

## Depression And Health Related Quality of life among diabetic adolescents at Zagazig city

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### Abstract

Background: Diabetes mellitus metabolism disorder characterized by chronic hyperglycemia with disturbance of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both leading to variety of medical complication such as hypoglycemia. **Aim of the study:** assess depression and health related quality of life in diabetic adolescents at Zagazig city subjects and methods: **Research design:** was analytical case- control design. **Setting** was conducted at Diabetes outpatient clinic at Zagazig University Hospital, Diabetes clinic at Almbra Hospital, Preparatory and Secondary school at Zagazig city. **Subjects** 100 of diabetic adolescent aged 12-18 years and 100 of control group who attended the previous settings. **Tools of data collection:** Three tools were used for data collection: Tool I: questionnaire interview sheet and Tool II was depression inventory scale The Tool III: was Pediatric Quality of life inventory. Results: revealed that half of diabetic adolescents had depression compared to control group. Two thirds of diabetic adolescents had poor quality of life compared to control group. **Conclusion:** The study findings concluded that diabetes effect on quality of life In diabetic adolescents, There were relation between depression and health related quality of life in studied group. **Recommendations:** This study recommended that design training guiding programs for diabetic adolescent about blood glucose test, sites of insulin injection, risk of complication, diet restrain. orientation of the studied group about symptoms of hypo and hyperglycemia and how control it

**Key words:** Diabetes – Quality of life – Depression – adolescence.

### Introduction:

Diabetes mellitus is the most common metabolic disease in the young and type 1 diabetes, resulting from beta-cell destruction and absolute insulin deficiency. Which counts for over 90% of diabetes in young people aged less than 25 years. It affects 18 to 20 per 1, 00,000 children a year in the United Kingdom. Secondary cause due to exposure to environmental risk factors during the neonatal period and in the first year of life play a significant role in setting off the immune process leading to the destruction of  $\beta$ -cells and the development of type 1 diabetes. The American Diabetes Association committee recommends the term type 1A diabetes for immune mediated diabetes with its destruction of the islet  $\beta$ -cells of the pancreas. Non-immune mediated diabetes with severe insulin deficiency is termed typed. The most common symptoms of type 1 diabetes among children and adolescents include increased thirst, urination hunger, weight loss, fatigue, irritability, fruit smell on the breath and blurred vision <sup>(1)</sup>

Type 1 diabetes is one of the most common childhood chronic illnesses. It is a lifelong illness that requires intensive daily treatment management. Adolescents with diabetes must learn how to test their blood sugar regularly, administer insulin properly, monitor their dietary intake and physical activity, and adjust insulin dosages based on current blood sugar, diet, and exercise. Failure to properly engage in all of these activities could lead to acute episodes of low blood sugar (i.e., hypoglycemia) or high blood sugar (i.e., hyperglycemia)—each of which is associated with hazardous implications for health. Low blood sugar levels can have immediate health consequences with the potential to lead to coma or death if left untreated. High blood sugar levels can have immediate health consequences in the form of ketoacidosis. Furthermore, chronic hyperglycemia can lead to longer-term health consequences, such as circulatory problems, kidney disease, and blindness. <sup>(2)</sup>

The combination of diabetes and depression present a major clinical challenge as the outcomes of both conditions are worsened by the presence of the other. Quality of life is worse, diabetes self-management is impaired, the incidence of complications is increased and life expectancy is reduced. The costs of treatment increase significantly for both adolescents and health economies but these costs do not necessarily result in significant improvements in disease or quality of life outcomes. Both psychological interventions and antidepressants are effective in treating depressive symptoms in adolescents with diabetes but have mixed effects on glycemic control. Clear care pathways involving a multidisciplinary team are needed to obtain optimal medical and psychiatric outcomes for people with comorbid diabetes and depression<sup>(3)</sup>. Health related quality of life indicates magnitude of impact exerted by a disease or medical condition upon everyday physical, emotional, mental and contextual well-being of a person thus it stands for the subjective perception<sup>(4)</sup>

Diabetes mellitus negatively impacts Health related quality of life. This negative impact affects multiple aspects of adolescence life including the psychological impact of being chronically ill, dietary restrictions, changes in social life, symptoms of inadequate metabolic control, chronic complication and ultimately lifelong disabilities. Many variables have been associated with HRQOL in adolescence with Diabetes mellitus such as age, gender, treatment, chronic complication and quality of care<sup>(5)</sup>

