTICLE

Knowledge, Practice and Associated Factors towards Hypoglycemia Prevention among Caregivers of Diabetic Children: Cross Sectional Study Design

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Lidete A, Kidan AG, Kaleayu M. Knowledge, Practice and Associated Factors towards Hypoglycemia Prevention among Caregivers of Diabetic Children: Cross Sectional Study Design. Int J Diabetes Manag. 2024;3(2):27-39

Abstract

Background: Hypoglycemia is an acute medical condition that occurs when blood sugar falls below 70 mg/dl. It is a common and potentially life-threatening complication in children with diabetes. Caregivers play a crucial role in managing and caring for their child's diabetes. This thesis was aimed at assessing hypoglycemia prevention knowledge, practice, and factors associated among caregivers of diabetic children on follow-up at the Ayder Comprehensive specialized hospital Pediatric Endocrinology Clinic in 2024.

Methods: An institutional-based cross-sectional study was carried out between September 2023 and April 2024. A structured questionnaire was used to gather data, and statistical tools for social sciences software, version 25.0, was used for analysis after data was cleared using EPI Data. The dependent and independent variables were tested for relationships using bivariate and multivariate Regression analyses.

Result: Of the 162 enrolled caregivers of diabetic children, thirty (18.5%) of the caregivers had good knowledge, and sixty-eight (42%) of them had good practices towards hypoglycemia prevention. Formal training and education programs had a significant association with good knowledge (AOR =17.9, CI: 4.6-70.2). Good hypoglycemia prevention knowledge had a significant association with hypoglycemia prevention practice (AOR = 0.32; CI: 0.13–0.76).

Conclusion: The knowledge and practice of hypoglycemia prevention among caregivers of diabetic children were found to be low. Providing formal training and education to the caregivers and counseling regarding hypoglycemia during their visit are essential for the improvement of their knowledge and practice in hypoglycemia prevention.

Key Words: *Diabetes mellitus; Hypoglycemia; Prevention; Practice; Knowledge; Caregivers*

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Received: December 13, 2024, Accepted: December 19, 2024, Published: December 31, 2024

Introduction

Diabetes mellitus (DM) is a common chronic metabolic disease caused by changes in insulin sensitivity or secretion. It is characterized by hyperglycemia and impaired metabolism of carbohydrates, proteins, and fats [1,2]. In the United States, type 1 diabetes mellitus (T1DM) affects 190 out of every 100,000 school-aged children [2]. The estimated prevalence of diabetes in Ethiopia is between 2% and 6.5% [3].

Acute hypoglycemia is a medical emergency that happens when blood sugar levels drop below the recommended level of 70 mg/dl [4,5]. Individuals who use diabetes drugs have a higher chance of developing low blood sugar and can occur from high insulin doses, missing meals, or lower insulin requirements during activity [4,6]. It is prevalent, accounting for around 70.8% of T1 DM [7]. It is linked to cognitive dysfunction, anomalies in brain structure, and the possibility of lasting brain damage and death, especially in young children with type 1 diabetes [8,9].

Hypoglycemia prevention is a critical component of diabetes management. Self-monitoring of blood glucose (SMBG) and continuous glucose monitoring (CGM) are essential tools to assess therapy and detect incipient hypoglycemia [4,10]. Patients and their caregivers should be aware of the circumstances that can lead to hypoglycemia, including skipping meals, insulin overdosing, and engaging in vigorous exercise [8,11].

For children with diabetes, managing their blood sugar level can be particularly challenging; they rely on their caregivers to monitor their glucose levels and administer insulin or other medication as needed. Therefore, it is crucial for caregivers to have adequate knowledge and practice in preventing hypoglycemia in these children [11,12].

A thorough understanding of diabetes care, including routine blood sugar testing, appropriate insulin dosage adjustments, and identification of the warning signs and symptoms of low blood sugar, is necessary for the avoidance of hypoglycemia [4,10]. Caregivers need to be educated on the risk factors that cause hypoglycemia and how to prevent and act quickly and effectively when hypoglycemia occurs [12,13].

