

# Community-based Multidimensional Cancer Rehabilitation in Norway – a Feasibility Study

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## Abstract

### **Background**

Cancer survival is often accompanied by late effects that can be mitigated by tailored rehabilitation. In Norway this has traditionally been offered as residential programs, whereas community-based cancer rehabilitation programs are lacking.

### **Objective**

The aim was to assess feasibility and acceptability of a newly developed community-based multidimensional cancer rehabilitation program in Norway.

### **Methods**

A feasibility study with a mixed methods explanatory sequential design. The intervention was a 12-week group-based rehabilitation program comprising five components: goal setting, physical exercise, psychoeducation, individual follow-up consultations and peer support. Feasibility was assessed through recruitment, retention and intervention delivery. Acceptability was assessed through intervention adherence and participant evaluation. Qualitative data were generated from focus group interviews. Statistical analyses were descriptive and qualitative data were transcribed and analyzed using framework analyses.

### **Results**

Sixty participants started and 55 completed the 12-week rehabilitation program. The majority were female (80%) and mean age was 56 years. The largest diagnostic group was breast cancer (42%). Retention was high (92%), as was adherence rates for all intervention components. The exercise component was rated the most beneficial, followed by individual consultations and peer support. Qualitative findings contributed to explaining the high adherence and positive evaluation.

### **Conclusions**

High retention, strong adherence and positive evaluation imply that the community-based program was feasible and acceptable to cancer survivors.

### **Implications for practice**

The results will aid intervention refinement and contribute to a future randomized controlled trial to examine its effectiveness. If successful, the rehabilitation program could be implemented in the Norwegian Cancer Pathway “Home”.

## Introduction

Improvements in diagnostics and treatments have led to increased cancer survival and in Norway the five-year relative survival is around 76% for all cancer sites combined.<sup>1</sup> Commonly, treatment for cancer is multimodal and becoming more individually targeted, but increased survival comes at a price of short-term, prolonged, or lifelong late effects.<sup>2-4</sup> Issues such as fatigue, neuropathy, lymphoedema, urinary- and gastrological problems, impaired memory and concentration, anxiety, depression, and sexual implications affect many cancer survivors with subsequent social, economic, and work-related challenges.<sup>3,5-8</sup> Research has established that rehabilitation can mitigate the impact of cancer-related impairments by improving physical functioning and quality of life.<sup>9-11</sup> In Norway, cancer rehabilitation has traditionally been offered as residential programs at specialist health care level. In 2012, the “Act on Habilitation and Rehabilitation, individual plan and coordinator” was passed by the Norwegian Government, declaring a municipal responsibility for providing rehabilitation services.<sup>12</sup> Despite this, cancer rehabilitation is yet not integrated in the cancer pathways and community-based cancer rehabilitation services are few and shown to be limited, fragmented, not evidence-based, and often reliant on cancer survivors’ own initiative.<sup>13-15</sup>

To address the paucity of evidence-based municipal cancer rehabilitation services, a multidimensional cancer rehabilitation program was developed and tested for feasibility within a community setting. The intervention is underpinned by the theory of health promotion, a process enabling people to increase control over, and to improve their health by a range of individual, social and environmental interventions.<sup>16</sup> Considering the complexity of cancer survivors’ impairments and challenges, a multidimensional approach was considered a good fit for the theory in assisting cancer survivors improving their health. Multidimensional rehabilitation includes both physical and psychosocial components, addressing at least two different dimensions of the International Classification of Functioning, Disability and Health (ICF).<sup>17</sup>

Findings from systematic reviews indicate benefits of multidimensional rehabilitation interventions over usual care, however studies employing randomized controlled trial (RCT) designs are limited, particularly within primary care settings.<sup>10,11,18</sup> Research evidence is also sparse on combinations of various physical and psychosocial components and on studies conducted in mixed diagnosis groups. Furthermore, there is lacking research evidence on

multidimensional cancer rehabilitation after completion of primary treatment, as a large proportion of studies have been conducted in patients undergoing cancer treatment. Finally, more research is required to determine long-term outcomes.<sup>10,11,18</sup> Hence, there is a need for further evidence on community-based multidimensional cancer rehabilitation. When developing the program, existing residential rehabilitation programs were used to identify components that could be adapted to a primary care setting. Additionally, the research literature was reviewed to identify best evidence for rehabilitation components, frequency, and duration. Five key components outlined below were identified as having impact on relevant outcomes for cancer survivors and influenced the content and structure of the cancer rehabilitation program.

Physical exercise presents the most robust evidence, demonstrating improvements in physical functioning, fatigue, quality of life and psychosocial impairments.<sup>19-21</sup> Psychosocial interventions, for example psychoeducation, discussions and coping tools have shown positive effects on coping, stress reduction, fatigue, depression, anxiety, fear of recurrence and quality of life.<sup>22,23</sup> It is further recognized that setting individual goals for the rehabilitation process is vital in promoting motivation, structure, control, and coping.<sup>24,25</sup> Equally, research emphasizes the importance of addressing cancer survivors' individual needs<sup>26</sup> and likewise, the role of peer-support is key to promoting positive changes, psychosocial function, empowerment, and quality of life.<sup>27-29</sup> Consensus exercise guidelines for cancer survivors recommend aerobic training at least three times per week with the addition of resistance training at least two times per week,<sup>30</sup> and this influenced intervention frequency. With respect to program duration, research suggests that cancer rehabilitation is effective in programs lasting between four to 12 weeks.<sup>18</sup> Finally, research has shown group rehabilitation to be beneficial with no additional gain from diagnosis-specific groups compared to mixed diagnosis groups.<sup>18</sup>

In preparation for a future randomized controlled trial to determine its effects, the aim of the current study was to assess feasibility and acceptability of the rehabilitation program described below. Specifically, this paper examines participant characteristics; recruitment procedures, attrition and retention (feasibility); intervention delivery (feasibility); intervention adherence (acceptability); and finally, evaluation of the program's content and structure including recommendations to guide future refinement of the program (acceptability).

