

## Psychosocial Adjustment of School Age Children with Type I Diabetes Mellitus

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### Abstract

**Background:** Children with type 1 diabetes mellitus need to form psychosocial adjustment in order to deal with the complex and demanding daily treatment regime and to prevent overwhelming psychological problems, for the diabetic children the diagnosis of T1DM is usually accompanied by a mild psychological crisis, these crises are usually predictors of a subsequent anxiety and/or depression event, and a lower self-esteem. **Aim:** To assess the psychosocial adjustment of school age children with type I of diabetes mellitus. **Methods:** A descriptive study design was used at pediatric hospital affiliated to Ain Shams University (Out-patient Diabetic Clinic). **Sample:** A convenient sample of 150 children suffering from type 1 diabetes mellitus from both sex, at age group 6 > 12 years. **Tools:** *First tool:* Interviewing questionnaire, *Second tool:* A semi-structured questionnaire for psychological and social problems of school age children with type1diabetes mellitus and *Third tool:* Psychosocial Adjustment Pattern scale for School Age Children with type1Diabetes mellitus scale. **Results:** Findings of the present study showed that more than half of the studied children had satisfactory total level of knowledge compared to less than half of them had unsatisfactory level of knowledge regarding their disease. Moreover, more than half of them suffer from psychological problems compared with more than two fifth of them without psychological problems. Nearly three fifth of them had a moderate level of total adaptation compared to nearly one quarter of them had a high level of total adaptation. **Conclusion:** the study concluded that most of the studied school age children suffered from psychological problems related to type 1of diabetes mellitus ,the study also revealed that all the studied children had social issues due to type 1 of diabetes mellitus, there was positive correlation between children's psychosocial problems and their total negative & positive adjustment pattern. **Recommendations** Counseling intervention for school age children at outpatient clinic to illuminate their psychosocial problems regarding diabetes and promote to their psychosocial adjustment regarding their illness.

**Keywords:** Psychosocial Adjustment, School Age, Type 1 Diabetes Mellitus.

### Introduction

Diabetes mellitus (DM) is one of the most common, important and costly chronic disease on a large scale with many physiological complications, such as increased rates of morbidity, heart disease, blindness and amputations; there are two common types of diabetes, Type 1 Diabetes (T1D) and Type 2 Diabetes (T2D) (Wilson et al., 2017).

In general, T1D is one of the most common chronic diseases in childhood and is being diagnosed at an increasing rate in

adults. The onset of T1D, also called insulin-dependent diabetes, occurs commonly, but not consistently, during childhood or adolescence and manifests itself as a result of a vulnerability gene that makes an individual vulnerable to autoimmune-mediated demolition of the pancreatic beta cells, also called islet cells (Barrett, 2020).

Preschool-age children with T1D present unique challenges with regard to diabetes management. Daily high variability in eating and activity patterns,

need for smaller insulin doses and frequent adjustments, developmental increases in independence, newly emerging language, self-awareness and self-control skills are all factors that complicate diabetes management. In response to these challenges, continuous subcutaneous insulin infusion (CSII) has become an increasingly common treatment in this age-group (**Merchant, 2016**).

Psychosocial adjustment or adaptation refers to the ability of people to adapt to the environment, which means that the individual has sufficient mechanisms to feel contented, integrated, respond appropriately to the requirements of the environment, and achieve his goals. In childhood, psychosocial adjustment often refers to adaptation and work in some of the key areas that characterize this stage: the family and school settings (**Burwinkle & Jones, 2017**).

In this regard, maladjustment can manifest itself in various ways such as behavior problems, low self-esteem, emotional upheavals, poor peer relationships, and children with chronic diseases are more likely to show signs of maladjustment than healthy children. It would not be surprising if this also applied to their siblings, but although there is some evidence of the risks of maladjustment in siblings of chronically ill children, other studies have shown no increased risk (**Ahern & Doane, 2018**).

According to (**Beck et al., 2019**) T1D is one of the most common chronic childhood conditions, and adherence to treatment has important long-term implications. However, day-to-day care of chronic illness has great emotional and practical demands on family members and may affect the adaptation (ability to mentally, socially, and physically adapt to stress) of any family member (**Beck et al., 2019**). Therefore, through this study, the

researcher seeks to assess the psychosocial adjustment of school age children with type 1 of diabetes mellitus.

The psychosocial impact of living with diabetes can be a challenge for any child and any family but is particularly burdensome to those with maladaptive coping skills. So, the providers, families, and patients should all be aware of the developmental and psychosocial challenges in this age group and focus on patient-centered approaches to promote self-empowerment, decrease burdens and make diabetes more live-able (**Phelan et al., 2018**). Nurses need to integrate scientific knowledge with assessments of family composition, stress response, child developmental level, and family resources. Synthesis of complex data is critical for proper teaching and support of the family (**Bajpai et al., 2019**).

