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Education Program to Enhance Parents' Knowledge of Caring for Children with Type One Diabetes Mellitus

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ABSTRACT

Type one diabetic is a major metabolic disease that effect on children It is distinguished by increase glucose level in blood result of insulin secretion defect, It can be diagnosis by plasma glucose intolerance, HbA1c and fasting blood glucose. It lead to a major complications as blindness, amputation, etc.

The study objectives are to identify parent's knowledge towards diabetic children and to find-out the relationship between parent's knowledge and socio-demographic characteristic.

Material and method A quasi experimental study is carried to describe effectiveness of the educational program upon parents knowledges toward your diabetic children care in the diabetic and endocrine center of Al-Najaf Al-Ashraf city by use the method of pretest/ posttest 1 then posttest 2 by application it on both study group and control group for the period of july.28/ 2024 until October. 10/2024.

Study Results: Finding revealed parents knowledge level of study group altered significantly ($P<0.05$), where before performing educational program sessions the knowledge mean was (1.18) then became after the application of educational program sessions (1.65) and in post-test two the mean became (1.66), while the parents knowledge in control group stayed the same without any change. the research explained the major children age group in both groups with (6-10 years). The parents knowledge in experimental group in posttest1 &2 is elevating, this indicated the educational program was effective interventional approach to improve parents knowledge. Also finding refer to a scientific association between parent knowledge and demographic data in disease period, father and mother Educational level

Keywords: *Education Program, Parents Knowledge and Children with Type One Diabetes Mellitus Care.*

1. INTRODUCTION

Diabetes mellitus is a severe metabolic disease that affects people over time. It is caused by a lack of insulin hormone secretion and is distinguished by elevated blood glucose levels compared to normal state and healthy condition. that produced by the pancreas that can be treated but not cured. formerly this disease is knowing as Juvenile diabetes, also known as insulin-dependent diabetes, is a chronic illness that occurs as a matter of fact of the pancreas ceasing to secrete insulin altogether or not at all. (Jalan & Al, 2022)

Diabetes, derived from the Greek words dia (through) and bayenine (to go), means "siphon." It is a catchall concept for conditions marked by polyuria, or excessive urination; like diabetes and diabetes insipidus, it is regarded as a disorder associated with a metabolic disorder. Impaired insulin secretion or a mixture of insulin resistance and insufficient secretion can cause improper hyperglycemia. Insulin prediabetes is marked by low glycated hemoglobin, reduced glucose tolerance, or fasting glucose at high levels causing risk of diabetes mellitus development. (Alsifri Saud, 2021)

Glucose sugar regularly enters the blood cells to raise the level of glucose in them and acts as a the body's energy source, which is controlled by the hormone insulin, which controls the entry of glucose into the muscles, liver and other cells according to the need of those cells and tissues for glucose to provide them with energy in the normal state as for diabetic,

glucose sugar is not transported regularly into bloodstream due to inability of pancreas to produce insulin normally, which causes a lack of control over the regulation of glucose entry into those cells and tissues, which causes a hyperglycemia. (Vijayaraghavan, 2021)

Diabetes is divided into three types, type I diabetes, it is called insulin-dependent which affects both adults and children but commonly in children The destruction of pancreatic beta cells leads to type I diabetes, causing minimal or no insulin production. Alternatively referred to as non-insulin-dependent diabetes mellitus (NIDDM), type II diabetes occurs due to cellular resistance to insulin production and a lack of response to insulin. which common in adults and is often associated with obesity and sedentary lifestyles and type III is called gestational diabetes, which results from physiological changes in pregnant women and weight gain, which causes stress on the pancreas to produce insulin to cover that increase where this type usually disappears at birth. (Wicklow, 2023)

Diabetes is generally characterized by a group of symptoms, which include increased thirst, dry lips, excessive urination, exhaustion, lightheadedness, inexplicable weight loss, tingling sensation or numbness in your hands or feet, and wounds or sores that take a long time to heal and return to healthy and normal conditions, recurrent skin and/or vaginal yeast infections and other symptoms that appear after suffering from all three types of diabetes.(Ramachandran, 2021)

