

Quality of life in breast cancer patients with cancer treatment-related cardiac dysfunction: a qualitative study

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Received 16 July 2020; revised 16 February 2021; accepted 8 June 2021; online publish-ahead-of-print 12 July 2021

Background

Although improved breast cancer (BC) treatment has decreased mortality, these anti-cancer regimens may have serious cardiovascular side effects that affect patients' long-term prognosis and quality of life (QoL). BC patients with cancer treatment-related cardiac dysfunction (CTRCD) can suffer from a variety of symptoms, such as dyspnoea and fatigue. The impact of CTRCD after BC treatment on patients' daily life has not been qualitatively explored yet.

Aims

This study aims to explore the influence of CTRCD on QoL of women with BC, as defined by the concept of positive health. Second, we aim to evaluate the personal experience with cardiac surveillance during the BC trajectory.

Methods and results

A qualitative study with semi-structured interviews was conducted and thematically analysed to explore the QoL and healthcare experiences of BC patients with CTRCD. Twelve patients participated in this study. Five themes are selected in response to the study objective: (i) patients: overwhelming fatigue, (ii) patients: mental burden of anxiety, (iii) social setting: lack of understanding and acceptance, (iv) medical specialists: lack of knowledge and acknowledgement, and (v) patients: need for personalized care.

Conclusion

This study identified core components of the impact CTRCD has on the QoL of BC patients. Patients experienced an increased health-related burden due to CTRCD, affecting their physical, social, and psychosocial well-being. Healthcare experiences were largely affected by a lack of acknowledgement and professional communication. Patients underlined the need for personalized care during follow-up.

Keywords

Quality of life • Breast cancer • Cardiotoxicity • Cancer therapy-related cardiac damage • Heart failure

Implications for practice

- Cancer therapy-related cardiac dysfunction has a large impact on breast cancer patients' quality of life; including physical, social, and psychosocial well-being, and thus patients could benefit from a more holistic approach.
- Professionals' lack of acknowledgement and communication largely influenced patients' healthcare experience, knowledge of cardiotoxicity, and early detection of cardiac damage could improve these experiences.
- Patients express a need for personalized care with a multidisciplinary approach to ensure tailored holistic care, professionals need to incorporate this in their work process.

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Introduction

Improved cancer treatments have increased the number of breast cancer (BC) survivors. However, a secondary potential impact of these treatments is cardiovascular damage.¹ Cardiac damage is a common side effect of BC treatment and the cardiovascular disease (CVD) mortality risk even exceeds that of the initial BC or recurrence of the disease.^{2,4} Prior data show that up to 30% of women have reduced cardiac function after BC treatment and a 1.44 times higher risk of cardiac events than women without BC.^{2–5} Incidence and type of cancer treatment-related cardiac dysfunction (CTRCD) differs based on cumulative dose and treatment combinations. CTRCD includes coronary artery disease (~8%), valvular disease (~10%), and heart failure (~10%) with serious consequences for patients' quality of life (QoL).^{1,5}

The most common manifestation of CTRCD among BC patients is heart failure.^{1,5} Patients can suffer from a variety of symptoms, such as dyspnoea, fatigue, and insomnia. In particular, heart failure has a high treatment burden and is perceived as life-limiting and disabling, as it impairs daily activities, physical function, vitality, and mental health.^{6,7} In addition to patients' significant symptom and treatment-related burden, hospitalization rates are often high and patients have an adverse prognosis.^{2,3,7} A previous study revealed that a large proportion of patients suffer from subclinical left ventricular dysfunction 5–10 years after BC treatment,⁸ suggesting that underdiagnosis of CTRCD is an important issue in cardio-oncology care.

Modern cardiac imaging techniques with cardiovascular magnetic resonance mapping sequences and strain echocardiography can detect cardiac damage at an early stage and guide CV treatment to prevent progression of cardiac damage.^{9–11} However, early detection strategies (e.g. imaging) are often not structurally performed in clinical practice and vary among healthcare providers.¹²

Accordingly, there is an increased interest in improving the early detection of CTRCD to improve treatment options and preserve QoL. Positive health or overall QoL is defined as 'a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity' and has six dimensions: bodily functions, mental functions and perceptions, spiritual dimension, QoL, social and societal participation, and daily functioning.¹³

Previous BC QoL studies have focused on the specific BC burden related to nausea, pain, drowsiness, and (recurrence) anxiety; but specific comorbidities influencing the QoL were not evaluated.¹⁴ CVDs, and in particular heart failure is known to have a significant effect on QoL but these studies often exclude cancer patients and women are often underrepresented.⁶

To the best of our knowledge, data on the QoL of patients with the combined burden of cancer and CVD is limited. One quantitative study showed early-stage BC patients are disproportionately affected by a reduced QoL and functional status due to heart failure.⁶ Especially young and early-stage BC patients showed deficits in emotional and social functioning. However, these complex and dynamic experiences have not been qualitatively evaluated in this population. If we have more insight on themes these women are confronted with, we could be able to act more preventively or proactively in the future. Therefore, this study aims to explore the influence of CTRCD on QoL of women with BC, as defined by the concept of positive health. Second, we aim to evaluate the personal experience with cardiac surveillance during the BC trajectory.