#### **Significance of the study:**

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The onset of T1D, also called insulin-dependent diabetes, occurs commonly, during childhood or adolescence and manifests itself as a result of a vulnerability gene that makes an individual vulnerable to autoimmune-mediated demolition of the pancreatic beta cells, also called islet cells (**Barrett, 2020**).

Type 1 diabetes is one of the most common childhood diseases, affecting nearly 150 million children with diabetes worldwide and this number could double by 2025. In Egypt, 8 out of 100,000 children under the age of 14 have type 1 diabetes (**WHO, 2018**). The development of type 1 diabetes entails a life-long judgment of a difficult treatment regimen that includes several daily insulin injections, blood glucose monitoring, a prescribed meal plan, and regular exercise (**Northam et al., 2020**). Managing children and youth with diabetes presents additional challenges in the form of emotional and psychological difficulties. Stress, by itself, may lead to an

imbalance in the regulation of diabetes through psychological and physiological processes or associated changes in self-management behaviors. Diabetes is a risk factor for pre-school age mental disorders such as depression, anxiety, anorexia and isolation. It is important that the psychosocial problems and adjustment of children and adolescents with T1DM to be studied in order to improve the diabetic children's management and results (McGrady and Hood, 2020). So, this study aimed at assessment of the psychosocial adjustment of school age children with type 1 of diabetes mellitus.

### **Aim of the study**

This study aimed to assess the psychosocial adjustment of school age children with type 1 of diabetes mellitus.

### **Research question:**

These aims can be achieved through answering the following questions:

1. What are the psychological problems of school age children with type 1 of diabetes mellitus?
2. What are the social problems of school age children with type 1 of diabetes mellitus?
3. What are the psychosocial adjustment patterns of school age children with type 1 of diabetes mellitus?

### **Subjects and Methods**

This study aimed to assess psychosocial adjustment of school age children with type I of diabetes mellitus.

### **Research question:**

1. What are the psychological problems of school age children with type 1 of diabetes mellitus?
2. What are social problems of school age children with type 1 of diabetes mellitus?

3. What are psychosocial adjustment patterns of school age children with type 1 of diabetes mellitus?

### **The subjects recruited and methods used for achieving:**

The study was elaborated under the following items:

- 1- Technical design
- 2- Operational design
- 3- Administrative design
- 4- Statistical design

### **1) Technical design**

The technical design used for the study was discussed in the following four categories: research design, the setting of the study, subjects of the study and tools for data collections.

### **A- Research design:**

A descriptive study design to assess psychosocial adjustment of school age children with type I of diabetes mellitus in pediatric hospital affiliated to Ain Shams University (Out-patient Diabetic Clinic).

### **B- Setting:**

The study was conducted at the Out-patient Diabetic Clinic affiliated to Ain Shams University, Egypt.

### **C- Subjects:**

**Sample size:** The actual sample size (150) that was selected according to flow rate of outpatient clinic follow up visits and medical record outpatient diabetic clinic in 2017 around 1400 children & 2018 around 1480 children respectively.

Statistical presentation and analysis of the present study was conducted, using the mean, standard Deviation, Linear Correlation Coefficient and chi-square tests by (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.).

$$\text{Mean} = \frac{\sum x}{n}$$

Where  $\sum$  = sum & n = number of observations.

**Standard Deviation [SD] :**

$$SD = \sqrt{\frac{\sum |x - \bar{x}|^2}{n - 1}}$$

**Chi-square**

The hypothesis that the row and column variables are independent, without indicating strength or direction of the relationship. Pearson chi-square and likelihood-ratio chi-square. Fisher's exact test and Yates' corrected chi-square are computed for 2x2 tables.

**Linear Correlation Coefficient [r]:**

Linear Correlation coefficient was used for detection of correlation between two quantitative variables in one group.

>0.05 Non significant      <0.05\* significant  
<0.001\*\* High significant

**Sample type:** A convenient sample was used to recruit all children suffering from type 1 diabetes mellitus who fulfilled study inclusion criteria.

**Sample criteria:** The sample was selected in the study according to certain criteria: children suffering from type 1 diabetes mellitus who will attend Out-patient Diabetic Clinic for a checkup and follow up according to the following criteria: from both sexes, at the age group(6 > 12 years), duration of the disease is not less than one year.

**Data collection tools:** three tools of data collection were used: interviewing

questionnaire, a semi-structured questionnaire (Salam, 2006 & Greca, 1988 and Jalowiec et al., 1991), psychosocial Adjustment Pattern scale.