History of diabetes is millennium of years old and there is no ultimate cure yet, Even though diabetes has been known for more than 200 years, the term "diabetes" was initially coined by the Greek physician Aretaeus in 250 BC. Diabetes is originated from the Greek word the "siphon," which serves as a warning indicator for diabetics about how the illness can lead to moisture through increased frequency and magnitude of urination. Afterward by Thomas Willis, the personal physician of King Charles II, coined the term "mellitus" in 1674 to the already-defined diabetes formula has long been used to describe the urine of diabetic patients with diabetes, a Latin word, it means honey. (Mohajan, 2023)

Matthew Dobson established in 1776 that the presence of an sweet taste of diabetic patients' urine was caused by an excess of a specific type of sugar in their blood, in ancient and medieval times, a diabetic person was tantamount to death row, Aretaeus tried to treat it, but he was unable to give a good result, while Sushruta, in the sixth century BC, Indian healer classified the disease as Madhumiha, where the term Madhu means honey, which refers to the sweet taste of urine, they diagnosed the disease in a classical way by whether ants are attracted to urine or not, and the combination of the term means sweet urine this was shared by Indians, Chinese, Japanese, and Koreans, In adopting that term to that disease condition, launching the term was also based on the same principle that exists in naming the disease. (Haslam, 2022)

Educational Program

Comprehensive education of the patient's family gives them the scientific skills necessary to achieve good control of the disease and its complications and improves the quality of management by identifying interventions aimed at improving patient's parents awareness about disease risks compared to parents who have less scientific knowledge of the health management of the disease, as those who attend educational and cultural programs, they are at an advanced and sophisticated cognitive and cultural level, unlike those who have not developed themselves and have not participated in educational programs in providing the necessary care for their children, as those with good knowledge are aware and have a high understanding of the disease and have the ability to deal with their children with the health programs and methods that they have learned from the educational programs and to be parents have health awareness in most aspects related to the health condition of their children. (Diriba & Leung, 2023)

Parents Knowledge of Diabetic

It focuses on transferring knowledge and promoting education programs designed to meet the needs of patients and their parents, as education can meet parents' cognitive needs and improve commitment to managing the treatment and care of their children determined according to the basic needs of patients and their families and enhancing the roles and positions of parents depending on the different health status of their sick children who suffer from complications, severe diabetes & poor quality of life, in addition to various psychological and social challenges and contributing to improving the family's lifestyle due to their child's condition and engaging in the daily management of their child's needs. (Diriba & Leung, 2023)

Knowledge is a crucial factor in maintaining the health of sick children by their parents and helps control blood glucose levels. However, poor parental control over blood glucose levels and insufficient treatment portend a worsening of the health problems of the disease, this could be the result of a lack of accurate knowledge of the risks of developing diabetes and the parents' preoccupation with the requirements of life and their lack of interest in knowing the health management of the disease as for the children, they do not understand the nature of the disease and its management, so the greatest responsibility for their care falls on the shoulders of their parents. (Daka, 2023)

2. METHODOLOGY

1) Quasi-Experimental of (120) parents, those do Diabetes and Endocrinology Center in Al- Najaf Al-Ashraf City.

2) An assessment tool is adopted by the researcher. Which consist of four sub-parts, where the first sub-part includes 11

questions related to knowledge about type I diabetes milieus disease, the second sub-part includes 8 questions related to the signs and symptoms of diabetes, the third sub-part consist of 11 items related to the signs & symptoms of hypoglycemia, the fourth subpart includes 11 questions related to parents' knowledge of diabetes complication. each question has three options. The question was scored with a score of two for the correct answer and a one for the incorrect answer

3) Samples were collected from the period 29. June 2024 until 10. October 2024, by interviewed and medical assessments of diabetic children parents

4) The reliability of the take a look at was used to decide the accuracy of the questionnaire, it changed into received via evaluating the questionnaire, the reliability coefficient of (Cronbach Alpha) becomes (0.720)

5) The data collection is assessed and analyzed by the Microsoft excel 2010 and version (25) statistical package of social sciences (SPSS).

