The Coping Styles of Adolescents With Type 1 Diabetes Are Associated With Degree of Metabolic Control

Marit Graue, MSC\(^1,2\)  
Tore Wentzel-Larsen, MSC\(^3\)  
Edvin Bru, PhD\(^4\)  
Berit Rokne Hanestad, PhD\(^1\)  
Oddmund Søvik, MD\(^2\)

OBJECTIVE — To systematically study the various coping styles in a population-based sample of adolescents with type 1 diabetes, exploring the association of different coping styles with metabolic control and adolescent self-reported diabetes-related quality of life.

RESEARCH DESIGN AND METHODS — Of a total population of 116 adolescents with type 1 diabetes (age 13–18 years), 103 (89%) participated in the study, completing a questionnaire to obtain information on coping styles and perception of diabetes-specific quality of life. The mean age (±SD) was 14.9 ± 1.6 years, diabetes duration 7.1 ± 3.8 years, HbA\(_1c\) 9.4 ± 1.6%, and male-to-female ratio 52:51.

RESULTS — There was a significant correlation between higher HbA\(_1c\) values and higher degree of mental (\(r = 0.25, P < 0.05\)) and behavioral (\(r = 0.33, P < 0.01\)) disengagement and aggressive coping (\(r = 0.33, P < 0.01\)). Stepwise multiple regression analyses indicated that greater use of aggressive coping (\(P < 0.05\)) and behavioral disengagement (\(P < 0.05\)) were significantly related to increase in HbA\(_1c\). Greater use of active coping (\(P < 0.05\)) was significantly related to a decrease in HbA\(_1c\). Partial correlation analysis showed that lower scores on diabetes-specific quality of life were significantly related to greater use of emotion-focused coping (\(r = -0.22 \text{ to } -0.49\)). Stepwise multiple regression analyses showed that greater use of mental disengagement was significantly related to lower degree of perceived diabetes-related impact.

CONCLUSIONS — Poor metabolic control and lower degree of diabetes-related quality of life are associated with greater use of emotion-focused coping in adolescents with type 1 diabetes.

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Adolescents with type 1 diabetes are faced with a complex set of developmental changes as well as changing demands of the disease. Adjustment problems might affect both psychological well-being and the course of the disease by contributing to poor self-management and poor metabolic control. Whereas coping skills are crucial for emotional and social development among young people in general (1), adolescents with diabetes are faced with additional demands.

In the present study, coping refers to a widely used framework classifying coping responses according to their function (2). Coping styles refer to typical, habitual preferences for ways of approaching problems and might be regarded as strategies that people generally use to cope across a wide range of stressors (3). Problem-focused coping refers to efforts directed toward rational management of a problem, and it is aimed at changing the situation causing distress. Emotion-focused coping implies efforts to reduce emotional distress caused by the stressful event and to manage or regulate emotions that might accompany or result from the stressor.

In previous work among healthy youths and youths with physical, behavioral, and psychological problems, it is reported that adolescents who were more easily distressed used more cognitive avoidance and emotional discharge (4). In addition, across different chronic diseases, it has been suggested that problem-focused coping is generally associated with better adjustment (5). In adolescents with diabetes, avoidance coping and venting emotions have been found to predict poor illness-specific self-care behavior but were unrelated to metabolic control (6). On the other hand, ways of coping with stress have also been identified as important factors in relation to metabolic control. Relationships between higher levels of avoidance coping and poorer metabolic control have been reported (7,8).

The importance of a developmental perspective in understanding the variability in adolescents’ coping efforts is underscored (9,10). It has been suggested (11) that subjects who used more mature defenses and exhibited greater adaptive capacity were more likely to adhere to their regimen. Coping strategies seem to be age dependent, with adolescents using more avoidance coping than younger children with diabetes (12).

In the present work, we hypothesized that problem-focused coping styles are positively associated, and emotion-focused coping styles negatively associated, with better metabolic control and higher levels of perceived diabetes-related quality of life.

