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Online Cognitive-Behavioral Group Intervention for Adolescents With Chronic Illness: A Pilot Study

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Objective: To assess feasibility and explore preliminary effectiveness of an online cognitive-behavioral group intervention (Op Koers Online) to prevent and/or reduce psychosocial problems by teaching use of active coping skills to adolescents (ages 12 to 18) with chronic illness. **Method:** Adolescents who signed up for the chat intervention were asked to complete online questionnaires at baseline and postintervention (after 8 weeks). Feasibility was evaluated based on attendance (missed sessions, dropout rate and homework completion), technological issues and with an evaluation questionnaire. Preliminary effectiveness was evaluated with standardized questionnaires: Op Koers Online Questionnaire (disease-related coping skills), Youth Self-Report (emotional and behavioral functioning), Pediatric Quality of Life Inventory (Health-Related Quality of Life [HRQoL]). Mean scale scores postintervention were compared with baseline with paired-samples *t* tests. Effect sizes were calculated. **Results:** In total, 33 adolescents participated in the intervention, 29 adolescents completed the questionnaires at baseline. Regarding postintervention questionnaires, 25 adolescents completed the evaluation questionnaires and 23 adolescents completed all questionnaires postintervention. Dropout rate was 6%. In 1 session (2%), there were technological issues that caused the session to stop. Participants' overall satisfaction was high. Regarding effectiveness, participants improved significantly in the use of total coping skills and the coping skills "information seeking and giving" and "social competence" after the intervention compared with baseline. Participants also reported significantly fewer withdrawn/depressed behavior and scored significantly better on emotional and psychosocial HRQoL after following the intervention. **Conclusions:** This pilot study indicates that Op Koers Online is feasible and potentially effective. Further research (a randomized controlled trial) is needed to establish the effects of the intervention.

Implications for Impact Statement

This study evaluates the feasibility and preliminary effectiveness of a new and unique Internet-delivered intervention for adolescents with chronic illness: Op Koers Online. The findings indicate that this intervention is feasible (based on good attendance, limited technological issues and positive overall evaluation of the intervention) and show preliminary effectiveness (based on improvements in disease-related coping skills and psychosocial functioning). In conclusion: Op Koers

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Online is a promising intervention. Our findings emphasize the growing evidence for Internet-based interventions and their suitability for adolescents. The importance of teaching adolescents how to use active coping skills with cognitive-behavioral therapy techniques is also highlighted.

Keywords: chronic illness, adolescents, e-health, psychosocial group intervention, cognitive-behavioral therapy

The number of children and adolescents living with chronic illness (CI) continues to grow due to increased medical knowledge and improved treatments (Berry, Rock, Smith Houskamp, Brueggeman, & Tucker, 2013; Van Cleave, Gortmaker, & Perrin, 2010). In the Netherlands, 15% to 20% of children (age range: 0–18) are living with a CI, such as diabetes or asthma (van der Lee, Mokkink, Grootehuis, Heymans, & Offringa, 2007). Children and adolescents with CI have to live with physical consequences and face difficulties such as hospital visits and/or hospitalizations, activity restrictions, and illness-related stressors such as uncertainty about the course of their illness. Many of these stressors persist throughout their life (Compas, Jaser, Dunn, & Rodriguez, 2012), necessitating teaching children and adolescents skills that will help them cope with these stressors.

Children and adolescents with CI show higher levels of stress, internalizing behavior problems and somewhat elevated levels of externalizing behavior problems compared with healthy peers (Compas et al., 2012; Greenley et al., 2010; Piquart & Shen, 2011). They do not necessarily develop psychopathology, but they are constantly confronted with the stressors. Especially during adolescence, with the formation of identity, self-image and self-esteem, a CI constitutes a major challenge (Chao et al., 2016; Ersig, Tsalikian, Coffey, & Williams, 2016). In recent years, psychosocial interventions have become increasingly important in the treatment of psychosocial problems (social, emotional, and behavioral problems such as loneliness, depression, aggressive behavior) in adolescents with CI (Compas et al., 2012; van Beugen et al., 2014). The psychosocial interventions discussed in the literature are mostly disease-specific (Tsai, Morton, Mangione, & Keeler, 2005). For example, a cognitive-behavioral therapy (CBT) for adolescents with inflammatory bowel disease showed decreased depressive symptoms in participants after treatment (Szigethy et al., 2004) and a psychosocial group intervention for young people with epilepsy succeeded in learning participants to talk about their disease and to cope with negative disease-related feelings (Dorris et al., 2017). Interventions are available in face-to-face as well as online format. An increasing number of online interventions are becoming available due to advances in technologies (Stinson, Wilson, Gill, Yamada, & Holt, 2009; van Beugen et al., 2014). Another reason that increasingly more online psychosocial interventions are becoming available is they offer a cost-effective alternative to face-to-face therapy (Hedman, Ljótsson, & Lindfors, 2012; Palermo et al., 2016; van Beugen et al., 2014).

