

The Cardiac Care Bridge Transitional Care Program; *A Mixed Method Process Evaluation*

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List of abbreviations

CCB	Cardiac Care Bridge
CCRN	Community Care Registered Nurses
CGA	Comprehensive Geriatric Assessment
CRN	Cardiac Research Nurses
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LV	L. Verweij. <i>ACHIEVE, Center of Applied Research, Amsterdam University of Applied Sciences, Amsterdam, the Netherlands.</i>
MRC	Medical Research Council
MRCPE	Medical Research Council Process Evaluation framework
MT	M.S. Terbraak. <i>ACHIEVE, Center of Applied Research, Amsterdam University of Applied Sciences, Amsterdam, the Netherlands.</i>
NPT	Normalization Process Theory
PT	Community Care Physical Therapists
RCT	Randomized Controlled Trial

Abstract

Title The Cardiac Care Bridge Transitional Care Program; A Mixed Method Process Evaluation

Background The Cardiac Care Bridge (CCB) intervention was designed to reduce unplanned readmission and mortality within six months after hospital admission, for frail cardiac patients of ≥ 70 years. The Medical Research Council Process Evaluation framework (MRCPE) provides guidance to assess contextual factors, implementation success and mechanisms of impact.

Aims The first aim was to assess the level of treatment delivery, by fidelity, dose, and reach. The second aim was to gain insights in the caregivers' experience with the delivery of the CCB intervention. By gaining insight in the contextual factors, implementation success and mechanisms of impact from the MRCPE.

Methods A mixed-method concurrent qualitative dominant design was conducted, with a retrospective descriptive design for the quantitative part, using self-reported logbooks. An interpretive descriptive design, using semi-structured interviews with the caregivers (nurses and physiotherapists) for the qualitative part.

Results Delivery rates ranged from 13.7% to 91.9% per key-element. One patient received all key-elements. Caregivers expressed strong beliefs in the effectiveness of the CCB intervention but experience some barriers in providing the key-elements. Expressed barriers were related to lack of insights in the added value of key-elements, time limitations and planning issues. The motivation of the patients had a large influence on providing care during home-visits.

Conclusion The CCB intervention is currently not completely provided as intended, but caregivers strongly believe in the intervention. They are confident that this intervention can contribute to the patients' wellbeing and prevents adverse events like readmissions.

Recommendations The research-team should apply targeted implementation strategies during the study period to increase the level of adherence to the protocol by the caregivers. A secondary qualitative analysis guided by the Normalization Process Theory could contribute to a better understanding of the normalization level of the CCB intervention.

Key words; Process evaluation, complex intervention, cardiology, frail elderly, transitional care

Nederlandse samenvatting

Titel Het Cardiologische Zorgbrug programma, een procesevaluatie met gelijktijdige verzameling van kwantitatieve en kwalitatieve data.

Achtergrond De Cardiologische Zorgbrug (CZB) interventie is ontwikkeld om ongeplande heropnames en mortaliteit, binnen zes maanden na ziekenhuisopname, bij kwetsbare cardiologische patiënten van ≥ 70 jaar te voorkomen. Een procesevaluatie raamwerk van de Medical Research Council (MRCPE) is gericht op contextuele factoren, implementatie succes en de elementen die de meeste impact hebben.

Doel Het eerste doel is om in kaart te brengen in welke mate de interventie werd geleverd, door de mate van opvolgen van het protocol, geleverde dosis en het bereik te onderzoeken. Het tweede doel was de ervaringen van zorgverleners met de CZB-interventie te onderzoeken. Vormgegeven aan de hand van het MRCPE, gericht op context, implementatie en elementen met de meeste impact.

Methode Een gemixte opzet met een gelijktijdige verzameling van data werd gebruikt, met een retrospectieve beschrijvende methode, middels zelf-gerapporteerde logboeken voor het kwantitatieve deel. Voor het kwalitatieve deel is een interpretatieve beschrijvende methode, middels semigestructureerde interviews met zorgverleners (verpleegkundigen en fysiotherapeuten) gebruikt.

Resultaten De mate van geleverde zorg varieerde van 13.7% tot 91.9% per element. Eén patiënt ontving alle elementen. De zorgverleners hebben vertrouwen in de effectiviteit van de CZB, maar ervaren barrières in het leveren van sommige elementen. De genoemde barrières zijn inzicht in de toegevoegde waarde, de planbaarheid en tijdrovendheid van een element. De motivatie van de patiënten had grote invloed op het leveren van de zorg thuis.

Conclusie De CZB-interventie wordt op dit moment niet volledig geleverd zoals bedoeld, maar de zorgverleners hebben veel vertrouwen in de interventie. Ze zijn ervan overtuigd dat deze interventie kan bijdragen aan de gezondheid van de patiënt en aan het voorkomen van nadelige complicaties zoals heropnames.

Aanbevelingen Het onderzoeksteam van de CZB zou een gerichte implementatiestrategie kunnen inzetten om de geleverde zorg te verhogen.

