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## **Physical exercise and psychosocial intervention in children with cancer: the psychological perspective**

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## Chapter 4

# Applicability and evaluation

of a psychosocial intervention program  
for childhood cancer patients

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## ABSTRACT

**Purpose:** To explore the applicability of a psychosocial intervention in childhood cancer patients.

**Methods:** This individualized structured psychosocial program to enhance social-emotional functioning and coping with disease-related effects, includes six sessions for children and two sessions for parents. This program was part of a combined intervention with physical exercise. Questionnaires are used to evaluate completion of the psychosocial intervention, coping and satisfaction with the psychosocial intervention by patients and psychologists, and ranking of the individual topics by patients, parents and psychologists.

**Results:** Of the 30 patients (mean age 13.0 (SD 3.0); 53.3% male; 30% still on treatment) who participated in the psychosocial intervention, two dropped-out due to medical complications and one due to lack of time; 90% completed the psychosocial intervention. Overall, patients liked participation in the intervention (4.2 on 5-pointscale; SD: 0.8) and were positive about the psychologists (8.1 on 10-pointscale; SD: 1.3). Psychologists rated the intervention on several points (e.g. clarity of the manual and content of the intervention) and mean scores ranged from 7.1 (SD: 1.1) to 8.6 (SD: 0.9) on 10-pointscals. Minor adaptations were suggested by patients and psychologists, including customizing according to age, and a more patient-tailored approach.

**Conclusion:** This psychosocial intervention for childhood cancer patients appears to be applicable. Future studies need to establish whether this intervention combined with a physical exercise intervention actually improves psychosocial functioning of childhood cancer patients. When proven effective, this combined intervention can be offered to childhood cancer patients and may enhance their physical health and quality of life.

## INTRODUCTION

Since the diagnosis and treatment options for childhood cancer patients have considerably improved in the last decades, more information is available on possible late effects of the disease (and its treatment) which can impair long-term physical and mental health. About 75% of childhood cancer survivors has at least one late adverse health effect after a median follow-up of 17 years including psychosocial problems and a diminished health-related quality of life (HrQoL) [1]. Although the majority of the childhood cancer patients adapt well and seem resilient [2-4], there is a risk of developing anxiety problems, depression and/or posttraumatic stress symptoms [2, 5-6]. In order to prevent psychosocial late effects or to improve decreased psychosocial functioning and health-related quality of life, more psychosocial interventions are necessary for childhood cancer patients and survivors.

Although psychosocial interventions are available in clinical practice, to our knowledge, little is known about the feasibility of psychosocial interventions for childhood cancer patients and their families, and their need for such interventions [7]. Only a few studies that evaluate the effects of psychosocial interventions on the psychosocial functioning of childhood cancer patients are available and only modest support for the effectiveness have been found [8]. Therefore we developed an individualized structured program to reinforce social-emotional functioning and coping with disease-related effects. The program is based on clinical experience and composed of psycho-education and cognitive-behavioral techniques. The primary goal of the psychosocial intervention is to improve psychosocial functioning. The secondary objective is to enhance participation in physical activities. Improved physical fitness by participating more in physical activities, is hypothesized to enhance the patients' wellbeing, psychosocial functioning and health-related quality of life. Vice versa, improved wellbeing by psychosocial training is hypothesized to increase the willingness and motivation to engage in sport activities.

In adult cancer patients, rehabilitation programs combining physical exercise and psychosocial support report positive effects on HrQoL and physical fitness [9-10]. In childhood cancer patients, however, only few studies have evaluated the effects of physical exercise programs, most were performed with small study groups and did not include psychosocial training/support [11-14].

Therefore the psychosocial intervention was applied to children participating in the QLIM (Quality of Life in Motion) study. This study is aimed to evaluate the applicability and effects of a 12-week intervention program, combining physical exercise (twice a week in a physical therapy center close to home) with psychosocial training (six sessions, once every two weeks in the treating hospital). In this multicenter randomized controlled trial (RCT) a (pediatric) physiotherapist-led exercise therapy program and the psychologist-led psychosocial intervention were offered simultaneously. The design of this RCT has been described in detail elsewhere [15].

