(RESEARCH ARTICLE)

Family conflict: Risk factor for low adherence in adolescents with type 1 diabetes in Greek families

Alexandra Skodra [1], Vasiliki Matziou [2], Sofia Zyga [3], Ioannis Kasimis [4], Varvara Boutopoulou [2], Effrosyni Vlachioti [5], Koumpagioti Despoina [6], Konstantaki Evanthia [7] and Pantelis Perdikaris [3, *]

[1] General Hospital of Thessaloniki "G. Gennimatas", Thessaloniki, Greece.
[2] Department of Nursing, National & Kapodistrian University of Athens, Greece.
[3] Department of Nursing, School of health Sciences, University of Peloponnese, Greece.
[4] General Hospital of Ioannina "G. Hatzikosta", Ioannina, Greece.
[5] Children's General Hospital "Agia Sophia", Athens, Greece.
[6] Children's General Hospital "P & A Kyriakou", Athens, Greece.
[7] Menarini Hellas, Athens, Greece.

Abstract

Introduction: Type 1 Diabetes Melitus (T1DM) treatment is demanding, due to daily blood glucose monitoring, certain diet plan, specific exercise program, multiple daily insulin injections, and management of episodes of hypo- or hyperglycemia. Family conflict may play a significant role in the adherence of adolescents with type 1 diabetes.

Purpose: To evaluate Greek families' conflicts and determine their relationship with T1DM adolescents' adherence.

Methods: A cross-sectional study was conducted from October 2021 to June 2022. Due to COVID-19 restriction, all the interviews were conducted through online survey. Three questionnaires were distributed to the adolescents. Pediatric Quality of Life Inventory tool, Diabetes Self-Management Profile and Collaborative Parent Involvement Scale for Youths Questionnaire. PeDsQL was distributed to their parents as well.

Results: 59 adolescents (N=21) aged 10-19 years and their parents (N=38) participated. The mean values of PedsQL for all five factors ranged from 55.7 (Worry subcategory) to 77.8 (Treatment adherence), showing an overall moderate QoL. According to the mean values, parents' perspectives PedsQL for all five factors ranged from 38.6 (Worry subcategory) to 77 (Treatment adherence), showing an overall moderate QoL. Mean DSMP score indicated a high level of adherence of children with diabetes mellitus to their treatment, whilst mean cooperation score indicated a high level of cooperation between parents and adolescents with T1DM and low level of FC. Bivariate analysis revealed that less FC was related to better treatment adherence in adolescents.

Conclusions: T1DM management remains challenging, particularly as children grow older and move into adolescence. The family can play a significant role in T1DM management. Diabetes multidisciplinary teams should evaluate and understand family members' interactions detecting inter-family problems such as high frequency of FC. Provision of family support can improve communication between adolescents and parents and may reduce FC resulting in better T1DM treatment adherence and outcomes.

Keywords: Type 1 Diabetes Mellitus; Adolescent; Family conflicts; Treatment adherence; Quality of life

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1   Introduction

Type 1 Diabetes Melitus (T1DM) treatment is demanding, due to daily blood glucose monitoring, certain diet plan, specific exercise program, multiple daily insulin injections, and management of episodes of hypo- or hyperglycemia [1]. Although technology has offered more options for managing treatment—insulin pumps, Continuous Glucose Monitoring (CGM) devices—management requirements remain complex. Parents play a significant role in disease management and family interactions appear to influence parameters which relate to patient outcomes [2].

The term Adherence describes "the extent to which a person's behaviour coincides with medical or health advice" [3]. Family functioning is a well-documented factor for adolescents with T1DM adherence [4]. Family functioning refers to the physiological and psychological functioning and dynamics in the relationships which develop between its members [5]. In the study by Lewin et al. (2006) they found that 34% of the factors that positively contributed to glycemic control were due to parameters of family functioning [6]. Similarly, family variables could predict 13% to 34% of Quality of Life (QoL) outcomes in T1DM patients [7]. Research agrees that a family environment which supports optimal disease management is associated with better patient's outcomes [8]. Recent studies have also shown that the level of parental monitoring of a warm family environment contributes to adolescents' adjustment to chronic illness, including T1DM [9].