Pediatric Nurse plays important role in treatment of diabetic adolescents with depression and in improving quality of life. Nurse helps diabetic adolescents by education, children with new-onset type 1 diabetes and their families require intensive diabetes education by an interprofessional pediatric diabetes health-care (DHC) team that should include either a pediatric endocrinologist or pediatrician with diabetes expertise, dietician, diabetes nurse educator,

social worker and mental health professional to provide them with the necessary skills and knowledge to manage this disease. The complex physical, developmental and emotional needs of children and their families necessitate specialized care to ensure the best long-term outcomes. Education topics must include insulin action, administration and dosage adjustment; BG) and ketone monitoring; sick-day management and prevention of diabetic ketoacidosis (DKA); nutrition therapy; physical activity; and prevention, detection and treatment of hypoglycemia.<sup>(6)</sup>

#### **Significance of the Study:**

Diabetes is the most common disease that affects children. It can strike children of any age, even toddlers and babies. If not detected during early childhood, the disease can have deadly consequences or result in serious damage to the brain. Diabetes Type I is one of the most common chronic diseases affecting in every 400-600 children and adolescents. DM is believed to cause psychological problems as Depression is a serious illness that can affect at nearly every part of a young person's life and significantly impact his or her family. It can disrupt relationships among family members and friends, harm school performance and limit other educational opportunities. Depression is 12% in children with diabetes ages 8 to 12 years. We found scarcely researches which concerned with depression and quality of life among diabetic adolescents at Zagazig city therefore; this study will be conducted to assess depression and quality of life in adolescents with diabetes mellitus.

#### **Aim of the study:**

The present study aimed to Assess depression and health related quality of life among diabetic adolescents at Zagazig city.

#### **Research Questions:**

- Is there a relation between depression and health related quality of life among diabetic adolescents?'
- What is the level of presence of depression in diabetic adolescents ?
- Does diabetes affecting on their children's quality of life ?

**Subjects and methods:****Research design:**

Analytical case –control design was used .

**Study setting:**

The study was conducted at four settings( Diabetes outpatient clinic at Zagazig university hospital, Almabra Hospital , Preparatory and Secondary school at Zagazig city).

**Study subjects:**

The subjects of this study composed of all accessible adolescent suffering from diabetes mellitus attending diabetic clinics at the previous setting for 3months.

Inclusion criteria: of the study group

- Age;12-18
- Sex: Both sexes.
- Able to communicate
- Free from chronic illness other than diabetes.

**Control Group** of adolescents will be selected of secondary school students at Zagazig city.in the same age of studied group.

**Tools of data collection:**

Three tools were used to collect the necessary data:

**Tool I: Structured interview questionnaire** sheet was used to collect socio demographic data from diabetic adolescents and parent .ex age, gender, general health, education

**Tool II: Childhood depression inventory scale**

Developed by Varni, <sup>(6)</sup> was adopted by the researcher in this study to assess symptoms of depression in adolescent age. Depression inventory rating scale is a multiple choice questionnaire consisting of 27 items

Scoring system:

yield total scores from 0 to 54 Higher scores reflect greater symptoms the responses by choosing one answer from three answer which was Never(0 point) sometimes( 1)- always (2) regarding system high score 31.5%The point 0 take <31.5 point 1 take 31.5.point 2take >31.5. depression score calculated according to the following scale present (17-54) absent (≤17)

**Tool III: Pediatric quality of life inventory**

Developed by Varni <sup>(6)</sup> in current study the pediatric quality of life inventory was used to assess QOL by scales generic and diabetes module

- **Part ( I ) Quality of life Generic scale :**

It is a 15 item multidimensional quality of life instrument designed for use with adolescents measures perception of adolescents of comprehensive quality of life ( question1 -15) The 15 item ped QL encompass the following 4 subscales: physical health (5items) ,emotional functioning (4items).social health (3items) school health (3 items )The response by choosing one answer from four answers which Never(0 point )- almost never( 1)- sometimes (2) -often (3)- always ( 4).

