Effect of Educational Program on Improving Quality Of Life of Diabetic Children and Adolescents

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Abstract: Diabetes mellitus is one of the most common chronic non curable diseases affect children and adolescents. So, it requires sustained and coordinated educational support for those young patients to live peacefully and happily with it. Implementing educational programs for those children and adolescents is crucial for maintaining their life and improving their quality of life. Therefore, **the aim of this study** was to illustrate the effect of an educational program on the quality of life of diabetic children and adolescents, through identifying children and adolescents' knowledge and practice regarding care of them, design, implement and evaluate the constructed educational program according to children and adolescents' deficit. **A quasi experimental (intervention)** study with **a sample** of 100 males and females diabetic children and adolescents, with age ranged from 10-18 years. The study was conducted at the outpatient pediatric and diabetes clinics of school health insurance hospital at Benha City. **The tools** of data collection were 1) Interviewing questionnaire was constructed by the researcher, to assess their knowledge about diabetes, and quality of life 2) Observational checklist to assess their care of themselves. **The results** revealed that, there was statistical significance differences immediately post /3 months after implementation of the educational program compared with pre program implementation in knowledge self care practice. There were highly statistical significant differences in quality of life domains 3 months after the program compared with pre program. There were a highly statistical significance correlation between total knowledge and total practice, total quality of life and total knowledge and total practice, total quality of life and glycemic control before and 3 months after the program. It was **concluded** from the study that, there were an improvement in knowledge, practice and quality of life of the study subjects after implementation of the program. **The study recommended** conducting educational programs for medical, nursing staff, socialists, pharmacist, parents, school teachers, school doctor and school health nurse about various aspects of type 1 diabetes in children and adolescents about their care, and importance of enhancing their QOL.
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Introduction

Diabetes is one of the most serious health problems facing the world during the last decade. Increasingly, health care providers are finding more and more children and teens with type 1diabetes; in addition of finding of large numbers have type2 diabetes, that disease usually seen in people over age 40. Although there are no accurate national data, some clinics reported that one-third to one-half of all new cases of childhood diabetes is now type 1**(American Diabetes Association (ADA), 2010).**

Throughout the world, incidences of diabetes are on rise, and consequently, type 1 diabetes in children and adolescents. Most children are affected by type 1 diabetes in childhood. However, the number of children and young adults affected by type 2 diabetes is beginning to rise. Number of young people with type 1 diabetes varies from place to place **(The**

Global Diabetes Community, 2011). During the last decade the incidence rate of diabetes type 1 increased. That it represented by about 0.7% among Egyptian children and adolescents and also the prevalence rate whereas, the number of children and adolescents affected with type 1 diabetes was 95146 **(Wrong Diagnosis, 2011).**

Diabetes is a non curable disease. Then, the treatment plan is directed toward managing or controlling its course. This can be achieved through balancing insulin, food and exercise. The diabetic child or adolescent may be either exposed to hypoglycemia which may be caused by too little food, too much insulin or more exercise than usual, or hyperglycemia which may be due to too much food, too little insulin, illness, stress or less exercise than normal. So, allowing children and adolescents with diabetes to participate fully and safely in their plan of

care is a very important concern in their self care behaviors (**Libman and Rewers, 2004).**

Education is the corner stone of diabetes management. That, it should be a lifelong process and those children and young people with diabetes should be provided with information and a structured program of diabetes-related education (International Society for Pediatric and Adolescent Diabetes **(ISPAD), 2009).**

There are many unique challenges in caring for children and adolescents with diabetes that differentiate pediatric from adult care. These include; the obvious differences in the size of the patients, developmental issues such as the unpredictability of a child's dietary intake, activity level and medical issues such as; the increased risk of hypoglycemia and diabetic ketoacidosis. Because of these considerations, the management of a child with type 1 diabetes must be taken into account. Also, the age and developmental maturity of the child must be regarded. Although most children with type 1 diabetes present with the classic signs and symptoms of hyperglycemia without accompanying acidosis, their management depends on their self care behaviors with appropriate supervision **(Lynne *et al.,*2011).**

Quality of life is the degree of well-being felt by an individual or group of people. Unlike standard of living, it is not tangible thing, and so cannot be measured directly. It consists of two components; physical and psychological. The physical aspect includes; things such as health, diet, and protection against short and long term complications. The psychological aspect includes stress, worry, pleasure and other positive or negative emotional states (**Costanza *et al.,* 2008).**

Quality of life for children with diabetes mellitus refers to subjective well-being focuses on the health related component of life satisfaction such as self care, and community. Assessment of quality of life reflects personal evaluation of daily experience, and resonate with other subjective outcomes, such as; life satisfaction, sense of coherence and self concept **(Michael *et al.,* 2007).**

Significance of the study:

Diabetes education programs developed for children and young people have highlighted that educational interventions are useful for improving their knowledge and practice. It is assumed that, improving knowledge and skills leads to better adherence to care and metabolic control **(Martin *et al.,* 2009).**

Hypothesis:

- Diabetic children and adolescents will report poor knowledge in relation to aspects of quality of life and will be improved after implementation of the program.

2- Children and adolescents with diabetes will show inaccurate practice in caring for themselves as insulin self injection, home blood glucose monitoring and testing urine for sugar and ketone bodies and will be improved after implementation of the program.

3-Knowledge and practice of diabetic children and adolescents about diabetes will be improved after implementation of the program.

4-There will be relationship between knowledge and practice of diabetic children and adolescents in caring for themselves.

The aim of the study:

illustrate the effect of an educational program on the quality of life of diabetic children and adolescents, through identifying children and adolescents' knowledge and practice regarding care of themselves, design, implement and evaluate the constructed educational program according to children and adolescents' deficit.

2. Subject and Methods:

The present study was conducted with the aim of enhancing quality of life for children and adolescents with diabetes mellitus, this was achieved through designing, implementing and evaluating an educational program for those children and adolescents.

Study Design:

Quasi- experimental (Intervention study)

Setting:

The study was conducted at the out patient pediatric and diabetes clinics of school health insurance hospital at Benha City.