According to the disability–stress–coping model (Wallander & Varni, 1998), stressors related to illness and psychosocial adjustment of the child are moderated by coping strategies and cognitive appraisals. The model states that the use of more effective coping strategies can prevent or reduce psychosocial problems in children with CI. Moreover, effective use of coping skills increases patients' abilities to manage illness by improving medical compliance and psychosocial functioning (Blount et al., 2008; Compas et al., 2012; Dean, Walters, & Hall, 2010; Yi-Frazier et al., 2015). Active coping strategies have been shown to be more effective than passive, avoidant coping strategies (Yi-Frazier et al., 2015). Cognitive restructuring is an example of an active coping strategy in which transforming negative thoughts are transformed into more realistic, helpful, and proactive thoughts. To prevent and/or reduce psychosocial problems, interventions that teach adolescents how to cope with stressors caused by the CI are essential.

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Interventions can be offered in individual or group format. Results on the effectiveness of group interventions are promising, particularly for learning to use more active coping skills and improving knowledge about symptom reduction and disease-related problem-solving (Plante, Lobato, & Engel, 2001). Compared with individual interventions, psychosocial group interventions enable participants to share emotions and experiences and therapists can treat more patients simultaneously (Clarke & DeBar, 2010). Sharing emotions and experiences is helpful for adolescents with CI, as peer relationships can positively affect social adjustment and adaptation to the disease (Chao et al., 2016; Plante et al., 2001). This is illustrated by the iPeer2Peer program, where adolescents with juvenile idiopathic arthritis (JIA) are matched to a trained “peer mentor” for receiving peer support via Skype video calls. Thanks to the online format, the intervention is easily accessible. Furthermore, iPeer2Peer program is effective at improving participants’ perceived ability to manage JIA (Stinson et al., 2016). Most group interventions are focused on a specific illness, such as diabetes (Kichler, Kaugars, Marik, Nabors, & Alemzadeh, 2013). However, even though different diagnoses may have different medical treatments, several of the psychosocial problems are the same (Plante et al., 2001). A generic approach that focuses on the psychosocial problems associated with a CI rather than the CI itself might be more accessible as it would allow for patients with rare illnesses to participate in a group intervention without the need to tailor content for and find multiple participants with a specific CI. Op Koers (English translation: “On Track”) is a group intervention designed with this in mind (Last, Stam, Onland-van Nieuwenhuizen, & Grootenhuis, 2007; Scholten et al., 2011).

Op Koers was first developed in a face-to-face format. Op Koers uses CBT techniques to teach participants to use active coping skills to prevent and/or reduce psychosocial problems (Last et al., 2007; Scholten et al., 2011, 2013). A core aspect of CBT involves identifying unhelpful thoughts, challenging them, and replacing unhelpful thoughts with helpful thoughts. It also teaches coping and problem-solving skills (Butler, Chapman, Forman, & Beck, 2006). Another important part of Op Koers though is sharing experiences with fellow patients (Plante

et al., 2001; Ramchand et al., 2017; Treadgold & Kuperberg, 2010). A randomized controlled trial (RCT) of Op Koers face-to-face showed that the intervention had a positive effect on parent-reported internalizing problems and child-reported externalizing problems and on the disease-related coping skills information seeking, social competence, and positive thinking (Scholten et al., 2013). However, Op Koers’ delivery involves weekly sessions at the hospital, which can cause logistical barriers for potential participants.

Online intervention programs eliminate logistical barriers, such as travel time and distance (Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010; Dever Fitzgerald, Hunter, Hadjistavropoulos, & Koocher, 2010) and connect to the digital environment in which adolescents live. Offering online interventions has additional advantages of improved accessibility, independence (participation from home), and anonymity (possibility to participate with a nickname). Online interventions without use of a webcam adds the benefit that appearance plays no role which might make it easier to talk about problems (Maurice-Stam et al., 2014; Nicholas, Oliver, Lee, & O’Brien, 2004). Research has also shown that e-health interventions eliminate the stigma related to participating in mental health services and therefore lower the threshold for participation (Christensen & Hickie, 2010). To this end, Op Koers face-to-face was translated into an online chat version: Op Koers Online. The intervention was first designed for adolescent survivors of childhood cancer (Op Koers Online Oncology). A feasibility study shows promising results: participants and course leaders reported high levels of satisfaction and the dropout rate was very low. Most participants considered chatting appropriate for the intervention and reported to prefer Op Koers Online above Op Koers face-to-face. After the feasibility study, the intervention was optimized based on feedback from participants and course leaders. Changes during this optimization include (1) increasing the number of sessions from six to eight, (2) composing groups with participants in the same age category (as much as possible, depending on applications), and (3) excluding individuals with severe learning difficulties (Maurice-Stam et al., 2014). After the optimization of Op Koers Online Oncology, Op Koers Online for adolescents (ages 12 to 18) with CI

was developed as an addition to the Op Koers Online program.