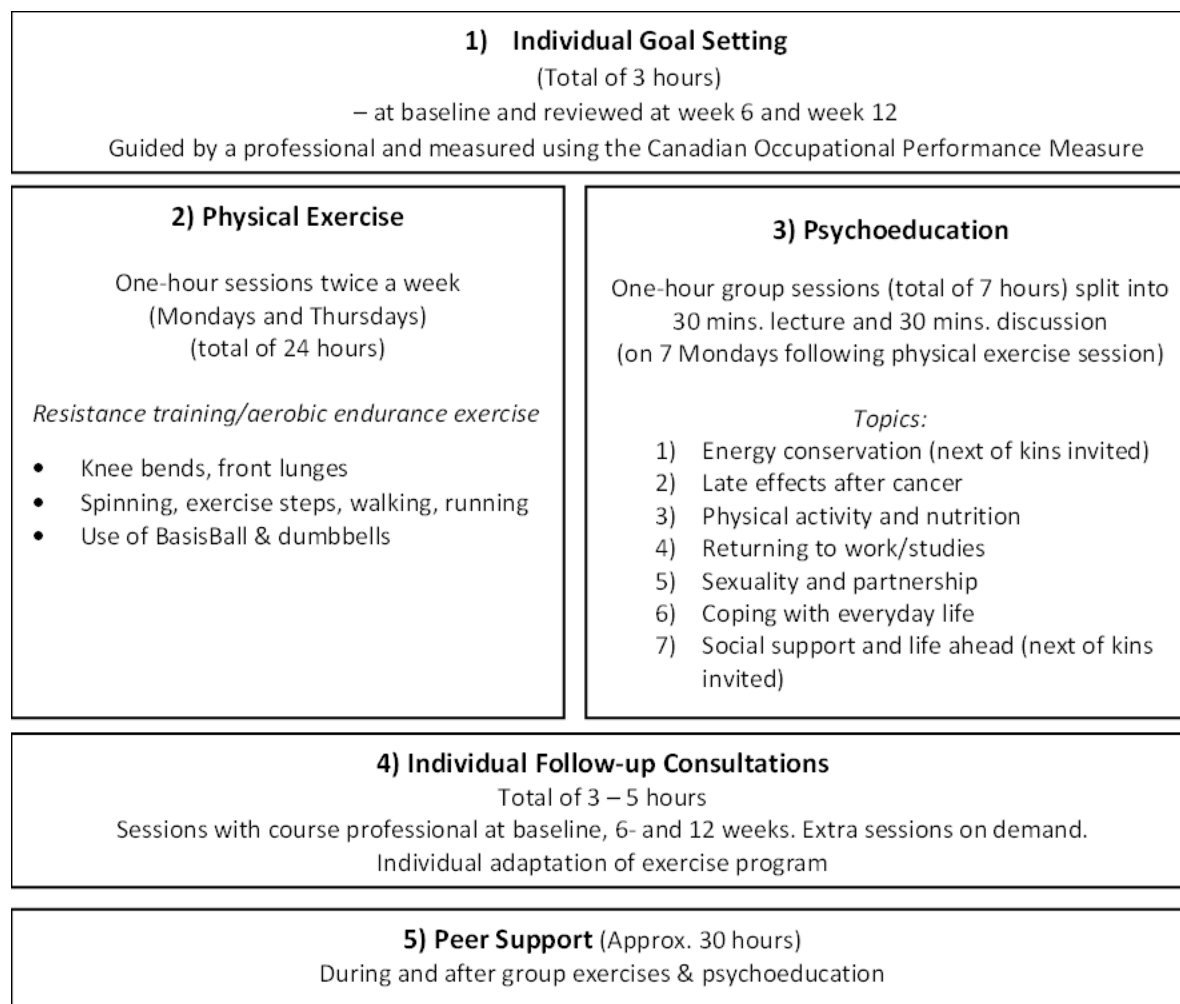
## Methods

### Research design

This was a feasibility study and based on the study's aims, we used mixed methods with an explanatory sequential design as described by Creswell and Clark.<sup>31</sup> In this design, quantitative data are first collected and analyzed, followed by collection and analyses of qualitative data to explain or extend the quantitative findings. The study's quantitative strand was based on a quasi-experimental research design, whereby quantitative feasibility and acceptability data were collected from baseline (pre) to the end of the intervention (post) for eight groups. The study's qualitative strand was based on a descriptive research design, with data collected via focus group interviews at the end of the intervention for the same eight groups.<sup>32</sup> The study was conducted within a local community setting and the research process is guided by the Medical Research Council's and the National Institute of Health Research's recommendations for developing and evaluating complex interventions.<sup>33</sup>

### The intervention

Development of the rehabilitation program was undertaken as a collaborative process between researchers, health care professionals, local council- and user representatives. The project was managed by a project group, overseen by a steering group, and guided by an advisory board. In addition to the above research evidence, it was vital that the rehabilitation program could be administered and delivered within a local community setting, thus the community's available expertise and resources had to be considered when planning the program. The intervention was developed as a group-based multidimensional cancer rehabilitation program lasting 12 weeks, conducted through 2-3 hours weekly sessions during daytime and comprising five components as described below and summarized in Figure 1. It was tested in an island community with approximately 30,000 inhabitants in the western part of Norway and housed in an established Healthy Life Center<sup>34</sup>, which is a municipal health care service (Table 1).



