

Psychosocial Profile of Adolescent Patients with Diabetes Mellitus

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ABSTRACT

Introduction:	One third of adolescents with diabetes have psychiatric disorders, most involving internalizing symptoms. Diabetic youth have greater rates of depression and those with depression have poor glycemic control.
Background: Objective:	To investigate the effect of cognitive and emotional response to disease and treatment on diabetes self-management behavior and to study the effect of psychosocial factors as self-esteem, body image, different coping strategies and family factors on diabetes self-management behavior and subsequent glycemic control in diabetic adolescents.
Subjects and methods::	This is a cross-sectional study including 37 controlled and 30 uncontrolled diabetic adolescents. All participants were subjected to Semi structured interview, Personal Models of Diabetes Questionnaire, Body Image Scale, Coopersmith Self Esteem Inventory, Taxonomy of Children's Coping Strategies and assessment of Glycosylated Hemoglobin.
Results:	Perceived seriousness of diabetes is higher in the uncontrolled diabetes group ($p < 0.001$). Higher self-esteem in the controlled diabetes group (14.91 ± 3.43) compared to the uncontrolled diabetes group (10.33 ± 4.74). There was highly statistical significant difference regarding Coopersmith Self- Esteem Inventory ($p < 0.001$).
Conclusion:	Lower self-esteem was more prevalent among uncontrolled diabetic adolescents. In the uncontrolled diabetes group early age of onset, and longer duration of illness were associated significantly with lower self-esteem.
Key words:	Diabetes, Models, Coping, Self Esteem.

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INTRODUCTION:

Recent epidemiological data indicate that the most common age of onset of type I diabetes (DMT1) is from 10 to 14 years, with the incidence of the disease increasing worldwide^{1,2}.

Adolescents with DMT1 are challenged to adapt to a lifestyle that requires self-management of dietary practices, exercise behaviors, and insulin adjustment in addition to developing autonomy and self-identity. Rapid biological changes occurring during this time period along with learning to manage a chronic illness place adolescents at risk for poor metabolic control and life adjustment difficulties^{3,4}.

Although those with diabetes can live a relatively normal life, the chronic complications (neuropathy, renal disease, and retinopathy) can result in a substantial decline in quality of life (QOL). The Diabetes Control and Complications Trial confirmed that improved metabolic control was significantly associated with

delayed onset and delay progression of microvascular complications, with a clear increasing risk related to poorer metabolic control⁵.

A follow up study of diabetic adolescents suggests that intensive insulin regimens are not the only key to improving control in diabetic adolescents⁶. Furthermore, when intensive insulin regimens are used, the problems of increased episodes of hypoglycemia and weight gain exist⁷.

Research showed that regimen adherence declines over time and is especially poor among some adolescents⁸. Although this decline in metabolic control is partly attributable to the physiological aspects of puberty⁹, adolescence period is also often a period of reduced self-management¹⁰.

A study on adolescents with diabetes found that one third had psychiatric disorders, most involving internalizing symptoms¹¹; other studies showed that

diabetic youth have greater rates of depression¹² and that those with depression have poor glycemic control¹³.

A 10-year longitudinal study found lower self-esteem among young adults with diabetes¹⁴. Poorer psychological adjustment during adolescence may persist into adulthood¹⁵. Research findings indicate that better QOL in youths is associated with increased self-efficacy and less depression¹⁶, as well as improved metabolic control¹⁷.

Adolescents with a more negative perception of their appearance had poor glycemic control and were less likely to check their blood sugar¹⁸. Also adolescents were more dissatisfied with their weight and who perceived themselves to be overweight were more likely to show disordered eating behaviors which may interfere with adherence to diabetic regimen¹⁹.

Family factors are significantly associated with regimen adherence and metabolic control in children and adolescents²⁰. Children who have less life stress and who cope well with diabetes management are more likely to have fewer problems with regimen adherence and metabolic control²¹.

AIM OF THE WORK:

This study was done to investigate the effect of cognitive and emotional response to disease and treatment on diabetes self-management behavior and to study the effect of psychosocial factors as self-esteem, body image, different coping strategies and family factors on diabetes self-management behavior and subsequent glycemic control in diabetic adolescents.

SUBJECTS AND METHODS:

Subjects: The subjects for this cross-sectional study were recruited from Abou El-Rich Pediatric Hospital, Cairo University according to the following criteria.