Sample:

A convenient sample of 100 children and adolescents with diabetes mellitus according to the inclusion criteria.

Criteria of inclusion:

- Both sexes of children and adolescents.

- Age of children and adolescents, from10 to 18 years.

-The diabetic children and adolescents had diabetes for a period more than one year

C-Tools of Data collection

Two tools were used for collecting data

I- Interviewing questionnaires:

Questionnaire sheets were constructed by the researcher under supervision of supervisors after reviewing related literature. It includes three main questionnaires that covered knowledge of the study subjects, Kiddo KINDL Children's Questionnaire and Diabetes Distress Scale. Each questionnaire includes sub items as the following:

A-knowledge assessment sheet of the study subjects:

It consists five parts. Each part includes many sub items covered; socio-demographic data of the

study subjects, medical history, their knowledge about diabetes, as following:

Part I:

Socio-demographic data of children and adolescents' age, level of education, rank among siblings, number of siblings, residence.

Part II:

Medical history of the children and adolescents with diabetes, such as; duration of disease, follow up times, previous hospitalization and any complications occurred due to affection with diabetes.

Part III:

Children and adolescents' knowledge regarding diabetes mellitus, its treatment and drugs used for the diabetic children or adolescents, nutrition, activity allowed and exercises, investigations as the following:

1- Knowledge regarding diabetes such as; definition, associated problems, types, causes, signs and symptoms and its complications.

2- Knowledge regarding medications prescribed for managing diabetes such as; insulin definition, sites of insulin injection, side effects associated with insulin injection, and storage of insulin.

3- Knowledge regarding nutrition of the diabetic child or adolescent such as; relation between intake and diabetes, nutritional elements should be taken and formulation of a diet suitable for a diabetic child or adolescent.

4- Children and adolescents' knowledge regarding exercises and sports allowed for the diabetic children and adolescents such as; importance of exercise for the diabetic child or adolescent, avoidance of exhaustion during performing exercise or sports, types of sports suitable for a diabetic child or adolescent.

5- Knowledge regarding personal hygiene, skin care, eye care, teeth care, and foot care such as; meaning of personal hygiene, importance of periodical check up on eye and teeth and caring of feet.

6- Knowledge regarding investigations performed to a diabetic child or adolescent such as; fasting blood sugar, random blood sugar, and post prandial blood sugar levels, Glycosylated hemoglobin (HbA1c), and urine tests.

7- Impressions regarding health insurance services introduced to them as; insulin doses they receive sufficient or no, their HbA1c was checked every three months.

Part (IV):-

Physical assessment sheet was designed by the researcher to assess general health status of the diabetic children and adolescents which contains two parts

1-General physical assessment as: weight, height, skin condition, gum, teeth and feet condition.

2- Fasting blood glucose levels and blood glucose levels at bed time of the diabetic children and adolescents checked by them or their caregiver before the program and 3 months after the implementation of the program.

Part (V):

Children and adolescents' knowledge regarding quality of life it includes; concept of quality of life, and effect of diabetes on quality of life pre and post program implementation and after 3 months.

B- Kiddo KINDL Children's Questionnaire

Kiddo KINDL Children's Questionnaire was adopted from **Revens and Bullinger, (2000).** It was modified by the researcher and translated into Arabic language to be used for assessment of quality of life of the diabetic children and adolescents. It consists of physical well-being (the child or adolescent describe his or her feeling about physical health which include 4 items), emotional well-being (the child or adolescent describe his or her feeling toward emotional status, that includes 4 sub items), self esteem (the child or adolescent described his or her feeling toward self, that also includes 4 sub items and feeling accompanied with the disease which includes 6 sub items. These sub items have a 5 point rating scale, as: 1=never, 2=seldom, 3=some times, 4=often and 5=all the time. The items related to feeling accompanied with illness were modified to suit a child or adolescent with diabetes as; feeling different because of diabetes, have fears of diabetes complications.

C- Diabetes Distress Scale:

To gather data in relation to many problems concerning diabetes that may affect on the diabetic children and adolescents, and they can vary greatly in severity. Problems may range from minor to major life difficulties.(e.g., feeling that diabetes is taking up too much of their mental and physical energy every day, feeling angry, scared and/or depressed when they think about living with diabetes. This scale was adopted from Annals of Family Medicine, and was designed by **Lawrence *et al.* (2008)**. The rating scale for items of this scale is; 1= not a problem, 2=moderate problem, 3=serious problem. There were few items where this stem and rating scale is not appropriate, such as items concerning relations with doctor, were cancelled. For example: feeling that doctor doesn't give them clear directions on how to manage diabetes.

II-Observational checklist:

Adopted from Standards of medical care of diabetes in accordance of **American Diabetes Association (2005)**.To assess the actual care of the diabetic children and adolescents for themselves. As if the child or adolescent done the practice correctly he was scored 2, and if he done it incorrectly he was scored 1.While if he didn't done it he was scored 0.

Scoring of variables:-

1-Scoring system of knowledge:

All knowledge variables were weighted according to the items included in each question. A question that implies a 4 items answer have a score of 8 and another that implies 3 items answer have a score of 6 as if a child or an adolescent answered a correct and complete answer he was scored 2 and if his or her answer was correct and incomplete he was scored 1 and so on and each item has answer with don't know or incorrect it implied 0.

2-Scoring of the Kiddo KINDL Children's Questionnaire (QOL):

Scoring of Items is transformed to a scale with a possible range of 1-5 for each sub item of the items of the questionnaire.

3- Scoring of the Diabetes Distress Scale:

The scores varies from 1-3 for each item that if child or adolescent choose the item not a problem he was scored 1 and if he choose moderate problem he was scored 2, while the serious problem scored 3.

4-Scoring system of practice:

Total practice of diabetic children and adolescents were scored as the following:

*Good :> 80%
*Average: 60-80%
*Poor :< 60%
A Guide booklet:-

It was designed by using simple Arabic languages and different illustrated pictures in order to facilitate subjects' understanding.