Sleutelwoorden; Procesevaluatie, complexe interventie, cardiologie, kwetsbare ouderen, transmurale zorg

Introduction

Worldwide the number of elderly (≥ 65 years) is expected to increase with more than 60% in 15 years. In 2030 about 12% of the population will be older than 65.¹ In the Netherlands, 17.8% of the population were elderly in 2016.² This percentage is expected to rise to 23.8% in 2030.³ In the Netherlands, most hospitalizations are in patients between 65 and 70 years of age. Of all patients 9.8% are readmitted within 30 days, these readmissions costs €10 to €25 million per hospital per year.⁴⁻⁶ Many elderly suffer from cardiac disease, such as heart failure, rhythm disorders and valve problems.⁷ Cardiac patients are getting older as well, due to increasing treatment possibilities. Older cardiac patients are at risk of readmission or mortality within 30 days of discharge.⁸⁻¹¹

Because of the high risk of readmission and mortality in elderly cardiac patients, the Cardiac Care Bridge (CCB) intervention was developed.⁹ The Medical Research Council (MRC) for complex interventions was used to develop the CCB intervention.¹² After developing and piloting, Verweij & Jepma¹³ are currently assessing the effectiveness of the CCB program in a randomized controlled trial (RCT). RCT's provide information about the effectiveness, but lack in providing information about why and how the intervention works.¹⁴

Process evaluations contribute to insights in causal assumptions, actual implementation success, contextual factors and mechanisms of impact.¹⁵ The MRC developed a framework for process evaluation (MRCPE).¹⁵ The MRCPE describes three key functions of process evaluation: Context, implementation and mechanism of impact.^{15,16} The key function implementation consists of fidelity, dose, reach and adaptations. The goal of a process evaluation study is to gain insights in the actual delivered care.¹⁷⁻²¹ In this case the actual delivered items of the CCB intervention. This is important to understand and interpret the outcomes of the RCT. The MRCPE recommends process evaluation to take place before reporting the findings of a trial to prevent bias.¹⁵ After the findings of the trial are known it is important to relate them to the process evaluation outcomes. To our knowledge, currently only four trials reported these data^{14,22-24}

Aim

The first aim was to assess the level of treatment delivery, by fidelity, dose, and reach. The second aim was to gain insights in the caregivers' (Cardiac Research Nurses(CRN), Community Care Registered Nurses(CCRN), physical therapists(PT)) experiences with the delivery of the CCB intervention. By gaining insight in the context, implementation, and mechanism of impact from the Medical Research Council Process Evaluation framework.

Methods

Process evaluation design

The goal of a process evaluation is to gain insight in the actual delivered care.^{17–21} A mixed-method concurrent qualitative dominant design was conducted alongside the CCB study, using an interpretive descriptive design for the dominant qualitative part of this study.^{15,25} For the quantitative part a prospective descriptive design was performed on the collected process evaluation data from the CCB trial.²⁵ The process evaluation is embedded in the CCB trial, a two-arm RCT where patients receive or do not receive a 6-week transitional care program. In total 500 patients will be included. Patients are recruited in six hospitals in or surrounding Amsterdam, the Netherlands. The primary outcome is unplanned readmission or mortality within six months post-randomization. The full study design is described in the study protocol.¹³

The CCB intervention

The CCB intervention is developed for patients of 70 years and older, admitted to a hospital for a cardiac condition. Patients have to be at risk of functional decline according to the screening instrument for frail elderly of the Dutch Safety Management Programme^{9,13,26} or had an unplanned hospital admission in the previous six months.^{27,28} The CCB intervention consists of three phases with several evidence based interventions.^{9,13} A logic model containing nine key-elements was provided to describe the intervention and its causal assumptions ([Table 1](#)).

The clinical phase consists of a comprehensive geriatric assessment (CGA)^{29,30} conducted by a CRN, a CGA-based integrated care plan²⁹, and a geriatric consult if indicated. In the discharge phase a face-to-face handover³¹ with the CCRN is performed. Four home-visits from the CCRN take place, focusing on medication reconciliation^{32–34}, promotion of life-style^{33,35} and self-management. A CCB pharmacist assists the CCRN in the medication reconciliation and advises in case of medication side-effects. PT's offer a home-based^{36–38} cardiac rehabilitation programme^{39,40} of one to two visits per week, with a total of 9 visits spread over six weeks.^{9,13}

Insert [Table 1](#)

Population

Quantitative

Patients included in the CCB intervention arm are cardiac patients, aged ≥ 70 years, who were at risk of functional decline after hospitalization. Details of the inclusion criteria are described in the study protocol.^{9,13}

Qualitative

Interviews were conducted with CRN's, CCRN's and PT's. A CRN is a research nurse from the CCB research team (CRN CCB) or a nurse working in a participating hospital. Caregivers were eligible to participate after delivering CCB care to at least one patient, selected purposeful, from different regions, and on the number of patients treated.^{15,25}

Data collection

The different data sources per MRCPE concept are described in [Table 2](#). An integration of the quantitative and qualitative measures was provided in the outcome implementation.

Insert [Table 2](#)

Quantitative

Delivered care items from the self-reported logbooks (registered by caregivers) were collected.

