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Perceived Peer Support and Diabetes Management from Adolescence into Early Emerging Adulthood

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Abstract

Objectives: To examine longitudinal associations of perceived diabetes-specific peer support with adherence and glycemic control among late adolescents with type 1 diabetes as they transition out of high school and into early emerging adulthood.

Methods: As part of a larger study, 211 high school seniors with type 1 diabetes completed confidential online surveys and were reassessed one year later. Perceived diabetes-specific peer support and adherence were assessed in each survey. Glycemic control was measured with HbA1c assay kits.

Results: Perceived diabetes-specific peer support in high school predicted better adherence across the subsequent year, while controlling for initial levels of adherence. Perceived peer support during early emerging adulthood was also associated with better adherence across time, after controlling for initial levels of both adherence and peer support.

Conclusions: Perceived diabetes-specific peer support may be a protective factor as late adolescents with type 1 diabetes transition out of high school. Building strong peer support during the transition into early emerging adulthood may facilitate better diabetes management during this high-risk time of development.

Keywords

adherence; type 1 diabetes; emerging adult; longitudinal; peer support

The transition from late adolescence into early emerging adulthood is a time of risk for managing type 1 diabetes (T1D), as evidenced by poorer adherence and glycemic control

compared to younger and older ages (Miller et al., 2015). Emerging adulthood is defined as the period from late adolescence through the mid-twenties (e.g., typically ages 18-25), when young people experience many transitions as they explore future roles and identities (Arnett, 2000). In the United States, these transitions begin near the end of high school as youth begin to move away from home, enter college or the workforce, and establish new relationships with peers. Emerging adults with T1D have to navigate these new social contexts while managing a serious illness more independently from parents. Understanding factors that can promote better T1D management at this challenging time is important because good glycemic control can prevent or delay long-term complications (DCCT/EDIC, 2001).

Peer support for diabetes may be an especially important resource for T1D management as late adolescents transition into new social roles during early emerging adulthood and increasingly manage their diabetes away from their parents (Berg et al., 2017). Illness-specific peer support is associated with improved health among adults (Heisler, Vijan, Makki, & Piette, 2010). However, research among youth is limited and findings are inconclusive as to whether peer support experienced during adolescence (Palladino & Helgeson, 2012) or during early emerging adulthood is beneficial for diabetes outcomes. Two studies have examined whether peer support is associated with T1D outcomes across one year among early emerging adults. Both found that a "general" (i.e., not diabetes-specific) measure of peer support was unrelated to adherence and glycemic control (Helgeson et al., 2014; Raymaekers et al., 2017). However, general versus diabetes-specific peer support may yield different findings (Doe, 2016). In addition, only Helgeson et al. (2014) examined the transition year after high school, finding that peer support *during early emerging adulthood* was generally unrelated to concurrent measures of T1D management (while controlling for T1D management during high school). Although current friends may be most readily utilized as a source of support (Monaghan, Helgeson, & Wiebe, 2015), Helgeson et al. (2014) did not examine whether peer support in high school longitudinally predicted changes in T1D management across the transition into early emerging adulthood.

The current study examined whether greater perceptions of diabetes-specific peer support during high school predicted changes toward better adherence and glycemic control longitudinally across the year after high school (Aim 1), and whether greater perceived peer support during the year after high school was related to better changes in diabetes outcomes across the transition year, independent of peer support experienced during high school (Aim 2).

Method

Participants

As part of a larger study, 211 individuals with T1D completed assessments during their senior year of high school (Time 1 or T1; M age = 17.77 years, SD = .40; M illness duration = 7.43 years, SD = 3.84; 43% on insulin pump), and one year later (Time 2 or T2; M age = 18.80 years, SD = .40; 47% on insulin pump). Participants were recruited from pediatric endocrinology clinics in Dallas, TX and Salt Lake City, UT if they had T1D for at least one year, had English as their primary language (necessary for cognitive testing completed for

the broader study), were in their final year of high school, and lived with a parent. Out of 507 qualifying individuals, 301 (59%) agreed to participate; of these, 247 (82%) were enrolled (18% were not enrolled due to scheduling problems). Reasons for not participating included lack of interest (33%) or being too busy (34%); 20% declined to give a reason. At the Dallas site, the Institutional Review Board (IRB) permitted data collection comparing those who did versus did not participate. Participants did not differ from nonparticipants on HbA1c, time since diagnosis, or pump status ($ps > .05$).

