Peer and Family Support in Children and Adolescents With Type 1 Diabetes

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Objective: To examine social support and peer and family involvement in relation to diabetes management within a developmental context.

Methods: Sixty-eight youths ages 8 to 17 diagnosed with type 1 diabetes participated. This study represents the phase 1 data from a multisystemic, home-based intervention. Data included parent and youth report of disease management and conflict, youth-reported perceptions of support, peer participation in the intervention, and HbA1c.

Results: Adolescents perceived greater diabetes-related peer support than did school-age children. Perceived peer and family support were not correlated with metabolic control. Peer participation in the intervention was correlated with metabolic control.

Conclusions: There is a developmental shift in perceptions of peer support. Increased perceptions of peer and family support overall may not result in improved metabolic control. Social support interventions should focus on the types of support that are most highly associated with positive health outcomes.

Key words: adolescents; diabetes; peers; social support.

Management of type 1 diabetes is complex and challenging for children and adolescents due to the necessary integration of daily medical tasks (e.g., blood glucose monitoring, insulin injections) and lifestyle modifications (e.g., eating and exercise patterns) into everyday life. Although near-normal blood glucose control may decrease the risk of several long-term diabetic complications in individuals with type 1 diabetes (DCCT Research Group, 1993, 1994), children and adolescents often have difficulty juggling all of the aspects of an arduous treatment regimen. Several investigators have found that this is particularly problematic for adolescents as compared to younger children (Anderson, Auslander, Jung, Miller, & Santiago, 1990; La Greca, Follansbee, & Skyler, 1990). Developing adequate treatment-related behaviors may be particularly important in adolescence, as it marks a critical time for the development of disease management behaviors that may persist through adulthood. In a recent commentary on adherence, La Greca and Bearman (2001) outline the importance of obtaining a better match between what children and families need and the types of treatments they receive.

From a systemic perspective, an individual's environment plays a pivotal role in his or her disease management. As with any chronic illness, the individual's family may play an integral role in encouraging and providing support for treatment-related...
behaviors. Diabetes may require families to redistribute responsibilities, modify daily routines, and renegotiate family roles. Research has suggested that diabetes management within the family follows a developmental progression and that family roles change over time. For instance, in a study comparing children and adolescents, La Greca et al. (1990) reported that children (7 to 11 years) who assumed greater responsibility for diabetes care evidenced worse metabolic control than children whose parents assumed more responsibility for the regimen. Further, children’s knowledge about diabetes was unrelated to metabolic control, whereas their mothers’ knowledge was positively associated with both adherence and metabolic control. In contrast, adolescents’ (12 to 17 years) knowledge of diabetes was significantly associated with metabolic control, whereas their mothers’ knowledge was not. Still, adolescents with type 1 diabetes belonging to supportive families have been found to have better control of their diabetes (Anderson & Auslander, 1980; Anderson, Miller, Auslander, & Santiago, 1981), and parental involvement in blood glucose monitoring has been shown to support more frequent monitoring, which is associated with better metabolic control (Anderson, Ho, Brackett, Finkelstein, & Laffel, 1997).

Although familial support is a necessary aspect of diabetes management, research has shown that it is not sufficient to ensure adequate disease management. Diabetes management is complicated because it must occur across different settings, such as at home and in school. Consequently, diabetes management should be optimally facilitated by the support of both family members and peers. Yet research examining the ways in which peers may influence or support children and adolescents with diabetes is in its infancy.

To understand the role that family and peer support may play for children and adolescents with diabetes, we must examine social support in the context of normal development. In early childhood, children are reliant on parents for nearly all aspects of nurturance, support, and growth. In middle childhood, social networks expand as children spend increasing amounts of time outside of the family. At this stage, children develop social relationships with nonfamilial adults and peers, both in and out of school. They become affiliated with peer groups, spend more unsupervised time with peers (Simmons & Blyth, 1987), and derive significant support from friends (Furman & Buhrmester, 1992; Levitt, Guacci-Franco, & Levitt, 1993).