### I- Interviewing questionnaire

It was designed by the researcher in the Arabic language after reviewing the related literature and consisted of 38 questions. It was divided into four parts: **Part (1):** It was designed to assess children's socio-demographic data as (medical history, cause, number of hospitalization, duration of disease). It included questions from 1-5, **Part (2):** It was designed to assess children's knowledge about disease as(age, sex, grade years, number of siblings, rank of child in family, regularity in school attendance). It included questions from 6-13. **Part (3):** It was designed to assess children's knowledge regarding preventive measures for type 1 diabetes mellitus as (treatment precaution, insulin and diabetic food). It includes questions from 14-26. **Part (4):** It was designed to assess children's knowledge regarding exercise as (types of sports, complications of diabetes associated with exercise). It includes questions from 27-38.

### ❖ Scoring system:

Each question was evaluated as 1 scores for correct answer and 0 scores for incorrect answer. The total knowledge was classified into: satisfactory: 60% or more, unsatisfactory: less than 60%.

### II- A semi-structured questionnaire:

It was adopted from (Salam, 2006 & Greca, 1988 and Jalowiec et al., 1991), and modified by the researcher to assess psychological and social problems related to diabetes among school age children and consisted of 32 questions. It was divided into two parts: **Part (1):** It was designed to

assess children's psychological problems related to diabetes as (depression, anxiety, eating problems). It included questions from 1-19. **Part (2):** It was designed to assess children's social problems related to diabetes as (communication difficulties, social isolation and difficulties friendship). It included questions from 20-32. Scoring system: each question was evaluated as 1 scores for the presence of psychological problems which considered as (Yes) and 0 scores for the absence of psychological problems which considered as (No). The total psychological problems was classified into: Yes (presence of psychological problems): 60% or more, No (absence of psychological problems): less than 60%.

### III- Psychosocial Adjustment

#### Pattern scale:

It was designed by the researcher in the Arabic language after reviewing the related literature to assess psychosocial adjustment pattern of school age children with type1 diabetes mellitus and consisted of 23 questions. It was divided into two parts: **Part (1):** It was designed to assess children's positive adaption regarding type1 diabetes mellitus as (school activities, and communication classmate). It included questions from 1-11. **Part (2):** It was designed to assess children's negative adaption regarding type1 diabetes mellitus as (not go for medical follow up). It included questions from 12-23.

#### ❖ Scoring system:

For positive/negative adaptive scale: each question was evaluated as 2 scores for most of the time, 1 scores for sometimes and 0 scores for No. The total positive/negative adaptive scale was classified into: Most of the time: 75% or more, sometimes: 60% to <75%, no: less than 60%.

## 2) Operational design:

The operational design includes elaboration of the phases of the study, namely preparatory phase, ethical considerations, pilot study, and fieldwork.

#### Preparatory Phase:

The researcher reviewed the literature using textbooks, scientific journals, and the internet to develop the data collection tool, and for acquiring in-depth knowledge about the subject. The questionnaire was developed in the English language, and then translated into Arabic language and re-translated to English to ensure its accuracy; i.e. the translation-back-translation technique was used.

The validity of the tools was done through seeking the opinions of a jury group consisting of three professors of Psychiatric Nursing who judged their clarity, comprehensiveness, accuracy, relevance and whether it elicited the type of information sought; thus the tools were the face and content-validated. The tools were modified and rephrased based on the jury's opinions. This phase took three weeks' duration.

#### Pilot study:

It was carried out for one week to evaluate the reliability and applicability of the tools to find the possible obstacles that might be faced during data collection. 10% from the total sample (15 cases) was included and chosen randomly from the previously mentioned setting, then later excluded from the sample. There were no major modifications found after the pilot study. The pilot also served to assess the reliability of the scale by examining its internal consistency. It showed very high levels of reliability as indicated (0.08) and the chrompae alpha test was used.

#### Field of work:

An official approval letter clarifying the purpose of the present study was issued from the Dean of the Faculty of Nursing at

Ain Shams University to the General Director Pediatric hospital affiliated to Ain Shams University, Out-patient Diabetic Clinic Director, and Scientific Research Ethical Committee in the Faculty of Nursing as an approval to conduct this study. The previously mentioned setting was attended by the researcher three days/week (Monday, Tuesday and Wednesday) from 9.00 a.m. to 1 p.m. This study started from beginning of March 2020, till the end of September 2020, covering seven months for data collection.

**Firstly**, the researcher held the first meeting by interviewing each parents and their diabetics children individually after the doctor examination to introduce herself and briefly explained the nature and the purpose of the study. They were informed that participation in this study was voluntary and they had the right to withdraw at any time without giving any reason. Oral approval of parents and their diabetic children to share in this study was achieved.

**Secondly**, an interviewing questionnaire was distributed to each parent and her diabetic child to assess children's socio-demographic characteristics, knowledge regarding type 1 diabetes mellitus and preventive measures. The questionnaire took about 10-20 minutes to be completed.

Then the researcher distributed the semi-structured questionnaire to assess psychological and social problems related to diabetes among school age children and psychosocial adjustment pattern of school age children with type1 diabetes mellitus. It was filled in by the parent and her child in a time ranged from 20 to 45 minutes to be completed.