Educational program:

I-preoperational phase:

Official letter from faculty of nursing to health insurance hospital administrator were prepared and delivered.

II-Preparation of the educational program

-Review of relevant literatures.

-The preparation of the program design for objectives, contents, methods of teaching, and media. The program was in form of Arabic Language to be easy understood.

-Preparation of the teaching aids and media includes; hand out and power point presentation.

-Pre test was performed to identify weakness in the diabetic children and adolescents' knowledge and self care practice.

-Application of the educational program:

A-Pilot study

A pilot study was carried out on 10% of the sample (10 patients varied from males and females) for the purpose of modification and clarification. Participants in the pilot study were not included in the sample. And there were little modifications of the designed questionnaire as asking the study subjects about dimensions of quality of life was omitted from the questionnaire and some questions related to doctor patient relationship in the diabetes distress scale were

omitted from it. Also, HA1c test was omitted because it was unavailable to be done at the hospital. Needs of the study subjects were identified and an educational program was designed to meet these needs.

B- Operational Design

1-First Phase:

This phase included assessment of the knowledge and practice of the diabetic children and adolescents about diabetes mellitus through using the developed tools as a pre-test

2-Second phase:

This phase Included analysis of the pretest findings and identification of children and adolescents' knowledge and practice toward diabetes mellitus issues then an educational program was designed.

3-Third Phase :(Planning &Implementation):

Based on the results from the interviewing questionnaire, the quality of life questionnaire (Kiddo KINDL Children's Questionnaire) and diabetes distress scale, as well as literature review, and an educational program regarding diabetes mellitus issues were developed by the researcher.

General Objectives:

By the end of diabetes mellitus educational program, children and adolescents with diabetes mellitus will be able to have adequate and proper knowledge and practice toward diabetes mellitus and care for them selves.

Specific Objectives:-

By the end of the program, the diabetic children and adolescents will be able to:

Define diabetes mellitus.

Identify causes of diabetes mellitus

Identify signs and symptoms of diabetes mellitus

Identify complications of diabetes mellitus.

Identify treatment of diabetes mellitus

Identify self care aspects of diabetes mellitus.

The implementation of educational program entailed 8 sessions.

The time of each session was verified from 30 - 60 minutes, different teaching strategies e.g. (Lectures, and group discussion) will be used.

The sessions were conducted at out patient clinics of the previous hospital.

Children and adolescents' knowledge and practice were evaluated by the end of the sessions as a post-test.

4-Fourth Phase:

Follow up test was conducted after 3 months.

III- Administrative Design:

An official approval was obtained to conduct the study. The title and objectives of the study were illustrated as well as the main data items to be covered, and the study was carried out after gaining the necessary approval. The study was carried out during the period from 17 February to August 2010.

Ethical and legal considerations:

The aim of the study was explained to each subject before applying the tools to gain their confidence and trust.

An oral consent was obtained from each subject and his or her parents to participate in the program.

The tools of this study weren't touching the subjects' shyness.

The study was conducted in safe places for the children and adolescents

Data were collected and treated confidentially.

IV- Statistical Design:

The collected data was entered and analyzed by using SPSS version11. Data was presented in tables by using Mean, Standard deviation, number and percentage and other statistical tests such as Paired t-test was used as a parametric test of significance for comparison between two sample means. Spearman's rank correlation coefficient (r) was used as a non parametric measure of the mutual relationship between none normally distributed quantitative or ordinal variables.

3.Results

As regard mean scores of the study subjects in relation to their knowledge about quality of life before, immediately after, and after three months., there was a highly statistically significant difference related to mean scores of the study subjects regarding their knowledge about concept of quality of (t=-46.40, p=<0.001) and during immediate post test and three months after test compared to pre program mean scores

As regard mean and standard deviation of the study subjects in relation to their knowledge about diabetes mellitus before, immediately after, and after three months,

there were highly statistically significant differences related to mean scores of the study subjects regarding their knowledge about diabetes definition, signs and symptoms diabetes complications items during immediate post test and Three months after test as compared to pre program mean scores.

As regard mean and standard deviation of the study subjects regarding their knowledge about diabetic coma before, immediately after, and after three months,

there were a highly statistically significant differences related to mean scores of the study subjects regarding their knowledge about diabetic coma items during immediate post test and three months after test as compared to pre program mean scores.

As regard mean and standard deviation of the study subjects regarding their knowledge about Medications used in treatment of diabetes mellitus before, immediately after, and after three months,

there were highly statistically significant difference in relation to mean scores of study subjects' knowledge regarding medications used in treatment of diabetes mellitus items during immediate post test and three months after test as compared to pre program mean scores.

As regard mean and standard deviation of the study subjects regarding their knowledge about diet regimen for diabetic child or adolescent before, immediately after, and after three months, there were highly statistically significant differences in relation to mean scores of the study subjects regarding their knowledge about diet items during immediate post test and three months after test as compared to pre program mean scores.

As regard the study subjects' practice in relation to insulin self injection by insulin syringe and by insulin self injector pen before, immediately after, and after three months, the majority of the study subjects have poor practice in relation to insulin self injection by insulin syringe items before program. While immediately after they performed in good manner and had a highly scores but declined slightly after 3 months. While, the majority of the study subjects had poor practice in relation to insulin self injection by insulin pen injector's items before program, while immediately after they performed in good manner and had a highly scores but declined slightly after 3 months.

Table (1) shows that there were highly statistically significant differences in relation to knowledge mean scores of the study subjects regarding exercises and sports items during immediate post test and three months after test as compared to pre program mean scores.

Table (2) shows that there were highly statistically significant differences in knowledge mean scores of the study subjects regarding personal hygiene, skin care, eye care, teeth care, and foot care for diabetic child or adolescent items during immediate post test and three months after test as compared to pre program mean scores.

Table (3) shows that there were highly statistically significant differences in knowledge mean scores of the study subjects regarding laboratory investigations needed for diabetic child or adolescent items during immediate post test and three months after test as compared to pre program mean scores.

Table(4) revealed that the majority of the study subjects had poor practice in relation to blood glucose monitoring items before program, while immediately after they performed in good manner and had a highly scores but declined slightly after 3 months.