In contrast, Family Conflict (FC) has been associated with adverse psychological and physical outcomes associated with T1DM management. Furthermore, FC specific to disease management has been shown to be a strong negative predictor of QoL in adolescents with T1DM [2]. These conflicts have additionally been associated with poorer adherence, as well as increased rates of depression in adolescence [10]. The causal relationship between FC and disease parameters has not yet been clarified. There are studies that show that FC follow the declining course of the disease, while some have shown the opposite – the declining course of the disease is the major cause of FC. There is likely a bidirectional relationship between these factors, as worsening glycemic control leads to greater tension and conflict between adolescents and parents, increasing stress levels and raising the risk for further worsening. Regardless of whether FC is a cause or consequence of poor glycemic control, it is essential to recognize this aggravating factor in the adherence of adolescents with T1DM [2].

Many studies have extensively examined the types of parental involvement and their relation to adolescent treatment adherence. Strong parental involvement results in adolescents becoming reactive and leading to lower compliance and even withdrawal [11]. Parental involvement perceived by adolescents as collaborative has been associated with better outcomes, including better glycemic control and QoL, and lower rates of depression. The study findings point out that the goal is to encourage communication and collaboration between adolescents and their parents regarding T1DM treatment management. Studies have shown that the FC level depends on the type of parental involvement [12].

Moreover, race/ethnicity has been associated with type of parental involvement as a parameter of culture. Hsin et al. (2010) found that in Hispanic families, higher levels of parental involvement and family support were associated with better adolescent adherence to T1DM treatment [13]. Greece, which is a Mediterranean country as well, new family models have appeared, but the traditional core of male-father-centred model remains [14]. Greek parental involvement although it is believed that it is strong causing high levels of FC, it hasn't been studied yet in relation to chronic disease management [15]. Nevertheless, up to date, FC in Greek families in relation with adolescents' adherence in T1DM has never been studied before. Thus, the main purpose of this study was to evaluate Greek families FC and determine their relation to T1DM adolescents' adherence.

2   Material and method

This is a cross-sectional study, which was held in Diabetes's Centre of three public hospitals in North Greece, and nationwide through an online survey which was announced by Greek Associations of Diabetes, from October 2021 to June 2022. Approval of Ethics Committee of all hospitals was taken. Due to COVID-19 restriction, all the interviews were conducted through online survey.

2.1   Inclusion criteria

- Age of adolescents 10-19 years (World Health Organization definition) of both sexes, have a confirmed diagnosis of T1DM and agree to participate in the study after being informed.
- Sufficient communication skills of all participants (adolescents and parents) in the Greek language (writing and reading), with no underlying mental illness or mental retardation.

- Participants' parents under the age of 18 years (according to the Greek law) approval and signed consent. Due to COVID-19 restriction all signed consent forms were sent to the research group via email.

Three questionnaires were distributed to the adolescents. Pediatric Quality of Life Inventory tool (PedsQL Diabetes Module Version 3.0), which includes 28 questions classified into five sub-categories (Symptoms of Diabetes Mellitus, Treatment Barriers, Treatment Adherence, Worry, Communication) [16], Diabetes Self-Management Profile (DSMP), which assess child's self-awareness regarding the degree of adherence to the treatment of T1DM, including 14 questions [17], and the questionnaire for the Collaborative Parent Involvement Scale for Youths questionnaire, consisted of 12 questions (CPISY) [18]. PedsQL and DSMP have previously validated in Greek [19, 20]. CPISY questionnaire was validated in Greek during present study.

2.2 Statistical Analysis

Data analysis was performed with the statistical program IBM SPSS 21.0 (Statistical Package for Social Sciences). Categorical variables are presented as absolute and relative frequencies, while quantitative variables are presented as mean, standard deviation, median, interquartile range. The Kolmogorov-Smirnov test was used to test for normal distribution of quantitative variables. Quantitative variables were found to follow normal distribution. Associations between cooperation, treatment adherence and QoL were explored using Pearson's correlation coefficient. t-test, Pearson correlation coefficient, Spearman's correlation methods were applied and in case of more than two significant independent variables bivariate analysis and multiple linear regression was applied. Two-sided level of statistical significance was set equal to 0.05. Therefore, correlations and differences found below this level were defined as statistically significant ($p<0.05$).