Since the psychosocial intervention was not previously evaluated in a pilot study, the primary aims of the present study are to explore the applicability of and satisfaction with this psychosocial intervention program for children with cancer. More specifically, the research questions are: 1) What is the adherence rate to this psychosocial intervention in childhood cancer patients during or within the first year after cancer treatment; 2) To what extent did the children participate in the intervention according to the psychologists during the psychosocial intervention; 3) What is the level of satisfaction of both the participants and psychologists related to this psychosocial program; 4) Do the participants and psychologists have suggestions for improvement of the psychosocial intervention; and finally, 5) What are the most valuable topics of the psychosocial intervention according to patients, parents and psychologists.

## MATERIALS AND METHODS

### **Intervention**

The psychosocial intervention has a duration of 12 weeks and includes six child sessions of 60 min each, scheduled once every two weeks. At the start and the end of the program, a parent session is included; children are not present during these two parent sessions. The content of the program covers psycho-education (Table 1) and cognitive-behavioral techniques.

Cognitive-behavioral techniques are applied to enhance awareness of feelings, thoughts and behavior, as well as their consequences, and to reinforce coping strategies. The intervention program is carried out by a trained psychologist of

the treating pediatric oncology center. The content of the program, the psycho-educational information and the exercises are described in an instruction manual for the psychologists. Although all topics of the psychosocial intervention program are addressed in each individual participant, implementation is customized by adapting the number of exercises within the topics according to the needs of the individual patient. Children and parents were asked in the first session to rank the topics of the program from top priority to lowest priority, independently from each other. Top priority items were to receive the most attention, low priority the least. Judgments of both patient and parent were weighted and resulted in a psychosocial intervention program tailored to the individual needs. During the intervention, the psychologist could further adapt the program within the topics for the individual patients according to his/her clinical evaluation. The patients receive their own manual with background information about the topics discussed, exercises for the training sessions and for home exercises (which could be given by the psychologist if considered necessary).



**Table 1 Content of the QLIM psychosocial intervention modules**

Module 1	Increasing self-awareness and self-belief Expressing positive characteristics about oneself
Module 2	Basic feelings: fear, anger, happiness and sadness Feelings, thoughts and behavior
Module 3	Coping with (non) disease-related difficult situations Relaxation exercises
Module 4	Possible changes in social contacts with peers Adolescents: sexuality and relationships
Module 5	Possible changes in relations with parent and siblings
Module 6	Plans to continue physical exercises in daily life The future
Parent session 1	Background of the combined intervention Increasing parental support
Parent session 2	Evaluation of the program

Because of the assumed strong impact of parental support on the physical activity of the children [16], two parent sessions are added to increase parental knowledge of the child's abilities during and after childhood cancer, and to increase in general parental support to improve endurance and compliance with the whole program. In the first session, the parents are informed about the

principles of the program so they can encourage and support their child with both the physical and psychosocial training. The last session includes an evaluation by both the parents and the pediatric psychologist of their impression of the child's functioning, and possible changes observed during the program.

## **Procedure**

Data for the present study were obtained as part of the QLIM-RCT [15]. Study inclusion for the QLIM-RCT took place between March 2009 and July 2013. Eligible participants for the QLIM study were aged 8-18 years, diagnosed with any type of childhood malignancy, treated with chemotherapy and/or radiotherapy, and were no longer than 12 months off treatment. Patients requiring stem cell transplantation and/or growth hormone therapy were excluded. Other exclusion criteria were: dependency on a wheelchair, inability to 'ride a bike' and inability to read, write, self-reflect and/or follow instructions. The treating pediatric oncologist provided this information and therefore selected eligible patients.

