

Complementary and Alternative Medicine Used for Children with Type 1 Diabetes Mellitus

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Abstract

Background: This is a cross-sectional study performed to assess the use of complementary and alternative medicine (CAM) in children with T1DM.

Methods: 200 mothers of children with T1DM under observation in Pediatric Endocrinology Polyclinic of a university hospital between September 2014 - September 2015 were interviewed regarding CAM use in their children.

Results: 40.0% of mothers of children with T1DM used CAM to control blood glucose and to support treatment. CAM users often used herbs, mixtures and praying. Those who preferred herbal used black cumin, cinnamon and olive leaves, while those who preferred mixtures used a yoghurt-lemon mixture and mengisu. There was no difference between HbA1c values of children who used CAM and those who did not ($P > 0.05$). Patient's sex, family income level, and educational level of mother and father did not affect CAM use ($P > 0.05$).

Conclusions: Children with T1DM often received herbs, mixtures and praying. Nurses should provide diabetic children and their parents with training and counseling about the advantages and hazards of CAM.

Keywords: Child, Complementary Therapies, Diabetes, Alternative Medicine, Nurse

1. Background

The use of complementary and alternative medicine (CAM) has been increasing in recent years (1, 2). Although the use of CAM is different among cultures, the prevalence of it ranges between 9.8% and 76.0%. CAM is most commonly used by adults in East Asian countries for chronic diseases (1, 3, 4). Type I diabetes mellitus (T1DM), which is encountered often in childhood, is one of those chronic diseases (5-9).

T1DM is a complicated disease that requires diet, exercise, insulin treatment, measurement of blood glucose levels and a struggle against hypo/hyperglycemia (10). CAM is used by T1DM children and their families in order to decrease blood glucose levels and diabetic complications, to increase general health and to obtain psychological relief and relaxation; it is thought that CAM is beneficial with fewer side effects (3, 5-9). Although several studies have been published on CAM use among diabetic adults (11-18), knowledge about the use of these methods among chil-

dren is rather limited and there are inconsistencies among studies (5-7, 9, 16, 19, 20). The prevalence of CAM use ranges from 5% and 81% in diabetic adults (11-14, 17, 18); whereas the prevalence of CAM use ranges from 18% to 56% in the pediatric population. It has been noted that children with T1DM mostly use methods such as herbal therapies, vitamins/minerals and nutritional supplements (5-7, 9, 15, 19). CAM use is higher among children with T1DM who develop complications due to the disease (7), and who have a high level of family income (5-8, 14). Some studies have indicated a correlation between the rate of CAM use, the duration of diabetes and the mother's educational level (5, 6), while other studies have contradicted these findings (5-9, 15).

Since liver and kidney functions in children are physiologically immature, they are more affected by medicine and chemical agents and therefore side effects may be more severe and deadly in children as compared with adults (16, 20-22). While some CAMs (e.g. bitter melon) trigger beta-cells in the pancreas to produce more insulin,

other CAMs (e.g. cinnamon) increase the sensitivity of peripheral insulin receptors (23, 24). One of the ingredients commonly found in cinnamon, cinnamaldehyde, promoted glucose uptake into skeletal muscle through glucose transporter translocation (25) and the use of natural products with hypoglycemic effects with conventional drugs possessing blood glucose lowering effects may cause a dramatical decrease in blood glucose level (23), yet the exact anti-diabetic mechanism is not yet established. Hypoglycemic effects of black cumin oil might be due to presence of some phytochemicals including thymoquinone and carvacrol (26). Thus, due to the possibility of undesirable interactions with conventional medicine, it is imperative to ask patients about CAM use during patient assessment.

However, advantage and hazard assessments of CAM therapies in children with T1DM are limited (20-22). It is important to understand the characteristics of these patients in terms of planning services and managing treatment and giving care. Therefore, health professionals working with children with T1DM should determine which CAM methods are used by the children.

2. Methods

This cross-sectional study was performed at the Pediatric Endocrinology Polyclinic of a university hospital between September 2014 and September 2015. The study was conducted with participation of mothers of 200 T1DM children who stand under observation.

Before the study, approval of the ethical council (Erciyes University Ethical Council, protocol number: 2014/511) and informed consent was obtained.

Inclusion criteria of the mothers consisted of:

- Having a child with T1DM,
- Attending the pediatric endocrinology polyclinic with her child,
- Having no disability (auditory, visual, mental...)
- Speaking Turkish,
- Giving consent.