### 3) Administrative design:

An official permission was issued from the Dean of the Faculty of Nursing at Ain Shams University to the General Director Pediatric Hospital affiliated to Ain shams university, Out-patient Diabetic Clinic Director, and Scientific Research Ethical Committee in the Faculty of Nursing as an approval to conduct this study.

### **Ethical considerations:**

- The research approval was issued from the Scientific Research Ethical Committee in the Faculty of Nursing at Ain Shams University before starting the study.
- The researcher was clarified the importance and aim of the study to all the children included in the study.
- Oral consents were obtained from all the studied children.
- The questionnaire didn't include any immoral statements that touch children's beliefs, dignity, culture, tradition and religious issues.
- All children were informed that they are allowed to choose to participate or not in the study and that they have the right to withdraw from the study at any time without giving any reason and confidentiality of the information was assured.
- All children were informed that the collected data would be used only for the present study, as well as for their benefits.

### 4): Statistical design

Data were collected, coded and entered into a personal computer (P.C) IBM compatible 2.6 GHz. They were analyzed using Statistical Package for Social Science (SPSS), under windows version 18. The collected data were organized, revised, analyzed, tabulated using number and percent distribution. Proper statistical tests were used to determine whether there were statistically significant differences between the variables of the study. The statistical tests

used in this study were: correlation coefficients ( $r$ ) to find correlations between quantitative data.  $P > 0.05$  there is a statistically insignificant difference,  $P < 0.05$  there is a statistical significant difference,  $P < 0.01$  there is a statistical highly significant difference.

### **Result:**

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**Table (1):** showed that, slightly more than three fifth (62%) of the studied children were male, slightly more than two fifth of them (43.4 %) were in age group from 10 to 12 years old with mean age was (44.4+ \_ 11.4) and more than one third of them were in six and fifth grade which constitute 38% and 36.5% respectively. The current study also clarified that more than half (55.4%) of studied children are the late child in his family and slightly more than three quarter (77.3%) of them had irregular school attendance.

**Table (2):** showed that, the majority of studied children (82%) had disease onset less than six months ago and the highest percentage of them had more than two hyperglycemic coma and were completely dependent on their mother in their care (86%) respectively. whenever, more than three fifth of studied children (64.7%)

hospitalized less than three times due to diabetes complication.

**Table (3):** showed that, the majority of studied children (82%) had disease onset less than six months ago and the highest percentage of them had more than two hyperglycemic coma and were completely dependent on their mother in their care (86%) respectively. whenever, more than three fifth of studied children (64.7%) hospitalized less than three times due to diabetes complication. **Table 4:** illustrated that, there were statistically significant relations between all items of sociodemographic characteristics of studied children and their total negative adaptation  $p < 0.05^*$ .

**Table (4):** Illustrated that, there were ahightly statistically negative correlation between children total knowledge and their (total psychological problems & total negative adaptation)  $p < 0.001^*$ . In addition there were statistically negative correlation between children total knowledge and their total social problems  $p < 0.05^*$ . Also, the study concluded that there were a highly statistically positive correlation between children total knowledge and their total positive adaptation  $p < 0.001^*$ .

**Part I: Socio-demographic data of the studied children.****Table (1):** Distribution of studied children according to their socio demographic characteristics (n=150).

Items	No	%
<b>Gender</b>		
Male	93	62
Female	57	38
<b>Age (years)</b>		
6 > 8 Y	34	22.7
8 > 10 Y	51	34
10 - 12 Y	65	43.3
Mean±SD	44.4±11.4	
<b>Grade of school</b>		
First Year	0	0
Second Year	6	4
Third Grade	14	9.3
Fourth Grade	18	12
Fifth Grade	55	36.7
Sixth Grade	57	38
<b>Rank of child</b>		
First	32	21.3
Middle	35	23.3
The last	83	55.4
<b>School attendance</b>		
Regular	34	22.7
Irregular	116	77.3

**Table (2):** Distribution of the studied children according to their medical history (n= 150).

Items	No	%
<b>Onset of the disease</b>		
Less than 6 months	123	<b>82</b>
More than 6 months	27	18
<b>Number of hypoglycemic coma</b>		
Once	9	6
Twice	12	8
More than two times	129	<b>86</b>
<b>Did you get hyperglycemic coma</b>		
Yes	22	14.7
No	128	85.3
<b>Number of hyperglycemic coma</b>		
Once	12	54.5
twice	8	36.4
Last mention	2	9.1
<b>Have you ever been hospitalized due to coma</b>		
Yes	9	6
No	141	94
<b>Self-care experience</b>		
Completely independent	8	5.3
Partly dependent on mother	9	6
Completely dependent on mother	133	<b>88.7</b>
<b>Number of hospitalization due to diabetes complications</b>		
<3 times	97	<b>64.7</b>
4-6 times	26	17.3
>6 times	15	10