- **Scoring system:**

Regarding system high score 100 the point 0 takes 100.point 1 take75 point 2 take 50 point 3 take 25 point 4 take 0 good quality of life = 100-75.fair =75-50.poor quality of life = less than 50

**Part (II) Diabetes module scale:**

The other questionnaire used to assess quality of life in diabetic adolescents the modules demonstrates the overall negative impact of diabetes on life style of their adolescents Diabetes module consists of 28 item encompass the following 5 subscales: **Problems with diabetes:** this is concerned with physical symptoms of diabetes **Problem with treatment I:** This is concerned with insulin takings **Problem with treatment II :**This is concerned with blood test and exercise **Problem with worry: This is concerned** with worry about diabetic complications **Problem with communication:** This is concerned with communication problem, The responses by choosing one answer from four answers which are Never (0 point )- almost never (1) – sometimes (2)- often (3)- always (4). Regarding system high score 100 the point 0 takes 100.point 1 take75 point 2 take 50 point 3 take 25 point 4 take 0 good quality of life = 100-75.fair =75-50.poor quality of life =less than 50.

**Content Validity and reliability**

For validity assurance purposes the tools were tested for content validity by three experts

(two professors of pediatrics at the Faculty of Nursing and professor of endocrinology at the Faculty of Medicine) the recommended modifications were done and the final form was ready for use. Reliability Childhood depression inventory scale: The present study clarified overall reliability of childhood depression inventory (total) Alph Cronbach (0.9) - acceptable consistency. Quality of life scale: Generic: The present study showed overall reliability of quality of life inventory (total) Alph Cronbach (0.85 good consistency Diabetes modules: The present study showed reliability of ped QOL diabetes modules (total) Alph Cronbach (0.88 acceptable consistency).

#### Field work:

Data collection took a period of three months from October 2018 till December 2018. The data were collected at four days of the week (Saturday, Monday, Tuesday and Wednesday) from 9:30 am to 12:00 pm. The adolescents were interviewed to fill the sheet after complete explanation of the purpose of the study and asked for participation. Throughout the interview, relative information was recorded in the designed sheet depending upon the response of the participant. The time needed for finishing each interview ranged between 20-30 minutes according to adolescents physical and mental readiness.

#### Pilot study:

It was carried on 10% of the studied adolescents and control group to assess the applicability of the data collection tool, arrangement of items, estimate the time needed for filling the sheet with the collected data and feasibility of the study and acceptance to be involved in the study. No modification was done

#### Administrative and ethical considerations:

All ethical issues were taken into consideration during all phases of the study: The researcher maintained anonymity and confidentiality of the subject. The inclusion in the study was totally voluntary. The aim of the study was explained to every adolescent

before participation and an oral consent was obtained. Adolescents were notified that they can withdraw at any stage of the research: also they were assured that the information obtained during the study will be confidential and used for the research purpose only. An official permission were obtained by submission of formal letters issued from dean of the Faculty of Nursing, Zagazig University to the responsible authorities of the study setting to obtain their permission for data collection.

#### IV Statistical Analysis:

The collected data was coded and entered in a data base file using the fox professor windows professor. After complete entry, data was transferred to IBM SPSS version 20 program by which the analysis was conducted applying frequency tables with percentages and cross tabulations. Data is qualitative variable presented as number and percent. Regarding scoring system, the items scores for each domain were summed together. Then the sum of scores for each calculated by summing the scores given for its responses. The tests of significances used were Mont Carlo exact test, T test, Chi square test and fisher exact probability, adolescents correlation co-efficient. When  $p < 0.05$ , it is statistically significant difference - When  $p > 0.05$ , it is statistically insignificant difference

#### Results:

**Table1:** Represents Characteristics of Adolescents. It was found that the mean age of studied group was  $14.6 \pm 2.1$  compared to  $17 \pm 1.4$  years of the control group. Regarding to gender it was found that 55% of studied adolescents were females compared to 52% of control group. Concerning to birth order, it was found that 45% of studied adolescents were middle in birth order .and 66% of studied adolescents lived at urban area compared to 5% of the control group as well as 82% of studied adolescents family had insufficient family income compared to 26% the of control group.

**Table 2 :** illustrates frequency problem of diabetic group regard disease duration, type

of treatment, complication . It was found that 64% of diabetic adolescents had diabetic coma. When adolescents were asked about place of insulin injection they reported that they were take 49% at home while 21% take this dose at school .

Regarding to physical activity it was found that 77% had not follow any physical activity and It was found that 67% had not follow any diet pattern.

