

Metabolic control in adolescents with type 1 diabetes: looking at the role of perceived consistent parenting support of self-care

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Abstract – Objectives: Different parenting practices contribute differently to the development of adolescent self-care. However, little is known about the impact of consistent parenting practices on adolescent self-care and metabolic control. Our study aimed to explore the association between parenting practices and adolescent metabolic control when both parents were consistent in supporting the adolescent's management of (i) diabetes alone, (ii) psychosocial life issues alone and (iii) both diabetes and psychosocial life issues. Moreover, we looked at the types of consistent parenting practices most frequently associated with optimal metabolic control. **Methods:** 31 adolescents with type 1-diabetes aged 13 to 15 were interviewed during a diabetes summer camp in France. A mixed-methods (both qualitative and quantitative) design was used in order to code the different reported parenting practices, and to identify associations between different types of perceived parental consistencies and the adolescents' metabolic control. **Results:** The results significantly support the hypothesis that consistent parental support of all aspects of self-care is associated with better glycaemic control in young adolescents. **Conclusion:** A dimension of family work should be more systematically included in diabetes care in order to strengthen the parents' capacity to effectively and adequately support their adolescents' emerging self-care capacity in the medical and psychosocial dimensions of self-care.

Keywords: self-care / adolescent / parenting / mixed methods / psychosocial dimension

Résumé – Contrôle métabolique chez les adolescents atteints de diabète de type 1 : regard sur le rôle de la perception d'une cohérence du soutien parental dans le processus de self-care de l'adolescent.

Objectifs: Chaque pratique de soutien parental contribue différemment au développement de l'auto-soin (self-care) de l'adolescent. Cependant, le rôle de la cohérence de soutien parental sur le processus du self-care et le contrôle métabolique de l'adolescent a été peu exploré dans le contexte du diabète de type 1. Notre étude visait à explorer l'association entre la cohérence des pratiques parentales et le contrôle métabolique des adolescents lorsque les deux parents soutenaient le processus de self-care de l'adolescent (i) seulement dans le domaine du diabète, (ii) seulement dans le domaine de la vie psychosociale et (iii) dans les deux domaines simultanément (diabète et vie psychosociale). De plus, nous avons examiné les types de pratiques parentales cohérents entre les deux parents les plus fréquemment associés à un contrôle métabolique optimal. **Méthodes:** 31 adolescents diabétiques de type 1 âgés de 13 à 15 ans ont été interviewés lors des camps d'été de l'association « aide aux jeunes diabétiques » en France. Une méthodologie mixte (à la fois qualitative et quantitative) a été utilisée afin d'identifier et de coder les différentes pratiques parentales perçues déclarées, et afin de mettre en évidence les associations statistiques entre différents types de cohérence parentale perçue et le contrôle métabolique des adolescents. **Résultats:** Les résultats soutiennent de manière significative l'hypothèse selon laquelle un soutien parental cohérent entre les deux parents dans tous les deux domaines du self-care de l'adolescent est associé à un meilleur contrôle glycémique chez les jeunes adolescents. **Conclusion:** La dimension familiale dans le soutien au processus de self-care chez le jeune adolescent devrait être plus systématiquement incluse dans les soins du diabète afin de renforcer la

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capacité des parents à soutenir efficacement et adéquatement la compétence émergente d'auto-soin de leurs adolescents à la fois dans les dimensions médicale et psychosociale du self-care.

Mots clés : auto-soin / adolescent / rôle parental / méthodes mixtes / dimension psychosociale

1 Introduction

Type 1-diabetes (T1DM) is one of the most common childhood chronic diseases. Its incidence is increasing earlier in life, and has doubled in children under 5 years of age over the past decade [1]. From its onset onwards, diabetes forms an integral part of the lives of the children and their families. During adolescence, metabolic control may be more precarious because of hormonal fluctuations and physical transformation due to puberty [2,3]. During this time, adolescents learn to develop both behavioural and psychological autonomy [4] in managing their disease within their family and everyday life. Whereas behavioural autonomy refers to independent functioning, psychological autonomy refers to daily decision-making to achieve optimal metabolic control. The complexity of treatment, the challenge to develop autonomy in decision-making, and the need to integrate the identity of being a person with diabetes with other dimensions of one's identity explain the great difficulty that adolescents may experience in complying on a daily basis with the prescribed treatment and its management [5–8].