Inclusion criteria:

- Both sexes,
- Age between 12-18 years
- Diagnosis of DMT1 of at least one year duration,
- Acceptance to participate in the study, by obtaining an informed consent from parents and assent from patients and the ability to participate in the study.

Exclusion criteria: Refusal to participate in the study, clinically mentally retarded patients, currently hospitalized patients, current psychiatric disorder and other chronic medical condition.

Procedure: Subjects were chosen sequentially from the diabetes endocrinology and metabolism pediatric unit

(DEMPU) clinic which is held once weekly during the period from March 2005 to August 2005.

N.B.: 19 patients from the whole number attending the clinic in this period were dropped from the study, this group included 6 patients due to lack of their levels of glycosylated hemoglobin and 13 patients did not finish their psychological evaluation due to the length of the assessment period; approximately 90 minutes).

The patients were divided into 2 groups, a group of controlled diabetes and a group of uncontrolled diabetes according to the level of glycosylated hemoglobin (HbC1). The level of HbC1 $\geq 10\%$ was used to distinguish between inadequate and adequate control based on the recommendations from the American Diabetic Association. Poor control was used as proxy variable for poor treatment adherence as there is substantial literature supporting link between poor control and inadequate diabetes management²².

According to the inclusive and exclusive criteria the group of controlled diabetes consists of 37 cases and the group of uncontrolled diabetes consists of 30 cases.

Methods:

Subjects of the study were submitted to the following:

I- Clinical psychiatric assessment: Patients were interviewed guided by a psychiatric history taking sheet designed at the Department of Psychiatry, Cairo University. It includes detailed developmental, family, educational and past history. Also it includes a mental state examination.

II- Full medical assessment: It is carried out by the pediatrician in DEMPU clinic to assess other medical conditions, any complication of diabetes and attendance of education program.

III- Semi structured interview to assess parental involvement in diabetes management: These include insulin injection, glucose monitoring, diet, exercise, physical activity and doctor visit.

IV- The Personal Models of Diabetes Questionnaire²³: An individual's personal model of diabetes is hypothesized to be a proximal determinant of both the emotional and behavioral response to the illness and treatment by assessing the emotional consequences of diabetes (e.g., worry and fear). Personal models are an extension of schema theory from cognitive social psychology²⁴. The models are grounded in a general theory of cognition that accounts for the merging of incoming information with past experience. Like other cognitive schema, personal model beliefs will change in response to experience, especially during adolescence,

when young people are learning to take responsibility for their own diabetes management²³.

The questionnaire consists of seven items measuring three constructs:

1-Perceived seriousness of diabetes: Three items relate to the consequences of diabetes, two of which assess the patient's feeling of seriousness and worry concerning diabetes complications and one assess the impact of diabetes on the patient's daily life .

2- Perceived treatment effectiveness: It has two items on which patients evaluate their beliefs about the effectiveness of their treatment regimen, one to assess the belief that self-management will control their diabetes and one item assessing beliefs that self-management can prevent the complications of diabetes.

3- Perceived control of diabetes: Two items are used to assess belief about control of diabetes and blood glucose level.

Each item has a 5-point likert scale response option (ranging from 1= not at all serious/important/likely to help to 5= extremely serious/important).

The test was translated by the researcher and back translated by two senior MD staff in the psychiatry department of Cairo University, and was applied on 10 patients as a pilot study by two senior MD staff separately.

V- Coopersmith Self -Esteem Inventory²⁵:

The Arabic version used in this study was translated from the original version developed by Coopersmith, 1991²⁶. This inventory is used to rate how the subject evaluate him/herself. It is self rated and consist of 25 phrases answered either yes or no. It contains 16 negative phrases if answered by no given score and if answered by yes, no score is given. Higher scores reflect higher self-esteem.

VI- Body Image Scale²⁷:

This scale measures the degree of satisfaction of the person about his/her body image. It consists of 26 phrases answered with "I agree "(2), "I am not sure" (1), or "I disagree" (0). The total sores range from 0 to 52. Higher scores reflect more body image disturbance.

V- Taxonomy of children's coping strategies²⁸:

The author has grouped the coping response into 15 conceptually similar categories synthesized from the literature describing children's stress coping strategies.

The categories are:

-*Aggressive activities:* verbal and motor activities, harmful to others.