Several studies have shown that knowledge and practice towards hypoglycemia prevention is associated with good glycemic control [11,14,15]. Despite this fact, recent studies conducted in different countries indicate that many individuals lack the necessary knowledge and practice regarding hypoglycemia prevention, which could have an adverse effect on their children's overall diabetes control and associated complications [14-17].

This study aims to assess knowledge, practice and associated factors towards hypoglycemia prevention among caregivers of diabetic children. This will be helpful in designing subsequent interventions to improve the diabetic care in general for children with T1DM.

Method and Materials

Study area and study period: The study was carried out at Endocrinology follow up of ACSH, Mekelle Tigray, Ethiopia from September 2023 to April 2024. There were a total of 199 diabetic

patients following at Endocrinology clinic of ACSH out of which 36 were newly diagnosed T1DM,162 were included in the study.

Study design: Institution-based cross-sectional study design with prospective data collection was applied.

Sample size and sampling technique: To calculate the sample size, we used single population proportion formula with the assumption of 95% level of confidence, 5% marginal error, 10% non- response rate and considering 25.5% proportion level of knowledge from study done in south Gondar [15]. Since the source population consisted of less than 10,000 respondents, the sample size was adjusted by using correction formula. This revealed a final sample size of 147 and with the addition of non-respondents becomes 162.

Inclusion criteria

All the caregivers who bring their child to endocrinology follow up clinic.

Exclusion criteria

Caregivers who do not provide primary care for the diabetic child. Newly diagnosed Diabetic children.

Data collection method and analysis: A questionnaire was used to gather information about people's knowledge and usage of hypoglycemia prevention after developing questionnaire from different articles then it was tested using 5% of the study population. There were four sections to the questionnaire. It comprised demographic profiles, as well as psychological state and knowledge and practice questionnaires about preventing hypoglycemia. Their academic standing was divided into groups according to the grades they received. Data was collected on weekly base on follow up.

Data analysis was made by using SPSS version 25. P-value of 0.05 was considered as statistically significance. Bivariate and Multivariate logistic regression was used to check the effect of each independent variable on the dependent variable. Odds ratio and 95% confidence interval were computed to assess the strength of the association and statistical significance.

Good hypoglycemia prevention knowledge is defined as caregivers answered equal to or above the mean score of knowledge questions. Good hypoglycemia prevention practice is defined as caregiver answered equal to or above the mean score of practice questions [15].

Results

Socio demographic characteristics

A total 162 caregivers of diabetic children participated in this study. The mean age of caregivers included in the study was 36.48 with a S.D. of ± 10.97 years, and the mean age of diabetic children was 10.83 with a S.D. of ± 4.77. Ninety-six (59.3%) of the children were female. Eighty-two (50.6%) of the participants were mothers, and thirty-nine (24.1%) were fathers. 150(92.6%) respondents were orthodox Christians in religion, and 23(14.2%) of the respondents did not have formal education. Sixty-two (38.3%) of the mothers were housewife, and 112(69.1%) of the caregivers were married. Most of the participants were Urban dwellers and 4.9% of respondents had 2

and above diabetic child in their family. Ninety three of caregivers has Low income (Table 1).

Knowledge of caregiver's regarding hypoglycemia

From all the knowledge questions 30(18.5%) respondents had good knowledge in hypoglycemia prevention; however in a specific question 58(35.8%) of them had poor knowledge in identifying symptoms of hypoglycemia. With regard to the level of blood glucose level to say hypoglycemia 67(41.4%) of the caregivers knows its less 70 mg/dl. Majority 108 (66.7%) of the participants did not know that exercise and too much insulin aggravated hypoglycemia, one hundred seven (66.1%) of the caregivers know that skipping meal leads to hypoglycemia and 39(24.1%) of respondents are no sure of the potential causes (Table 2).

Practice of caregivers regarding hypoglycemia prevention

From the total respondents sixty-eight (42%) study subjects had good practice in hypoglycemia prevention. 154(94.4%) take combined (NPH and RI) and 137(84.6%) of the participants had glucometer at home and 64(39.5%) of the caregivers make sure their diabetic child is taking regular meal with snack always. 70(43.2%) monitors the blood glucose of their child occasionally. 106(65.4%) of the children experience hypoglycemia and 82(50.6%) delay giving insulin until it corrects. 158(97.5%) give something sugary immediately if their child experience hypoglycemia. Around 74(45.7%) of caregivers prefer meal adjustment with insulin as hypoglycemia prevention way (Table 3).