RESEARCH DESIGN AND METHODS — The patients were recruited from the outpatient department of...
Coping styles in adolescents with diabetes

Table 1 — Patient characteristics of 103 adolescents (age 13–18 years) with type 1 diabetes

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Boys 52 (50.5), Girls 51 (49.5)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>14.9 ± 1.6</td>
</tr>
<tr>
<td>Age at onset (years)</td>
<td>7.8 ± 3.5</td>
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<tr>
<td>Diabetes duration (years)</td>
<td>7.1 ± 3.8</td>
</tr>
<tr>
<td>Insulin treatment</td>
<td>Two to three injections per day 46 (44.7), Four or more injections per day 54 (52.4)</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>9.4 ± 1.6</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>Girls 21.7 ± 3.5, Boys 20.4 ± 2.8</td>
</tr>
<tr>
<td>Subcutaneous infiltration at injection sites</td>
<td>Yes 27 (26.2), No 74 (71.9), Missing 2 (1.9)</td>
</tr>
<tr>
<td>Family lives with</td>
<td>Mother and father 83 (80.6), Mother 9 (8.7), Father 4 (3.9), Other 2 (1.9), Missing 5 (4.9)</td>
</tr>
</tbody>
</table>

Age, sex, height, weight, age at diagnosis, number of daily insulin injections, subcutaneous infiltration at injection sites, and total daily insulin dose were recorded. In addition, the following events during the last 6 months were assessed: number of severe hypoglycemic episodes (leading to convulsions or unconsciousness) and number of hospitalizations with ketoacidosis. Family structure was classified according to whether the adolescent lived with two parents, a single parent, or another type of arrangement. A blood sample was taken from each patient for determination of HbA1c and analyzed by DCA-2000 (Bayer, Elkhart, IN); the normal range is 4.5–6.1%.

The study was designed as a cross-sectional survey and conducted from January 2000 until April 2000. To cover different coping styles relevant to the management of diabetes in adolescence, coping styles were assessed by subscales selected from the following established scales (an example of items and number of items for each scale are given in parentheses). 1) Six subscales from the COPE scale developed by Carver, Scheier, and Weintraub (3); “active coping” (“I take direct action to get around the problem”); four items), “planning” (“I make a plan of action”); four items), “seeking social support for instrumental reasons” (“I try to get advice from someone about what to do”); four items), “seeking social support for emotional reasons” (“I discuss my feelings with someone”); four items), “behavioral disengagement” (“I admit to myself that I can’t deal with it, and quit trying”); four items), and “mental disengagement” (“I turn to substitute activities to take my mind off things”); four items). 2) Three subscales from other coping style scales; “accepting responsibility” (I realize that I have brought the problem on myself); four items) slightly modified from the “Ways of Coping Questionnaire” (13), “aggressive coping” (“I get irritated”); five items) from the “Life Events and Coping Inventory” (14), and “self blame” (“I think it is my fault”); four items) from Vitaliano et al. (15). The introduction to the questionnaire was derived from the dispositional version of the COPE scale and directed the adolescents’ attention toward what they usually do when faced with problems and strain. Indicating the frequency with which the adolescents used the different coping styles, the response choices were “I usually don’t do this at all,” “I usually do this a little bit,” “I usually do this a medium amount,” and “I usually do this a lot” (scored from 0 to 3). Scores for the subscales assessing coping styles were computed as the mean score across items included in the subscale, yielding a scoring range of subscales that corresponded with that of the single items: 0 (lowest possible use of each coping style) through 3 (highest possible use of each coping style). The Cronbach’s α scores for the COPE subscales in the present study (0.71–0.89) and the other three subscales (0.76, 0.82, and 0.87, respectively) indicate that the scales have good internal consistency.

Diabetes-specific quality of life was assessed using the Diabetes Quality of Life (DQOL) questionnaire. It was designed by the Diabetes Control and Complication Trial Research Group (16) and modified for youths by Ingersoll and Marrero (17). It is composed of three subscales: a Disease Impact scale, a Disease-Related Worries scale, and a Diabetes Life Satisfaction scale. All subscales were linearly transformed so that the worst and best possible scores were 0 and 100, respectively. Higher scores indicate higher degree of diabetes-related quality of life and, therefore, lower perceived diabetes-related impact and worry and higher diabetes life satisfaction. The Cronbach’s α scores for the different subscales in the present study (0.88–0.92) were in accordance with previous multinational results (18) and indicate that the scales have good internal consistency.

The study was approved by the regional ethics committee and performed according to the Declaration of Helsinki.

