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## Authoritarian Parenting Predicts Poorer Glycemic Control in Children with New-Onset Type 1 Diabetes

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### Abstract

**Objective:** To examine cross-sectional and longitudinal associations among parenting styles (i.e., authoritative, authoritarian, and permissive) and youth HbA1c in a cohort of families of children with new-onset type 1 diabetes (T1D).

**Research Design and Methods:** One-hundred two parents completed a baseline measure of parenting style, and we collected child HbA1c values at baseline and at three- and six-month follow-ups. We examined correlations among use of different parenting strategies and child HbA1cs. We conducted multiple regressions to assess the impact of these strategies on child HbA1c at three-month and six-month follow-ups, while controlling for baseline HbA1c, family income, and T1D duration.

**Results:** Correlational analyses showed negative associations between authoritative strategies and child HbA1c at baseline, three-month, and six-month assessments and positive associations between authoritarian strategies and child HbA1c at three-month and six-month assessments. Regression analyses found use of authoritarian-like strategies were the only parenting strategies associated with child HbA1c at three-month and six-month follow-ups, while controlling for baseline HbA1c, family income, and T1D duration.

**Conclusion:** Parents' use of authoritarian-like strategies may negatively impact glycemic control over the course of six-month in children with new-onset T1D.

### Keywords

type 1 diabetes mellitus; parenting; new onset; Hemoglobin A1c; child

Type 1 diabetes mellitus (T1D) is an autoimmune disease with a complex daily regimen.<sup>1,2</sup> While parents often assume the majority of responsibility for T1D, they are also encouraged to involve their child in age-appropriate self-cares to help ensure successful transfer of responsibility during adolescence and young adulthood.<sup>3,4</sup> Thus, parents of children with T1D need to balance performing T1D management required to achieve near-normal glycemic control with teaching their child age-appropriate T1D self-care in a way that promotes child's competence and future independence. This suggests that parental involvement as well as, the manner in which parents interact with their child when completing T1D management tasks may influence short- and long-term glycemic control.<sup>5</sup> In parents of children newly diagnosed with T1D, this balancing act is even more complicated as parents themselves are learning daily T1D self-care while teaching their child about his or her own T1D self-care.<sup>6</sup>

Parenting style describes how parents interact with their child.<sup>7-9</sup> Existing research on parenting and parenting behaviors has identified three prominent parenting styles: authoritative, authoritarian, and permissive.<sup>7-9</sup> These three parenting styles are conceptualized along the dimensions of *responsiveness*, the extent to which parents foster child self-assertion by being supportive and accepting of their child's requests and opinions, versus *demandingness*, the extent to which parents foster child self-control and responsibility by implementing boundaries, supervision, and consequences.<sup>7,8,10</sup> *Authoritative* parenting includes high levels of responsiveness and demandingness, and provides a balance between acknowledging a child's worth and opinions and enforcing rules and boundaries. Several cross-sectional studies show that an authoritative style may promote better T1D management,<sup>11,12</sup> and relate to better glycemic control in adolescents with T1D.<sup>13,14</sup> Similarly, at least two observational studies in adolescents, show that high maternal responsiveness and sensitivity are associated with better glycemic control and psychosocial outcomes,<sup>15,16</sup> while another study examining collaborative parenting style (described as high responsiveness) found a positive association with glycemic control at baseline and twelve-month follow-up.<sup>17</sup> In sum, these studies suggest that high responsiveness coupled with communication about T1D may be important for short- and long-term glycemic control. However, not all studies have found an association between authoritative parenting and glycemic control.<sup>12,18</sup> Monaghan et al. found that authoritative parenting was associated with better adherence and less parenting stress, yet showed no relation to glycemic control.<sup>12</sup> Moreover, in a short, prospective trial, the cross-sectional association of self-report authoritative parenting and glycemic control appeared to diminish at three months post-baseline, suggesting authoritative parenting alone may not have a long-standing effect on children's glycemic control.<sup>19</sup>