The present sample included the 211 participants with valid data at T1 and T2. In this sample: 65% were female; 76% were non-Latino White, 5% Black, 14% Latino, with the remainder as Asian/Pacific Islander, American Indian or more than one race; 56 and 51% of mothers and fathers had achieved less than a Bachelor's degree, 35 and 27% a Bachelor's degree, and 9 and 22% more than a Bachelor's degree. Median family income from neighborhood census tract data showed 21% < $50,000, 64% between $50,000 and $100,000, and 15% > $100,000; 12% of the sample reported public insurance through Medicaid.

Procedures

The study was approved by IRBs at the University of Texas Southwestern Medical Center, University of Utah, and University of California, Merced (where follow-up of the TX sample occurred). Parental consent/participant assent (17-year-olds) or participant consent (18-year-olds) was completed before data collection occurred. Confidential online surveys and an HbA1c assay were completed during the senior year of high school and one year later. Participants were paid $50 for completing the following measures at each annual assessment.

Perceived peer support.—Six items assessed perceptions of diabetes-specific support from friends with whom participants currently spend time (see online appendix for full information). Three emotional support items from the Diabetes Social Support Questionnaire—Friends (Bearman & La Greca, 2002) measured friends' level of understanding and encouragement about diabetes. For each item, participants rated frequency on a 0 (*never*) to 5 (*at least once a day*) scale, and helpfulness on a −1 (*not helpful*), 0 (*neutral*), or 1 (*a little helpful or supportive*) to 3 (*very helpful or supportive*) scale. A single score on each item was obtained by multiplying frequency by helpfulness ratings. Three additional items were developed to capture how friends may be helpful for T1D management, without being intrusive (Doe, 2016). Items assessed friends' awareness of their diabetes diagnosis, knowledge of actions needed in emergent diabetes situations, and degree of helpfulness in providing support for T1D. Participants rated each statement on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). A principal component analysis of the six items revealed a single factor (T1 $\alpha = .72$; T2 $\alpha = .74$). We combined items to form a single index of peer support by computing average z-scores. Peer support items were added to the protocol after the first 32 participants had completed T1 surveys, resulting in the need to use multiple imputation to replace missing values prior to analyses.

Adherence.—Adherence was measured through the Diabetes Behavioral Rating Scale (Iannotti et al., 2006). This 37-item scale correlates well with more time-intensive interview measures, and had good internal consistency in the present sample (T1 $\alpha = .86$; T2 $\alpha = .83$). The scale is scored as a proportion ranging from 0 to 1. Higher scores indicate better adherence.

Glycemic control.—Glycemic control was measured using HbA1c assay kits processed by CoreMedica Laboratories. HbA1c reflects average blood glucose over the preceding 3-4 months; higher values indicate poorer glycemic control. Participants' average HbA1c of 8.17% ($SD = 1.64$) and 8.94% ($SD = 1.98$) at T1 and T2, respectively, were above recommendations of < 7.5% (younger than 18) and < 7.0% (ages 18 and older) (Chiang, Kirkman, Laffel, & Peters, 2014).

Analytic Strategy

Multiple imputation was conducted to replace missing values (Graham, 2009). Five datasets were imputed by including variables beyond those in presented analyses to ensure an adequate missing-at-random model. Across all analyses, the lowest relative efficiency was .926, suggesting adequate recovery of missing data. To address Aim 1, hierarchical multiple regressions tested whether perceived support during late adolescence (T1) predicted adherence and glycemic control at T2 (i.e., while controlling for T1 levels of the outcome). Control variables (pump status, illness duration, sex, T1 diabetes outcome) were entered in Step 1, and T1 peer support was entered in Step 2. To address Aim 2, parallel analyses entered T2 peer support as the main predictor of change in diabetes outcomes, while controlling T1 peer support.

Results

Participants experienced multiple transitions in the year after high school. Fifty-one percent reported at T2 that they had moved away from home in the past year (33% lived in a college dorm, 12% had an apartment with roommates; 2% lived alone); most were in college (67% full-time, 10% part-time) and were paid employees (16% full-time, 38% part-time).

Aim 1 analyses (top section of Table 1) revealed T1 perceived peer support longitudinally predicted better T2 adherence, while controlling for T1 adherence. T1 peer support did not predict changes in glycemic control across time. Aim 2 analyses (bottom section of Table 1) revealed T2 perceived peer support was associated with better T2 adherence and trended toward an association with better (lower) T2 glycemic control, after controlling for T1 peer support and the T1 diabetes outcome. Thus, those who perceived higher peer support for diabetes during early emerging adulthood (T2) displayed better changes in diabetes self-management across this transition year, regardless of earlier levels of perceived peer support.

