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**ORIGINAL RESEARCH:
EMPIRICAL RESEARCH - QUALITATIVE**

The course of readmission in frail older cardiac patients

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Abstract

Aim: The aim of this study is to explore patients' and (in)formal caregivers' perspectives on their role(s) and contributing factors in the course of unplanned hospital readmission of older cardiac patients in the Cardiac Care Bridge (CCB) program.

Design: This study is a qualitative multiple case study alongside the CCB randomized trial, based on grounded theory principles.

Methods: Five cases within the intervention group, with an unplanned hospital readmission within six months after randomization, were selected. In each case, semi-structured interviews were held with patients ($n = 4$), informal caregivers ($n = 5$), physical therapists ($n = 4$), and community nurses ($n = 5$) between April and June 2019. Patients' medical records were collected to reconstruct care processes before the readmission. Thematic analysis and the six-step analysis of Strauss & Corbin have been used.

Results: Three main themes emerged. Patients experienced acute episodes of physical deterioration before unplanned hospital readmission. The involvement of (in)formal caregivers in adequate observation of patients' health status is vital to prevent rehospitalization (theme 1). Patients and (in)formal caregivers' perception of care needs did not always match, which resulted in hampering care support (theme 2). CCB caregivers experienced difficulties in providing care in some cases, resulting in limited care provision in addition to the existing care services (theme 3).

Conclusion: Early detection of deteriorating health status that leads to readmission was often lacking, due to the acuteness of the deterioration. Empowerment of patients and their informal caregivers in the recognition of early signs of deterioration and adequate collaboration between caregivers could support early detection. Patients' care needs and expectations should be prioritized to stimulate participation.

Impact: (In)formal caregivers may be able to prevent unplanned hospital readmission of older cardiac patients by ensuring: (1) early detection of health deterioration, (2) empowerment of patient and informal caregivers, and (3) clear understanding of patients' care needs and expectations.

KEYWORDS

cardiology, caregivers, frail elderly, nurses community health, nursing, patient readmission, physical therapists, qualitative research, transitional care

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1 | INTRODUCTION

In the older population, approximately 27% of early hospital readmissions are preventable (van Walraven et al., 2011). Hospital readmissions of older cardiac patients are common and occur up to 25% of all cases (Jencks et al., 2009; Jepma et al., 2019; Krumholz et al., 2013). The risks of (re)hospitalization and the burden of the disease are high in this population (Krumholz et al., 2016). Geriatric conditions, such as functional decline, malnutrition, fall risk and cognitive impairment, contribute to this risk of readmission and the burden of the disease (Buurman et al., 2012; Covinsky et al., 2011; Dodson & Chaudhry, 2012). However, these conditions often remain unrecognized or are insufficiently treated (Dodson & Chaudhry, 2012).

To prevent adverse outcomes such as rehospitalization with frail older cardiac patients, the Cardiac Care Bridge (CCB) transitional care program was developed, based on case management, disease management, and home-based cardiac rehabilitation (Verweij et al., 2018). The intervention was provided by an interdisciplinary team of cardiac hospital nurses, community nurses and community physical therapists during hospitalization and up until 12 weeks after discharge (Verweij et al., 2018). Despite the intensive CCB program, hospital readmissions were not prevented in the studied population

in comparison with usual care (Jepma et al., submitted b). In the CCB process evaluation on intervention fidelity and experiences of involved caregivers and patients within the intervention, the CCB intervention was evaluated (Jepma et al., submitted a; Verweij et al., 2021). However, in-depth information on how the care system functioned in the course of unplanned hospital readmission and how the mechanism of the CCB program impacted individuals remained unclear and is studied in this multiple case study.

2 | BACKGROUND

Various system- and patient-related factors increase the risk of hospital readmission of frail older cardiac patients (Alyahya et al., 2016; Donaghy et al., 2018; Osnard, 2016; Riegel et al., 2009; Toles et al., 2016; Walsh et al., 2016). A conceptual framework was developed, based on these system- and patient-related factors to explore CCB patients' and (in)formal caregivers' perspectives on their role(s) and contributing factors in the course of unplanned hospital readmission, see Figure 1 and Appendix S1. We classified all factors in three main themes. First, the system-related factors, consisting of 'organizational structure' and 'transitional

