

Factors affecting adhering toward therapeutic regimen among children with type 1 diabetes mellitus

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Abstract:

Introduction: globally there is an increase of Type 1 diabetes among children. Poorly controlled Type 1 diabetes is associated with the complication. Although medication adherence is important for diabetic children to prevent disease-related complications and improve quality of life, the rate of children adherence to therapeutic regimen is somewhat disturbing. Hence, **this study aimed** to assess factors affecting adherence toward therapeutic regimen among children with type 1 Diabetes Mellitus.

Design: Descriptive exploratory design. **Setting:** This study was conducted at Diabetic Outpatient Clinic in Children's Hospital. **Sampling:** A purposive sample comprised of 200 children with type 1 Diabetes Mellitus. **Tools of data collection:** The data was collected using the following Tools: **I- Interview questionnaire sheet.** It consists of 4 parts: **Part I:** bio-sociodemographic Characteristics of children. **Part II:** assessing the level of knowledge regarding DM, complications, and therapeutic regimen. **Part III:** Adherence of children to therapeutic regimen. **Part V:** assessing the level of adherence and factors affecting children adherence toward therapeutic regimen. **Results:** This study revealed that more than two thirds 78% were satisfactory. Regarding p-value knowledge about therapeutic regimen was highly significant < 0.001*. Also, this study showed that hypoglycemia and hyperglycemia adherence were more than two thirds (80.3%, 76.7%) respectively and p-value were highly significant to both. According to Medication intake adherence were 85.7% and highly significant. Regarding Follow up adherence were 73.3% and highly significant. As regards factors affecting children adherence toward their therapeutic regimen, these showed that physical factors were 90% followed by Financial factors were 79%. **Conclusion:** it was concluded that the factors affecting children adherence toward their therapeutic regimen related to physical factors and financial factors were large percent. While, Psychological factors, Lack of knowledge and Lack of social support were small percent. **Recommendation:** Continuous health teaching to children with type 1 diabetes and their caregivers regarding diabetes, its complication and management.

Introduction:

Type 1 diabetes, is one of the most common chronic diseases in childhood worldwide, is caused by insulin deficiency following destruction of the insulin-producing pancreatic beta cells. It most commonly presents in childhood, but one-fourth of cases are diagnosed in adults. Type 1 diabetes remains the most common form of diabetes in childhood, accounting for approximately two-thirds of

new diagnoses of diabetes in children's ≤ 19 years of age in the United States, despite the increasing rate of type 2 diabetes (*Mayer-Davis et al., 2017*).

Adherence to medication is important especially in children with chronic illness to prevent disease-related complications, improve quality of life, and extend life expectancy. Although medication adherence is important, the rate of Children's adherence to medication is somewhat disturbing (*Jaser et al., 2014*). Pediatric nurse plays an important role in diabetes management. Thus, facilitating the children diabetes care. Pediatric nurse for the children with diabetes must have a basic understanding of the disease, blood glucose goals, management tasks, and symptoms of hypoglycemia and hyperglycemia which may require intervention (*Griffey et al., 2014*).

Type 1 diabetes is the most common endocrine metabolic disorder of childhood and adolescent there are reported small studies from Cairo, the prevalence of type 1 diabetes in children and adolescent is 0.38/1000 in Egypt (*Salem et al., 2010*). Additionally, in Egypt the incidence variance between 8/100000 per year (*El-Ziny et al., 2014*). Moreover, many factors are important to be studied in relation to adherence toward therapeutic regimen such as parents and children related factors.

Aim of the study:

This study aimed to assess factors affecting adherence toward therapeutic regimens among children with type 1 diabetes mellitus.

Materials and method:

Design: A descriptive exploratory design was used.

Setting: This study was conducted at Diabetic Outpatient Clinics

Subjects: A purposive sample consisted of 200 children with type 1 diabetes and their accompanying caregivers who attended to the previously mentioned setting, equal 550-570 in 2013-2014 and 2014-2015 respectively and under the following criteria.