Association of selected demographic variables with hypoglycemia prevention knowledge and practice

Bivariate logistic regression analysis showed that age of caregivers (p=0.025), place of residency (p=0.024), occupation (p=0.044), relation with diabetic child (p=0.010) and training and educational programs (p=0.000) were factors associated with knowledge of hypoglycemia prevention. However only the Formal training and educational program and relationship with diabetic child showed statistically significant association (p=0.00; AOR: 17.891 95% CI 4.559- 70.213) and (p=0.012; AOR: 0.093 95% CI 0.016-0.553) respectively on multivariate regression (Table 4).

Bivariate logistic regression analysis showed that age of caregivers, residency, marital status, financial status, level of education, relationship with a diabetic child , insulin type, level of stress, hypoglycemia episodes, owning a glucometer , training and education and level of knowledge were factors associated with hypoglycemia prevention practice. However only level of knowledge, hypoglycemia episodes, owning glucometer, formal training and education and age of caregivers showed statistically significant association (p=0.01; AOR: 0.32 95% CI (0.13- 0.76), (p=0.014; AOR: 2.51(1.20-5.22),(p=0.001;AOR: 8.05 95% CI 2.4-26.9), (p=0.033;AOR: 2.31 95% CI 1.07-4.9)and (p=0.02;AOR:0.19 95% CI 0.36-0.94) respectively on multivariate regression (Table 5).

TABLE 1

Socio demographic characteristics of caregivers and their children following at endocrinology follow-up clinic at ACSH, 2024 (N=162).

	(N=162)	(%)	Characteristics	(N=162)	(%)
	Sex of child		**Educational status**		
Female	96 (59.3)	59.3	Primary	27	16.7
Male	66	40.7	Secondary	64	39.5
Total	162	100	College	48	29.6
	Age of child		Unable to read or write	23	14.2
≤5year	27	16.7	Total	162	100
06-Oct	51	31.5	**Residency**		
>10	84	51.9	Urban	132	81.5
Total	162	100	Rural	30	18.5
	Age of caregivers		Total	162	100
18-30	57	35.2	**Relation to child**		
31-45	82	50.6	Mother	82	50.6
>45	23	14.2	Father	39	24.1
Total	162	100	Guardians	41	25.3
	Duration of diseases		Total	162	100
≤ 1 year	31	19.1	**Occupation**		
1-5years	82	50.6	House wife	62	38.3
6-10years	38	23.5	Farmer	15	9.3
≥10 years	11	6.8	Merchant	25	15.4
Total	162	100	Employed	32	19.8
	Religion		Other	28	17.3
Orthodox	150	92.6	Total	162	100
Muslim	6	3.7	**Number of children who had DM**		
Protestant	5	3.1	1	154	95.1
Catholic	1	0.6	≥ 2	8	4.9
Total	162	100	Total	162	100
	Marital status		**Income**		
Married	112	69.1	Low<5000ETB	93	57.4
Single	34	21	Middle 5000-10000	68	42
Divorced	14	8.6	High >10000	1	0.6
Widowed	2	1.2	Total	162	100
Total	162	100			

TABLE 2

Knowledge of caregiver's regarding hypoglycemia following at endocrinology follow-up clinic at ACSH, 2024(N=162).

Variable	Good knowledge n (%)	Poor knowledge n (%)
Hypoglycemia	43(26.5%)	119(73.4%)
Level of glucose to say hypoglycemia <70	67(41.4%)	95(58.4%)
Symptoms of hypoglycemia	104(64.2%)	58(35.8%)
Effect of skipping meal on hypoglycemia	107(66.1%)	55(33.9%)
Effect of excessive exercise and insulin over dose	54(33.3%)	108(66.7%)
Meal adjustment with insulin as hypoglycemia prevention method	74(45.7%)	88(54.3%)

TABLE 3

Practice of caregivers regarding hypoglycemia prevention following at endocrinology follow-up clinic at ACSH, 2024(N=162).