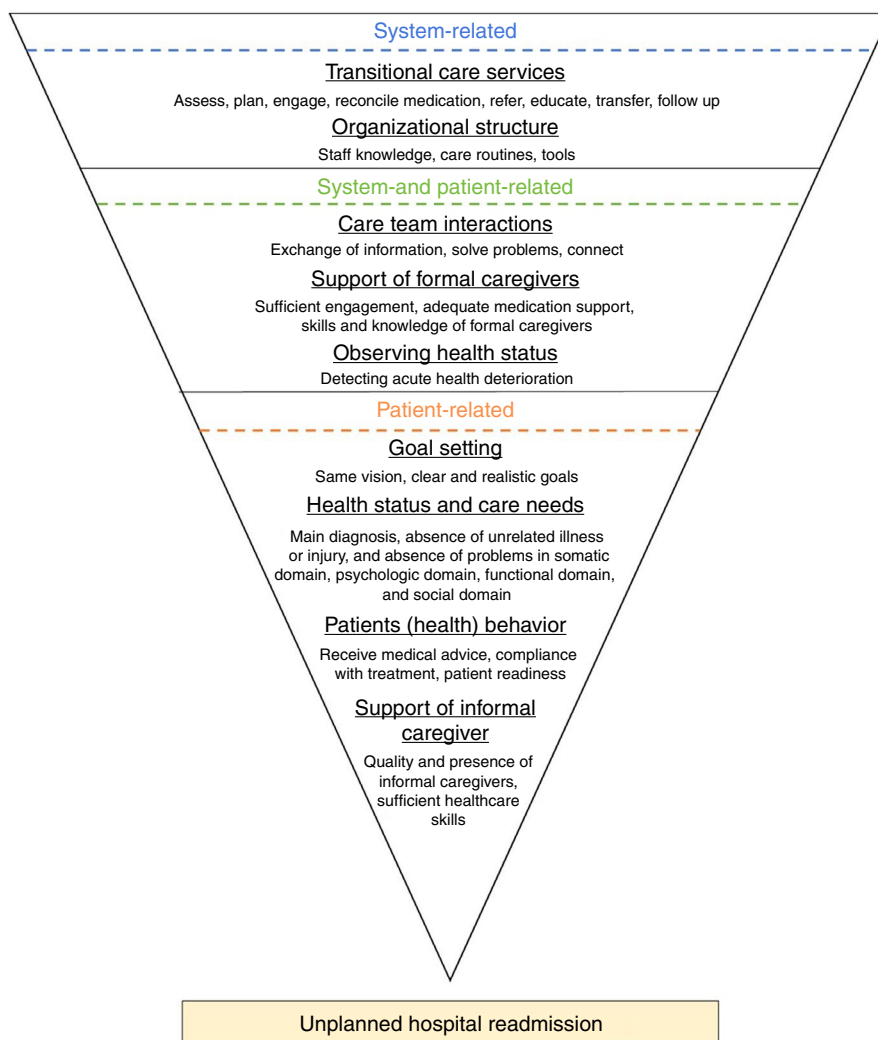


FIGURE 1 Conceptual framework of factors contributing to unplanned hospital readmission [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

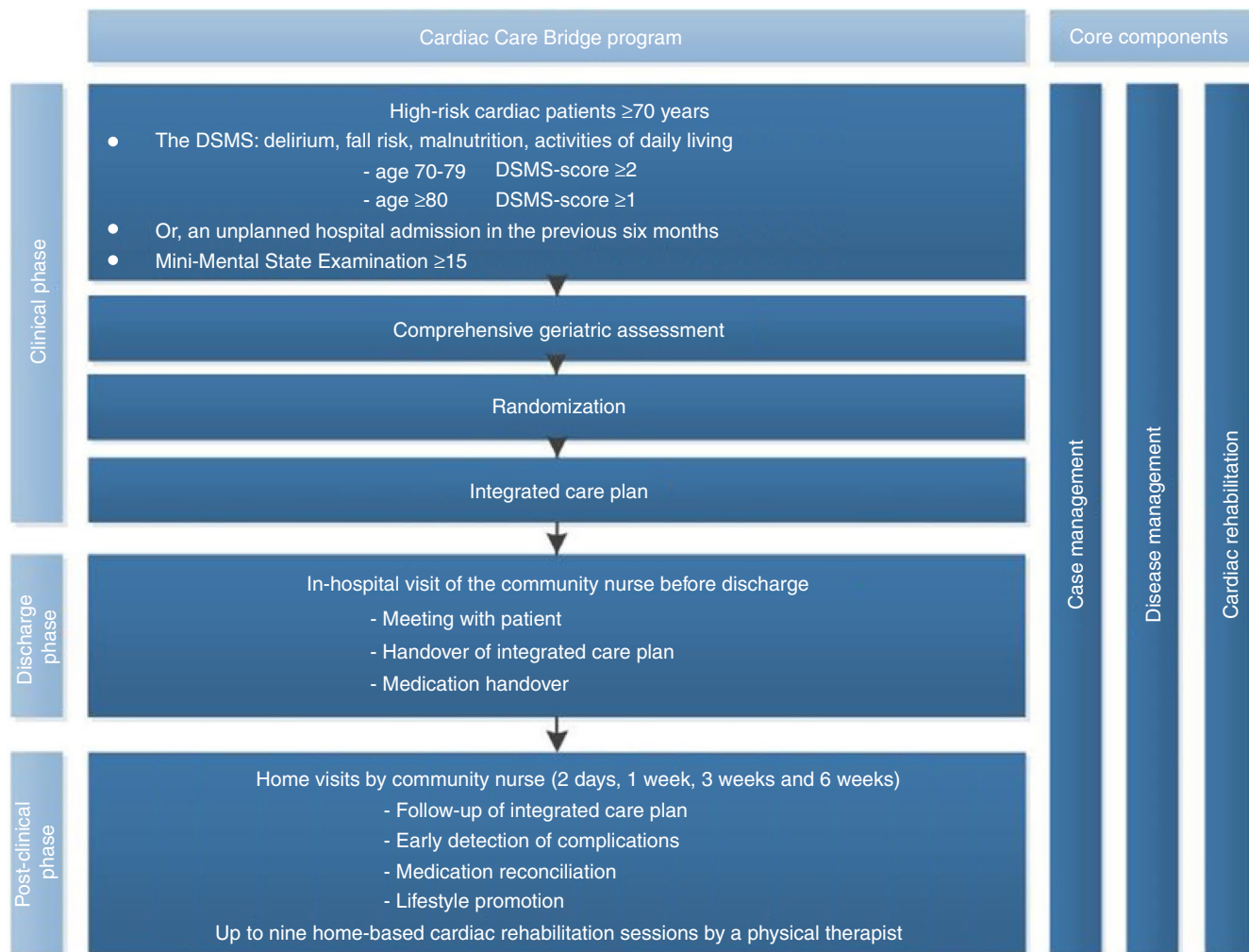


FIGURE 2 CCB transitional care program (Jepma et al., submitted b; Verweij et al., 2018) [Colour figure can be viewed at wileyonlinelibrary.com]