Implementation

Fidelity was defined as CCB-care delivered as intended.⁴¹⁻⁴³ Dose delivered was calculated in total, per phase and per key-element. Reach was calculated to gain insights in the number of patients who received the CCB intervention related to the patients who declined parts of, or dropped out of the CCB intervention.⁴⁴

Qualitative

Data collection consisted of semi-structured expert interviews with the caregivers, who were conducted between November 2016 and April 2018. PT's were interviewed by MT, the other caregivers by DS. The topic list was developed based on the MRCPE^{15,16}, previous unstructured focus-groups and the logic model ([Table 1](#)). The first question asked was 'how do you experience providing CCB care at this time?' Main topics were feasibility, adaptations, time-management, barriers, facilitators, and sustainability.

Context

Gain insights in the influence of contextual factors in providing CCB care.

Implementation

The caregivers were asked to provide information on adaptations, considerations for adaptations, and participants' reasons for withdrawal.

Mechanism of impact

To understand how the CCB intervention works, the interactions between participants and the delivered care needs to be examined.¹⁶ The caregivers were asked how patients' respond to the different elements of CCB care.

Data analysis

Quantitative

Data was analyzed using IBM SPSS Statistics version 23 (Armonk, New York, USA).

Descriptive statistics were calculated for fidelity, dose, and reach. Outcomes were presented in numbers, percentages, and flowcharts. Missing data from logbooks were registered as unknown and interpreted as care not delivered. In case of loss to follow up due to death or withdrawal no follow-up was performed.

Qualitative

The analysis followed the phases of thematic analysis, a six phase guidance to systematically analyze qualitative data, resulting in an overview of relevant themes.^{45,46} The software program MAX-QDA 12 Standard (Berlin, Germany) was used for the analysis process.⁴⁷ Two members of the research team, LV and DS, independently started with open coding. After every two interviews coding was compared and differences were discussed to reach consensus. Another researcher (IB) was asked to read the second transcribed interview to provide feedback on the interview questions and interview skills.⁴⁸ During and at the end of all interviews a verbal summary on the main topics was provided to the participants.

After the collection of both data arms interpretive integration was used to compare the two types of findings.

Procedures

Quantitative

Participants from the CCB study all provided informed consent to participate in the CCB study, including the use of data for process evaluation.

Qualitative

Invitation emails were sent to eligible caregivers. The interviews took place at a location preferred by the caregivers. Both researchers (DS and MT) performed a pilot interview, in which another researcher observed. DS received a two-hour training, provided by Utrecht University, before conducting interviews, MT received no interview training. DS and MT knew some of the caregivers, but there was no dependent relationship. Written informed consent was obtained from all caregivers. The interviews were audio-recorded and transcribed verbatim. During the interview methodological memos were made, which provided information about questions with good or little response, to adjust the topic list.⁴⁸

Ethical issues

The study met the ethical principles of the World Medical Association Declaration of Helsinki. The researchers protected the privacy, dignity, and health of the participants. Data is stored

in the secure environment of the Amsterdam Medical Center. Ethical approval for the CCB process evaluation was provided by the Medical Ethics Committee of the Amsterdam Medical Center (Protocol ID: MEC2016_024).

Results

Participants

At the point of analysis 51 logbooks were included in this process evaluation ([Figure 1](#)). Seventeen caregivers were interviewed.

Demographic data

Most caregivers were female (16, n=17). Median age was 37 years (range: 23-62), with a median of 20 (range: 1–41) years of experience ([Table 3](#)). All approached CRN's CCB and PT's participated, three out of five CRN's participated and five out of twelve CCRN's participated in the interviews.

Findings

Interviews lasted 26 to 65 minutes (median 44). The main themes derived from the interviews with the caregivers were: organizational preconditions, multi-disciplinary collaboration, belief in the effectiveness of the program, time-management, and influence of patient characteristics. Quotes are presented in [Table 4](#).

Insert [Figure 1](#), [Table 3](#), and [Table 4](#).

Context

Factors that possibly affected implementation and intervention mechanisms were present in the themes organizational preconditions and multi-disciplinary collaboration.

Organizational preconditions

The CRN's had concerns regarding privacy of patients. The questions in the CGA were experienced as sensitive. Most hospital rooms are not private, and the possibility to take the patients apart wasn't always present (Q1).

Most of the CRN's were not working on wards where patients were included, which gave them the feeling of being a guest at the ward. The CRN's have limited access to consult other disciplines. The nurses working at the wards are usually busy, and the CRN's do not want to consult other discipline(s) without first discussing it with the nurses. The added value of consulting a geriatric nurse/physician or a physical therapist is not always known by the CRN's (Q2), therefore this item is skipped. Besides CRN's CCB struggle with differences in patient files to find the information needed.

In all hospitals there is a lot of pressure to discharge patients as soon as possible. This is experienced as a barrier in planning the face-to-face handover (Q3).

All caregivers mentioned double registration as a barrier, regarding the registration of care in the logbook and for their own organization.

Multi-disciplinary collaboration

The caregivers were not completely aware of the contributions of each other within the CCB intervention, for instance some CRN's did not know how a PT could contribute.