**Table3:** Showed the family responsibility and economic burden. It was found that 39% of families felt shortage Care of their diabetic adolescents Regarding to other family member who had diabetes, It was found that 69% of adolescents had family history of diabetes .and it was found that 89% of families had economic burden Knowledge about diabetes were known by 64% of families compared to 36% did not known complete data about diabetes

**Table4:** Clarifies that 62% of diabetic adolescents had depression compared to 38% of the control group, and the difference was statistically significant at  $p < 0.05$

**Table 5:** Comparison between quality of life of Studied and Control Group was illustrated in table (9). It was found that 94% of diabetic adolescents had poor quality of life compared to 29% of the control group .The difference was statistically significant at P value  $< 0.05$

**Table 6:** illustrates Comparison between Generic QOL components of Diabetic Adolescents and Control group. It was found that 63% of studied group had poor quality of life in physical health compared to 15% of control group. Additionally 89% had poor quality of life in emotional functioning compared to 35% of control group Regarding to social function it was found that 74% of studied group had fair quality of life compared to 45% of control group. It was found that 78% had poor quality of life in school functioning compared to 28% of control.

It was found also that 75% of studied group had poor generic quality of life compared to 17% of the control group It

was found also that 75% of studied group had poor generic quality of life compared to 17% of control group.

**Table 7:** Illustrates the Relationship between Depression level of Diabetic Adolescents and their personal characteristics .It was found that there was a statistically significant relation between sex, child order, family income and depression level. (**P < 0.05**)

**Table 8:** Relationship between Diabetic modules QOL level of diabetic adolescents and their personal characteristics was portrayed in table (8). It was found that there was a statistically significant difference between age, their family income and Diabetes Modules QOL

**Table 9:** Illustrates Comparison between Depression Levels &diabetic modules& generic quality of life of Both Studied And Control Group. It was found that there was a statistically significant difference between depression levels & diabetes modules QOL &generic QOL.

#### Discussion:

Suglia, et al <sup>(.7)</sup> who conducted a study about Depressive Symptoms During Adolescence And Young Adulthood and the Development of Type I Diabetes Mellitus in United States and reported that the majority of diabetic adolescents were younger than 15 years and had severe depression . This goes in line with the finding of the present study in which half of diabetic adolescents who were less than 15 year old had severe depression level as well as there was a statistically significant relation between depression and age of adolescents . Additionally The risk for depression increases as adolescents with type 1 diabetes develop into young than adulthood due to early discover of diabetes ,longer duration of disease ,recurrent insulin therapy per day, feel continuously of diet restrain finally view of people for them .

Regarding to gender it was found in current study more than half of diabetic female had severe depression .This result due to female had internal stress and fear from diabetes, life stressor as well as

females associate marriage with diabetes so females enter in severe depression . This finding agreed with khater et al ., <sup>(8)</sup> who carried out study about Frequency And Risk Factors Of Depression In Type I Diabetes In A developing Country In Alexandria

As well as Ali et al ., (2017)who proved study about quality of life in children with type 1 diabetes mellitus in Minia governorate : relationship with mood and family attitudes and illustrated that Majority of the diabetic adolescents who had severe depression symptoms were females

The finding of present study revealed that more than half of diabetic adolescents had complication of disease, as regard physical activity the majority had not follow any physical activity. Concerning diabetic diet pattern more than half had not follow any diet pattern .This results due to loss of control and low fitness levels, the overriding barrier to physical activity and lack of knowledge about importance of sports in disease, adolescents fear of sever hypoglycemia and risk of complication associated with physical activity.

This finding was supported with Young et al., <sup>(9)</sup> who carried out a study about Eating Disorders In Adolescence With Type I Diabetes Mellitus and mentioned that most of diabetic adolescents had problem in physical activity and following diet pattern

Moreover This results matched with Atwa, et al .-<sup>(10)</sup> who carried out study about Relationship Between Depression and Quality of Life In Children with Type I Diabetes Mellitus In Suez Canal University Faculty of Medicine and mentioned that majority of diabetic adolescents had complication and two thirds of adolescents did not follow physical activity and diabetic diet pattern

Majeed et al ., <sup>(11)</sup> who conducted study about Diabetes In The Middle-East And North Africa and reported that nearly half of diabetic adolescents had family history. This finding was consistent with the current study which revealed that more than half of diabetic adolescents had family history of diabetes .These results are due to

other factor related to diabetes such as genetic factor.

This finding was inconsistent with Gaidhane et al ., <sup>(12)</sup> who carried out study about Risk factors of Type 1Diabetes Mellitus Among Adolescents from Rural Area of India and revealed that more than half of adolescents had some risk factors as sedentary lifestyle, nutritional risk factor associated with diabetes and obesity

As regard economic burden of diabetes on the present study the majority of families was loaded with economic burden of disease due to cost of medication and longer duration of disease .These finding is supported by Ramachandran et al <sup>(13)</sup> who carried out a study about Socio-economic burden of diabetes in India. and stated that majority of families had economic burden due to the cost of disease.

