

Cancer Survivors' Experience of Health-Related Quality of Life Six to Eight Years after Diagnosis—A Qualitative Study

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Abstract

Background: Health-related quality of life (HRQOL) is affected for many years following cancer treatment. With an increasing number of long-term cancer survivors, HRQOL will be a key concern in the future. There is a lack of qualitative studies investigating long-term cancer survivors' needs and experience of late effects and HRQOL. **Objective:** The aim of this sub-study is to describe cancer survivors' own experience of late effects affecting HRQOL six to eight years after diagnosis. **Methods:** We used a qualitative methodology with semi-structured focus group interviews to gain an in-depth understanding of participants' experience of their HRQOL. Interviews were audio-recorded, transcribed and analyzed using thematic analysis. **Results:** All of the participants reported late effects at some point after the treatment. Some of the experienced late effects had improved over the years, while the late effects mentioned in this article were still prominent six to eight years after the diagnosis. They described, among others, late effects such as reduced physical strength, cognitive difficulties, lack of energy and increased sensitivity. The participants described the late effects as bearable, but still affecting their HRQOL by limiting their activity level, their ability to work and their social interactions. **Conclusions:** Six to eight years post-treatment, cancer survivors still experienced physical and cognitive late effects affecting their HRQOL. The findings indicate that some late effects affect HRQOL for a long time. To prepare cancer survivors for post-treatment life and to optimize their HRQOL, they need information concerning potential late effects before, during and after cancer treatment, as well as support services and follow-up in the municipalities.

Keywords

Long Term, Late Effects, Social Function, Return to Work

1. Introduction

The number of cancer survivors is growing steadily due to early detection and advances in multimodal treatment, and this increase is expected to continue worldwide [1] [2] [3] [4]. The impact of cancer and its treatment has the potential to affect cancer survivors for a long period after completing cancer treatment [4]. Cancer is no longer considered only to be an acute disease, but also a chronic disease [4] [5]. Late effects after cancer and its treatment are well documented and can include concentration problems, memory deficits, stress reactions, cancer-related fatigue, depression, anxiety and cognitive dysfunction. In addition, survivors may experience physical late effects such as osteoporosis, hypertension, heart failure, diabetes, chronic pain, endocrine dysfunction, sexual dysfunction and/or secondary cancers [4] [5] [6] [7]. These late effects may restrict activities of daily living, employment, social life and family life, and lead to loss of independence and confidence [8] [9]. Thus, they pose a threat to cancer survivors' quality of life [4] [7].

Quality of life is a complex concept with a variety of definitions [10]. The term health-related quality of life (HRQOL), which will be used in this article, is a multidimensional concept that usually involves the core domains of physical, emotional and social functioning. These three domains reflect the World Health Organizations' definition of health as a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity. The domains of economic and spiritual well-being are also frequently included [5] [11]. HRQOL is a subjective perception, and a personal evaluation provides an understanding of the impact of illness from the patients' point of view, which is different from their health status. HRQOL is dynamic, meaning that the patients' own assessment of their HRQOL will change over time, based on priorities, experiences and circumstances at the given time. This means that an individual might attribute more importance to their "working life" at one time than at another time [12].

Today there is increased knowledge concerning cancer survivors and HRQOL. A meta-analysis describing what we know concluded that HRQOL is significantly impacted for two to 26 years after the cancer diagnosis [4]. Research on long-term cancer survivors indicates that HRQOL levels are comparable to the general population, although deficits in HRQOL among survivors have shown to be more prominent among younger age groups. Research has found that nearly 17% of working-age cancer survivors reported cancer-related pain. Cancer-related chronic pain is prevalent and negatively associated with HRQOL and employment in working-age cancer survivors [13]. Most of the existing knowledge is based on quantitative research. By studying HRQOL using quantitative method, it does not provide knowledge about the cancer survivors own experience of late effects, and their description of how it affects their life. More qualitative studies investigating long-term cancer survivors' needs and their experiences of late effects and HRQOL are warranted. This will provide new and unique information

about cancer survivors' experienced consequences of the late effects. By exploring long-term cancer survivors' own experiences of late effects and its' long-term consequences, we aimed to achieve a better understanding and foundation for improved clinical follow-up. In an attempt to contribute to increase HRQOL, this knowledge can be useful for nurses and other health providers working with cancer survivors. The cancer survivors included in this study were participants in a follow-up study of a randomized controlled trial, which evaluated the effect of a stress management program during cancer treatment [14]. For more information concerning the main study, see [14] [15] [16] [17]. The aim of this sub-study is to describe cancer survivors' own experience of late effects affecting HRQOL six to eight years after diagnosis.