Variables	Good practice (%)	Poor practicen (%)
Diet follow up	65(40.1%)	97(59.9%)
Monitor blood glucose level	48(29.6%)	114(70.4%)
Hypoglycemia treatment	65(40.1%)	97(59.9%)
Taking medication appropriately	72(44.4%)	90(55.6%)
Hypoglycemia episode	36(33.9%)	70(66.1%)
Insulin injection in the presence of hypoglycemia	60(37.1%)	102(62.9%)
Adjustment of medication	82(50.6%)	80(49.4%)
Type of insulin	76(46.9%)	86(53.1%)

TABLE 4
Association of selected demographic variables with hypoglycemia knowledge in ACSH 2024 (n =162); P-value <0.05 considered as scientifically significant.

Variable	Good n (%)	Poor n (%)	P-value	COR(95% CI)	P-value	AOR(95% CI)
18-30	7(12.2%)	50(87.7%)	0.009	0.22[0.07-0.69]		0.45[0.6-3.4]
31-45	14(17.1%)	68(82.9%)	0.028	0.32[0.12-0.89]		0.66[0.13-3.3]
>45	9(39.1%)	14(60.9%)		1		1
Educational level			**0**		0.8	
Primary	9(33.3%)	18(66.7%)	0.29	0.55[0.17-1.71]		1.07[0.65-1.76]
Secondary	7(10.9%)	57(89.1%)	0.001	0.13[0.04-0.42]		0.9[0.0`-1.5]
College	3(6.25%)	45(93.7%)	0	0.07[0.017-0.3]		0.1[0.001-1.001]
No formal education	11(47.8%)	12(52.2%)		1		1
Residency			**0.024**		0.658	
Urban	20(66.7%)	10(33.3%)		1		1
Rural	20(15.5%)	112(84%)		2.8[1.143-6.859]		1.48[0.29-7.4]
Marital status			0.456			
Single	6(17.6%)	28(82.3%)				
Married	22(19.6%)	90(80.4%)				
Divorce	6(33.3%)	12(66.7%)				
Occupation			**0.044**		0.37	
House wife	49(79.03)	13(20.9%)		3.45[0.72-16.46]	0.062	6.06[0.92-40.2]
Farmer	8(53.3%))	7(46.7%)	0.007	11.38[1.96-66.11]		3.01[0.22-41.8]
Merchant	21(84%)	4(16%)		2.48[0.41-14.9]		3.9[0.37-41]
Employed	28(87.5%)	4(12.5%)		1.86[0.31-11.0]		13.2[0.8-223]
Other	26(92.8%)	2((7.1%)		1		1
Relation					**0.012**	
Mother	8(9.7%)	74(90.2%)	0.071	0.38[0.14-1.09]	**0.009**	0.09[0.02-0.55]*
Father	13(33.3%)	26(66.7%)		1.78[0.66-4.81]		1.72[0.29-10.04]
Guardians	9(21.9%)	32(88.1%)		1		1
Duration of disease			0.927			
≤ 1 year	6(19.4%)	25(80.6%)		2.4[0.26-22.6]		
1-5years	14(17.1%)	68(82.9%)		2.1[0.24-17.4]		
6-10years	9(23.7%)	29(76.3%)		3.1[0.35-27.7]		
≥10 years	1(9.9%)	10(90.9%)		1		
Formal training or education you received			**0**		**0**	
yes	71(61.2%)	45(38.8%)		19.3[5.94-67.16]		17.9[4.56-70.2]*
no	26(56.5%)	20(43.5%)		1		1
Level of stress			1.021			
Mild	4(3%)					
Moderate	17(56.7%)	50(37.8%)				
Sever	13(43%)	78(59.1%)				
Income			0.68			
Middle	12(40%)	56(42.4%)				
low	17(56.7%	76(57.6%)				

TABLE 5

Association of selected demographic variables with hypoglycemia Practice in ACSH 2024 (n=162); P-value <0.05 considered as scientifically significant.