-*Behavioral avoidance:* keep away from stressor.

-*Behavior distraction:* delay the need to deal with stressor.

-*Cognitive avoidance:* deliberate cognitive attempts to avoid stressor.

-*Cognitive distraction:* deliberate cognitive attempts to keep thoughts away from stressor.

-*Cognitive problem solving:* thoughts focused on how to modify, prevent, eliminate stressor.

-*Cognitive restructuring:* how to change mental perception of stressor

-*Emotional expression:* feeling or emotional expression.

-*Endurance:* how to face stressor and accept its consequences.

-*Information seeking:* Obtaining information about stressor.

-*Isolating activities:* separate the individual from the presence of others.

-*Self-controlling activities:* control of one's behaviors or emotions.

-*Social support:* support from others.

-*Spiritual support:* support an appeal to a higher being.

-*Stressor modification:* non cognitive elimination or modification of the stressor.

The questionnaire consists of 15 phrases each phrase represent one category and the phrases are answered by yes or no (used or not used). It was translated by the researcher and back translated by two senior MD staff in the psychiatry department of Cairo University, and was applied on 10 patients as a pilot study by two senior MD staff separately.

IV- Glycosylated hemoglobin (HbC1):

HbC1 measures the percentage of hemoglobin bound to glucose. As hemoglobin and glucose are together in the red blood cell, the glucose gradually binds to the A1c form of hemoglobin in a process called glycosylation. The amount bound reflects how much glucose has been in the blood during the past average 120-day lifespan of red cells. Adequate control of diabetes should achieve HbC1 levels of less than 7.5%²⁹.

In our study the level of HbC1 $\geq 10\%$ was used to distinguish between adequate and inadequate metabolic control based on the recommendations from the

American Diabetic Association. The patients' HbC1 levels were obtained from their records in DEMPU clinic. The most recent level (within the last three months of the psychological assessment) was used as indicator of diabetic control.

Statistical Analysis:

Statistical analysis was performed on IBM/PC using GraphPad Instat ver.3 for Windows. Both statistical analysis and tabulation were done according to *Altman*,

1991³⁰. The Student's unpaired "t" test was used to detect statistical significance between controlled and uncontrolled diabetic group and between male and female groups. The chi-square "X²" test was used for the analysis of categorical data. The Pearson product moment correlation coefficients "r" was calculated between the different investigated parameters. The level of significance was set at $p < 0.05$.

RESULTS:

I- Socio-demographic data

Table (1): Mean age of both groups

Age	Controlled DM N=37	Uncontrolled DM N=30	p value
	Mean±SD	Mean±SD	
	15.05±2.01	15.73±1.78	0.15

Table (2): Gender distribution in both groups

Gender	Controlled DM		Uncontrolled DM		Total (N=67)		p value
	No.	%	No.	%	No.	%	
Male	24	64.9	4	13.3	28	41.8	<0.001
Female	13	35.1	26	86.7	39	58.2	

Table (3): level of education of both groups

Level of education	Controlled DM		Uncontrolled DM		Total		P value
	No.	%	No.	%	No.	%	
Illiterate	1	2.7	7	23.3	8	19.3	0.03
Primary	3	8.1	0	0	3	4.5	
Preparatory	13	35.1	7	23.3	20	29.9	
Technical & Secondary	19	51.3	16	53.3	35	52.2	
University	1	2.7	0	0	1	1.5	

II- Medical data:

Table (4): Age of onset of diabetes, duration of diabetes in both groups

	Controlled DM	Uncontrolled DM	t-value	p value
	Mean±SD	Mean±SD		
Age of onset (years)	7.86±3.7	9.8±2.72	-2.38	0.02
Duration (years)	7.18±3.49	5.93±2.74	1.6	0.11

Table (5): Number of hospitalization and level of glycosylated hemoglobin in both groups

	Controlled DM	Uncontrolled DM	t-value	p value
	Mean±SD	Mean±SD		
Hospitalization	1.29±0.74	4.7±4.85	-4.20	<0.001
Glycosylated Hb	7.56±0.87	10.2±0.21	-16.14	<0.001

Glycosylated Hb: level of glycosylated hemoglobin

Table (6): Attendance of education program for diabetes in both groups

Education program attendance	Controlled DM		Uncontrolled DM		Total		P value
	No.	%	No.	%	No.	%	
	23	62.2	15	50.0	38	56.7	0.31

