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Correlation between Adaptation to Disease and Adherence to Treatment in Children with Type 1 Diabetes

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Abstract

Background and Aim: Considering the increasing prevalence of diabetes, its complications and inappropriate treatment adherence in children, which can have significant effects on their disease outcomes, the researchers in this study were prompted to investigate the relationship between adaptation to disease and adherence to treatment in children with type 1 diabetes.

Materials and Methods: This descriptive-correlational study was conducted on 150 diabetic children referring to the clinic and endocrinology departments of educational and therapeutic centers affiliated with Amol University of Medical Sciences in 2024. Patients were selected based on the inclusion criteria, using purposive sampling method. To collect data, a demographic information questionnaire, a treatment adherence questionnaire in chronic diseases, and a disease adaptation questionnaire were used. The data were analyzed by SPSS-26 software, using descriptive and inferential statistics.

Results: The results showed that adaptation to disease has a positive and significant correlation with treatment adherence (P=0.044, r=0.165).

Conclusion: Adaptation to disease can increase treatment adherence in children with diabetes and ultimately help them recover faster.

Keywords: Adaptation, Adherence, Diabetes, Pediatrics.

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Introduction

Type 1 diabetes is an autoimmune disease characterized by high blood glucose levels due to a deficiency in insulin production [1]. It is the third most common chronic disease among children, affecting an estimated 15 million children worldwide. In addition, the serious complications associated with the disease make type 1 diabetes a serious medical problem, reducing the life expectancy of affected people by 10 years compared to the general population. These complications can be acute, subacute or chronic, and poor diabetes control can put children at risk of complications [2].

One of the key goals in the care of patients with diabetes is to increase adherence to treatment regimens and recommendations provided by the healthcare team. Studies showed that adherence to treatment is one of the most important behaviors related to diabetes management, as it ensures the health of patients and reduces the severity of complications [3]. The level of adherence to treatment regimens among diabetic patients can be accompanied by disease improvement or exacerbation. However, the level of patient adherence to treatment regimens is quite poor [4]. Although complications of diabetes can be prevented or delayed, several studies have reported poor diabetes control [5]. Adherence to treatment is one of the most important issues in the field of physical and mental diseases, and many patients do not adhere to treatment and ignore physician's orders, which causes economic, physical and cultural problems for the individual, family and society. Adherence to treatment in patients with diabetes is affected by various direct and indirect factors [6]. Lack of social support, psychological problems, poor relationship with the treatment team, access to incomplete and contradictory information, and inappropriate reactions from family and friends are among factors that affect adherence to treatment in patients with diabetes [7]. Adherence to treatment can reduce fasting or random blood sugar levels and reduce glycosylated hemoglobin [8, 9]. Poor adherence in patients with diabetes in various settings can lead to irreversible complications, and ultimately places additional pressure on the health care system [10]. Adaptation to chronic disease is necessary in various areas of life. Adaptation to the disease is an important factor in the management of chronic disease and prevention of complications. A child is

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always faced with physical, social, and psychological changes in his/her environment and must interact with them to achieve adaptation. Since diabetes disrupts biological and psychological interactions, it is necessary for children to adapt to the diabetes [11]. Various aspects of treatment create difficulties for diabetic children in adapting to the disease, so these children must change their lifestyle to the disease conditions and sometimes are required to restrict their diet and activity level against their wishes. This may cause many problems and make their adaptation to treatment more difficult [12]. Family relationships, conflicts of independence and dependence, relationships with friends, attitude towards the disease and body image are among these problems [13].

Therefore, considering the increasing prevalence of diabetes, its complications and adherence to inappropriate treatment in children, which can have significant effects on their treatment outcomes, the research team decided to evaluate the relationship between adaptation to the disease and adherence to treatment in children with type 1 diabetes.

Methods

This is a descriptive-correlational study (IR.IAU.TMU.REC.1403.406) conducted in 2024 on 150 children with type 1 diabetes who were hospitalized in the endocrinology departments of teaching hospital affiliated with Amol University of Medical Sciences, in North of Iran. Inclusion criteria included; having type 1 diabetes confirmed by the treating physician and documentation, having diabetes for at least a year, using insulin for a year, having ability to communicate verbally, and being 7 to 15 years old [14]. The exclusion criteria also included, unwillingness to continue cooperation in any stage of the study, and having severe psychological or cognitive problems. In this study, sampling was done non-randomly by convenience sampling method.

