

DIABETES AND THE TRANSITION TO COLLEGE

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Abstract

Sixteen adolescents with diabetes who had recently completed high school and planned to attend college enrolled in the study. Participants primarily attended colleges and universities that were close to home and small to medium in size. Students were sent questionnaires assessing psychological factors and self-care behavior at three times: the summer before college matriculation, the middle of the first semester, and the end of the second semester. At each time, students also completed and returned finger-stick tests of hemoglobin A1C. From the summer before college to the second semester, metabolic control deteriorated from 7.35 to 8.22 ($p < .05$). Reports of self-care behavior did not change over this interval. At each of the three assessments, we determined whether four psychological factors were associated with self-care behavior and metabolic control: social support, the spotlight effect (the extent to which an individual believes peers are attending to his/her behavior), depressive symptoms, and diabetes quality of life. Depressive symptoms and poor diabetes quality of life were related to poor self-care behavior at all three times of assessment and were associated with poor metabolic control before college entry. Social support was associated with good metabolic control before college entry. The spotlight effect was associated with poor self-care behavior prior to college and during the first semester of college. While small in scope, this study suggests that college matriculation is an important transition in need of further study.

Background

For adolescents with diabetes, the transition to college may be especially problematic because: (Anderson & Wolpert, 2004)

1. College is the first time adolescents are solely responsible for diabetes care.
2. New schedules and eating habits may make diabetes more difficult to manage.
3. Establishing new relationships may make adolescents particularly sensitive to issues that make them different from their peers.

Little work has addressed the transition to college for adolescents with diabetes. However, existing work suggests:

- College students with diabetes are more likely than healthy students to **live at home** during the college years (Myers, 1992)
- College students with diabetes report several **barriers** to good self-care behavior that are **exacerbated during college**, including difficulties with time management, stress, constraints on diet management and insufficient finances (Wdowik et al., 1997)
- One study found that 71% of college students with diabetes felt their **disease was more difficult to manage in college** than in high school (Ramchandani et al., 2000)
- College students with diabetes reported **worse self-care behavior** than adults with diabetes, and **worse diabetes quality of life** than adolescents with diabetes (Wysocki et al., 1992)
- There is some evidence that indicates HbA1C levels peak during the ages associated with college matriculation (Bryden et al., 2001), and other evidence that indicates at least some students experience a **deterioration in metabolic control** after college entry (Ramchandani et al., 2000)

Thus, this is an important transition to examine. However, there are two important weaknesses in prior work:

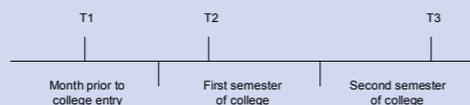
- Use of cross-sectional and retrospective design
- Little emphasis on social/psychological predictors and outcomes during the transition to college

The current study examines the relation between psychosocial and diabetes variables in a sample that was prospectively examined.

Method

Procedure

- Letters were sent to 17 and 18 year-old adolescents who attended Children's Hospital of Pittsburgh
- Interested individuals returned a postcard to the research team with their contact information
- The research team contacted interested individuals to explain the study and determine eligibility (i.e., about to enroll in first year of college, have had diabetes for at least a year, no other major chronic illnesses)
- Consent forms and the pre-college questionnaire (Time 1; T1) were mailed to participants at home
- Follow-up questionnaires (Time 2 and Time 3; T2 & T3) were mailed to students' college residences