An *authoritarian* parenting style couples low levels of responsiveness with high demandingness and is known for its highly structured, rule-based approach with minimal focus on warmth and emotional support. With respect to T1D, numerous studies using self-report and observational measures have shown that more restrictiveness and critical parenting leads to poorer metabolic control.<sup>15,20-22</sup> Additionally, research has shown that authoritarian-like parenting may be associated with elevated levels of T1D-distress, parent-child conflict, and poorer T1D management compared to authoritative-like parenting.<sup>23,24</sup>

However, findings from two cross-sectional studies found no direct association between self-reported authoritarian parenting and glycemic control, and one prospective study using observational measures found no association between authoritarian-like parenting and youth glycemic control at baseline or twelve-month follow-up.<sup>13,14,17</sup> Finally, a *permissive* parenting style is characterized by high responsiveness and low demandingness, which is believed to foster competence but also a limited sense of responsibility and child self-control. T1D studies have demonstrated that a permissive style is associated with poorer glycemic control,<sup>14</sup> and adherence compared to authoritative-like parenting.<sup>24</sup>

Studies in families of preadolescents and adolescents who have had T1D for >1 year show positive associations between authoritative parenting strategies (e.g., high responsiveness, warmth) and glycemic control,<sup>13,14</sup> whereas use of authoritarian and permissive parenting strategies are often associated with poorer glycemic control.<sup>14,15,20–22</sup> Thus, suggesting a need for targeted parenting strategies during this developmental period when youth begin to negotiate responsibilities for shared T1D care (e.g., interventions that teach parents to be responsive to their child's need for autonomy while setting age-appropriate boundaries around T1D management).<sup>12,21,22</sup> Yet, because similar studies do not exist in families of school-age children newly diagnosed with T1D, it remains unclear if these parents would also benefit from parenting resources tailored to the unique challenges of the new diagnosis phase and targeted to fit the developmental milestones achieved during middle-childhood. Another limitation is that studies have not yet examined the long-term relations between parenting style and T1D outcomes.<sup>13,14,19,20,24</sup> Therefore, our goal was to examine the association between parenting styles – specifically parents' use of authoritarian, authoritative, and permissive parenting strategies – and glycemic control in families of children newly diagnosed with T1D using a six-month prospective design. Consistent with adolescent samples,<sup>13,14</sup> we hypothesize that greater reliance on authoritative strategies would predict lower glycated hemoglobin (HbA1c) levels at baseline and over the six-month time frame. In other words, we thought that school-age children would experience better glycemic control early in the course of T1D if parents were responsive to their changing social and emotional needs and developmentally adept at balancing parent-child collaborative T1D self-care with parent-only T1D self-care. We also hypothesized that greater reliance on authoritarian or permissive strategies would relate to higher HbA1c levels in newly diagnosed children. Here, consistent with the existing adolescent literature, we expected that a more restrictive family environment with minimal emotional support (i.e., authoritarian parenting) would negatively impact child glycemic control.

## METHODS

### Participants and Procedure

We recruited families of children, 5–9 years of age, and new to T1D from two hospital-based pediatric diabetes clinics in the United States to participate in a three-year longitudinal study examining psychosocial factors that predict child glycemic control. This study focuses on an early subset of this project and outcomes measured in the first six months of study participation. Eligible children needed to be within 12 months of their T1D diagnosis at enrollment. Participating families completed informed consent before baseline assessment.

We collected child HbA1c by a central laboratory at baseline and at three month intervals. The present study uses children's HbA1c at baseline and at three and six months post-baseline and parents' baseline report on the Parenting Styles and Dimensions Questionnaire.<sup>25</sup> We compensated parents and children for study participation. The Institutional Review Boards at both participating hospitals approved all study procedures.

## Measures

**Demographics:** Parents reported parent age and marital status and child sex, age, and race/ethnicity. We extracted youths' date of T1D diagnosis from their medical record and point-of-care (POC) HbA1c values that corresponded with the study visits.