Table(5) revealed that the majority of the study subjects had poor practice in relation to estimating glucose level, ketone bodies and acetone in urine

items before program, while immediately after they performed in good manner and had a highly scores but declined slightly after 3 months.

As shown in table (6) there was an improvement in total knowledge and practice mean scores of study subjects immediately after the program and slightly declined after three months, compared with before the program. Regarding total quality of life dimensions of them, it was noticed that, there was an improvement in there total quality of life after 3months of the program compared with before the program.

As viewed in table (7), that there was a highly statistical significance correlation between total knowledge and age, educational stage, while there was no statistical significance correlation between total knowledge before the program and their residence. Also, there was a highly significance correlation between total knowledge post implementation and their age, and residence, while there was no statistical significance correlation between total knowledge post the program and their educational stage.Regarding total practice, there was a highly statistical significance correlation between total practice pre program and their age and educational stage, while there was no statistical significance correlation between total practice pre program, and their residence. In relation to total practice post the program.

There was a highly statistical significance correlation between total practice post the program and their age and educational stage. While there was no statistical significance correlation between total practices post the program and their residence.

As illustrated in table (8) that there was a highly statistical significance correlation between total knowledge and total practice before, immediately after, and after three months.

As shown table (9) there was no Positive statistical significant correlation between total quality of life and study subjects' education, duration of affection. But there was a highly statistical significant correlation between total quality of life and their age, total knowledge and total practice.

As illustrated in table (10), there was no significance correlation between total quality of life before the program and fasting blood sugar. Also, there was a highly statistical significant correlation between total quality of life before the program and bed time blood sugar. Regarding correlation between total quality of life after 3 months it is obvious that there was a highly statistical significant correlation between total quality of life after 3 months and both fasting blood sugar and bed time blood sugar after 3 months.

Table (1):-Mean and standard deviation of the study subjects regarding their knowledge about exercises and sports for diabetic child or adolescent before, immediately after, and after three months.

Knowledge Ite	Mean ±SD		t	P	Mean ±SD		t	P
	Before	Immediately after	test	value	Before	After three months	test	value
Importance of exercises	0.622± 0.758	1.90±.301	-15.27	<0.001	0.622± 0.758	1.700±.626	-10.754	<0.001
Avoidance of over activity or exhaustion	0.644 ±0.939	1.75±.65	-9.359	<0.001	0.644±.939	1.700±.549	-9.32	<0.001
Sports to be performed	0.844±.923	1.91±.414	-10.31	<0.001	0.844±.923	1.76±.520	-8.493	<0.001
Precautions Before exercising	0.622±.758	1.75±.586	-11.31	<0.001	0.622±.758	1.73±.53	-12.159	<0.001
Importance of having a card (ID)	1.55 ±0.538	2.00±.00	-32.48	<0.001	1.55 ±0.538	1.77±.632	-19.549	<0.001

A statistical significant difference (P ≤ 0.05); A highly statistical significant difference (P ≤ 0.001)

Table (2): Mean and standard deviation of the study subjects regarding their knowledge about personal hygiene, skin care, eye care, teeth care, and foot care for diabetic child or adolescent before, immediately after, and after three months

Knowledge Item	Mean ±SD		t	P	Mean ±SD		t	P
	Before	Immediately after	test	value	Before	After three months	test	value
Concept of personal hygiene	0.111± 0.380	1.82± 0.552	-25.352	<0.001	0.111± 0.380	1.67±.650	-21.14	<0.001
Importance of personal hygiene	0.855 ±0.67	1.82±0.487	-11.89	<0.001	0.855 ±0.67	1.65± 656	-9.707	<0.001
Methods of skin care	0.455±.705	1.76±0.520	-16.074	<0.001	0.455±.705	1.73±.536	-13.13	<0.001
Methods of eye care	0.522±.657	1.86±0.373	-18.49	<0.001	0.522±.657	1.70 ±.608	-13.70	<0.001
Importance of periodical eye check-up	0.700±.322	1.77± 0.556	-17.058	<0.001	0.700±.322	1.73± 0.536	-17.22	<0.001
Time of periodical eye check-up	0.731±.322	1.71±0.707	-14.316	<0.001	0.731±.322	1.67± .650	-14.86	<0.001
Methods of teeth care	0.744±.727	1.97 ± 0.148	-15.91	<0.001	0.744±.727	1.730±.536	-12.39	<0.001
Time of periodical teeth check-up	0.632±.22	1.84± 0.538	-19.549	<0.001	0.632±.22	1.68±0.629	-14.82	<0.001
Methods of foot care	0.622±.500	1.92 ± 0.26	-20.137	<0.001	0.622±.500	1.73± .536	-17.83	<0.001

A statistical significant difference (P ≤ 0.05); A highly statistical significant difference (P ≤ 0.001

Table (3):-Mean and standard deviation of the study subjects regarding their knowledge about Laboratory investigations for diabetic child or adolescent before, immediately after, and after three months

Knowledge Item	Mean ±SD		t test	P value	Mean ±SD		t test	P value
	Before	Immediately after			Before	After three months		
Fasting blood sugar	0.633± 0.643	1.86±.341	-15.00	<0.001	0.633±.643	1.56 ±.636	-9.606	<0.001
Post prandial	0.911± .697	1.95±.207	-13.80	<0.001	0.911± .697	1.71±.565	-8.415	<0.001
Random blood sugar	0.755±.623	1.88±.3160	-17.293	<0.001	0.755±.623	1.86±.373	-14.58	<0.001
HbA1c	0.522±.690	1.92 ±.269	-18.161	<0.001	0.522±.690	1.73±.576	-14.61	<0.001
Urine tests Glucose in urine	0.722± 0.653	1.73 ±.536	-12.203	<0.001	0.722±.653	1.65±.656	-11.41	<0.001
Acetone in urine	1.12±.329	1.96.±180	-21.981	<0.001	1.12±.329	1.72.±653	-8.32	<0.001
-Albumin in urine	1.15±.364	1.90±.301	-13.293	<0.001	1.15±.364	1.74.± 645	-7.46	<0.001

A statistical significant difference ($P \leq 0.05$); A highly statistical significant difference ($P \leq 0.001$).