1. Children with Type 1 Diabetes mellitus age group ($9 \leq 18$) years.
2. Diagnosis at least one month before the study.

Exclusion criteria: Children suffering from other chronic diseases, mental or psychiatric illness.

Tools of data collection: The data was collected using the following Tools:

I-Interview questionnaire sheet. It was written in a simple Arabic language by the researcher after reviewing the related literature and reviewed by supervisors. It consists of 4 parts:

Part I: bio-sociodemographic Characteristics of children including; age, gender, duration of DM, random blood glucose, BMI and presence of complications and characteristics of caregivers including; level of education and working.

Part II: assessing the level of knowledge regarding DM, complications, and therapeutic regimen.

Part III: Adherence of children to therapeutic regimen which composed of: (a) Adherence to diet regimen, (b) Adherence to exercise regimen and (c) Adherence to follow-up in outpatient clinic.

Part V: assessing the level of adherence and factors affecting children adherence toward therapeutic regimen which include the following:

Financial factors, Physical factors, Psychological factors, Lack of knowledge and Lack of social support (**Morisky Medication Adherence Scale (MMAS) - Revised**). It was adopted from *Morisky et al. (2010)*, to assess the children adherence toward medication regimen.

Content validity and reliability: It was be done based on result of pilot study and ascertained by a jury of five expertise from Pediatric Medical and Nursing staff, to review the tools for clarity, relevance, comprehensiveness, understandable and applicability. For reliability test-retest was done (0.88).

Data collection:

The actual field work of the study was carried out from the first of 3months the researcher was available in the study setting 3days/week to collect data. From 9 am to 3 pm. The children and their caregivers were interviewed (for 45-50 minutes). The researcher started the interview by introducing herself to both the child and his/her caregivers, giving them clear and brief idea about the aim of the study and its expectation to each child before starting the interview questionnaire. Then each child with diabetes was interviewed individuals to answer the questions.

In addition, written informed consent was obtained from children and their caregivers prior to data collection. They were assured that anonymity and confidentiality would be guaranteed and the right to withdraw from the study at any time. Ethics, values, culture and beliefs were respected.

Statistical Design:

The data obtained was categorized, analyzed, and presented in the form of tables and figures using the Statistical Package for Social Sciences (SPSS) version 21. Qualitative variables was presented in the form of frequencies and percentages; quantitative variables was presented in the form mean and SD. Qui square and fishers tests were used to test the significance of results obtained. Statistically significant difference was considered at $P < 0.05$.

Results:

Table (1): As regards socio-demographic characteristics of studied participants, this table showed that 38% of them aged from 25 to 50 years and more than half of them were females. According to level of education, mother education 38% secondary while, father education 38% primary. Regarding employment status, large number of fathers were employed but large number of mothers were not employed.

Table (1) Socio-demographic characteristics of participants:

	N	%
Age		
<25	50	25
25-50	76	38
>50	74	37
Sex:		
Male	74	37
Female	126	63
Mother education:		
Illiterate	48	24
Primary	44	22
Secondary	76	38
University	32	16
Father education:		
Illiterate	22	11
Primary	76	38
Secondary	44	22
University	58	29
Mother employment status:		
Not employee	150	75
Employed	50	25
Father employment status:		
Not employee	24	12
Employed	176	88

Table (2): As regards disease characterises of studied participants, this table exhibited that duration of diabetes 56% were more than one year and discovery mode were 66% by chance. According to symptoms of disease were 64% by random blood glucose level of education, mother education 38% secondary and body mass index were 38% over weight. Regarding Frequency of glucose monitoring were 66% More than 4 times per day.

Table (2) Disease Characteristics:

	N	%
Duration of diabetes:		
Less than 6 months	30	15
6-12 months	58	29
More than 1 year	112	56
Discovery mode:		
By symptom	68	34
By chance	132	66
Symptoms		
Complications	22	11
History of hyperglycemia and hypoglycemia	50	25
Random blood glucose:	128	64
Body mass index:		
Normal	68	34
Over weight	76	38
Obese	56	28
Frequency of glucose monitoring:		
1-2 times per day	46	23
3-4 times per day	22	11
More than 4 times per day	132	66

Table (3) and figure (1): As regards knowledge about therapeutic regimen, these displayed that more than two thirds 78% were satisfactory. Regarding p-value knowledge about therapeutic regimen was highly significant < 0.001*.