The CCRN's valued collaborating with the CRN's, and vice versa. The face-to-face handover was experienced as a good way to get to know each other, and to achieve a faster way to communicate. The CCRN's increased their collaboration with nurse-specialists, general practitioners, or outpatient clinics. The CCRN's thought that the integrated care plan, was not always appropriate for the situation at home. Most CCRN's did not prepare new care plans but adjusted the goals in deliberation with the patient. The collaboration between the PT and the CCRN was valuable in motivating patients. The intensity of collaboration differed between regions, all caregivers mentioned ways to communicate, to discuss the current care plan or condition of the patient (Q4).

Implementation

Relevant themes that occurred in the interviews regarding implementation were: belief in the effectiveness of the study, time management and influence of patients' characteristics.

Fidelity

In this paragraph the results from the interviews were compared to the CCB protocol, to evaluate if care was delivered as intended. Relevant findings were described.

Belief in the effectiveness of the study

CRN's think that taking time for the patient in the hospital and assessing geriatric problems is a good intervention for this frail population. They felt that time to sit down with the patient was something that patients valued most. All CRN's found the intervention useful, they think the most important part of the intervention is that patients receive care from the CCRN after discharge. The belief in the added value of the face-to-face handover was a common statement. Therefore, some CRN's and CCRN's tried everything to perform the face-to-face handover.

The most important element according to the CCRN's was the medication reconciliation. Most CCRN's felt like they had prevented adverse events such as readmissions, because of

recognizing early signs of heart failure, or other conditions (Q5). The PT's noticed an increase in physical condition over time.

Time management

Scheduling the CGA was difficult due to several time-related reasons. For example: other caregivers needed to assess the patients, patients had to go for an X-ray or had visiting relatives. As mentioned in the context paragraph, the geriatric consultation was not performed because of multiple reasons. The CGA and other tests (baseline data CCB study) took time, therefore the geriatric consultation was often dropped (Q6).

The CGA took about an hour, all patients included in the CCB RCT received a CGA, after the CGA, randomization took place to control or intervention treatment. Most of the time after returning to the patient to discuss the care plan, they were asleep or busy with other caregivers. Some CRN's mentioned that the integrated care plan was therefore not always discussed with the patient.

In one region the face-to-face handover was performed rarely due to a 30-minute travel time to the hospital (Q7).

The CCRN's mentioned that for every patient something went wrong with the medication, which resulted in contacting the hospital, the general practitioner, the pharmacy, or the pharmacist from the CCB study. This was very time consuming, resulting in the first visit taking more time than described in the CCB protocol (Q8).

Most of the time the PT's were not able to finish rehabilitation within six weeks after discharge. The intensity of two visits per week was not always feasible, because of their own schedule and because of the patient's wishes.

Influence of patient's characteristics

The PT's focused on home-based rehabilitation. Their experience is that once patients have a concrete goal they are motivated to practice. However, motivation was the main struggle.

Dose

The delivery rates ranged from 13.7% to 91.9% per key-element ([Table 5](#)). One patient received all key-elements of CCB. Of the 35 patients that should have received a consult of a geriatric caregiver, seven received the consult (13.7%). In ten patients there was no registration of what kind of handover was performed (26.4%). The medication reconciliation was registered in 31 cases (83.8%). The first visit of the CCRN took place within 48 hours after discharge in seventeen cases (45.9%) and in thirteen of these visits the medication

reconciliation took place as well. The number of patients that received all four home-visits from the CCRN was 28 and nine patients received all PT visits.

Insert Table 5

Adaptations

The caregivers mentioned some adaptations in CCB care. Some CRN's mentioned that the integrated care plan was not discussed with the patient but developed by the CRN alone. Alternatives to the face-to-face handover were expected, such as a handover by phone or by mail. One CCRN said that if the face-to-face handover was not possible she performed an extra home-visit on the day of discharge (Q9).

Considering the content of the face-to-face handover, caregivers mentioned that discussing the medication overview was often not feasible, because often the medication was changed after the face-to-face handover.

In the post-clinical phase most adaptations regard timing. Performing the first visit within 48 hours after discharge showed difficulties because of unexpected early discharge or discharge on Friday's. Over time some CCRN's decided not to try it as hard as before, the alternative was to call the patient. The timing of the joint home-visit showed difficulties as well. CCRN's preferred the afternoons as PT's preferred the mornings.

Reach

During the hospital admittance thirteen participants dropped out of the study ([Figure 1](#)). The number of patients that were able to receive all post-clinical elements was 37 (72.5%). These 37 patients received at least one home-visit from the CCRN, 29 received at least one home-visit from the PT. The number of home-visits of the PT's and CCRN's dropped after every home-visit. Main reasons were, refusal of care, withdrawal, or unknown.

Mechanism of impact

The main theme was the influence of patient characteristics.

Some patients refused participation, because they would not appreciate a lot of different people in their home. The caregivers interpreted the physical tests, Mini Mental State Examination, CGA and prioritizing patient's goals/problems as burdensome. This all happened within two or three days after admission and may have led to withdrawal.