**Parenting Styles and Dimensions Questionnaire-Short Version (PSDQ):** The PSDQ measures general parenting style using 32-items,<sup>25</sup> yielding continuous subscale that correspond to Baumrind's three parenting styles: authoritarian, authoritative, and permissive.<sup>9</sup> Parents responded to items using a 5-point scale according to how often they may use the parenting strategy. Higher scores indicate greater use of parenting strategies that correspond with a particular parenting style. Consistent with previous studies,<sup>26–30</sup> we treated each of the parenting style variables as continuous, given that parents often engage in more than one specific parenting style. For study analyses, we used baseline PSDQ. The internal consistencies for the Authoritarian ( $\alpha = 0.87$ ; 12 items), Authoritative ( $\alpha = 0.85$ ; 15 items), and Permissive ( $\alpha = 0.75$ ; 5 items) subscales for the current sample were acceptable. The three subscales have demonstrated adequate reliability and validity in parents of school-age children.<sup>25</sup>

**Child HbA1c:** We used glycated hemoglobin (HbA1c) as a proxy measure of children's average glycemic control. We collected these levels at baseline, and three and six months post-baseline using a finger-stick blood sample and a central laboratory HbA1c kit. We attempted to schedule all study visits to coincide with families' routine clinic visits. In the case of missing or diluted laboratory samples, we used the corresponding POC values (baseline  $n = 16$ ; three-month  $n = 6$ ; six-month  $n = 10$ ). At baseline, parents completed the PDSQ within  $2.4 \pm 6.1$  days of the lab HbA1cs and  $3.9 \pm 7.4$  days of the POC. Correlations between laboratory and POC values for the larger sample were high ( $r > 0.90$ ). We analyzed all lab samples using automated high performance liquid chromatography (reference range: 4.0–6.0%, Tosoh 2.2., Tosoh Corporation, San Francisco, CA), a test that is reliable to Diabetes Control and Complications Trial standards. Internal reliability checks revealed this measure to be reliable ( $r = 0.98$ ) with fresh venous blood samples.

## Analyses

We used descriptive statistics to examine sample characteristics and to test for assumptions. We used correlations to identify associations cross-sectionally and longitudinally. We confirmed these associations using a series of multiple regression analyses to examine the impact parenting styles have on youths' HbA1c at three- and six-month follow-ups (one model each) while controlling for baseline HbA1c, family income, and T1D duration.

## RESULTS

One-hundred six families provided baseline measures for this study along with youth HbA1c at baseline and six months (84% participation) and 103 families provided youth HbA1c at three months. Four youth HbA1c values were >3 standard deviations above the mean and were removed, resulting in a final sample of 102 families at baseline and six-months and 100 families at three-months.

Parents were 88.2% mothers, 10.8% fathers, and 1.0% legal guardians (mean age =  $36.81 \pm 6.34$  years). Most parents reported being married or living together (88.2%) and the median family income was between \$70,000-\$79,999 (range \$10,000–19,000 to \$100,000). Most children were non-Hispanic (90.1%) and White (88.2%) and 50% percent were male. Children had a mean T1D duration of  $4.64 \pm 3.27$  months and a mean age of  $7.43 \pm 1.34$  years. Sixteen percent of children used insulin pump therapy at baseline, 39% at three-months, and 50% at six-months. Eighteen percent of children used a continuous glucose monitor at baseline, 31% at three-months, and 44% at six-months. For this study, the HbA1c target for all pediatric age groups was < 7.5%.<sup>31</sup> HbA1c values were  $7.54 \pm 1.24\%$  (59 mmol/mol; 51.0% within the recommended range) at baseline,  $7.62 \pm 1.12\%$  (60 mmol/mol; 46.5% within the recommended range) at three months, and  $8.00 \pm 1.08\%$  (64 mmol/mol; 24.5% within the recommended range) at six months.

