Recovery after Cardiac Arrest: The Brain is the Heart of the Matter

Barriers and facilitators for the implementation of systematic cognitive screening and rehabilitation in cardiac rehabilitation programs of patients after an out-of-hospital cardiac arrest in the Netherlands.

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Date: July 6th, 2021

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ABSTRACT

Background: Over the past decades survival after out-of-hospital cardiac arrest (OHCA) has improved. However, neurological outcome after OHCA has improved only marginally. About half of the survivors of an OHCA suffer from long-term cognitive impairments. These impairments can have a serious impact on daily functioning, societal participation, and quality of life. Despite recommendations of recent literature and the Dutch and European guidelines, cognitive impairments are addressed infrequently and not systematically after cardiac arrest. Therefore, this research aimed to identify barriers and facilitators for implementation of systematic cognitive screening and rehabilitation in cardiac rehabilitation programs for patients after an OHCA in the Netherlands.

Methods: Sixteen semi-structured stakeholder interviews were conducted. Eleven healthcare professionals (cardiologists, rehabilitation physicians, specialized nurses, and an occupational therapist), two managers, three policy makers, and one health insurer were interviewed. The Tailored Implementation in Chronic Diseases (TICD) checklist was used to guide the data collection and analysis. Based on the emphasis, the expected impact, and frequency of codes the most relevant factors were determined.

Results: Barriers towards implementation are lack of practical instruction in the current cardiac rehabilitation guideline, lack of evidence supporting the intervention for inclusion, lack of awareness and knowledge about cognitive consequences, and lack of structural cooperation. The factors that facilitate implementation are compatibility, availability of local protocols and a positive attitude towards the intervention.

Conclusion: To solve the main barrier lack of evidence, we recommend performing research at hospitals where the intervention is already implemented. This will also facilitate the inclusion of a practical instruction in the guideline cardiac rehabilitation. In addition, the lack of awareness and knowledge can be overcome by training. The last main barrier about structural cooperation can be improved by a multidisciplinary consultation.

Keywords: implementation, cognitive screening, cognitive rehabilitation, out-of-hospital cardiac arrest

Contributions to literature:

- All specialists have a strong belief that systematic cognitive screening and rehabilitation are compatible with current practices for patients after out-of-hospital cardiac arrest. More research is needed to determine the best settings in the care process.
- The current cardiac rehabilitation guideline is lacking a practical instruction about cognitive screening and rehabilitation. More research is needed to prove the effectiveness of the intervention for patients after out-of-hospital cardiac arrest for inclusion in the guideline and reimbursement by the health insurer.
- The identified barriers are solvable. Successful implementation of systematic cognitive screening and rehabilitation for patients after out-of-hospital cardiac arrest in the Netherlands is feasible.

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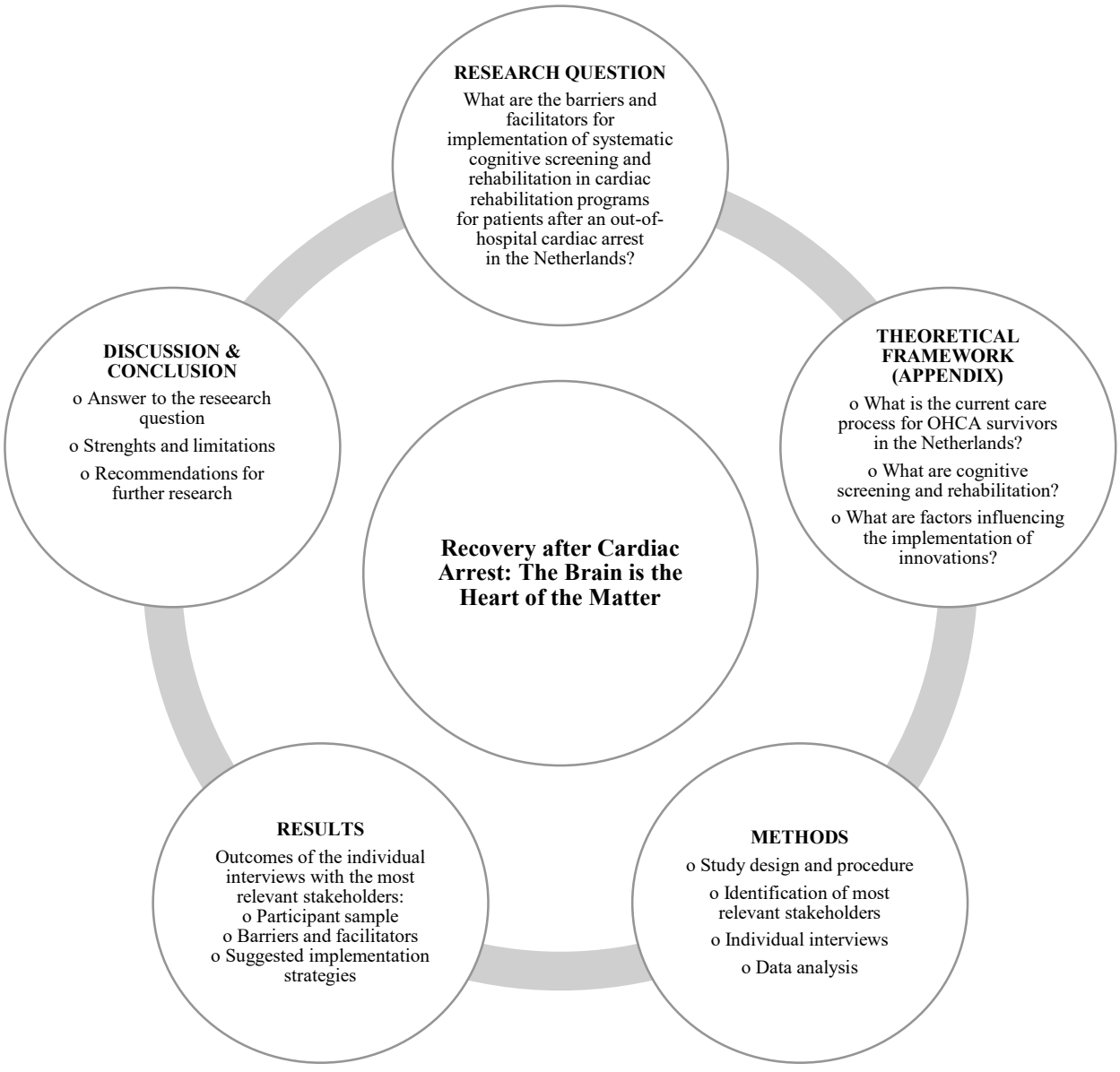
Figure 1: Global Outline