**Figure 1. The Five Components of the 12-week Rehabilitation Program**

*1) Individual goal setting:* The goal-setting process was facilitated using the Canadian Occupational Performance Measure (COPM),<sup>35</sup> where – in consultation with a professional – participants identified a maximum of five individual goals in the areas of selfcare, productivity and leisure time. The goals were then rated for goal attainment and satisfaction, and these were reviewed halfway and at the end of the rehabilitation program.

*2) Physical exercise:* Physical exercise was implemented twice a week in the Healthy Life Center. The exercise sessions were conducted in groups and supervised by a physiotherapist, an occupational therapist and a cancer specialist nurse, all possessing expertise in cancer and physical activity. Each session lasted 60 minutes and included warm-up (10-15 minutes), aerobic endurance exercise and resistance including coordination (30 minutes), and body awareness,

relaxation and stretching (10-15 minutes). The exercise program was tailored to the individual participant's level of physical functioning and previous experience with physical exercise. The warm-up session comprised aerobic exercises using large muscle groups in an up-right position such as walking, high knee lifts and various exercises involving coordination. Aerobic exercises included spinning, fast walking, indoor running, relays, including both aerobic and strength exercises, jumping and exercise step boxes. The participants were instructed to push themselves to "somewhat exhausting" to "exhausting". They were also told that during the aerobic exercises they should not be able to speak in whole sentences. Resistance training included knee bends and front lunges, abdominal- and back exercises and core stability. The exercises were performed against body weight or the use of BasisBall and dumbbells. The last part of the program included stretching of the muscles and relaxation.

**Table 1.** Healthy Life Centres in Norway

<b>Key points</b>
<ul style="list-style-type: none"> <li>• Initiated in 2011 by the Norwegian Directorate of Health to support health promotion and disease prevention</li> <li>• Funded by the Norwegian Government through the municipal health care services</li> <li>• By 2019, 60% of all Norwegian municipalities had established a Healthy Life Centre – covering 80% of Norway's population</li> <li>• Interdisciplinary and knowledge-based resource centres</li> <li>• For people with, or in high risk of disease, who need support with health behaviour change and coping with health problems and chronic disease.</li> <li>• Offering exercise groups, counselling, courses relating to issues such as physical activity, healthy nutrition, tobacco cessation, mental health, sleep and alcohol.</li> <li>• Signposting to alternative and supplementary services</li> <li>• Services are free at point of delivery</li> </ul>

3) *Psychoeducation*: The program included seven psychoeducational sessions, each lasting one hour and split into a 30-minute lecture followed by a 30-minute group discussion. The topics are outlined in Figure 1 and the sessions were delivered primarily by health care professionals working in the community, including cancer specialist nurse, physiotherapist, occupational therapist, and social worker.

4) *Individual follow-up consultations*: Individual face-to-face follow-up consultations were provided by professionals running the program. The purpose of these consultations was to focus on participants' individual challenges, rehabilitation needs and goals. The consultations were delivered in combination with the goal setting sessions and as requested by study participants.

5) *Peer support*: Peer support was incorporated in the rehabilitation program by structuring the program around group sessions. Hence, this component was available throughout the 12-week program by participating in physical exercise sessions and psychoeducation sessions.

## Participants and procedure

Participants were recruited as a convenience sample and self-selected to the study by contacting the project manager. Study documentation was provided in cancer units at the regional hospital, at general practitioner surgeries, via cancer coordinators, the Norwegian Cancer Society, as well as through information posters, leaflets, the council's website and other media channels.

Inclusion criteria were: 1) aged 18-70, 2) having been diagnosed with any type of cancer, 3) having completed primary cancer treatment no less than 3 months and no more than 5 years ago (hormone therapy could still be ongoing), 4) affirmation from general practitioner/oncologist to engage in the program, 5) ability to write and speak Norwegian. Exclusion criteria were: 1) current active malignancy (advanced disease requiring treatment other than symptomatic), 2) undergoing primary cancer treatment, 3) severe physical and/or mental comorbidity, 4) insufficient cognitive or language skills to complete study questionnaires and participate in group interviews.

## Data collection

Consistent with the mixed methods design, both quantitative and qualitative data were collected. Participants' demographic and medical data were collected via a self-report questionnaire.

Feasibility was assessed through recruitment documentation, attrition and retention rates, i.e. by recording recruitment procedure, numbers of participants consenting, starting, dropping out and completing the 12-week rehabilitation program. Reasons for drop-outs were also documented as an indication of feasibility. Further data on feasibility were gathered from project managers' reports on intervention delivery. Acceptability was assessed through intervention adherence by registering participant attendance at each rehabilitation session. Acceptability was further assessed via a self-report evaluation questionnaire at the end of the rehabilitation program.

Participants were asked to report on a 4-point Likert scale to what degree they had benefitted from the program and its individual components. Qualitative data were gathered at the end of the rehabilitation program through eight semi-structured focus group interviews comprising all 55 study participants who completed the 12-week intervention. All interviews were conducted face-to-face at the Healthy Life Centre by a senior researcher who had not been involved in delivering the program. The purpose of the interviews was to explore participants' experiences of taking part in the newly developed rehabilitation program and findings on this has been published in a paper by Løken and Hauken.<sup>29</sup> As part of the semi-structured interview guide, participants were asked to give feedback on the intervention's content and structure and suggest recommendations for program refinement. Findings from this part of the interviews are reported here to provide a deeper understanding of the constructs relating to intervention feasibility and acceptability.