2. Methods

2.1. Design and Participants

The study used a qualitative methodology with semi-structured focus group-interviews to gain an in-depth understanding of participants' experience of their HRQOL 6 - 8 years after cancer diagnosis. We formed focus groups with a sample of cancer survivors who had engaged in a randomized controlled trial (RCT) of early rehabilitation during cancer treatment, the participants were included in the RCT at the point of diagnosis [15]. Consecutively 291 cancer patients participated in the RCT, and 211 cancer survivors consented to participate in the follow up-study. Twenty-five participants had died since the RCT study, 22 participants declined participation and 33 did not reply. The follow-up study consisted different questionnaires, and all of the participants were asked to join the focus groups interviews. The questionnaires and consent forms were sent to the cancer survivors by mail, including three reminders. A hundred and twenty participants consented to join the focus groups, and were contacted by telephone. Thirty-five of the 120 consenting participants declined when they were contacted, with the explanatory reasons "Do not have the time/the time for the interviews does not fit with work or other appointments/live other places and do not want to travel to Bergen/did not understand that consenting meant that they had to meet in person".

Of the remaining 85 participants, we selected forty participants to join the four focus groups. Creating two homogeneous groups, consisting of working breast cancer survivors in one group and retired prostate cancer survivors in the other group, made a basis for the selection. The other two groups were heterogeneous groups, consisting of both retired and working-age breast cancer survivors, and some that received benefits from welfare service. Therefore, some working participants, some retired and some receiving benefits from welfare services, were selected. Only prostate and breast cancer participants were selected, and the participants were already enrolled in the mentioned RCT. Participants > 75 were excluded, in an attempt to reach participants who might had been working during their cancer journey. We calculated with ten participants in

each group, and ended up with four groups with seven participants in each. When contacted, 12 participants could not join, due to other appointments, work, state of health and similar reasons. See patient descriptive in **Table 1**. All the 28 participants had finished their cancer treatment at the point of the focus groups interviews.

2.2. Data Collection

Data was collected with the first author as moderator, with a co-moderator. The interview guide was developed in consultation with all authors, based on the main aim of the study and the knowledge gaps surrounding the chosen topic [4] (**Table 2**). The participants were first asked to introduce themselves and describe their life situation and, briefly, their cancer trajectory. Next, they were asked about their experience of HRQOL and the experience of their social, active and work life 6 - 8 years after the cancer diagnosis. The focus groups lasted for 60 - 90 minutes, were audio recorded and transcribed.

Table 1. Baseline demographic and medical background data of focus groups participants (n = 28).

Sex	
Female	22 (78.6) ¹
Male	6 (21.4)
Education	
University education (1 - 4 years)	12 (42.9)
University education (>4 years)	7 (25)
Other	9 (32.1)
Cancer diagnosis	
Breast cancer	22 (78.6)
Prostate cancer	6 (21.4)
Treatment	
Surgery	22 (78.6)
Chemotherapy	19 (67.4)
Radiation therapy	28 (100)
Anti hormone treatment	22 (78.6)
Other health complaints/comorbidity	
Yes	11 (39.3)
No	17 (60.7)
Work status	
Working	16 (57.1)
Retired	8 (28.6)
Other	4 (14.3)

¹N (%).

Table 2. Interview guide.

Topic area	Subtopics
<i>Presentation round</i>	Name, age and diagnosis Life situation Family life Work life Cancer trajectory
<i>Describe your life today, 6 - 8 years after the cancer treatment</i>	Late effects Physical and cognitive capacity Social life Work life Stress handling HRQOL

2.3. Data Analysis

Malterud's systematic text condensation method [18] was used to deductively analyze the core concepts of HRQOL. This is a systematic method following four concrete steps allowing for a thematic and cross-case strategy analysis. We have done a secondary analysis, with main focus on late effects and HRQOL (Table 3).