Patients were recruited from four pediatric oncology centers: VU University Medical Center (VUmc) in Amsterdam, Wilhelmina Children's Hospital UMC in Utrecht (WKZ/UMCU), Emma Children's Hospital/Academic Medical Center (EKZ/AMC) in Amsterdam, and Erasmus Medical Center (Sophia Children's Hospital) in Rotterdam. The patients and their parents individually received written and verbal information about the study, an informed consent form, and an addressed return envelope. Written informed consent was obtained from the parents or legal guardian of each patient, and also separately from each patient aged 12 years and older. Patient inclusion started after approval was received from the VUmc Medical Ethics Committee (No. 2008/208). For the present study we focus solely on the participants who were randomised (after baseline testing) to the intervention group.

Psychologists had to be experienced in applying cognitive-behavioral techniques and were trained by the first author to carry out the QLIM psychosocial training. During the course of the intervention, the first author was available for any specific questions about the intervention (manual) and for supervision if necessary.

## Data collection and instruments

### ***Evaluation per session by the psychologists***

After each intervention session the psychologists filled in an evaluation form summarizing the topics discussed and exercises performed. Evaluation of homework performances as well as motivation and concentration of patients during the session were each scored on a 4-point scale (1=poor, 2=moderate, 3=reasonable, 4=good) and an open question was added for general impressions of the child.

### ***Ranking importance of topics by parents and patients***

In the first child and parent session, all patients and parents were asked separately to rank the importance of the topics for themselves (patients) or for their child (parents). The most important topic was rated with an 8, the least important with a 1.

### ***Evaluation after the intervention by the patients***

After finishing the intervention the patients rated the usefulness, strain and burden of the intervention on a 5-point scale (1=no not at all, to 5=yes, very much; or 1=very heavy, to 5=very easy), as well as satisfaction with the therapist on a scale from 1-10.

### ***Evaluation of all interventions by the psychologists***

After the study period, all psychologists completed a questionnaire about their professional experience (in childhood psycho-oncology) and the number of QLIM interventions performed. Further, on a 10-point scale they rated the purpose, theoretical background and content of the intervention, the clarity and usability of the therapist's instruction manual, the clarity and usability of the manual for the patients, their own enthusiasm about performing the intervention, and their impressions regarding the effects of the intervention on the patients. They were also asked for suggestions for possible improvements. Finally, they were asked to rank the importance of each of the topics covered by the intervention (1=least important, 8=most important).



## Statistical analysis

The IBM-SPSS for Windows version 20 was used for all quantitative analyses. Descriptive statistics were used to assess ratings for the intervention, information about the psychologists, and the ranking of the topics. Per participant the number of exercises (in % of total) performed during the training sessions in the hospital or at home were calculated. Group averages were calculated as well.

## RESULTS

Of the 174 patients eligible for the QLIM study, 68 participated (39.1%). No differences were found on general and medical characteristics between the participants and the non-participants [17]. Of the participants 30 patients were randomized to the intervention group and were, therefore, included in the present study. Mean age of the intervention group in the present study was 13.0 (SD: 3.0) years, 61.5% were adolescents (aged 12-18 years), 53.3% were boys, and 30% were still undergoing treatment. Of children in the intervention group, 40% were treated for ALL, chronic myeloid leukemia (CML) or Hodgkin lymphoma (HL). Approximately 27% of participants were diagnosed with acute myeloid leukemia or non-Hodgkin lymphoma, 30% with a solid tumor and 3.3% were diagnosed with a brain tumor (Table 2).

Of the 30 patients in the intervention group, one dropped out before start of the intervention due to lack of time. Of the remaining 29 patients, 27 completed the intervention (90.0%). Two patients dropped out due to a medical complication and recurrence of the disease. In the four participating centers, 7 psychologists performed the interventions; on average they had 4.8 years of experience in childhood psycho-oncology (Table 3).

All remaining 27 patients completed all sessions. For 8 patients two sessions were offered on the same day due to logistical reasons. All six topics were discussed with all patients, almost all exercises (92.9%; SD: 9.1) were carried out in the sessions, and after 76.4% (SD: 27.2) of the sessions, home exercises were given. Psychologists rated the contact with the patients, their concentration, motivation and performance of the home exercises as good (Table 3).