care services'. Second, the factors overlapping both system- and patient-related factors, consisting of 'care-team interactions', 'support of formal caregivers' and 'observation of the health status'. Third, the patient-related factors, consisting of 'goal setting', 'health status', 'care needs', 'patients' health behaviour' and 'support of informal caregiver'. This conceptual framework was used to study the functioning of the informal and CCB formal care system and the contributing factors within the course of readmission, from CCB caregivers', informal caregivers' and patients' perspectives.

3 | THE STUDY

3.1 | Aims

This study aimed to explore patients' and (in)formal caregivers' perspectives on their role(s) and the contributing factors in the course of unplanned hospital readmission of older cardiac patients in the CCB program.

3.2 | Design

We performed a qualitative multiple case study based on grounded theory principles (Baxter & Jack, 2008; Verschuren & Dooreward, 2010). This design is a valuable qualitative method for the evaluation of processes within complex interventions because evaluation takes place within a real context and with multiple sources of evidence to replicate similarities and differences across cases (Yin, 1992). Cases were analysed using multiple perspectives of (in)formal caregivers and patients through interviews and also included patients' medical records, maintained by CCB caregivers with notes on vital signs and reported events during the CCB intervention until hospital readmission.

3.3 | CCB intervention

The CCB study was a multi-centre randomized controlled trial on nurse-coordinated, interdisciplinary transitional care of frail, older (≥ 70 years) hospitalized cardiac patients. In total, 306 patients were

included in six hospitals in the Netherlands (Jepma et al., submitted b; Verweij et al., 2018). The composite primary outcome was all-cause unplanned hospital readmission and mortality within 6 months, after randomization. A detailed description of the intervention components, the TiDieR checklist and the CCB training program, are displayed in Appendices S2–S4, respectively.

In brief, the CCB program included three phases (clinical, discharge and post-clinical phase) and consisted of three core components, see Figure 2 (Jepma et al., submitted b). The clinical phase included a comprehensive geriatric assessment (CGA), conducted by a registered cardiac hospital nurse, and an integrated care plan. In the discharge phase, an in-hospital face-to-face handover with the community-based registered nurse was performed, including the integrated care plan, medication list and the medical record. In the post-clinical phase, four home visits by the community nurse were performed, focusing on medication reconciliation, a healthy lifestyle, evaluation of the care plan and early detection of physical deterioration. A pharmacist from the study group assisted the community nurses with medication reconciliation. Physical therapists provided home-based cardiac rehabilitation twice a week, with a total of up to nine visits. Full study details are published elsewhere (Jepma et al., submitted b).

3.4 | Participants

For this multiple case study, five cases within the CCB intervention group were purposefully selected based on saturation within the study (Baxter & Jack, 2008; Green & Thorogood, 2004), using the following criteria: (1) CCB intervention patients that received the CCB intervention in the post-clinical phase and were physically and mentally able to be interviewed, (2) patients had unplanned hospital readmission(s) of at least two days within 6 months after randomization in the CCB study, (3) only CCB patients included between July 2018 and April 2019 (maximum of six months before the interviews) were selected, to prevent recall bias. A representative selection for the CCB patient population with unplanned hospital readmission was approached, as most patients were diagnosed with heart failure, spread in level of frailty (DSMS) and various hospitals of inclusion and caregivers working within those regions, see Table 1 (Jepma et al., submitted b). Within each case, data collection focused on the perspectives of the patient, informal caregiver(s) and CCB formal caregivers in the post-clinical phase, and on patients' medical records. Patients and their informal caregivers were contacted and invited to participate by telephone. The CCB formal caregivers were invited by e-mail and reminded by telephone if necessary.

3.5 | Data collection

Data of each case were collected by two or three interviews, one with the patient and their informal caregiver, one with their CCB physical therapist, and one with their CCB community nurse. Between April

and June 2019, a total of 14 interviews were conducted by researcher CR. Four of the five interviews were held with the patient and informal caregiver simultaneously. One patient was unable to participate in the interview because of her poor health and hospice admission.

Semi-structured interviews were conducted using an interview guide that consisted of open questions (Gray, 2004; Green & Thorogood, 2004). Two interview guides were established, one for the patient and their informal caregiver(s) and one for the CCB formal caregivers. The interview guide was based on the conceptual framework (Figure 1) and on information from patients' medical records, which was used by CCB caregivers for registration of intervention components during the intervention in the post-clinical phase (Figure 2). The medical record reviews provided information on clinical signs of deterioration of the patient's condition and reported interventions by CCB caregivers. Based on this information, a timeline was developed, which was used during the interviews to recall the received/provided care before the unplanned readmission. Additional data on patients' baseline characteristics regarding admission, diagnosis, comorbidities, frailty measures, and the reason for the first readmission, were collected from the medical records.