There are several similarities in the friendships of children and adolescents (Berndt & Perry, 1990). For example, both children and adolescents receive instrumental and self-esteem support from friends (Berndt & Perry, 1986), and childhood and adolescent friendships share the common feature of mutual liking. Also, the frequency of prosocial behaviors (Berndt & Perry, 1986) and positive interactions (Newcomb & Brady, 1982) is equivalent in childhood and adolescent friendships. However, it is not until early adolescence that peer relationships become intimate (Berndt & Savin-Williams, 1993) and loyal (Berndt & Perry, 1990). Intimacy was identified by Berndt (1989) as a critical component of supportive social relationships. This may be particularly relevant for adolescents with diabetes as they learn to confide in friends and share information regarding their diagnosis and medical regimen.

As peer influence steadily increases through childhood and peaks during early adolescence (Fuligni, Eccles, Barber, & Clements, 2001), support received from parents is viewed as less positive (Furman & Buhrmester, 1992; Paikoff & Brooks-Gunn, 1991), and both parents and children report less cohesive relationships with one another (Collins & Russell, 1991; Paikoff & Brooks-Gunn, 1991). Although these changes in social support may be normal and may facilitate the development of autonomy, they may also place the adolescent at risk for psychological difficulties (Berndt & Hestenes, 1996). Fortunately, the shift from parental to peer support is not absolute, as adolescents continue to seek guidance and advice from their parents (Fuligni et al., 2001). Adolescents with diabetes might therefore best be served by simultaneously maintaining close, supportive relationships with parents and friends.

Given the increasing importance placed on peer relationships in adolescence, peer support should be further explored as a potential target for intervention. However, peer influence may exert both positive and negative effects on diabetes management. For example, Thomas, Peterson, and Goldstein (1997) demonstrated some potential negative effects of peer influence. When presented with hypothetical social situations in which a choice between diabetes regimen adherence and peer desires was necessary, adolescents demonstrated significantly better diabetes-specific problem-solving abil-
ities than children. However, adolescents also exhibited a decrease in regimen adherence and an increase in choice of actions consistent with peer desires. Thus, inclusion of a peer management component in diabetes education was suggested, perhaps with the goal of challenging adolescents’ fears regarding peer perceptions of diabetes. On the positive side, La Greca et al. (1995) found that although family members provided support for some aspects of adolescents’ treatment, friends provided more emotional support for diabetes. These researchers concluded that involving peers as supportive companions for meals and exercise might positively influence disease management. Indeed, including peers in treatment has been associated with increased peer knowledge about diabetes, decreased parent-reported parent-child diabetes conflict, and a trend for improved parent-report of adherence (Greco, Pendley, McDonell, & Reeves, 2001). For optimal success, intervention programs aimed at improved disease management should mobilize supports from the multiple systems (family, peers, etc.) involved in the daily care regimen.

This article presents phase 1 (baseline) data from an ongoing, innovative intervention program. The purpose of the phase 1 data was to provide information regarding the relationships among peer support, disease management, metabolic control, and parent-child relations among youths with diabetes. The goal was to identify social support indices that could be targeted during the phase 2 portion of the project, an intervention that seeks to directly include peers in supporting youths with their diabetes. (Contact J. Shroff Pendley for information about the intervention.) Given reported developmental changes in both familial and peer support, a wide age range of youths was included to examine developmental differences in perceptions and effectiveness of social support.

Given age-related changes in peer relationships in normative development, we hypothesized that older adolescents would report more support from peers than younger children. As families are likely involved with some aspects of the diabetes regimen for youths of all ages, we did not expect to find age differences in terms of family support. Second, we hypothesized that youths who reported more family and peer support would also have increased adherence to the diabetes regimen, less parent and youth diabetes-related conflict, and better metabolic control. Finally, we expected support to contribute to predicting metabolic control, even when controlling for adherence and knowledge.

