
Evaluation of the Level of Knowledge in type 1 Diabetic Patients & Their Families

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Abstract:

Introduction: type 1 diabetes mellitus is the most common chronic metabolic disease in childhood. Diabetics and their families have to learn wide varieties of technical and cognitive skills to maintain good glycemic control. Glycemic control and diabetic complications mainly depend on quality and intensity of diabetic education of the patients and their families.

Objectives: To assess the levels of diabetic knowledge and its relation to the levels of metabolic control among diabetic children and their families.

Method: A cross-sectional study for 100 type 1 diabetic children and their families randomly chosen from the patients attending National Diabetes Center /Al-Mustansiriyah University (NDC) for a six months period. Evaluation of the diabetic knowledge levels has been done by using validated questionnaire formed of 20 questions. Answers of the questionnaire scored and the scores were divided into 3 groups of low, medium and high levels of knowledge. The levels of knowledge were correlated with sex, age, height and weight centiles, duration of the disease, frequency of acute complications, level of HbA_{1c}, frequency of medical visits and frequency of testing blood glucose estimations.

Results: The 100 questionnaires form filled by the diabetic patients and their families classified as low 11%, medium 56% and high levels 33% of knowledge about diabetes and male /female ratio was 1.7/1. The relations between levels of knowledge were correlated with duration of the disease, growth centiles (height and weight for age), level of HbA_{1c}, frequency of the acute complications, frequency of medical visits and frequency of testing blood glucose. The level of knowledge had a significant relation to sex, HbA_{1c}, frequency of visits and frequency of testing blood glucose but no significant relation to age, duration of diabetes.

Conclusions: This study emphasized two main facts which were the presence of considerable poor glycemic control among diabetic children and significant relation between the level of knowledge about diabetes and the glycemic control.

Key words: type 1 diabetes mellitus, level of knowledge.

Introduction

Type I diabetes mellitus is the first common endocrine and metabolic disease; it is considered as the third common chronic disease in childhood.^[1] In order to live with such chronic disease, the diabetic patients especially children and their families must incorporate into their life a wide variety of technical and cognitive skills which is necessary for maintaining a good glycemic control.^[2] The diabetic patients and their family should be capable of becoming able to assist physician in the process of diabetic management, as far as the success of diabetic management depends on their participation by knowledge and cooperation.^[1, 2] WHO during the 1980s considered the education as the fourth corporation of diabetic therapy in type 1 diabetes mellitus during childhood.^[1, 2] since the time of introduction of insulin at 1920 Dr. Elliot P. Joslin realized the importance of education in diabetic management; he founded the 1st diabetic teaching clinics and stating that "The diabetic who knows the most, will live the longest".^[3] Patients who are not knowledgeable about diabetes and can not carry out instructions is more likely to get complications, hospital admission, more likely to have psychological concern and unable to work efficiently to enjoy life.^[4] In addition to the cost – effectiveness issues in medical services.^[5] Successful glycemic control depends mainly on

qualities and intensity of diabetic education,^[6] considered as one of the major factors which reduce progression of micro and macrovascular complications in the diabetics.^[7]

Objectives:

To assess the levels of diabetic knowledge and its relation to the levels of glycemic control among type 1 diabetic children and their families.

Patients & Method:

A cross-sectional study was done for 100 type 1 diabetic children and their families randomly chosen from the patients attending National Diabetes Center Al-Mustansiriyah University (NDC) for a six months period between 1st Jan. – 30th June 2001. Ages of the patients were 2.8 - 21 years and the male /female ratio was 1.17/1. A diabetic educational briefing has been made by individual teaching and posters for all the patients and their families.

Evaluation of the diabetic knowledge levels has been done by using validated questionnaire formed of 20 questions; collectively covering 4 items of general knowledge about the diabetics diet, insulin, exercise, sick day management, hypoglycemia and frequency of blood glucose monitoring.^[8] Answers of the questionnaire scored as 2 points for the correct answer, 1 point for the incomplete and 0 for

wrong or unsure or don't know answer. The sum of point's scores was (total score from zero up to 40 points, full mark) classified into 3 groups of low level of knowledge (score <20 points, <50% of full mark), medium level of knowledge (score 21-30 points, 50-75% of full mark) and high levels of knowledge (score >31 points, >75% of full mark).

Depending on the statistical results of the scores were correlated with sex, age, height and weight centiles, duration of the disease, frequency of acute complications, levels of HbA_{1c}, frequency of medical visits and frequency of blood glucose estimations.

Statistical analysis was done using chi-square and fissure exact test of significance (P value of 0.05) was considered as significant results.

Results

Evaluation of 100 questionnaire forms filled by the diabetic patients and their families showed that low, medium and high levels of knowledge about diabetes were 11%, 56% and 33% respectively; and sex distribution, male and female were 54% and 46% respectively. The male/female ratio was 1.17/1 table -1.

Table -2 showed the age of low, medium and high levels of knowledge groups mean $\pm$ SD as 12.6 $\pm$ 4.16, 11.95 $\pm$ 4.58 and 10.26 $\pm$ 3.34 years respectively; and the duration of the diabetes were 4.55 $\pm$ 4.70, 3.60 $\pm$ 3.45 and 2.50 $\pm$ 2.43 years respectively. In addition; the relations of the levels of knowledge were correlated and tested statistically using chi-square test and Fissure exact test, with the age, duration of diabetes, height and weight growth centiles and found of no statistical significance Table - 2.