Table (7): Parental involvement in diabetes management in both groups

Parental involvement	Controlled DM	Uncontrolled DM	p value
Insulin injection	78.4%	60.0%	0.109
Glucose monitoring	70.3%	33.3%	0.008
Doctor visit	73.0%	40.0%	0.016
Diet	75.7%	66.7%	0.248
Activity	8.1%	20.0%	0.317
Sport	2.7%	10.0%	0.317

III- PSYCHOMETRIC ASSESSMENT :

1- Personal Models of Diabetes Questionnaire:

Table (8): Comparison between both groups regarding results of Personal models of Diabetes Questionnaire

Personal Models of Diabetes	Controlled DM	Uncontrolled DM	P value
	Mean+SD	Mean+SD	
Perceived seriousness	4.568±2.102	7.100±1.768	<0.001
Perceived treatment effectiveness	6.568±1.259	6.667±1.155	0.741
Perceived control of diabetes	5.216±2.016	3.133±1.332	<0.001

2- Coopersmith Self- Esteem Inventory:

Table (9): Comparison between both groups regarding results of Self- Esteem Inventory

Self-Esteem	Controlled DM	Uncontrolled DM	P value
	Mean+SD	Mean+SD	
	14.92±3.44	10.33±4.74	<0.001

3- Body Image Scale:

Table (10): Comparison between both groups regarding results of Body Image Scale

Body Image Scale	Controlled DM	Uncontrolled DM	P value
	Mean+SD	Mean+SD	
	16.703±9.431	29.600±9.294	<0.001

4- Coping Strategies Questionnaire:

Table (11): Comparison between both groups regarding results of Coping Strategies Questionnaire

Coping Strategies	Controlled DM		Uncontrolled DM		Total		P value
	No.	%	No.	%	No.	%	
Aggressive activities	14	37.8%	16	53.3%	30	44.8%	0.205
Behavioral avoidance	11	29.7%	22	73.3%	33	49.3%	<0.001
Behavioral distraction	21	56.8%	19	63.3%	40	59.7%	0.585
Cognitive avoidance	9	24.3%	8	26.7%	17	25.4%	0.827
Cognitive distraction	19	51.4%	8	26.7%	27	40.3%	0.041
Cognitive problem-solving	23	62.2%	16	53.3%	39	58.2%	0.466
Cognitive restructuring	17	45.9%	12	40%	29	43.3%	0.625
Emotional expression	26	70.3%	30	100%	56	83.6%	0.001
Endurance	26	70.3%	7	23.3%	33	49.3%	<0.001
Information seeking	21	56.8%	9	30.0%	30	44.8%	0.029
Isolation activities	20	54.1%	18	60%	38	56.7%	0.625
Self controlling activities	21	56.8%	23	76.7%	44	65.7%	0.088
Social support	21	56.8%	20	66.7%	41	61.2%	0.408
Spiritual support	29	78.4%	24	80 %	53	79.1%	0.871
Stressor modification	18	50.0%	16	53.3%	34	51.5%	0.787

IV- Gender differences regarding Personal Models of Diabetes Questionnaire, Diabetes Self Care Activity Questionnaire, and Coopersmith Self- Esteem Inventory in group of uncontrolled diabetes:

Table (12): Gender differences regarding Personal Models of Diabetes Questionnaire, Diabetes Self Care Activity Questionnaire & Coopersmith Self- Esteem Inventory in uncontrolled diabetes GROUP

	Group of uncontrolled diabetes		p value
	Male (N=4) Mean±SD	Female (N=26) Mean±SD	
Perceived seriousness	6.5±0.57	7.19±1.87	0.476
Perceived treatment effectiveness	7.5±0.57	6.53±1.17	0.123
Perceived control of diabetes	4±0	3±1.38	0.166
Self-esteem	12.5±4.04	10±4.82	0.335
Body image	28.75±6.13	29.73±9.77	0.848

V- Correlations:

1- Age of onset of diabetes:

Table (13): Correlation between age of onset of diabetes and Personal Models of Diabetes Questionnaire in uncontrolled diabetes group

Personal Models of Diabetes	Age of onset in uncontrolled diabetes	
	R	P
Perceived Seriousness	-0.0888	0.641
Perceived Treatment effectiveness	0.406	0.026
Perceived Control	0.0837	0.660