Method

Participants

Participants were 68 children ages 8 to 17 years (mean age = 12.9 years, SD = 2.66) diagnosed with type 1 diabetes. Inclusion criteria specified that participants were diagnosed with diabetes for a minimum of 15 months to control for the “honeymoon” period that often occurs immediately after diagnosis. During this period, insulin is still made by the cells in the pancreas and, therefore, only small doses of exogenous insulin may be required. As a result, blood glucose levels may be affected by the individual’s body insulin rather than by disease management. Children or parents with a moderate or greater developmental delay as identified through medical chart review were excluded from the study because of the reading demands of psychosocial questionnaires.

Mean time since diabetes diagnosis was 5.51 years (SD = 3.16). Mean glycosylated hemoglobin (HbA1c), an average of blood glucose levels for a period of 3 months, for the year prior to baseline was 9.20 (SD = 1.21, range = 6.35–14.00). The Endocrine Clinic at the Alfred I. duPont Hospital classifies patients into four groups based on level of control. Level 1, “well-controlled,” includes individuals with HbA1c < 7.3%, indicating average blood glucose levels between 100 and 180. Level 2, “good to fair control,” includes individuals with HbA1c of 7.4–9.3%, indicating average blood glucose levels of 180–250. Level 3, “fair to poor control,” is used to describe individuals with HbA1c of 9.4–11.3%, indicating average blood glucose levels greater than 300. Participants from this study were classified as follows: 6.1% were at level 1, 47.5% were at level 2, 36.1% were at level 3, and 9.8% were at level 4. Approximately 74% of the sample received prescribed insulin injections, and the remainder had been placed on insulin pump therapy. Sixty-two percent of the sample was female, 88% was European American, and 7% was African American. Seventy-five percent of participants lived with both biological parents.
and 16% were from single parent households. Ninety percent of parents completing assessment measures were mothers, as she was the parent who typically brought the child to clinic appointments. Of the 98 youths recruited for the study, 68 participated (69% participation rate).

**Procedure**

Participants were recruited from a diabetes clinic in a children’s hospital for participation in a five-session, multisystemic, home-based intervention for children and adolescents with type 1 diabetes. Phase 1 assessment measures were administered to all participants by the project coordinator (postdoctoral fellow) or a trained undergraduate-level research assistant. Parents and children completed measures separately and were not permitted to discuss responses during questionnaire completion. After completing the phase 1 data, participants were randomly assigned by coin toss into intervention versus control groups.

Each participant assigned to the intervention (N = 21) was asked to identify at least three individuals from his or her extended family, peer-group, neighborhood, or school who might be willing to participate in the study. Inclusion of at least one nonfamily child/adolescent was strongly encouraged. No upper limit was given to the number of support-team members who could participate; however, study participants were encouraged to invite those individuals who they felt were sufficiently involved in their life to provide regular support. These individuals, who attended the first intervention session, comprised the “support team” for the participant. For this study, the number of peers (nonfamily children and adolescents) on the support team was used as a measure of participants’ potential peer support system (termed “support-team peers” in data analysis). The number of support-team peers who participated were thought to be representative of potential sources of regular support for specific aspects of the daily care regimen. That is, support-team peers made a commitment to act as an identified “support person” and agreed to assist the study participant on a specific, identifiable task or tasks throughout the study period.

This study was approved by the institutional review board, and written parental informed consent and youth assent were obtained. Informed consent/assent was also obtained from the adult support team members, peers, and the parents of the peers involved in the study. These consent/assent forms were mailed to potential support team members identified by the youths along with an invitation to participate in the intervention. The consent/assent forms did not appear to affect the number of support persons who participated in the intervention, as there were no reports of refusal to participate after consent forms were reviewed by adults, peers, and/or their parents.