**Table 2 Demographic and medical characteristics**

	<b>Total group (N=30) (%)</b>
<b>Males</b>	53.3
<b>Center</b>	
• VU University Medical Center, Amsterdam	50.0
• Wilhelmina's Childrens Hospital/UMC Utrecht	13.3
• Emma's Childrens Hospital/AMC, Amsterdam	23.3
• Erasmus Medical Center, Rotterdam	13.3
<b>Diagnosis</b>	
• ALL, CML, HL	40.0
• AML, NHL	26.7
• Solid tumors	30.0
• Brain tumors	3.3
<b>When eligible for study</b>	
• During treatment	30.0
• Within the first year after treatment	70.0
<b>Parents present during intervention</b>	
• Mothers only	35.7
• Fathers only	0
• Both parents	64.3
<b>Mean years since diagnosis (SD)</b>	1.07 (0.11)

Patients, parents and psychologist ranked the importance of each of the topics of the psychosocial intervention on a scale of 1-8 (Figure 1). Patients rated 'enhancing self-perception' as the most important topic (mean=5.4; SD 2.0) and 'relationships and sexuality' as least important (mean=2.8; SD 2.4). Their parents rated 'expression of feelings' as the most important topic (mean=6.2; SD 1.9) and also 'relationships and sexuality' as least important (mean=2.9; SD 2.3). Psychologists rated 'expression of feelings' as the most important (mean=7.7; SD 0.8) and 'relationships and sexuality' as least important topic (mean=2.4; SD 2.3).

**Table 3: Information received from the psychologists (n=7)**

<b>Background</b>		
Level of expertise	<b>N</b>	
junior pediatric psychologist	3	
pediatric psychologist with general post-graduate education	2	
clinical psychologist/psychotherapist with specialist post-graduate education	3	
	<b>Mean</b>	<b>SD</b>
Experience in childhood psycho-oncology (years)	4.8	5.0
Number of interventions performed for this study	4.1	5.0

<b>Evaluation of the patient in the sessions (score 1-4)</b>	<b>Mean</b>	<b>SD</b>
Contact	3.8	0.4
Concentration	3.7	0.5
Motivation	3.7	0.5
Performance of the home-exercises	3.3	0.6

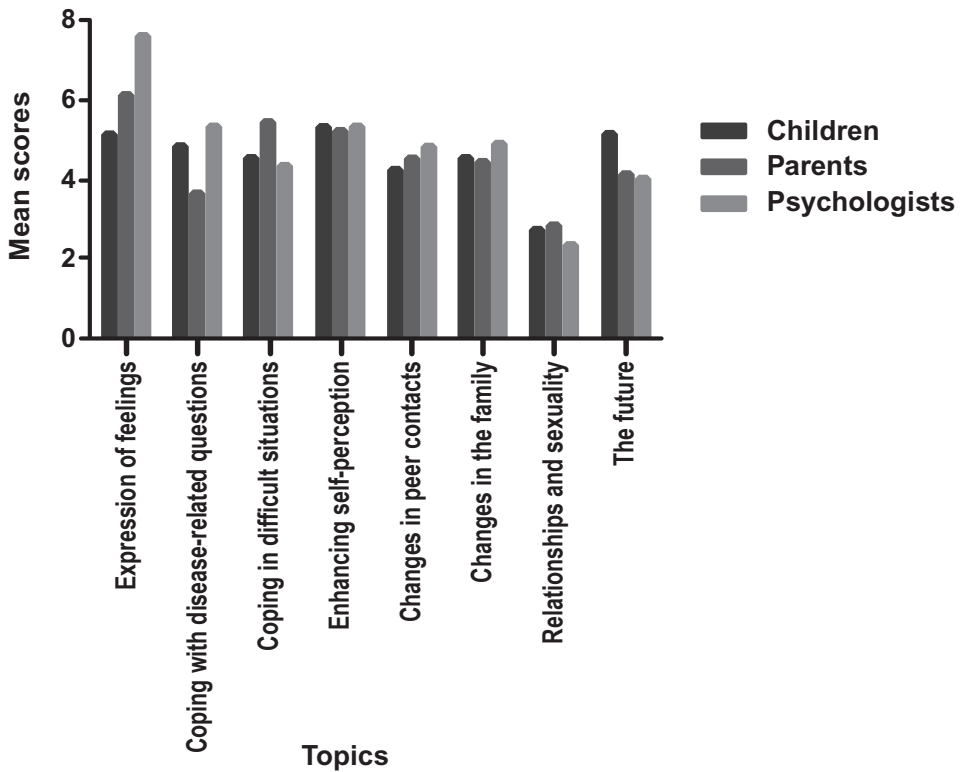
<b>Evaluation of the intervention (score 1-10)*</b>	<b>Mean</b>	<b>SD</b>
Purpose of the intervention	8.6	0.9
Theoretical background	8.0	1.1
Content of the intervention	7.3	0.8
Clarity and usability of the manual for the psychologists	8.2	0.4
Clarity and usability of the manual for the patients	8.3	0.5
Own enthusiasm about performing the intervention	8.6	0.9
Feeling that patients have benefited from the intervention	7.1	1.1