**Table (3):** Distribution of the studied children according to their positive adaptation (n=150).

Items	Most of the time		Sometimes		No	
	N	%	N	%	N	%
1-Going to school regularly	41	27.3	94	62.7	15	10.0
2-Participating in school activities	32	21.3	100	66.7	18	12.0
3-Communicating with the classmates	25	16.7	111	74.0	14	9.3
4-Studying more to be distinguished from friends.	30	20.0	100	66.7	20	13.3
5-Going to the doctor continuously to follow-up.	34	22.7	103	68.7	13	8.7
6-Adherence to the doctor's orders	22	14.7	113	75.3	15	10.0
7-Talking to children who have the same health problem during medical follow-up	25	16.7	109	72.7	16	10.7
8- Avoid taking insulin without eating.	32	21.3	101	67.3	17	11.3
9-Eating small frequent meals.	35	23.3	97	64.7	18	12.0
10-Discussing problems with parents	43	28.7	92	61.3	15	10.0
11-Participating in family visits	38	25.3	92	61.3	20	13.3
Total	32	21.3	101	67.3	17	11.3

**Table (4):** Relation between total negative adaptive and their socio of studied subjects.

Socio – demographic characteristics	Total negative Adaptive						Total	Chi-square	
	Most of the time		Sometimes		No			X <sup>2</sup>	P-value
	N	%	N	%	N	%			
<b>Gender</b>									
Male	28	30.1	41	44.1	24	25.8	93	5.917	0.052
Female	8	14.0	35	61.4	14	24.6	57		
<b>Age (years)</b>								15.788	0.003*
6- <8	15	44.1	14	41.2	5	14.7	34		
8- <10	13	25.5	21	41.2	17	33.3	51		
10 <12	8	12.3	41	63.1	16	24.6	65		
<b>Grade of school</b>								15.111	0.057
Second Year	4	66.7	2	33.3	0	0.0	6		
Third Grade	6	42.9	6	42.9	2	14.3	14		
Fourth Grade	6	33.3	7	38.9	5	27.8	18		
Fifth Grade	12	21.8	26	47.3	17	30.9	55		
Sixth Grade	8	14.0	35	61.4	14	24.6	57		
<b>Rank of child</b>								15.569	0.004*
First	13	40.6	14	43.8	5	15.6	32		
Middle	11	31.4	11	31.4	13	37.1	35		
The last	12	14.5	51	61.4	20	24.1	83		
<b>School attendance</b>								7.211	0.027*
Regular	4	11.8	24	70.6	6	17.6	34		
Irregular	32	27.6	52	44.8	32	27.6	116		

Non sig. &gt;0.05 Sig. &lt;0.05

\* High sig. &lt;0.001

\*\* (Statistical significant difference)

**Table (5):** Correlation between total knowledge with total psychological, total social problems, total positive, and total negative adaptive.

Items	Total knowledge	
	r	P-value
Total psychological problems	-0.427	<0.001**
Total Social problems	-0.169	0.035*
Total positive Adaptation	0.298	<0.001**
Total negative Adaptation	-0.430	<0.001**

Non sig. &gt;0.05 Sig. &lt;0.05

\* High sig. &lt;0.001

\*\* (Statistical significant difference)

## Discussion

Type 1 diabetes mellitus is one of the most common pediatric illnesses which body no longer produces an important hormone (insulin). The development of type 1 diabetes entails a lifelong sentence to a difficult therapeutic regimen which includes several daily insulin injections, blood glucose monitoring, a prescribed meal plan and regular exercise; and still these measures may be only partially effective in preventing acute and chronic complications (*Chatterjee et al., 2020*).

The management of children with diabetes poses additional challenges in the form of emotional and psychological difficulties. Stress, in itself, may deregulate diabetes through psycho-physiological processes or associated changes in self-management behaviors. Diabetic treatment guidelines include metabolic goals, as well as facilitation of normal social and emotional development, however, the psychological aspect of the disease is often missed with major emphasis being given on the strict maintenance of blood glucose levels only (*Delamater et al., 2018*). This study was descriptive findings which aimed to assess the psychosocial adjustment of school age children with type 1 of diabetes mellitus.

### Part I: Socio-demographic data of the studied children.

In the current study there were slightly more than one third of the studied children in age group 10 to 12 years and more than three fifth of them were male, it may be due to that the studied sample was from school stage. These findings were in the same line with *Khandelwal et al., (2016)* who studied Psychosocial Illness in Children with Type 1 Diabetes Mellitus: Prevalence, Pattern and Risk Factors and reported that mean age for the study population was 11.10±2.54 years and more than three fifth were males.

In the current study were clarified that more than three quarter of the studied children had irregular school attendance, it may be due to the effect of the fatigue due to the disease. This finding was similar to the study of *Fried et al., (2018)* who studied The School Experiences of Children and Adolescents with Type 1 Diabetes in Western Australia and revealed that the majority of children had absent days from the school.