3 Results

3.1 Validation of CPISY questionnaire

The Cronbach's alpha coefficient of CPISY questionnaire was 0.81 and indicates very good reliability of the questionnaire. The Cooperation Score values range from 12 to 60. It is emphasized that an increase in the score also indicates better cooperation between parents and adolescents.

3.2 Sample

In total, 59 adolescents (N=21) aged 10-19 years and their parents (N=38) participated in the study. **Table 1** shows the demographic characteristics of adolescents and parents. The mean age of the adolescents was 15.1 years (SD=1.8), while the mean age of the parents was 46.2 years. Most children were girls (65%), whilst most parents were mothers (92.1%).

Table 1 Parents and adolescents' characteristics

Characteristics		N	%
Adolescents			
Sex	Boys	7	35
	Girls	13	65
Age$^\alpha$	Mean= 15.1 SD=1.8		
Parents			
Sex	Male	3	7.9
	Female	35	92.1
Profession	Household	3	9.1
	Unemployed	3	9.1
	Employee	22	66.6
	Other	5	15.2
Age$^\alpha$	Mean=46.2 SD=4.4		

| Educational level | Elementary school | 3 | 9.4 |
	Secondary school	15	37.5
	University	15	46.9
	MSc	2	6.3

α Mean, Standard Deviation

3.3   PedsQL, DSMP and CPISY results

Adolescents' PedsQL results for the five sub-categories are presented in **Table 2** and **Figure 1**. According to the mean values, PedsQL for all five factors ranged from 55.7 (Worry subcategory) to 77.8 (Treatment adherence), showing an overall moderate QoL. Parents' perspectives of their children's PedsQL for the five sub-categories are presented in Table 3 and Figure 2. According to the mean values, parents' perspectives PedsQL for all five factors ranged from 38.6 (Worry subcategory) to 77 (Treatment adherence), showing an overall moderate QoL.

Table 2 Descriptive results for all five PeDsQL subcategories for adolescents

| Subcategory	Mean	Standard Deviation	Median
Symptoms of Diabetes Mellitus	65.5	17.3	72
Treatment barriers	60.4	24.9	63
Treatment Adherence	77.8	20.7	86
Worry	55.7	28.6	58
Communication	68	24.1	67
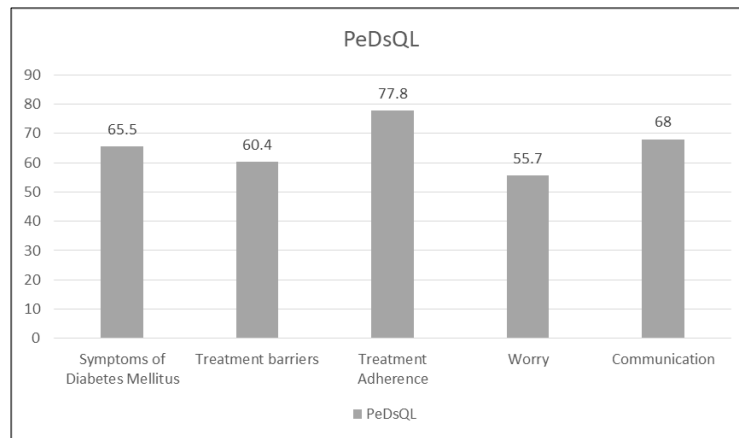
Figure 1 Mean values for all five PeDsQL subcategories for adolescents