Table (4): Percentage distribution of the study subjects' practice in relation to blood glucose monitoring before, immediately after, and after three months.

Practice item	Before						Immediately after						After 3months					
	Good		Average		poor		Good		Average		poor		Good		Average		poor	
	no	%	no	%	no	%	no	%	no	%	no	%	no	%	no	%	no	%
1- Prepare the needed equipments:	78	78.0	10	10.0	12	12.0	98	98.0	2	2.0	0	0.0	85	85.0	5	5.0	10	10.0
2-wash hands with soap and warm water and dry them	0	0.0	12	12.0	88	88.0	95	95.0	2	2.0	3	3.0	87	87.0	8	8.0	5	5.0
-Select the location to piece. Avoid the index of the fingers	46	46.0	11	11.0	43	43.0	88	88.0	8	8.0	4	4.0	73	73.0	19	19.0	8	8.0
Warm the fingers by rubbing the hands together	29	29.0	21	21.0	50	50.0	95	95.0	3	3.0	2	2.0	88	88.0	3	3.0	9	9.0
-Make a puncture on the side of the finger on the site of puncture	46	46.0	10	10.0	44	44.0	90	90.0	10	10.0	0	0.0	82	82.0	14	14.0	4	4.0
Insert the strip into the glucose meter and read the result.	46	46.0	10	10.0	44	44.0	90	90.0	10	0.01	0	0.0	82	82.0	14	14.0	4	4.0
3-collect equipment and discard the used strips and lancet	46	46.0	10	10.0	44	44.0	95	95.0	3	3.0	2	2.0	80	80.0	16	16.0	4	4.0
4-Record the result	46	46.0	10	10.0	44	44.0	88	88.0	5	5.0	7	7.0	84	84.0	10	10.0	6	6.0
5-Wash hands	16	16.0	0	0.0	84	84.0	89	89.0	2	2.0	9	9.0	81	81.0	10	10.0	9	9.0

Table (5) :Percentage distribution of the study subjects ' practice in relation estimating glucose level, ketone bodies and acetone in urine before, immediately after, and after three months.

Practice item	Before						Immediately after						After 3months					
	Good		Average		poor		Good		Average		poor		Good		Average		poor	
	no	%	no	%	no	%	no	%	no	%	no	%	no	%	no	%	no	%
-Wash hands	0	0.00	10	10.0	90	.90.0	94	94.0	6	6.0	0	0.0	87	87.0	7	7.0	6	6.0
-prepare practice materials include container or urine, strip, watch	54	54.0	32	32.0	14	14.0	87	87.0	3	3.0	10	10.0	85	85.0	5	5.0	10	10.0
-Collect the urine specimen: *Wear a clean gloves	0	0.00	0	0.00	100	100.0	85	85.0	5	5.0	10	10.0	82	82.0	12	12.0	6	6.0
*Use a second voided specimen and collect the needed amount	17	17.0	46	46.0	37	27.0	85	85.0	5	5.0	10	10.0	82	82.00	11	11.0	7	7.0
-Measure urine glucose: -Review the directions on the product, and place the correct color scale where it is clearly visible	58	58.0	17	17.0	35	25.0	84	84.0	14	14.0	2	2.0	91	91.00	5	5.0	4	4.0
-Remove a strip from the container	50	50.0	26	26.0	24	24.0	90	90.0	6	6.00	4	4.0	84	84.0	6	6.0	10	10.0

Practice item	Before						Immediately after						After 3months					
	Good		Average		poor		Good		Average		poor		Good		Average		poor	
	no	%	no	%	no	%	no	%	no	%	no	%	no	%	no	%	no	%
- Avoid touch the area of the strip where the reagent is present	17	17.0	17	17.0	66	66.0	85	85.0	12	12.0	3	3.0	81	81.0	7	7.0	12	12.0
-Dip the strip into the urine then tap it on the inside container edge to remove excess urine	50	50.0	25	25.0	25	25.0	88	88.0	5	5.0	7	7.0	81	81.0	6	6.0	13	13.0
- Begin timing according to manufacturer instructions	50	50.0	25	25.0	25	25.0	85	85.0	13	3.0	2	2.0	81	81.00	16	16.0	3	3.0
-At the end of the specified time period, compare the color on the strip with the correct color chart.	50	50.0	25	25.0	25	25.0	85	85.0	13	13.0	2	2.0	81	81.00	16	16.0	3	3.0
4-Collect equipments	27	27.0	28	28.0	55	55.0	88	88.0	5	5.0	7	7.0	72	72	29	29.0	9	9.0
5-Record the result	31	31.0	14	14.0	65	65.0	95	95.0	3	3.0	2	2.0	82	82.0	12	12.0	6	6.0
6-Wash hands	24	24.0	17	17.0	69	69.0	89	85.0	2	2.0	9	9.00	73	73.0	15	15.0	12	12.0

Table (6): Total mean scores of the study subjects before, immediately after, and after three onths as regard total QOL, knowledge and practice.

Item	Mean ±SD		
	Before	Immediately after	After three months
Total quality of life knowledge	.851±.610	.687± 4.75	1.58±4.54
Total knowledge	44.35± 18.99	117.3±8.81	104.16±22.4
Total practice	32.0±18.02	81.70± 8.02	73.26±24.02
Total quality of life dimensions(Kiddo KINDL Children's Questionnaire)	75.14±7.44	-	89.58±13.19

Table (7): Correlation between total knowledge of the study subjects ' age, educational stage and residence.

Variable	Total Knowledge				Total practice			
	Pre program		Post program		Pre program		Post program	
	r	p	r	p	r	p	r	p
Age	.725**	<0.001	.429**	<0.001	.890**.	<0.001	.504*	<0.001
Educational stage	. 603**	<0.001	.169	<0.05	.587**	<0.001	-.006	0.05>
Residence	.041	>0.05	-.289	>0.05	-.081	0.05>	-.368	>0.001

A statistical significant difference ($p \leq 0.05$); A highly statistical significant difference ($p \leq 0.001$)

Table (8): Correlation between total knowledge & total practice before, immediately post, and after three months.