In the present study there were showed that, the majority of the studied children had disease onset less than six months ago. These findings were similar to *DeCosta et al., (2020)* who studied the psychosocial experience and needs of children newly diagnosed with type 1 diabetes from their own perspective and found that children diagnosed with type 1 diabetes mellitus from six months.

In the current study there were found that highest percentage of the studied children had more than two hypoglycemic coma. It may be due to hypoglycemia is the commonest acute complication of type 1 diabetes which presents a major physiological and psychological barrier to achieving optimal glycemic control. This finding was agreed with *Abraham et al., (2018)* who studied Assessment and management of hypoglycemia in children and adolescents with diabetes and revealed that children had more than one time for occurrence of hypoglycemic coma.

In the present study there were showed that the highest percentage of them were completely dependent on their mother whenever, nearly two thirds of children hospitalized from 1 to 3 times due to diabetes complication, it may be related to that most frequent reason for hospitalization was hypoglycemia. These findings were in the same line with the study of *Bohn et al., (2018)* who studied Hospital admission in children and adolescents with or without type 1 diabetes from Germany and concluded that there

was higher chance for hospital admission in children with T1D compared to the general pediatric population without T1D and they were completely dependent on their mothers.

In the current study there were showed that, less than three quarters of studied children had incorrect knowledge regarding definition and manifestations of DM also, three fifth of them had incorrect knowledge about normal level of fasting blood glucose and random of blood glucose. This due to lack access for children to improve their information about the disease, so the children need continuous health educational program for their disease. These findings were similar to the study of *Sparapani et al., (2017)* who studied and reported that the children had lack of knowledge about the disease definition, manifestations and normal range of glucose tests.

The current study also revealed that three fifths of the studied children had correct knowledge about signs of hypoglycemia and the majority of them had a correct knowledge regarding DM treatment. This may be due to increase the children's awareness about the disease. These findings similar to *Karilena et al., (2016)* who studied Education effectiveness in diabetes mellitus type 1 management made by children's caregivers and reported that, more than two third of participant had can recognize hypoglycemia and most of them can perform the treatment.

In the present study there were revealed that slightly more than half of the studied children have satisfactory level of knowledge while, slightly more than one third of them have unsatisfactory level of knowledge about their disease. This might be due to the children don't engaged in health educational program about their disease. This finding was similar to the study of *Gomes et al., (2018)* who studied Knowledge on Diabetes Management Influence Glycemic Control and revealed

that, nearly half of participants had lack of knowledge and had a potential impact on their ultimate control and health management efforts.

In the other hand the results of the current study disagree with *Al-Hussaini and Mustafa, (2016)* who studied Adolescents' knowledge and awareness of diabetes mellitus in Kuwait and reported that nearly three quarters of participants have correct level of knowledge about the disease.

In the current study there were showed that three quarters of studied children adhered to medication, all of them treated by insulin and most of them changed the insulin site regularly. This is due to dependence of the children to themselves which promote self-care and awareness about the importance to take their medication. These findings similar to *Karilena et al., (2016)* who revealed that, the majority of the children take medication regularly and apply the correct technique of insulin administration at correct sites.

The current study findings also revealed that three fifths of studied children never took the prescribed diet regularly in addition half of them never avoid not allowed food. This was usually due to peer pressure or un-healthy school food. Also, this may be due to that the children faced resistance to change from their children. These results were similar to the study of *Shen et al., (2018)* who studied Parental Social Support, Perceived Competence and Enjoyment in School Physical Activity and indicated that, however, some of the families with diabetic children were willing to help their children by changing to healthier diets and organizing meals according to the health team's advice. However, the children don't have regular meals. The findings were disagree with *Al-Hussaini and Mustafa, (2016)* who reported that students' knowledge regarding the diet of person with diabetes was fairly good.

In the present study there were reported that, slightly more than half of studied children sometimes performed exercise also, nearly one third of them never avoid performing exercise without eating moreover, nearly three quarters of them sometimes had hypoglycemia due to exercise. This may be due to children are more concerned with a favorable lifestyle consistent with their peers and often ignore essential practices that help to improve the health status of them. These findings were not similar to *Aldossary et al., (2020)* who studied Knowledge and Understanding of Type 1 Diabetes and Its Management among Saudi Children and Adolescents and revealed that, the majority of children engaged in sports and may occur complication from the disease as hypoglycemia.

#### **Part II: Psychosocial problems of studied children**

In the present study there were showed that, less than three quarters of the studied children had currently feel sad and uncomfortable, and thought to hurt yourself, majority of them had repeat crying more now than before angry and revolt more quickly than before feel upset when enter the hospital feel anxious when friends know nature of illness and more than three fifths feel embarrassed to take treatment in front of others. This due to the effect of the disease on psychological status due to rigid routine on the children to adherence to treatment plan. These findings were in the same line with *Khandelwal et al., (2016)* who reported that the most common disorder observed in the children with T1DM was irritation and sad followed by depression. Also they cry when go to the doctors clinic and taking medication.