Concerning family knowledge about diabetes most of families were knowledge about the disease due to help parents can identify symptoms of hyperglycemic ,hypoglycemic and can deal with symptoms and complications .These results were consistent with Mahfouz et al, <sup>(14)</sup> who carried out study about Effects of Mothers Knowledge And Coping Strategies on The Glycemic Control of Their Diabetic Children In Egypt and mentioned that most families had general knowledge about diabetes

.In contract Atwa et al., (2014) who reported that more than half of family had poor knowledge about diabetes

Jayaprasad et al ., <sup>(15)</sup> who conducted study about Association Of Depression ,Stress And Anxiety With Type I Diabetes Mellitus In India showed that two third of diabetic adolescents had severe depression due to poorer glycemic control. This results came in agreement with Present study which portrayed that more than half of diabetic adolescents had severe depression .Depression occur due to increased incidence of hospitalization , recurrent injection of insulin per day and increased risk of complications

The present study showed that more than half of studied adolescents had poor

health related quality of life than control group. due to longer time of disease ,course of medical treatment ,fear from future and adolescents thought that disease affect in relationship in life.

This study was in agreement with De costa et al .<sup>(16)</sup> who carried out a study about the Quality of Life In Adolescents With Type I Diabetes In Brazil and showed that the majority of studied group had poor quality of life than control group.

Gadallah et al.,<sup>(17)</sup> showed that diabetes had negative impact on all domains of health related quality of life with low mean scores of physical ,emotional ,social and school functioning were with high statistical significant for adolescents with diabetes compared to healthy peers

As well as Arabiat et al .,<sup>(18)</sup> carried out study about Health related Quality Of Life In pediatric Chronic Health Conditions: A comparative study Among Children and Adolescents In Jordan and reported that adolescents with chronic health condition had progressively lower HRQOL compared to their healthy peers .This results were matched with current study which illustrated that diabetic adolescents had low generic QOL compared to healthy group .This results due to early onset of disease, frequent doing blood glucose test per day and longer duration of diabetes were associated with poorer QoL as well as poor glycemic control.

Concerning residence more than half of diabetic adolescents lived in urban area. The result of present study due to Urbanization is associated with changes in eating habits, physical activity, smoking , alcohol consumption , problem is related to obesity and Lifestyle changes

This result was in agreement with Aung et al.,<sup>(19)</sup> who carried out study about Urban-rural Differences In The Prevalence Of Diabetes Mellitus Among Adolescents Of The Yangon Region In Thailand and reported that the majority of diabetic adolescents lived in urban area had poor QOL

In current study , there was statistically significant relation between age of diabetic adolescents and generic modules QOL level. This finding due to adolescents in age (13–15 years) had poor QoL compared to teens in later years of adolescence (16–18 years). Teens in the later stages of adolescence may assume greater autonomy in handling their insulin regime, with less parental influence compared to younger adolescents as well as self-care autonomy ,reduced parental involvement predict poorer self-care management and poor management of their diabetes has been associated with poor quality of life .

This result was consistent with Yayan et al.,<sup>(20)</sup> who carried out study about the Relationship between the Quality of Life and Depression Levels of Young People with Type I Diabetes in Brazil and stated that age of adolescents was an important predictor of QOL as children got older the scores improved .

AlBuhairan et al .,<sup>(21)</sup> who carried out study about Health related quality of life And Family Impact of Type 1 Diabetes Among Adolescents In Saudi Arabia mentioned that majority of females adolescents with diabetes had low generic QOL than males . This finding was consistent with results which revealed that more than half of females had lower Generic QOL than males and there was statistically significant relation between gender and generic QOL . Possible reasons included the different physical and hormonal changes that occur during puberty between the sexes: girls have higher insulin requirements during puberty .Female adolescents with T1DM are known to have more unhealthy weight control practices, such as skipping or taking less insulin compared to males resulting in poor metabolic control which was itself associated with reduced quality of life.

As well Gadallah et al .,<sup>(17)</sup> carried out study about Health Related Quality of Life Among Children With Type 1 Diabetes Assiut City Egypt and stated that gender had no significant effect on any of the QOL aspects except for the school functions

where females reported significantly higher score . This may be due to Egyptian community especially upper Egypt that don't give enough degree of freedom for females so they spend most of their times in studying , in addition to the preoccupation of males with other social activities.