Participants

- 16 adolescents with type 1 diabetes, enrolling in college for the first time

Measures

Psychosocial variables

- **Social Support** – Interpersonal Support Evaluations List for College Students (Cohen & Hoberman, 1983)
 - Measures perceived support from friends and family
 - e.g. "I know someone who I see or talk to often with whom I would feel perfectly comfortable talking about any problems I might have adjusting to college life"
 - Possible scores range from 0 to 23
- **Spotlight effect** – measure developed for the current study
 - Measures extent to which individual believes others are attending to his/her behavior
 - e.g., "Let's say you're in class and you suddenly feel low. Do you think your classmates will notice?"
 - Responses range from 1 (definitely not) to 4 (definitely)
 - Contains diabetes-specific and general items
 - Alphas were .77, .78, and .81 for T1, T2 and T3, respectively
- **Depression** - Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977; Schultz et al., 1997)
 - e.g., "I felt depressed"
 - Responses range from 1 (rarely) to 4 (most of the time)
 - Alphas were .88, .86, and .92 for T1, T2 and T3, respectively
- **Diabetes Quality of Life** – DQOL scale (Ingersoll & Marrero, 1991)
 - Measures problems associated with diabetes
 - e.g., How often do you miss work, school, or household duties because of your diabetes?
 - Responses range from 1 (never) to 5 (all the time)
 - Higher scores indicate more problems
 - Alphas were .91, .83, and .85 for T1, T2, and T3, respectively

Diabetes variables

- **Self-care behavior** – Self-care Inventory (La Greca et al., 1988)
 - Measures diabetes care behaviors in past two weeks
 - e.g., "glucose testing"
 - Responses range from 1 (never do this as recommended) to 5 (always do this as recommended)
 - Alphas were .74, .82, and .87 for T1, T2, and T3, respectively
- **Metabolic control** – Hemoglobin A_{1c} as measured with A1C Now Kit
 - Participants were mailed A1C Now test kit, containing disposable meter, mixing solution, and instructions
 - Participant conducted test and returned meter & report of HbA_{1c} to the study team
 - When meters arrived with data still visible, results were verified by study staff (72% of the time)
 - HbA_{1c} ranged from 5.8 to 12.3 at study onset



Step 1: Finger stick

Step 2: Mix blood with dilution solution

Step 3: Shake

Step 4: Apply solution to meter

Step 5: Wait for results (8 min)

Information about Participants

Living Situation

- At T2 (first semester), 1 respondent reported living at home with parents
- By T3 (second semester), 3 respondents reported living at home with parents

Visits Home

- At T2, the average student had visited home about 2 times in the past month
- By T3, the average student had visited home just over once per month
- A study of healthy students in Pittsburgh by the first author indicated that these students typically visited home approximately .6 times per month in their first semester and .3 times per month in their second semester

Distance From Home

- 75 % of participants attended college within 200 miles of their home town
- Only 1 participant attended college further than 300 miles from home

Size of College/University

- Size of college ranged from very small (70 students) to very large (nearly 35,000 students)
- Median college size was approximately 5000 students
- Of the students who attended larger colleges & universities, 75% were within 200 miles of their home town

Diabetes Treatment Method

- Approximately 56% of participants used insulin pumps
- Type of treatment was unrelated to distance of college from home or size of college
- Treatment type was also unrelated to self-care behavior or HbA_{1c} at any point

Sex

- 63% of study participants were female
- Sex was not associated with distance from home or size of college
- Sex was not associated with self-care behavior or HbA_{1c} at any point

Family Income

- Most participants came from middle and upper income families
- Higher income was marginally associated with longer distance between home and college ($r = .44, p = .10$), but was unrelated to college size
- Higher income was marginally associated with better T1 self-care behavior ($r = .47, p = .08$), but was unrelated to self-care behavior during college, or metabolic control at any point

Results

Means

	T1 (summer) N=16	T2 (fall) N=14	T3 (spring) N=12
Social support	19.13	20.43	19.83
Spotlight effect	2.79	2.76	2.87
Depression	1.65	1.71	1.97
Diabetes quality of life	2.06	1.96	2.07
Self-care behavior	3.60	3.62	3.61
HbA1C ¹	7.77	7.94	8.23

¹ Means for the 10 participants with complete data were 7.33, 7.66, 8.22, respectively

Changes Over Time

We used paired t-tests to detect changes in variables from T1 to T2 and from T1 to T3

	T1 to T2	T1 to T3
Social support	ns	ns
Spotlight effect	ns	$t(11) = -1.78, p = .10$
Depression	$t(13) = -1.89, p = .08$	$t(11) = -2.52, p < .05$
Diabetes quality of life	ns	ns
Self-care behavior	$t(13) = 1.78, p = .10$	ns
HbA1C	$t(11) = -1.94, p = .08$	$t(10) = -2.35, p < .05$

Correlations with Self-Care Behavior

Cross-sectional correlations between psychosocial variables and self-care behavior are shown below (e.g., T1 social support is correlated with T1 self-care behavior, T2 social support with T2 self-care behavior, etc.)