Variable	Total knowledge & Total practice					
Total knowledge & Total practice	Pre program		Post program		After Three Months	
	p	r	p	r	p	r
	<0.001	.796**	<0.001	.746**	<0.001	854**

A statistical significant difference ($p \leq 0.05$); A highly statistical significant difference ($p \leq 0.001$)

Table (9): Correlation between total quality of life after 3 months & age, education, duration of affection, total knowledge, and total practice.

Variable	Total quality of life	
	r	p
Age	-202*	0.05<
Education	.180	0.05>
Duration of affection	-.001	0.05>
Total knowledge	.155	<0.001
Total practice	.006	<0.001

A statistical significant difference ($p \leq 0.05$); A highly statistical significant difference ($p \leq 0.001$)

Table (10): Correlation between total quality of life and blood glucose levels (fasting blood glucose and bed time blood glucose) before and after 3 months of the program implementation.

Variable	Total quality of life before program		Total quality of life after 3 months	
	r	p		
Fasting blood sugar one week before	.033	>0.05	r	p
Bed time blood sugar before	-.234	<0.05**		
Fasting blood sugar one week after 3months			-.177*	<0.05*
Bed time blood sugar for one week after 3 months			.274**	<0.001**

A statistical significant difference ($p \leq 0.05$); A highly statistical significant difference ($p \leq 0.001$)

4. Discussion

All over the world, cases of children and teenagers with diabetes are increasing at a faster rate. When diabetes strikes during childhood, it is routinely assumed to be type 1, or juvenile-onset diabetes. However, in the last 2 decades type 1 diabetes mellitus in most cases is the result of environmental factors interacting with a genetically susceptible person. This interaction leads to the development of autoimmune disease directed at the insulin producing cells which are progressively destroyed, with insulin deficiency usually developing after the destruction of 90% of Islet cells *(Votroubek and Tabaco, 2010)*. So, Diabetes is one of the most common chronic diseases

in childhood that requires sustained and coordinated educational support for both health and educational sectors (*Nafee and Awad, 2008).*

In relation to visual status and eye condition assessment, it was noticed that, more than half of the diabetic children and adolescents had eye abnormalities in the form of blurred vision, wearing glasses, recurrent eye infections. This may be due poor glycemic control, improper referral and lack of ophthalmologic follow-up for those children and adolescents related to financial costs or lack of knowledge about importance of periodical follow-up. This opinion supported by *Royal College of Ophthalmologists,(2010)* who stated that, although vision may be good, changes can be taking place in retina that need treatment. Most sight loss due to diabetes is preventable if treatment is given early. The earlier the treatment is given the more effective it is, this can be achieved by, periodical follow-up. Also, *Beharman et al., (2004)* mentioned that, diabetic patient with visual symptoms or abnormalities should be referred for ophthalmologic evaluation. This is in accordance with *Hay et al., (1999)* who found that, about 30-40 % of diabetic adolescents eventually develop visual complications.

Regarding teeth condition, it was found that, the majority of the diabetic children and adolescents had teeth abnormalities in the form of dental caries and extracted teeth. This is may be related to poor control of blood glucose and lack of diabetes regimen knowledge. This finding is in agreement with*, Mayo Foundation for Medical Education and Research (2010)* indicated that, diabetes can lead to many complications, some of them very severe. This means that the effect that diabetes has on teeth can often be completely overlooked. Diabetics are at a higher risk for periodontal disease (diseases of the mouth) than most people.

Regarding skin condition of diabetic children and adolescents it was observed that, nearly more than half (56.0%) of them had skin abnormalities in the form of appearance of pustules or abscess at insulin injection sites and skin rash. This may be related to concentration on one site in insulin injections times and effect of uncontrolled blood glucose level. This finding is congruent with *Luxner (2005)* who mentioned that, impaired skin integrity related to disease process and its related management process such as injections, blood glucose monitoring, altered metabolic state and nutritional status. This is also, is in accordance with *Abd El-Aziz (2007*) who reported that, diabetic adolescents have skin changes more obvious among them such as, pallor, dry skin, swelling and localized atrophy of subcutaneous fat. *Cleveland Clinic Foundation (2010)*, stated that, skin problems are common in people with diabetes. Blood glucose

provides an excellent breeding ground for bacteria and fungi, and can reduce the body's ability to heal itself. These factors put people with diabetes at greater risk for skin problems. In fact, as many as a third of people with diabetes will have a skin disorder related to their disease at some time in their lives. Fortunately, most skin conditions can be prevented and successfully treated if caught early. But if not cared for properly, a minor skin condition can turn into a serious problem with potentially severe consequences.

In relation to foot condition assessment, this study revealed that, more than three quarters of the studied diabetic children and adolescents (87.0%) had foot problems in the form of, infections in between toes, cold feet, numbness of feet and injuries or scratches. This finding is in accordance with *Abdel-Rehim(1996), and Corbett,(2003)* who stated that, the common complications in diabetics usually results from a triad of peripheral neuropathy, peripheral vascular insufficiency and infections. Poor foot condition in the present study could be due to poor foot hygiene as let feet wet and not dried will especially between toes, wearing tied uncomfortable shoes and walking bare foot. *Wrong Diagnosis (2011)* mentioned that, diabetic foot often due to a combination of neuropathy and arterial disease, may cause skin ulcer and infection and, in serious cases, necrosis and gangrene. It is the most common cause of amputation, usually of toes and or feet,

Regarding children and adolescents' knowledge about quality of life, it is obvious that highly significant improvement in knowledge mean scores of diabetic children and adolescents regarding to quality of life knowledge items during immediate post test and three months after test as compared to pre program mean scores in relation to concept of quality of life and dimensions of quality of life. This finding is in agreement with, *Umpierrez et al. (2006*) who reported that, QOL is a multidimensional construct that includes physical, function, emotional and social well- being. Moreover, *Abd El-Aziz (2007*) reported that the majority of study subjects reported a correct concept of QOL after implementation of educational program for diabetic adolescents.