The number of samples was calculated to be 150 people using the following formula with 95% confidence level and 80% statistical power, taking into account an increase of approximately 2.5 times in sample size to neutralize the effect of sampling method.

$$n = \left(\frac{z_{1-\frac{\alpha}{2}} + z_{1-\beta}}{0.5 \ln(\frac{1+r}{1-r})} \right)^2 + 3$$

The data collection tool consisted of three parts. First, a demographic characteristic questionnaire was used to collect demographic data (gender, age, family history of diabetes, hospitalization history,

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duration of the disease, hospitalization or outpatient status, underlying diseases) and clinical data (blood sugar, HbA1c). In the second part, we used the Treatment Compliance Questionnaire in Chronic Diseases, designed and psychometrically tested by Modanloo (2013). This questionnaire consists of 40 questions and 7 domains, including commitment to treatment (9 questions), willingness to participate in the treatment (7 questions), ability to adapt to the treatment (7 questions), integration of treatment into patient's life (5 questions), desire to participate in treatment (4 questions), commitment to treatment (5 questions), and hesitation in implementing treatment (3 questions). The total score is 0 to 200. The higher the total score, the higher the individual's adherence [15]. The third part, the Disease Adaptation Questionnaire, designed by Ebrahimi et al. (2014) includes 43 statements about adaptation to diabetes, which are rated on a 5-point Likert scale ranging from completely agree to completely disagree, with a minimum score of 43 and a maximum score of 215. A high score indicates greater adaptation to the disease [16]. The validity of the questionnaires was confirmed with face and content validity methods by 13 members of Islamic Azad University of Medical Sciences, Tehran, and necessary changes were made to the questionnaires. To determine the reliability, the questionnaires were given to 20 patients to complete and using the Cronbach's alpha method, a coefficient of 0.97 and 0.94 was obtained for the treatment adherence questionnaire and the disease adaptation questionnaire, respectively. It should be noted that the reliability of the tools has been calculated and approved in various studies [16, 8].

After the approval project by Research Vice-Chancellor of the Islamic Azad University of Medical Sciences in Tehran, and obtaining permission for sampling from the respected directorates of hospitals, the researchers began collecting the data. For this purpose, children who met the entry criteria were first identified and then the questionnaires were distributed among them in two morning and evening sessions. The questions were read and explained to the children by the researcher to help them understand the meaning of the questions, and then their answers were marked in the questionnaire by the researcher. To prevent fatigue in the research samples, they were given rest and food. The data were collected by the first author over a period of 3 months.

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Data was analyzed by SPSS-26 statistical software, using descriptive and analytical statistics at the significance level of P<0.05. Demographic characteristics and main study variables were evaluated using descriptive statistics and the normality of quantitative data was assessed using Kolmogorov-Smirnov test. The study hypotheses were tested by Pearson correlation test.

Ethical considerations in this study, such as obtaining the code of ethics from the Research Ethics Committee of Tehran Islamic Azad University of Medical Sciences, explaining the purpose of the research, obtaining informed consent from children's families, ensuring the confidentiality of personal information, and voluntary participation in the study were observed.

Results

The mean and standard deviation of participants' age was 10.65 (2.65) years, and their mean duration of diabetes was 3.07 (1.41) years. The participants' mean serum HBA1C level was 6.10 (0.24). Other demographic information is given in Table 1.

Table 1: The demographic variables

Variables		Frequency	Percentage
Gender	Female	57	38
	Male	93	62
Method of referral	Inpatient	60	40
	Outpatient	90	60
Previous hospitalization history	No	111	74
	Yes	39	26
Family history	No	103	68.7
	Yes	47	31.3
Underlying medical condition	No	106	70.7
	Yes	44	29.3

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The findings also showed that the lowest score of adaptation to the disease among the participants was 45 and the highest score was 140. The mean and standard deviation of adaptation score was 87.86 (15.12). Also, the lowest score of treatment adherence was 97 and the highest score was 157. The mean and standard deviation of treatment adherence score was reported as 119.14 (11.66). The mean scores of treatment adherence subscales are presented in Table 2.