Parental support plays an essential role in the adolescents' process of developing autonomous self-care behaviours, and needs to be suitably adapted to the adolescents' psychological stages of development [9]. In the field of paediatric diabetes, Barrera & Ainlay's theoretical framework of *Social Support* [10] has been used by Hanna & Guthrie [11] to describe how different parenting practices may be supportive of adolescents' autonomisation processes, leading to the self-management of their condition. The *Social Support* framework [10] defines four types of socially supportive behaviours:

- the *Directive Guidance* (DG) type concerns activities of “guidance and feedback such as teaching skills, giving feedback and providing advice”;
- the *Non-Directive Guidance* (NDG) type concerns interactions like “expressions of intimacy, unconditional availability, esteem and trust, physical affection and listening to talk about private feelings”;
- the *Tangible Assistance* (TA) type concerns technical support like “forms of physical assistance (sharing tasks), and providing shelter, money or physical objects of value”;
- the *Positive Social Interactions* (PSI) type concerns the kind of interactions that permit “joking and kidding, talking about interests and engaging in diversionary activities”.

In relation with the management of diabetes, the *Directive Guidance* type was found to impact positively by allowing to structure adolescent learning through the provision of secure parental models and environments [12,13]. The *Non-Directive Guidance* type was found to have a positive impact by encouraging the development of adaptation skills and competencies, such as coping skills, self-efficacy, self-trust, self-worth [13–15]. Moreover, the *Non-Directive Guidance*

type was found to promote individuality, self-regulation and self-assertion [11]. As far as the *Tangible Assistance* type (TA) is concerned, it was found to have a positive impact only if provided in response to perceived needs of those who receive it, as it would otherwise decrease the adolescents' self-esteem, and make them feel incompetent [11,16]. Last but not least, the *Positive Social Interactions* type was found to be associated with enhanced well-being in adolescents [11]. This short overview shows that different parenting practices may contribute differently to the development of autonomy and psychosocial adaptation in adolescents with diabetes. However, the literature on parenting practices and self-care in adolescents with diabetes tends to focus exclusively on the medical dimension of self-care, ie. self-management of diabetes and diabetes-related issues. Therefore, the management of psychosocial life issues tends to be disregarded. Yet, it forms an integral part of developing self-care capacities [17]. Indeed, from the perspective of health-promotion, *self-care* may be defined as a set of autonomous health-oriented behaviours, with a psychosocial dimension that is as important as the strictly medical dimension, to define one's own health promotion and self-care needs [18–20]. There is some evidence that parental practices that are consistent across disease management and psychosocial life issues have a positive impact on the psychological functioning and quality of life of adolescents with cardiovascular diseases [21]. However, little is known about the impact of such consistency on disease self-management and control.

Our study aimed to explore the association between parenting practices and adolescents' metabolic control when both parents were consistent in (i) supporting their child's management of diabetes alone (ii), supporting their child's management of psychosocial life issues alone and (iii) supporting their child in managing both diabetes and psychosocial life issues. We hypothesized that adolescent metabolic control would be associated with perceived consistent parental support of self-care. Moreover, we looked at the types of consistent parenting practices most frequently associated with optimal metabolic control.

2 Methods

2.1 Data collection

Semi-structured interviews were conducted during two consecutive summer camps for young diabetic patients in France. A total of 120 adolescents attended both camps (60 per camp). Of these 120 adolescents, 54 were eligible for our study according to the following three inclusion criteria:

- aged between 13 to 15 years at the time of the summer camp (in order to take into account both the behavioural and psychological dimensions of autonomy involved in self-care);
- T1DM diagnosed at least one year prior to the summer camps;

- having both parents attending to the adolescent's needs, either as a family unit or separated.