Discussion

Perceived diabetes-specific peer support may be an important resource for diabetes management as youth navigate the transitions that occur in the year after high school, a potentially high risk time for those with T1D. This study is the first to demonstrate that late

adolescents' perceptions of diabetes-specific peer support predicted better adherence longitudinally across the transition out of high school. There are several ways that perceived peer support may be helpful across time for youth with T1D. Late adolescents who perceive a network of support for diabetes may continue to draw on that existing support system over the subsequent year as they face multiple life changes. Higher perceived support in high school may also be a marker for skills that enable emerging adults to develop an expanding network of peers to support T1D. In either case, late adolescents who perceive higher diabetes-specific peer support during high school are likely to transition better in terms of adherence.

Second, perceived peer support *during early emerging adulthood* was also associated with better adherence at T2, after controlling for levels of both adherence and perceived peer support during high school. The ability to develop new sources of peer support for diabetes appears to be important as late adolescents become more independent, move away from high school friends, and manage diabetes in new social contexts. Findings also suggest that the risk of poor peer support during high school may be overcome if early emerging adults develop new peer supports when they leave high school. This pattern is consistent with findings that peers are more influential for T1D management during emerging adulthood than during adolescence (Raymaekers et al., 2017), and with developmental theory that peers are increasingly influential as youth transition toward independence during emerging adulthood (Berg et al., 2017).

The study should be interpreted in light of limitations. The sample was primarily white and was only examined during entry into early emerging adulthood. Findings may not generalize to other ethnic groups and may change as youth age. Measures were largely self-report and shared method variance may have affected findings. Perceptions of diabetes-specific peer support were measured with a combination of items, some of which were newly developed for this study. The composite index has not been validated elsewhere, and objective measures (e.g., multiple reporters or observations) may yield different findings. Finally, despite the strengths of the longitudinal design, the correlational approach limits causal interpretations.

The findings have implications for research, theory, and practice. Further research is necessary to understand why the perceived availability of support (e.g., having peers who know about diabetes and can be called on for support when needed) was helpful for emerging adults managing T1D, while general aspects of supportive friendships have not been found helpful (Helgeson et al., 2014; Raymaekers et al., 2017). Potentially, efforts to maintain positive relationships with friends come at the cost of neglecting one's T1D. However, some have theorized that general support may actually be more helpful than diabetes-specific support because the latter can be perceived as intrusive (Doe, 2016). Our measure of diabetes-specific support assessed whether friends know about T1D and treatments, and are generally helpful. These aspects of support are likely to be driven by the individual with T1D and, thus, less likely to feel intrusive. This possibility is consistent with developmental theory that "disclosure" is a key facet to receiving useful support during emerging adulthood (Berg et al., 2017). Clinicians working with late adolescents or emerging adults can draw on these findings. Assessing perceptions of diabetes-specific peer

support and developing interventions that provide new opportunities for support (e.g., support group with same-age patient peers), or that target skills such as how to disclose T1D information to others so as to create a network of support in new social settings at work or school may be useful. Raising awareness of T1D on college campuses, potentially in collaboration with student health services, may also help emerging adults feel more comfortable disclosing T1D to peers, allowing them to experience higher levels of peer support for T1D management at this important time of development.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Table 1.

Peer support predicting diabetes outcomes from Time 1 to Time 2.

	Time 2 Adherence			Time 2 HbA1c		
	B (SE)	*R^2*	*p*	*B (SE)*	*R^2*	*p*
T1 support as predictor						
Step 1		.463	.000		.236	.000
T1 Pump status[a]	−.012 (.023)		.595	−.629 (.448)		.162
T2 Pump status[a]	.034 (.024)		.151	.510 (.438)		.245
Time since diagnosis	.001 (.002)		.708	−.047 (.035)		.173
Sex	.021 (.016)		.185	−.044 (317)		.891
T1 Adherence or HbA1c	.723 (.059)		.000	.557 (.083)		.000
Step 2		.046	.034		.003	.496
T1 Peer support	.010 (.005)		.040	−.053 (.083)		.510
T2 support as predictor						
Step 1		.477	.000		.239	.000
T1 Pump status[a]	−.013 (.024)		.582	−.620 (.446)		.582
T2 Pump status[a]	.037 (.024)		.128	.495 (.437)		.128
Time since diagnosis	.000 (.002)		.826	−.047 (.035)		.826
Sex	.022 (.016)		.160	−.058 (.318)		.160
T1 Adherence or HbA1c	.683 (.065)		.000	.564 (.085)		.000
T1 Peer support	.010 (.005)		.040	−.053 (.081)		.510
Step 2		.032	.001		.029	.064
T2 Peer support	.015 (.005)		.003	−.167 (.094)		.083

Note. T1 = Time 1 (senior high school year); T2 = Time 2 (one year later)

[a]The pattern of results is unchanged when regressions are run while controlling for pump status from Time 1 only, from Time 2 only, or from both Time 1 and 2 simultaneously.