x-axis: Subcategories of PeDsQL scores; y-axis: PeDsQL scores

Table 3 Descriptive results for all five PeDsQL subcategories for parents

Subcategory	Mean	Standard Deviation	Median
Symptoms of Diabetes Mellitus	67.2	16.8	69
Treatment barriers	60.9	24.8	63
Treatment Adherence	77	17.6	78
Worry	38.6	20.3	33
Communication	76.4	29.4	92
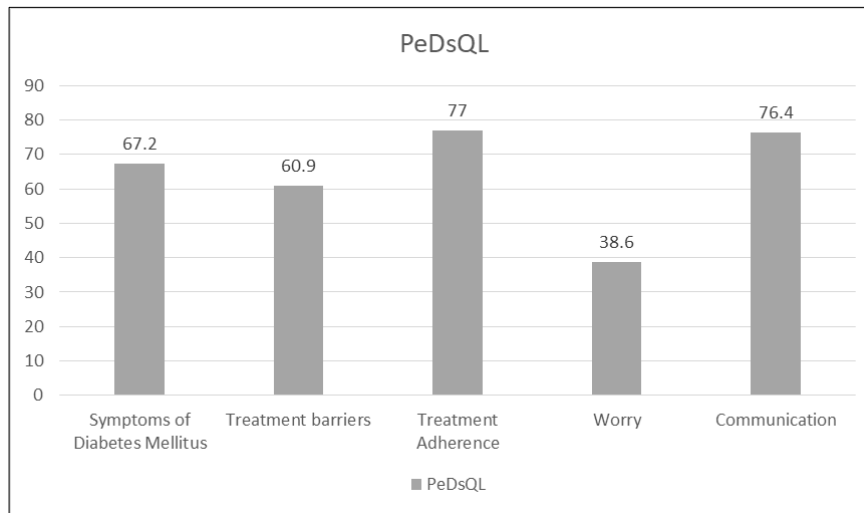
Figure 2 Mean values for all five PeDsQL subcategories for parents

x-axis: Subcategories of PeDsQL score; y-axis: PeDsQL scores

Mean DSMP score indicates a high level of adherence of children with diabetes mellitus to their treatment. Mean DSMP score was 4 (SD=0.5, Median=3.8). Among DSMP items, '*administration of insulin in certain hour*', '*having a fast-acting glucose (or sugar) for hypo-glycaemic incidents in my bag*' and '*going to the appointments with the diabetes team*' rated the highest score (Mean=4.6, SD=0.5; Mean=4.6, SD=1.1; Mean=4.6, SD=0.7 respectively).

The mean cooperation score indicates a high level of cooperation between parents and adolescents with diabetes mellitus. The CPISY score was 51.6 (SD=12.7, Median=58). Among the CPISY items, ''*my parents help me when I need it*'' had the higher mean score (Mean=4.7, SD=1), whilst '' *my parents help me to plan my free time with my peers and at same time to manage my diabetes*'' scored the lowest score (Mean=4, SD=1)

3.4   Correlation

Bivariate analysis revealed no statistical relationship between the independent variables and DSMP (**Table 4**). However, better cooperation between parents-adolescents, such as less FC, was related to better treatment adherence in adolescents. **Table 5** presents correlations between FC, DSMP, and PedsQL. The statistically significant relationships were:

- Less FC was moderately associated with better QoL in the subcategory of Treatment Adherence.
- Less FC was moderately related to better QoL in the subcategory of Communication.
- Higher DSMP score was moderately associated with better QoL in the subcategory of Treatment Barriers.
- Better QoL in the subcategory of Symptoms of Diabetes Mellitus was strongly associated with better QoL in the subcategory of Treatment Barriers.
- Better QoL in the subcategory of Treatment Barriers was moderately associated with better QoL in the subcategory of Treatment Adherence.
- Better QoL in the subcategory of Treatment Barriers was strongly related to better QoL in the subcategory of Worry.
- Better QoL in the subcategory of Treatment Barriers was strongly related to better QoL in the subcategory of Communication.
- Better QoL in the subcategory of Treatment Adherence was strongly associated with better QoL in the subcategory of Communication.
- Better QoL in the subcategory of Treatment Adherence was moderately related to better QoL in the subcategory of Worry.

Table 4 Bivariate analysis between demographic characteristics and FC

Variable		Mean Adherence Score	Standard Deviation	P-value
Adolescence's sex	Boys	4	0.8	0.9[a]
	Girls	4	0.4	
Parent's age			-0.3[b]	0.3[b]
Working parents	No	4.3	0.5	0.2[a]
	Yes	3.8	0.4	
Parent educational level			-0.01[c]	0.9[c]
Family Conflict's level			0.3[b]	0.3[b]

[a] t-test; [b] Pearson correlation coefficient; [c] Spearman correlation coefficient