Variable	Good	Poor	P-value	COR(95% CI)	P-value	AOR(95% CI)
Age of caregiver			**0.037**		**0.02**	
18-30	27(47.4%)	30(52.6%)		0.58[0.216-1.55]		0.91[.29-2.79]
31-45	27(32.9%)	55(67.1%)		0.32[0.121-0.821]		0.31[0.11-0.93]*
>45	14(60.9%)	9(39.1%)		1		1
Educational Level			0.134		0.59	
Primary	13(48.1%)	14(51.9%)		1.40[0.458-4.28]		1.424[0.35-5.78]
Secondary	28(43.8%)	36(56.2%)		1.671[0.64-4.37]		1.58[0.43-5.85]
College	14(29.2%)	34(70.8%)		3.16[1.124-8.87]		5.36[1.02-28.06]
No formal education	13(56.5%)	10(43.5%)		1		1
Residency			**0.03**		0.37	
Urban	50(37.9%)	82(62.1%)		1		1
Rural	18(60%)	12(40%)		0.407[0.18-0.91]	0.435	0.65[0.25-1.69]
Marital status				0.85		
Single	20(22.5%)	69(77.5%)				
Married	43(75.4%)	14(24.6%)				
Divorce	3(21.4%)	11(78.6%)				
Occupation				0.885		
House wife	25(40.3%)	37(59.7%)		0.68[0.28-1.66]		
Farmer	10(66.7%)	5(33.3%)		2[0.54-7.4]		
Merchant	7(28%)	18(72%)		0.39[0.12-1.2]		
Employed	12(37.5)	20(62.5%)		0.6[0.2-1.7]		
Other	14(50%)	14(50%)		1		
Relation			**0.018**		0.23	
Mother	28(34.1%)	54(65.9%)		0.33[0.15-0.72]		1.48[0.95-2.3]
Father	15(38.5%)	24(61.5%)		0.40[0.16-0.98]		0.49[0.18-1.4
Other	25(60.9%)	16(39.1)		1		1
Duration of disease				0.937		
≤ 1 year	16(51.6%)	15(48.4%)		1.3[0.32-5.1]		
1-5years	29(35.4%	53(64.6%)		0.66[0.18-2.3]		
6-10years	18(47%)	20(52.6%)		1.1[0.28-4.2]		
≥10 years	5(45.5%)	6(54.5%)		1		
Training or Education you received			**0.001**		**0.033**	
Yes	88(59.1%)	61(40.9%)		0.35[0.182-0.67]		2.31[1.07-4.9]*
No	7(53.8%)	6(46.2%)		1		1
Knowledge			**0.003**		**0.01**	
Good	20(66.7%)	10(33.7%)		3.500[1.50-8.09]		0.32[0.13-0.76]*
Poor	48(36.4%)	84(63.6%)		1		1
Stress level				0.072		
Hypoglycem ia episode	36(33.9%)	70(66.1%)	**0.005**	0.386[0.198-0.75]	**0.014**	2.51[1.2-5.22]*
Income			0.093	1.715[0.92-3.22]	0.38	1.49[0.7-3.14]
Type of insulin (BID)	67(44%)	86(56%)	0.088	2.49[0.87-7.15]	0.13	2.4[0.78-7.4]
Frequency				0.999		
Owning Glucometer	49(35.7%)	88(64.2%)	**0.001**	5.687[2.1-15.2]	**0.001**	8.05[2.4-26.9]*

Discussion

With the current study, we aimed to determine the knowledge and practice level of the caregivers of children with type I diabetes mellitus and associated factors to wards hypoglycemia prevention at ACSH in Mekelle. This is particularly important in order to understand the situation in the local context and address the existing gaps with regard to the knowledge and practices of hypoglycemia prevention, with the ultimate goal of improving the hypoglycemia prevention practice given to this group of population and, hence, reducing the associated complications and improving the quality of care of the patients.

This study revealed low knowledge and practice towards hypoglycemia prevention among caregivers of diabetic child and determines the associating factors with dependent variable.