The frailty of the population had a big influence on providing care, most patients have comorbidities which limits them in their activation level. This limited the options for the PT's to provide physical training, eventually most visits consisted of motivational interviewing

according to the PT's. The goalsetting was important to convince patients of the value of physical therapy (Q10,Q11,Q12).

Discussion

The delivery rates ranged from 13.7% to 91.9% per key-element, eventually one patient received all nine key-elements. Caregivers experienced barriers in providing some key-elements. First, the geriatric consult (13.7%) is often not delivered, because the CRN's consider various barriers, including: time related barriers, lack of insights in the added value and being a guest at the ward. Second, the face-to-face handover (47.4%) was hard to plan, because of the unknown discharge date and traveling time. Third, home-visits were not all performed according to the protocol, in terms of timing and total number of visits. The first visit from the CCRN's was hard to plan, less than half of all visits took place within 48 hours. PT's experienced most dropouts, and most of the time spread their visits over more than six weeks. Some patients did not want the PT to visit them, but for most drop-outs the reason was unknown. After every visit more patients kept dropping out. Caregivers believe in the intervention. They are confident that this intervention contributes to the patients' wellbeing and prevents adverse events like hospital readmissions. In conclusion, the CCB intervention is currently not completely provided as intended.

Other process evaluation studies show similar results regarding implementation success. Norris et al.⁴⁹ evaluated a trial designed to increase physical activity of children, the delivery of the elements ranged from 33.3% to 100%. Wilson et al.⁴⁴ evaluated implementation dose at one, two and three years after the implementation of a complex intervention and showed a delivery rate ranging from 32% to 80% per element in the first year. Several strategies to improve the dose, were implemented and resulted in improved delivery rates, ranging from 77 to 100%.

The Normalization Process Theory (NPT) is often applied in qualitative process evaluations.^{20,50,51} This theory can be used to reflect the normalization of working with an intervention. When applying NPT to our study, the CCB intervention is implemented, but still experiences implementation problems. Problems relate to: organizational preconditions, collaboration between caregivers and time-management. The belief in the effectiveness is a strong facilitating factor for the CCB integration.^{50,52} Using NPT in a secondary analysis could contribute to a better understanding of the current normalization level of the CCB intervention. Røstad et al.⁵³ performed a qualitative process evaluation of the implementation of a care pathway for elderly patients, using NPT during the analysis. They found that all factors identified to embed new practices mutually influenced each other: When work processes were facilitated and when investments were made in experienced

employees, they got a better understanding of their roles, responsibilities and how to use the intervention and found a way to incorporate the intervention in daily work.⁵³

The maximum variation approach to reach the caregivers succeeded, from every region some caregivers were interviewed which provided insights in the different barriers and facilitators. This can help the research team in applying targeted implementation strategies to overcome identified barriers or to enhance facilitators in other regions. After the seventeen conducted interviews theoretical saturation was reached for the nurses.⁵⁴

By using a mixed method design we were able to triangulate the data. The quantitative measures complemented the qualitative data, and made it possible to provide an integrated conclusion.^{15,25} This study gained insights in the actual delivered care, the barriers that caregivers experience in providing CCB care, and the belief in the added value of the CCB care by caregivers. The insights in the actual delivered care is essential for interpreting the outcomes of the CCB RCT. The timing of this study enables the application of targeted strategies to increase protocol adherence by the caregivers.⁴⁴ The use of the MRCPE framework, enabled a structured approach of the process evaluation and relates to the MRC complex intervention framework, which was applied in the CCB RCT. The quantitative data extracted from the logbooks was subject to a limitation of the study. The missing values were interpreted as not delivered care. Although the care could have been delivered, but not registered by the caregivers, because of time-management issues or the registration burden. Also registration by the caregivers could potentially have led to social desirability response bias, e.g. caregivers could have 'checked the box' for delivering a key-element, to fulfil the norms.²⁵

At the point of interviewing the PT's had delivered CCB care from 1 to 3 patients, versus 4 to 30 patients by the CRN's and CCRN's. This could have had influence on the outcomes, regarding the heterogeneity of the sample of PT's.⁴⁸

The results of this process evaluation showed room for improvement regarding implementation of the CCB intervention. The research team should apply targeted implementation strategies on multi-disciplinary collaboration, 'knowing what other caregivers within the CCB do' and should provide insights in the added value of the face-to-face handover, the geriatric consultation and physical therapy. A strategy could be an informal multi-disciplinary meeting, discussing each other's roles, responsibilities, and experiences within the CCB intervention. Another outcome that needs attention is the under registration of provided care, and reasons for dropouts. Insights in the reasons for dropouts or refusal of CCB care provides important information for the interpretation of RCT results and possible implementation after the RCT is finished.

To fully understand the actual delivered care, a multiple-case-study could provide insights in the clinical reasoning of the caregivers, collaboration between caregivers and applied interventions to prevent adverse events.

Conclusion

The CCB intervention is currently not completely provided as intended, with delivery rates ranging from 13.7% to 91.9% per key-element. One patient received all key-elements of the intervention. Caregivers believe in the effectiveness of the CCB intervention, but caregivers experience barriers in providing some of the key-elements. The results of this process evaluation shows room for improvement in the implementation of the CCB intervention to increase protocol adherence among caregivers.