Table 5 Correlations between FC, DSMP, and PedsQL

	FC	DSMP	Symptoms of Diabetes Mellitus	Treatment barriers	Treatment Adherence	Worry
DSMP	0.3 (0.3)					
Symptoms of Diabetes Mellitus	0.3 (0.1)	0.3 (0.1)				
Treatment barriers	0.5 (0.1)	0.6 (0.01)	0.7 (<0.001)			
Treatment Adherence	0.6 (0.01)	0.5 (0.03)	0.6 (<0.001)	0.7 (<0.001)		
Worry	0.4 (0.1)	0.3 (0.3)	0.5 (<0.001)	0.7 (<0.001)	0.6 (0.01)	
Communication	0.5 (0.03)	0.3 (0.2)	0.4 (0.1)	0.7 (<0.001)	0.8 (<0.001)	0.4 (0.1)

Pearson correlation coefficient (p<0.05)

4 Discussion

A cross-sectional study was conducted involving adolescents with T1DM aged 10-19 years and their parents. More specifically, FC between adolescents and parents, adolescents' adherence to treatment and QoL were assessed. Our study showed that less FC and better cooperation among Greek family members is related to better treatment adherence in adolescents with T1DM.

Our main finding agrees with previous published studies [6, 21-27]. Harmonious cooperation between parents and children and less FC are a necessary condition for the best possible treatment adherence in children, especially in the first months or even years after the initial diagnosis of diabetes [21]. Children need their parents to be involved in their care and to share responsibility, feeling that there is a family support network. Parental knowledge and ability to manage children's diabetes are essential prerequisites for disease management [23, 28-30]. Indicatively, it is reported that approximately 60% of adolescents still want their parents' help in managing diabetes [30].

Another significant finding of the present study was that better cooperation between parents and adolescents, less FC and better treatment adherence, were related to better QoL. This finding is also supported by the literature, as less FC significantly improves children's compliance with treatment, resulting in limitation of negative outcomes and improvement of QoL [22, 31, 32]. Better adherence treatment in adolescence leads to better glycemic control, which also improves adolescents' QoL. Therefore, the best possible adherence treatment which can be achieved in a supportive

and harmonious family environment becomes of particular importance. Families that are more emotionally supportive and there is better communication among members encourage adolescents to increase self-management level, whilst adolescents experience fewer T1DM complications, worry less about the disease, and are more satisfied [22]. When parents allow open and honest dialogue, provide help to their child whenever he/she needs it and practically encourage him/her to continue living a normal life, the psychological and physical outcomes seem to be better.

Even though Greek families are considered to be strict and male- father centred, this study revealed that Greek parents cooperate at a satisfied level with adolescents with T1DM [14]. This study also showed a low level of FC in Greek families with a chronic disease, finding that it is controversial to literature. This finding can be explained by the fact that in the last decades Greek family profiles have changed greatly and there is an asymmetry between the cultural ideals and actual everyday parental behaviour [15].

Study limitations include that this study is a cross-sectional study, in which information was obtained at a specific point in time during COVID-19 pandemic, and findings may have been affected by restrictions. Further longitudinal studies following children over a period could provide more information. In addition, since the questionnaires were self-administered by adolescents and parents, the subjective factor increases the possibility of systematic reporting error. The sample of the study was also quite small, showing the need for larger studies in the field.

5   Conclusion

The ever-increasing number of paediatric populations, including adolescents, suffering from T1DM makes it imperative to investigate as many variables which are related to worsening of symptoms as possible. T1DM management remains challenging, particularly as children grow older and move into adolescence. Adolescents have different needs, and it is more difficult for them to adapt to highly demanding situations such as T1DM. Therefore, a careful and thorough understanding of adolescence is needed. The family can play a significant role in T1DM. Diabetes multidisciplinary teams can play a crucial role by understanding family members' interactions and revealed inter-family problems such as high frequency of FC. Provision of family support can improve communication between adolescents and parents and may reduce FC resulting in better T1DM treatment adherence and outcomes.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

Ethical approval of the present research work was obtained by the Committee of Ethics and Deontology of the University of Peloponnese, as well as by any of the institutes involved in the research. Moreover, a written informed consent was obtained by any of the parents who he/she and his/her kid participate in the research work. Children and adolescents who participated in the study were informed by the main researcher too. Data will be secured for 3 years with no permission to anyone, except of the main researcher.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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