1. INTRODUCTION

Over the past decades survival after out-of-hospital cardiac arrest (OHCA) has increased, in 2016 the survival rate in the Netherlands was 23-27% [1]. However, neurological outcome after OHCA has improved only marginally. Due to a temporary limitation in blood supply of the brain during the arrest, about half of the survivors of an OHCA suffer from long-term cognitive impairments [2]. Most frequently the cognitive domains of memory, attention, and executive functioning are affected. These cognitive impairments can have a serious impact on daily functioning and quality of life. Almost half of the survivors of OHCA have problems with participation in society and are not able to return to their previous work capacity after 6 months [3]. Therefore, reliable diagnosis of cognitive impairments and effective treatments for cognitive recovery are needed to improve the outcome of OHCA survivors.

Currently, diagnostics and treatment of OHCA survivors are mainly focused on cardiac functioning. Cardiac rehabilitation is offered, focusing on physical, psychological, social, and lifestyle goals [4]. The overall aim of cardiac rehabilitation is to limit the negative effects of the cardiac incident, reduce risks of another incident, and control and stabilize the symptoms and progression related to the cardiac disease. Yet, cardiac rehabilitation does not systematically address the highly prevalent cognitive impairments, despite increasing awareness of the incidence and relevance of enduring cognitive impairments [2]. Studies have proven the effectiveness of cognitive rehabilitation therapies for patients with acquired brain injury resulting from stroke or traumatic brain injury [5,6]. OHCA survivors with cognitive impairments will likely benefit in the same way as these patients. Accordingly, both the Dutch guideline for cardiac rehabilitation in 2011 as the European Resuscitation Council Guidelines in 2015 advise screening for cognitive impairments and referral to cognitive rehabilitation if cognitive impairments are found [7,8]. The Montreal Cognitive Assessment (MoCA) is recommended to perform screening, although it is not validated in patients after OHCA [8,9]. However, despite the recommendations in recent literature and guidelines for cognitive screening and

rehabilitation, brain damage and cognitive impairments are addressed infrequently and not systematically after cardiac arrest [10].

A study by Boyce and colleagues in 2018 shows that a majority of cardiologists and rehabilitation specialists sees an added value in an integrated cardiac and cognitive rehabilitation program for OHCA survivors [10]. Nevertheless, lack of knowledge, logistic barriers, and lack of structural cooperation were identified as factors hampering the uptake of the recommendations. The study provides a basis for understanding why systematic cognitive screening and rehabilitation are not yet implemented in cardiac rehabilitation programs for OHCA survivors. More comprehensive research is needed to investigate the barriers and facilitators from other perspectives, such as different healthcare professionals and policymakers. Identification of such factors will contribute to the formulation of recommendations for implementation on a national level.

Hence, the objective of this research is to improve the quality of care delivered to OHCA survivors, the aim is to identify the barriers and facilitators for the implementation of diagnosis and treatment of cognitive impairments.

This results in the following main research question: What are the barriers and facilitators for the implementation of systematic cognitive screening and rehabilitation in cardiac rehabilitation programs for patients after an out-of-hospital cardiac arrest in the Netherlands?

2. METHODS

2.1. Study design and procedure

A qualitative descriptive research was performed to gain an understanding of the reasons why implementation of systematic cognitive screening and rehabilitation in cardiac rehabilitation programs has not occurred nationwide. Between April and June of 2021, the qualitative study was performed with interviews with the most relevant stakeholders. Individual semi-structured interview schemes were used to identify the barriers and facilitators for the implementation of systematic cognitive screening and rehabilitation in cardiac rehabilitation programs for survivors of OHCA.

The comprehensive Tailored Implementation in Chronic Diseases (TICD) checklist of Flottorp et al for identifying determinants for improvements in healthcare practice was used to guide the data collection and analysis [11]. The TICD checklist contains 57 factors which are categorized into seven domains. Table 1 shows the seven domains and some corresponding examples.

Table 1: Domains and Examples of TICD Checklist [11]

Domains	Examples
Guideline factors	Recommendation, recommended clinical intervention and behavior
Individual health professional factors	Knowledge and skills, cognitions, and professional behavior
Patient factors	Patient preferences, motivation, behavior and beliefs, and knowledge
Professional interactions	Communication and influence, team processes, and referral processes
Incentives and resources	Availability of necessary resources, financial incentives, and disincentives
Capacity for organisational change	Mandate, authority, accountability, and capable leadership
Social, political, and legal factors	Economic constraints on the health care budget, contracts, legislation

It was unknown which topics of the TICD checklist were most important and thus most relevant to ask for. From the theoretical framework, which can be found in Appendix A, it was concluded that all categories of the TICD checklist had to be covered in this study to gain a comprehensive understanding of why implementation has not occurred. Therefore, a qualitative research was performed, because it provides flexibility in what to ask for and flexibility in gaining in-depth answers by asking follow-up questions when topics seem relevant [12]. More information and argumentation about the data collection method can be found in Appendix B.

As methodological approach content analysis is used. This approach aims to identify patterns and themes, in this research, the factors hindering or facilitating the implementation of systematic cognitive screening and rehabilitation. Hence, the content analysis provided a qualitative description of the views of the most relevant stakeholders about specific topics of the TICD checklist hindering or facilitating the implementation of the intervention [13].