\*one psychologist (first author) was involved in the development of the intervention and was therefore excluded from this evaluation

**Table 4: Evaluation of the psychosocial intervention by the patients (n=22)**

	<b>Mean</b>	<b>SD</b>
Did you like participating in the QLIM program? (score 1-5)	4.2	0.8
Do you feel the psychosocial intervention was useful to you? (score 1-5)	3.3	1.0
How would you rank the 'heaviness' of the psychosocial intervention? (score 1-5)	4.2	0.8
How would you rank the frequency of the psychosocial sessions (score 1-5)	2.8	0.9
What rating would you give to your psychologist? (score 1-10)	8.1	1.3

Figure 1: Ranking of topics



Of the 30 patients, 22 (73.3%) filled out an evaluation questionnaire after finishing the intervention. On average the patients rated the psychosocial intervention as useful (mean score=3.3 on a scale of 1-5; SD: 1.0) and did not experience the intervention as a burden. The patients rated the psychologist with an 8.1 (on a scale of 1-10; SD: 1.3) (Table 4).

Overall, the psychologists seemed satisfied with the intervention and considered it to be a feasible program (Table 3). They were also enthusiastic about performing the intervention (mean 8.6; SD 0.9). Psychologists considered the program to be beneficial for the participants (mean 7.1; SD 1.1). Of all psychologists, 71.4% would recommend this intervention to future patients; the remaining 28.6% would consider recommending this intervention. None would not want to recommend this intervention.

Of all patients, 60% gave suggestions for improvements in the total QLIM program, whereas 27% gave comments and/or suggestions specifically for the psychosocial intervention. For example, two girls (aged 12.4 and 14.0 years) found the relaxation exercises too childish; one girl (aged 17.3 years) suggested that the psychosocial intervention was more suitable for older children; one boy (aged 16.2 years) requested additional personal sessions with the psychologist, and another boy (aged 12.6 years) asked for consultation with the psychologist every week instead of every other week. In contrast, another boy (aged 11.7 years) suggested there should be fewer sessions with the psychologist.

Of the psychologists, 83% gave suggestions for improvements of the program: i.e. more practical exercises, shorter amount of psycho-education, fewer topics, more freedom in choice of topics, more focus on feelings-thoughts-behavior, adding an extra parental session halfway through the program, and paying more attention to the fear of recurrence and loss of function.

In four patients, advice for additional psychological care was given at the end of the intervention period: continuation of individual treatment (3), family therapy (1), and diagnostic assessment for possible autism spectrum disorder (1).

## DISCUSSION

The results of the present study indicate that the psychosocial intervention is applicable for childhood cancer patients during or within the first year after treatment. During the intervention only two patients dropped out (shortly after the start) due to medical complications and the recurrence of cancer. All remaining patients completed all sessions, were well concentrated and motivated during the sessions, and completed the home exercises to the satisfaction of the psychologists. The patients were positive about their psychologists and were satisfied with the usefulness, burden and frequency of the psychosocial intervention.