3. RESULTS

Table 4.1. Socio – demographical distribution of diabetic children

Groups	**Study**		**Control**
Age (Years)			
1-5	F	13	13
	%	21.7	21.7
6-10	F	24	23
	%	40	38.3
11-15	F	16	16
	%	26.7	26.7
16 – above	F	7	8
	%	11.6	13.3
Total (%)		**60 (100)**	**60 (100)**
Sex			
Male	F	32	34
	%	53.3	56.7
Female	F	28	26
	%	46.7	43.3
Total (%)		**60 (100)**	**60 (100)**
Residential			
Urban	F	35	32
	%	58.3	53.3
Rural	F	25	28
	%	41.7	46.7
Total (%)		**60 (100)**	**60 (100)**

4.1. Explain a highly percent of age of children were (6-10) years for both study and control groups were present as (40 %) for study and (38.3 %) from control group.

In relative to sex were (53.3%) from experimental group were men while were (56.7%) of control group also men.

In relative to Residential, the most percent of the study and control sample were lived in urban area where (58.3%) of study group resident in urban area and, (53.3%) of control study also resident in urban areas.

Table 4.2: Normality tests of parents knowledge regarding to diabetic children care (Pre-test)

Groups		Shapiro-Wilk		
		Statistic	d. f	P. Value
Knowledge	Study	.910	60	.134*
	Control	.970	60	.185*

Normal distribution

Table 4.2. show that the distribution of both study and control group is normal distribution and it is significance at p. value (.134) and (.185) for study and control group respectively.

Table 4.3: Overall assessment of parents knowledge regarding to diabetic children care (Pre-test)

		Study		Control		t-observed	P value
		f	%	f	%		
Diabetic mellitus disease	Poor	43	71.7	45	75	0.410	0.41 N.S
	Fair	17	28.3	15	25		
	Good	0	0	0	0		
	Total	60	100	60	100		
Signs and symptoms of hyperglycemia	Poor	41	68.3	40	66.7	0.461	0.07 N.S
	Fair	19	31.7	20	33.3		
	Good	0	0	0	0		
	Total	60	100	60	100		
Signs and symptoms of hypoglycemia	Poor	38	63.3	37	61.7	0.187	0.71 N.S
	Fair	22	36.7	23	38.3		
	Good	0	0	0	0		
	Total	60	100	60	100		
Diabetic complications	Poor	36	60	38	63.3	0.562	0.27 N.S
	Fair	24	40	22	36.7		
	Good	0	0	0	0		
	Total	60	100	60	100		
Overall assessment of parents knowledge regarding to diabetic children care	Poor	**43**	**71.7**	**42**	**70**	0.462	0.13 N.S
	Fair	17	28.3	18	30		
	Good	0	0	0	0		
	Total	60	100	60	100		
Mean ± SD		1.18 + 0.390		1.19 + 0.411			
df=118							

Table 4.3. appear the parents at both study and control group were have a poor level of knowledge regarding diabetic children care where their percent (71.7%) of study and (70%) of control group have poor knowledge level respectively and that is mean non-significance difference in the controls and study group with their knowledge about diabetic children care at p. value <0.05%.

Table 4.4. Normality tests of parents of knowledge of diabetic children care (Post – test one)

Groups		Shapiro-Wilk		
		Statistic	D. f	P. Value
Knowledge	Study	.715	60	.178*
	Control	.482	60	.104*

Normal distribution

Table 4.4. show that the distribution of both study and control group is normal distribution and it is significance at p. value (.178) and (.104) for study and control group respectively.