In our study, 30 (18.1%) participants had good knowledge in hypoglycemia prevention. This is low compared to the study done at the medical OPD in Smch, India, where 76% had good knowledge [18] and 47.3% of the study participants had good knowledge of hypoglycemia from Ghana, 2021 [19]. According to Das et al 52% of participants had Good knowledge about hypoglycemia [17]. Our result is slightly higher than 8% of good knowledge from National Guard. Primary Health Care Center, Jeddah, Saudi Arabia study, 2017 [14]. This variation can be due to the educational status, emotional stability of respondents, peace, and stability of the country. Twenty (66.7%) of urban dwellers were knowledgeable in hypoglycemia prevention. This is relatively high when compared to a study conducted in south Gondar, Northwest Ethiopia, in which 29.6% had good knowledge and 47.9% from Cecyli et al [15,18]. This difference could be due to time variation, educational status differences, healthcare access variation and sample size differences.

In this study, sixty eight (42%) of the participants had good practice in hypoglycemia prevention which is higher than the study done in south Gondar, Northwest , Ethiopia in which 89 (21.4%) of them had good practice [15]. This variation can be due to educational status of participants, study population and area difference, sample size difference and time variation. Our current finding is lower than the study conducted in Gondar teaching hospital, Ethiopia 2019(93.1%) And conducted in central zone, Tigray, Ethiopia 2018 (63.2%) [20,21]. This difference might be due to the different emotional stability of respondents and peace and stability of study area and time variation.

In this study, 67 (41.4%) of the participants know that hypoglycemia happens when the level is less than 70 mg/dl. This is low compared to the study conducted in the National Guard Primary Health Care Center, Jeddah, Saudi Arabia, in 2017, which was 50.7% and Gondar university teaching hospital 2019 (82.2%) [14,20]. This discrepancy might be due to sociodemographic differences, educational status, diabetic knowledge and training availability, and the accessibility of health facilities.

In the study done in El-Mabara Hospital, Egypt, in 2019, 44.28% of caregivers had good knowledge about the cause of hypoglycemia [13] while in our study, 64.2% of the participants had good knowledge about the cause of hypoglycemia. This variation might be due to the time difference, sociodemographic

difference, sample size, study population and means of data collection. In our study 66.1% of the participants reports skipping meal as a cause of hypoglycemia while in study done SPHMMC, 2018 93.9% of the participants report delaying meal as cause [22]. This discrepancy can be due to sociodemographic character, accessibility of health facilities and educational programs, emotional stability of the participants and sample size.

In our study from all the caregivers who participated, one hundred thirty two (84.6%) of caregivers report that they have glucometer at home and 33.3% of them had good practice to wards hypoglycemia prevention in our study which lower than studies conducted in Guwahati, Assam 2022 and in central zone, Tigray, 2018 and [16,21]. This variation can be due to different diabetic education program.

One hundred forty three (88.3%) of participants could identify hypoglycemia symptoms is slightly lower compared to the study done at St.pual's Hospital millennium medical college AddisAbeba Ethiopia, 2019(94.3%)of the participants could identify the symptoms of hypoglycemia [22] and higher than the result reported from Khartoum, Sudan, 2013(52%) [23]. This result might be due to socio-demographic difference, health service difference, educational status and difference in the study population.

Twenty-five (40.3%) of the housewife participants have good practice towards hypoglycemia prevention in this study. The result was higher comparing to study done at public hospital central zone, Tigray Ethiopia, 2018 that was 14% [21]. This difference could be because of time difference, Regular follow-up clinics, diabetic education program difference, accessibility of education and sample size.

In our study, knowledge of hypoglycemia prevention, experiencing hypoglycemia episodes and owning glucometer had a statistically significant association with hypoglycemia prevention practice which was similar to various studies Das et al., Sakyi et al. 2022, Almigbal.Th et al., and Wako et al. 2017 [17,19,24,25]. In this study good hypoglycemia prevention knowledge and owning glucometer was significantly associated with good hypoglycemia prevention practice which is similar to other studies done in Gondar Teaching Hospital, Ethiopia and Central, Zone, Tigray Ethiopia [20,21]. In our result formal training and educational program had statistically significant association with knowledge towards hypoglycemia prevention and hypoglycemia prevention practice which is similar to studies of Nordfeldt et al., Bhutani et al.2015 and study done in Central, Zone, Tigray Ethiopia [9,10,21].