The aim of this pilot study was to assess feasibility and explore preliminary effectiveness based on disease-related coping skills and psychosocial functioning (emotional/behavioral problems and Health-Related Quality of Life; HRQoL) of Op Koers Online for adolescents with CI.

Method

Study Overview and Procedures

A quasi-experimental, prepost intervention pilot study was conducted between October 2013 and September 2015. Participants were asked to complete online questionnaires before the intervention (baseline; T0), directly after the intervention (i.e., 8 weeks; T1) and after a booster session (i.e., 4 months; T2). Participants were recruited via (1) health care providers, (2) information folders spread out at the hospital, and (3) online advertising. A pediatric psychologist informed interested adolescents and parents about the procedure and intervention by phone. Adolescents and parents willing to participate were asked to return the signed informed consent form sent by mail. Participants received an e-mail with a hyperlink to the questionnaires and, when necessary, electronic and/or telephone reminders. Approval of the Medical Ethical Committee of the Amsterdam University Medical Centers was obtained for this pilot study.

Participants

Inclusion criteria were as follows: The participants must have been between the ages of 12 years and 18 years with a CI diagnosis, according to the following criteria set forth by van der Lee et al. (2007): (1) onset between ages 0 and 18; (2) diagnosis based on medical scientific knowledge; (3) the illness is not (yet) curable; and (4) the illness has been present for at least 3 months, or at least three episodes have occurred in the last year (van der Lee et al., 2007); and they had to have been receiving treatment in the Emma Children's Hospital (Amsterdam University Medical Centers). Participants also had to have access to a computer with Internet connection, be able to read and write in Dutch,

and be able to independently complete the questionnaires. Adolescents with severe learning difficulties were excluded.

Measures

Sociodemographic (e.g., gender, age, school-related) and medical information was obtained from adolescents via an online questionnaire. First, feasibility was measured based on attendance (dropouts, missed sessions and homework completion) and technological issues. Online presence was recorded based on entering the chatroom during the session. Participants who explicitly quit the intervention or were absent for four or more sessions were considered dropouts. Course leaders checked if participants completed their homework assignments and recorded technological issues and other particularities in every session log.

Second, an evaluation questionnaire focusing on satisfaction with the content, design and course leaders was completed by participants at T1. The questionnaire consists of two parts with a total of 41 items. The first part has 25 questions (e.g., "What is your opinion about the design of the chatroom?") with different multiple-choice answer options. The second part has 16 statements (e.g., "I liked following the course via a chatroom"), which were rated on a five-point Likert scale (ranging from 1 *totally agree* to 5 *totally disagree*).

Outcome measures of preliminary effectiveness were disease-related coping skills and psychosocial functioning (emotional/behavioral problems and HRQoL), assessed with three specific validated questionnaires. Disease-related coping skills were assessed with the Op Koers questionnaire (Last et al., 2007; Maurice-Stam et al., 2014). Adolescents were asked if they agreed with 26 statements (four-point Likert scale ranging from 1 *always/almost always* to 4 *almost never/never*) on the use of coping skills taught in Op Koers Online (e.g., "I know how to get answers to questions about my disease"). The items are divided into five subscales: Information-Seeking (six items), Relaxation (three items), Social Competence (six items), Positive Thinking (three items), and Medical Compliance (eight items). All items together form a total scale score. Mean item scores were calculated for the subscales and the total score (range = 1–4). Higher scores reflect use of

more active coping skills. Subscales had moderate to good internal consistencies (Cronbach's $\alpha = .46$ for Social Competence T0 to $\alpha = .71$ for Relaxation T1). The total scale had good internal consistency (T0 $\alpha = .70$, T1 $\alpha = .89$). The subscale Medical Compliance was not used in the analyses because of insufficient internal consistency (T0 $\alpha = .10$, T1 $\alpha = .40$), but the items of that subscale were included in the total scores.