Table 4.5. Overall assessment of parents knowledge regarding to diabetic children care (Post - test one)

		Study		Control		t-observed	p≤0.05
		f	%	F	%		
Diabetic mellitus disease	Poor	1	1.7	45	75	15.786	0.01 Sig
	Fair	23	38.3	15	25		
	Good	36	60	0	6.7		
	Total	60	100	60	100		
Signs and symptoms of hyperglycemia	Poor	2	3.4	40	66.7	16.962	0.03 Sig
	Fair	28	46.6	20	33.3		
	Good	30	50	0	0		
	Total	60	100	60	100		
Signs and symptoms of hypoglycemia	Poor	6	10	37	61.7	10.197	0.02 Sig
	Fair	25	41.7	23	38.3		
	Good	29	48.3	0	0		
	Total	60	100	60	100		
Diabetic complications	Poor	6	10	38	63.3	14.343	0.02 Sig
	Fair	20	33.3	22	36.7		
	Good	34	56.7	0	0		
	Total	60	100	60	100		
Overall assessment of parents knowledge regarding to diabetic children care	Poor	2	3.3	42	70	20.880	0.01 Sig
	Fair	25	41.7	18	30		
	Good	33	55	0	0		
	Total	60	100	60	100		
Mean ± SD		**1.65 + 0.134**		**1.19+ 0.749**			

Table 4.5. revealed that the most of parents in study group were have a good level of knowledge regarding diabetic children care where their percent (55 %) of study have good level of knowledge while regarding to control group was (70%) has poor knowledge level and (t–observed) was (20.880) P. value was (0.01) that is mean there are a scientific variance among experimental group and control group about diabetic children care at p. appear in table is > 0.05%.

Table 4. 6. Normality tests of parents of knowledge of diabetic children care (Post – test two)

Groups		Shapiro-Wilk		
		Statistic	D. f	P. Value
Knowledge	Study	.717	60	.173*
	Control	.483	60	.102*

Normal distribution

Table 4. 6. show that the distribution of both study and control group is normal distribution and it is significance at p. value (.173) and (.102) for study and control group respectively.

Table 4. 7. Overall assessment of parents knowledge regarding to diabetic children care (Post – test two)

		Study		Control		t-observed	p≤0.05
		F	%	F	%		
Diabetic mellitus disease	Poor	1	1.7	45	75	15.783	0.01 Sig
	Fair	23	38.3	15	25		
	Good	36	60	0	6.7		
	Total	60	100	60	100		
Signs and symptoms of hyperglycemia	Poor	2	3.4	40	66.7	16.959	0.03 Sig
	Fair	28	46.6	20	33.3		
	Good	30	50	0	0		
	Total	60	100	60	100		
Signs and symptoms of hypoglycemia	Poor	6	10	37	61.7	10.199	0.02 Sig
	Fair	25	41.7	23	38.3		
	Good	29	48.3	0	0		
	Total	60	100	60	100		
Diabetic complications	Poor	6	10	38	63.3	14.338	0.02 Sig
	Fair	20	33.3	22	36.7		
	Good	34	56.7	0	0		
	Total	60	100	60	100		
Overall assessment of parents knowledge regarding to diabetic children care	Poor	2	3.3	41	68.3	20.881	0.01 Sig
	Fair	26	43.3	19	31.7		
	Good	32	53.3	0	0		
	Total	60	100	60	100		
Mean ± SD		1.66 + 0.132		1.19+ 0.749			

Table 4. 7. revealed that the most of parents in study group were have a good level of knowledge regarding diabetic children care where their percent (53.3 %) of study have good level of knowledge while (68.3%) of control group have poor level of knowledge and (t–observed) was (20.881) and P. value was (0.01) that is mean there are a scientific variance among experimental and control groups about diabetic children care at p. appear in table is > 0.05%.

Overall comparison among pre, post one and post two in each groups

Table 4.8. Comparison among pre, post one and post two in parents knowledge of diabetic children care within Study group

Time	Sample	MS	S.D	P. value
Pre test	60	1.1848	.08915	0.001
Post test1	60	1.6457	.13436	H.S
Post test2	60	1.6648	.13558	

One-Way ANOVA, H.S = High significance

Table 4.8. Show that a significant differences in parents knowledge about diabetic children care among pre, post one, and post two test within study group at P. value = 0. 001.