In the current study there were revealed that, slightly more than three fifths of the studied children suffering from psychological problems and nearly one third not suffering from psychological problems. This is due to that the children

feel different that their peers. This finding was in an agreement with the study conducted by *Troncone et al., (2019)* who studied Psychological support for adolescents with type 1 diabetes provided by adolescents with type 1 diabetes and found that less than three fifths of the studied children had reported prevalence of psychological illness in type 1 diabetic.

In the other hand the results of the current study disagree with *Agrawal et al., (2016)* who studied Prevalence of psychosocial morbidity in children with type 1 diabetes mellitus and reported that one fifth of the studied children have psychological problems.

In the current study there were showed that, half of studied children didn't communicate with family members and nearly half of them avoid social visits in addition, more than half of them didn't ask others for help when facing any problem. Regarding participation in school activities three fifths of them didn't participate and slightly more than three fifths of them didn't perform homework due to health problems. This may be due to that all people are not very sensitive regarding the illness and the lack of awareness about T1DM often makes the child suffer discrimination. These findings in the same line with *Kakkar and Puri, (2016)* who studied Psychosocial implications of type 1 diabetes mellitus among children in India: an emerging challenge for social work profession and reported that children with type 1 diabetes mellitus feel ignored and have a fear of being rejected by their friends. Another challenge that children face is that of being discriminated so, they don't ask for help from others.

In the present study there were reveals that, nearly half had suffering from social problems. While, slightly more than half didn't have a social problem. This may be due to the nature of the disease effect which makes the child restricted than his peers at the same age. This finding was agreed with

*Akhtar et al., (2016)* who studied Influences of social issues on type 1 diabetes self-management and showed that nearly half of the children suffering from social problems.

In the current study there were revealed that, slightly more than half of studied children had psychological problems while, slightly more than one third didn't have psychological problems. This is due to that chronic illness as type 1 diabetes often causes negative psychological and social consequences, but one needs to learn to cope with them. This finding was in the same line with *Khandelwal et al., (2016)* who studied Psychosocial Illness in Children with Type 1 Diabetes Mellitus: Prevalence, Pattern and Risk Factors and found that more than half of the children had psychosocial disorder.

### **Part III: Adaptive patterns of the studied children**

In the present study there were illustrated that slightly more than three fifth of the studied children some-times but not always go regularly to school and more than three fifth of them some-times participated in school activities, this may be interpreted that the disease affect their health status but with adequate health care and adherence to medical regimen, diet and exercise program they can some-times overcome the disease and go regularly to school and engaged in school activities. The study findings agreed with *Cooper et al., (2016)* studied school performance in children with type 1 diabetes: a contemporary population-based study and found that nearly three quarters of studied students were sometimes absent from school but their school performance weren't affected by their health problem and they participated in simple school activities such as painting, light exercise and reading.

The study is disagreed with *Oakley et al., (2018)* studied association between

type 1 diabetes mellitus and educational attainment in childhood, they revealed that more than half of their study sample had a higher absenteeism rate which leads to poor school performance as a result of their disease, fatigue weakness and lack of mental concentration and frequent hospitalization as a result they recommend educational program for the child and their caregivers to increases adherence to medication, diet program so they improve life style and school performance.

In the current study there were showed that only about one quarter of studied children went to doctor regularly for medical follow-up and avoid taking insulin without eating, this may be interpreted that children may be afraid from follow-up and stressed about doctor visit also may be caused by knowledge deficit regarding insulin action, dosage, types and precautions which may result in serious complications. The study was in the same line with *Battelino et al., (2017)* studied prevention of hypoglycemia with predictive low glucose insulin suspension in children with type 1 diabetes: A randomized controlled trial and reported that more than one third of his study sample didn't go to medical follow-up regularly also they some-times taking insulin without sufficient food intake which resulted in hypoglycemia and sometimes hypoglycemic coma.

### **Part IV: Relation and between variables of the study.**

In the current study there were revealed that there were a highly statistically significant relation between patients' age, grade and their adaptation, this may be interpreted that as age increase this means that increasing the years of experiencing the disease, so that they increased their knowledge, skills about the disease and management actions and also finding the best supportive personnel either from family, friends or health care providers. The current study also illustrated that, there were

statistically significant relation between children adaptation and school attendance, which may be interpreted that, school attendance and lack of absenteeism, increased patients' socialization, interaction with peers and experience in dealing with any problem occurred at school.

The current study was agreed with *Joiner et al., (2020)*, studied perceptions and experiences of living with type 1 diabetes among Latino children and parents with limited English proficiency, they revealed that children adaptation increased with age and school attendance due to improved knowledge, skills and attitude toward their disease management, they realize that their health problem as a life-long condition which they must accept and cope with it.