As regard residence the present study revealed that two thirds of diabetic adolescents lived in urban area had poor quality of life than adolescents lived in rural area and there was statistically significant relation between residence and generic quality of life. This finding due to culture of urban, spread neglect in urban area .

This finding was consistent with Dacosta et al ., <sup>(16)</sup> who carried out study about Quality of life of Adolescents with Type 1 diabetes in Brazil and mentioned that majority of diabetic adolescents who lived in urban area had poor quality of life

Concerning to birth order the present study revealed that middle child had low generic quality of life and there is statistically significant relation between birth order and generic quality of life .

This finding was inconsistent with Gadallah et al .<sup>(17)</sup> who carried out study about Health related Quality of Life Among Children With Type 1 Diabetes In Assiut city Egypt and stated that birth order hadn't effect on QOL, this can be explained by the Arab and Egyptian culture

#### **Conclusion:**

Based on the findings of present study, it can be concluded that more than half of diabetic adolescents had depression which associated with poor management compared to healthy group . Majority of studied group had poor quality of life compared to healthy group .There were relationship between depression and quality of life in diabetic adolescents and two third of diabetic adolescents had negative impact on their quality of life.

#### **Recommendations**

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

- 1-Design training guiding programs for adolescents about DM, blood glucose test , medication , symptoms of hypoglycemia , complication & Depression how manage it as well as improving QOL.
- 2-Identify adolescents about important of medication
- 3- Orientate adolescents about symptoms of hypoglycemia and hyperglycemia and complication of disease may be done.
- 4- Educate adolescents about how controlling hypoglycemic symptoms
- 5- Encourage adolescents to do physical activity
- 6- Advice adolescents about important of following diet pattern & exercise

**Table (1) :** Characteristics of Studied Adolescent

Characteristics	Diabetic group No(%)		Control group No(%)		$\chi^2$	P
<b>Age per years</b>						
• ≤15	58	(58)%	9	(9)%	(t)=9.4	0.0001 (S)
• >15	42	(42)%	91	(91)%		
mean± SD	14.6±2.1		17±1.4			
range	11-19		13-19			
<b>Sex</b>						
• Male	45	45%	48	48%	0.18	0.67
• Female	55	55%	52	52%		
<b>Number of sibling</b>						
• 1& 2	42	42%	41	41%	0.02	0.9
• 3+.	58	58%	59	59%		
<b>Child order</b>						
• First	37	37%	41	41%	0.71	0.7
• Middle	45	45%	45	45%		
• Last	18	18%	14	14%		
<b>Father education</b>						
• Educated	81	81%	93	93%	6.3	0.01 (S)
• Illiterate	19	19%	7	7%		
<b>Mother education</b>						
• Educated	82	82%	87	87%	0.95	0.33
• Illiterate	18	18%	13	13%		
<b>Residence</b>						
• Urban	66	66%	5	5%	81	0.0001 (S)
• Rural	34	34%	95	95%		
<b>Family Income</b>						
• Enough	18	18%	57	57%	66	0.0001 (S)
• Not –enough	82	82%	26	26%		
• Enough and more	0	0	17	17%		

**Table (2):** frequency problem of Diabetic Group Regard Disease Duration. Type of treatment, Complication

<b>Items</b>		
<b>Duration of disease per years</b>		
mean± SD	66.8±43	
Range	(0.25-169)	
	No	%
<b>Type of treatment</b>		
• Insulin	100	100%
<b>Complications</b>		
	72	72%
• Yes	28	28%
• No		
<b>Type of complication</b>		
• Diabetic coma	64	64%
• Hypoglycemia	6	6%
• Eye problem	2	2%
<b>Number of insulin injection per day at home</b>		
	1	1 %
• First dose	21	21%
• Second dose		
• Third dose	49	49%
• Four dose	28	28%
• More than four	1	1%
<b>Insulin injection at school</b>		
• Yes	21	21%
• No	79	79%
<b>Number Insulin injection at school</b>		
• One injection	21	21%
<b>Physical activity</b>		
• Yes	23	23%
• No	77	77%
<b>Diabetic Diet pattern</b>		
• Yes	33	33%
• No	67	67%