The interview questions were asked conversationally, with clear questions and in direct, comforting, and simple wording. Participants were free to add important aspects to the discussion (Gray, 2004). Interviews lasted approximately 45 minutes and took place at the patients' homes or at the physical therapists' or community nurses' workplace, without the presence of third parties. The interviews were audio-recorded and (field) notes were made.

3.6 | Ethical considerations

This study has been approved by the Medical Ethics Committee of the CCB University Medical Center in CCB (Protocol ID: MEC2016_024). Informed consent was signed by the participants before the interviews (Gray, 2004). Participants were informed about the purpose of this study both orally and in written. Participants could stop at any time and they were allowed to ask for data deletion.

3.7 | Data analysis

In this study, thematic analysis was applied (Attride-Stirling, 2001; Green & Thorogood, 2004). Themes were derived from the interviews by CR and LV. Data analysis started directly after the first interview to enable adjustment of the interview guide(s) during the phase of data collection. The anonymity of the participants was guaranteed by transcribing the interviews anonymously. Six steps of data analysis were followed (Corbin & Strauss, 1998; Gray, 2004): (1) transcribing the audio records, (2) familiarization with the data, in which collecting and coding were alternated, (3) reading and re-reading; open coding was applied to identify concepts and dimensions in data, (4) axial coding, relating categories to their subcategories, (5) modifying codes, removing duplications, ordering codes hierarchically and integrating theory;

TABLE 1 Characteristics of cases and (in)formal caregivers

| | Case 1 | Case 2 | Case 3 | Case 4 | Case 5 |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Patient | Female | Male | Female | Female | Female |
| Age (years) | 89 | 91 | 81 | 81 | 88 |
| Cardiac disease | Arrhythmias and conduction disorders | Heart failure decompensation | Heart failure decompensation | Valve deficit | Palpitations |
| Comorbidity | Heart failure | COPD, diabetes mellitus | COPD, kidney failure | Heart failure, peripheral vascular disease, diabetes mellitus, hemiplegia | Heart failure, kidney failure |
| Perceived health status by formal caregivers after hospital discharge | Frail, slightly confused, excessive fatigue, limited exercise capacity | Malnutrition, weight loss, excessive fatigue, limited physical condition | Shortness of breath, nausea, limited physical condition, sudden exposing excessive fatigue | Complex health status, in the final stage of life | Severe shortness of breath, excessive fatigue, deteriorating physical condition, limited exercise capacity |
| High-risk patients DSMS-score ^a | 3 | 0 | 3 | 2 | 3 |
| Acute hospitalization within six months prior to index admission ^b | No | Yes | Yes | Yes | Yes |
| Readmission after index admission | Within 3 and 4 months | Within 5 months | Within 1, 2, 4 and 5 months | Within 1, 3, 5 and 6 months | Within 5 days |
| Reason of first readmission | Collapse | Unknown | Acute heart failure and dyspnea with COPD exacerbation | Wound infection after thromboend-atherectomy | Cardiac asthma |
| Informal caregiver | Female | Female | Female | Male | Male |
| Relationship with patient | Daughter | Wife | Daughter | Husband | Son |
| Age (years) | 61 | 86 | 58 | 86 | 60 |
| Number of informal care hours (per week) | 15 | Daily | 20 | Daily, on indication | 6 |
| CCB community nurse | Female | Female | Female | Female | Female |
| Age (years) | 64 | 41 | 50 | 50 | 54 |
| Work experience (years) | 42 | 17 | 25 | 25 | 30 |
| CCB physical therapist | Female | Female | Female | NA | Male |
| Age (years) | 54 | 51 | 60 | NA | 59 |
| Work experience (years) | 31 | 25 | 40 | NA | 15 |
| Existing care system ^c | Specialized cardiac nurse of the out-patient clinic | Regular home care, pharmacist | Regular home care, specialized cardiac nurse of the out-patient clinic | Regular home care, specialized cardiac nurse of the out-patient clinic | Regular home care |

Abbreviations: COPD, Chronic Obstructive Pulmonary Disease; DSMS, Dutch Safety and Management System (VMS veiligheidsprogramma, 2009).

^aMaximum score: 4 and patients at high risk of functional decline: ≥ 80 years DSMS-score ≥ 1 (VMS veiligheidsprogramma, 2009).

^bIncreases the risk of hospital readmission.

^cAll patients received care from the general practitioner and cardiologist.

selective coding was performed, in which core categories were integrated into theories, and (6) looking for patterns in the data. The coding process was performed in MAXQDA version 2018 (VERBI Software, 2018). The manuscript was reported according to the COREQ checklist for reporting qualitative research (Tong et al., 2007).

3.8 | Rigour

In this study, dependability was enhanced by using an interview guide, which ensured that interviews were conducted likewise (Green & Thorogood, 2004). Moreover, there were multiple data analysts during the coding process (Green & Thorogood, 2004). To provide credibility, a member check was performed during the interviews by summarizing and confirming information by participants, ensuring accuracy of the interpretation (Gray, 2004). Additionally, with all five cases, the entire spectrum of each case was evaluated from two to three various perspectives (i.e. patients' and (in)formal caregivers'). After the evaluation of the fifth case, no new information emerged from the interviews (Green & Thorogood, 2004).