To ensure the trustworthiness of this qualitative study, two researchers (LF and LK) made coding, analysis, and interpretation decisions (triangulation), and the research path is described transparently (audit trial) [14]. Furthermore, the interview study is reported according to the COREQ (consolidated criteria for reporting qualitative research) guidelines (see Appendix C) [15].

2.2. Identification of relevant stakeholders

The stakeholders that are relevant to take into consideration were identified using literature and personal communication with a neurologist, a cardiovascular nurse, and an expert in rehabilitation after resuscitation. By means of a power-interest grid, the most relevant stakeholders were identified. Potential interview candidates were healthcare professionals, more specifically cardiologists, rehabilitation specialists, specialized nurses, and occupational therapists, directly involved in the care process of OHCA survivors, and policymakers, managers, and health insurers with the power to influence the implementation of systematic cognitive screening and rehabilitation in cardiac rehabilitation programs. The complete list of stakeholders and the power-interest grid can be found in Appendix D and E.

2.3. Individual interviews

Potential interview candidates were recruited, by email, through purposeful sampling to ensure a diverse sample in terms of professional background and level of experience with cognitive and cardiac rehabilitation for OHCA survivors [16]. Also, snowball sampling was used to gain sufficient respondents. Recruited professionals were asked if they knew other potential interview candidates to participate. The researchers did not establish relationships with the participants prior to the interviews.

The interview schemes were developed based on the TICD checklist [11]. First, a topic guide, covering all factors of the TICD checklist, was made (Appendix F). Subsequently, a semi-structured interview scheme was developed by formulating one overarching question per factor. Thereafter, the interview schemes were adapted to the specific stakeholders. When a participant was not familiar with cognitive screening and rehabilitation, an informative text was used to explain the intervention. During data collection, data analysis was performed to assist in evaluating and optimizing the interview

schemes. This iterative process and emergent design improved gaining rich data and interesting findings [13]. The final versions of the interview schemes and informative text can be found in Appendix G.

Each interview lasted between 30-40 minutes. The interviews were conducted by both authors (LF and LK). The interviews took place online via Microsoft Teams, with only the participant and authors present. No repeat interviews were carried out. During and after the interviews field notes were made. Also, audio from the interviews was recorded and transcribed verbatim using Amberscript. After each interview, the participant had the opportunity to check the transcript of their interview. It was estimated that 8-12 interviews could be performed in the available time for this research.

One interview was conducted with two policy advisors. These participants were asked to complement each other's answers and indicate whether they agree or do not agree with each other. The interaction of the policy advisors was desirable for this interview because they could combine their expertise and therefore provide us with more in-depth answers. No power differences or main differences in perspectives were influencing their answers.

2.4. Data analysis

The transcribed interviews were coded using Atlas.ti. The data were analysed by means of content analysis [17]. The first part of the analysis was deductive analysis, for which the coding framework was based on the TICD checklist (see Appendix H). The identified determinants in the interviews were classified into seven predefined categories of the TICD checklist. To further structure the findings, the constructs of the TICD framework were divided into two subcategories, namely barrier and facilitator. The second part of the analysis was inductive analysis in which information deemed important and did not fit the constructs of the TICD framework was coded inductively [18]. The researchers discussed the potential additional determinant until consensus was reached. After carrying out the deductive and inductive analysis the researchers conducted a quantitative analysis. This consisted of calculating the total frequencies of the identified barriers and facilitators and the frequencies over the interviews. The frequencies were noted in tables per stakeholder group in which only factors that were mentioned were

listed. The main barriers and facilitators were determined based on the emphasis given by the participant, the expected impact for implementation and the frequencies. The interviews were analysed independently by LF and LK. Differences were discussed until consensus was reached.

2.5. Data Saturation

To assess the extent of data saturation in this study the method of Hennink, Kaiser and Marconi was used [19]. The research of Hennink et al shows that meaning saturation is needed to develop a comprehensive understanding of the issues. To identify meaning saturation, each coded quote was examined to identify what was learned about the code from successive interviews. For each interview, the coded data was searched, noting the various dimensions of the described barriers and facilitators. Data saturation was reached when further interviews provided no additional dimensions of the code. Based on the extent of data saturation, recommendations for further research are provided.

2.6. Ethics approval

Ethics approval for this study was gained from the Ethics Committee of the University of Twente (reference 210162). Prior to the interview, the participants were informed about the purpose of the research and the required time investment. Participation was voluntary and the participants were free to withdraw from this research at any time. There were no risks associated with participation in this research. Furthermore, participants were informed about the anonymization and storage of their data. Participants gave verbal consent to participate and for audio-recording of the interviews.

3. RESULTS

3.1. Participant sample

Twenty invites for interviews were sent out. Nineteen people agreed to participate, of whom two were unavailable after all. Sixteen semi-structured interviews were conducted, see Table 2. The interviews were conducted with eleven healthcare professionals, of which three cardiologists, four rehabilitation physicians, three specialized nurses, and one occupational therapist from five different hospitals and rehabilitation centres. In addition, two managers, three policymakers, and one health insurer were

interviewed. Only the policy advisors and health insurer were not familiar with cognitive screening and rehabilitation. None of the participants provided feedback on the transcripts.

Table 2: Characteristics of Participants

Stakeholder	Profession	Number of participants
Healthcare professionals	Cardiologist	3
	Rehabilitation physician	4
	Specialized nurse	3
	Occupational therapist	1
Managers	Manager care	2
Policymakers	Guideline maker	1
	Policy advisors	2
Health insurers	Care-expert medical specialist care	1

3.2. Barriers and facilitators

The outcomes of the individual interviews with the most relevant stakeholders are described per category of the TICD checklist. For an overview of all barriers and facilitators, see Table 3. Most determinants were covered by the TICD framework. The inductive codes that were found in this research were: current guideline cardiac rehabilitation, the added value of the innovation, family, and screening instrument. These codes are elaborated on in the most suitable categories, namely: guideline factors, patient factors, and incentives and resources, respectively. The tables with frequencies of the identified barriers and facilitators can be found in Appendix I.