	T1 (summer)	T2 (fall)	T3 (spring)
Social support	.27	.02	.30
Spotlight effect	-.61**	-.79**	-.30
Depression	-.76**	-.63*	.51
Diabetes quality of life	-.48*	-.76**	-.71**

Correlations with Metabolic Control

Cross-sectional correlations between psychosocial variables and self-care behavior are shown below (e.g., T1 social support is correlated with T1 metabolic control, T2 social support with T2 metabolic control, etc.)

	T1 (summer)	T2 (fall)	T3 (spring)
Social support	-.60*	-.23	.07
Spotlight effect	.15	.34	-.01
Depression	.60*	.18	.51
Diabetes quality of life	.75**	.47	.29

Discussion

The current study utilized a small sample, thus the findings should be regarded as preliminary. Nonetheless, important issues are raised that should be addressed by future work.

- Metabolic control deteriorated over the transition to college. Future work should examine the processes by which this occurs (e.g., self-care behavior, stress) and consider possibilities for assisting adolescents with this difficult life transition.
- Self-care behavior showed a trend for decline during the initial transition to college. The initial transition may be a difficult time for students during which they may benefit from intervention.
- Depression, the spotlight effect (feeling others are paying attention to your behavior), and poor diabetes quality of life were associated with self-care behavior before college matriculation and during the first year. It is possible that improving these factors will help to improve self-care behavior.

Recommendations for Future Work

- This study established the feasibility of conducting a prospective study with adolescents with diabetes as they make the transition to college. Future work should use a larger and more diverse sample to more fully examine the nuances of the transition to college.
- Future work should consider following adolescents as they make the transition to adulthood as not all adolescents attend college.
- Future work should consider the role of continuing medical care during the transition to adulthood. As many patients transition from pediatric to adult clinics when they leave home, it is important to document this change and determine any impact it may have on self-care behavior, metabolic control and psychological well-being.

References

- Anderson, B. J., & Wolpert, H.A. (2004). A developmental perspective on the challenges of diabetes education and care during the young adult period. *Patient Education and Counseling, 53*, 347-352.
- Bryden, K. S., Dinger, D. B., Mayou, S. A., Fessler, R. C., & Neil, H.A.W. (2003). Poor prognosis of young adults with type 1 diabetes. *Diabetes Care, 26*(4), 1052-1057.
- Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology, 13*(2), 99-125.
- Ingersoll, G. M., & Marrero, D. G. (1991). A modified Quality-of-Life Measure for Youths: Psychometric properties. *Diabetes Educator, 17*(2), 114-118.
- La Greca, A. M., Swales, T., Klemo, S., & Madigan, S. (1988). Self-care behaviors among adolescents with diabetes. Paper presented at the Proceedings of the Ninth Annual Sessions of the Society of Behavioral Medicine, Rockville, MD.
- Myers, J. T. (1992). Transition into adulthood with a chronic illness focus: Insulin-dependent diabetes mellitus. Unpublished doctoral dissertation, University of Michigan.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401.
- Ramchandani, N., Cantley-Kiser, J. M., Alter, C. A., Bink, S. A., Yeager, S. D., Tamborlane, W. V., & Chipkin, S. R. (2000). Self-reported factors that affect glycemic control in college students with type 1 diabetes. *The Diabetes Educator, 26*(4), 656-666.
- Schulz, R., Newton, J., Mittman, M., Burton, L., Hirsch, C., & Jackson, S. (1997). Health effects of caregiving: The Caregiver Health Effects Study. *Annals of Behavioral Medicine, 19*, 110-116.
- Wdowik, M. J., Kendall, P. A., & Harris, M. A. (1997). College students with diabetes: Using focus groups and interviews to determine psychosocial issues and barriers to control. *The Diabetes Educator, 23*(3), 568-582.
- Wysocki, T., Hough, B. S., Ward, K. M., & Green, L. B. (1992). Diabetes mellitus in the transition to adulthood: Adjustment, self-care, and health status. *Developmental and Behavioral Pediatrics, 13*(3), 194-201.

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