Through a face-to-face interview, the data were collected using the child descriptive form and the parent form about complementary therapy practice which were designed by the authors through literature review (5-10). The child descriptive form included questions addressing age, sex, educational status, and family income level. The Parent form about complementary therapy practice was composed of 17 questions addressing issues such as whether or not CAM was used, reasons why CAM was used or not used, the duration of CAM use, whether or not health care personnel were consulted, whether or not they knew

the side effects and whether or not they still continued to use CAM.

All statistical analyses were performed using the IBM SPSS Statistics 22.0 package program (IBM Corp., Armonk, New York, USA). Data are expressed either as frequencies and mean \pm standard deviation. Shapiro-Wilk's test was used and a histogram and q-q plot were examined to assess the data normality. Levene's test was used to assess the variance homogeneity. A two-sided Student test or a two-sided Mann-Whitney U test were applied to compare the differences between groups for continuous variables. A two-sided Fisher's Chi-square exact test for rxc tables was applied to compare the differences between groups for categorical variables. A P value $<$ 0.05 was considered statistically significant.

3. Results

The average age of the children with T1DM was 11.6 ± 3.7 years and diabetes duration since its diagnosis 4.3 ± 3.1 years. 51.0% were girls, 75.0% had a moderate level of family income and 40.0% were from families with two children. 47.0% of the mothers were between 35 - 44 years and 56.5% of the mothers had a primary school education; 50.5% of the fathers were between 35 - 44 years and 40.0% of whom had a primary school education (Table 1).

14.0% of the children had co-existing diseases. The most commonly encountered co-morbidities were hypothyroidism (41.6%) and celiac disease (16.6%). Physiological parameters of the participating children: average body weight 43.5 ± 16.4 kg, average height 147.15 ± 20.8 cm, average HbA1c level $9.8\% \pm 5.7$ and average insulin dose 0.98 ± 0.71 U/kg.

Forty percent of mothers used CAM because: 55.6% wanted to keep blood glucose level of their child under control, CAM is found it natural (12.7%) and wanted to support the treatment (11.3%). 30.1% of the children started to use CAM within one year after they were diagnosed with diabetes, 21.1% of them started to use CAM when they saw it discussed on mass media and 46.3% continued to use CAM during the administration of the questionnaire. 25.0% of mothers stated that they consulted a health care personnel regarding the use of CAM and 50.0% of them were told that their health care practitioner supported CAM use (Table 2).

CAM users often used herbs (46.6%), mixtures (23.3%) and praying (22.4%). The mothers who preferred herbal methods stated to use black cumin, cinnamon and olive leaves, while those who preferred mixtures used yoghurt-lemon mixtures and mengisu (Table 3).

In this study, sex of children, family income level, the number of the children in the family, the presence of a co-existing disease with diabetes, mother's age, father's age,

Table 1. Descriptive Characteristics of the Children with T1DM and Their Parents

Descriptive Characteristics	Number (%)
Sex	
Girls	102 (51.0)
Boys	98 (49.0)
Family income level	
Poor	10 (5.0)
Moderate	150 (75.0)
Good	40 (20.0)
Number of children in family	
1	17 (8.5)
2	80 (40.0)
3	65 (32.5)
4+	38 (19.0)
Age of mother (year)	
25 - 34	73 (36.5)
35 - 44	94 (47.0)
45+	33 (16.5)
Educational status of mothers	
Illiterate	5 (2.5)
Primary school degree	113 (56.5)
Secondary school degree	26 (13.0)
High school degree	40 (20.0)
University	16 (8.0)
Age of father (year)	
25 - 34	29 (14.5)
35 - 44	101 (50.5)
45+	70 (35.0)
Educational status of fathers	
Illiterate	2 (1.0)
Primary school degree	80 (40.0)
Secondary school degree	44 (22.0)
High school degree	41 (20.5)
University	33 (16.5)
Total	200 (100.00)

mother's educational level and father's educational level did not affect CAM use ($P > 0.05$) (Table 4). During the study implementation, there was no statistically significant difference between children who used CAM and those who did not in terms of HbA1c values ($U = 744.500, P = 0.623$).