Table 2: Mean score of treatment adherence and its subscales

Variables	Min	Max	Mean	SD
Treatment commitment	13	41	27.15	4.66
Desire to participate in treatment	8	28	20.16	3.62
Ability to adapt to disease	15	34	25.25	3.96
Integrating treatment into life	5	23	15.13	3.02
Adherence to treatment	4	18	11.37	2.62
Commitment to treatment	6	27	13.96	3.69
Hesitation in implementing treatment	3	11	6.62	1.90
Total	97	157	119.66	11.59

The correlation between disease adaptation and treatment adherence along with their subscales is shown in Table 3. Considering the normal distribution of variables and their subscales, statistical analysis was performed using Pearson correlation test. According to the results, adaptation to the disease had a positive and significant correlation with treatment adherence (r=0.165, P=0.044).

Table 3: Correlation of disease adaptation and treatment adherence with their subscales

variable	Treatment commitment	Desire to participate in treatment	Ability to adapt to disease	Integrating treatment into life	Adherence to treatment	Commitment to treatment	Hesitation in implementing treatment
Adaptation to the disease	0.165	0.076	0.118	0.047	0.170	0.107	0.047
	0.044	0.357	0.149	0.569	0.038	0.190	0.568

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Discussion

According to the results, patients with high disease adaptation scores had higher treatment adherence. In this regard, the results of a study showed that disease perception has a direct and significant effect on treatment adherence [17]. Also, according to the findings of another study, lack of proper adaptation to diabetes leads to the lack of self-management behaviors, which in turn reduces treatment adherence and leads to poor diabetes control [18]. Perhaps the reason for this relationship is that patients become frustrated with treatment and, as a result, they become less likely to follow the treatment recommendations by the treatment team. However, this issue requires further investigation to discover the causes of this issue. The findings of a study by Kamody et al. (2018) showed that high disease adaptation and treatment adherence among young people with type 1 diabetes reduce their stress [19].

Based on these studies and comparing their results with the present study, it can be said that adherence to the treatment regimen is one of the most important behaviors related to diabetes management that ensures the health of clients and reduces the severity of disease complications. Compliance of diabetic patients to treatment regimens can lead to the improvement or exacerbation of the disease and affect the treatment outcomes. In this regard factors such as role of family members, support of treatment team, providing education and information about diabetes and its complications, addressing miss-information and ambiguities are also important [3].

On the other hand, adaptation to the disease is considered as a process of maintaining a positive view of oneself and the world in the face of a health problem. Adaptation to a chronic disease is a dynamic process that is constantly influenced by individual and environmental stimuli. In this process, a person with diabetes must confront individual and environmental challenges in order to reach an acceptable level of health as well as physical, mental and social functioning. In diabetes, some of the obstacles to achieving optimal blood sugar control are related to the patient's individual characteristics, including lack of knowledge about diabetes, lack of acceptance and adherence to treatment and diet, beliefs, motivation, lack of individual skills, personality factors, psychological and social factors, physical complications, and psychological and social maladjustments after being diagnosed with diabetes.

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Achieving health in chronic disease is possible by helping patients adapt to their condition physically and psychologically. Successful adaptation to the problems caused by diabetes promotes self-management and self-care and ultimately, improves the patient's quality of life. In diabetic patients, high level of adaptation to the disease is associated with better blood sugar control. Diabetes causes disruption in the biological and psychological interaction of organism [20]. Therefore, considering the increase in the prevalence of diabetes in children and heavy treatment cost it imposes on people and society, practical measures are needed to increase and facilitate the adaptation of children to diabetes.

Conclusions

The results of this study showed that adaptation to the disease has a positive and significant correlation with treatment adherence. By improving patients' adaptation to their disease, it is possible to prevent them from abandoning treatment and make them more hopeful about treatment measures. The results of this study can be used in clinical nursing to provide care and education to patients. These results can also be used in the education of nursing students to prevent complications and improve compliance with pediatric treatment. One of the main limitations of the work was the use of adult tools for children.

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Conflict of Interest

The authors have no conflicts of interest.

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