**Measures**

The Self-Care Inventory (SCI; La Greca, Swales, Klemp, & Madigan, 1988) is a 15-item scale that measures adherence to the most common type 1 diabetes regimen tasks. Items are rated on a 5-point Likert-type scale (1 = never do it, 3 = follow recommendations about 50% of the time, 5 = always do this as recommended without fail), and mean adherence scores are calculated, with higher scores indicating better disease management. The SCI was completed by parents and children independently. For this study, internal consistency coefficients were adequate; SCI adolescent report, alpha = .75; SCI parent report, alpha = .87.

The Diabetes Responsibility and Conflict Scale (DRC; Rubin, Young-Hyman, & Peyrot, 1985) is a 15-item scale that assesses family conflict surrounding each prescribed type 1 diabetes regimen task. Items are rated on a 5-point Likert-type scale assessing how much the child and parent argued or hassled about specific tasks over the past month (1 = never, 3 = half the time, 5 = all the time). Mean conflict scores are calculated, with higher scores indicating higher levels of family conflict. The DRC was completed by parents and children independently. Internal consistency for the current study was good; for DRC adolescent report, alpha = .90; and DRC parent report, alpha = .89.

The Diabetes Social Support Interview (DSSI; La Greca et al., 1995) is a structured interview developed to assess youths’ reports of support received from family and friends for their diabetes care. Youths are asked about support from family members and from friends. First, family support is assessed by asking youths “In what ways does your family help you or provide support for...” four instrumental diabetes tasks (insulin shots/insulin pump bolus, glucose monitoring, diet, and exercise). A fifth question pertains to diabetes-specific emotional support from family members: “In what ways does your family help you to feel good about
diabetes?” (“feel good” variable). Following the questions about family members, youths are asked the same questions as they pertain to friends. After each interview, trained research assistants coded the DSSI. Totals were calculated both across diabetes tasks (i.e., insulin shots/insulin pump bolus, glucose monitoring, diet, exercise, and feel good) and across types of support (four categories of support can be coded: tangible, informational, companionship, or emotional). Interrater reliability for a sample of 20% showed a kappa value of .926. For DSSI family support categories, alpha = .56; DSSI peer support, alpha = .78. The DSSI has acceptable concurrent validity (La Greca et al., 1995).

The Diabetes Patient Knowledge Test (DPKT; Hess & Davis, 1983) is a 23-item multiple choice measure that assesses diabetes and related nutrition knowledge. The DPKT has adequate overall reliability and concurrent validity for an adult population. Although this measure has not been validated for children, based on a literature review, there were no diabetes knowledge tests normed on children that have strong psychometric properties. The DPKT was reviewed by three diabetes educators and one dietitian familiar with the sample population who deemed the questions and the level of information assessed as appropriate for knowledge expected of the study population (i.e., the questions represented information typically addressed in basic diabetes education). While the DPKT has an eighth grade reading level, the project coordinator or trained research assistants were available throughout the completion of the test to read items for participants or explain vocabulary-based questions. The research assistants were trained to give standardized explanations to frequently asked questions. Parents and youths completed the DPKT independently. Internal consistency was adequate with DPKT adolescent report, alpha = .73; and DPKT parent report, alpha = .65.

Results

First, t tests and chi-square analyses were conducted to test group differences between those who participated in the study and those who refused. No significant group differences were found on age \(t = - .92, p > .05\), metabolic control \(t = .15, p > .05\), ethnicity \((\chi^2 = 2.04, p > .05)\) or gender \((\chi^2 = 1.94, p > .05)\).