4 | FINDINGS

In total, five cases were studied, including interviews with patients ($n = 4$), informal caregivers ($n = 5$) and CCB formal caregivers (physical therapists $n = 4$, community nurses $n = 5$). Of these, four interviews were performed with the patient and informal caregiver collectively, leading to a total of 14 interviews. A description of all cases and participants is presented in Table 1.

Three main themes were derived from the data:

1. (in)formal caregivers' involvement in adequate observation of patients' health status to prevent rehospitalization;
2. patients' care support from (in)formal caregivers;
3. the (functioning of the) CCB transitional care program within the existing (in)formal caregivers system.

4.1 | Theme 1. (In)formal caregivers' involvement in adequate observation of patients' health status to prevent rehospitalization

Within this theme, a few important issues were reported. First, regarding the response to health deterioration, and second, about the (un)avoidability of readmissions.

4.1.1 | Response on health deterioration

In cases 3 and 4, the patient's health status was poor and complex due to comorbid diseases and an advanced state of their cardiac

disease (Table 1). In these cases, both CCB caregivers mentioned that they observed clinical deteriorations during home visits.

It is always the same type of problem, (...) or it is because of the kidneys that do not work well. Then (...) she is unable to take diuretics properly, which means she decompensates again. Then she has atrium fibrillation, which is not under control (...) and then it's the hypoglycemia again. (CCB community nurse case 4)

In some cases, home visits by CCB caregivers enabled timely observation and adequate response to the deteriorating health signs. In case 4, the CCB community nurse noticed hyperglycemia and urinary incontinence during a home visit and brought a urine sample to the general practitioner. Renal failure was diagnosed, as well as decompensation of heart failure, which resulted in hospital readmission. In case 3, the CCB community nurse observed that the patient experienced shortness of breath and the patient felt that she 'walked on cotton'. Due to these observations, outpatient intravenous diuretic therapy was arranged, and hospital readmission was prevented. Later in this case, the patient experienced a high heart rate during a home visit and the CCB physical therapist alarmed the physicians. This resulted in readmission for atrial fibrillation.

In the other three cases (1, 2 and 5), the CCB caregivers indicated that they did not observe health deteriorations during the home visits, except for the occasional 'off day'. During these days, patients felt tired, were short of breath or had flu-like symptoms. CCB caregivers interpreted this as fluctuations reflecting patients' vulnerability.

You saw progress again, except for a single off day. That is what everyone can have of course. (CCB physical therapist case 1)

The CCB caregivers were not involved in observing the health deteriorations that led to readmission(s), but the informal caregiver, general practitioner or regular homecare nurses were involved instead.

Timely observation of health deterioration was complicated according to CCB caregivers because of their acute occurrence and since they were not involved on a daily basis. The low frequency of home visits limited continuity of care and, therefore, early detection of health deterioration lacked in some cases.

...that is difficult, health deterioration or problems in medication adherence would be better observed when you would come every day. (CCB community nurse case 2)

In case 1, the CCB community nurse reported that she noted an increase in blood pressure in the week before readmission. Figure 3