Regarding knowledge of diabetic children and adolescents about diabetes and its related concerns, the current study revealed that, there was a general improvement in their knowledge after completion of the educational program compared with before implementation of the educational program. This finding is in agreement with *Abd El Ghaffar,(2003), and Herman and Kennedy (2005*) who stated that, diabetic adolescents were having good knowledge regarding diabetes and its aspects of self care that they can manage it. Also, they found that their knowledge levels of patients changed through out periods of

disease. Moreover, it was mentioned by *Jahanlou et al. (2011)* that, many of the inquiries concern the treatment of diabetic children and young people in the education system. As always, a large part of the problem is a lack of knowledge, either on the part of parents, children or the schools and colleges they attend. Ignorance, of the issues surrounding the condition and its safe management, frequently lie at the heart of discrimination, so it's important that healthcare professionals and educators alike are actively involved in resolving them.

As evidence in this study, knowledge of the study subjects regarding their knowledge about definition of diabetes mellitus, types of diabetes mellitus, causes of diabetes mellitus, signs and symptoms of diabetes mellitus, complications of diabetes mellitus and prevention of complications. The present study revealed that there was a highly significant improvement in knowledge means scores of diabetic children and adolescents regarding to their knowledge about diabetes definition, signs and symptoms and diabetes complications items during immediate post test and three months after test as compared to pre program mean scores. This finding is in accordance with *Jenkins (2007),*who reported that, a patient who have no knowledge about diabetes and can not carry out instructions, is more likely to require medical or even attention due to frequent hypoglycemic reactions, ketoacidosis or complications of cardiovascular system, eyes, nervous system, kidneys and feet. Also, *Mohammed (2003*) stated that, there were a highly statistically significant differences regarding their knowledge about definition of diabetes mellitus, types of diabetes mellitus, causes of diabetes mellitus, signs and symptoms before and after implementation of the educational program.

Regarding knowledge of the study subjects about insulin, its uses and sites of injection, it was revealed that, their mean scores had improved after completion of the program immediate post and after 3 months compared with pre test mean scores. This may be due to inadequate knowledge they had and lack of educational programs. This findings supported by, *Patton et al.(2010)*stated that, many children and adolescents with type 1 diabetes mellitus(T1DM) may not adhere to an adequate site rotation plan. Regular assessment of insulin sites and counseling regarding adequate site rotation is needed when managing diabetes in children and adolescents. Relaxation and distraction may help to reduce their fear of pain when rotating to new insulin sites.

Regarding knowledge of diabetic children and adolescents about exercises and its importance to diabetic patient, it was noticed that, their mean scores were improved immediately after and after 3 months compared with pre test mean scores. This may be due

to lack of their knowledge about diabetes regimen. This supported by *Alliance, (2011)* who mentioned that, exercise is important measure of diabetes regimen program, and there is no reason for the diabetic child who cannot participate in all regular physical activity. It helps to control blood sugar levels. However, children with diabetes should not exert themselves before meal time. Also, they will need to have a snack, such as juice, crackers or a fruit, as they will need to replace sugar lost during physical activity. Most importantly, parents and guardians need to inform their children and adolescents of the possible health triggers and what to do in the event that something goes wrong. Children should also be told what to do if their blood sugar levels fall or rise. Telephone numbers should also be kept in a convenient place so that help can be easily summoned in the case of an emergency.

Regarding knowledge of diabetic children and adolescents about diet regimen for diabetic children, it was revealed from the current study that their mean scores of their knowledge were improved immediately after and 3 months after compared with the pre test mean scores. This is may be related to two reasons; lack of their knowledge about the ideal diet for diabetic children and the conflict between what they should to eat and what they desire to eat. This is in accordance with, *Maffeis and Pinelli (2008)* who suggested that, children with type 1 diabetes should follow the recommendations for age, sex and body size of the general population. In the case of being overweight or obese, weight-control strategies should be applied. The second main target of nutritional intervention is to encourage a reproducible daily meal plan that can be maintained by acquiring good habits when making nutritional choices. Finally, teaching diabetic children to learn to follow a structured eating schedule, which is desirable for long-lasting efficacy in diabetes care. In adolescents, eating disorders and insulin misuse for weight control purposes are concrete and difficult problems to deal with. A good balance between eating for pleasure and maintaining one's health is a challenge for anyone. Appropriate nutritional education helps children with diabetes to find this balance and enjoy a better quality of life.

Regarding knowledge of the diabetic children about personal hygiene, skin care, eye care, teeth care and foot care, the present study revealed an improvement in the mean scores of the diabetic children and adolescents immediately after and 3 months after the program compared with pre test mean scores. This also may be lack of their knowledge about caring of them selves and improper follow-up for eye, teeth and inspection of feet. This is supported by, *Umpierrez et al. (2006*) stated that, children and adolescents with diabetes should examine their feet

every day. It is important to examine all parts of the feet, especially the area between the toes, Look for broken skin, ulcers, and blisters, areas of increased warmth or redness, or changes in callus formation. This examination should be a part of the daily bathing or dressing routine.

Regarding self care practice of the study subjects, the current study emphasized that, less than three quarters of them weren't able to inject them selves with insulin before implementation of the program, while, the majority of them were able to inject them selves after implementation of the program. Rather more, there was an improvement in the study subjects' practice after implementation of the program immediately and after 3 months compared with pre test practice whereas, the majority of them had good performance in relation to insulin self injection by using insulin syringe and insulin self injector pen, checking blood glucose level, and monitoring urine for glucose, acetone and ketone bodies at home. This may be related to, limited training programs at health insurance on insulin self injection practice for those children and adolescents. This finding is supported by *Abd El-Aziz (2007)*,who stated that, all the studied sample had good satisfaction aspects of diabetes care concerning urine /blood glucose monitoring, insulin preparation and injection. *Toljamo and Hentinen (2001)* who stated that, it is essential that diabetic young individuals adhere to self- care to prevent complications, achieves a subjective well-being and a sense of control over their diabetes. In addition to self monitoring of blood glucose considered a cornerstone of self care.