Next, to examine the differences in youth-reported perceived support in a developmental context, we divided the sample into two groups: children (individuals 8–12 years of age; \(N = 34\)) and adolescents (individuals 13–17 years of age; \(N = 34\)). These age cutoffs were selected as early adolescence has been described as a time when developmental changes in peer relationships peak (Berndt & Perry, 1990; Berndt & Savin-Williams, 1993). Further, dividing the sample of youths in this manner provided a median split among the two groups. Means and standard deviations of the DSSI for each age group are presented in Table I. MANOVAs were conducted to test group differences on the peer and family DSSI types of youth-reported support as well as support tasks categories. Both MANOVAS for peer support (i.e., types of support, support tasks) were significant. Univariate analyses revealed that adolescents reported more support than youngsters in every category except exercise. The overall Fs for the family support MANOVAs were not significant and thus univariate tests on individual categories were not analyzed.

Pearson correlations were conducted to assess the relationship between total youth-reported perceived peer and family support as assessed by the DSSI with youth-reported and parent-reported adherence, youth-reported and parent-reported diabetes conflict, youth and parent diabetes knowledge, metabolic control, and youth age (see Table II). Perceived peer support was significantly correlated with youth knowledge and youth age, but not metabolic control, adherence, or diabetes-related conflict. Interestingly, perceived family support was significantly correlated with parent-report of diabetes conflict; more perceived family support was associated with increased parent-report of diabetes-related conflict. Higher reported adherence was associated with lower HbA1c and more diabetes-related conflict was associated with higher HbA1c. In addition, more diabetes-related conflict was associated with less reported adherence.

Pearson correlations were also conducted to assess the concordance between perceived peer support and a measure of potential sources of support as assessed by peer participation in the first session of the intervention (“support-team peers”). As the support-team peers variable was only available for half of the sample, resulting in a small number (i.e., \(N = 21\), intervention group), these results are viewed as exploratory. Surprisingly, perceived peer support was not significantly correlated with the number of support-team peers. Although, as stated
previously, age was significantly correlated with perceived peer support in that older participants reported more instances of diabetes-related support behaviors by their friends, age was not significantly correlated with the number of support-team peers. In addition, the number of support-team peers had a strong negative correlation with metabolic control; individuals with better-controlled diabetes (i.e., lower HbA1c) had more support-team peers ($r = -0.50, p < .05$). The number of family members who participated as members of the support team was not analyzed because of the restricted range of such data (i.e., limited number of family members).

Finally, a multiple regression analysis was conducted to examine whether perceived support contributed to predict HbA1c, after controlling for adherence and knowledge (see Table III). Interestingly, the only significant predictor of HbA1c was parent report of adherence. Support-team peers was not entered into the equation due to the limited number of this variable.

**Discussion**

This study is one of only a few that have examined perceptions of diabetes-related peer support in children and adolescents with type 1 diabetes. It is the first to attempt to analyze the relationship between peer support and disease management by measuring metabolic control. Many professionals who work with children and adolescents with type 1 diabetes have recognized the potential positive impact that support from the multiple systems involved in a youth’s life could have on the youth’s disease management. However, how to mobilize this support in ways that are effective and helpful to the youth is less clear. Therefore, the primary goal of

**Table I. Means, Range, Standard Deviations, and MANOVA Results of the Diabetes Social Support Interview (DSSI) Variables, Controlling for Diabetes Duration**