Simple correlations revealed a negative correlation between parents' use of authoritative strategies and children's HbA1c at baseline, three months and six months. In contrast, we found positive correlations between parents' use of authoritarian parenting strategies and children's HbA1c at three and six months (Table 1). Multiple regression analyses examining the impact of parenting strategies on youths' HbA1c at three months revealed a main effect for authoritarian strategies ( $\beta = 0.189$ ,  $t = 1.912$ ,  $p = 0.059$ ). Specifically, children of parents who reported using some authoritarian strategies at baseline had higher HbA1c values at three months. There were also main effects for children's baseline HbA1c ( $\beta = 0.500$ ,  $t = 5.867$ ,  $p = 0.001$ ), duration of T1D ( $\beta = 0.212$ ,  $t = 2.535$ ,  $p < 0.013$ ), and family income ( $\beta = -0.164$ ,  $t = -1.914$ ,  $p = 0.059$ ), suggesting that higher HbA1c values, longer T1D duration, and lower family income at baseline predicted higher HbA1c values at three months. Similarly, findings for six-month follow-up found a main effect for use of some authoritarian strategies ( $\beta = 0.254$ ,  $t = 2.325$ ,  $p = 0.022$ ). Specifically, children of parents who reported using some authoritarian strategies at baseline had higher HbA1c values at six months. There was also a main effect for children's HbA1c at baseline ( $\beta = 0.385$ ,  $t = 4.057$ ,  $p = 0.001$ ), indicating that higher HbA1c values at baseline predicted higher HbA1c values at six months. We report the results of our multiple regression analyses in Table 2.

## DISCUSSION

We examined associations between styles of parenting strategies and children's HbA1c in families of school-age children newly diagnosed with T1D. Children in this study were generally within six month of diagnosis, a time when families may still be learning how to effectively manage T1D and when children may be experiencing significant glycemic variability requiring a lot of parent supervision and assistance. This is also a time when

parenting style could influence how children learn about their own T1D self-care. Similar to the literature,<sup>13,14</sup> we found an association between parents' use of authoritative strategies and lower child HbA1c levels, and negative correlations between use of authoritative strategies and child HbA1c at the three- and six-month follow-ups. However, in regression models controlling for baseline child HbA1c, family income, and T1D duration, we did not see a prospective association between use of authoritative strategies and children's HbA1c, suggesting the use of these parenting strategies may be less predictive of future child HbA1c than current HbA1c levels in the new-onset period. Radcliff et al. has also examined the relation between an authoritative style and child HbA1c prospectively, and found no relation between this parenting style and children's HbA1c at three-months.<sup>19</sup> Our results mirror these previous findings. However, both studies are inconsistent with the notion that an authoritative style might better reinforce a collaborative parent-child approach to T1D self-care, and in turn, optimal health outcomes.<sup>12</sup> In the new-onset period, children's glycemic variability could have masked any association between authoritative parenting and future child HbA1c. Future research should also consider alternative measures, such as adherence, when examining these relationships in families new to T1D.

Supporting our second hypothesis, we found associations between parents' use of authoritarian strategies and poorer child HbA1c at three- and six-months when controlling for children's baseline HbA1c, family income, and T1D duration. Interestingly, our findings contradict a previous longitudinal observational study that found no direct association between overinvolved or intrusive parenting (described as high demandingness) and preadolescent and adolescent HbA1c at twelve-month follow-up.<sup>17</sup> However, they appear consistent with associations identified in several cross-sectional studies.<sup>15,20-23</sup> Research in adolescents with a longer T1D duration has shown that parents who report using an authoritarian style also report elevated levels of personal distress, T1D-related distress, and concerns about the parent-child relationship.<sup>23</sup> While these findings may be tied to natural shifts in responsibilities for T1D tasks and increased youth desire for autonomy during adolescence, the challenges faced by parents of school-age children newly diagnosed with T1D may present unique, yet equally challenging situations that could impact parents' psychosocial functioning. Therefore, it is possible parents in the new-onset period might try to use more authoritarian strategies and be more directive and strict in T1D self-care as a reaction to their own anxiety and discomfort related to T1D self-care. However, from the general parenting literature, we also know that some parents may rely on authoritarian strategies and exert high levels of behavioral control in an attempt to manage child outcomes.<sup>7,8,10</sup> Thus, parents in the new-onset period may report using authoritarian strategies in an attempt to reduce glycemic variability and better control their child's T1D self-care. Future research should examine a prospective relation between parent anxiety, distress, and parenting style in the new-onset period to understand how parents may come to use authoritarian strategies with their child.

