Evaluation of peer-group support and problem-solving training in the treatment of adolescents with type 1 diabetes

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Abstract

Aim: The aim of this study was to describe the elements and results of peer-group support and problem-solving training in the treatment of adolescents with type 1 diabetes and their parents. The hypothesis was that the intervention would improve HbA_{1c} and enable the adolescents to take responsibility in managing their diabetes.
Method: A total of 60 adolescents with type 1 diabetes, aged 13–18 years, and their parents, were invited to participate in this study. They were recruited from outpatient clinics in two centres in Norway, and 19 adolescents agreed to participate. Both adolescents and parents completed self-report questionnaires pre-treatment, during treatment, post-treatment and at one year follow up. In addition HbA_{1c} values were obtained five times from the adolescents' medical records over the same time period.
Results: The results indicated that peer-group support and problem-solving training is a suitable intervention in the treatment of adolescents with type 1 diabetes. In terms of metabolic control there was a significant decrease in HbA_{1c} in girls ($p=0.039$).
Conclusion: The intervention was peer-oriented and psycho-educative, and encouraged collaboration between the paediatric diabetes clinic and the psychiatric department in the treatment for adolescents with diabetes and their parents. This collaboration was of great importance for the quality of the study and added valuable knowledge and experience to the diabetes multidisciplinary team.

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Key words

Adolescents; parents; diabetes; group intervention

Introduction

Managing type 1 diabetes is a challenge during puberty. In addition to the hormonal changes of adolescence that cause insulin resistance and a need for larger doses of insulin, adolescence is a period of increasing physical, cognitive and emotional maturation.[1] Empirical studies indicate that adolescents with type 1 diabetes display the worst glycaemic control when compared to individuals of other age groups.[2] Hampson *et al* showed that educational and psychosocial interventions only have small to medium beneficial effects on diabetes-related outcomes.[3] Furthermore, it is shown that the evidence of effectiveness of psychological therapies in improving diabetes outcomes is minor.[4]

Group interventions for people with health issues are distinctive in that they mainly address coping difficulties. Participants may have very different experiences, personality styles and resources, yet sharing the same medical condition provides them with ample common ground. While exploration of long-standing interpersonal and intrapersonal problems may be better addressed individually, a group situation can provide a rich learning environment in which one may recognise inadequate patterns and skills.[2] Van der Ven has shown that interventions with a short, structured format may have more beneficial effects than groups relying only on disclosure and sharing of experiences. To achieve behavioural change, people need strategies and practice to translate new information into actual behaviours and to integrate these new behaviours into their everyday lives.[5]

The aim of the present study was to explore whether peer-group support and problem-solving training in a group intervention would improve metabolic control and quality of life for the participating adolescents. The hypothesis was that education, peer-group support and problem solving in a group intervention would improve HbA_{1c} and enable the adolescents to take more responsibility in managing their diabetes.

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Materials and methods

Patients

All patients (13–18 years of age; n=60) cared for in two centres in Nord-Trøndelag County, Norway were invited to participate. Inclusion criteria were type 1 diabetes, age 13–18 years and that both the adolescent and at least one of the parents agreed to participate.

A total of 19 adolescents with type 1 diabetes (13–17 years of age) and their parents participated in the intervention. The study group included 9 boys (47.4%) and 10 girls (52.6%), mean age 14.9 years (SD=1.22), mean diabetes duration 6.6 years (range 1–15 years). A total of 16 (84.2%) were living with both parents. Two sets of siblings were included in the study. Only 19 of 60 eligible participants were included, however reasons for refusal were unfortunately not registered.

At baseline 17 patients used multiple insulin injections (four or more injections per day), and 2 used insulin pumps. Mean HbA_{1c} was 9.2% (SD=1.06, range 7.7–13.0%), and within this range the adolescents fell into three sections: 1 (5.3%) had HbA_{1c} <8%, 15 (78.9%) had HbA_{1c} of 8–9.5% and 3 (15.8 %) had HbA_{1c} >9.5%.

Before attending group sessions both the adolescents and their parents were interviewed by the group leaders. In these interviews, which focused on the participants' expectations and reasoning behind their requests for the group sessions, the parents gave the impression that they were eager to participate. They had a strong desire to meet with peers, and to discuss with them