An information letter and a consent form were sent to the 54 eligible adolescents and their parents. Thirty-one (31) consent forms were completed by both the parents and the adolescents and returned to the researcher before the summer camps. At the start of the study, oral consent was sought again from each adolescent.

In keeping with the definition of self-care from health promotion [18], the interview guide was built around two series of open-ended questions, which inquired about the adolescents' perceptions of parental support in relation with several self-reported self-care behaviours, in both the medical and the psychosocial dimensions of their lives. The adolescents were first asked to report self-care behaviours they would undertake in relation to diabetes management and psychosocial life issues, either by themselves ("What are you doing to care your diabetes? To care your life?") or with the help of their parents [22]. With respect to each self-reported behaviour, they were then asked to name and describe the type of support each of their parents would typically provide ("What is your father/your mother doing to support you to care your diabetes? To care your life?"). The interview guide was meant to allow for a short interview (mean duration: 22 minutes, min 15.57; max 31.50) and had been pre-tested with three adolescents during a multi-disciplinary outpatient consultation. All interviews were audiotaped and fully transcribed.

The research protocol received formal approval from the ethics committee at Cliniques universitaires Saint-Luc – Université Catholique de Louvain in Bruxelles (N°B40320108875).

2.3 Data analysis

To explore the hypothesis of an association between metabolic control (A1C) and perceived consistent parental support in the medical and psychosocial dimensions of self-care, we used a mixed-methods design, which included both qualitative and quantitative analyses [23–25].

2.3.1 Qualitative categorisation

In the first stage, we conducted a thematic analysis of the transcripts in order to list all parenting practices that had been reported by the adolescents as supporting their self-care behaviours in relation to the medical and psychosocial dimensions of their lives. We then categorised the reported practices according to the 4 types of parental support defined in the theoretical framework of social support: namely the *Directive Guidance*, *Non-Directive Guidance*, *Positive Social Interactions*, and *Tangible Assistance* types [10]. To ensure rigour and reliability of analysis, the 31 transcripts were independently coded by two of us (JP & IA). Disagreements were resolved through discussion until consensus was reached.

We coded as *Directive Guidance* (DG) expressions describing the parenting practices of both parents that enabled guidance and structuring of autonomous behaviours, in relation to either diabetes management or psychosocial issues.

For example, regarding diabetes management: "My father helps me by pinching up the roll of skin, when I inject myself, and my mother explains to me how I need to adapt insulin doses". Regarding psychosocial life issues: "My mother helps me with my homework"; "My father advises me when I have to take decisions". Expressions that pointed to parenting practices based on availability for and acceptance of the adolescents' self-care behaviours were coded as *Non-Directive Guidance* (NDG). For instance, regarding the management of diabetes: "My father stays with me when I am hypoglycaemic, so that I'm not dealing alone with it"; "My mother knows that I know how to adapt my insulin, so she lets me decide alone". Regarding the management of psychosocial life issues: "My parents are always there for me, if I need it; they ask me how things are going with my friends". We coded as *Tangible Assistance* (TG) all practices that were done by the parents alone, in order to assist their child in performing a specific task. For instance, regarding diabetes management: "My mother is the one that inserts the cannula of my catheters, so that I don't have to do it myself"; "My father only takes me to the doctor for my diabetes". Regarding psychosocial life issues: "My father takes me to my friends and my mother sometimes gives me money, so that I can enjoy myself". We coded as *Positive Social Interactions* (PSI) all parenting practices that were meant to entertain the adolescents and share time with them. Such practices were evidenced exclusively in the psychosocial dimension. For instance: "Sometimes my mother does things to entertain me, and I do things together with my father, like playing rugby for instance". When social interactions were described by the participants as a parental strategy to improve the adolescents' performance regarding diabetes self-management, such practices were coded as *Directive guidance* (DG) instead of *Positive social interactions* (PSI), e.g. "He bikes with me as I would not otherwise do the physical activity which I have to do for my diabetes". During the process of analysis, we created a new category, which we labelled *Not Involved* (NI). This category gathered adolescents' perceptions that they did not receive any support from their parents, either for the management of their diabetes, or for the psychosocial dimension: "My parents do not have time for me, they get up early and work all day"; "My father is never there during the week, and at weekends he rests. My mother is tired, I do not want to bother her, so I help her more than she helps me".