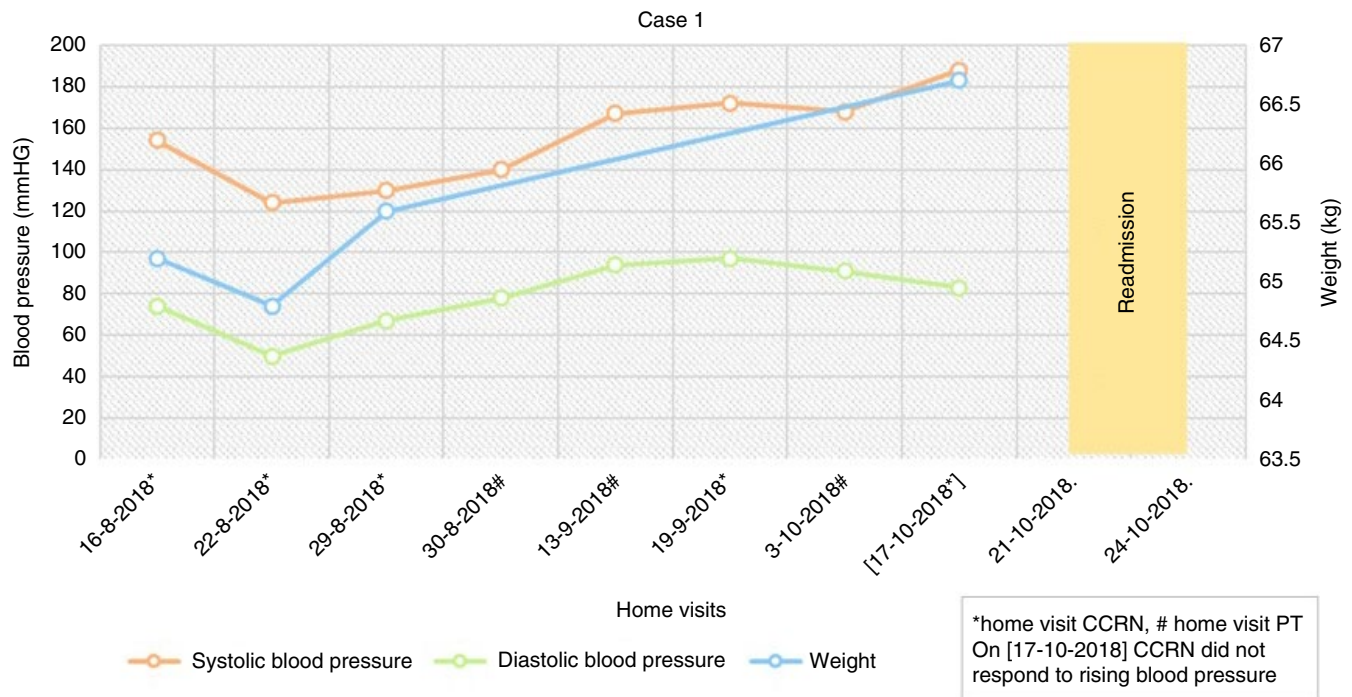


FIGURE 3 Blood pressure (left) and weight (right) of case 1, as measured by the CCB community nurse (*) or CCB physical therapist (#) during home visits [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.com)]

shows a rising systolic blood pressure in the days before readmission. However, the CCB community nurse reported that she observed an improved clinical condition and did not feel the urge to act. The vital signs and weight curves during home visits in the other cases are displayed in Figures S1–S4.

Health observations and vital signs were not consistently reported in the CCB medical record during home visits. Therefore, the course of the patients' health might not always be properly observed and interpreted. This may have influenced the observation of early signs and symptoms of deterioration and this lack of continuity of care could have contributed to unplanned hospital readmission. A reason mentioned by the CCB caregivers is the administrative burden of double registration.

4.1.2 | (Un)avoidability of the readmissions

Despite the above-mentioned factors of influence, patients, informal caregivers and CCB formal caregivers in cases 1, 2, 4 and 5 mentioned that they were convinced that the readmissions were unavoidable due to the frail patient's situation, the level of the disease and present comorbidities. Patients' health status deteriorated suddenly and the CCB caregivers could not always observe this process in time.

You cannot always prevent that. Uhm... that's just how it is. Sometimes you cannot really see it coming, especially if they become short of breath. (CCB community nurse case 5)

In all five cases, the informal and formal caregivers reported that they expected a future readmission. The patient and informal caregiver in case 2 mentioned that it was patient's frailty status ensuring that the readmission was unavoidable. In case 4, the readmission was experienced as unavoidable because of the patient's advanced stage of heart failure. After the readmission, a palliative care process was started. In case 5, the patient stated that she thought that she was discharged too early, and was readmitted five days after discharge.

Patient: "No, the readmission could not have been prevented".

Informal caregiver: "No, you strictly adhere to the nutrition and fluid restrictions, it's just your vulnerability". (Case 2).

4.2 | Theme 2. Patient care support from (in) formal caregivers

Within this theme, the support of the CCB formal caregivers and informal caregivers are discussed in relation to the course of readmission. In some cases, the collaboration between CCB caregivers, informal caregivers and patients went well; in other cases, discrepancies in care expectations occurred.

4.2.1 | Support of the CCB community nurse

In case 3, the CCB formal caregivers focused on the patients' confidence and trust regarding their health status. The CCB community nurse reported that patients gained trust when clinical parameters

like the blood pressure were measured. Additionally, she motivated the patient on energy management and early symptom recognition in daily circumstances. In case 4, the CCB community nurse specified that she performed additional home visits because of the patient's deteriorated health status. The medication prescription changed frequently, which needed close monitoring due to the influence on e.g. the blood pressure. In these cases, the CCB community nurse and patient had a good care-related relationship and adequate care support was provided. In the other cases (1, 2 and 5), the CCB community nurses experienced that they could not contribute to the patients' care needs on top of the actively involved informal caregivers and well-functioning regular home care. It was difficult for them to apply motivational techniques, for example, the CCB community nurse of case 1 hoped to contribute by providing information and motivating the patient and informal caregivers, she could not find the opportunity.

There was no regular home care involved (...) I tried to arrange this (...). I tried to do it, but the family did not want regular home care. (CCB community nurse case 1)

In case 2, the CCB community nurse reported that the patient and informal caregiver were very independent and therefore, her care tasks were less necessary. Except for the recommendation to consult a dietician because of malnutrition, the CCB community nurse did not feel that further support was necessary. Patients' and informal caregivers' needs were focused on empowerment and advice instead of 'hands-on acting'.

4.2.2 | Support of physical therapist

In case 1, the role of the CCB physical therapist was to support the patient in achieving their goals to extend the functional capacity by exercising, and she instructed the informal caregivers on how to support the patient with exercises. In case 2, the physical condition was limited and the motivation to exercise lacked. The CCB physical therapist mentioned that she regularly walked outside with the patient, encouraged the neighbours to go for a weekly walk and stimulated home-trainer exercising.

I have regularly went outside with him. (...) I asked the neighbours to go for a walk with him. (...) I tried to stimulate home-trainer exercises to see if I can find some intrinsic motivation, without imposing on him. (CCB physical therapist case 2)

In cases 3 and 5, patients felt that they had different expectations of the home-based rehabilitation program than the CCB physical therapist. These CCB formal caregivers adhered firmly to the CCB protocol by providing the physical exercises that were suggested and patients did not sufficiently emphasize their goals. However, this situation

affected the mutual relationship and resulted in the refusal of the rehabilitation program.