Objectives	Details of content	The educational process, goals and methodology
First phase (the formative phase). The adolescent must deal with a new system: the group. Begin to develop a group culture in which group members feel safe. To discover and deal with resentment that may occur among group members.	A brief, simple opening statement from the group leaders. Clarification of purpose and mutual expectations. Clarification of the group leaders' roles. Group members are introduced to each other. Setting up a contract. Encouraging participation from all group members. Starting education. Starting with non-threatening topics.	In this phase the focus was on getting to know each other and making everyone feel safe in the group so that the adolescents would want to attend the following group sessions.
Second phase Education	Using teaching modules. Using the adolescents' own experiences and ideas. Group leaders aimed at becoming a member of the group rather than being an authority figure.	Receiving new knowledge. Using experience. Discussing solutions. Learning from each other. Parents knowing that the adolescents were updated.
Third phase (the established phase). Everybody feeling safe to be in the group. The work phase.	Exploring a range of issues brought in by the adolescents. Themes, which are important to the group members.Group leaders undertake tasks in order to pursue certain issues, to monitor the state of the group and to encourage participation. Using learning by doing, as in eating, cooking, swimming and bowling combined with glucose monitoring.	Group members achieve personal benefit from being in a group.To utilise events occurring in the groups for the benefit of individual members.
Fourth phase (termination phase). Termination of the group sessions.	Preparing termination of group sessions.	The groups deal with feelings that occur in this phase. Some group members may feel that there is little time left, a time when urgent issues may come up. Some adolescents may have difficulties in dealing with termination. Others feel relieved.

Table 1. Further information about educational methods and content

the issues of parenting adolescents with diabetes. The adolescents had mixed expectations about joining the groups. The interviews revealed that they mainly wanted to learn more about diabetes, and second to that they wanted to meet with peers.

Design

The participants were allocated to three different groups (five to eight participants in each group). The first two groups, consisting of five and six adolescents, attended 10 group sessions (from March until December), whereas the third group of eight adolescents attended six sessions from June until December. The group consisting of six participants included adolescents from a geographically distant area.

Group intervention

The education programme consisted of both 'theory' and 'learning by doing' (Table 1). Topics to be discussed in the groups were: me and my diabetes, what is diabetes, measuring blood sugar levels, HbA_{1c}, insulin, hypoglycaemia, hyperglycaemia and ketoacidosis, alcohol, smoking, physical activity, diet, insulin pumps, travels, complications, research, using the internet, living alone with diabetes.

The group members met once a month, for sessions lasting one hour, with adolescents and parents attending separate groups. Family cohesion and conflict are common in the adolescent years,[6] and the idea is that sharing experiences and talking freely about diabetes with peers – adolescents and parents separately – might facilitate communication and co-operation between adolescents and parents in the future. The opportunity to meet in groups with peers might allow the family to bring in new topics to conversations at home. Two group leaders attended each group session. The first four group sessions were teaching sessions focusing on education, and thereafter the sessions were support and problem-solving group sessions. The parents were not offered education; they were only to be part of the support groups.

	Adolescents' mean (range)	**Parents' mean (range)**
Knowledge about the disease and treatment	3.5 (2–6)	4.3 (3–6)
Faith in disease management and ability to self-care	3.4 (1–6)	3.5 (1–6)
Motivation to treatment	3.7 (2–6)	3.8 (2–5)
Positive change in family collaboration	3.4 (1–5)	3.8 (2–5)

Table 1. Patient satisfaction including perceptions from the adolescents' and parents' point of view

Teaching principles about groups and communication theory from Heap, Whitaker and Shulman were used when planning the group intervention.[7–9] The focus was on 'The group as the second client', meaning that mutual aid is offered in relation to specific concerns raised by individual members. As group members help an individual to look closely at a particular problem and find a new way of dealing with it, they also help themselves to deal with similar issues in their own lives. It is in this way that mutual aid can start with a specific issue for an individual and then become relevant for the group as a whole.[9] The group leaders began each group session with experimental games and exercises to help group members relax and learn to trust one another.[10] This was very useful, especially for the silent group members.

While aiming at maintaining diabetes-related management tasks, the adolescents were gradually encouraged to take more responsibility in managing their diabetes. This is in line with the idea that interventions should include efforts to reduce diabetes-specific family conflict in order to preserve the child's overall quality of life.[11]

The programme was developed in the clinic and was a multidisciplinary collaboration between staff in the paediatric and psychiatric departments for children in the hospital. Implementation of this programme requires that one of the group leaders counsels in the paediatric diabetes outpatient clinic and the other works in the psychiatric department. This type of programme encourages co-operation between different departments that affect the adolescent patient with type 1 diabetes, as well as integrating traditional consultation and group-based intervention.