### Data analyses

Descriptive analyses were performed to describe the characteristics of the sample and presented using frequencies, percentages and means/SD. Attrition rate was calculated as percentages of participants who consented but did not complete the program and retention rate was calculated as percentages of those who commenced and completed the program. Adherence rates were calculated as percentages of scheduled rehabilitation sessions that were completed and are reported using means/SD, minimums, and maximums values. The evaluation questionnaire produced categorical data of ordinal level and were reported as percentages. Differences between completers and dropouts were examined using Mann-Whitney U tests and Pearson Chi-Square tests. Statistical significance was defined as a  $p$  value of  $<.05$ . Statistical analyses were performed using the Statistical Package for Social Sciences (IBM SPSS version 27).

Qualitative data deriving from group interviews were transcribed verbatim and analyzed using framework analysis, comprising the five key steps of analysis: familiarization, identifying a thematic framework, indexing, charting and finally mapping and interpretation.<sup>36</sup> The data analysis was facilitated using QRS NVivo 12. Integration of the quantitative and qualitative findings offers a broader perspective on feasibility and acceptability aspects of the intervention and aids its optimization for the future trial.



## Ethical considerations

The study was approved by the West Norway Regional Research Committee (ref.no. 2017/357) and registered in ClinicalTrials.gov (protocol ID: F322). The participants received verbal and written information about the study and all participants provided written consent. The data were anonymized and stored in line with institutional requirements. It was acknowledged that participation in the research had the potential to cause physical harm or emotional distress in study participants. All professionals and the researcher involved in the study were experienced in caring for and communicating with cancer patients and study participants were offered access to the experts and a cancer nurse specialist at any point during the study period, including for referral to other specialists if required. No adverse events were reported during the study.

## Results

### Participant characteristics

Table 2 presents an overview of participants' demographics and medical characteristics. Most participants were female (80%), married or co-habiting (85%), had received multimodal cancer treatment (82%) and had no evidence of metastasis (74%). The mean age was 56, ranging from 30 to 69 years. Although the largest diagnostic group was breast cancer (42%), the sample comprised a variety of cancer diagnoses.

### Feasibility

#### Recruitment and attrition

Recruitment took place between January 2017 and December 2019. Sixty-eight participants consented to the study. Thirty-seven percent had learnt about the study via health care professionals (cancer coordinator, general practitioner's surgery, or hospital), 28% had received information about the study from fellow cancer patients, family members, friends, and neighbours, 18% had found information online and 17% had read about it in the newspaper. Participants were enrolled consecutively in groups of five to ten individuals in a total of eight groups. Sixty participants commenced and 55 completed the program. Eight people consented to the study but did not start the rehabilitation program. Five participants (8% of those who started) dropped out during the program; four due to illness/injuries unrelated to cancer and participation in the rehabilitation program and one for unknown reasons. Analyses on baseline variables

showed no statistically significant differences between completers and dropouts, except that three of the five dropping out had a gynaecological cancer diagnosis ( $p = .04$ ). Participant flow throughout the study is reported with reasons for dropouts in Figure 2.

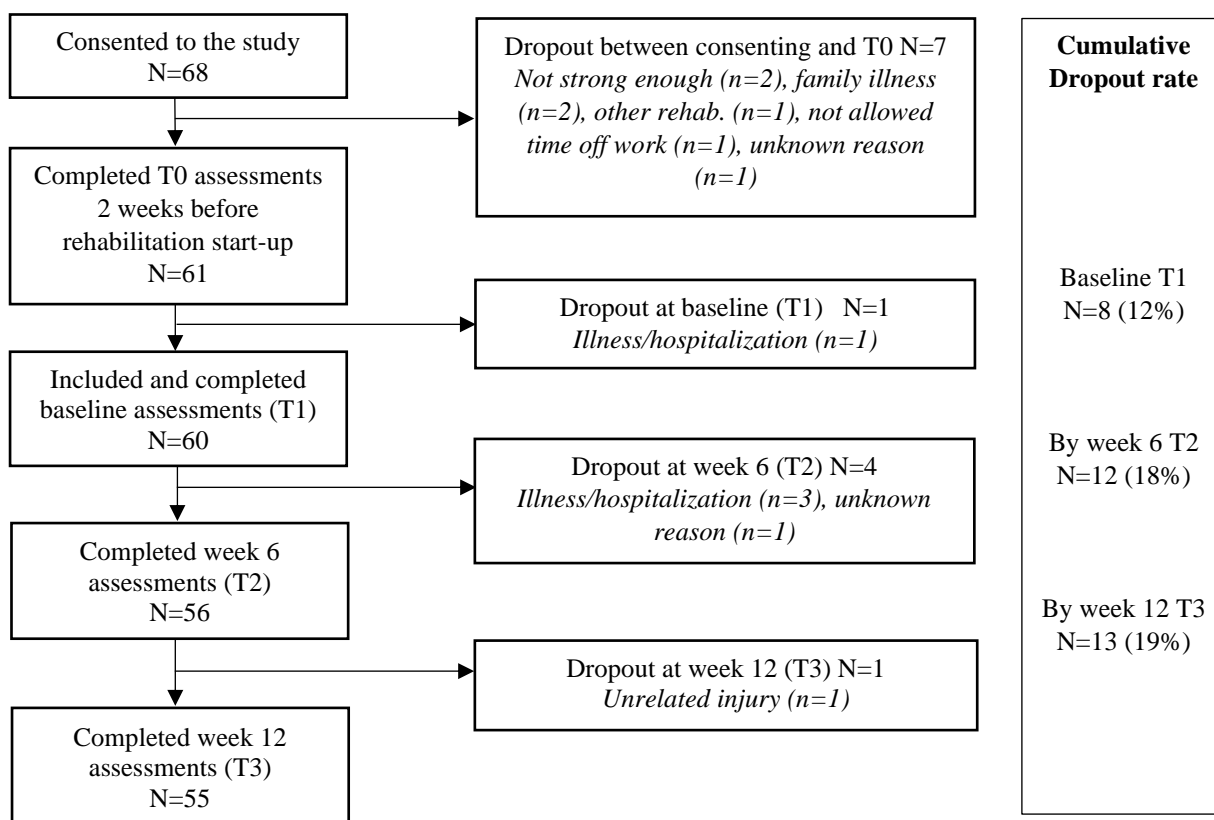
**Table 2.** Sample Demographics and Medical Characteristics