Usually individuals with high education level have good knowledge score about diabetes, diabetes risk factor and diabetic management. Education level does not show effect on knowledge of hypoglycemia symptoms in this study. This result was Similar to Sakiy et al., Muche and Mekonen et al. 2019 and Madani et al. 2013, [19,20,23]. However, in study conducted in Guwahati, Assam 2022 educational status had effect on hypoglycemia prevention knowledge [16].

In present study, there was no association between the employment, income, religion, residency and marital status with knowledge and practice towards hypoglycemia prevention.

These findings are supported by studies Sonam and Jayalakshmi et al. 2022, Das et al. 2022 and Sakiy et al. 2022 [16,17,19].

Conclusion

In conclusion, knowledge and practice towards hypoglycemia prevention among caregivers of diabetic child were low as revealed by this study. Providing formal health education to the caregivers and being mother of the diabetic child had statistically significant association with knowledge of hypoglycemia prevention.

Level of knowledge about hypoglycemia prevention, episodes of hypoglycemia. Owning glucometer, formal training and education, and age of caregivers were statistically significantly associated with hypoglycemia prevention practice of caregivers.

Limitation

The limitation of this study is using cross-sectional study design. Therefore, causal modeling could not be attempted.

Smaller sample size in our study may reduce the precision of the study.

Absence of HgbA1c for the Patients on follow up.

List of Abbreviation

CGM: Continuous Glucose Monitoring

SMBS: Self-Monitoring of Blood Sugar

T1DM: Type 1 Diabetic mellitus

DM: Diabetic Mellitus

Declarations

Ethical considerations: Permission was acquired from the hospital's authorities, and ethical clearance was obtained from the Institutional Review Board of Mekelle University College of Health Science (RE of MU-IRB 2166/2024). Prior to their recruitment in the trial, all study participants provided written informed consent.

Authors' contributions: AL was responsible for the idea's conception, method design, and tool development, supervision of data collection, data analysis, and manuscript drafting. In addition to reviewing the study protocol and tool and the draft text, AG and MK provided support for the study design. The final draft of the manuscript was reviewed and approved by AL, AG, and MK.

Funding: The study is funded by ACSH, Post graduate and research Coordinating office.

Acknowledgement: Author would like to acknowledge the caregiver's who gave us their consent and responded for our questionnaire.