The findings of the current study reflected positive quality of life 3 months after the program implementation. This finding is supported by *World Health Organization (2006)* which stated that, understanding individual quality of life domains can help clinicians to motivate their young patients with diabetes for self care.

Regarding physical and emotional status domains, the present study revealed that, there was a highly statistical difference before and after 3 months of the program implementation. Whereas, there quality mean scores were improved after implementation of the program. This is in accordance with *Donald (2009)* who described quality of life as a descriptive term that refers to an individual's physical, emotional, and social well-being, and their ability to function in the ordinary tasks of living.

Regarding self esteem of the diabetic children and adolescents, the current study reflected that, there were significant statistical differences in their self esteem mean scores before and after 3 months of the program. This findings is supported by *Abd-El Hafez (2007)* who stated that health status is an

individual's relative level of wellness and illness, taking into accounts the presence of biological or physiological dysfunctional impairment. Health perceptions are subjective ratings by the affected individual of his or her health status; some people perceives themselves as healthy despite of their suffering from one or more chronic diseases, while, others perceive themselves as ill when no objective evidence of disease can be found.

Regarding feeling accompanied with diabetes as it has an effect on quality of the diabetic children and adolescents' life. The current study revealed that, there were no statistical significance differences in relation to feeling accompanied with illness. This may be related to increase their concordance by correcting misbelieves and misconceptions about diabetes and its management and increased motivation to comply self care practice. This finding is supported by *Sioufi and Shaltout (2005)* who stated that, diabetes imposes considerable demands on children and their families. For many children and adolescents they try to surmount developmental challenges that are typical at their age, the additional burden of diabetes often proves difficult to cope with effectively. Diabetes can adversely affect both psycho-social well-being and learning abilities of children or adolescents. This almost always has a negative impact on the quality of life of these young people and their families. It has been widely demonstrated that psycho-social factors can influence a person's ability to adhere to a diabetes management plan.

The present study revealed that, there was a statistical significant correlation between total quality of life domains and the total knowledge of diabetic children and adolescents before and after the program implementation. This finding is in agreement with *Abd- El-Aziz (2007)*, those reported that, there were a significant correlation between total knowledge scores and total quality of life of diabetic adolescents.

Regarding correlation between the total quality of life and glycemic control, the current study revealed that there was a statistical significant correlation between total quality of life of diabetic children and adolescents and their glycemic control before and after 3 months of the program. This finding is in accordance with *Abu-Samra (2005)*, who reported that there was a significant correlation between knowledge scores and glycemic control in diabetic adolescents. While this finding not supported by, *Jahanlou et al. (2011)* who reported that there was no relation between glycemic control and health related quality of life.

Regarding correlation between total knowledge scores of the study subjects and their total practice scores, the present study illustrated that, there was a highly statistical significance correlation between total

knowledge scores and total practice scores. This finding is in agreement with, **William et al. (2010)** who stated that there was a significant relation between knowledge, practice and attitude of diabetic patients at all age groups in the community as poor knowledge indicated poor practice and attitude.

The current study revealed that, there was a highly statistical significant correlation between total quality of life and their age, total knowledge and total practice. While, there was no positive statistical significant correlation between total quality of life and study subjects' education, duration of affection.

As regard, to age of the study subjects. This study revealed that, there was a highly statistical significant correlation between total quality of life of the diabetic children and adolescents and their age. These findings supported by **Hockenberry et al (2005)** who mentioned that, school age-are eager to learn and eventually need to learn to manage their own diabetes related care. Hence that will eventually affect diabetes control and life style consideration.

Regarding level of education of the study the present study clarified that, there was positive statistical significant correlation between total quality of life of the study subjects and their educational stage or level. This finding supported by **Hockenberry et al. (2005)** who mentioned that, the educated children can easily follow special instructions concerning insulin, diet, monitoring blood glucose level, and urine, keep records and adjustment feeling that contribute to better control and quality of life.Also, **Abd- El-Aziz (2007)**, mentioned that, there was significant statistical difference between the total quality of life of diabetic adolescents and their level of education.

Conclusion:

In the light of the study's findings, it was concluded that, there were an improvement in the study subjects' knowledge and practice immediately after receiving the program and there was a slight decline after 3 months compares with before the program. Also, their quality of life has improved after 3 months of program implementation compared with pre program. Moreover, there were highly statistically significance correlation between total knowledge and total practice, total quality of life and total knowledge and total practice, total quality of life and glycemic control before and 3 months after the program.

Recommendations

In the light of the current study's findings, the following recommendations are suggested:

Conducting educational programs for medical, nursing staff, socialists, pharmacist, parents, school teachers, school doctor and school health nurses about various aspects of type 1 diabetes in children and adolescents, their care, and importance of enhancing their QOL and emphasizing developmentally-age progress to obtain appropriate self-care and integrating this into the child's diabetes management.

Regular training programs at the out patient clinics on insulin self injection, checking blood glucose and urine analysis at home, personal hygiene and care of foot for enhancing their self care behaviors and for gradual independence.

Improve nurse's knowledge and performance toward concept and dimensions of quality of life and their integration in care of diabetic children and adolescents for improving their quality of life.

Encourage a fair health insurance system for provision of the children and adolescents with type 1 diabetes with sufficient insulin doses and sensor strips to do self blood glucose monitoring at home regularly to reach the strict control of diabetes and to be away from the dangerous acute and chronic complications.

Making a big program about how to deal with diabetes to be applied through the whole types of media.

Diabetes education must not be given once to the diabetic children and their families, but must be regular follow up programs to be applied in fixed times monthly.

Further studies: Conducting more prospective researches to emphasize the factors affecting quality of life of diabetic children and adolescents and how to deal with it for developing and refining interventions to ensure their QOL.

Conducting further prospective follow-up studies to refine care interventions to improve quality of life of diabetic children and adolescents.

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