Table (3) Knowledge about therapeutic regimen:

Knowledge about therapeutic regimen:		
	N	%
Satisfactory	156	78
Unsatisfactory	44	22
Total	200	100
X²	61.605	
P-value	<0.001*	

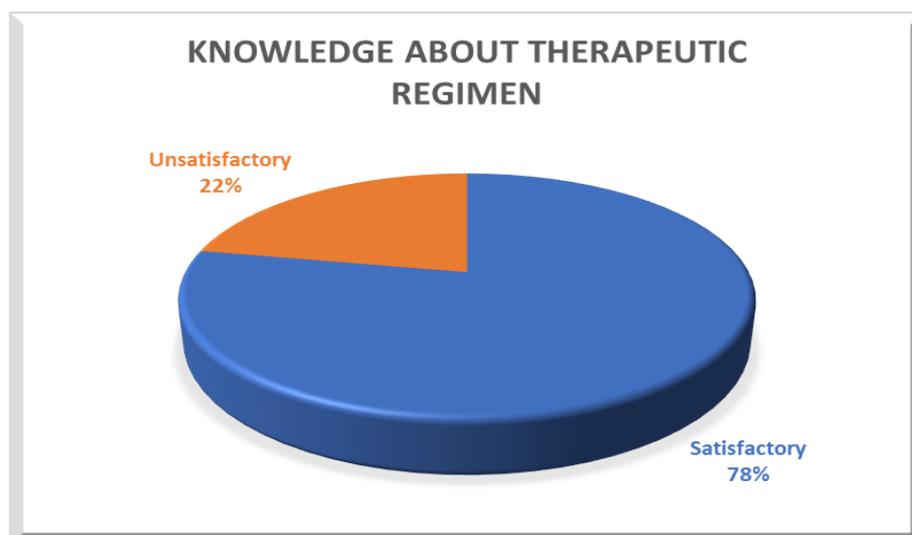


Figure (1) Knowledge about therapeutic regimen

Table (4): As regards distribution of regimen adherence, and glycemic control level, this table exposed that hypoglycemia and hyperglycemia adherence were more than two thirds (80.3%, 76.7%) respectively and p-value were highly significant to both. According to Medication intake adherence were 85.7% and highly significant. Regarding Follow up adherence were 73.3% and highly significant.

Table (4): Distribution of regimen adherence, and glycemic control level

	low		Moderate		High		% of adherence	Chi-square	
	N	%	N	%	N	%		X ²	P-value
Hypoglycemia	24	12	70	35	106	53	80.3	50.680	0.000*
Hyperglycemia	42	21	56	28	102	51	76.7	29.560	0.000*
Investigation (self-tested)	64	32	58	29	78	39	69.0	3.160	0.206
Medication intake	24	12	38	19	138	69	85.7	115.960	0.000*
Diet	64	32	82	41	54	27	65.0	6.040	0.049
Self-care activities	90	45	62	31	48	24	59.7	13.720	0.001*
Follow up	36	18	88	44	76	38	73.3	22.240	0.000*

Table (5) and figure (2): As regards Level of adherence among studied participant, this table uncovered that average and high were (40%, 48.5%) respectively with Mean \pm SD = 15.105 \pm 3.664

Table (5) Level of adherence among studied participant:

Level of adherence			Score	
	N	%	Range	Mean \pm SD
Weak	23	11.5	3-21.	15.105 \pm 3.664
Average	80	40.0		
High	97	48.5		
Total	200	100.0		