References

1. Inzucchi SE, Lupsa B. Clinical presentation, diagnosis, and initial evaluation of diabetes mellitus in adults. https://www.uptodate.com/contents/clinical-presentation-diagnosis-and-initial-evaluation-of-diabetes-mellitus-in-adults#H1 (accessed November 2024).
2. Kliegman R, Joseph W. Nelson textbook of paediatrics (22ndedn), Elsevier, Philadelphia, Pennsylvania. 2024;p.4740.
3. Bishu KG, Jenkins C, Yebyo HG, et al. Diabetes in Ethiopia: a systematic review of prevalence, risk factors, complications, and cost. Obes Med. 2019;15:100132.
4. Abraham MB, Karges B, Dovc K, et al. ISPAD clinical practice consensus guidelines 2022: assessment and management of hypoglycemia in children and adolescents with diabetes. Pediatr Diabetes. 2022;23:1322-40.
5. Nakhleh A, Shehadeh N. Hypoglycemia in diabetes: an update on pathophysiology, treatment, and prevention. World J Diabetes. 2022;12:2036-49.
6. Cobuz M, Cobuz C, Bozomitu L, et al. Hypoglycemia in children with type 1 diabetes mellitus. Romanian J Diabetes Nutr Metab Dis. 2011;18:49-55.
7. Lamounier RN, Geloneze B, Leite SO, et al. Hypoglycemia incidence and awareness among insulin-treated patients with diabetes: the HAT study in Brazil. Diabetol Metab Syndr. 2018;10:1-10.
8. Seaquist ER, Anderson J, Childs B, et al. Hypoglycemia and diabetes: a report of a workgroup of the american diabetes association and the endocrine society. Diabet Care. 2013;36:1384-95.
9. Nordfeldt S, Johansson C, Carlsson E, et al. Prevention of severe hypoglycaemia in type I diabetes: a randomised controlled population study. Arch Dis Child. 2003;88:240-5.
10. Bhutani G, Kalra S, Lamba S, et al. Effect of diabetic education on the knowledge, attitude and practices of diabetic patients towards prevention of hypoglycemia. Indian J Endocrinol Metab. 2015;19:383-6.
11. Bonsa G, Melkamu B. Knowledge and practices on diabetic care among the caregivers of children with type 1 diabetes mellitus: a cross sectional study. Ethiop J Pedia Child Healt. 2023;18:119-30.
12. Dhada B, Blackbeard D. Caregivers of children with diabetes mellitus: challenges of caring for and perceptions of consultations in a South African public sector context. South Afr Fam Pract. 2019;61:117-35.
13. Abolwafa NF, Ahmed SM, Aly SA. Effect of educational program on improving knowledge and practice for adolescences with type 1 diabetes. Int J Adv Nurs Stud. 2017;6:36.
14. Al Zahrani A, Al-Zaidi S, Al Shaikh A, et al. Lack of knowledge about hypoglycemia among adult patients with diabetes in Saudi Arabia: a cross-sectional study. J Diabetes Endocr Pract. 2021;4:35-40.
15. Girma NG, Getahun AA, Tadese AA. Knowledge and practice on prevention of hypoglycemia among diabetic patients in South Gondar, Northwest Ethiopia: institution based cross-sectional study. Integ Obe Diabt. 2015;1:56-60.
16. Sonam, Jayalakshmi DM. A descriptive study to assess the knowledge on prevention of hypoglycemia among diabetic patients in Guwahati, Assam. Int J Appl Res. 2022;8:06-10.
17. Das M, Khati P, Banik R, et al. A study to assess the knowledge on hypoglycemia among the diabetic patient in selected hospital, Siliguri. Int J Adv Med. 2022;9:1108-14.
18. Cecyli C, Preethi K, Priyadarsini A. Assessment of the knowledge and self-care practice on hypoglycemia among patients with diabetic mellitus attending medical opd at smch. Cardiometry. 2022;23:103-10.

19. Sakyi SA, Opoku S, Senu E, et al. Factors associated with knowledge and hypoglycemia experience among patients with diabetes mellitus in Ghana: a cross-sectional study. Public Health Chall. 2023;2:e130.

20. Muche EA, Mekonen BT. Hypoglycemia prevention practice and its associated factors among diabetes patients at university teaching hospital in Ethiopia: cross-sectional study. Plos one. 2020;15:e0238094.

21. Gebremichael GB, Zemicheal MT. Hypoglycemia prevention practice and associated factors among diabetic patients on follow-up at public hospitals of central zone, tigray, Ethiopia, 2018. Int J Endocrinol. 2020;2020:1-7.

22. Kahsay H, Fantahun B, Nedi T, et al. Evaluation of hypoglycemia and associated factors among patients with type 1 diabetes on follow-up care at St. Paul's hospital millennium medical college, Addis Ababa, Ethiopia. J Diabetes Res. 2019;2019:1-9.

23. Madani AM, Mahmoud AN, Abdelrahim HM, et al. Assessing knowledge of hypoglycemia symptoms among type 2 diabetic patients using insulin, khartoum, Sudan. Pharmacol Amp Pharm. 2018;10:21-30.

24. Almigbal TH. Association between knowledge of hypoglycemia and likelihood of experiencing hypoglycemia among patients with insulin-treated diabetes mellitus. Diabet Metab Syndr Obes Targets Ther. 2021;14:3821-9.

25. Wako A, Belay S, Feleke Y, et al. Assessment of the magnitude, severity and associated factors of hypoglycemia in diabetic patients attending national diabetes referral clinic at tikur anbessa hospital, Addis Ababa, Ethiopia. J Diabetes Metab. 2017;08.