3. Results

In the process of investigating cancer survivors' HRQOL, the following two themes emerged as especially important: 1) Experienced late effects 6 - 8 years post treatment, 2) Experience of everyday life 6 - 8 years post treatment. Four code groups for investigating cancer survivors' HRQOL were identified; 1a) Physical late effects affecting HRQOL, 1b) Cognitive late effects affecting HRQOL, 2a) Consequences affecting social life, 2b) Consequences affecting work life. The four code groups encompass the challenges experienced by the cancer survivors and affecting one or more dimensions within the HRQOL concept 6 - 8 years after the diagnosis.

3.1. Experienced Late Effects 6 - 8 Years Post Treatment

According to the participants, there was little doubt that the cancer and its treatment had resulted in late effects. For some, the consequences of the treatment asserted itself immediately after the treatment. Others reported few late effects during the first years after treatment, but several years post-diagnosis the late effects started to show and subsequently affect their HRQOL. Many of the late effects experienced by the participants had improved over the years, while the late effects described under, were still prominent, six to eight years after the diagnosis.

3.1.1. Physical Late Effects Affecting HRQOL

The participants drew attention to various bodily ailments affecting their HRQOL, in addition to reduced physical capacity and performance, and little or no energy. They described a loss of physical strength, up to 50% after the cancer

Table 3. Four-steps analysis.

Steps	Performance	Result
<i>Total impression</i>	All authors read the material to obtain an overall impression, and to identify preliminary themes.	“Late effects” and “Everyday life” were identified.
<i>Identifying and sorting meaning units</i>	We developed code groups from the preliminary themes. The first author identified and coded meaning units reflecting the different aspects of the participants’ experiences. After discussion with the researcher group, some themes were redefined and reorganized.	1) Experienced late effects 6 - 8 years post treatment and 2) Experience of everyday life 6 - 8 years post treatment.
<i>Condensation</i>	Subgroups that exemplify the vital aspects of each code group were defined, condensing the contents of each of these and identified illustrative quotations for each subgroup. The codes and subcategories was continually discussed within the researcher group. This was a dynamic process, where codes and subcategories were redefined and renamed as new understanding emerged.	Code groups; 1a) Physical late effects affecting HRQOL, 1b) Cognitive late effects affecting HRQOL, 2a) Consequences affecting social life, 2b) Consequences affecting work life.
<i>Synthesizing</i>	To create a picture of the long-term cancer survivors’ experience of HRQOL the analytical text was synthesized and reconceptualized to illustrate the content of the subcategories.	

diagnosis. During activity and during the day in general, several participants described the need for a break more frequently than earlier, they got tired faster and the tiredness felt completely different from anything they had experienced earlier. For the retired participants, they emphasized that they still had the desire to work at home and to do things, they had lots of initiative and ideas, but the energy was missing. Their planning ability was as good as before, but their implementation capacity and work capacity were reduced. Things were more time consuming, projects that previously would have taken one day, could now keep them busy for a long time, and they described challenges on getting started on activities. Participants described these experiences as demotivating.

Every day I need time to get started with the day, my discomforts force me to start slowly until I am physically and mentally ready to start the day and to get out of the house. As a result, I often have little time and I am late for various appointments (E, 3).

In addition to the need for “warm up” in the morning to get the body on track and to function, the participants described difficulties like an aching body and a feeling of bodily unrest, restless legs, and a tingling sensation in the body, which had not been there before the cancer diagnosis. They mentioned several ailments, such as increasing allergies, skin and nail discomfort, joint pain and wounds that would not heal. Some participants reported challenges associated with hot flushes. In contrast to challenges associated with hot flushes, others reported a constant feeling of cold regardless of season and after treatment a sensitive skin, especially in cold weather.

I am so glad every year when it is September, that I do not have to be the only one feeling cold, and the only person walking around wearing gloves at every time (A, 1).

They also mentioned other persistent bodily changes, such as reduced potency

and difficulties linked to reconstructions of the breast/breasts. The participants described a complicated and long lasting reconstruction process that had left its marks. The participants had concerns about the treatment they had received and the late effects. Some felt that they had been over treated, and that this could be the reason for many of their late effects. At the same time, the participants that only received surgery and/or radiotherapy reported late effects still affecting their HRQOL as well. Due to radiation therapy reduced lung capacity, among others, were mentioned.

The surgery has affected my relationship with the operated breast. All the nerves in the operated area are broken, and the breast no longer has the same function for me as earlier. Mentally, I was not prepared for that consequence, and I would have liked to have information about this before I started the treatment. My breast does not have a sexual function anymore, and to this day, that affects my life (G, 3).