3.2.1. Guideline factors

All healthcare professionals and managers are confident that the systematic cognitive screening and rehabilitation are compatible with current practices for patients after OHCA. Also, the policymakers expect that the intervention is feasible, fits with current practices, and can be implemented with relatively little effort. Only the health insurer stated that cognitive screening and rehabilitation do not

fit the Diagnosis Treatment Combination (DTC) for cardiac rehabilitation. Cognitive screening and rehabilitation would be an extra activity that does not match with the current content of the DTC.

A facilitator towards the implementation is that multiple healthcare professionals mentioned the screening and rehabilitation to be of added value to the current care process for patients after OHCA. *"I certainly see added value in it. […] You get a picture of it faster; people get clearer information, and you can also understand the problem faster. Detect it faster, so that you can treat it better." (Occupational therapist I)*

A barrier is the current cardiac rehabilitation guideline, which hinders most interviewed healthcare professionals to execute systematic cognitive screening and rehabilitation. Cardiologist I stated: *"the reason why it is not systematic, is because it is not included in the current guideline for cardiac rehabilitation in the Netherlands".* Many healthcare professionals mentioned that the current guideline is not up to date, the last revision was in 2011. In addition, a practical instruction is lacking about the execution of cognitive screening and the organization of cognitive rehabilitation. *"If you really look at the entire guideline on its own, then everything is written out completely […] but not the bit of cognitive problems after resuscitation" (Specialized nurse I).* Also, multiple participants mentioned there is some uncertainty about the targeted population and the settings in which the intervention has to be used. Some healthcare professionals mentioned the intervention would fit in the cardiologist's aftercare in contrast to others who mentioned it fits best in the cardiac rehabilitation program.

The most frequently mentioned barriers by the health insurer and policymakers are the strength of the recommendation and the quality of evidence supporting the recommendation. Policy advisor I: *"Before admission, we must therefore be able to determine that it is effective, that it is cost-effective, that it is feasible in the Netherlands, […] and that it is also necessary to reimburse it from the insured package."* Also, the health insurer stated that due to the absence of evidence about the effectiveness of cognitive rehabilitation, it would currently not be eligible for reimbursement. Only a minority of healthcare professionals mentioned the lack of evidence as a barrier. Particularly cardiologists

mentioned that first the effectiveness of cognitive rehabilitation must be proven before it can be implemented. *"First you have to make it very likely that the training trajectory that follows after the screening is effective. There are too many things that are assumed to be effective, but it has never been proven." (Cardiologist III)*

3.2.2. Individual health professional factors

All participants had a positive attitude towards the implementation of systematic cognitive screening and rehabilitation. "*Yes, I think that it is certainly of added value for best optimal treatment for the patient." (Guideline maker).*

A majority of the healthcare professionals mentioned a lack of awareness and knowledge about cognitive consequences after OHCA as a barrier towards implementation. In particular, the cardiology department would not have the knowledge which is needed to adhere to the intervention. The healthcare professionals at the cardiology department have a lot of knowledge about cardiac and vascular diseases, but cognitive impairments are not their area of expertise. Moreover, those healthcare professionals would not have the skills to conduct the screening, inform patients about cognitive consequences, and provide advice about how to deal with those. The lack of knowledge and skills mainly applies to the nurses at the cardiology department. Specialized nurse I described it as follows: *"Well, I think, […], that there is also a lack of knowledge, […], cardiology nurses are very much focused on cardiology, so especially on the heart and what is involved. So, there is really a lack of knowledge about cognition, cognitive problems and what it entails and [..] how you can experience it […], how you can discover it, but also what advice can be given."* On the other hand, some healthcare professionals mentioned that the necessary skills are not hard to learn and that the involved professionals could easily be trained.

Another barrier towards the implementation of systematic cognitive screening and rehabilitation can be the relatively small patient group. Multiple healthcare professionals, the health insurer, and the guideline maker suggested, therefore, to use the already existing knowledge and expertise by referring patients to the right place at the right time: networking. *"I would just leave the rehabilitation to the*

experts who are already there and then refer to existing programs if indicated. I don't think you need to do a special cognitive program for this group, we have a lot of overlap with other types of brain injury patients, and I think that's a waste of effort to create a separate team for that. Locally, the numbers are often too small for you to be able to run an entire program for it. Unless you have a very large centre." (Rehabilitation physician I)

3.2.3 Patient factors

No interviews were performed with patients. The results on patient factors are based on interviews with healthcare professionals. Some healthcare professionals mentioned that patients would have a lack of knowledge about their own health status with regards to cognitive impairments after OHCA. This could hinder patients to participate in cognitive screening and rehabilitation. *"Because the victims of this have no insight into what is wrong with them at all, [...] they notice it after a few weeks or after a few months that things are not going well." (Rehabilitation physician II).* On the other hand, the majority of the healthcare professionals believe that patients will have a positive attitude towards cognitive screening and rehabilitation. *"It is much more patient friendly, and you can start earlier with therapy. People are also more likely to feel understood." (Specialized nurse II).* Also, the interviewed healthcare professionals believe that relatives of patients will have a positive attitude towards cognitive screening and rehabilitation.

The health insurer is a proponent of early interventions and providing the right care at the right time. The starting point is that the insured patient should be able to receive the care he or she needs.