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Tables

TABLE 1 LOGIC MODEL OF THE CARDIAC CARE BRIDGE (CCB) INTERVENTION; KEY-ELEMENTS AND INVOLVED CAREGIVERS¹³

Timing	Key-element number	Intervention component (Care coordination ³¹)	Caregivers involved
Clinical phase			
≤ 72 h after hospital admission	1	CGA^{29,30}	CRN
During hospital stay	2	CGA based integrated care plan²⁹	CRN
	3	Geriatric consultation in case of ≥5 identified health issues or ≥1 psychological issue⁵⁵	CRN, CNS, Geriatrician
Discharge phase^{32,55–57}			
Before hospital discharge	4	Face-to-face handover³¹ of the CGA based^{29,30} integrated care plan²⁹	CRN, CCRN
	5	Medical treatment plan⁵⁸ delivered to the CCRN	CRN, CCRN
Post-clinical phase			
≤ 2 days after discharge	6	Medication reconciliation^{32–34}	CCRN ^a , CCB Pharmacist
Week 1 – Week 6	7	Evaluating the integrated care plan²⁹	CCRN, PT ^b
Week 1 – Week 6	8	Lifestyle promotion^{33,35} and self-management promotion	CCRN, PT
Week 1 – Week 6	9	Homebased^{36–38} cardiac rehabilitation sessions^{39,40}	PT

CGA=Comprehensive geriatric Assessment, CRN=Cardiac Research Nurse, CNS=Clinical Nurse Specialist in geriatrics, CCRN=Community Care Registered Nurse, PT=Physical Therapist

^a CCRN performs 4 home-visits, a 5th home-visit can take place within 12 weeks if indicated

^b PT performs 9 home-visits

TABLE 2 PROCESS EVALUATION COMPONENTS, DATA SOURCES AND MEASURES

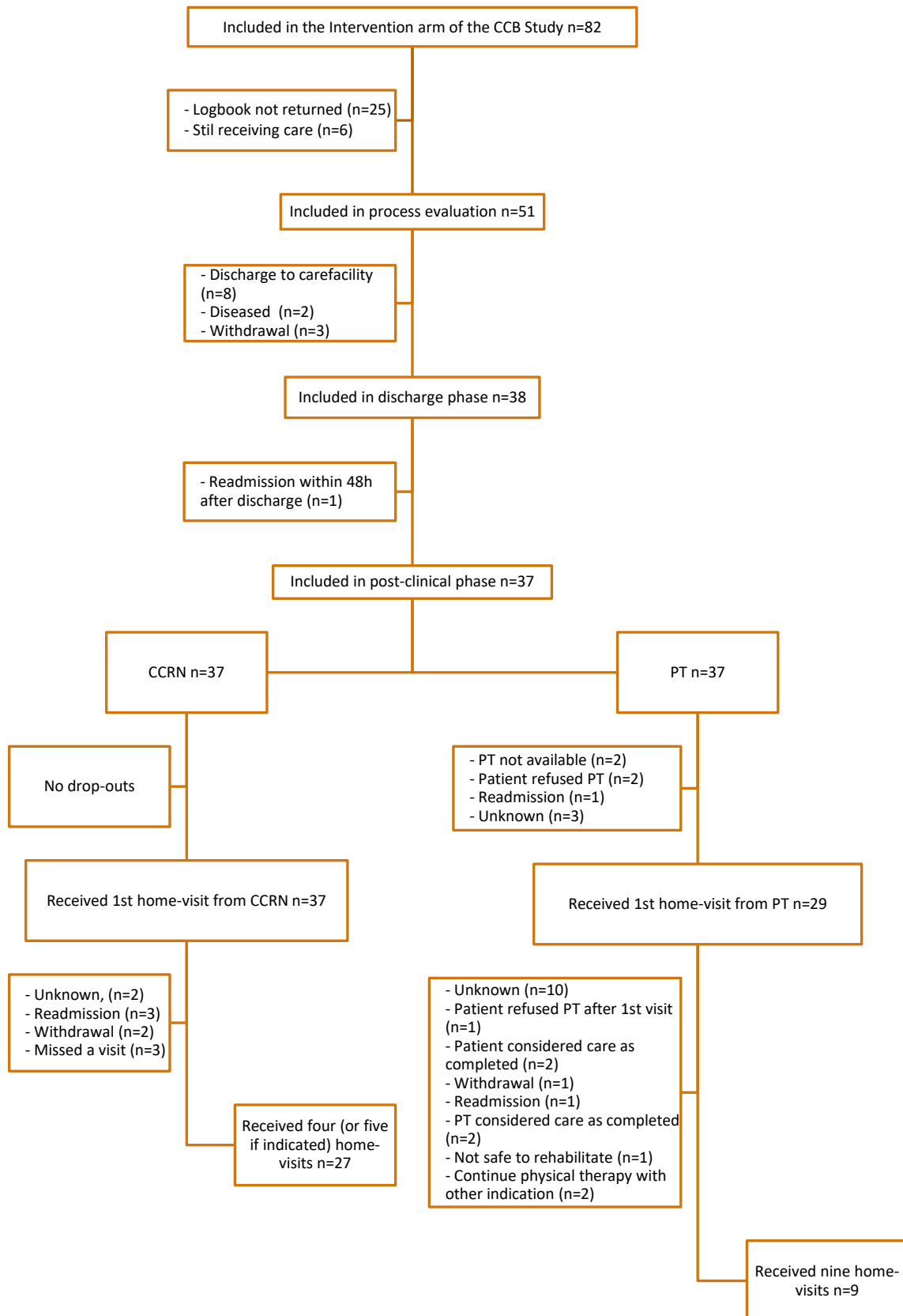
Process evaluation component	Data source	Measures
Context	Semi-structured expert interviews	Barriers/facilitators concerning contextual elements
Implementation		
Fidelity	Semi-structured expert interviews Logbooks	Experiences with delivering CCB care Number of patients who received care as intended
Dose	Logbooks	Number of delivered key-elements
Reach	Semi-structured expert interviews Logbooks	Reasons for dropouts Drop-outs
Adaptation	Semi-structured expert interviews	(Considerations for) adaptations
Mechanism of impact	Semi-structured expert interviews	Perceived experience of the participants