3.1.2. Cognitive Late Effects Affecting HRQOL

The cognitive late effects had emerged during and/or after treatment, and were still present. The participants described reduced memory, lack of concentration and a feeling of losing words and names. Lack of concentration was described as one of the most troublesome late effects, they did not have the ability to concentrate, and some were no longer able to read a book. They could read a sentence and have no idea of what they had been reading immediately after. Others explained that impatience and inability to concentrate interfered with reading. The experience of not being able to relax was described as tiring. The informants found it mentally exhausting never being able to calm down and they struggled to find activities to help them achieve calmness.

When I go to bed in the evening, it would probably help me to have a good book to read, but I cannot do it. (...) I do not know if it is my patience or what, I am restless. I am too restless to sink into a novel (...) This is a real change from earlier (I, 3).

There was a lot of uncertainty concerning the cause of the late effects. Some participants had other diseases, such as chronic diseases, heart disease and they used a range of medications. They related many of the late effects to other diagnoses they had and to the medication they used. In addition, many wondered if the late effects were simply age-related. At the same time, they concluded that their cognitive difficulties were greater than what they observed among their peers. They described the cognitive problems as difficult, especially in social and work settings. On several occasions, many of the participants compared the symptoms to those of Alzheimer disease.

For example, I might say "I have to buy shampoo, and... what is the name of that other thing you have in your hair?" The words just disappear for me. It is particularly demanding in social settings and I find it embarrassing in a work context (...) My husband occasionally thinks I am joking, but I am not (E, 3).

3.2. Experience of Everyday Life 6 - 8 Years Post Treatment

3.2.1. Consequences Affecting Social Life

The informants felt more sensitive to sound and noise after the cancer treatment. For many, this was a pronounced change from before treatment. For some, the sensitivity increased when they were tired, while for others it got tiresome interacting with larger crowds, which included much talking and loud noises. The sensitivity felt overshadowing and impossible to overlook, and the consequence was social withdrawal. They had to avoid loud music; loud noises and they felt the need to be alone. Often they felt it was easier to just stay at home and not expose themselves to such situations. To withdraw could be difficult in different social settings, with family, colleagues and friends. For those who were used to having an active social life, this was a large contrast to before their cancer treatment.

The participants discovered new sides to themselves after the cancer treatment; they felt that everything they had been through left them as a slightly different person. They described it as difficult to return to their old life and their old selves, and that made them more antisocial. The fact that they experienced many limitations and were no longer able to do the same as everybody else, allegedly affected their HRQOL.

(...) I react to sounds, noises and many people, I get very tired from it. Of course, I have my personality. I think I am a kind of sensitive person, and this has not gotten any better, it has gotten worse. It has reinforced some things that lie in my personality and who I am (I, 3).

The participants agreed that increased focus on long-term late effects, increased knowledge and more information to cancer patients and the community in general, could provide a better understanding of cancer survivors' difficulties with late effects and a greater understanding for their need to prioritize. The participants would have appreciated information at different points during the treatment, and especially a while after the treatment, and preferably, group based. In that setting, they could meet others in the same situation, share experiences and maybe they would not feel so alone with their late effects. They also suggested information in writing to family, friends and at the work place, for increased understanding. Participants expressed that this could have contributed to increase their HRQOL post-treatment. The fact that the participants experienced many limitations, they were not able to do the same as everybody else and the same as they used to before the cancer treatment, affected their HRQOL. In addition to the sensitivity, some participants still experienced severe hot flashes. The hot flashes had subsided for some, while others described it as a persistent issue affecting their social functioning, their sleep quality and to some degree their HRQOL.

The hot flashes still affect me, and I find it challenging especially in settings where it is difficult to pull away when I feel it coming. For example, when I am on a plane and caught between two strangers or on public transport. That is very

unpleasant, so in that way it still affects my life and the choices I make (O, 2).

3.2.2. Consequences Affecting Work Life

The participants repeatedly expressed having had a strong desire to return to work (RTW). This was described as an important part of the healing process; as soon as you returned to work, you were “normal” again, hence your body and mind were back on track. The informants described that being on sick leave felt degrading and had different ways of approaching RTW. Some went directly from sick leave to full-time work, while others returned gradually. For some, it took a while before the late effects appeared. Some described a feeling of being “lost”, especially when taking part in discussions at work. Work got more challenging when they experienced difficulties remembering names and using lots of energy on simple, everyday tasks. They had a feeling of not being in the right frame of mind in work settings, neither emotionally or cognitively.