The PT can come by (...) but I won't do any exercise (...) let me sit comfortably and I walk to the toilet and walk to the bedroom (...) and it all works out. (Patient case 5)

4.2.3 | Support of informal caregivers

In most cases (1, 2, 3 and 4), the informal caregivers lived nearby and were involved in noticing health deteriorations.

I am the one who can quickly notice health deteriorations and if I am aware of the criteria, then it is okay. (Informal caregiver case 2)

In these cases, the informal caregivers were involved on a daily basis. The informal caregivers in case 1 had a medical background, provided support by monitoring the patients' blood pressure, and stimulated physical activity by walking outside together. However, the informal caregivers experienced informal care as stressful and burdensome. In case 2, the formal CCB caregivers mentioned that the informal caregiver was proactive, observed the patients' health status and arranged healthcare needs. However, her own health often came second. In cases 3 and 4, the informal caregivers experienced physical limitations that impeded their ability to provide care support.

4.3 | Theme 3. The (functioning of the) CCB transitional care program within the existing (in) formal caregivers system

Within this theme, the collaboration between CCB caregivers and the existing caregivers' network is discussed to explore the CCB caregivers' role within the course of readmission. An important finding within this theme is that during the transitional care intervention, the CCB caregivers were not contacted by patients, informal caregivers or other involved formal caregivers in case of health deterioration. Patients and informal caregivers preferred to contact formal caregivers in the existing network.

4.3.1 | Collaboration between CCB caregivers and the existing caregivers' network

CCB caregivers expressed that they sometimes experienced difficulties in recognizing their contribution to the existing care system, which resulted in their withdrawal from some cases. In cases 2, 3 and 4, the CCB community nurses did experience the value of their contribution, which positively influenced the continuity of care. They had contact with other involved healthcare providers (e.g. regular

homecare services, general practitioner, specialized cardiac nurse) in case of health deterioration and new medication regimes, and discussed adjustments in the care plans. In case of health deterioration, communication went via the existing network and the CCB community nurses were not informed by this network. According to the CCB community nurse, this was a logical route and ensured a good distribution of roles and clear expectations.

In those days you are not there and (...) at once the health status declines and (...) if you are just not visible at that time then (...) she will not call me, she did not. (CCB community nurse case 3)

In the other two cases (1 and 5), the CCB caregivers mentioned they did not have care-related contact with other formal caregivers due to an already good functioning existing caregivers network. This resulted in a feeling of redundancy of the CCB formal caregivers and reluctance to provide CCB care. In all four cases with both CCB caregivers involved, there was limited communication and interaction between the CCB community nurse and CCB physical therapist about the case. They reported that communication was not always necessary, and they were usually (i.e., outside CCB intervention) not used to these interactions. However, this lack of (interdisciplinary) collaboration and communication influenced the continuity of care.

I think the communication with other caregivers could be uh... better. There is no extensive reporting in patients' logbooks of things that have been done or should be monitored. (CCB community nurse case 2)

5 | DISCUSSION

This multiple case study explored patients' and (in)formal caregivers' perspectives on their role(s) and contributing factors in the course of unplanned hospital readmission of older cardiac patients in the CCB program. Three main themes emerged from our analysis, (1) (in) formal caregivers' involvement in adequate observation of patients' health status to prevent rehospitalization, (2) patients' care support from (in)formal caregivers, and (3) the (functioning of the) CCB transitional care program within the existing (in)formal caregivers' system. The outcomes of this study can contribute to the optimization of care processes for older cardiac patients.

Although involved CCB caregivers mentioned that some unplanned readmissions were unavoidable in the cases reported, they also mentioned that their early observations in other cases prevented unplanned readmissions. The findings within the first theme suggest that early observation of health deterioration could lead to adequate response from (in)formal caregivers, which potentially prevents unplanned hospital readmission or further deterioration (Farmakis et al., 2015). Pattern recognition of the clinical course by vital sign measurements and the intuition of (in)formal caregiver(s) are important contributors to the prevention of unplanned readmission (Odell

et al., 2009). For example, weight gain is a strong predictor for health deterioration and hospital readmission of patients with heart failure (Chaudhry et al., 2007; Engelfriet et al., 2009). However, CCB caregivers reported they were not always able to adequately observe health deterioration due to the low frequency of home visits and inadequate reporting of vital signs due to the administrative burden. In patients with a risk of health deterioration, the continuity of care can be improved by continuously observing the clinical course with the use of home-based telemonitoring (Farmakis et al., 2015; Park et al., 2019). This method could provide formal caregivers with the daily real-time vital signs data that are needed to outline the clinical course and adequately respond (Antonicelli et al., 2008; Fairbrother et al., 2014; Kitsiou et al., 2015; Park et al., 2019). However, this requires the involvement of patients and informal caregivers, particularly when it comes to measuring weight. Additionally, formal caregivers need to be able to quickly respond to changes in vital signs. Telephone follow-up might also be a solution, since that has proven to be effective in reducing unplanned readmissions when added to standard care (Harrison et al., 2011).