Statistical analyses

Statistical analyses were carried out using SPSS version 11.0 for Windows (SPSS, Chicago, IL). Cronbach’s α was used to determine internal consistency reliability for the different coping and diabetes-specific quality-of-life scales. Partial correlation coefficients were used to examine the univariate relationships of coping scales with metabolic control and diabetes-related quality-of-life scales, controlling for demographic and clinical variables (age, sex, and insulin dose and regimen). The influences of coping scales on metabolic control and diabetes-related quality-of-life scales were examined by forward stepwise regression analyses. Statistical significance was set at 0.05.
Table 2

Partial correlation coefficients and unstandardized regression coefficients between metabolic control and diabetes-related quality of life (DQOL) by coping styles in adolescents with type 1 diabetes, adjusted for age, sex, insulin dose, and regimen.

<table>
<thead>
<tr>
<th>Coping styles*</th>
<th>HbA1c</th>
<th>DQOL subscales</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Impact</td>
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<tr>
<td>Problem-focused coping</td>
<td></td>
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<tr>
<td>Active coping</td>
<td></td>
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<tr>
<td>Planning</td>
<td></td>
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<tr>
<td>Instrumental support</td>
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<tr>
<td>Responsibility taking</td>
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<tr>
<td>Emotion-focused coping</td>
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<tr>
<td>Emotional support</td>
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<tr>
<td>Mental disengagement</td>
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<tr>
<td>Behavioral disengagement</td>
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<tr>
<td>Aggression</td>
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<tr>
<td>Self-blame</td>
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</tbody>
</table>

Control variables:
- Age
- Sex
- Insulin regimen (IU/kg per day)

Statistical significance:
- **P < 0.01
- *P < 0.05
- †P < 0.01
- §P < 0.05
- ¶P < 0.001

*Higher scores indicate greater use of coping styles.
†Higher scores indicate higher degree of diabetes-related impact and worry and higher perceived diabetes-related quality of life (DQOL).
‡Coping scales from ref. 3.
§Based on both coping styles and control variables.
RESULTS — Descriptive characteristics of the adolescents (13–18 years) included in the study are shown in Table 1. Only three patients in this study were using insulin pumps. Two patients were hospitalized once and two patients were hospitalized twice with ketoacidosis during the 6 months immediately before the study. Severe hypoglycemia during the last 6 months was recorded in six patients.

Relationships between metabolic control (HbA1c) and coping styles
There were significant partial correlation coefficients between the adolescents’ self-reported emotion-focused coping and metabolic control (Table 2), adjusting for age, sex, and insulin dose and regimen. Higher values of HbA1c were associated with greater use of behavioral and mental disengagement and aggressive coping ($r = 0.25–0.33$). The regression analysis for metabolic control (Table 2) showed that lower use of active coping ($P < 0.01$) and greater use of behavioral disengagement ($P < 0.05$) and aggressive coping ($P < 0.05$) were related to a significant increase in HbA1c. These coping styles explained 20% of the variance in HbA1c, and no control variables (age, sex, and insulin dose and regimen) were significantly related to HbA1c.

Diabetes-specific quality of life (DQOL) and coping styles
Adjusted for age, sex, and insulin dose and regimen, mental and behavioral disengagement, aggressive coping, and self-blame were significantly negatively correlated with diabetes-related impact, worry, and life satisfaction ($r = -0.23$ to $-0.49$) (Table 2). In addition, greater use of responsibility taking was associated with a higher degree of perceived diabetes-related impact ($r = -0.24$). Higher perception of diabetes-related worry was significantly correlated to greater use of planning, instrumental support, and responsibility taking ($r = -0.28$ to $-0.42$).

Furthermore, regression analyses showed that greater use of mental disengagement ($P < 0.01$) (Table 2) was related to a significantly higher degree of perceived diabetes-related impact (DQOL). This coping style alone explained 12% of the variance in impact, 20% together with the control variable age. The analyses also showed that greater use of mental disengagement ($P < 0.05$) and self-blame ($P < 0.01$) (Table 2) were related to a significantly higher degree of perceived diabetes-related worry (DQOL). These coping styles explained 32% of the variance in the worry dimension, 41% together with age. Higher degree of active coping ($P < 0.05$) and lower degree of self-blame ($P < 0.001$) (Table 2) were associated with better diabetes life satisfaction. These coping styles explained 18% of the variance in the satisfaction dimension, 44% together with age, sex, and insulin dose.

CONCLUSIONS — In the present population-based study, poor metabolic control and reduced diabetes-related quality of life were significantly related to emotion-focused coping styles, such as behavioral and mental disengagement and aggressive coping. Greater use of active coping, on the other hand, was related to improved metabolic control and diabetes life satisfaction. We therefore feel justified to conclude that in adolescents with type 1 diabetes, the hypothesized relationships between coping styles and the degree of metabolic control and self-reported diabetes-related quality of life are supported.