Many had been working several years, when suddenly an eruption of various health problems arose, followed by shorter or longer sick leave. The health problems varied from infections, loss of energy and physical ailments. These late effects resulted in numerous challenges and the participants experienced a sense of disbelief and skepticism at work and from the welfare system.

The informants explained that staying in active employment comes with a price. Because of the cognitive consequences linked to the cancer treatment, they described work life as more challenging; their energy and work capacity was changed. The participants described these late effects as exhausting, demotivating and they affected their confidence. Most managed to keep working to a certain extent, but as a consequence they had less energy left for everything else.

I have been working 100% for almost 2 years. I find it very tough, tougher than I imagined. I think there is a big difference between the capacity I had before I got sick, especially when it comes to the memory and the ability to concentrate. In addition, I have a lot of muscle pain, I get tired and my body is aching. I am often very tired when I get home from work. I was not prepared that it was going to be so. (...) Maintaining the activity in the family and somehow managing to have a normal life with a normal activity level, is difficult. It just does not add up (Å, 3).

In order to endure work life, several participants found themselves forced to adapt by reducing work hours, changing to a lower position or finding a new job (e.g. without shifts). The participants had many suggestions on how RTW and how maintaining a work life could be easier for them, such as; increased understanding, various up-to-date brochures with information about potential late effects, advice on how to deal with late effects and different tips for the patient, their family, friends, colleagues and employers.

4. Discussion

The aim of this study was to describe cancer survivors’ own experiences of late effects affecting HRQOL six to eight years after diagnosis. To the best of our

knowledge, this is the first in-depth qualitative exploration of long-term late effects after cancer treatment and HRQOL.

From quantitative research, we know that late effects might affect cancer survivors' HRQOL for years following the cancer treatment, but we know less about the cancer survivors' own experiences. The present study substantiates that the late effects still affect cancer survivors six to eight years post-treatment. Among others, they described late effects such as reduced physical strength, cognitive difficulties, lack of energy and increased sensitivity. The participants described the late effects as bearable, but still affecting their HRQOL by limiting their activity level, their ability to work and their social interactions. Some participants found it difficult to conclude that the late effects were in fact related to the cancer and its' treatment, or if they were simply associated with age, other comorbidities and medications. At the same time, the participants described a significant change from before the diagnosis, and their ailments felt more prominent than with their peers. This is in line with quantitative research showing that breast cancer survivors have impaired cognitive function, more sleep problems, sexual issues, pain and fatigue compared to age-matched women of the general population 5 years post treatment [19].

All of the participants reported late effects at some point after the treatment. Some of the experienced late effects had improved over the years, while the late effects mentioned in this article were still prominent six to eight years after the diagnosis. This is in line with results of earlier research finding that cancer survivors often describe the years following treatment as more difficult than the treatment itself [20]. The results in this study provide additional knowledge on the consequences the late effects are having on HRQOL, work life and social relations. It also shows that these consequences often led to frustration, as the participants were not prepared for the degree of difficulties 6-8 years post treatment. The participants had prepared themselves to get through treatment and to get back to their old everyday life and work, but found that in reality, it was not that easy. Both the need for, and the lack of information were highlighted repeatedly during the interviews. Participants believed that if they had been prepared for the potential late effects, it would have made it easier to handle. This is in line with previous research concluding that cancer patients have an unmet need for up-to-date information and support [19] [21]. At the same time, it is important that health workers consider cancer survivors varying ability to absorb information at the time of diagnosis and during the treatment. Cancer patients experience an overload of information, and their ability to absorb it at different stages of the cancer disease, might be affected by the treatment. People finding themselves in crisis and in an overwhelming situation, only manage to focus on the "important" information. Research shows a patients' need for information change over time, from the point of diagnosis, through cancer treatment and beyond. At the point of diagnosis, survivors are often focused on information concerning the treatment, possible late effects and ways to manage