Instruments and measures

Both the adolescents and their parents completed self-report questionnaires at pre-treatment, during treatment, post-treatment and at one year follow up. A diabetes-specific quality of life instrument (DQOL) was used to explore the effects of peer-group support and problem solving on the adolescents' perception of burden of disease on daily life.[12] It consists of the following three subscales: diabetes-related impact (23 items), daily and future disease-related worries (11 items) and diabetes life-satisfaction (17 items).[13–15] Higher scores indicate more favourable ratings, a lower degree of perceived diabetes-related impact and worry and higher life satisfaction.[16] Cronbach's alpha for

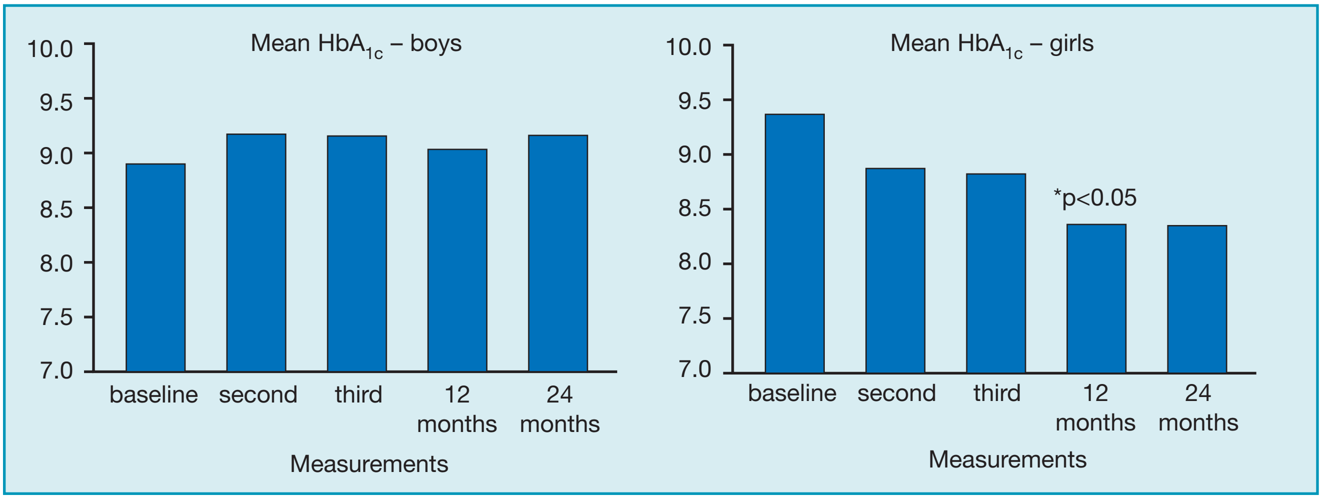

Figure 1. HbA_{1c} in boys (n=9) and girls (n=10) separately from baseline to follow-up

the present study (0.88–0.92) is in accordance with the Hvidøre study,[14] and indicates that the scales have good internal consistency.

HbA_{1c} values were obtained from medical records and measured five times during the group intervention. These were analysed by the DCCT-equivalent DCA-2000 method (Bayer Corp, Elkhart, IN, USA), normal range being 3.4–6.1%. Patient satisfaction was evaluated by a questionnaire designed for this study and included questions on a Likert scale with six numerical scale points ranging from 'to a small extent' (1) to 'to a large extent' (6). Due to irregular attendance in the parent groups not all the parents completed the measurements. As a result we chose to only analyse data from the mothers' questionnaires (n=17). Patient satisfaction was evaluated one year after the last group session.

Data analysis

Statistical analyses of the data were performed using SPSS 13.0 (SPSS Inc., Chicago, IL, USA). Means (with 95% CIs based on a normal distribution) were computed for the measurements of metabolic control and DQOL sumscores. The effect of the intervention was tested by paired-sample *t*-tests for the whole sample and for each gender. Statistical significance was set at 0.05.

Ethics

The study was approved by Regional Ethics Committee, and written informed consent was obtained from all participants before entry.

Results

HbA_{1c}

In the total group there was a non-significant reduction in HbA_{1c} values from baseline to 24 months follow up, from 9.2 to 8.7. The greatest reduction was seen in girls (Figure 1). Paired-sample *t*-tests showed a significant change in HbA_{1c} from 9.4 to 8.4 during the study period (p=0.039).

Diabetes quality of life

Mean scores of the subscales of diabetes-related impact were 75.5 (SD=12.8), daily and future disease-related worry was 79.7 (SD=15.9) and diabetes life-satisfaction was 72.3 (SD=11.0). These baseline scores are in line with previous research in larger population-based studies.[14,16] The magnitude of change in scores from baseline to the end of study period (not statistically significant) was minor (from -2.3 points to 5.6 points). A 5–10 point change on a 100-point scale is considered to be a clinically significant change for health-related quality-of-life endpoints.[17]

Patient satisfaction

Education seemed to be one of the issues that both adolescents and parents were satisfied with. On average 82% of the adolescents attended the group sessions, ranging from 75 to 100%. There were no dropouts. The parents were confident that the adolescents became more competent in handling their diabetes, with mothers reporting slightly higher scores on the patient satisfaction questionnaire (Table 1) than adolescents.