CCB; Cardiac Care Bridge

TABLE 3 DEMOGRAPHIC DATA FROM INTERVIEWED CAREGIVERS

Respondent	Interviewed by	Sex	Function	Educational level	Work-experience in years	Numbers of patients within CCB (approximately)
R1	DS	Female	CRN CCB	Bachelor	1	20
R2	DS	Female	CRN CCB	Bachelor	7	15
R3	DS	Female	CRN	Master	7	10
R4	DS	Female	CRN	Bachelor	35	30
R5	DS	Female	CRN	Vocational	9	20
R6	DS	Female	CCRN	Vocational	22	5
R7	DS	Female	CCRN	Vocational	41	15
R8	DS	Female	CCRN	Bachelor	20	4
R9	DS	Female	CCRN	Bachelor	24	10
R10	DS	Female	CCRN	Bachelor	20	15
R11	DS	Female	CCRN	Vocational	20	10
R12	MT	Female	PT	Master	2	1
R13	MT	Female	PT	Bachelor	2	2
R14	MT	Female	PT	Master	10	1
R15	MT	Female	PT	Master	35	1
R16	MT	Female	PT	Bachelor	30	1
R17	MT	Male	PT	Bachelor	6	3

DS. D.F. Spoon 1st researcher. MT; M.S. Terbraak 3rd researcher. CRN CCB; Cardiac Research Nurse from the Cardiac Care Bridge Study. CRN; Cardiac Research Nurse. CCRN; Community Care Registered Nurse. PT; Community Care Physical Therapist.



CCB; Cardiac Care Bridge. CCRN; Community Care Registered Nurse. PT; Community Care Physical Therapist