2.3.2 Quantification of the qualitative data

In the second stage of the analysis, we assigned numerical values to the 5 types of perceived parental support reported by the adolescents in relation with the management of (i) their diabetes, and (ii) their psychosocial life issues: *Directive Guidance* (DG)=1, *Non-Directive Guidance* (NDG)=2, *Positive Social Interactions* (PSI)=3, *Tangible Assistance* (TA)=4, *Not Involved* (NI)=5. The quantification process, defined as the process of assigning numerical values to non-numerical data, enables the transformation of qualitative data into categorical variables to permit the testing of research hypotheses [26]. We further looked at the type of parental practices that were perceived as consistent from both parents in either the management of diabetes alone, the management of psychosocial life issues alone, or the management of both diabetes and psychosocial life issues. The parental consistency

Table 1. Characteristics of the two adolescent groups according to their A1C levels.**Tableau .** Caractéristiques des deux groupes d'adolescents en fonction du niveau d'HbA1C.

Characteristics	A1C $\leq$ 7.5% (58 mmol/mol) (n = 13) Mean $\pm$ SD or Median [P ₂₅ ; P ₇₅] or n (%)	A1C > 7.5% (58 mmol/mol) (n = 18) Mean $\pm$ SD or Median [P ₂₅ ; P ₇₅] or n (%)	P-value
Age, years (Mean $\pm$ SD)	14.1 $\pm$ 0.7	14.2 $\pm$ 0.9	0.855*
Gender			0.276***
Boy	3 (23.1)	8 (44.4)	
Girl	10 (76.9)	10 (55.6)	
A1C (%)	7.2 [7.0; 7.4]	8.3 [7.9; 9.0]	< 0.001**
A1C (mmol/mol)	55 [53; 57]	67 [63; 75]	< 0.001**
Time since onset of diabetes (years)	3.7 [2.2; 8.3]	4.6 [3.3; 6.7]	0.900**
Parental status			0.667***
Together	11 (84.6)	13 (72.2)	
Separated	2 (15.4)	5 (27.8)	

SD: standard deviation.

* Student's two-sample *t*-test *p*-value.

** Mann-Whitney U test.

*** Fisher's exact test *p*-value.

was defined as the adolescents' perception of a same type of parenting practice from both parents with the aim to support their self-care efforts. Using the quantitative data, 4 categories of parental consistency in supporting the adolescents' self-care behaviours were identified:

- consistency in the medical dimension of self-care;
- consistency in the psychosocial dimension of self-care;
- consistency in both dimensions;
- no consistency.

Up to this stage, the researchers were blind to the participants' levels of metabolic control.

2.3.3 Statistical analysis

We explored the association between the categories of perceived consistency listed above and the level of metabolic control by applying different statistical tests according to whether the different levels of A1C were used as categorical or continuous variables. On the one hand, categorical variables were created by splitting the levels of A1C into two groups:

- A1C $\leq$ 7.5% (58 mmol/mol) defined a group of adolescents with optimal metabolic control;
- A1C > 7.5% (58 mmol/mol) defined a group of adolescents with non-optimal metabolic control.