them. After treatment, the survivors want more information about recovery and health promotion activities [20]. It is possible that the participants did receive information about late effects, but that they were unable to absorb and properly process it. That might explain the perceived lack of information. This shows the importance of considering at what point in time different information is given. To be prepared for what they could expect post treatment and in an attempt to increase their HRQOL, the participants themselves stressed the importance of right information at the right time. The participants listed specific examples of how they would like the information. This consisted of information during and after treatment, preferably group based, and in writing to participants, family, friends and work place. These suggestions are useful information for nurses and other health workers in future work with cancer survivors. The participants also felt some form of follow-up post treatment were lacking. Research shows that unmet needs can mediate poorer HRQOL, including greater physical impairment and symptom burden, more anxiety and depression, and need for supportive care for a longer period. Experiencing unmet needs years after the treatment is associated with young age, breast cancer and chemotherapy [20]. To improve HRQOL, there is a need for improvements in long-term follow-up care, as cancer patients and their relatives have a need for psychosocial follow-up. The ongoing cancer strategy “Cancer clinical pathway-home” aim for better follow-up for patients in the municipalities after cancer treatment [5] [22]. By using the results in this study, we can further develop follow-up based on cancer survivors needs. One of the main goals of the current Norwegian cancer strategy (2018-2022) is to contribute to the best possible HRQOL, by securing follow-up and guidance, and informing cancer patients and relatives about existing health and support services [22].

The finding that the participants had a strong desire to RTW, but found the process challenging is not unique to this study. Other studies have found that survivors often seek to RTW, and one Meta review of reviews concluded that RTW remains challenging for cancer survivors and requires careful thought and follow up [23]. This study offers additional knowledge showing that the participants had been working for several years, when they suddenly experienced an increase in various health problems, followed by shorter or longer sick leave. The fact that the participants experienced a sense of skepticism from the welfare system and disbelief that the cancer could be the cause of these health issues appearing several years post-treatment is an indication that there is a need for more knowledge. These results show that there is no pattern when it comes to late-effects; it is a subjective feeling, it is individual and it varies from survivor to survivor. Follow-up studies have shown an increased risk of unemployment among cancer survivors compared to the general population [24]. Being able to work is a key contributor to HRQOL for cancer survivors, and it has importance to the survivors, their families and to the society [1] [24]. Therefore, it is important that nurses, health workers and everyone working with cancer survivors are

aware of their responsibility, and base the follow-up on cancer survivors own needs. The participants themselves suggested that various up-to-date brochures with information about potential late effects, advice on how to deal with late effects and different tips for their colleagues and employers could be useful, and could result in increased understanding and facilitation.

Strengths and Limitations

A key strength with this study is the fact that it is a long-term qualitative study, which provides us unique information about the cancer survivors own experiences after cancer treatment. The results substantiates much of the available knowledge we have from quantitative research, at the same time as it provides additional information from the cancer survivors' point of view and their own descriptions of late the effects. This gives nurses and other health workers useful knowledge in the further follow-up of cancer survivors.

Since many participants declined to join the focus groups, the composition of the groups was to some extent decided by who had the opportunity to participate; in addition, we did a purposive sample of the participants. To illuminate the aim in the best possible way, this is a recommended method. The groups we planned were both heterogeneous and homogeneous groups. We ended up with four groups with seven participants in each. Few of the prostate cancer survivors were working at the point of the focus group interviews (86.2% > 66 years), therefore it was not possible to create a group with working men. However, participants aged < 70 years were prioritized, in an attempt to include some participants who had been engaged in work at some time during the study period. We did not mix men and women in the groups. That might be a limitation, but we made this choice based on the thought that it could provide us more information concerning their sexuality and their feelings in general.

The participants described many similar cognitive and physical late effects affecting their HRQOL, in addition to different ailments, reduced physical capacity and strength. It would have been interesting to investigate if similar late effects were reported by a group consisting of survivors with other cancer diagnoses than breast and prostate cancer. We know less about the participants that did not consent to join the focus groups interviews, and why they declined. Did they decline because they do not suffer of any late effects affecting their HRQOL, or for other reasons, such as reluctance to talk about such matters in a group setting or limitations due to reduced capacity?

5. Conclusion

Six to eight years post-treatment, cancer survivors still experienced physical and cognitive late effects affecting their HRQOL. In order to prepare for the post-treatment life, and to optimize cancer survivors' HRQOL, there is a need for more knowledge-based follow-up, involving information dissemination concerning the consequences of long-term late effects, to cancer survivors, their

family, friends, colleagues, employees and in the community in general.

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Conflicts of Interest

The authors have no conflicts of interest to disclose.

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