Methods

Design

A generic qualitative study with semi-structured interviews was performed to explore QoL and healthcare experiences of women diagnosed with CTRCD. The interviews, informed by the six domains of positive health and components of the 'tailored implementation for chronic diseases' checklist were conducted in 12 women with confirmed CTRCD (Table 1).^{13,15} Thematic analysis as outlined by Braun and Clarke¹⁶ was performed, an inductive, semantic, and realist approach was applied.

Sample and recruitment

To ensure the study covers different patient perspectives and to increase transferability of study data, maximum variation sampling was used in the recruitment to obtain diversity in age and type of cancer treatment. Patients with BC and cardiologist confirmed CTRCD were eligible.

Eligible patients (N = 15) were contacted by telephone and invited to participate in this qualitative study. The selected patients were referred by their treating cardiologist to a cardio-oncology outpatient ward of a university hospital; eligibility was assessed by the investigator. Twelve patients (80%) agreed to participate, whereas three patients declined to participate—one due to language barrier, one due to the recent start of chemotherapy for BC recurrence, and one for reason of poor physical condition (i.e. Stage IV metastatic disease).

The study sample consists of 12 patients with a history of BC, who developed any form of CTRCD (e.g. heart failure, myocardial infarction, valvular insufficiency, conduction disorders) during or after cancer treatment. CTRCD was diagnosed by their cardiologist. Patients' ages ranged from 42 to 73 years (median 59 years). Patients were curatively treated for BC, with Stages Ib or IIb according to the BC staging criteria.¹⁷ All patients received cardiotoxic therapy, as in anthracycline chemotherapy and trastuzumab. Six patients (50%) had HER2+ BC and received additional trastuzumab targeted therapy, while five patients (42%) had hormone receptor-positive (oestrogen or progesterone) BC and received additional hormone therapy. All patients underwent surgery, and nine patients (75%) received additional radiotherapy. Seven patients (58%) developed >1 type of CVD after initiation of BC treatment. Almost all patients (92%) developed systolic heart failure, four (33%) had a myocardial infarction, three (25%) developed valvular disease, and three (25%) a conduction disorder. Seven patients (58%) were diagnosed with CTRCD within 1 year of cancer treatment discontinuation, whereas four patients (33%) were diagnosed with CTRCD >1 year after cancer treatment discontinuation.

Data collection

Face-to-face individual interviews were conducted using a semi-structured interview guide, which consisted of open questions regarding

Table 1 Interview topics

Concepts of positive health ¹³	TICD checklist ¹⁵
Bodily functions	Patient needs
Mental functions and perception	Beliefs and knowledge
Spiritual/existential dimension	Preferences
Quality of life	Motivation
Social and societal participation	Behaviour
Daily functioning	

TICD, tailored implementation for chronic diseases checklist

QoL, mental and physical health, social and societal participation, and perception of cardiac care received during and after cancer treatment.

The investigators reviewed the interview guide to ensure feasibility and completeness of the topics. All interviews started with the same opening question about patients' CTRCD diagnosis, continued with questions on concepts of positive health, and ended with discussions about the patients' experiences with cardiac care during and after cancer treatment. The interviewer provided a short summary regularly to ensure correct interpretation of patients' views; probes and prompts were used to encourage openness.¹⁸ The interviews were conducted in a private room at the hospital or at the patients' residence, depending on patients' preferences. Baseline characteristics were collected from patient records after written informed consent was obtained. Interviews were conducted by a Masters student with a background in oncology nursing, the interviewer was unknown to the patients enabling them to express their experiences and perceptions without restrictions.

Interviews ranged from 30 to 106 min (mean 74.8 min). All interviews were audio-recorded, transcribed verbatim, and checked for transcription errors. Immediately after the interviews, notes were made to record the observations of the interviewer, capture initial ideas on the topics, and reflect on the methodology (e.g. interview guide refinement). Interview techniques were improved by simulating an actual interview to practice skills and obtain feedback from more experienced researchers.

Data analysis

The six steps of thematic analysis proposed by Braun and Clarke¹⁶ were used: data familiarization, coding, searching for themes, reviewing themes, defining and naming themes, and writing up (Table 2). Data analysis started after the first three interviews. The first four interviews were coded by three independent researchers and checked for inconsistencies and similarities. Inconsistencies were discussed in analysis meetings with the research team. Each theme was further considered and refined, and illustrative quotes were selected. After the 10th interview, data saturation was reached. Two more interviews confirmed saturation and ensured maximum variation in the sample. Data management was supported by

ATLAS.ti software, version 8 (Scientific Software Development GmbH, Berlin, Germany).