**Table (3):** Family Responsibility and Economic Burden

Items	No	%
<b>Family Responsibility Disease</b>		
• Yes	23	23%
• No	77	77%
<b>Feeling shortage Care diabetic children</b>		
• Yes	39	39%
• No	61	61%
<b>Other Family members had Diabetes</b>		
• Yes	69	69%
• No	31	31%
<b>Other child of Family had Diabetes</b>		
• Yes	9	9%
• No	91	91%
<b>Economic burden</b>		
• Yes	89	89%
• No	11	11%
<b>Knowledge about Diabetes</b>		
• Yes	64	64%
• No	36	36%
<b>Price of treatment per month</b>		
• Mean+ SD	556±297	
• Range	100-2500	

**Table(4) Comparison between Depression Level of Both Studied And Control Group**

Items	Studied		Control		X <sup>2</sup>	p
	No	%	No	%		
<b>Depression</b>						
• present (17-54)	62	62.0%	38	38%	11.5	0.0001 (S)
• absent <17	38	38.0%	62	62%		

**Table ( 5) Comparison between quality of life of Studied And Control Group**

Diabetic Symptoms	Studied		Control		X <sup>2</sup>	P
	No	%	No	%		
Poor QOL(<50)	94	94.0%	29	29%	89.2	0.0001 (S)
fair QOL(50 -75)	5	5.0%	61	61%		
good QOL >75	1	1.0%	10	10%		

**Table 6 :** Comparison between studied and control group in generic QOL components

Items	Studied		Control		$\chi^2$	p
	No	%	No	%		
<b>Physical health</b>						
Poor QOL(<50)	63	63.0%	15	15%	59	0.0001
fair QOL(50 -75)	31	31.0%	42	42%		
good QOL >75	6	6.0%	43	43%		
<b>mean± SD</b>	44.9±18		70.9±21			
<b>median(range)</b>	45(0-90)		75(5-100)			
<b>Emotional functioning</b>						
Poor QOL(<50)	89	89.0%	35	35%	62.2	0.0001
fair QOL(50 -75)	10	10.0%	52	52%		
good QOL >75	1	1.0%	13	13%		
<b>mean± SD</b>	22.69±19.8		53.5±20			
<b>median(range)</b>	18.8(0-100)		50(60.25-100)			
<b>Social function</b>						
Poor QOL(<50)	9	9.0%	5	5%	24.5	0.0001
fair QOL(50 -75)	74	74.0%	45	45%		
good QOL >75	17	17.0%	50	50%		
<b>mean± SD</b>	66.5±18.6		76±19.3			
<b>median(range)</b>	66.7(41.67-100)		83.3(0-100)			
<b>School functioning</b>						
Poor QOL(<50)	78	78.0%	28	28%	50.7	0.0001
fair QOL(50 -75)	18	18.0%	64	64%		
good QOL >75	4	4.0%	8	8%		
<b>mean± SD</b>	38.3±18		55.8±20			
<b>median(range)</b>	33(0-100)		58.3(0-100)			
<b>Generic QOL</b>						
Poor QOL(<50)	75	75.0%	17	17%	67.8	0.0001
fair QOL(50 -75)	21	21.0%	67	67%		
good QOL >75	4	4.0%	16	16%		
<b>mean± SD</b>	43±14.3		64.4±14			
<b>median(range)</b>	38.8(20.73-97.5)		64.1(34.06-97.5)			

\* P &lt; 0.05 (Significant)

**Table 7:** Relations between Depression level of Diabetic Adolescents and Their Personal Characteristics

Items	Depression level of diabetic			$\chi^2$	P
	present (17-54)	absent <17	Total		
	No(%)	No(%)			
<b>Age per years</b>					
• ≤15	38(65.5)	20(34.5)	58	0.7	0.4
• >15	24(57)	18(43)	42		
<b>Sex</b>					
• Male	23(51)	22(49)	45	4.1	0.042*
• Female	39(70.9)	16(29.1)	55		
<b>Residence</b>					
• Urban	40(60.6)	26(39.4)	66	0.16	0.7
• Rural	22(64.7)	12((35.3)	34		
<b>number of sibling</b>					
• 1& 2	23(54.8)	19(45.2)	42	1.6	0.2
• 3+.	39(67.2)	19(32.8)	58		
<b>Child order</b>					
• First	28(75.7)	9(24.3)	37	15.4	0.0001*
• Middle	30(66.7)	15(33.3)	45		
• Last	4(22.2)	14(77.8)	18		
<b>Father education</b>					
• Educated	47(58)	34(42)	81	2.9	0.09
• Illiterate	15(79)	4(21)	19		
<b>Mother education</b>					
• Educated	50(61)	32(39)	82	0.2	0.65
• Illiterate	12(66.7)	6(33.3)	18		
<b>Family Income</b>					
• Enough	5(27.8)	13(72.2)	18	10.9	0.001*
• Not –enough	57(69.5)	25(30.5)	82		