<b>Variable</b>	<b>n / %</b>	<b>Mean/SD</b>
<b>Gender</b>		
Female	49/80	
Male	12/20	
<b>Age (years)</b>		55.7 / 9.5
<b>Marital status</b>		
Married/co-habiting	51/85	
Single/divorced	9/15	
<b>Highest level of education</b>		
Secondary school	5/8	
Senior high school/A-levels	30/49	
Higher education/University	26/43	
<b>Children under the age of 18</b>	14/23	
<b>Employment status</b>		
Working full time/part time	9/15	
Sick leave or temporary off work	23/39	
Disability benefit/retired	22/37	
Other	5/9	
<b>Cancer diagnosis</b>		
Breast	25/42	
Gynecological	8/13	
Gastrointestinal	7/12	
Lymphoma	7/12	
Lung	4/7	
Malignant melanoma	2/3	
Others	7/12	
<b>Confirmed metastases</b>		
No	45/74	
Yes	14/23	
Don't know	2/3	
<b>Months since diagnosis</b>		32.6 / 33
<b>Treatment types</b>		
Single mode	11/18	
Combination/multimodal	50/82	
<b>Duration of treatment in months</b>		16 / 32
<b>Months since end of treatment</b>		15 / 16

### Intervention delivery

Each of the eight rehabilitation groups was led by two professionals: a physiotherapist and a cancer specialist nurse (three groups) and an occupational therapist and a cancer specialist nurse (five groups). Three feasibility issues were identified in relation to delivery of the intervention.

First, due to the extensive duration of the study, there was some turnover in professionals involved in the intervention, though there were overlaps that enhanced continuity. Second, there were some variations regarding the order of the topics for the psychoeducation sessions depending on availability of the professionals running each session. The first and last sessions were consistently delivered as planned as the topics for those were time sensitive. Third, a modification was made within the physical exercise component after the first rehabilitation group. This related to outdoor group walks that was a planned element of the intervention. Due to the heterogeneity of participants' fitness level this proved not feasible, and the walking aspect was adapted to take place indoors in the exercise hall for the remaining seven groups.



**Figure 2.** Flow Chart of Recruitment and Attrition

## Acceptability

### Adherence

As depicted in Table 3, adherence rates for all five rehabilitation components were generally high. Participants attended the exercise sessions at a mean of 76% of the 24 sessions and they attended at a mean of 83% of the seven psychoeducation sessions. All participants attended the individual goal-setting consultations prior to starting the rehabilitation program and midways at six weeks. At the end of the program after 12 weeks, there was a slight decline in attendance at these consultations due to illnesses unrelated to both the cancer diagnoses and rehabilitation participation. The individual follow-up consultations coincided with the goal-setting sessions and the adherence rate is therefore identical.

**Table 3. Adherence Rates for the Five Rehabilitation Components<sup>a</sup>**

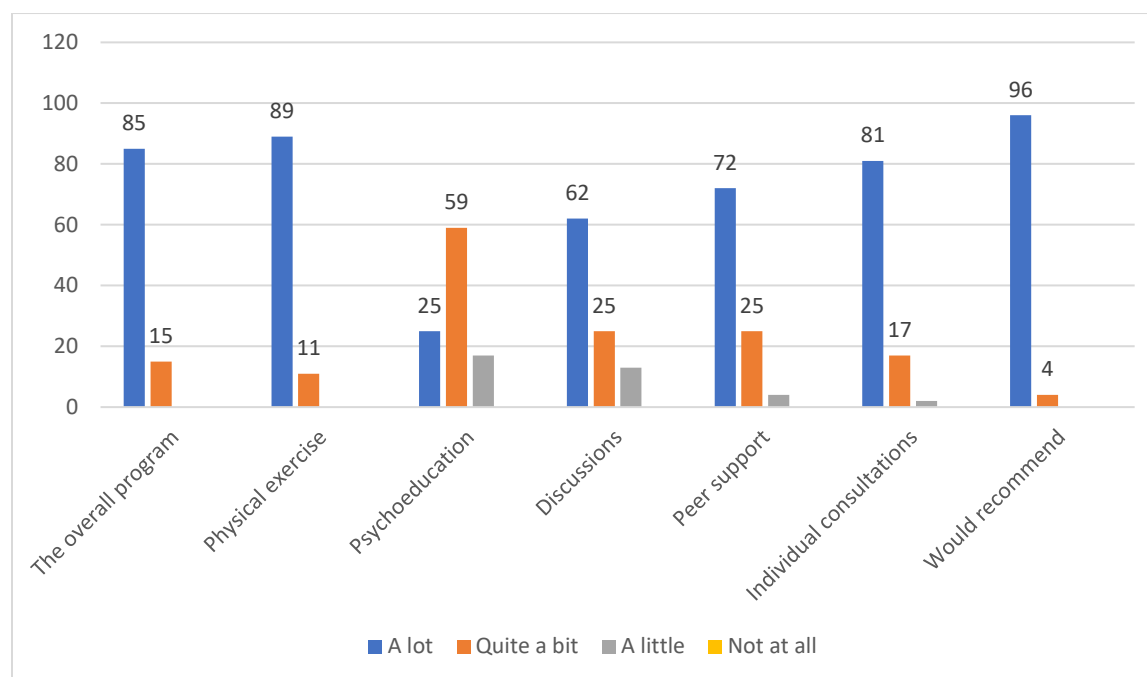
	N <sup>b</sup>	Scheduled sessions	Minimum %	Maximum %	Mean %	Std. deviation
Individual goal-setting	59	3	33	100	94	18
Physical exercise	55	24	35	100	76	15
Psychoeducation	55	7	22	100	83	17
Peer support	55	30	29	100	80	16
Individual follow-up	59	3	33	100	94	18