Trustworthiness

Credibility of data collection and analysis was enhanced by researcher triangulation and peer review in all study phases.¹⁹ Analysis meetings were regularly scheduled to ensure accuracy and enhance data dependability.¹⁸ Experienced researchers were involved to ascertain the study's methodological quality and reliability. Additionally, an audit trail improved the study's confirmability.¹⁸ Braun and Clarke's¹⁶ 15-point checklist ensured the correct use of the thematic analysis method. The consolidated criteria for reporting qualitative studies were used to ensure completeness of reporting.

A waiver was provided by the Medical Research Ethics Committee of Arnhem-Nijmegen since the study did not need an ethical review. The study was conducted in accordance with the principles of ICH Good Clinical Practice, applicable privacy requirements, and principles of the Declaration of Helsinki.

Results

Between January and May 2019, 12 women with a history of BC and CTRCD were interviewed. Participants' characteristics are described in the sample description and presented in Table 3. After transcribing and coding the interviews the 1978 generated codes were grouped in 19 clusters, for example, positive and negative effects of treatments and of the provided care, physical burden of BC treatment and of CTRCD, mental health, social setting, societal participation, coping strategies, acceptance, and acknowledgement. Within these clusters the recurring themes were discussed.

As shown in Figure 1, five themes were selected as answers to the research question: (i) patients: overwhelming fatigue, (ii) patients: mental burden of anxiety, (iii) social setting: lack of understanding and acceptance, (iv) medical specialists: lack of knowledge and acknowledgement, and (v) patients: need for personalized care.

Table 2 Six steps of thematic analysis

Phase	Description of the process
1. Familiarizing with the data	Interviews were transcribed (N.v.Z.), the transcripts were read and re-read, and initial ideas for topics were discussed in the research team (N.v.Z. and Y.K.)
2. Generating initial codes	All transcripts were coded by two researchers independently of each other (N.v.Z., LD, and Y.K.). Interesting features of the data were coded in a systematic fashion across the entire data set, collating data relevant to each code. The codes were presented and discussed in the research team (N.v.Z., Y.K., and H.V.)
3. Searching for themes	Codes were collated into potential themes, gathering all data relevant to each potential theme. A preliminary description of potential themes and subthemes was made and discussed (N.v.Z., Y.K., and H.V.)
4. Reviewing themes	The preliminary themes were checked if they were consistent with the original data (N.v.Z. and Y.K.). Inconsistencies were discussed and the themes were further explored (N.v.Z. and Y.K.). The main and subthemes were revised accordingly and further described (N.v.Z. and Y.K.) and reviewed (Y.K., H.V., S.E.M., A.H.E.M.M., and F.A.)
5. Defining and naming themes	The specifics of each theme were discussed, and names and definitions of themes were refined (Y.K., N.v.Z., H.V., S.E.M., A.H.E.M.M., and F.A.)
6. Producing the report	A first draft of the results was written (Y.K.) and reviewed (H.V., S.E.M., A.H.E.M.M., and F.A.). The quotes were selected to clarify the presented data, the report was further discussed (N.v.Z., Y.K., and H.V.) and adjusted (Y.K.). The report was critically assessed by the research team and further adjusted to adequately present the themes with verbatim quotes (Y.K., N.v.Z., H.V., S.E.M., A.H.E.M.M., and F.A.)

Table 3 Patients' baseline characteristics

Patient	Age ^a	BC diagnosis (year)	BC stage and characteristics ^b	BC treatment	CTRCD (type and year of diagnosis)	LVEF at time of CTRCD diagnosis (%)
1	63	2006	IIb HER2−, OR+	AC chemotherapy Hormone therapy Radiotherapy	2007: HFrEF	25
2	73	2014	IIIb HER2+, OR/PR−	Targeted therapy	2016: HFmrEF 2017: STEMI	46
3	70	2015	Ib HER2−, OR/PR−	AC chemotherapy	2015: AF, STEMI 2017: STEMI, HFrEF	26
4	55	2010	IIb HER2+, OR/PR+	AC chemotherapy Targeted therapy Radiotherapy	2012: HFmrEF	48
5	50	1999	IIIb HER2−, OR/PR−	AC chemotherapy Radiotherapy	2004: STEMI 2005: STEMI 2017: HFmrEF, MR	45
6	42	2011	Ib HER2−, OR/PR−	AC chemotherapy Radiotherapy	2014: LBBB, HFrEF	39
7	66	2016	IIIb HER2+, OR/PR+	AC chemotherapy Targeted therapy Radiotherapy	2017: HFrEF	35
8	46	2010	IIb HER2−, OR/PR−	AC chemotherapy Radiotherapy	2011: HFmrEF 2018: AR	40
9	47	2015	IIIb HER2+, OR/PR−	AC chemotherapy Targeted therapy	2018: HFrEF	27
10	59	1999	Ib HER2+, OR/PR+	AC chemotherapy Targeted therapy Hormone therapy Radiotherapy	2014: AF	63
11	58	1998	IIb HER2+, OR/PR+	AC chemotherapy Targeted therapy Hormone therapy Radiotherapy	2009: HFmrEF 2012: MR 2014: STEMI	40
12	62	2010	Ib HER2−, OR/PR−	AC chemotherapy Radiotherapy	2011: hypertension 2017: HFrEF	26