**Table (8)** Relations between Diabetic modules QOL level of Diabetic Adolescents and Their Personal Characteristics

Items	Diabetic modules of patients				$\chi^2$	P
	Poor QOL (<50)	fair QOL (50 -75)	good QOL >75	Total		
	No(%)	No(%)	No(%)			
<b>Age</b>						
• ≤15	47(81)	11(19)	0	58	6.2	0.04(S)
• >15	25(59.5)	16(38.1)	1(2.4)	42		
<b>Sex</b>						
• Male	28(62.2)	17(37.8)	0	45	5.4	0.066
• Female	44(80)	10(18.2)	1(1.8)	55		
<b>Residence</b>						
• Urban	44(66.7)	22(33.3)	0	66	5.6	0.061
• Rural	28(82.4)	5(14.7)	1(2.9)	34		
<b>number of sibling</b>						
• 1- 2	27(64.3)	15(35.7)	0	42	3.4	0.19
• 3+.	45(77.6)	12(20.7)	1(1.7)	58		
<b>Child order</b>						
• First	27(73)	10(27)	0	37	5	0.29
• Middle	35(77.8)	9(20)	1(2.2)	45		
• Last	10(55.6)	8(44.4)	0	18		
<b>Father education</b>						
• Educated	57(70.4)	24(29.6)	0	81	5.5	0.064
• Illiterate	15(78.9)	3(15.8)	1(5.3)	19		
<b>Mother education</b>						
• Educated	60(73.2)	22(26.8)	0	82	4.6	0.1
• Illiterate	12(66.7)	5(27.7)	1(5.6)	18		
<b>Family Income</b>						
• Enough	8(44.4)	9(50)	1(5.6)	18	11.2	0.004(S)
• not-enough	64(78)	18(22)	0	82		

\* P &lt; 0.05 (Significant)

**Table 9** Comparison between Depression Level & diabetic modules & generic quality of life of Both Studied And Control Group

Items	Studied		Control		$\chi^2$	P
	No	%	No	%		
<b>Depression</b>						
• present (17-54)	62	62.0%	38	38%	11.5	0.0001
• absent <17	38	38.0%	62	62%		
<b>Diabetic Symptoms</b>						
Poor QOL(<50)	94	94.0%	29	29%	89.2	0.0001
fair QOL(50 -75)	5	5.0%	61	61%		
good QOL >75	1	1.0%	10	10%		
<b>Physical health</b>						
Poor QOL(<50)	63	63.0%	15	15%	59	0.0001
fair QOL(50 -75)	31	31.0%	42	42%		
good QOL >75	6	6.0%	43	43%		
<b>mean± SD</b>	44.9±18		70.9±21			
<b>median(range)</b>	45(0-90)		75(5-100)			
<b>Emotional functioning</b>						
Poor QOL(<50)	89	89.0%	35	35%	62.2	0.0001
fair QOL(50 -75)	10	10.0%	52	52%		
good QOL >75	1	1.0%	13	13%		
<b>mean± SD</b>	22.69±19.8		53.5±20			
<b>median(range)</b>	18.8(0-100)		50(60.25-100)			
<b>Social function</b>						
Poor QOL(<50)	9	9.0%	5	5%	24.5	0.0001
fair QOL(50 -75)	74	74.0%	45	45%		
good QOL >75	17	17.0%	50	50%		
<b>mean± SD</b>	66.5±18.6		76±19.3			
<b>median(range)</b>	66.7(41.67-100)		83.3(0-100)			
<b>School functioning</b>						
Poor QOL(<50)	78	78.0%	28	28%	50.7	0.0001
fair QOL(50 -75)	18	18.0%	64	64%		
good QOL >75	4	4.0%	8	8%		
<b>mean± SD</b>	38.3±18		55.8±20			
<b>median(range)</b>	33(0-100)		58.3(0-100)			
<b>Generic QOL</b>						
Poor QOL(<50)	75	75.0%	17	17%	67.8	0.0001
fair QOL(50 -75)	21	21.0%	67	67%		
good QOL >75	4	4.0%	16	16%		
<b>mean± SD</b>	43±14.3		64.4±14			
<b>median(range)</b>	38.8(20.73-97.5)		64.1(34.06-97.5)			

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