FIGURE 1 FLOWCHART DROPOUTS

TABLE 4 OVERVIEW OF QUOTES

Theme	Quote number	Quote	Respondent (Function; years of experience; number of patients within CCB)
Organizational preconditions	Q1	“It (CGA) is quite personal, while people are usually in a four-person room. I can imagine that if you are, that you would provide socially accepted answers. But there is not always a room where you can take the patient to. Often, they have, because of their frailty, limited mobility, certainly because we arrive so short after admittance. So, I question how honest it is, how honest the patient’s response is.”	R2 (CRN CCB; 7; 15)
Organizational preconditions	Q2	“I have limited experience with a geriatric physician, and I think it is always difficult to get the right information from the documentation. We have six hospitals, and the ways to the geriatric professional, yes... I wouldn’t know. I should probably find out how, but, the other reason, you know, what does the geriatric professional do? The protocol says to consult a geriatric professional, but I think, speaking for myself, it already takes a lot of time. The thing that is the hardest is the first thing you skip, right?”	R1 (CRN CCB; 1; 20)
Organizational preconditions	Q3	“As soon as they (<i>the patients</i>) are a little better, they are discharged, we throw them out. It sounds very worrisome, but ... [<i>silence</i>] There is enormous pressure on the beds, because new patients are already queued at the front door... Sometimes you think ‘this is simply impossible.’”	R4 (CRN; 35; 30)
Multi-disciplinary collaboration	Q4	“I think we, the PT and I, accomplished a lot. There was a woman who, that was so sad... Yes, so sad... She had little or no informal care at all. She went for groceries, the first day after discharge... So, she went to the store with her walker. And there she sat in the middle of the street on top of her walker. She simply overestimated her situation. Eventually someone helped her out, but she simply couldn’t do this anymore. For us, that little walk would have been peanuts, no distance at al. And before the incident (<i>the hospital admission</i>) she was able to walk it by herself, but now, she just couldn’t. If you see that together with the PT you enable her to do her groceries again, then you feel happy, really happy.”	R8 CCRN; (20; 4)
Belief in effectiveness of the study	Q5	“What strikes me, that people usually have the idea that... They say that they know very well when they are decompensating (<i>increase of heart failure</i>), but when the early signs appear, most people don’t respond actively, they don’t call the general practitioner. That is something I noticed several times. People still remain very passive and do not take action, they do not realize that their situation is deteriorating again.”	R10 (CCRN; 20; 15)
Time management	Q6	“What is difficult, is that you are a guest at the wards. And you don’t really know how, we are in six hospitals, so it is quite inconvenient to consult a geriatric professional or any other discipline. Often, they are already involved. But according to the protocol, if they score on the psychological domain, you should consult a geriatric professional. I think that makes it difficult for me. That’s why I don’t always do it.”	R1 (CRN CCB; 1; 20)
Time management	Q7	“It (<i>Face-to-face handover</i>) takes way too much time. There is one hour scheduled for it, but we already have to travel for one hour. And so far, after that one experience we haven’t noticed that it was of additional value in comparison to a usual handover by phone.”	R11 (CCRN; 20; 10)
Time management	Q8	“The medication takes the most of my time. Especially checking the medication overview.... And if you have to dispense medication. Half an hour to an hour for the medication alone, sometimes even more. But you know, it is so important, because the rest of all visits, are dependent on that. You have to invest extra time in that first visit.”	R7 (CCRN; 41; 15)
Belief in effectiveness of the study	Q9	“... An extra visit. Yes, always! So, I visit the patient, the day they come home, and then three days, a week. Because I missed the face-to-face handover. That is the least I can do...”	R7 (CCRN; 41; 15)
Influence of patient characteristics	Q10	“For example, there was a woman who eventually didn’t want me to come over. So, then I contacted the CCRN. We had a joint visit, well it was not really the joint intake, but after the fourth visit or so. I took over from my colleague, we went there together. And then everything seemed to be good and I felt very positive. Afterwards I called her to make an appointment, and she did not want anything to do with me. And when I stood there in front of her door, she wouldn’t let me in.”	R13 (PT; 2; 2)
Influence of patient characteristics	Q11	“... Then she said; ‘it is so good to be back home. In the hospital, there was so much happening. And then you are asked to participate in a study, well that is, fine. But I didn’t know what I said yes to. Than you come home, and you hear this (<i>CCRN and PT visits at home</i>)’... “	R17 (PT; 6; 3)
Influence of patient characteristics	Q12	“... He thought it all took too much time. But when we finally found out that fishing was important for him, we (<i>CCRN & PT</i>) focused on fishing. That his goal was not so much doing exercises, but the goal was to be able to go fishing again. Making little steps got him motivated again...”	R8 (CCRN; 20; 4)

CGA; Comprehensive Geriatric Assessment. CRN CCB; Cardiac Research Nurse part of the Cardiac Care Bridge Study. CRN; Cardiac Research Nurse. CCRN; Community Care Registered Nurse. PT; Community Care Physical Therapist.

TABLE 5 REGISTRATION OF DELIVERY OF KEY-ELEMENTS

	Registered as delivered	%	Registered as not delivered	%	Unknown	%
Clinical phase N=51						
<u>1. CGA summary form completed</u>	28	54.9	12	23.5	11	21.6
<u>2. Integrated care plan consists of two or more goals</u>	35	68.6	5	9.8	11	21.6
<i>Had a right to receive a geriatric consult</i>	35	67.3	16	30.8	1	1.9
<u>3. Received geriatric consult based on eligibility (N=35)</u>	7	20.0	28	80.0	0	0
All clinical key-elements delivered	6	11.8	42	82.4	3	5.9
Discharge phase N=38						
<u>4. Face-to-face handover</u>	18	47.4	NA	NA	10	26.4
Handover by phone	9	23.7	NA	NA		
Handover by mail	1	2.6	NA	NA		
<u>5. Medical treatment plan received by CCRN</u>	22	57.9	3	7.9	10	26.3
Only medication overview received by CCRN ²	2	5.3	NA	NA	NA	NA
All discharge elements delivered	12	31.6	20	52.6	6	15.8
Post clinical phase N=37						
<u>6. Medication reconciliation</u>	31	83.8	5	13.5	1	2.7
Visit #1 (CCRN) took place within 48 hours after discharge	17	45.9	20	54.1	0	0
<i>Visit #1 (CCRN) took place within 48h and medication reconciliation was performed (N=17)</i>	13	76.5	4	23.5	0	0
<u>7. Evaluated integrated care plan at least once</u>	34	91.9	1	2.7	2	5.4
<u>8. Discussed lifestyle promotion at least once</u>	32	86.5	3	8.1	2	5.4
Received a minimum of 4 home-visits from CCRN	28	75.7	9	24.3	0	0
<u>9. Received at least 1 PT visits</u>	29	78.4	8	21.6	0	0
Received 4 or more PT visits	19	51.4	12	32.4	6	16.2
Received all 9 PT visits	9	24.3	21	56.8	7	18.9
Received a joint visit of the PT and CCRN	8	21.6	29	78.4	0	0
All post-clinical elements delivered	22	59.5	13	35.1	2	5.4
All key-elements delivered	1	2.7	36	97.3	0	0

CGA; Comprehensive geriatric assessment. CCRN; Community Care Registered Nurse. PT; Community Care Physical Therapist NA; Not Applicable