<table>
<thead>
<tr>
<th></th>
<th>Entire sample</th>
<th>Adolescents</th>
<th>Children</th>
<th>MANOVA (Univariate F)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
<td>M (SD)</td>
<td>M</td>
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<tr>
<td>DSSI types of support: Friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tangible</td>
<td>0</td>
<td>8</td>
<td>2.29 (1.83)</td>
<td>2.71</td>
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<tr>
<td>Information</td>
<td>0</td>
<td>1</td>
<td>0 (.17)</td>
<td>na</td>
</tr>
<tr>
<td>Companionship</td>
<td>0</td>
<td>9</td>
<td>1.62 (1.41)</td>
<td>2.03</td>
</tr>
<tr>
<td>Emotional</td>
<td>0</td>
<td>7</td>
<td>2.19 (1.69)</td>
<td>2.76</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
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<tr>
<td>DSSI support tasks: Friends</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Insulin</td>
<td>0</td>
<td>4</td>
<td>.96 (.94)</td>
<td>1.18</td>
</tr>
<tr>
<td>Glucose monitoring</td>
<td>0</td>
<td>4</td>
<td>1.19 (.93)</td>
<td>1.53</td>
</tr>
<tr>
<td>Diet</td>
<td>0</td>
<td>5</td>
<td>.96 (.97)</td>
<td>1.29</td>
</tr>
<tr>
<td>Exercise</td>
<td>0</td>
<td>4</td>
<td>1.18 (.75)</td>
<td>1.33</td>
</tr>
<tr>
<td>Feel good</td>
<td>0</td>
<td>3</td>
<td>1.06 (.77)</td>
<td>1.24</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DSSI types of support: Family</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>10</td>
<td>5.29 (2.14)</td>
<td>5.50</td>
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<tr>
<td>Information</td>
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<td>.22 (.42)</td>
<td>.26</td>
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<tr>
<td>Companionship</td>
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<td>3</td>
<td>.65 (.96)</td>
<td>.97</td>
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<td>1.56 (1.52)</td>
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<td>DSSI support tasks: Family</td>
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<td>Glucose monitoring</td>
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<td>1.22 (.99)</td>
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<td>1.47</td>
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<td>1.12 (.92)</td>
<td>1.06</td>
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<tr>
<td>Overall</td>
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“Feel good” refers to DSSI question assessing category of diabetes-specific emotional support: “In what ways does your family/friends help you to feel good about diabetes?” DSSI = Diabetes Social Support Interview.

*p < .05.

**p < .01.
adolescents’ social and personality development (Berndt & Perry, 1990). However, as Thomas and colleagues demonstrated (1997), peer influence may not necessarily be associated with positive effects on treatment-related behaviors. In fact, these findings illustrate that although adolescents perceived peer support for their diabetes, this perception of peer support was not correlated with metabolic control or with self-report of adherence. Peers may lack knowledge about diabetes and the importance of the daily care regimen, they may not support the adolescent in a regular, consistent or specific manner, and they may even offer “support” that is neutral or detrimental to the daily care regimen. For example, although a friend may “treat me like everybody else,” which can be perceived as a form of emotional support, the peer may actually be encouraging nonadherent behavior around diabetes regimen tasks.

the study was to provide information regarding the relationships among peer support, adherence, metabolic control, and parent-child relations among a wide age range of youths with diabetes. Given normative developmental changes in peer influence, focus was placed on the relationship between age and peer support with respect to diabetes management. An understanding of all of these various relationships is essential to develop interventions that match what youths and their families need within a developmentally relevant context. Overall results supported developmental changes regarding youths’ perceptions of peer support, although youths’ perceptions of peer support were not correlated with metabolic control, with self-report of adherence, or with the number of support-team peers who actually participated in the intervention.

Results confirmed that perceptions of peer support shift developmentally. Adolescents reported significantly more peer support for various management tasks in every category of peer support except exercise as compared to children. It may be that as adolescents experience more intimacy and disclose more information, as is typical in normative development, (Berndt & Savin-Williams, 1993; Fuligni et al., 2001), they may also share more disease-related information and, in turn, perceive their friends as offering more support for their diabetes. It is not surprising that children reported less perceived peer support than adolescents, given previous research demonstrating that children perceive their relationships with their mothers and fathers as most important (Furman & Buhrmester, 1985).