<sup>a</sup> Percentages of scheduled rehabilitation sessions that were attended

<sup>b</sup> N varies according to numbers available for analyses

### Participant evaluation of the content and structure of the program

Quantitative results from the evaluation questionnaire, as outlined in Figure 3, demonstrate high participant satisfaction for all components of the rehabilitation program, with the exercise component being rated as the most beneficial. Individual consultations with professionals and the element of peer support were rated as the second and third most beneficial components respectively. All those who completed the rehabilitation program would recommend it to other cancer survivors. Providing a qualitative perspective in explaining the positive participant evaluation and high adherence rates, analyses of data from interviews with all eight rehabilitation groups identified the following five themes when asked for feedback on the program's structure.

**Figure 3. Perceived Benefits of Rehabilitation Components**

**1) Locality of the rehabilitation program:** The setting of the rehabilitation program being in the local community was a key factor that was unanimously agreed amongst participants. One reason provided was that rehabilitation took place within their everyday lives, and they had to fit it into other activities and commitments. A second reason concerned the long journey that residential rehabilitation commonly requires, particularly in Norway where the geography can make travelling rather time-consuming and tiring. Thirdly, many were unable or unwilling to be away from home and family, especially if they had young children. Finally, participants also discussed their preference for a local program as opposed to attending outpatient rehabilitation at the cancer hospital due to negative associations with undergoing treatment there: *“That [being local] has meant everything. I would not have gone back there [to the hospital] again”*.

**2) Duration of the rehabilitation program:** There was universal agreement amongst participants that they wished the rehabilitation program had lasted longer than 12 weeks. This applied particularly to the exercise component and the following quote illustrates the apprehensiveness about their ability to keep it up once the program had ended: *“Yes, will we manage to continue, or do we fall back to...? I know I have to work with myself in order to get*

*out.*” There were also concerns about joining regular gyms or exercise classes in fear of not measuring up to other participants with respect to fitness level.

**3) Frequency and timing of rehabilitation sessions:** There was general agreement that the frequency of sessions twice a week was both appropriate and acceptable, although some found it hard at the start of the program. Also in the beginning, many found it demanding to start as early as 10:00; however, after getting into the routine, this became more manageable and was viewed positively as it freed up the rest of the day. One participant explained: *“Yes, my body did not cooperate. But it has been fine, I have told my body that we had to change around the hours a bit.”* The few participants who were in employment were able to get paid time off when attending rehabilitation sessions within working hours, aiding the high adherence rates.

**4) Individual adaptations:** Some reported that they had been reluctant to join the program out of concern that they were not fit enough and might be a burden to other participants. They were relieved to find that exercises could be tailored to them and felt reassured by the highly qualified professionals delivering the program: *“No matter your fitness level, it is adapted accordingly. That has been important.”*

**5) Group compositions:** Participants’ imminent response when asked about the importance of other members in the group having the same diagnosis was that it did not matter, and they found it positive that they had experienced different diagnoses and treatment types. In fact, diagnosis was not something they had discussed much in the groups. However, it emerged that some of the participants would have preferred there to be one other person with the same diagnosis as themselves: *“...before I started, I hoped there would be one person who had been through the same as I had. But it has been fine.”* Generally, they felt that the emphasis now was on cancer survival and therefore it was important to look forward and not focus on what they had been through. Thus, the group composition was of less importance in that respect and participants expressed that it was an advantage with groups comprising both genders and a range in ages. Only 12 men participated in the study and some of the groups included only one male participant. This was reported as not important for both the males and the females involved.

### Participant recommendations

Analyses of both quantitative and qualitative data revealed a high level of satisfaction with the various components and the structure of the rehabilitation program. Further elements that were suggested were yoga, swimming, and group walks. Participants commented that the

psychoeducation sessions could have been even more specific and practical in relation to topics such as fatigue and nutrition. It was further suggested that more emphasis be put on posttraumatic growth and positive consequences arising from experiencing a cancer diagnosis and treatment, though it was acknowledged that this might be controversial for some. Moreover, it was proposed that the psychoeducation sessions should take place prior to the exercise sessions, preventing participants feeling overly tired in those sessions. There were also requests for increased time for group discussions, reflecting the importance of this component. The perceived benefit of the exercise component was also highlighted by data from the group interviews and participants were eager to find ways to sustain their enhanced exercise level. A few mentioned that it could be useful if they were provided with a manual describing the individual exercises so that they could easier repeat those at home. One participant recommended that they could be given the music that had been played at the spinning sessions to spur them on when exercising on their own after the program. Others suggested a period continuing the exercise component at longer intervals for up to a year: *“Start an exercise group, or some sort of group to keep us going. Minimum once a month for a year afterwards.”* A further suggestion was that the Healthy Life Centre could facilitate a ‘safe’ transition from the protected environment of the dedicated rehabilitation program in collaboration with a regular gym.