In addition to the patients, the psychologists were also satisfied with the intervention and found it feasible. About 71% of the psychologists would recommend this intervention to future patients and about 29% would consider recommending the intervention. Further, the psychologists themselves were enthusiastic about applying the intervention. Although the performance of the psychologists was

not assessed 'live', the evaluation forms of the intervention sessions showed that, based on self-report, the patients completed all the topics and did most of the exercises.

Patients, parents and psychologists all indicated that 'expression of feelings' was a highly important topic for the intervention. Another important topic was 'enhancing self-perception'. Parents attach more value to 'coping with (non) disease-related difficult situations' than the patients themselves and the psychologists. On the other hand, patients attach more value to 'changes in the family' than parents and the psychologists. Although in recent decades considerable attention in childhood oncology has focused on problems with relationships and sexuality [18-24], this was found to be the least important topic by patients, parents and psychologists. Unfortunately, the ranking scores of the topics after the intervention are not available; these scores might have been different from those given at the start of the program due to better understanding of the content of the topics and/or due to changed beliefs about the topic most in need for. Also, information about this difference might have provided more insight into the specific topics of the intervention, as evaluated by the patients and their parents.

About 25% of the children made suggestions for improvements to the psychosocial intervention, including intensifying the contact with the psychologist (more personal and more frequent), as well as reducing the sessions with the psychologist. As this appears to be a personal preference, in the future this topic might be better addressed by means of a patient-tailored approach. Also, since the relaxation exercises were found to be 'childish' by several patients, they need to be customized to be appropriate for each age group. Most psychologists gave suggestions for improvements, including more practical exercises (especially with feeling, thoughts and behavior) and less psycho-education, as well as less or different subjects (e.g. adding 'loss of function' as a topic). One psychologist suggested an extra parental session halfway through the intervention. However, due to methodological restrictions, there was limited possibility to adapt the program to the specific needs of the individual patient. In the future, therapists might have more freedom in adapting the program to suit these individual needs.

To our knowledge the present study is the first to explore the applicability of a psychosocial intervention as part of a combined physical and psychosocial

intervention. However, some limitations need to be addressed. First, the study group is relatively small and might be biased toward more positive evaluation of the intervention for several reasons. First, only about 40% of the total number of eligible patients were motivated to participate in this RCT and, therefore, already had a positive attitude towards psychosocial and physical training as an important element of rehabilitation. Secondly, the combined intervention places high demands on patients, parents and healthcare workers; therefore, because patients invested much time and effort in the program, this might have encouraged them to emphasize the importance of the intervention in order to justify (or at least not to contradict) their 'personal investment'. Thirdly, the psychosocial intervention was implemented in combination with the physical intervention and was not pilot-tested. The content of the program was based on clinical practice and well-established cognitive-behavioral techniques in other/general populations. Due to time limitations and low numbers of eligible patients in the Netherlands within the time span of the study, it was not possible to implement a 4-arm RCT (care as usual, psychosocial intervention, physical intervention, combined intervention) which would have been more informative in assessing the impact of each individual component of the intervention.

This study indicates that this psychosocial intervention for childhood cancer patients, is applicable and was positively evaluated by patients and psychologists. Some minor adaptations were suggested by the patients and psychologists, including age-adjusted modifications, as well as a more patient-tailored approach. Since we used this psychosocial intervention in combination with a physical intervention in the QLIM-RCT, it is interesting to look into adherence rates and satisfaction with the combined physical and psychosocial intervention in future analyses.

Further research should demonstrate whether a combined physical and psychological intervention can improve physical fitness and psychosocial functioning of childhood cancer patients during (or shortly after) their treatment, when compared with a control group receiving care-as-usual. Results of these analyses will enable us to provide clinical recommendations for physical and psychosocial care. When proven effective, this combined intervention (with some minor adaptations) can be offered to childhood cancer patients and may serve to enhance their physical health and quality of life.

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