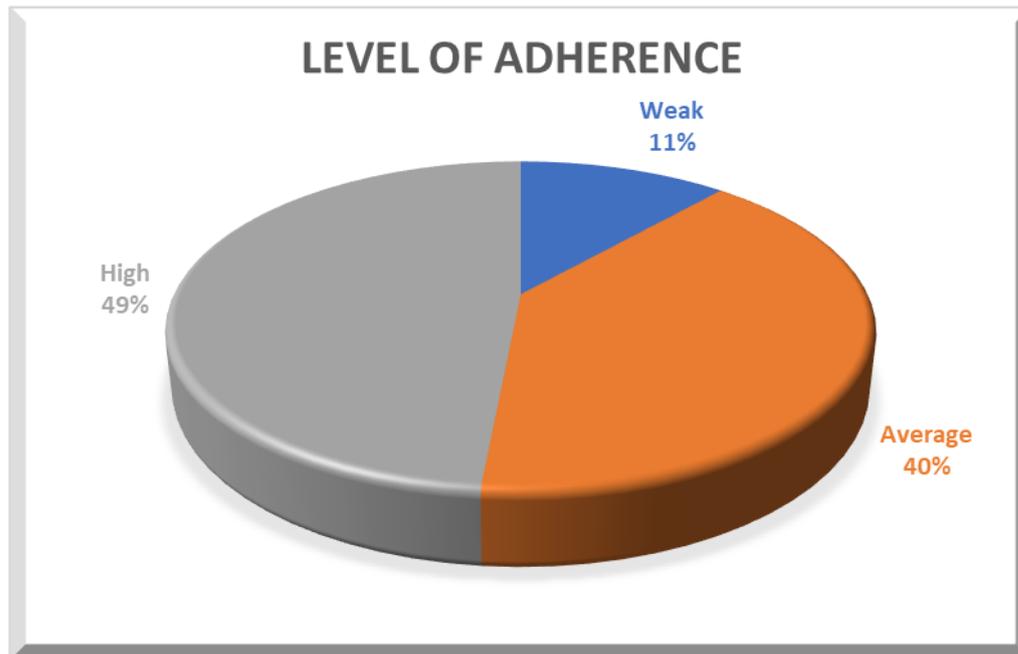


Figure (2) Level of adherence among subjects

Table (6) and figure (3): As regards factors affecting children adherence toward their therapeutic regimen, these showed that physical factors were 90% followed by Financial factors were 79%. While, Psychological factors, Lack of knowledge and Lack of social support were (15%, 23% and 19%) respectively.

Table (6) Factors affecting children adherence toward their therapeutic regimen:

	Yes		No	
	N	%	N	%
No factors	84	42	116	58
Financial factors	42	21	158	79
Physical factors	20	10	180	90
Psychological factors	170	85	30	15
Lack of knowledge	154	77	46	23
Lack of social support	162	81	38	19