## Discussion

This study investigated sample characteristics and feasibility/acceptability factors involving participation in a newly developed 12-week multidimensional cancer rehabilitation program in a local community setting. Most participants were females and married/co-habiting with a diverse range in diagnosis groups. The high retention and adherence rates combined with participants’ positive evaluation support the feasibility and acceptability of the program. The findings highlight relevant matters as discussed below.

### Feasibility

Of the eight people who consented to the study but did not start the rehabilitation program, there were potential feasibility-related reasons in four of the cases: not feeling strong enough (n=2), not allowed time off work (n=1), and one started another rehabilitation program. A fifth gave no reason and potential feasibility issues are thus unknown. The remaining three who dropped out

after consenting did so due to family illnesses or own illness unrelated to study participation. This is a small proportion of the sample and does not signify a feasibility barrier. Potential obstacles for study participation should be considered when planning the future randomized controlled trial to maintain a low threshold for rehabilitation participation.

Research has found that cancer rehabilitation programs are commonly accessed by married women possessing a higher education.<sup>37</sup> Our study confirms an over-representation of female, married participants. However, the education distribution in this study contrasts with previous research<sup>37</sup> with only 43% of the sample having completed higher education. It may be that a local rehabilitation program is more successful at attracting participants independent of their socio-demographic status and financial means. Certainly, participation in residential rehabilitation programs may require long journeys and incur further expenses in the form of a fixed contribution towards the rehabilitation costs. Reflecting existing research literature,<sup>38,39</sup> men were underrepresented in this study, accounting for only 20% of the sample. Research suggest that men's reluctance to access rehabilitation services may be connected to fear of losing control and masculinity as well as a wish to speedily resume 'normality'.<sup>38</sup> Our study demonstrated that though some men declared an initial skepticism to join the rehabilitation program, none dropped out of the program even if they were the only male in their group.

Participant characteristics showed that it was in mean 15 months between end of treatment and start of the rehabilitation program. As our sample self-selected to the study, this demonstrates a perceived need for rehabilitation despite having completed cancer treatment more than one year prior to joining the program. Rehabilitation needs for cancer survivors is subject to extensive research, and our findings are in line with the literature reporting perceived needs for rehabilitation from 2-5 months through to two-three years after a cancer diagnosis.<sup>40,41</sup>

The speed of recruitment, resulting in a sample of 68 participants, was slower than anticipated and there may be various reasons for that. First, the study recruited from only one district council and there may have been a limited number of cancer survivors eligible for the study in that area. Moreover, committing to a 12-week long program may have been a barrier for some, substantiated by group interviews uncovering a general concern about not being sufficiently fit to participate in the rehabilitation program. Furthermore, the rehabilitation was delivered during daytime, and this may have been impractical for some and a feasibility issue to consider when



planning the future trial. An additional point relating to recruitment feasibility is that only 37% of the sample had learnt about the rehabilitation program and associated study via health care professionals, narrowing the ability to reach all eligible participants. This mirrors existing research,<sup>13,42</sup> and more attention should be directed at involving health care professionals in the recruitment for the future trial.

Study retention was high during the 12-week rehabilitation period. Despite 19% attrition by the end of the rehabilitation program, the majority dropped out between consenting to the study and start-up of the program. Hence, only five participants (8% of those who started) dropped out during the rehabilitation program and in all cases the reasons for dropouts were unrelated to participation in the program. This signifies a program completion rate of 92%, which is higher than the mean of 75% found in a recent review of community-based exercise programs for cancer survivors<sup>43</sup>. The high completion rate in our study strengthens the feasibility of the rehabilitation program in the tested setting.

Largely, the rehabilitation program was delivered as planned and the same format was applied to all eight rehabilitation groups. However, intervention refinement being a core element in the applied framework for developing complex interventions,<sup>33</sup> some modifications were made as described in the results. The requirement of modifying exercise programs to suit individual needs resonates with previous research in this field.<sup>44</sup> Intervention fidelity – the extent to which an intervention is delivered as intended<sup>45</sup> – is an essential aspect in testing the intervention's effectiveness and application in real life contexts and will be rigorously assessed in the future randomized trial.

### Acceptability

Findings on adherence variables revealed a high level of participation in all components of the program and is comparable to similar research.<sup>46</sup> Adherence is likely to be influenced by issues such as motivational factors and competing commitments and as suggested in the qualitative findings, the high adherence rate may have been boosted by the vicinity of the rehabilitation program lowering the threshold for attendance.

Participant evaluation demonstrated that the rehabilitation program was well received and appraised with respect to both content and structure. All components were deemed relevant and

beneficial, though the lecture part of the psychoeducation sessions was not rated as highly as the other components. This was explained by findings from the group interviews, revealing that although the lectures were regarded important by all, the topics were of variable relevance at an individual level. This finding is in keeping with previous research<sup>39</sup> and should be taken into consideration when refining the program for the future trial.

Combined quantitative and qualitative data highlighted the value of the individual follow-up consultations. The low level of requesting additional consultations may be evidence of the rehabilitation program's ability to address participants' needs within the 3 fixed sessions. It may also be a testimony of the value of the peer support experienced within the groups, facilitating exchange of experiences, advice, and support.