^aAge at time of interview.
^bStaging according to the American Joint Committee of Cancer staging manual.¹⁷
AC chemotherapy, chemotherapy regimen with anthracyclines (doxorubicin) and cyclophosphamide; AF, atrial fibrillation; AR, aortic valve regurgitation; BC, breast cancer; CTRCD, cancer treatment-related cardiac dysfunction; HER2, human epidermal growth factor receptor 2; HFmrEF, heart failure with mid-range ejection fraction (LVEF 40–49%); HFrEF, heart failure with reduced ejection fraction (LVEF <40%); LBBB, left bundle branch block; LVEF, left ventricular ejection fraction; MR, mitral valve regurgitation; OR, oestrogen; PR, progesterone [positive (+) or negative(−) test]. Targeted therapy, Trastuzumab for HER2+ patients; STEMI, ST-elevation myocardial infarction.

Patients: overwhelming fatigue

Physical effect of fatigue

Most participants experienced fatigue, which they described as different from their known fatigue due to their oncologic treatment. Participants reported limitations in several daily activities (New York Heart Association Class II–III²⁰) such as household chores, social and societal participation, walking long distances, and climbing stairs.

‘I can do a lot, as long as I take a rest in between. I can also go on like a steam train, but then I’m broken for a day or two, or longer. It depends. I’m just broken, tired . . . like running a marathon’ (P6).

Influence of fatigue on work-life balance

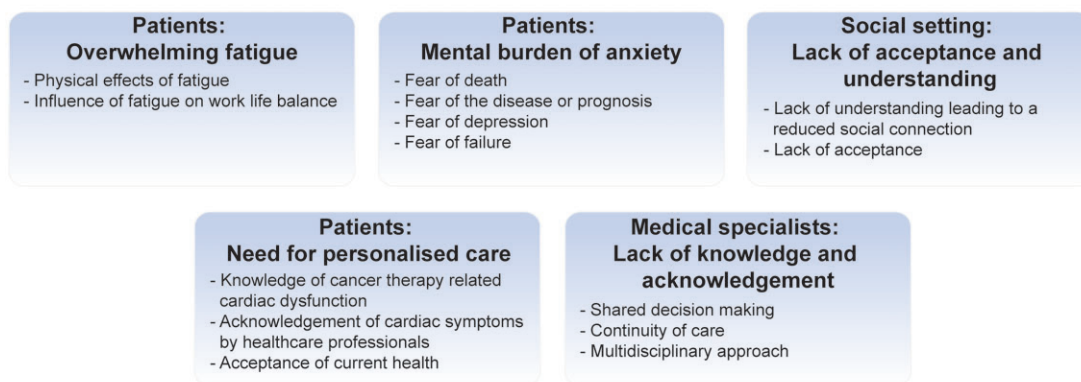
Fatigue influenced patients’ entire life, regarding their social and societal activities. Some participants expressed that they had difficulties in finding a balance between their work and private life, related to their fatigue. Some participants needed to switch jobs, decrease work hours, or quit, causing financial concerns, and affecting their social network.

‘You want to, but you can’t. And everywhere you’re too late; you’re lagging behind. In my job, at home, in everything’ (P1).

Patients: mental burden of anxiety

Participants reported four types of anxiety—fear of death, fear of the disease or prognosis, fear of depression, and fear of failure—all of

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Experiences with cardiac surveillance during the breast cancer trajectory

Figure 1 Thematic overview.

which were related to prognosis, stress, poor sleep quality, and uncertainty.

'Eventually, I think it's fear because, at the moment, your heart is not functioning well, so you don't get immunotherapy. And when you don't get immunotherapy, then you die of cancer' (P9).

The accumulating effects of anxiety and cardiac symptoms (e.g. fatigue) limit participants in their daily activities and affect their overall vitality. Some participants perceived their mental burden as worse than their physical burden; they reported having negative thoughts and anxiety due to the uncertainty of their disease and prognosis.

'With the cancer diagnosis, you think, I could die, but you also know what to prepare and what you can do. Everything is scheduled. ... With this [heart failure], you can't, it's unpredictable. What's going to happen, you realise that it's different. You feel different about it. You're like, "I don't want this. It's scary", so yes, it's fear. Everything is going to be different. It's a different kind of fear' (P12).