Table 4.9. Comparison among pre, post one and post two in parents knowledge of diabetic children care within Control group

Time	Sample	MS	S.D	P. value
Pre test	60	1.1911	.07490	0.994
Post test1	60	1.1908	.07511	N.S
Post test2	60	1.1922	.07270	

One-Way ANOVA,

Table 4.9. Show that non - significant differences in parents knowledge about diabetic children care among pre, post one & post-test 2 within control group at p. appear in table is ≤ 0.05.

Table 4.10. Post hoc (Bonferroni) among pre, post one and post two in parents knowledge of diabetic children care within study sample

					95% Confidence Interval	
Mean Difference (I-J)			Std. Error	Sig.	Lower Bound	Upper Bound
Pre test	Post test1	-.38089-*	.02214	.000	-.4246-	-.3372-
	Post test2	-.40000-*	.02214	.000	-.4437-	-.3563-
Post test1	Pre test	.38089*	.02214	.000	.3372	.4246
	Post test2	-.01911-	.02214	.389	-.0628-	.0246
Post test2	Pre test	.40000*	.02214	.000	.3563	.4437
	Post test1	.01911	.02214	.389	-.0246-	.0628

*. Refer to a scientific mean variance in the 0.05 level.

4. DISCUSSIONS

Discussion of the Socio-demographical Data that related to The Parents who Shared in the Study

The result appear that most present children in the study are at (6-10) years age group for the control and study group, where

their percentage reached 40 % (24 children) from control group and 38.3% from experimental group (23 children). These finding are agree to a finding appear in 2023 when applied study to identify diabetic children care where largest percentage of the study sample was also under the age of 13 years, as their percentage reached 30% of the main sample size. (Elsayed & Al, 2023)

Also, the (table 4.1) showed that most sample from control group and experimental group was male was there percent was 53.29 % out of experimental group and 56.69 % out of control group was male. A study was conducted in 2022, research finding revealed most of experimental group who participant in sample is male, representing (51.7%). Research finding is agree to my research finding. (Akter & Rashid, 2022)

Finding of study explain most of control group and experimental group lived in urban areas Their percentage reached 58.3% of experimental group and 53.3% of control group. Research finding are consistent with another study conducted in Dhi-qar Governorate in Iraq, where residents of urban areas represented a percentage (76.7) of the total sample. (Jameel, 2013)

Discussion of the Parents Knowledge before apply Educational Programs (pre - test)

The study showed that the distribution of knowledge of parents of both study and control group is normal distribution and it is significant at p. value (.134) and (.185) for control group and experimental group which appear in table 4.1.

study recorded that (71.7%) of parents in study group were have poor knowledge and, (70 %) of parents in control group were also have a poor knowledge regarding diabetic children care this not significant at p. appear in table is 0.13 in table 4.2.

All current study finding before applying the educational program is agree to results of research applied at year, which assessed knowledge of parents' regarding to diabetic children care, and study showed that most parents have little to moderate knowledge regarding parents' knowledge about diabetic children care, and applies on results of my study. (Mutlu & Söbü, 2023)

Discussion of the Parents Knowledge after apply Educational Programs (post - test one)

In (table 4. 3), it showed that the experimental group parents knowledge distribution of diabetic children care with diabetes for post-test1 of the applied educational program has a distribution normally for study group in a p-value is .178, and also a normal distribution for the control group in a p. appear in table 0.104.

Finding of post one test showed that (3.3 %) of parents have poor knowledge, (41.7 %) of parents have fair knowledge and (55 %) of parents have good knowledge regarding to diabetic children care in study group , while (70 %) of parents have poor knowledge, (37 %) of parents have fair knowledge and (0 %) of parents have good knowledge regarding to diabetic children care in control group and p. value 0.01 this results are consider highly significant at p. value 0.001. which refer to there are a significant different between study and control group. (table 4. 4)

These results reflect that the educational health program was applicable and able to change the experimental group parents knowledge, while control group parents knowledge remained in the same level when assessing knowledge about diabetic children care pre & post implementing the educational program because the control group did not take educational health program.