Emotional and behavioral problems were assessed with the Youth Self-Report (YSR; Verhulst, van der Ende, Ferdinand, & Kasius, 1997), consisting of 119 problem items (rated on a three-point Likert scale ranging from 0 *not at all* to 2 *often/a lot*). The YSR has two broadband scales each consisting of subscales: Internalizing Problems (31 items, range = 0–62), including the subscales Anxious/Depressed (13 items), Withdrawn/Depressed (eight items), and Somatic Complaints (10 items), and Externalizing Problems (32 items, range = 0–64), including the subscales Rule-Breaking Behavior (15 items) and Aggressive Behavior (17 items). We excluded the subscale Somatic Complaints from Internalizing Problems, because somatic complaints would likely be due to illness (Perrin, Stein, & Drotar, 1991). On this questionnaire, higher scores indicate more problems. Cronbach's alphas for the YSR (sub)scales at T0 and T1 were moderate to good ($\alpha = .61$ for Aggressive Behavior T0 to $\alpha = .86$ for Internalizing Problems T0) except for the subscale Rule-Breaking Behavior which was therefore excluded from further analysis ($\alpha = .36$, T1). *T* scores were used to assess whether participants reported subclinical/clinical symptoms; *T* scores in the 90th percentile or higher in the norm population are considered subclinical/clinical, indicating that the adolescent has clinically relevant symptoms and may need professional help (Verhulst et al., 1997). To indicate the percentage of participants scoring within the subclinical/clinical range (*T* score 63 or higher), we computed *T* scores from the raw scale scores.

HRQoL was measured with the Pediatric Quality of Life Inventory–Self-Report (PedsQL 4.0; Varni, Seid, & Kurtin, 2001). All items state a problem (e.g., “difficulty walking”), and participants indicate to what extent they had difficulties with that problem in the last month (five-point Likert scale ranging from 0 *never* to 4 *always*). The PedsQL 4.0 contains 23 items

divided into four subscales: Physical Functioning (eight items), Emotional Functioning (five items), Social Functioning (five items), and School Functioning (five items). The Psychosocial Functioning score is the combined score of emotional, social and school functioning, and the total score is the sum of all subscales. Higher scores indicate a better HRQoL (range = 0–100). Cronbach's alpha of the PedsQL (sub)scales were moderate-to-good (lowest $\alpha = .66$ for Physical Functioning T0 and highest $\alpha = .89$ for Physical Functioning T1).

Intervention

The intervention consists of eight weekly 90-min sessions. The goal of the intervention is to prevent and/or reduce psychosocial problems by teaching the use of active coping skills. Table 1 presents the five learning goals (coping skills) of the intervention: (1) information-seeking and information-giving about the illness, (2) use of relaxation techniques in stressful situations, (3) increasing knowledge of self-management and medical compliance, (4) improving social competence, and (5) positive thinking (Last et al., 2007; Scholten et al., 2011). Table 1 also provides examples of learning activities (instruction/modeling and practice). CBT techniques, such as relaxation, cognitive restructuring, and social skills, are used (Ehde, Dillworth, & Turner, 2014; Thompson, Delaney, Flores, & Szigethy, 2011). The thinking–feeling–doing model is used to explain how thought influences feelings and behavior. The focus lies on restructuring negative thoughts about the illness such as worrying about participating in or missing school/sports activities or what others think of you. Lastly, psychoeducation is used to expand participants' knowledge about the topics used in the intervention, for example, about sources of information and compliance/noncompliance. Each coping skill is taught during one specific session, but elements of the coping skills are also addressed in the subsequent sessions.

Sessions take place at a scheduled time in a secured chatroom with three to six participants. Participants log on to the website (www.opkoersonline.nl) to enter the chatroom (Figure 1) and their personal online environment, where they can view intervention material and submit homework assignments. Sessions are led by two

Table 1
The Five Basic Learning Goals of Op Koers Online and Examples of Learning Activities

Learning goals (coping skills)	Examples of learning activities	
	Instruction/modeling	Practice
1. Information seeking and giving about the illness	Education about sources of information	Write down questions you have and look for answers
2. Use of relaxation during stressful situations	Relaxation exercise (MP3 fragment)	Practice the relaxation exercise
3. Increase knowledge of self-management and medical compliance	Group discussion about own treatment and compliance/noncompliance	Write down situations of noncompliance and how to improve compliance
4. Enhancement of social competence	Video and group discussion: how and what do you tell others about your illness	Think of what you CAN (instead of CANNOT) do and write down your story for the other group members
5. Positive thinking	Thinking–feeling–doing game	Write down positive adjustments for negative thoughts

pediatric psychologists (course leaders), who received extensive training in carrying out the intervention based on a detailed manual. To improve adherence, participants receive a small

gift (like a memory game) after the last session for participating and completing homework assignments. Four months after the last session, there is a booster session.