The study is disagreed with *Khandelwal et al., (2016)* studied Psychosocial Illness in Children with Type 1 Diabetes Mellitus: Prevalence, Pattern and Risk Factors, they revealed that there were no statistically significant relation between child age, gender years of disease experience and their psychosocial adaptation to the disease.

In the present study there were revealed that there were highly statistically significant relation between children age and school grade and their total knowledge regarding diabetes, from the researcher point of view this may be related to that as age increase, children perception and understanding about their health problem improve. The children begin to read and seek information about their health problem either from parents, relatives, healthcare providers or even internet search.

The study was similar to *Shenker et al., (2019)* who studied type 1 diabetes mellitus management in young children: implementation of current technologies, they conducted the study to assess knowledge, attitude and management of their studied diabetic children, they

revealed that as age increase, children improved their knowledge about diabetes and factors that may increase blood glucose level such as stress, lack of physical exercise or diet high in calories and sweets. With age increase, they also improve their skills in self-monitoring blood glucose level and performing insulin self-injection.

In the current study there were showed that there were highly statistically significant relation may be related to reading about the disease to be able to self-care during the school day, the study is agreed with *Cooper et al., (2016)* who studied school performance in children with type 1 diabetes: a contemporary population-based study and showed that there were a relation between children knowledge and school attendance.

In the present study there were revealed that there were significant correlation, patients' adaptation to health problem decreased when their psychosocial problems increase due to the effect of psychological and social problems on patients ability to cope and overcome the health problem, the study was consistent with *Hilliard et al., (2017)* whose study entitled (The Diabetes Strengths and Resilience Measure for children With Type 1 Diabetes (DSTAR-Teen): Validation of a New, Brief Self-Report Measure), they revealed that there were a correlation between patients' psychological problems and their adaptation to chronic health problem.

In the current study there were revealed that there were highly statistically and statistically negative correlation, when patients' knowledge increase their psychological and social problems significantly decreased, this may be interpreted that, patients' knowledge about the disease results in better management, stress reduction, understanding how to deal with their stress and frustration, express their negative feelings about their health problem, seeking sources of social support such as

parents, relatives or peers and realizing that psychological and social problems produce stress that affecting negatively their blood glucose level.

The study was congruent with *Delamater et al. (2018)* studied psychological care of children and adolescents with type1 diabetes, they revealed that there were significant relation between patients' knowledge and psychosocial satisfaction, they mentioned that clear and comprehensive understanding of patients problems resulted in decreasing their stress, depression, cognitive problems and improving their school performance and social functioning.

In the present study there were showed that, there were a highly statistically positive correlation between children knowledge and their total positive adaptive behavior, may be related to that when patients' knowledge increase they understand information and skills which help them in adjustment with the diseases and its consequences whenever, there were a highly statistically negative correlation between child total knowledge and their negative adaptation, when knowledge decrease, negative adaptation of the children increase in the form of crying social isolation or negligence of school duties.

The current study was in the same line with (*Guo et al., 2019*) studied school-aged children with type 1 diabetes benefit more from a coping skills training program than adolescents in China: 12-month outcomes of a randomized clinical trial)they clarified there were correlation between patients' knowledge and their positive and negative adaptation, the children coping skills increased with adequate knowledge about health and disease management whenever, decrease level of knowledge resulted in negative children coping skills.

## Conclusion

### Findings of the present study concluded that:

The majority of the studied children suffer from psychological problems regarding their disease compared with more than one thirds of them without psychological problems. Less than half of the studied children suffer from social problems regarding their disease compared with the majority of them without social problems. Most of the studied children had a moderate level of total adaptation regarding their disease compared to the minority of them had a high level of total adaptation.

There was a positive correlation ( $P<0.05$ ) between children's total psychological problem and their total negative adaptation regarding their disease. There was a highly statistically positive correlation ( $p<0.001$ ) between children social problems and their total negative adaptation regarding their disease. There were positive correlations ( $p<0.001$ ) between children total knowledge and their total positive adaptation regarding their disease.

## Recommendations

### Based on the study results, the following recommendations can be given:

Nursing intervention program to promote awareness and prevention regarding the psychosocial problems of school-age children with type 1 diabetes at schools. Increase awareness of the community about role of psychiatric/mental health nurses in helping child and parent to promote psychosocial adjustment regarding type I diabetes mellitus. At the community level, programs should be designed for mothers of children with type I diabetes mellitus and school teachers about psychosocial adjustment, and empowering them with the necessary skills to implement adjustment.

Advise the parents to follow up with a pediatric psychologist in order to early diagnose any serious psychosocial problems and treat them. Establishment of an educational program for the diabetic children and their parents regarding the right nutrition and life style changes. Establishment of an educational program for school teachers about type 1 diabetes in children and its psychosocial impact on the children.

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