Table (14): Correlation between age of onset of diabetes & both Self- Esteem Inventory & Body Image Scale in uncontrolled diabetes group

	Age of onset in uncontrolled diabetes	
	R	P
Self Esteem	0.3712	0.043
Body Image Scale	0.6004	< 0.001

2- Duration of illness:

Table (15): Correlation between duration of diabetic illness & level of HbC1, Self- Esteem Inventory & Body Image Scale in uncontrolled diabetes group

	Duration of illness in uncontrolled diabetes	
	R	P
Glycosylated Hb	0.4009	0.028
Self-Esteem	-0.3828	0.037
Body Image Scale	0.4118	0.024

Glycosylated Hb: level of glycosylated hemoglobin

DISCUSSION

The sample was selected on the basis of age (should be 12-18 years). The mean age was higher in uncontrolled diabetes than controlled diabetes group, 15.73±1.78 and 15.05±2 years respectively (p=0.153) (table 1).

Females constituted the majority of the uncontrolled group (86.7%) while males constituted the majority of controlled group (64.9%) with high significant difference (p<0.001) (table 2). Metabolic control was poorer in diabetic adolescent girls compared to boys³¹. This could be explained by higher prevalence of psychological

disturbance in female adolescents that may affect adherence to diabetic management.

Only 2.7% of controlled diabetes group were uneducated compared to 23.3% of uncontrolled diabetes group with a significant difference between both groups (p=0.03) (table 3). Higher rates of illiteracy in the uncontrolled diabetes group could be attributed to the negative effect of poor metabolic control on education. This is consistent wprevious reports that poor metabolic control was associated with school absenteeism in children and adolescents with diabetes³². This may be

due to repeated hospitalization in uncontrolled diabetes group.

The mean age of onset (years) of diabetes was significantly lower in the controlled (7.86 ± 3.7) compared to the uncontrolled group (9.8 ± 2.72) ($p=0.02$) (Table 4). One study found that the younger age at time of disease onset has been associated with better psychological adjustment and better adaptation to the disease³³.

The uncontrolled diabetes group had significantly higher mean number of hospitalization 4.7 ± 4.85 compared to 1.29 ± 0.74 times in controlled diabetes group ($p<0.001$) (table 5). This is consistent with poor metabolic control that is associated with higher rates of hospital admissions especially for diabetic ketoacidosis³⁴. This may be due to the comprised health status of patients with poor control which makes them more vulnerable to metabolic instability in the face of acute illness or infection which need recurrent hospitalization.

The number of patients attending the educational program was higher in controlled diabetes than uncontrolled diabetes group, 62.2 % compared to 50 % respectively (Table 6). Individual and group educational interventions were followed by improvement of glycemic control, body weight, psychosocial adjustment, attitude toward diabetes and mental health³⁵.

In the current study the parents involvement was higher in all aspects of diabetes management in controlled diabetes group except for exercise, and it reached a significant level in glucose monitoring ($p=0.008$) and doctor visit ($p=0.016$) (table 7). This is consistent with other studies which found that high levels of parental performance and close monitoring of diabetes management were related to better metabolic control among young adolescents with DMT1²². Perceived seriousness of diabetes was higher in uncontrolled diabetes group while perceived control of diabetes was higher in controlled diabetes group (table 8). Perceived seriousness in diabetic adolescents may not be associated with good control, as increase seriousness may be associated with decrease hope of control of diabetes and emotional disturbance which lead to poor control. This agrees with Hoey et al.,³⁶ who found that adolescents with uncontrolled diabetes often appraised diabetes as more limiting, more inhibiting to them and have higher negative impact on their life. In addition perception of illness in negative terms is usually associated with poor psychological well-being and difficulties in diabetes control in diabetic adolescents³⁷.

The perceived control of diabetes is higher in controlled diabetes group (table 8). This could be attributed to feeling of control over diabetes which may encourage adolescents to follow diabetic regimen that in turn affect glycemic control. This agrees with Rose et al.,³⁸ who found that belief of self efficacy as that he/she is able to carry out treatment behaviors has been described as predictors for adherence to therapy.

The controlled diabetes group showed a statistically higher significant self-esteem (14.92 ± 3.44) compared to the uncontrolled diabetes group (10.33 ± 4.74) (table 9). Young individuals with poorly controlled diabetes have significantly lower self-esteem than well controlled patients³⁸.