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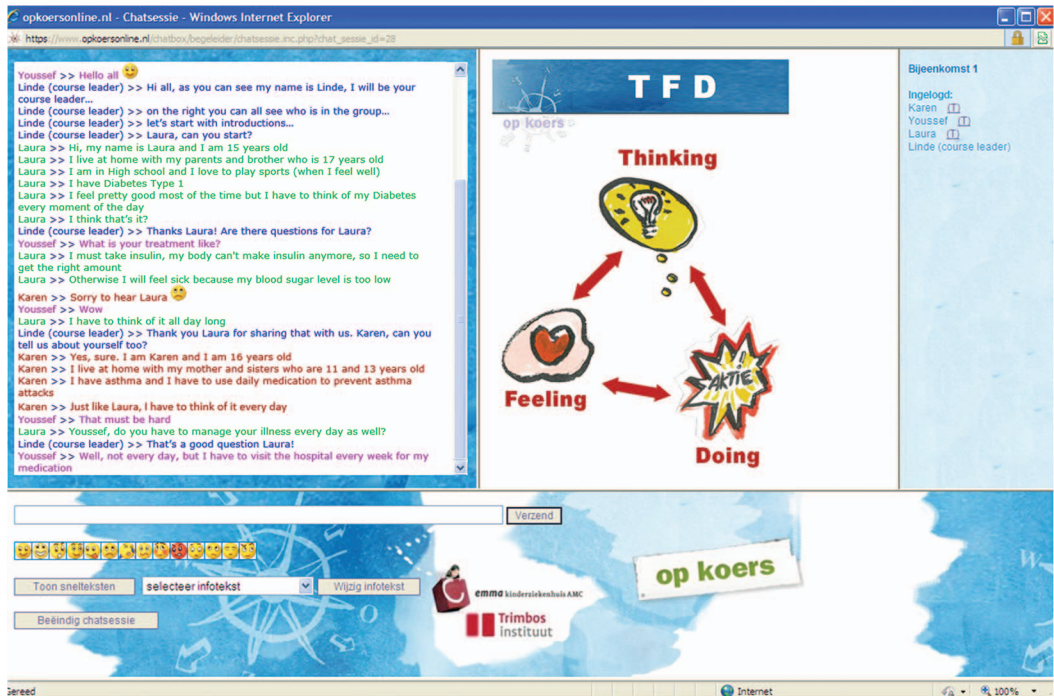


Figure 1. Example of a chat room session. On the left: chat screen with chat-talk and emojis to express feelings (to be typed below this screen). In the middle: information screen where course leaders can provide information to the participants (to be selected at the drop-down menu at the bottom). On the far right: listing of the names of participants and trainers. See the online article for the color version of this figure.

The protocol of Op Koers Online protects anonymity. First, participants are asked not to share contact details with each other until the last session. This way, communication between participants during the intervention elapses in the presence of the course leaders. Second, the intervention does not use a webcam to protect anonymity and to keep a low threshold for participation.

Statistical Analyses

Descriptive analyses were performed to characterize the participants. To assess feasibility, we calculated percentages of attendance and analyzed the results on the evaluation questionnaire descriptively. To assess preliminary effectiveness, mean scale scores on disease-related coping skills, emotional/behavioral problems and HRQoL at T1 were compared with T0 by paired sample *t* tests using SPSS version 24.0 (IBM Corp, 2016). Because of the low response rate (i.e., 10%), we did not include the data from T2. To correct for multiple testing, the significance level of 0.05 was divided by the number of scales of the concerning questionnaire. This led to the following significance levels: Op

Koers questionnaire 0.01 (0.05/5), YSR 0.006 (0.05/8), PedsQL 0.01 (0.05/5). Between-subjects effect size, Cohen's *d*, was calculated by dividing the difference in mean scores T1–T0 by the standard deviation at T0. Effect sizes *d* of .2 were considered small, .5 medium, and .8 large (Cohen, 1988). The use of between-subjects effect size was preferred over within-subject effect size because in small samples as in our pilot study, calculation of within-subject effect size may result in overestimation of the effect size. In addition, the use of between-subjects effect sizes is common, which benefits the interpretation of the results (Morris & DeShon, 2002).

Results

Participants

Thirty-three adolescents comprising six groups participated. A majority of the participants was female (62.1%) and mean age was 15.1 years (see Table 2). Most common diagnoses were bowel disease (20.7%) and cystic fibrosis (17.2%). Ten percent had subclinical/clinical scores on internalizing problems at T0.