All participants experienced a physical and a mental burden related to their health status that increased over time mainly related to the progressive character of their CVD diagnosis, other BC treatment-related consequences (e.g. lymphedema after surgery or radiotherapy). This was also affected by the impaired cognitive abilities of some participants who had trouble concentrating on a task, or suffered from amnesia (these patients received chemotherapy). Especially the patients of working age had a fear of failure regarding their social life and societal participation.

'I lost my job. I feel like I lost my life. I had a beautiful company, but I can't do it anymore. Physically, I can't handle night shifts anymore. It cost me a

lot, the price of being sick is very high. Not just the cancer, that's no one's fault, but the price of the chemotherapies is high for the patient. On top of chemotherapy, you have a myocardial infarction, and another, then the heart failure diagnosis. The price is high. And heart failure, I feel it could have been prevented' (P5).

Social setting: lack of understanding and acceptance

Lack of understanding leading to a reduced social connection

All participants experienced lack of understanding from their relatives and inner social circle over time. Participants reported difficulties communicating with their social network (e.g. relatives, friends, and acquaintances), and their social network seemed oblivious to their health-related problems, showing less empathy with, no interest in, or denial of their complaints. Participants felt unheard. They felt that they were not taken seriously, leading to less connection with their social network.

'People find it hard to hear how I feel. At a certain time, it all must be over. But. ... my recovery takes years or longer. I'm still not [recovered]' (P5).

Lack of acceptance

A lack of acceptance of the health-related burden resulted in some participants only discussing health issues with their partner or close friends. Most participants explained that questions were rarely asked within their social network, which led to unawareness and misunderstanding about the cardiovascular consequences of cancer treatment. Social contacts therefore often changed. Participants felt that sometimes their complaints were not acknowledged by their social network.

'I rarely go out. It costs too much energy. Your social circle becomes smaller. It's fine now. It's OK, but it doesn't mean I like it. It's a shame because I'm 42. I should be able to do so much, but I can't' (P6).

Medical specialists: lack of knowledge and acknowledgement

Cancer treatment-related cardiac dysfunction knowledge

Some participants reported that their medical specialists did not have knowledge regarding CTRCD, which resulted in misinterpretation of cardiac symptoms. None of the participants received information on CTRCD before or during cancer treatment and were thus shocked and upset when diagnosed with cancer therapy induced CVD.

'For me it was a huge eye-opener to hear that cardiac damage and cancer may have something to do with each other. I think there should be more information there. I didn't know, but now you hear it [cardiac damage] quite regularly' (P9).

Acknowledgement of cardiac symptoms by healthcare professionals

After participants were diagnosed with CTRCD, they all felt that their cardiac symptoms during and after cancer treatment were not timely recognized or acknowledged by their medical specialist. Some participants experienced specialists comforting them instead of acting and identifying cardiac damage. Although it could be challenging to differentiate between cardiac damage and 'other' cancer treatment-related side effects, patients felt their cardiac symptoms could have been recognized earlier.

'During the [outpatient] consultation, they just said that I need to take a step back. But I was like, "I want to take a step forward, not back". . . They didn't know what it was. I often asked, "Why can't I get an echo of my heart?" But I didn't get it. When I finally got it, we knew that it wasn't OK. Then, I'm like, "Why didn't we do something before?" I don't blame them. Now, we know I need to get treated; I have heart failure' (P3).

Acceptance of current health

Non-acknowledgement of their symptoms made participants feel anger and frustration. They felt their symptoms were being denied. Participants emphasize the importance of better understanding of their health-related problems and involvement from their social network. Participants felt they could accept their complaints better once the cardiac diagnosis has been made. Some participants also felt that cardiac damage could have been prevented if it had been detected and treated earlier. Participants stated that their specialists did not apologize for the late or missed CVD diagnosis.

'You forget it because you're not familiar with it, or there is no protocol yet. I think it's possible, especially 20 years ago or 15 years ago. But when it does happen, why don't you say sorry? I need to deal with it for the rest of my life. They don't have my heart that doesn't function properly' (P5).

Patients: need for personalized care

Shared decision-making

Most participants did not experience holistic, personalized care during both BC and CVD-related care. They felt that there was no opportunity for shared decision-making regarding treatments or discussions regarding the benefits and side effects of treatments with specialists.

'It would have been nice if it was discussed at an earlier stage, that it's a possible side effect. Side effects of medication, cardioprotective treatment, and cancer treatment should be a standard discussion topic' (P9).

Continuity of care

Participants reported that coordination and continuity of care were suboptimal and that interprofessional communication between cardiologists and oncologists was lacking.

'The collaboration between cardiology and oncology, the physicians they have their own island, and they just do what is good for the patient. . . but they don't communicate. I asked my oncologist to contact my cardiologist. They should talk to each other. . . and come up with a solution together about what's best for the patient' (P9).

Multidisciplinary approach

According to most participants, healthcare professionals (i.e. oncologists, cardiologists, nurse practitioners) provided different information that are sometimes difficult to understand. Participants affirmed the need for cardiologists and oncologists to communicate if patients have multi-organ diseases.