In the current study, uncontrolled diabetes group showed statistically higher significant body image disturbance compared to controlled diabetes group (Table 10). Similarly, Colton et al, 2004 showed that adolescents who perceived themselves to be overweight were more likely to show disordered eating behaviors which may interfere with adherence to diabetic regimen¹⁹.

The controlled diabetes group showed statistically significant more frequent use of endurance ($p<0.001$), cognitive distraction ($p=0.041$) and information seeking ($p=0.029$) (table 11). This agrees with other study that found seeking information about diabetes is frequently associated with diabetes regimen adherence and positive adjustment to diabetes³⁹.

On the other hand, uncontrolled diabetes group showed statistically significant more frequent use of behavioral avoidance ($p<0.001$) and emotional expression ($p=0.001$) (table 11). This agrees with another study which found that emotional expression as ventilating was associated with poor adaptation to diabetes⁴⁰. Also behavioral avoidance as omission of glucose test and avoiding problems by using substance are usually associated with poor diabetes control and poor adaptation to diabetes was previously reported⁴¹.

Female from uncontrolled diabetes group perceived diabetes more serious than males (table 12). This is consistent with Skinner and Hampson²³ who found that the girls perceived diabetes to be more serious and had a greater impact on their life. Also, females among uncontrolled group were with lower self esteem than males (table 12). This is consistent with studies which found higher psychological disturbances in female adolescents⁴².

In the uncontrolled diabetes group there was a significant positive correlation between age of onset of diabetes and perceived treatment effectiveness

($p=0.026$). The later age of onset was associated significantly with more perceived effectiveness of treatment (table 13). This may be related to that the later age of onset toward adolescents, in which they can understand the causal relation. This may allow them to search for causes, consequences of illness and effect of treatment.

In the current study the early age of onset of diabetes in the uncontrolled diabetes group was associated significantly with lower self-esteem and highly significantly with more pathological body image ($p=.043$), ($p<0.001$) respectively (table 14). This is not consistent with Schonner et al³³ who reported decreased behavior problems and less level of depression in youth with earlier versus later age of diabetes onset. The negative effect of early onset of diabetes which was apparent in our study in uncontrolled diabetes group may be related to the adverse affect of poor control. As exposure to stress related to poor metabolic control at early age may have negative effect on psychological development of children and adolescents.

There was a positive statistical significant correlation between duration of illness and glycosylated Hb in uncontrolled diabetes group. Poor metabolic control in diabetics was associated with longer duration of illness ($p=.028$) (table 15). This agrees with previous report that longer duration was associated with poor glycemic control because diabetic regimen compliance deteriorates with time³⁹.

The longer duration of diabetes is associated significantly with lower self esteem and more pathological body image ($p=.037$), ($p=.024$) respectively (table 16). This may be due to that longer duration associated with exhaustion of financial resources which may lead to more stress to the parents and may reflect to their children. Social support decreased with longer disease duration, children often experienced reduced sympathy from others and found caring for their diabetes more taxing with longer duration of illness⁴³.

LIMITATIONS OF THE STUDY

There are some limitations for the current study which included the small sized sample which selected nearly from the same social level and the Absence of healthy control group from general population in the same age group without diabetes and lastly tow of the questionnaires used in the study were novel with no available validity or reliability for the Arabic version.

CONCLUSION

Uncontrolled diabetes group showed

- 1- Higher statistically significant perceived seriousness and lower perceived effectiveness of treatment compared controlled diabetes group.
- 2- Significant more frequent use of behavioral avoidance and statistically significant more frequent use of emotional expression.
- 3- Earlier age of onset, and longer duration of illness which is associated significantly with lower self-esteem.

RECOMMENDATIONS

- 1- Increase awareness among workers in the field about the relation between poor metabolic control and poor psychological wellbeing. Psychological assessment should be a routine part of assessment of diabetic patients especially the uncontrolled adolescents.
- 2- A further research using larger sample and investigating more variable social levels would give more findings about the effect of social factors on adherence.
- 3- Further research comparing the results of this study with normal population in the same age group without diabetes would give clear idea of psychological profile of diabetic patients.
- 4- Future researches are highly beneficial to standardize the Arabic version of questionnaires used in this study including validity, reliability, sensitivity and specificity.

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