The A1C values were chosen according to the guidelines published by ISPAD [27]. Pearson's Chi-squared test or Fischer's exact test was used to test the hypothesis of a link between consistent parenting support and either good or poor metabolic control, as appropriate. On the other hand, continuous data were expressed using the mean and the standard deviation, when it was normally distributed, or the median [P₂₅; P₇₅], when it was not normally distributed. To compare a variable between two groups, a Student's two-

sample *t*-test or a Mann-Whitney U test was used, depending on the normality of the variable distributions. In addition, a Kruskal-Wallis test was used to compare the A1C level between the 4 categories of consistent parenting practices. A *p*-value < 0.05 was considered statistically significant.

3 Results

3.1 Participant characteristics

Thirty-one (31) adolescents (female: *n* = 20; male: *n* = 11) diagnosed with T1DM for at least one year, and living concomitantly or alternatively with their two parents, were included in the study. The average age was 14.1 $\pm$ 0.8 years (Mean $\pm$ SD) ranging from 12.8 to 16.0 with a median time since onset of diabetes of 4.4 years [3.0; 7.0]. Thirteen adolescents (41.9%) had good metabolic control with A1C $\leq$ 7.5% (58 mmol/mol) (Median [P₂₅; P₇₅]: 7.2% [7.0; 7.4]), and eighteen (58.1%) had poor metabolic control with A1C > 7.5% (58 mmol/mol) (Median [P₂₅; P₇₅]: 8.3% [7.9; 9.0]).

The estimation of the participants' metabolic control was based on an average of all values provided of glycosylated haemoglobin levels (A1C) measured over the year preceding the interview, taken from each individual's medical file. The A1C levels in our sample of adolescents with diabetes ranged from 7.0 to 9.0% (53 to 75 mmol/mol) (median [P₂₅; P₇₅]: 7.8% [7.3; 8.3] (62 mmol/mol) [56; 67]). The characteristics of the participants, according to the category of metabolic control (A1C $\leq$ 7.5% (58 mmol/mol) and A1C > 7.5% (58 mmol/mol)), are presented in detail in Table 1. There were no significant differences between the two groups with regards to age, gender, time from onset of diabetes and parental status.

3.2 Perceived parental consistency

A majority of participants perceived their parents to be consistent in their ways of supporting them for the

Table 2. Frequency of parenting practices consistency and description of the type of parenting practices (according to the self-care dimensions within the consistency of parental practices was perceived).

Tableau . *Fréquence des cohérences de pratiques parentales et description du type de pratiques parentales (selon les dimensions de l'auto-soin de l'adolescent dans lesquelles la cohérence des pratiques parentales a été perçue).*

Categories of parenting support consistency between both parents	<i>n</i> /31 (%)	Frequency of type of parenting practices consistency % (<i>n</i> /)
A-In the diabetes management dimension	22 (70.9)	DG : 63.6 (14/22) NDG : 13.6 (3/22) TA : 22.7 (5/22)
B-In the psychosocial life dimension	21 (67.7)	DG : 47.6 (10/21) NDG : 28.6 (6/21) TA : 19.0 (4/21) Not involved : 5.8 (1/21)
C-In both dimensions	15 (48.4)	DG-DG : 33.3 (5/15) NDG-NDG : 6.7 (1/15) TA-TA : 6.7 (1/15) DG-NDG : 26.7 (4/15) DG-TA : 20 (3/15) TA-Not involved : 6.7 (1/15)
D-In no dimension	3 (9.7)	

DG: directive guidance; NDG: non directive guidance; PSI: positive social interactions; TA: tangible assistance.

DG : orientation directive ; NDG : orientation non directive ; PSI : interactions sociales positives ; TA : assistance tangible.

management of their diabetes (70.9%; $n = 22/31$), as well as for the management of issues related to the psychosocial dimension of their lives (67.7%; $n = 21/31$). Moreover, 48.7% ($n = 15/31$) of the participants perceived their parents to be consistent not only in a single dimension, but with regards to both the management of diabetes and the management of psychosocial life issues. Three participants (9.7%; $n = 3/31$) perceived no consistency at all between their parents. Details regarding the type of consistent parenting practices are presented in [Table 2](#).