Because it is cross-sectional, the present study does not allow conclusions with regard to cause and effect. Young people with diabetes might “choose” a particular coping style in response to poorly controlled diabetes. In line with this alternative, beliefs about control play a major role in determining the degree to which a person feels threatened or challenged in a stressful encounter (2). Mental disengagement and aggressive coping might thus serve as adaptive mechanisms. Conversely, poor metabolic control might be a consequence of inherent and pre-morbid coping styles. Skinner and Hampp (19) suggest that adolescents’ beliefs about their diabetes and its treatment should be considered as key factors influencing self-care, emotional well-being, and metabolic control. Furthermore, in an attempt to improve diabetes outcomes in adolescents with diabetes, Gray et al. (20) has shown that coping skills training in combination with intensified insulin treatment had a significant impact on the adolescents’ metabolic control as well as on quality of life. The data from our study complement this finding, showing that greater use of active coping was related to better HbA1c and higher diabetes life satisfaction.

Previous studies have tended to focus predominantly on relationships between treatment-related factors and poor metabolic control and, to a lesser extent, on psychosocial factors underlying poor self-management behaviors. Thus, poor adherence to insulin treatment (21), and specifically missing shots (22), might contribute to poor metabolic control and episodes of ketoacidosis. However, in some studies (23, 24), a relationship between metabolic control and self-efficacy and learned helplessness was found, suggesting that particular beliefs about controllability of events might be relevant to the coping process. Seiffge-Krenke and Steemmler (8) found, in a longitudinal study of 98 adolescents with type 1 diabetes, that psychosocial stress was a significant risk factor for medical maladjustment. In that study, adolescents with stable good metabolic control used less avoidance coping in dealing with everyday stress.

Previous research (12) has shown that children and adolescents with diabetes differ significantly according to age in the way they cope with the illness. Younger subjects were more likely to cope by ventilating feelings through yelling and arguing, whereas older ones were more likely to cope with avoidance behavior. As the present study utilized a rather limited age range (13–18 years), no significant association was found between coping styles and age when controlling for sex (data not shown). In addition, Hanson et al. (6) reported that although poor adherence to treatment often has been associated with developmental problems in adolescence, it was the maladaptive coping styles rather than age that predicted poor adherence to treatment.

In the present study, the regression analyses showed that a higher degree of self-blame was related to higher degree of perceived diabetes-related worry and lower diabetes life satisfaction. In a study among healthy adolescents, Thuen and Bru (25) suggest that although self-blame might stimulate adolescents’ responsibility taking, too much self-blame might be linked to internalization of emotional problems. Subjects who set higher standards might also have a tendency to be dissatisfied with their own efforts. It has been demonstrated that strategies that increase the adolescents’ ability to cope with the disease might influence both psychological and metabolic adaptation (20).
The findings from the present study with greater use of mental and behavioral disengagement and aggressive coping related to negative impact of diabetes on quality of life and poor metabolic control might be interpreted as problems of neglect of disease in adolescence. From this perspective, health promotion interventions and supporting systems are important in helping adolescents to better integrate the challenges of the disease into daily life and to adopt more constructive behavior. On the basis of our results, we would suggest that communication and counseling with focus on individual beliefs and emotions should be integrated into routine outpatient care, addressing mental and behavioral disengagement, aggressive coping, and self-blame. During adolescence, a basis for future healthy life is established, and routines for how the individual will deal with stress later in life are formed.

Some methodological problems of this study should be addressed. Data based on self-reports allow for the participants’ own perception of coping efforts but are naturally subject to reporting bias. Furthermore, the results might have been influenced by the fact that 11% of eligible adolescents did not participate. A consequence might have been an underrepresentation of disengaged adolescents. It should be noted, however, that there were no significant differences in HbA1c values between participating and nonparticipating adolescents.

In conclusion, our findings point to the importance of taking individual coping behaviors into account when evaluating the impact of disease on metabolic control and quality of life. Delineation of coping styles might be useful for identifying adolescents in need of particular counseling and support. Further research should be directed toward identifying coping styles of subgroups of patients at risk for poor adaptation and exploring possible protective factors in order to optimize metabolic control and quality of life.

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References