The 12-week duration of the intervention was acceptable to all participants, but findings from the group interviews illuminated participants' desire for the rehabilitation program to have lasted even longer. There is however no evidence to support that programs delivered for durations longer than 12 weeks offer any additional benefits.<sup>18</sup> It is possible that an underlying reasoning for participants' reported preference is connected to the fear of not being able to continue exercising on their own, as well as losing the highly appreciated peer support provided by the group-based rehabilitation program, something that was well documented in the qualitative findings. Regarding the choice of a group-oriented program, this seemed a good fit for the sample in this study and is a model supported by the literature.<sup>18</sup>

Finally, the focal point of this research was the setting of the rehabilitation program being in the local community. For most, this seemed a deciding factor in being able to participate in the program. Many had been away from home a great deal during cancer treatment, and particularly for those with younger children it was not a viable option to go away for residential rehabilitation. This concurs with research highlighting parental challenges throughout the cancer trajectory, where parents commonly struggle with guilt and perceptions of not being there for their children.<sup>47</sup> Besides being easily accessible and at no cost, the community setting enabled participants to incorporate physical activity into their everyday lives, something that they emphasized as an essential factor to facilitate lifestyle changes. This resonates with another Norwegian study, showing that the preferred place to exercise for cancer survivors was at a community fitness centre.<sup>48</sup>

## Implications for future research

As stated in the introduction, this was a feasibility study in preparation to test the effectiveness of the community-based rehabilitation intervention in a future randomized controlled trial. The findings uncovered feasibility and acceptability issues as described in the results section and highlighted in the discussion section. Implications for planning of the future trial relates to modifications of the intervention, i.e. turnover in staff delivering the intervention, changes in the order of psychoeducation sessions and the elimination of outdoor group walks. Further, combined quantitative and qualitative findings revealed positive appraisals of the intervention, though modifications to the psychoeducation sessions should be considered, both with regard to educational content and increasing time for group discussions. The most resounding feedback from study participants concerned the wish for a longer-lasting intervention and this should be carefully considered when planning the future trial, perhaps in the form of a follow-up component. Finally, the study highlighted the importance of healthcare professionals' close involvement in the study, including in the planning stages, to optimize study recruitment.

## Clinical implications

Pertinent to both feasibility and acceptability is the intervention's fit within the municipal services and whether it might be successfully implemented as a standard service. The intervention in the current study was firmly rooted within the community's local authority with representation in the study's project group, steering group and advisory board. This is likely to have boosted their engagement in and sense of ownership of the intervention, which was thought vital with respect to the prospect of intervention implementation. This approach seems key to the success of the intervention now having been implemented into the municipal's standard services. This echoes previous research where municipal representatives in steering committees functioned as 'door openers' within the various levels and agents of rehabilitation services.<sup>49</sup>

Though the purpose of this study was to assess feasibility and acceptability, the findings also suggest some clinical implications for nurses. First, nurses have a vital role in communicating with cancer patients about the importance of rehabilitation after cancer treatments. With research showing that 40% of cancer survivors have unmet rehabilitation needs several years after diagnosis,<sup>40</sup> this is a serious issue where nurses have unique access and opportunities to inform and educate cancer survivors. Nurses are also in an excellent position to act as sign-posters to

rehabilitation services locally. Finally, this study shows that nurses can be actively involved in cancer rehabilitation through psychoeducation and as co-instructors in physical exercise sessions.

## Strengths and limitations

This study adds significant knowledge to the body of research in this field, though its specific purpose and strength is to prepare the grounds for a future randomized controlled study. The greatest strength of the study is the study setting where the multidimensional cancer rehabilitation program was housed within an existing service – a Healthy Life Centre – in a local community. This has not been done before and opens a new avenue for providing community-based multidimensional rehabilitation services to cancer survivors in Norway where such services are undeniably sparse. The high number of Healthy Life Centres in Norway<sup>34</sup> is an important factor when planning the future randomized controlled study to test the program's effectiveness. A further strength of the study is the comprehensive municipal involvement in both the development and feasibility testing of the intervention. It is largely thanks to their championing of the rehabilitation program that it is now part of their standard services for cancer survivors. The study recruited a diverse sample with differing cancer diagnoses and socio-economic backgrounds. This was a strength, reflecting real world research where the intervention must fit into the population where it is expected to be implemented.

However, this might also engender a limitation of the study, because as most participants belonged to the same community, there was an under-representation of men, younger age groups and ethnic minority groups, and these limitations may have influenced the results. A further limitation is the potential sample selection bias introduced by participants self-selecting to the study. Accordingly, we do not know how many might have been eligible for the study and reasons why potentially eligible individuals did not volunteer to participate. It is possible that there were feasibility and/or acceptability factors that prevented them from participating. The sample size was appropriate for a feasibility study<sup>50</sup>, however we cannot disregard the possibility that we captured a select group of participants and that the findings may have been different with another sample.

## Conclusion

This study offers valuable insight into the feasibility and acceptability of a newly developed multidimensional rehabilitation program for cancer survivors delivered from a Norwegian Healthy Life Centre within a local community setting. High retention, strong adherence rates and positive evaluation from study participants are encouraging indicators as to the feasibility of a small community's ability to facilitate such a service within the municipal's financial and organizational constraints, using primarily local resources. Development of complex interventions is an iterative process,<sup>33</sup> and this study has generated knowledge and insights that will aid intervention refinement and be a valuable contribution to planning a future randomized controlled trial examining effectiveness of the program. Should the future trial demonstrate effectiveness, the ambition is for the rehabilitation program to be implemented in the Norwegian National Strategy within the Cancer Pathway "Home".

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