3.3 Metabolic control and perceived parental consistency in several dimensions of self-care (Table 3)

3.3.1 Diabetes management

Our results show a significant difference regarding the perception of consistent parental support for the management of diabetes according to adolescents' A1C levels (Fisher's exact test $p = 0.004$) ([Table 3](#)). While 100.0% ($n = 13/13$) of adolescents with $A1C \leq 7.5\%$ (58 mmol/mol) perceived their parents to be consistent with regards to their attitudes and expectations for diabetes management, only 50.0% ($n = 9/18$) of adolescents with $A1C > 7.5\%$ (58 mmol/mol) perceived such consistency between their parents.

3.3.2 Diabetes management and psychosocial life issues

Our results show a significant difference regarding the perception of consistent parental support in both dimensions (diabetes management and psychosocial life issues) according to adolescents' A1C levels (Fisher's exact test, $p = 0.011$). Indeed, whereas 76.9% ($n = 10/13$) of adolescents in the

Table 3. Comparison of parenting practice consistency categories between the two groups of adolescents in relation to the metabolic control. **Tableau .** *Comparaison des catégories de cohérence de pratiques parentales entre les deux groupes d'adolescents selon leur contrôle métabolique.*

Categories of parenting support consistency		A1C $\leq 7.5\%$ (58 mmol/mol) ($n = 13$)	A1C $> 7.5\%$ (58 mmol/mol) ($n = 18$)	<i>p</i> -values
		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Consistency in diabetes management dimension	Consistent ($n = 22$)	13 (100.0)	9 (50)	0.004*
	Not consistent ($n = 9$)	0 (0.0)	9 (50)	
Consistency in psychosocial life dimension	Consistent ($n = 21$)	10 (77)	11 (61)	0.452
	No consistent ($n = 10$)	3 (23)	7 (39)	
Consistency in both dimensions of self-care	Consistent ($n = 15$)	10 (77)	5 (28)	0.011*
	No consistent ($n = 16$)	3 (23)	13 (72)	
Consistency in no dimension	Consistent ($n = 3$)	0 (0.0)	3 (16.7)	0.245
	No consistent ($n = 28$)	13 (100.0)	15 (83.3)	

* Fisher's exact test *p*-value.

Table 4. Link between the median A1C level and the categories of parenting practices consistency (according to the self-care dimensions in which the consistency of parental practices was perceived).**Tableau .** Lien entre le niveau médian d'HbA1C et les catégories de cohérence des pratiques parentales (selon les dimensions d'auto-soins dans lesquelles la cohérence des pratiques parentales a été perçue).

	Consistency in both dimensions of self-care	Consistency only in the diabetes management dimension	Consistency only in the psychosocial life dimension	No Consistency in any dimension
Median	7.43	7.75	8.53*	11.15*
A1C (%) (mmol/mol)	(58)	(61)	(70)	(98)
<i>n</i>	15	7	6	3

The continuous variable A1C Median was compared between the 4 groups using Kruskal-Wallis test. (Overall Kruskal-Wallis $p=0.018$).

* Difference significant with the category of consistency in both dimension.

A1C $\leq 7.5\%$ (58 mmol/mol) group perceived their parents to provide consistent support for both diabetes management and psychosocial life issues, only 27.8% ($n=5/18$) did so in the A1C $>7.5\%$ group (58 mmol/mol).

3.3.3 Psychosocial dimension alone

No significant difference was found regarding the perceived consistency of parental support in the psychosocial dimension of self-care alone according to adolescents' A1C levels (Fischer's exact test, $p=0.452$).

3.4 Metabolic control and overall perceived parental consistency

The median A1C level was the lowest when parental consistency was present in both dimensions of self-care and was the highest when there was no consistency at all: median A1C levels were 7.43% (58 mmol/mol) and 11.15% (98 mmol/mol) respectively. Moreover, A1C level was significantly different between the group of adolescents who perceived a consistency in both dimensions, as compared to the group who perceived consistency in only the psychosocial dimension, and to those who perceived no consistency (overall Kruskal-Wallis, $p=0.018$) (Table 4).