3.2.4. Professional interactions

Most interviewed healthcare professionals stated that good cooperation on a multidisciplinary basis between the involved professionals is essential for implementing systematic cognitive screening and rehabilitation. *"It mainly depends on the collaboration with the paramedical service and nurses, the doctor and the rehabilitation physician. That is the foundation." (Occupational therapist I).* However, many participants mentioned that currently the structural cooperation between different disciplines is poor. Especially, the collaboration between cardiology and neurology would be difficult. This barrier

was also mentioned by both managers. Experienced manager II, who was involved with the implementation of the cognitive screening and rehabilitation in a hospital where they are already performing the intervention, stated: *"I think we have brought the specialisms together, but I can imagine that does not always happen automatically and that is a tendency, generally in healthcare, to work more and more diagnosis-related instead of specialism-related. Anyway, that is difficult."*

Also, most healthcare professionals stated that the current referral processes are not optimal for the implementation of systematic cognitive screening and rehabilitation. *"Perhaps domain thinking also has something to do with that, who owns this problem? […] If that patient rehabilitates in cardiac rehabilitation, then he does not rehabilitate in neurology […] logistically always goes wrong when talking about agreements and who does what, and so on." (Specialized nurse III).* In addition, an occupational therapist mentioned that patients are sent home when they are medically stable. Other disciplines are often too late or not asked for a consultation. Therefore, there is often no attention to cognitive consequences and patients come back later with complaints that were not addressed yet. Another barrier towards implementation of this intervention is perceived uncertainty with regards to responsibilities and roles of healthcare professionals involved in the care process for OHCA patients.

3.2.5. Incentives and resources

Several barriers were mentioned in the interviews covering the availability of necessary resources. Personnel resulted to be a barrier because healthcare professionals must be scheduled in such a way so that they are able to perform cognitive screening and rehabilitation next to their current tasks or new personnel must be hired. In addition, the healthcare professionals who will be performing the screening and rehabilitation must be trained.

Two other factors that were mentioned by the healthcare professionals as necessary for implementing and performing the intervention are time and financial resources. Time is deemed important to perform the screening, detect patients, and make appointments with healthcare professionals. Financial resources are necessary to finance the personnel, time, and training. However, most healthcare professionals do not think financial constraints will hinder the implementation of cognitive screening

and rehabilitation. Cardiologist III mentioned: *"During the day I do much more expensive things than that."* On the other hand, all policymakers and some healthcare professionals mentioned that the costs for this kind of complex rehabilitation care can be a barrier to implementation. They mentioned that reimbursement by the health insurer is necessary. Also, according to both managers, it is all about the financial resources: *"You can be open to anything, but if you do not have the resources to perform it, then you will be hindered." (Manager I).*

Both managers do not see the need for trained personnel and time as a barrier. *"That is something temporary, you can start training people, you can start recruiting people for it and maybe that is not always easy, but I do not see that as a barrier. I think that are short-term actions as a problem you have to solve." (Manager II).*

Another barrier mentioned by an expert in cognitive rehabilitation is the screening instrument because the advised tool (the MoCA) is not validated for patients after OHCA. Mentioned alternatives are the CLCE-24 questionnaire or training nurses to do ADL observations.

A resource that resulted to be a facilitator for the implementation is pre-existing knowledge from the neurology departments and rehabilitation experts. Specialized nurse II stated: *"They knew this from neurology […] they just had to shape it a bit more to their patient group […]. They actually took the framework, the blueprint, and adapted it to the patient group."* Also, there are several protocols available from rehabilitation centres and hospitals that have already implemented cognitive screening and rehabilitation for OHCA patients. These existing protocols can be used for implementation on a national level.

3.2.6. Capacity for organisational change

In the interviews with the healthcare professionals, no barriers or facilitators related to capacity for organisational change were mentioned explicitly. Some participants mentioned that support of management and internal regulations of hospitals are not barriers to the implementation of cognitive screening and rehabilitation. This also resulted from the interviews with the managers, who both stated that they support the implementation of this intervention. Although, manager II mentioned that support

of the management is necessary for the implementation: *"It does, of course, start with a good story from the specialist himself. What are the benefits for the patient? What are the benefits for the hospital in the end? What do we have to do? Which groups do we have to get in motion? But we are an important factor in this. The specialist is not able to do that on his own."*. However, the managers did not consider this as a barrier to implementation on a national level. They expect that most managers will have a positive attitude towards this intervention and will be capable to make the necessary changes.

The policymakers mentioned that they stimulate innovations, and that the policy can function as a facilitator towards implementation. However, the health providers themselves and the health insurers are primary to move. Therefore, they mentioned multiple times that it is very important to involve relevant stakeholders from the start: *"The sooner you have the right people at the table, the easier it is, relatively easy it is to make agreements with each other about inclusion in the guideline and implementation in practice at the back" (Policy advisor I).*

Furthermore, the health insurer mentioned that the guideline can function as a facilitator for implementation. Inclusion in the guideline would indicate that evidence about the effectiveness of the intervention has been gathered and will stimulate the insurers for reimbursement.

3.2.7 Social, political, and legal factors

No specific barriers or facilitators were mentioned regarding social, political, and legal factors. Some participants mentioned that legislation would not be a barrier to the implementation of cognitive screening and rehabilitation. In addition, to raise more awareness a few participants stated that information about cognitive consequences and the screening and rehabilitation for patients after OHCA should be disseminated. Both managers mentioned the negotiating procedures with the health insurer about including cognitive screening and rehabilitation in insurance policies as a barrier.

3.3 Implementation strategies suggested by the participants

The participants offered several suggestions that could ease the implementation of systematic cognitive screening and rehabilitation. These are listed below.