Parents' use of authoritarian parenting strategies may also have important developmental implications when considering our school-age sample. We enrolled primarily school-age youth (mean age = 7.43±1.34 years), suggesting they are attending school up to seven hours a day, they may be beginning to participate in extracurricular activities (i.e., outside of the home sports), and they may be ready to participate in developmentally appropriate T1D self-

care tasks (e.g., helping to monitor blood glucose). School-age children still require parent support to manage T1D. Yet this also represents a period when they could benefit from the opportunity to practice developmentally appropriate T1D behaviors with the help of their parent.<sup>3</sup> Thus, parents' use of authoritarian strategies, with their greater reliance on child dependence, could potentially reduce the opportunities children might have to learn appropriate T1D self-care, which could, in turn, negatively impact their ability to participate in age-appropriate activities and, eventually, their self-care. The clinical implications of our findings suggest that assessing and monitoring parents' use of authoritarian parenting strategies during the new-onset stage may be imperative for ensuring good glycemic control. Moreover, parents demonstrating use of authoritarian strategies when managing T1D might benefit from learning strategies that encourage a collaborative parent-child approach to T1D self-care. While we need future research to determine the level and intensity of intervention (e.g., brief clinic-based versus formal behavioral parenting programs), parenting style is modifiable and teaching parents positive strategies that also encourage high parent responsiveness all may help guide parents to more authoritative-like strategies.<sup>32–34</sup> Also, if future research supports a relation between use of authoritarian strategies and parent distress or anxiety, then we should consider including cognitive-behavioral strategies to help parents learn alternative strategies to manage their anxiety.

Contrary to our hypothesis, and previous studies,<sup>14,24</sup> we found no relation between increased use of permissive parenting and youth HbA1c. Opposite of the authoritarian style, permissive parenting yields no expectations for the child. While there is a level of child independence involved in the authoritative style, the permissive style is based solely on child independence. One potential explanation for the lack of association between permissive parenting and child HbA1c in our study is that few parents endorsed using permissive strategies. Lower levels of permissive parenting could be a finding that is unique to the new-onset stage because parents who typically have more permissive parenting tendencies may feel that they now need to be involved in their child's care because of T1D management.

We acknowledge a few limitations, which could moderate our findings. First, we acknowledge that the honeymoon period, characterized by partial remission of endogenous insulin production after T1D onset, might be a confounder of the differences we observed. Because there is significant variability in individual duration of the honeymoon period, we were unable to account for its potential impact on the reported associations between parenting styles and glycemic control. Further, due to sample size limitations, we could not conduct analyses that could explain changes in glycemic control overtime (e.g., latent growth curve modeling), based on the honeymoon period. Thus, we need future studies, with larger sample sizes, to examine these trajectories and better isolate the potential impact of parenting style on child glycemic control in the new-onset period. Second, while our sample has a racial and ethnic diversity similar to our clinic population, the sample was predominantly Non-Hispanic White children. In the general parenting literature, there is some evidence that Latino, African American, and Asian American parents may trend towards being either more permissive or authoritarian in their parenting style.<sup>20,35–38</sup> Likewise, specific to families of children with T1D, Davis et al.<sup>20</sup> found that Hispanic and African American parents tended to use more restrictive parenting practices than White parents. In light of these studies, it is possible that our findings may not generalize and that

we need future research to explore these associations in a larger and more diverse sample of newly diagnosed families. Third, while we saw some variability in children's HbA1c levels across our study, we acknowledge that a larger sample size might offer a wider range of HbA1c values, which may show stronger correlations with parenting styles. Similarly, a larger, more diverse sample may be able to examine associations between the mothers and fathers and how their relationship may affect their parenting style. We believe future studies should consider parental stress and fear of hypoglycemia, as well as take an even longer longitudinal approach to look at changes in children's health outcomes beyond the first year of T1D, when blood glucose levels may become more stable. A final limitation is our use of the PDSQ, a self-report measure of parenting style, which has a risk of response bias. Additionally, parents might report greater use of authoritarian parenting strategies related to T1D management during the new-onset stage as a tactic to ensure completion of tasks or because of individual characteristics (e.g., anxiety). In our study, we did not instruct parents to think about parenting in the context of T1D specifically. Thus, it remains unclear if our parents reported use of authoritarian parenting strategies based on their general parenting style or because of their child's T1D diagnosis. In a future study, researchers may consider using behavioral ratings or child ratings to assess parenting styles. To obtain a broader perspective of parenting style, researchers should consider studying families who have other children without T1D in the home to see if there is a predictable feedback loop between parenting style and T1D specifically. Finally, we need future studies to examine the stability of parenting styles across the new-onset stage and after families have successfully integrated T1D self-care into their lives.