3.5 Type of consistency associated with optimal metabolic control

Looking at the type of support that was perceived to be consistent between the parents and across the medical and psychosocial dimensions of self-care, it is worth stressing that consistency in the *Non-Directive Guidance* type of support was reported only by adolescents in the group with A1C $\leq 7.5\%$ (58 mmol/mol) (Table 5).

4 Discussion

The purpose of this study was to explore if perceived consistency in parental self-care support to adolescents with T1DM would be associated with better metabolic control. Our results show that optimal metabolic control (A1C $\leq 7.5\%$

(58 mmol/mol)) in adolescents with diabetes was significantly associated with perceived consistent parental support. Moreover, our results suggest a positive impact of the *Non-Directive Guidance* type of parenting support, as this type of support was reported only by adolescents in the group with optimal metabolic control.

Parental involvement is a cornerstone of diabetes self-management in adolescence. For about 15 years, research teams have started investigating the influence of parent-adolescent interactions on adolescents' self-management in T1DM [11,28,29]. A recent study evidenced that family involvement is a stronger determinant of metabolic control in adolescents than the type of treatment that is prescribed [30].

The results of our own study show the importance of parental consistency in supporting adolescents' self-care and better metabolic control. Previous research on diabetes management in families focused on associations of metabolic control with individual parent-child relationships [31,32] or with marital relationships [33]. Our results show the important role that both parents play in supporting adolescent self-care. This is congruent with findings regarding general health-promoting behaviours. Indeed, there is some evidence that adolescents who receive consistent health messages from both parents are more likely to adopt positive and autonomous health behaviours. As an example, Sargent & Dalton [34] evidenced lower rates of initiation of tobacco use in adolescents who perceived that both their parents were opposed to their smoking. What we have called "consistent parenting practices to support adolescents' self-care efforts" is close to what other authors have called "Co-parenting", i.e. "a couple's ability to support, share leadership, and work together as a team when parenting" [33]. If both parents have the same goals, and the same expectations regarding their adolescent's self-care, they are more likely to provide the support that is appropriate to the adolescent's needs. "Co-parenting" was associated, in the field of T1DM, with better psychosocial adjustment and diabetes self-management in adolescents [35].

Moreover, our study shows the importance of consistent parental support for both management of diabetes and psychosocial life issues. This points to the essential need of chronically ill adolescents to be seen and addressed as "normal" people and not only as people suffering from a disease [36–38]. Both parents' recognition of and reassurance

Table 5. Comparison of the frequency of each type of parenting support practice consistent in both parents in each category of support consistency between both groups of adolescents with respect to metabolic control.**Tableau .** Comparaison de la fréquence de chaque type de pratique de soutien parental cohérente entre les deux parents dans chaque catégorie de cohérence de soutien dans les deux groupes d'adolescents selon leur contrôle métabolique.

Frequency		A1C $\leq$ 7.5% (58 mmol/mol) (n = 13)	A1C $>$ 7.5% (58 mmol/mol) (n = 18)
Categories of parenting practices consistency		n(%)	n(%)
Consistency in diabetes management dimension (n = 22)	Total of consistent	13	9
	DG	9 (69.2)	6 (66.7)
	NDG	3 (23.1)	0 (0.0)
	TA	1 (7.7)	3 (33.3)
Consistency in psychosocial life dimension (n = 21)	Total of consistent	10	11
	DG	6 (60.0)	4 (36.4)
	NDG	3 (30.0)	3 (27.3)
	TA	1 (10.0)	3 (27.3)
	Not involved	0 (0.0)	1 (9.0)
Consistency in both dimensions of self-care (n = 15)	Total of consistent	10	5
	DG-DG	3 (30.0)	2 (40.0)
	NDG-NDG	1 (10.0)	0 (0.0)
	TA-TA	0 (0.0)	1 (20.0)
	DG-NDG	4 (40.0)	0 (0.0)
	DG-TA	2 (20.0)	1 (20.0)
	TA-Not involved	0 (0.0)	1 (20.0)

DG: directive guidance; NDG: non directive guidance; PSI: positive social interactions; TA: tangible assistance.