Table 2
Characteristics of Participants of Op Koers Online (*N* = 29)

Characteristic	<i>n</i>	<i>M</i>	<i>SD</i> or %	Range
Age at T0 (years)	29	15.1	1.85	12.3–18.9
Age at diagnosis (years)	25	5.4	6.44	0–17
Female	18		62.1	
Diagnosis ^a				
Bowel disease	6		20.7	
Cystic fibrosis (CF)	5		17.2	
Rheumatological disease	4		13.8	
Metabolic disease	3		10.3	
Heart disease	2		6.9	
Other ^b	9		31.0	
Education (current)				
Elementary school (last year)	1		3.4	
Secondary education	26		89.7	
Secondary vocational education	2		6.9	
Treatment ^a				
Use of medication	20		68.9	
Regular hospital visits	28		96.5	
Surgery	4		13.7	
Diet	1		3	

^a More than one answer is possible. ^b The following diagnoses were reported, each by one adolescent: eczema, epilepsy, Graves' disease, IL12 deficiency, hereditary motor and sensory neuropathies (HMSN), spherocytosis, Alagille syndrome and endometriosis.

There were no subclinical/clinical scores on externalizing problems. A total of 29 participants (88%) completed the questionnaires at T0. At T1, 25 (76%) participants completed the evaluation questionnaire and 23 (69%) completed the other questionnaires. Attendance to the sessions is reported below as measure of feasibility.

Feasibility

Attendance. Fourteen out of 33 participants (42%) attended all eight regular chat sessions, 14 participants (42%) missed one session, and three participants (10%) missed two sessions. The most common reasons for missed sessions were illness or hospitalization. School (homework) was another, but less common, reason for missed sessions. Dropout rate was 6%; two participants decided to quit during the intervention (one due to illness/hospitalization, one due to school-related lack of time). They attended fewer than three sessions. Attendance at the booster session was 88% (two participants who finished the entire intervention did not attend the booster session). Fourteen participants (45%) completed all homework assignments. Six participants (19%) failed to complete one assignment, five participants (16%) failed to complete two assignments, and six participants (16%) failed to complete three or more assignments.

Technological issues. In 96% of the sessions, no technological issues occurred. In one session (2%) the website had a technical issue such that the session had to stop and resume later. In one other session (2%) the chatroom was interrupted a few times, but the session continued. Sometimes a participant reported technological issues (6%; e.g., interruption of the chatroom, seeing messages multiple times). Course leaders could join the session and kept contact with participants on how to deal with an issue (e.g., press F5/CMD + R, restart the chatroom).

Evaluation questionnaire. According to the first part of the questionnaire, a majority of participants had previously used chat as a communication tool (52% regularly or often, 20% sometimes). The provided information about the content of the intervention before the start was “enough,” according to 84% of participants. Most participants were satisfied with the usability of the chatroom, 64% rated it as

“good.” Some participants (12%) thought the design of the chatroom interface was not attractive. Most participants (84%) were positive about the course leaders. Regarding duration, 20% of participants thought chat sessions were too short and 24% thought they were too long. Most participants (76%) said the number of sessions was enough. Homework assignments were rated as “good” by most participants (92%). All participants rated the intervention as understandable. The intervention was found “quite useful” by 68% of participants and “useful” by the other 32%.

On a scale of one to 10, 92% of participants rated a seven or higher for overall satisfaction with the intervention ($M = 8.2$), 16% of them rated a 10. More than half of participants (52%) would definitely recommend the intervention to others, some participants (32%) would likely do that and a minority of participants might not (16%). A majority of participants (84%) rated the design of the chatroom a seven or higher. In the end, 72% participants said that given the choice, they would prefer an online group intervention over a face-to-face group intervention.

The results of the second part of the evaluation questionnaire are presented in Table 3. A majority of the participants thought a chatroom is a good format for this intervention and reported that chatting is a good way for them to talk about difficulties related to the illness. Most participants felt understood by other participants. Opinions were divided about the use of emojis (faces with expressions of emotions to use in the chatroom), anonymity and webcam use.

Preliminary effectiveness. Table 4 shows (marginally) significant improvement in disease-related coping skills (Op Koers questionnaire): total scale, $t(21) = -2.83$; information-seeking, $t(21) = -3.07$; and social competence, $t(21) = -2.68$. Significant decrease in emotional/behavioral problems (YSR) was found for: withdrawn/depressed behavior, $t(22) = 3.27$. HRQoL (PedsQL) improved on emotional functioning, $t(21) = -4.06$, and psychosocial functioning, $t(21) = -3.42$.