4. Discussion

The use of CAM has been increasing both in Turkey and all over the world (1-4). Studies have indicated that CAM use among children with T1DM varies between 18% - 56% (5-10). In the present study, the use of CAM among children with T1DM was found to be 40.0% (Table 2). In general, children with T1DM use CAM to reduce blood glucose to a normal level, to recover from the disease, to protect

Table 2. Status and Reasons of CAM Use Among the Children with T1DM

	Number (%)
CAM use	
Yes	80 (40.0)
No	120 (60.0)
Reasons of CAM use^a	
Controlling blood glucose	79 (55.6)
Natural qualities	18 (12.7)
Supporting the treatment	16 (11.3)
Decreasing side effects of the disease	6 (4.2)
Psychological relaxation	6 (4.2)
Thinking that it is beneficial	5 (3.6)
Other ^b	12 (8.4)
Time CAM use started^a	
As soon as the diagnosis was made	12 (14.5)
Within the first year	25 (30.1)
After 2 - 3 years	24 (28.9)
After 4 years and over	22 (26.5)
CAM use recommended by^a	
Mass media	26 (21.1)
Relatives	23 (18.7)
Friends	22 (17.9)
Family	16 (13.0)
Patients	12 (9.8)
Neighbors	10 (8.1)
Herbalists	8 (6.6)
Health care personnel	6 (4.8)
Whether or not CAM use is still being continued (n = 80)	
Yes	37 (46.3)
No	43 (53.7)
Informing health care personnel about CAM use (n = 80)	
Yes	20 (25.0)
No	60 (75.0)
Attitudes of health care personnel (n = 20)	
They supported CAM	10 (50.0)
They recommended CAM during the treatment	5 (25.0)
They did not support CAM, explained no reason	2 (10.0)
They did not support CAM, explained harms of CAM	2 (10.0)
They made no comment	1 (5.0)

^a More than one option was chosen.

^b Other (Pancreas renewal, complete recovery from diabetes, prevalence of treatment, acceptance of the disease, supporting the immune system and preventing internal organs, fewer side effects).

themselves from diabetic complications and/or to minimize these complications, to support medical treatment, to increase the benefits of insulin and to eliminate the side effects of insulin administration [5-7,9,15]. It has also been reported that children use CAM with the hope that every possible method should be tried to improve general health condition, to obtain inner peace, psychological relaxation and adaptation. Moreover, CAM is natural, cheaper and safer than medical treatments and is used in response to

Table 3. CAM Methods Used by the Children with T1DM

	Number (%)
CAM methods used^a (n=116)	
Herbal methods	54 (46.6)
Mixtures	27 (23.3)
Praying	26 (22.4)
Other ^b	9 (7.7)
Herbal methods used^a (n = 74)	
Black cumin	15 (20.2)
Cinnamon	14 (18.9)
Olive leaves	8 (10.8)
Pomegranate flower	7 (9.5)
Amberparis	3 (4.1)
Other ^c	27 (36.5)
Mixtures used^a (n = 26)	
Yogurt + lemon	11 (42.3)
Mengisu ^d	10 (38.5)
St lucie cherry + cinnamon + dried grapes + black Cumin + Yogurt	2 (7.7)
Barley + Wheat + Tall oil liquid	2 (7.7)
Barley + Wheat liquid	1 (3.8)

^aMore than one option was chosen.

^bOther (aromatherapy, massage, homoeopathy, healer, listening to music, cupping).

^cOther (rosehip, garlic, thyme, pomegranate syrup, centaury, fig leaves, bitter apricot seed, clove, chamomile tea, reishi mushroom, sour orange, lemon balm, cabbage, cordyceps, spirulina, linseed, turnip juice, pine wood, ginseng).

^dMengisu: a mixture made of olive oil, bitter almond, walnut leaves, lupinus albus, black mulberry leaves, myrtus leaves, thyme, salvia viridis, fenugreek, and stinging nettle).

cultural norms, family traditions and advertisements (5-7, 9, 15). In the current study, it was found that mothers used CAM for their T1DM children because of similar reasons. Moreover, children with T1DM often received herbs, did not consult health care personnel before using CAM, and did not know the side effects of the methods they used (Table 2). Practices based on physiology of herbs may affect glucose metabolism in children with T1DM, but clinical proof regarding CAM use in diabetic children is limited (16, 20, 27).

CAM methods used by children with T1DM include herbs, vitamins, minerals and supplementary therapies (5-9, 15). In the current study, it was found that the most commonly used CAM methods were herbal methods, mixtures and prayer (Table 3). However, according to studies performed abroad, CAM therapies that are not used in Turkey (5,7) include homoeopathy, chiropractic, yoga, meditation and tai-chi (6, 8, 9, 15). Because these methods are not

Table 4. CAM Use According to Descriptive Characteristics of the Children with T1DM