Finding of my dissertation is agree to findings of study to evaluate effect program of health educational on diabetic children care parents knowledge, as results of the educational program indicated that it was effective because it improve parents knowledge when compared and they are a positive association improvement in the study group parents knowledge, while the knowledge of the control group did not change, there is a slight observation at $P \leq 0.05$. finding is agree to results of my study, where educational program was effective in improving parents knowledge at $P \leq 0.05$. where parents knowledge of study group are elevated while the parents knowledge of control group is non change which refer to effectiveness of educational health program in improve diabetic children parents knowledge. (Kumar, K. M., 2023)

Discussion of Parents Knowledge after applied Educational Program (post-test two)

It showed that the distribution of diabetic children parents knowledge for post-test two of the applied educational program has a distribution normally for study group in a p.value =.173, and also a normal distribution for control group in a p. appear in table is 0.102. (table 4. 5)

Finding of post-test two showed that (3.3 %) of parents have poor knowledge, (43.3%) of parents have fair knowledge and (53.3%) of parents have good knowledge regarding to diabetic children care in study group , while (68.3%) of parents have poor knowledge, (31.7 %) of parents have fair knowledge and (0 %) of parents have good knowledge regarding to diabetic children care in control group and p. value 0.01 this results are consider highly significant at p. value 0.001. which refer to there are a significant different between study and control group. (table 4. 6)

These results reflect that the educational health program was applicable and able to change the knowledge of parents of experimental group, while knowledge of parents in the control group remained in the same level when assessing diabetic children parents knowledge with type one diabetes before, after implementing the educational (post- test one) program and

in post- test two due to the control group did not take educational health program.

These results have been proven by (Sawtell & Jamieson, 2022) where it was conducted to evaluate the effectiveness of an education health program to family knowledge about diabetic children care, where it was estimated that the largest percentage of parents become a good knowledge level after implementing the health education program with a P appear in table < 0.05, it is highly association, while the knowledge level changed slightly at the second post-test, and the results are still significant after applying the educational program, and the effect of the educational program is still clear and influential in enhancing parents' knowledge. (Sawtell & Jamieson, 2022)

In related to knowledge finding of estimated refer to there are a significant differences among pre, post one and post - test two in parents care on diabetic children care within study group because the study group who received educational health program. (table 4.7)

In related to knowledge finding of estimated that there are non- significant differences between pre, post one, and post two in parents care on diabetic children care within control group because the control group who doesn't receive educational health program. (table 4.8)

5. CONCLUSIONS

1. The level of parent's knowledge in study group altered significantly, where it's in pre-test before conducting educational program sessions the mean was (1.2248) then become in post-test one after applied educational program sessions (1.6057) and in post-test two (1.6248).

2. The knowledge level of parents in control group in pre-test and after applied education program (post-test one) and post-test two stayed in same level

3. Regarding the difference in knowledge level in study group among pre-test, post-test1 and post - test two, where level elevated this mean that the educational program was effective.

6. RECOMMENDATIONS

Recommendations of scientific research are the final part of the study, which are written based on the results and conclusions reached in the study, as they include a number of solutions to the problems that appeared in the study from the researcher's view point , which are based on the implications that the researcher presents in an elaborate scientific manner, where the relationship between the results and the recommendations is absolutely constructive, therefore the most important recommendations of this study are:

1. Develop an educational program regarding strategies to update parent's knowledge for their diabetic children care.

3. There should be ongoing educational programs in hospitals and specialized diabetes centers to provide parents with sufficient updated information to increase parents knowledge on diabetic children care.

4. Printing booklists and publications on the diabetic children care by the Ministry of Health and distributing them to parents of children with diabetes, which include recommendations and instructions issued by official international health institutions regarding the diabetic children care.

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