'It's challenging to understand all the information that was provided separately. It's like there is a wall in between. They're listening to what I'm saying, but I don't feel like there are any consultations. That's what I disapprove of most. . . I'm like, "It's both in my body, but do you ever communicate with each other about it?"' (P2).

All participants stated that there was lack of attention for lifestyle factors, such as diet and exercise. Participants experienced symptoms related to either their oncologic or cardiac disease, they expressed the need to discuss both with one specialist or that a multidisciplinary approach would be considered.

'I asked if it could be related to all the cancer treatments I've had. 'No', they said, shushing me. I was like, 'What?' It's a shame. Specialists should have a more holistic point of view, not just [of] the cancer or the heart but your entire body. What happens to your body when you're sick or when you receive treatments? Are treatments and complaints related? You can't say, "Oh this side effect is not related, it's not within the scope of my specialism". A different approach is multidisciplinary. I'm very much in favour of that' (P10).

Discussion

This qualitative study explored the QoL of BC patients with CTRCD and their experiences with cardiac surveillance. Patients showed increased physical and psychosocial burden due to CTRCD, affecting their QoL and their social and societal participation. The lack of knowledge and acknowledgement regarding CTRCD among medical professionals and the lack of acceptance and understanding of cardiovascular signs and symptoms within the patients' social circle negatively affected their ability to accept their health status. Patients emphasized the need for more personalized care and multidisciplinary collaboration to ensure more tailored and holistic care.

CTRCD negatively influences both long-term prognosis and QoL. This study found that disease burden affects patients' daily lives and

their physical and psychosocial well-being, leading to a smaller social circle and reduced societal participation. These results align with several studies that reported reduced QoL in BC survivors related to deficits in physical, social, and psychological well-being.^{6,14} Depending on the type of cancer treatment received, the side effects encompass cardiac damage, infertility and premature menopause, pain in the breast area, and lymphedema.¹⁴ Patients who receive chemotherapy often experience prolonged fatigue, affecting overall QoL.¹⁴ A previous study describes that the difference between the cancer and heart failure healthcare trajectory is the structure and assertiveness patients need to show, heart failure care is experienced as fragmented and patients struggle to understand their illness; which concurs with our findings of unpredictable nature of heart failure and the scheduled care for cancer.²¹ Due to the accumulating effects of the symptom burden over time, patients experienced questions of existential nature and felt a loss in their 'sense of self' and a changing relationship with their social network, which is in line with Leeming *et al.*'s²² study on the psychosocial concerns of heart failure patients. Patients expressed a need to redefine their lives (i.e. their social life and contribution to society) as they often experience a significant change in their capacity to undertake physical tasks of daily living, their cognitive capabilities (e.g. concentration), and their employment. Both BC and CVD patients experience depressive symptoms, anxiety, or cognitive deficits,^{6,23,24} which was also reflected in the results of the present study. This result also concurs with studies reporting on patients' negative thoughts, fear of cancer recurrence or (CVD) prognosis, and body image problems.^{25,26}

Professionals (i.e. physicians and nurse practitioners) are in the prominent position to support patients in managing their disease burden.²⁷ Based on the results of the present study, patients often do not receive information on CTRCD risk prior to BC treatment initiation, and despite developing CVD symptoms, these are not acknowledged by their treating physician. A tailored programme for BC patients' physical, educational, and psychosocial needs was recommended in a previous study by Hamer *et al.*¹⁴ This is in line with the needs that patients expressed in this study (i.e. to receive personalized care to improve QoL). Lack of knowledge regarding CTRCD risks and symptoms can hinder multidisciplinary collaboration between the cardiology and oncology departments. Previous studies affirmed that collaboration between oncologists and cardiologists with shared responsibilities and knowledge on cancer therapeutics, cardiotoxic effects, and cardio-protective treatments is needed for optimal surveillance.^{28,29}

A multidisciplinary team of physicians and nurse practitioners from relevant specializations can integrate short- and long-term follow-ups with a holistic care approach to enhance patients' physical, social, and psychosocial well-being. In several studies, a nurse practitioner in cardio-oncology care has been suggested to structure patient follow-up and identify patients in need of additional psychosocial care.³⁰ In childhood cancer survivors, this personalized cancer survivor care model support patients in managing adverse effects (e.g. cardiac damage).³¹ These programmes are beneficial for patients' health behaviour and knowledge and ensure the early diagnosis and treatment of cardiac damage.³²

This study identified core components of the impact CTRCD has on the QoL of BC patients. Patients reported increased health-

related burden due to CVD, affecting their physical, social, and psychosocial well-being. Their healthcare experiences were largely affected by a lack of acknowledgement and professional communication. Patients emphasize the need for personalized care during follow-up. A tailored, multidisciplinary, and holistic healthcare approach can potentially enhance patients' healthcare experiences and long-term QoL.