	CAM Use		P
	Yes	No	
Sex			0.817
Girls	40 (50.0)	62 (51.7)	
Boys	40 (50.0)	58 (48.3)	
Economical status			0.088
Good	14 (17.5)	26 (21.7)	
Moderate	65 (81.3)	85 (70.8)	
Poor	1 (1.2)	9 (7.5)	
Number of children in the family			0.890
1	8 (10.0)	9 (7.5)	
2	33 (41.3)	47 (39.2)	
3	25 (31.2)	40 (33.3)	
4+	14 (17.5)	24 (20.0)	
Presence of a co-existing disease with diabetes			0.114
Yes	15 (18.7)	13 (10.8)	
No	65 (81.3)	107 (89.2)	
Age of mother, y			0.289
25 - 34	25 (31.3)	48 (40.0)	
35 - 44	43 (53.7)	51 (55.4)	
45+	12 (15.0)	21 (60.6)	
Educational status of mother			0.292
Illiterate	-	5 (4.2)	
Primary school degree	46 (57.5)	67 (55.8)	
Secondary school degree	13 (16.3)	13 (10.8)	
High school degree	14 (17.5)	26 (21.7)	
University	7 (8.7)	9 (7.5)	
Age of father, y			0.183
25 - 34	8 (10.0)	21 (14.5)	
35 - 44	46 (57.5)	55 (50.5)	
45+	26 (32.5)	44 (35.0)	
Educational status of father			0.768
Illiterate	-	2 (1.7)	
Primary school degree	31 (38.8)	49 (40.8)	
Secondary school degree	18 (22.5)	26 (21.7)	
High school degree	16 (20.0)	25 (20.8)	
University	15 (18.7)	18 (15.0)	

coherent with the cultural features of our country, these methods are not known or used in Turkey. In the care of children with T1DM, psychosocial needs should be con-

sidered and methods such as spiritual care and praying may be helpful and supportive. In the current study and other studies (5, 7, 9, 15), it was shown that methods like faith healing, spiritual care and praying are usual (Table 3). Although mind-body exercises may promote a healthy lifestyle for children with T1DM, the long term efficacy of these methods on glycemic control has not been proved clinically.

In the treatment of diabetes, herbal medicines are used together with traditional methods all over the world (19, 27-30). It is known that traditional herbal treatments are used for the treatment of diabetes in different regions of Turkey as well (13, 24, 31, 32). Although studies on herbal methods used in children with T1DM are limited, Danne-mann et al. reported that aloe vera, cinnamon, Indian herbs/teas and ginseng are used (6). In Turkish studies, it was determined that thyme tea, stinging nettle, cinnamon, aloe vera and white mulberry are used (5, 7). In the current study, it was found that cinnamon, black cumin, olive leaves and pomegranate flowers were the most preferred ones (Table 3).

CAM use may be affected by the characteristics of children and their parents, but since studies on CAM use among children with T1DM are limited, the findings relevant to CAM use differ. In previous studies, it was found that family income level affects CAM use, but the number of children in the family did not (5, 7). Some studies have shown that age, sex, diabetes duration of the children and the age and educational status of parents affected CAM use, although there are some studies showing that these factors did not affect it (5, 7, 9, 15). In the current study, sex, family income level, the number of children in the family, the presence of co-existing diseases, the age of the mother and father, and the educational level of the mother and father did not affect CAM use ($P > 0.05$) (Table 4). Moreover, it was found that there was no statistically significant difference between the HbA1c values of those who used CAM and those who did not ($P > 0.05$). Since studies examining the factors that affect CAM use and its efficacy are limited, more studies should be performed in this regard.

To conclude, nurses should provide training and counseling to children with T1DM and their parents about the advantages and hazards of CAM. Nurses should give them evidence-based information and should respect the choices of these children and their parents in terms of self-management of the disease. When nurses give these children and their parents evidence-based information, they should mention the relevant studies and share knowledge with children and their parents.

4.1. Limitation of the Study

The most important limitation of the current study is its small sample size. It is necessary that studies with larger samples are performed to identify the factors that affect CAM use. Another limitation of this study is that it was a cross-sectional study.

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Footnote

Authors' Contribution: Study concept and design: Meral Bayat, Nevin Uslu, Emine Erdem, Yagmur Sezer Efe, Nurten Variyenli, Filiz Arican, Selim Kurtoglu; Data collection: Meral Bayat, Nevin Uslu, Yagmur Sezer Efe; Analysis: Meral Bayat, Nevin Uslu, Emine Erdem, Yagmur Sezer Efe; Paper drafting: Meral Bayat, Nevin Uslu, Emine Erdem, Yagmur Sezer Efe, Nurten Variyenli, Filiz Arican, Selim Kurtoglu. All authors contributed to editing and approved the final text.

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