Discussion

The aim of this pilot study was to assess feasibility and explore preliminary effective-

Table 3
 Statements About Op Koers Online Evaluation Questionnaire (N = 25)

Statement	(Totally) agree %	Don't agree/don't disagree %	(Totally) disagree %
The chatroom			
A chatroom is a good format for this intervention	88	12	0
I liked taking part in the intervention via a chatroom	76	12	12
I found it hard to take part in the intervention via a chatroom ^a	20	8	72
Chatting is a good way for me to talk about the difficulties I have in relation to the consequences of my illness	80	4	16
During the chat sessions . . .			
. . . it was hard for me to follow the subject ^a	8	12	80
. . . a lot of messages appeared on the screen at once	40	32	28
. . . it was (mostly) clear who responds to whom	68	24	8
. . . I could (mostly) say what I wanted to say	84	8	8
Interaction			
The course leaders responded to what I said	96	0	4
I felt understood by the course leaders	88	8	4
I felt understood by the other participants	92	0	8
Tool for expression of feelings			
Emojis helped me express my feelings	28	32	40
Emojis helped me understand participants' feelings	40	32	28
Privacy			
I liked the fact that participation was anonymous	36	32	32
I would have liked to see other participants via webcam	36	24	40
I would have liked to see course leaders via webcam	32	12	56

^a Statement is negative.

ness of Op Koers Online for adolescents with CI. Regarding feasibility, we found good attendance: the dropout rate was low (6%) compared with dropout rates of other Internet-based interventions for adolescents (van der Zanden, Kramer, Gerrits, & Cuijpers, 2012). The technology worked well; small issues were fixed by course leaders and/or the web developer. Only one time did a technological issue cause the end of a session. Participants reported positive overall satisfaction with the intervention, indicating its feasibility for this population with CI. Regarding effectiveness, we found improvement on disease-related coping skills and HRQoL, and decrease of emotional/behavioral problems.

Feasibility

According to the evaluation questionnaire, participants' opinion about taking part in the intervention anonymously was divided. Regarding webcam use, the difference in per-

centages between participants who did and did not want to see other participants and course leaders via a webcam is small, which indicates that a considerable portion of participants would have liked more openness. In the pilot study Op Koers Online Oncology, opinions about anonymity were divided too (Maurice-Stam et al., 2014). As discussed, Op Koers Online is intentionally designed without a webcam, and the protocol is set up to ensure anonymity. Furthermore, results of the evaluation questionnaire showed that for a majority of participants the emojis were not helpful to express personal feelings. This could be due to the type of emojis, which were a little outdated. Also, a majority of participants found that the design of the chatroom was not particularly attractive. When optimizing the intervention, a renewed, more attractive design and updates of emojis should be considered.

Table 4

Effectiveness T1 Versus T0: Disease-Related Coping Skills (Op Koers Questionnaire) and Psychosocial Functioning (Emotional and Behavioral Functioning: YSR, HRQoL, PedsQL)

	T0 M (SD)	T1 M (SD)	p	Effect size (d)
Op Koers questionnaire ^a , n = 22				
Seeking/giving information about the illness	2.72 (.48)	3.01 (.53)	<.01	.60
Relaxation during stressful situations	2.41 (.65)	2.61 (.73)	.16	.31
Social competence	2.55 (.48)	2.77 (.45)	.01	.46
Positive thinking	2.33 (.58)	2.62 (.73)	.06	.50
Total	2.83 (.29)	3.00 (.43)	.01	.59
Youth Self-Report ^b , n = 23				
Internalizing problems ^c	11.83 (6.67)	10.61 (6.27)	.17	.18
Anxious/depressed	6.13 (4.40)	6.00 (4.25)	.84	.03
Withdrawn/depressed	5.70 (3.01)	4.61 (2.64)	<.006	.36
Thought problems	4.74 (3.24)	4.30 (3.36)	.20	.14
Externalizing problems	5.65 (3.59)	4.30 (3.40)	.03	.38
Social problems	3.74 (3.11)	3.61 (3.01)	.81	.04
Attention problems	6.04 (3.30)	5.09 (3.15)	.04	.29
Aggressive behavior	3.52 (2.66)	2.26 (2.36)	.02	.47
Pediatric Quality of Life Inventory–Self-Report ^a , n = 22				
Total score	55.93 (14.23)	61.07 (15.19)	.02	.36
Physical functioning	50.99 (21.87)	54.26 (22.81)	.37	.15
Emotional functioning	56.36 (23.41)	67.95 (20.51)	<.01	.50
Social functioning	69.31 (19.66)	71.59 (15.54)	.43	.12
School functioning	50.00 (17.18)	54.55 (18.19)	.18	.26
Psychosocial functioning	58.56 (15.13)	64.70 (15.14)	<.01	.41

Note. Significant differences are in boldface type. After correction for multiple testing, the significance levels are as follows: Op Koers questionnaire .01, YSR .006, PedsQL .01.