- The lack of skills and knowledge could be improved by national training for cardiovascular nurses to teach them how to recognize cognitive impairments and how to address or refer them if needed. Thereafter, the nurses can apply the skills in their own hospital or rehabilitation centres.
- To overcome the knowledge gap, training can be facilitated for cardiologists, nurses, and other involved healthcare professionals in the care process for OHCA survivors about cognitive consequences and screening and rehabilitation.
- A structured multidisciplinary consultation (MDC) could improve knowledge sharing and multidisciplinary cooperation amongst involved healthcare professionals. An MDC provides an opportunity to discuss clear agreements and a good task division including responsibilities.
- Networking was suggested to improve the implementation of cognitive screening and rehabilitation. Due to a relatively small number of OHCA patients per year, hospitals and rehabilitation centres should make better use of already existing knowledge and expertise.
- The cardiac rehabilitation guideline should include a practical description and provide clarity about the targeted population, the responsibility of disciplines and professionals, and the settings in which the intervention should be used. In addition, the guideline can improve the financial issue by stating to which discipline or department cognitive screening and rehabilitation belong and which diagnosis treatment combination (DTC) has to finance it. By stating it nationally, it no longer has to be discussed locally.
- Use the existing protocols from rehabilitation centres and hospitals in which they already perform cognitive screening and rehabilitation for OHCA patients to facilitate implementation on a national level.
- Research about the effectiveness of systematic cognitive screening and rehabilitation could be performed at hospitals and rehabilitation centres where they already perform the intervention.
- The dissemination of information could be done by public campaigns in which awareness is raised for possible cognitive impairments for patients after OHCA. Also, sharing information at conferences could be helpful to raise awareness and enhance familiarity with cognitive impairments, screening, and rehabilitation for OHCA patients.

Table 3: Identified Barriers and Facilitators for the Implementation of Systematic Cognitive Screening and Rehabilitation.

TICD domain	Barriers	Facilitators/ Implementation strategies
Guideline factors	- Uncertainty about the settings of the intervention and the target patient group. - Lack of a practical instruction of the intervention in current cardiac rehabilitation guideline. - Lack of evidence about the effectiveness of the intervention. - The intervention does not fit in the Diagnosis Treatment Combination (DTC) of cardiac rehabilitation.	- The guideline should provide clarity about the target population and settings of the intervention. - The intervention is feasible and fits with current practices. - Perceived added value of the intervention by healthcare professionals. - Investigate effectiveness in hospitals and rehabilitation centres where they already perform the screening and rehabilitation. - The intervention can be implemented with relatively little effort.
Individual health professional factors	- Lack of knowledge amongst healthcare professionals at the cardiology department about cognitive impairments after out-of-hospital cardiac arrest (OHCA). - Lack of awareness about cognitive consequences and lack of familiarity with the intervention amongst most healthcare professionals involved in the care process. - Lack of skills amongst healthcare professionals at the cardiology department to recognize cognitive impairments and conduct the screening. - The patient target group is relatively small.	- All participants had a positive attitude towards the intervention. - The skills to perform the intervention are not hard to learn. - A training program can be facilitated for healthcare professionals to recognize cognitive impairments and perform screening and rehabilitation.
Patient factors	- Patients have little or no insight into their own health status with regards to cognitive impairments due to OHCA.	- Patients will have a positive attitude towards the intervention. - The relatives of patients will have a positive attitude towards the intervention.
Professional interactions	- Current referral processes are not optimal for the implementation of the intervention. Patients are sent home when they are medically stable. Other disciplines are often too late or not asked for a consultation.	- A structured multidisciplinary consultation (MDC) could improve knowledge sharing and multidisciplinary cooperation. Also, an MDC provides an opportunity to discuss agreements and task division. - Use the existing knowledge and expertise and refer patients to the right place at the right time (networking).

	- Healthcare professionals perceive uncertainty about the responsibilities and roles of healthcare professionals involved in the care process for OHCA. - Poor structural collaboration between the cardiology department and other disciplines.	
Incentives and resources	- (Trained) Personnel constraint - Time constraint - Financial constraint - The screening instrument, the Montreal Cognitive Assessment, is not validated for OHCA patients.	- Use pre-existing knowledge from neurology departments and rehabilitation experts. - Use local protocols from hospitals and rehabilitation centres that already perform the intervention. - Inclusion in the guideline will facilitate reimbursement by the health insurer.
Capacity for organization change		- Support of management - Internal rules and regulations would not hinder the implementation of the intervention. - The perceived capability of managers to make necessary changes.
Social, political, and legal factors	- Negotiating procedures with health insurers about the inclusion of intervention in insurance policies.	- Share information in public campaigns and at conferences to raise more awareness. - Legislation would not hinder the implementation of the intervention.

Note: These barriers and facilitators are identified based on interviews with three cardiologists, four rehabilitation physicians, three specialized nurses, one occupational therapist, two managers, three policymakers, and one health insurer.

3.4 Data Saturation

The identified dimensions of codes by interview can be found in Table 8 in Appendix J. A majority of dimensions of codes were captured by interview 7. Data saturation was reached for codes related to knowledge and skills, professional interactions and incentives and resources. The code compatibility has many different dimensions which vary until the last interviews. Also, the codes related to evidence, intention, and mandate have different dimensions varying until the last interview. For the patient factors, the results indicate that data saturation is reached, however, this is based on only the interviews with the healthcare professionals.

4. DISCUSSION

4.1. Main findings

The results of this study indicate that the main facilitator towards implementation is a strong belief, amongst healthcare professionals in particular, that systematic cognitive screening and rehabilitation are compatible with current practices. Another main facilitator is the availability of local protocols from hospitals and rehabilitation centres who are already performing the intervention. For example, the workbook 'Rehabilitation after Resuscitation' developed by Boyce and colleagues, and the compact intervention 'Stand still …, and move on' developed by Moulaert and colleagues to inform OHCA patients about cognitive consequences [20,21]. In addition, all interviewed stakeholders have a positive attitude towards implementation.

The main barrier towards implementation is the current guideline cardiac rehabilitation. This is remarkable since both the Dutch and European guidelines advise screening for cognitive impairments and referral to cognitive rehabilitation if cognitive impairments are found [7,8]. However, the healthcare professionals miss a practical instruction and clarity about the patient target group and the settings in which the intervention should be used. Evidence about the effectiveness of the intervention is required for inclusion in the guideline. The assumption that OHCA survivors will benefit in the same way as patients with acquired brain injury, resulting from stroke or traumatic brain injury, is not sufficient for inclusion in the guideline [5,6]. Evidence supporting the intervention will also facilitate reimbursement by the health insurer.