## CONCLUSIONS

Our study provides some support for previously observed associations between authoritative parenting practices and better HbA1c levels for children with T1D and extends this association now to families of school-age children with new-onset T1D. Additionally, we report novel findings with prospective and longitudinal associations between parents' report of authoritarian parenting strategies and children's HbA1c at three- and six-months. Our results suggest that school-age children in the new-onset period of T1D may have better HbA1c levels when parents resist using authoritarian parenting strategies. Targeted education programs could help parents to learn behavioral parenting strategies that promote their child's development, build their child's self-efficacy, improve parent-child communication, and support age-appropriate division of T1D tasks. Because children can experience significant glycemic variability during the new-onset period of T1D, immediate intervention in clinical settings could help promote better outcomes from the outset. Finally, future research should determine if parents who use authoritarian parenting strategies also report high levels of anxiety or T1D distress, as this could also direct intervention efforts.

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**Table 1.**

Correlations and descriptives among study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Authoritative	-													
2. Authoritarian	-.204*	-												
3. Permissive	-.071	.541***	-											
4. Baseline HbA1c	-.216*	.096	.024	-										
5. Three month HbA1c	-.230*	.198*	-.029	.580**	-									
6. Six month HbA1c	-.168*	.270**	.074	.440***	.775***	-								
7. Dx duration (months)	.073	-.019	-.043	.023	.221*	.122	-							
8. Child age	-.094	-.137	.084	-.225*	-.194*	-.100	-.110	-						
9. Child sex	.036	.003	-.050	.126	.086	.050	-.078	.074	-					
10. Child race	.192*	-.289**	-.126	.072	-.037	-.181*	.000	-.110	-.122	-				
11. Child ethnicity	.025	-.194*	.107	-.079	-.162	-.159	.107	.079	.003	.097	-			
12. Insulin regimen	.036	.026	-.110	-.010	-.009	-.114	.186*	.036	-.039	.236**	-.003	-		
13. Family income	.139	-.103	-.020	-.209*	-.292***	-.222*	.051	-.017	-.341**	.187*	.078	.203*	-	
14. Marital Status	.237**	-.171*	-.083	-.196*	-.181*	-.232**	.200*	-.087	-.243**	.244**	.083	.236**	.441***	-
Mean	66.1	20.02	9.2	7.54	7.62	8	4.64	7.43	-	-	-	-	-	-
SD	6.09	6.74	3.55	1.24	1.12	1.08	3.27	1.34	-	-	-	-	-	-

Note. Correlations between continuous variables are Pearson product moment correlations. Point-biserial correlations shown for correlations between continuous and dichotomous variables (Child sex: 0 = female, 1 = male; Child race: 0 = non-White, 1 = White; Child ethnicity: 0 = Hispanic, 1 = non-Hispanic; Insulin regimen: 0 = injections, 1 = pump; Marital status: 0 = not married or living together; 1 = married or living together). Dx duration (months) = Duration of child's T1D diagnosis in months; HbA1c mean and standard deviation = NGSP(%).

\*  $p < .05$

\*\*  $p < .01$

\*\*\*  $p < .001$  (one-tailed)

**Table 2.**

Regressions of Three-month and Six-month HbA1cs on Parenting Styles and Baseline HbA1c.

<i>Model</i>	Three-month HbA1c		Six-month HbA1c	
	<i>R</i> <sup>2</sup>	$\beta$	<i>R</i> <sup>2</sup>	$\beta$
<i>Model</i>	0.362 ***		0.186 ***	
Baseline HbA1c		0.500 ***		0.385 ***
Authoritative		-0.027		0.047
Authoritarian		0.189 *		0.254 *
Permissive		-0.141		-0.075
Dx duration (months)		0.212 *		0.111
Family income		-0.164 *		-0.091

*Note:* Dx duration (months) = Duration of child's T1D diagnosis in months

\*  $p \leq .05$

\*\*  $p < .01$

\*\*\*  $p < .001$