The increased loyalty and intimacy of adolescent friendships may result in beneficial effects on adolescents’ social and personality development (Berndt & Perry, 1990). However, as Thomas and colleagues demonstrated (1997), peer influence may not necessarily be associated with positive effects on treatment-related behaviors. In fact, these findings illustrate that although adolescents perceived peer support for their diabetes, this perception of peer support was not correlated with metabolic control or with self-report of adherence. Peers may lack knowledge about diabetes and the importance of the daily care regimen, they may not support the adolescent in a regular, consistent or specific manner, and they may even offer “support” that is neutral or detrimental to the daily care regimen. For example, although a friend may “treat me like everybody else,” which can be perceived as a form of emotional support, the peer may actually be encouraging nonadherent behavior around diabetes regimen tasks.
Further, results indicated that perceived peer support was not correlated with the number of support-team peers who participated in the intervention. This suggests that although adolescents may perceive their friends as being helpful with respect to their daily diabetes care regimen, this support may be limited in terms of the number of peers who are actually available and the extent that peer support is provided in a predictable and specific way. Indeed, numerous factors may have impeded peers from participating as support-team members in the intervention, and an analysis of the number of support-team peers does not account for the quality of support received. However, the number of support-team peers may provide a concrete example of potential sources of support that the youth may have readily available, willing to support diabetes-related tasks in a tangible, specific, and ongoing manner.

The findings highlight the impact that mobilizing regular peer support could have in facilitating successful diabetes management. The number of support-team peers was positively correlated with better metabolic control, suggesting that when peer support is present and readily available from a greater number of friends in the youths' social network, youths may have improved diabetes management. Alternatively, youths with better metabolic control may feel more comfortable including their peers in their disease management.

Although these findings show the predicted relationship between increased adherence and better metabolic control, results were somewhat surprising regarding the association between perceived family support, parent-report of diabetes-related conflict and metabolic control. Previous research has suggested that greater family support is associated with better blood glucose monitoring and improved metabolic control (Anderson & Auslander, 1980; Anderson et al., 1981, 1997). However, in this study, youth perceptions of greater family support were associated with greater parent report of diabetes-related conflict. One possible explanation may be that when there is greater family involvement around diabetes tasks, there may also be greater conflict, simply because of a greater amount of interaction around diabetes care overall. Conversely, when parents are less involved in their child's diabetes care, there may be less interaction around diabetes and fewer opportunities for conflict. These results may also be explained by different interpretations between parents and youths as to what is supportive versus what is conflictual. For instance, parent reminders about diabetes-related tasks might be perceived as "nagging," thereby eliciting a negative response from the child. The parent might interpret this interaction as a form of diabetes-related conflict. However, from the child's perspective, this reminder might be identified as supportive.

There are several limitations to our findings. First, measurement of potential peer support by the number of support-team peers offers limited information. The number of support team peers was intended to provide an example of potential sources of support that the youth had readily available to support diabetes-related tasks. However, this measure does not quantify the degree of support provided (e.g., the number of disease-management tasks each peer supported, the extent that each peer followed up with agreed-upon support tasks), nor does it account for ways that participants receive support outside of the research protocol. This measure also does not consider factors that might affect peer participation in the intervention.

The findings are somewhat limited in generalizability by the mean length of time since diagnosis for the sample, about 5½ years. It is unclear how these findings might apply to youths who are more newly diagnosed. In addition, the results analyzing diabetes-related knowledge are limited by the lack of an available validated test of diabetes knowledge in the age group studied.

These findings have important clinical implications. First, with age, perceptions of peer support and the importance of peer influence increase. However, perceptions of peer support may not be enough to effect metabolic control. Therefore, interventions that strive to educate and involve peers in effective ways appear to be an important, yet generally overlooked, area for clinical intervention. These findings would suggest that, to be effective, interventions aimed at peer support must mobilize that support in a way that is beneficial to the daily care regimen. Results indicate that clinicians should carefully consider individual perceptions of what constitutes supportive behavior. Perhaps what youths view as supportive might be seen as conflictual by parents and vice versa. Family therapy could help youths and parents solve problems to maximize support and involvement in ways that both perceive as beneficial.

Based on the findings outlined in this study, phase 2 of our intervention focuses on the implementation of a longitudinal intervention aimed at increasing the efficacy of family and peer support in youths' disease management. This research will
attempt to determine the cause and effect relationship between peer and family support and metabolic control.

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