The second main barrier is the lack of awareness and knowledge about cognitive consequences after OHCA. In particular, the healthcare professionals at the cardiology department do not have the knowledge and skills to recognize and address cognitive impairments. This is in line with the study of Boyce in which 31% of rehabilitation specialists mentioned a lack of knowledge by cardiologists regarding cognitive impairments [10]. In our study the knowledge gap at the cardiology department was even mentioned by the majority of healthcare professionals, including multiple cardiologists.

The last main barrier is lack of structural cooperation of healthcare professionals from different disciplines. Both our study as the study of Boyce showed that cooperation between cardiology and neurology is required for successful implementation [10]. However, both also showed that currently structural cooperation is lacking.

Other barriers towards implementation are related to the availability of necessary resources, namely time and trained personnel. However, these are temporary barriers that can be solved with short-term actions. Reimbursement by the health insurer is required to finance the necessary resources. Financial constraints resulting in limited personnel were also found as a barrier for the implementation of evidenced-based stroke care [22]. Patient factors will probably not hinder the implementation of this intervention. Technological concerns as in the study of Hoffmann et al. about video consultation do not apply to this intervention [23]. Also, in accordance with the study of Lescure et al., our study did not find major barriers or facilitators related to social, political, and legal factors [24].

A positive aspect towards implementation is that the identified barriers are solvable. The knowledge gap can be overcome by training. Research can be performed at hospitals and rehabilitation centres where they already have implemented the intervention. In addition, structural cooperation can be improved by i.e. a multidisciplinary consultation. Therefore, the main outcome of this study is that successful implementation is feasible. Implementation of this intervention will improve the quality of care for OHCA survivors, by screening and referring OHCA patients at an early stage and adjusting the rehabilitation program to the patients' needs. Eventually, this will result in a positive effect on quality of life, societal participation, and healthcare costs [25].

4.2. Strengths and limitations

A strength of this research is the used method, namely qualitative semi-structured interviews, to explore, in-depth, all perceived barriers and facilitators towards implementation of systematic cognitive screening and rehabilitation in clinical practice. A limitation of this research is that only a limited number of stakeholders were interviewed. No patients were interviewed, the two interviewed managers were from the same hospital and only one health insurer participated. In addition, results

may be biased by an overrepresentation of healthcare professionals who were already familiar with cognitive screening and rehabilitation for OHCA patients in our study sample. These participants may have influenced the outcomes positively, specifically about the compatibility, feasibility, and added value of the intervention. On the other hand, these participants provided insights about barriers and facilitators which they encountered in clinical practice, instead of hypothetical. A strength regarding the outcomes of the data analysis is that the findings about the main barriers and facilitators based on the emphasis and expected impact correspond to the findings based on the frequencies.

4.3. Recommendations for further research

Due to the diverse research population, a relatively large sample size is needed to gain a comprehensive view of the barriers and facilitators for implementation [19]. This study provides a basis for the identification of barriers and facilitators for the implementation of systematic cognitive screening and rehabilitation. Data saturation is reached for the factors related to knowledge and skills, professional interactions and incentives and resources. To gain a complete overview of barriers and facilitators related to patient factors we recommend conducting several interviews with patients prior to the implementation.

Moreover, the results of this study indicate that there is not a comprehensive understanding of the compatibility of systematic cognitive screening and rehabilitation. All participants did agree that the intervention fits with current practices, however there is a lot of uncertainty about the settings. To determine where in the current care process the intervention fits best and to gain a comprehensive understanding of the compatibility, more interviews with cardiologists, cardiovascular nurses, and rehabilitation physicians should be conducted until data saturation is reached. In addition, many different dimensions about the intention and motivation of cardiologists and nurses were found. More interviews with these stakeholders should be conducted until data saturation is reached for this topic.

Furthermore, the first step that needs to be taken in order for successful implementation is gaining more evidence supporting the systematic cognitive screening and rehabilitation. The meaning of the codes quality of evidence supporting the recommendation and strength of recommendation vary until

the last interviews. To determine which evidence is needed for inclusion in the cardiac rehabilitation guideline an interview with the coordinator of the work group for this guideline should be conducted. According to the interviewed policymakers and health insurer the following needs to be proven: effectiveness, added value with respect to current treatment, cost-effectiveness, and the feasibility of the cognitive screening and rehabilitation. It is recommended to use the assessment framework of the Dutch Zorginstituut to determine whether the intervention fits the criteria for quality standards for inclusion in the guideline [26]. Studies could be performed at hospitals or rehabilitation centres where they are already performing cognitive screening and rehabilitation for OHCA patients.

Finally, there is uncertainty about who should have the mandate, authority, and accountability for the implementation of the intervention. To gain a comprehensive understanding of this factor, interviews with medical department chairmen and managers should be conducted.

5. CONCLUSION

Systematic cognitive screening and rehabilitation are not implemented for patients after an out-of-hospital cardiac arrest in the Netherlands. Although, the intervention fits with current practices, local protocols are available, and all most relevant stakeholders have a positive attitude towards implementation. A barrier for implementation is the lack of a practical instruction in the current guideline cardiac rehabilitation. Evidence supporting this intervention is required for inclusion. Also, a lack of awareness and knowledge about cognitive consequences and a lack of structural cooperation are hindering the implementation. A positive aspect towards implementation is that these barriers are relatively easy to solve. Research can be performed at hospitals and rehabilitation centres where they already have implemented the intervention, the knowledge gap can be overcome by training, and structural cooperation can be improved by e.g. a multidisciplinary consultation.