Table 1: Distribution of gender and levels of knowledge about diabetes

Level of knowledge	Sex		
	No. of Females	No. of Males	Total No.
Low	4	7	11
Medium	33	23	56
High	9	24	33
Total	46	54	100

$\chi^2=8.84$, $P=0.01$

Table 2: Relations of age, duration of the disease and the growth centiles (height and weight) to the level of knowledge about diabetes

Level of knowledge	Age (year)	Duration (year)	Height centiles	Weight centiles
Low	12.6 $\pm$ 4.16	4.55 $\pm$ 4.70	37.18 $\pm$ 34.66	29.0 $\pm$ 26.12
Medium	11.95 $\pm$ 4.58	3.60 $\pm$ 3.45	30.18 $\pm$ 23.82	31.2 $\pm$ 27.24
High	10.26 $\pm$ 3.34	2.50 $\pm$ 2.43	33.82 $\pm$ 29.97	27.58 $\pm$ 25.68
ANOVA	F=2.17,	F=1.97,	F=0.39,	F=0.20,
P-value	P=0.120	P=0.145	P=0.677	P=0.822

The HbA1c % mean $\pm$ SD as a glycemic control indicator for the three levels of knowledge were 11.79 $\pm$ 2.35, 11.06 $\pm$ 2.59 and 9.05 $\pm$ 2.10 respectively. Relations between levels of knowledge and glycemic control, measured by HbA1c % and the scores of points obtained from the questionnaire were statistically significant Table-3.

Table- 4 showed the importance of relations between levels of knowledge and the frequency of acute complications of diabetes (hypoglycemia

and/or diabetic ketoacidosis) among the diabetics which classified to three groups; no events, infrequent events and frequent events; keeping in consideration that the same individual might develop both events of hypoglycemia and/or diabetic ketoacidosis in different occasions. Although; the relation between frequency of complication events and levels of knowledge was statistically insignificant (P=0.5 and 0.08 respectively) but the relation was very important.

Table 3: Relation of the level of HbA1c to the level of knowledge about diabetes

Level of knowledge	HbA1c (%)	Score
Low	11.79 $\pm$ 2.35	22.73 $\pm$ 8.10
Medium	11.06 $\pm$ 2.59	52.20 $\pm$ 9.37
High	9.05 $\pm$ 2.10	79.83 $\pm$ 10.61
ANOVA P-value	F=8.81, P=0.0003*	F=167.1, P=0.0001*

Table 4: Relation of acute diabetic complications events to the level of knowledge about diabetes*

Level of knowledge	No events		Infrequent events		Frequent events	
	Hypo**	DKA***	Hypo	DKA	Hypo	DKA
Low	3	7	3	4	5	0
Medium	32	29	13	14	10	12
High	22	19	7	8	3	5
Total	57	55	23	26	18	17

Hypoglycemia P= 0.5, DKA P= 0.08.

* The same patient may have both events

** Hypoglycemia

*** Diabetic ketoacidosis

Table- 5 showed the significance of relation between levels of knowledge about diabetes and the frequency of medical visits (> 2 visits /month, 1visit /month and <1visit /2 month); (P=0.03).

Table- 6 showed a high statistical significant association between levels of knowledge and the frequency of testing glucose in blood; (P=0.0001).

Table 5: Relation of No. of visits to the level of knowledge about diabetes

Level of knowledge	Visits/month		
	> 2 visits/month	1 visit/month	<1 visit /2 months
Low	1	5	14
Medium	5	37	5
High	10	19	4
Total	16	61	23

$\chi^2=11.24$, P=0.03

Table 6: Relation of testing glucose in blood to the level of knowledge about diabetes

Level of knowledge	Frequency of glucose estimation				
	Daily	Weekly	2/month	1/month	Occasional
Low	-	1	2	8	-
Medium	1	20	3	30	2
High	11	14	1	7	-
Total	12	35	6	45	2

$\chi^2=33.1$, P=0.0001

Discussion:

Though knowledge about diabetes does not necessarily correlate with good control' successful education not only instills knowledge, but it should also empower and motivate the young person to use knowledge and practical skills in problem solving and self – management.^[7]

Table-1 showed that the male are significantly predominant in high score group (>2.5 folds) the reason might be due to more families attention toward boys in addition to that boys are more independent, socially and physically to take the responsibility in self-management of diabetes. There is a highly significant relationship between the level of HbA1c and the level of the knowledge as most studies show this relation.^[8, 9]

There was insignificant statistical relation between levels of knowledge Vs. the age and duration of disease (P = 0.120 and 0.145 respectively) because of two reasons; first, the

younger diabetics with short duration of disease had no sufficient compliance and educational skills to deal with diabetes, and the second reason was because diabetics of low level of knowledge facing a lot of medical, nutritional and educational problems along their life and course of disease which affect their intellectual and learning skills.^[9]

Although, the relation between levels of knowledge and growth centiles (height and weight centiles) were statistically insignificant because of other reasons for the failure of diabetics to thrive like too much restriction of carbohydrates intake and associated autoimmune disease such as celiac disease.^[10]

Although there were no statistical significant relations between the levels of knowledge and the presence of hypoglycemia and/or Diabetic ketoacidosis (P=0.5, 0.08 respectively) in this study; but still the relation of great importance for diabetic children who must use the knowledge and

practical skill to aware from these serious complications and how to solve and get rid of these problems.^[11]

Frequencies of medical visits and testing blood glucose (tables- 4 and 5) Vs. level of knowledge were good valid indicators for conservative behavior and interest of diabetic patients toward their disease; the high statistical significant relations of these indicators with levels of knowledge about diabetes prove the importance of initiation and support for the medical visits and close up follow up of diabetes.^[11]

Conclusions:

This study emphasized two main facts which were the presence of considerable poor glycemic control among diabetic children and significant relation between the level of knowledge about diabetes and the glycemic control.

Recommendations:

Both intensive diabetic management and self-management for diabetics requiring high level of knowledge about diabetes, educational input and continues support which achieved by training, medical education for patients, families, teachers and groups of telling life experience in solving the diabetic problems.

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