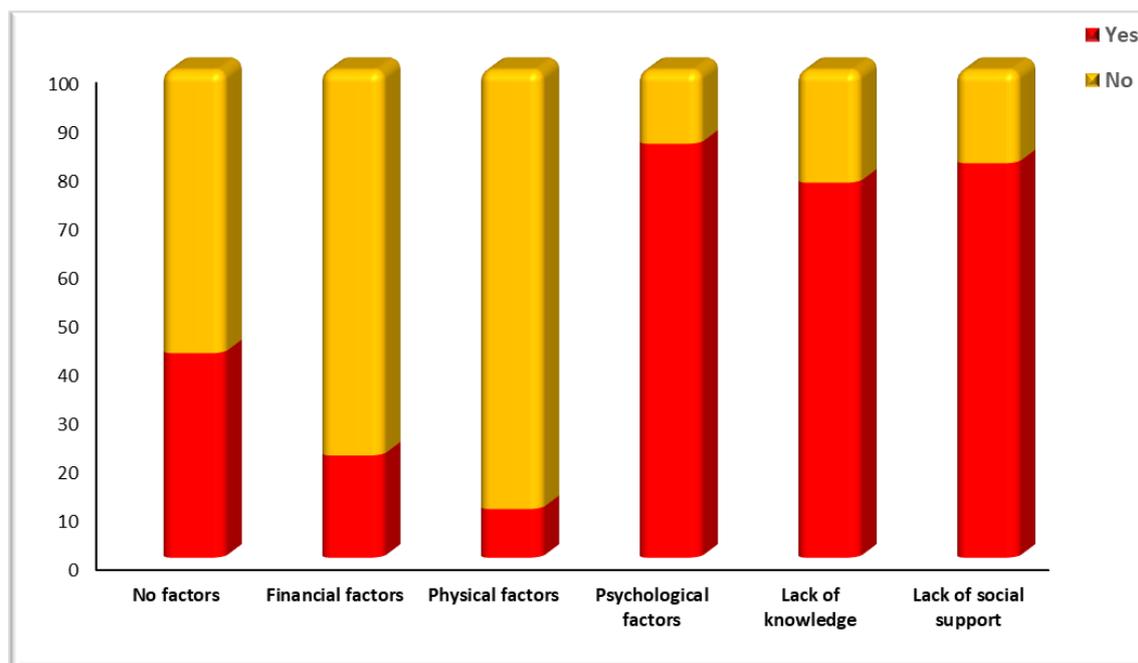


Figure (3) Factors affecting children adherence toward their therapeutic regimen

Discussion:

Diabetes Mellitus (DM) is a main health problem international; which needs more attention a way for applying base of appropriate interventions, and thus prevention of early and late problems of children having type 1 diabetes mellitus have incorporated a set of regimens into their daily lives to prevent diabetic complications (*International Diabetes Federation [IDF], 2015*). Adherence to treatment is a key link between process and outcome in medical care. More health benefits worldwide would result from improving adherence to existing treatments than by devolving new medical treatments (*Faria et al., 2013*).

The finding of the present study showed that slightly more than half of the studied participants were females. Likewise, employment status, large number of fathers were employed but large number of mothers were not employed. This due to the caring role, effectiveness and compassion of mothers are more important than father or other family members, and they are considered as the largest group of family caregivers and they are considered strongly supportive members. This finding was supported by **Omar et al. (2015)** who found that caring role related to children with diabetes depend on females (mother) more than males (father).

Furthermore, this study offered that more than two thirds were satisfactory related to knowledge about therapeutic regimen. This matched with several studies show that parental level of education is linked to their children achieving better care for diabetic children **Archinkova et al., (2018)** and **Haugstvedt et al., (2012)**.

This study presented that level of adherence of studied participants were very highly significant related to glycemic control level, medication intake adherence and follow up adherence. This finding was in accordance with **Memon et al. (2015)** who found that less than two thirds of studied subjects had positive attitudes toward their diabetes and its treatment. This finding was contrary with **Pilacinsk&Ziolkiewicz (2014)**, who found that majority of children included feel sad about having diabetes mellitus and may be associated with poor glycemic control.

The present study revealed that physical factors and financial factors were large percent. While, Psychological factors, Lack of knowledge and Lack of social support were small percent. This result supported by **Wu et al. (2014)** found that higher levels of caregiver support were a protective factor from the expected decline in diabetes self-management adherence. Also, this result matched with study conducted by **Rechenberg et al. (2016)** showed that socioeconomic status was associated with diabetes outcomes. While, this finding was disagreement with study conducted by with **Helgeson &**

Palladino (2012) who stated that poor diabetes outcomes resulting from poor follow up which due to low family socioeconomic status.

Conclusion:

Upon the findings of the current study, it was concluded that the factors affecting children adherence toward their therapeutic regimen related to physical factors and financial factors were large percent. While, Psychological factors, Lack of knowledge and Lack of social support were small percent. Furthermore, knowledge about therapeutic regimen revealed that more than two thirds were satisfactory.

Recommendation:

In view of the study findings, the following recommendations are suggested: Continuous health teaching to children with type 1 diabetes and their caregivers regarding diabetes, its complication and management. Designing an educational handout about type 1 diabetes mellitus and its management plan and allocated for diabetic children and their caregivers.

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