^a Higher scores indicate more use of coping skills or better HRQoL. ^b Higher scores indicate more problems. ^c Without Somatic Complaints subscale.

Among the advantages of offering this intervention online is improved accessibility. On the other hand, technological problems can disrupt the course of online sessions. Recommendations on what to do when that happens were included in the manual. For example, course leaders can call the web developer for help, and course leaders and participants can press F5 (CMD + R for Apple) to reset the chatroom. Course leaders are advised to call participants when they lose online contact to assist them with resuming the chat.

Preliminary Effectiveness

Most results seemed in line with findings on efficacy of the Op Koers face-to-face intervention (Scholten et al., 2013). However, given the different study designs actual comparison of this pilot study with the RCT is not workable. The coping skill ‘use of relaxation’ did not

improve significantly in participants after following Op Koers Online. This may be due to the way the relaxation exercise was taught. A sound clip was provided to participants to practice on their own. Though the course leaders asked questions to monitor the performance, it was difficult to check whether participants performed the exercise correctly. In the future, a text message to remind adolescents to perform the relaxation exercise could be sent. Furthermore, video might be a preferred medium than sound for adolescents to practice.

So far, studies focusing on online group interventions for chronically ill adolescents in the Netherlands are limited. Studies abroad show promising results on the efficacy of Internet-delivered CBT interventions for youth with CI (Calear & Christensen, 2010; Palermo, Wilson, Peters, Lewandowski, & Somhegyi, 2009; Rooksby, Elouafkaoui, Humphris, Clarkson, &

Freeman, 2015). However, there is a gap the literature on evaluating alternative, more accessible formats of psychosocial interventions for adolescents (e.g., group delivery, electronic formats; Bekker, Griffiths, & Barrett, 2017). Consistent with this call for additional research, the present study takes a first step by evaluating feasibility and preliminary effectiveness of an innovative online CBT group intervention (chat) for adolescents with a CI. Rather than limiting who could participate on the basis of a specific CI, more inclusive criteria allowing adolescents with diverse CIs to participate were used. This is more akin to what occurs in clinical practice in which clinicians have to treat the patient in front of them rather than research studies who look for the patient who fits their criteria. A group intervention for patients with various CIs may be especially useful for adolescents with rare illnesses who may not be able to interact with adolescents with the same CI, but could benefit from participating in an online group intervention with others who share the experience of having a CI.

Almost all participants of the pilot study felt understood by the other participants in the intervention. Many found a chatroom a good format for offering the intervention and three-quarter liked taking part in the intervention. These findings suggest that an illness generic approach warrants additional consideration in future efforts for dissemination and delivery of psychosocial group interventions (Dorris et al., 2017; Kichler et al., 2013; Stinson et al., 2016; Szigethy et al., 2004).

The pilot study had some limitations. First, recruitment and enrollment rates are not known because an open recruitment strategy was used. Second, the data of the assessment after the booster session could not be used for analysis because of too low response rate (10%). Third and fourth limitations are the rather small sample size and the one-group pre/post design. Although the sample size is appropriate for a pilot study, a larger sample size and the inclusion of a control group would have expanded our capacity to find evidence for feasibility and potential effectiveness. Notably, effect sizes found in pilot studies should be interpreted with caution as the meaning of hypothesis testing is limited in pilot studies (Kraemer, Mintz, Noda, Tinklenberg, & Yesavage, 2006; Leon, Davis, & Kraemer, 2011). Because of these limitations,

our findings should be interpreted with caution. For future research, it would be interesting to investigate whether the intervention leads to a decrease of psychosocial problems. It was not possible to examine this in the present study because the number of participants with scores in the (sub)clinical range of the psychosocial measures was too small.

Conclusion

First steps into assessing feasibility and effectiveness of Op Koers Online for adolescents with CI were taken. Results are promising; the use of coping skills and psychosocial functioning has improved. The current study shows that an online CBT intervention is feasible for adolescents with CI and that they benefit from the therapeutic techniques used. Given the preventive as well as curative character of the intervention, it can be offered to all adolescents with a CI. Furthermore, the study shows that a generic approach is appropriate for these adolescents, which is contributing to the existing knowledge on psychosocial group interventions. As the results of a pilot study should be interpreted with caution, results should be validated in an RCT.

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