Acknowledgements

We would like to thank all patients who participated in this study.

Funding

No funding was obtained for this study.

Conflict of interest: none declared.

Data availability

The data that support the findings of this study are available from the corresponding author, YK, upon reasonable request.

References

1. Zamorano JL, Lancellotti P, Rodriguez Munoz D, Aboyans V, Asteggiano R, Galderisi M, Habib G, Lenihan DJ, Lip GYH, Lyon AR, Lopez Fernandez T, Mohty D, Piepoli MF, Tamargo J, Torbicki A, Suter TM; ESC Scientific Document Group. 2016 ESC Position Paper on cancer treatments and cardiovascular toxicity developed under the auspices of the ESC Committee for Practice Guidelines: The Task Force for cancer treatments and cardiovascular toxicity of the European Society of Cardiology (ESC). *Eur Heart J* 2016;**37**:2768–2801.
2. Curigliano G, Cardinale D, Dent S, Criscitelli C, Aseyev O, Lenihan D, Cipolla CM. Cardiotoxicity of anticancer treatments: epidemiology, detection, and management. *CA Cancer J Clin* 2016;**66**:309–325.
3. Bodai BI, Tuso P. Breast cancer survivorship: a comprehensive review of long-term medical issues and lifestyle recommendations. *Perm J* 2015;**19**:48–79.
4. Gernaat SAM, Boer JMA, van den Bongard DHJ, Maas A, van der Pol CC, Bijlsma RM, Grobbee DE, Verkoijen HM, Peeters PH. The risk of cardiovascular disease following breast cancer by Framingham risk score. *Breast Cancer Res Treat* 2018;**170**:119–127.
5. Chang HM, Moudgil R, Scarabelli T, Okwuosa TM, Yeh ETH. Cardiovascular complications of cancer therapy: best practices in diagnosis, prevention, and management: part 1. *J Am Coll Cardiol* 2017;**70**:2536–2551.
6. Harrison JM, Davis MA, Barton DL, Janz NK, Pressler SJ, Friesen CR. Functional status and quality of life among breast cancer survivors with heart failure: results of the Medicare Health Outcomes Survey. *Support Care Cancer* 2017;**25**:2463–2473.
7. Gallacher K, May CR, Montori VM, Mair FS. Understanding patients' experiences of treatment burden in chronic heart failure using normalization process theory. *Ann Fam Med* 2011;**9**:235–243.
8. Boerman LM, Maass S, van der Meer P, Gietema JA, Maduro JH, Hummel YM, Berger MY, de Bock GH, Berendsen AJ. Long-term outcome of cardiac function in a population-based cohort of breast cancer survivors: a cross-sectional study. *Eur J Cancer* 2017;**81**:56–65.
9. Curigliano G, Lenihan D, Fradley M, Ganatra S, Barac A, Blaes A, Herrmann J, Porter C, Lyon AR, Lancellotti P, Patel A, DeCaro J, Mitchell J, Harrison E, Moslehi J, Witteles R, Calabro MG, Orecchia R, de Azambuja E, Zamorano JL, Krone R, Iakobishvili Z, Carver J, Armenian S, Ky B, Cardinale D, Cipolla CM, Dent S, Jordan K. Management of cardiac disease in cancer patients throughout oncological treatment: ESMO consensus recommendations. *Ann Oncol* 2020;**31**:171–190.
10. Ohtani K, Fujino T, Ide T, Funakoshi K, Sakamoto I, Hiasa KI, Higo T, Kamezaki K, Akashi K, Tsutsui H. Recovery from left ventricular dysfunction was associated with the early introduction of heart failure medical treatment in cancer patients with anthracycline-induced cardiotoxicity. *Clin Res Cardiol* 2019;**108**:600–611.
11. Cardinale D, Colombo A, Lamantia G, Colombo N, Civelli M, De Giacomi G, Rubino M, Veglia F, Fiorentini C, Cipolla CM. Anthracycline-induced