DG : orientation directive ; NDG : orientation non directive ; PSI : interactions sociales positives ; TA : assistance tangible.

about the adolescent's need for normality is an indication of positive parent-adolescent communication [39]. When parents are able to show interest for the adolescent's life overall, and if they help their child take decisions and incorporate self-care into everyday activities by providing positive feedback, they encourage their children's autonomisation process with regards to both the management of diabetes and the development of a healthy psychosocial life [39,40]. Thus, parents who give the same emphasis and importance to both dimensions, whilst being consistent between themselves, convey to their children that their developmental need of identity construction is fully taken into consideration, and that it is not only the management of diabetes that matters.

In addition, the type of parenting support that is perceived as consistent between both parents is important. The *Non-Directive Guidance* type of consistent support was quoted only by adolescents with A1C $\leq$ 7.5% (58 mmol/mol). The psychosocial skills, such as a sense of self-worth (that are facilitated through the *Non-Directive Guidance* type of support) are very important for the adolescents' process of identity construction and self-determination [41,42]. Making one's own decisions and inspiring one's own motivations increases with successful self-management. Parental *Non-Directive Guidance*, through an emotional and constructive support, contributes to diabetes self-management and on to an optimal metabolic control [43].

There are a number of limitations to this study. First, we chose to only explore the adolescents' perceptions of their

parents' self-care support practices. We did not triangulate the results through interviews with parents or observations of daily practices. However, we are aware that we chose to interview patients at an age where conflicted parent-child relationships are frequent, because conflicts are inherent to the process of identity construction in adolescents. Such conflicts may have influenced some of the responses regarding perceived parental support. Another limitation to the study is the size and characteristics of the sample. The selected sample was small due to the exploratory nature of the study. This enabled us to confirm the relevance of the hypothesis that consistent parenting practices regarding the management of diabetes and psychosocial life issues are associated with better A1C levels in adolescents with T1DM. However, the possible impact of different consistent practices, the participants' gender, and the parents' marital status deserve further investigation in larger samples. Moreover, the possible impact of socio-demographic factors would need to be accounted for, as some studies have already shown the influence of cultural factors on parenting practices and their impact on the behaviours of adolescents with T1DM [44,45].

Despite such limitations, a major strength of our study lies in the fact that the researchers were blind to the participants' levels of metabolic control from data collection until after the quantification of the qualitative data. Hence, no *a priori* knowledge or beliefs could have influenced the data collection and interpretation.

4.1 Implications for diabetes educators

Our results have some implications for clinical practice. We evidenced a relation between perceived parental consistency and metabolic control in adolescents with T1DM. Interventions that focus on strengthening or building a sustained and positive co-parenting, alliance between mother and father in their parenting roles, aimed at helping parents support one another [33], could help parents learn how to negotiate diabetes management issues while acknowledging and supporting adolescents' need for normality and autonomy. This in turn might help adolescents develop greater acceptance of their condition, and therefore have a positive impact on diabetes metabolic control.

We wish to recommend that diabetes care in paediatric patients include more systematically a dimension of family work with both parents in order to strengthen the parents' ability to effectively and adequately support their adolescents' emerging self-care capacity. It is important for health professionals to take up the challenge of collaborating with both parents, rather than with only one parent (most frequently the mother). There is some evidence in the literature that programmes aimed at promoting and maintaining family involvement [46–48] and patient, family and health-care team collaboration [49] in ways that facilitate autonomy in shared decision-making (through positive rather than critical methods for motivating adolescents to take up responsibility for self-care) have a positive impact. Such programmes need to be integrated into routine paediatric outpatient clinics to improve metabolic control and life skills in adolescents with T1DM.

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