Adolescent satisfaction

During the group sessions the adolescents expressed that in situations where they felt that their parents were nagging them, they now felt more able to discuss issues about diabetes more calmly with their parents. They also experienced spending less time than before talking about diabetes in the families. Some adolescents reported that they had fewer objections to measuring their glucose values and injecting insulin in public after the intervention.

Parental satisfaction

Meeting for one hour was not enough time for the parents as they had a lot to talk about; they wanted longer sessions. With regard to differences between fathers and mothers in managing diabetes-related tasks, there were several discussions about how much the fathers were involved in such tasks. What most fathers expressed was that they felt less important than the mothers when it came to assisting the adolescent. Most mothers expressed that they wanted the fathers to be more engaged in the adolescents' diabetes, however one father said that the mother was so occupied in managing their daughter's diabetes that he felt it would be wrong if he also got involved as this would make the daughter feel like she heard about little else from her parents. Openness like this encouraged the group to talk about relationships and sharing responsibilities.

It was difficult for parents to talk about certain issues such as diabetes causing health problems later in life. Nevertheless, the parents had thought about it a great deal, and were satisfied with having had the opportunity to discuss this in the safety of the group. Some parents who had not experienced severe hypoglycaemia found it difficult to hear others discussing it because it frightened them.

Discussion

The results of the study suggest that peer-group support and problem-solving training in a group intervention are beneficial in the treatment of adolescents with type 1 diabetes. Other studies have also shown that shared management between adolescents with diabetes and their parents is associated with improved control, when the adolescents' developmental needs are taken into consideration.[18] However, it should be taken into account that only one-third of the eligible patients in this study took part in the intervention. The reason for this is not clear. In our experience it is difficult to achieve high rates of participation among adolescents with diabetes. However, effort should be put into ways of improving access to the intervention. First, more personalised information about the intervention and advantages of participation could have been presented to the adolescents and parents. Second, more effort might have been put into the issue of motivating them to be willing to meet with others unfamiliar to them. Third, using incentives and various forms of rewards for participation might encourage participation.

In terms of metabolic control we observed a significant decrease in HbA_{1c} in girls. This observed reduction in HbA_{1c} is of clinical significance,[19,20] however the results should be recognised with caution because of the small sample size in this study. In both girls and boys the process of deterioration was stopped. However, the absence of a control group is a limitation and the results should be interpreted with caution.

Although the feedback from participants was very positive, scores on the DQOL did not indicate that there had been a big change. Living with diabetes is difficult and tiresome for both adolescents and parents; there were no expectations on our part that their lives would change radically during the study. Studies show that girls with diabetes report lower life satisfaction and health perception than boys.[16,21] Related to this are studies that show that eating disorders and emotional disorders are more common among young women with diabetes.[22]

Williams [23] found in her study that adolescent girls and boys with diabetes handled their disease very differently. The girls in her study were managing diabetes on their own, while the boys continued to be assisted by their mothers. In our study the boys seemed to be more interested in participating in groups than the girls. They showed up early, attended most group sessions, participated actively and wanted the sessions to continue. Despite these facts, the girls seemed to respond better to this intervention.

Winkley *et al* found that the effects of group interventions in improving metabolic control may potentially be underestimated compared to individual therapy.[4] The present study shows that group interventions for adolescents with type 1 diabetes are effective when combined with individual consultations. Discussing certain personal issues may feel more appropriate in an individual consultation, while other issues may be more suitable for discussion with peers in groups. It is clear that supportive behaviours must be individualised depending on the adolescents' developmental level and temperament and circumstances of each family. Graue *et al* carried out a study with group visits and individual computer-assisted consultations as a replacement for traditional consultations in a clinic. They found a beneficial effect on health-related quality of life in older adolescents.[24]

Good relationships with healthcare providers are important. Studies show the importance of healthcare professionals and patients having similar perspectives when they are trying to overcome the patients' ambivalence about change, and it is important for healthcare professionals to be aware of how changes in diabetes management will affect the patient's life.[25] Healthcare professionals need to reframe the message about the benefits of tight glycaemic control working in partnership with patients.

Methodological considerations

The possibility of detecting significant results in diabetes-specific quality-of-life scales is rather low in our study mainly because of the low number of participants. The effectiveness of the intervention should be confirmed in a randomised controlled trial with a larger number of patients and their parents. Effects attributed to motivated health personnel might be reduced by use of a control group. Also, the low response rate (19 of a total of 60 adolescents) is a limitation. Nevertheless, one strength of this study is the design allowing for co-operation between the paediatric diabetes clinic and the psychiatric department. This matter might be further explored by comparing the present programme with other interventions in a multicentre study.

Conclusion

The educational intervention described and evaluated in the present study is a suitable intervention in paediatric diabetes clinics. However, it requires tight collaboration between the paediatric diabetes clinic and the psychiatric department.

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Conflict of interest statement:

None

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