- cardiomyopathy: clinical relevance and response to pharmacologic therapy. *J Am Coll Cardiol* 2010;**55**:213–220.
12. Koop Y, El Messaoudi S, Vermeulen H, Maas AHEM, Atsma F. Healthcare utilization and hospital variation in cardiac surveillance during breast cancer treatment: a nationwide prospective study in 5000 Dutch breast cancer patients. *Cardio-Oncology* 2020;**6**:14.
 13. Huber M, van Vliet M, Giezenberg M, Winkens B, Heerkens Y, Dagnelie PC, Knottnerus JA. Towards a 'patient-centred' operationalisation of the new dynamic concept of health: a mixed methods study. *BMJ Open* 2016;**6**:e010091.
 14. Hamer J, McDonald R, Zhang L, Verma S, Leahey A, Ecclestone C, Bedard G, Pulezas N, Bhatia A, Chow R, DeAngelis C, Ellis J, Rakovitch E, Lee J, Chow E. Quality of life (QOL) and symptom burden (SB) in patients with breast cancer. *Support Care Cancer* 2017;**25**:409–419.
 15. Flottorp SA, Oxman AD, Krause J, Musila NR, Wensing M, Godycki-Cwirko M, Baker R, Eccles MP. A checklist for identifying determinants of practice: a systematic review and synthesis of frameworks and taxonomies of factors that prevent or enable improvements in healthcare professional practice. *Implement Sci* 2013;**8**:35.
 16. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;**3**:77–101.
 17. Giuliano AE, Connolly JL, Edge SB, Mittendorf EA, Rugo HS, Solin LJ, Weaver DL, Winchester DJ, Hortobagyi GN. Breast cancer-major changes in the American Joint Committee on Cancer eighth edition cancer staging manual. *CA Cancer J Clin* 2017;**67**:290–303.
 18. Creswell JW. *Qualitative Inquiry & Research design: Choosing among 5 Approaches*. 3rd ed. Thousand Oaks, CA: SAGE Publications; 2007.
 19. Polit DF, Beck CT. *Nursing Research: Generating and Assessing Evidence for Nursing Practice*. 9th ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2011. p768.
 20. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JGF, Coats AJS, Falk V, Gonzalez-Juanatey JR, Harjola VP, Jankowska EA, Jessup M, Linde C, Nihoyannopoulos P, Parissis JT, Pieske B, Riley JP, Rosano GMC, Ruilope LM, Ruschitzka F, Rutten FH, van der Meer P; ESC Scientific Document Group. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur Heart J* 2016;**37**:2129–2200.
 21. Macdonald S, Blane D, Browne S, Conway E, Macleod U, May C, Mair F. Illness identity as an important component of candidacy: Contrasting experiences of help-seeking and access to care in cancer and heart disease. *Soc Sci Med* 2016;**168**:101–110.
 22. Leeming A, Murray SA, Kendall M. The impact of advanced heart failure on social, psychological and existential aspects and personhood. *Eur J Cardiovasc Nurs* 2014;**13**:162–167.
 23. Berg SK, Rasmussen TB, Thrysoe L, Lauberg A, Borregaard B, Christensen AV, Ekholm O, Juel K, Svanholm JR. DenHeart: Differences in physical and mental health across cardiac diagnoses at hospital discharge. *J Psychosom Res* 2017;**94**:1–9.
 24. Gold M, Dunn LB, Phoenix B, Paul SM, Hamolsky D, Levine JD, Miaskowski C. Co-occurrence of anxiety and depressive symptoms following breast cancer surgery and its impact on quality of life. *Eur J Oncol Nurs* 2016;**20**:97–105.
 25. Knob MT. Psychosocial responses in breast cancer survivors. *Semin Oncol Nurs* 2007;**23**:71–83.
 26. Bertero CM. Affected self-respect and self-value: the impact of breast cancer treatment on self-esteem and QoL. *Psychooncology* 2002;**11**:356–364.
 27. Currie K, Strachan PH, Spaling M, Harkness K, Barber D, Clark AM. The importance of interactions between patients and healthcare professionals for heart failure self-care: a systematic review of qualitative research into patient perspectives. *Eur J Cardiovasc Nurs* 2015;**14**:525–535.
 28. Gujral DM, Lloyd G, Bhattacharyya S. Provision and clinical utility of cardio-oncology services for detection of cardiac toxicity in cancer patients. *J Am Coll Cardiol* 2016;**67**:1499–1500.
 29. Lancellotti P, Suter TM, Lopez-Fernandez T, Galderisi M, Lyon AR, Van der Meer P, Cohen Solal A, Zamorano JL, Jerusalem G, Moonen M, Aboyans V, Bax JJ, Asteggiano R. Cardio-oncology services: rationale, organization, and implementation. *Eur Heart J* 2019;**40**:1756–1763.
 30. Fradley MG, Brown AC, Shields B, Viganego F, Damrongwatanasuk R, Patel AA, Hartlage G, Roper N, Jaunese J, Roy L, Ismail-Khan R. Developing a comprehensive cardio-oncology program at a cancer institute: the Moffitt Cancer Center experience. *Oncol Rev* 2017;**11**:340.
 31. Loonen JJ, Blijlevens NM, Prins J, Dona DJ, Den Hartogh J, Senden T, van Dulmen-Den Broeder E, van der Velden K, Hermens RP. Cancer survivorship care: person centered care in a multidisciplinary shared care model. *Int J Integr Care* 2018;**18**:4.
 32. Signorelli C, Wakefield CE, Fardell JE, Wallace WHB, Robertson EG, McLoone JK, Cohn RJ. The impact of long-term follow-up care for childhood cancer survivors: a systematic review. *Crit Rev Oncol Hematol* 2017;**114**:131–138.