Support of (in)formal caregivers is of great importance to avoid unplanned hospital readmission of cardiac patients (Donaghy et al., 2018; Walsh et al., 2016). The main findings within the second theme, 'patients' care support from (in)formal caregivers', showed that informal caregivers often have the opportunity to observe health deterioration at an earlier stage than formal caregivers. However, due to their own physical or mental limitations and a lack of medical knowledge, informal caregiver support was also experienced as complicated. Although patient and informal caregiver empowerment is an important professional skill, CCB caregivers were not always able to adequately apply this in the studied cases. A possible explanation could be the limited integration of patient and informal caregiver empowerment within the CCB training program, which showed to be effective regarding readmission of heart failure patients (Krumholz et al., 2002). Furthermore, some CCB formal caregivers adhered firmly to the CCB protocol, i.e. by conducting home visits strictly according to the protocol and providing the physical exercises that were suggested. In some cases, this led to differences in expectations between CCB caregivers, informal caregivers, and patients. Some patients were not always willing to fully participate in the CCB program as they e.g. refused to participate in the home-based rehabilitation and did not always clearly emphasize their goals (Jepma et al., submitted a; Verweij et al., 2021). To align with the patients' goals, motivational interviewing techniques were integrated into the CCB training program. Motivational interviewing focuses on patients' willingness and confidence to change behaviour, enables formal caregivers to empower patients, and contributes to the prevention of unplanned hospital readmission (Knight et al., 2006; Riegel et al., 2016; Vanbuskirk & Wetherell, 2014). Although CCB caregivers were trained in motivational techniques, it remained difficult to support patients in formulating their goals.

The main findings within the third theme, '(functioning of the) CCB transitional care program within the existing (in)formal caregivers system', suggest that the limited integration of the CCB transitional care

service within the existing (in)formal caregivers system could have hampered the continuity of care. In some cases, adequate interdisciplinary collaboration and communication were observed and resulted in a perceived optimal continuity of care and clear communication routes. However, some CCB caregivers felt they could not optimally provide CCB care because of experienced resistance of other (in)formal caregivers. Instead of adding up to the existing care system, the CCB caregivers sometimes withdrew from the case because they felt redundant. It is important to focus on the optimal integration of CCB care within the existing care systems, based on patients' needs and in adequate collaboration with other (in)formal caregivers to optimize continuity of care and prevent unplanned hospital readmission.

Although CCB caregivers mentioned that some of the unplanned hospital readmissions were unavoidable due to an advanced stage of the disease, the burden of hospitalization is high due to the risk of adverse events (Brennan et al., 2004). Alternative care programs such as 'hospital care at home' can be an alternative to avoid adverse events associated with hospital readmission (Shepperd et al., 2016). Additionally, some of the studied cases might benefit from interventions that merely focus on improving the quality of life rather than improving physical health, which might still reduce unplanned hospital readmission (Jepma et al., submitted b). Palliative care principles can improve the quality of life of heart failure patients (Rogers et al., 2017; Sidebottom et al., 2015). In addition to contemporary heart failure management, a palliative care nurse can be involved to combine palliative care goals with the goal of improving heart failure symptoms (Rogers et al., 2017).

5.1 | Limitations

Some issues should be considered for the interpretation of the current study results. First, due to the thoroughness of the multiple case study design, only five CCB intervention cases with unplanned readmission have been included. However, these cases are considered representative for the population of CCB patients with unplanned hospital readmission, as they were selected to represent the diversity of living environments, socioeconomic status, and formal caregivers among patients. Second, the interviewed patients and their (in)formal caregiver network sometimes experienced difficulties in remembering details regarding their care process. Multiple caregivers were often involved, which made it difficult for patients to remember specific situations. Additionally, not all CCB caregivers reported their care activities comprehensively in the medical record, which complicated the reconstruction of particular situations. To avoid recall bias by patients and (in)formal caregivers as much as possible, we included cases with a maximum of six months after randomization in the CCB study. Furthermore, for each case, a personal timeline of events was made to help the participants recall the situation. Finally, no formal caregivers from the existing care systems have been interviewed, which could have contributed to an even broader perspective.

However, by performing two to three interviews from different perspectives per case, we triangulated the case-specific information, and the accumulated information contributed to a broad perspective.

6 | CONCLUSION

In this multiple case study on the perspectives of patients and (in)formal caregivers on their role(s) and contributing factors in the course of unplanned hospital readmission of older cardiac patients in the CCB program, we found that early detection of a deteriorating health situation is often lacking, while formal caregivers are not always present at the right time. The focus of care should merely be on the empowerment of patients and informal caregivers, since they have the potential to fill the gap between home visits. Moreover, collaboration and communication between caregivers must be optimized to enable continuity of care. Additionally, CCB caregivers experienced difficulties in providing care within the existing caregivers' system. Within the CCB program, patients were not always easily motivated to participate in the home-based program, often due to contrasting care expectations and the lack of patient's goals. In some cases, the advanced stage of disease could have influenced the lack of goal setting and the feeling that some of the unplanned hospital readmissions were unavoidable. From this perspective, the CCB program should be reconsidered for individual patients. Our findings provide considerations for future intervention (re)design and the target population.

CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*):

1. substantial contributions to conception and design, acquisition of data or analysis and interpretation of data;
2. drafting the article or revising it critically for important intellectual content.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

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

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