List of abbreviations

ADL: activities of daily living

CLCE-24: checklijst cognitie en emotie

DTC: diagnosis treatment combination

MDC: multidisciplinary consultation

MoCA: Montreal Cognitive Assessment

OHCA: Out-of-hospital cardiac arrest

TICD: Tailored Implementation for Chronic Diseases

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DECLARATIONS

Ethics approval and consent to participate

Approval was granted by the Ethics Committee of the University Twente. Verbal consent was obtained prior to the interviews and was audio recorded.

Consent for publication

Participants provided consent before participating in the study, which included consent to use anonymous quotes from individual participants.

Availability of data and materials

The datasets used and analysed during the current study are available from the authors on reasonable request.

Competing interests

L.S. Folkert and L.W. Klaver declare that they have no competing interests.

Funding

None.

Authors' contributions

Both authors contributed to all parts of the research.

Acknowledgements

We thank the study participants for their time and willingness to participate in the interviews.

APPENDIX A

THEORETICAL FRAMEWORK

Current guidelines and care process OHCA

The survival rate after OHCA is about one-fourth, the other patients remain in a comatose state due to a severe neurological injury or pass away during or shortly after the arrest [1]. The survivors of OHCA receive treatment that focuses on restoring quality of life and managing or increasing functional capacity [27]. Cardiac rehabilitation is recommended as an intervention to improve the life of OHCA survivors and other patients who experienced a cardiac incident [4,28]. The patient participates in the cardiac rehabilitation program for 3 to 6 months [4].

Cardiac rehabilitation consists of multiple programs which include physical, psychological, and social goals, and goals related to influencing risk behaviour [4]. The program can be facilitated in groups or individually. The overall aim is to limit the negative effects of heart disease, both physiological and psychological. In addition, cardiac rehabilitation reduces risks of another cardiac incident or death and controls and stabilizes the symptoms and progression related to cardiac diseases.

To achieve the physical goal, patients will learn about their physical limits and will improve their exercise capacity. Wenger states that improvements are measured in exercise tolerance as a result of the exercise training, and he states the importance of the training. [29].

The second goal of cardiac rehabilitation is the psychological goal which can be achieved by recovering emotional balance and learning to overcome the fear of exercise. Due to the cardiac incident, symptoms of, for example, depression and anxiety may occur.

Thirdly, the social goal consists of regaining emotional balance and resumption within relationship, family, social environment, and work. This goal focuses on reducing the limitations and participation problems. The last goal, the influencing risk behaviour goal, consists of creating familiarity with the disease and its risk factors. The patients will quit smoking, follow a healthy diet, adhere to medication, and develop a physically active lifestyle.

The cardiac rehabilitation program is offered by a team of professionals, including amongst others cardiologists, rehabilitation specialists, nurses, psychologists and physiotherapists [4]. The rehabilitation specialist has the final responsibility.

Cognitive screening and rehabilitation

Provision of diagnosis, support, and treatment to cope with cognitive impairments holds the potential to improve the outcome of OHCA survivors. Both the Dutch guidelines for cardiac rehabilitation in 2011 as the European Resuscitation Council Guidelines in 2015 advise screening for cognitive impairments and referral to cognitive rehabilitation when cognitive impairments are found [4,8].

Currently, there is no gold standard for cognitive screening. It is recommended to perform screening using the Montreal Cognitive Assessment (MoCA), although this screening instrument is not validated in patients after OHCA [8,9]. Screening for cognitive impairments has to be performed at an early stage to prevent additional and unnecessary stress for the patients and their relatives in an already stressful situation [30]. The MoCA is a simple, stand-alone cognitive screening tool and takes only 10 minutes for a trained nurse [8,9]. With a sensitivity of 90% for detecting mild cognitive impairments, it is the best brief screening tool available at this moment. The MoCA measures short-term memory, visuospatial abilities, executive functions, attention, concentration and working memory, language, and orientation to time and place. The maximum score of the MoCA is 30, patients with a score lower than 26 may have cognitive impairments. It is recommended to refer the patient to a neuropsychologist or rehabilitation specialist in case there are signs of cognitive impairments [8]. In patients after OHCA, the cognitive domains of memory, attention, and executive functioning are most often affected [2].

Cognitive rehabilitation can be defined as “any intervention strategy or technique which enables patients and their families to live with, manage, by-pass, reduce or come to terms with cognitive deficits precipitated by injury of the brain” [31]. In 2007, the Dutch Consortium Cognitive Rehabilitation published the guideline for cognitive rehabilitation in patients with acquired brain

injury [6]. The guideline describes that cognitive rehabilitation should not focus on the reduction of cognitive impairments, but on coping with cognitive deficits. It teaches patients how to deal with or compensate for cognitive deficits to retain optimal participation in society. The effectiveness of cognitive rehabilitation is proven for patients with acquired brain injury resulting from stroke or traumatic brain injury. OHCA survivors will likely benefit in the same way as these patients [5].

In 2016, the workbook 'Rehabilitation after Resuscitation' was published by Boyce and colleagues [20]. The workbook describes how an integrated care pathway for patients after OHCA can be organized. The described pathway is implemented in the Basalt Rehabilitation Centre. The workbook proposes to conduct a consultation and cognitive screening in the first weeks after hospital discharge by a specialized nurse, physician assistant, or social worker. The compact intervention 'Stand still …, and move on' developed by Moulaert and colleagues is used to inform patients and partners about the cognitive consequences after cardiac arrest [32]. Afterwards, a patient will be referred to one of three proposed rehabilitation paths. The cognitive rehabilitation path is recommended for patients with severe cognitive impairments (MoCA < 19). In this path the cognitive rehabilitation is central, the cardiologist advises about the cardiac capability, and the goals of the cardiac rehabilitation are as much as possible addressed individually. The combination path is recommended for patients with mild to moderate cognitive impairments. In this path, the patient participates in a small group in the cardiac rehabilitation program as described in the previous paragraph. At the end of the program, a cognitive rehabilitation specialist determines whether neuropsychological examination or a follow-up cognitive rehabilitation path is needed. Finally, the cardiac rehabilitation path is recommended for patients without signs of cognitive impairments. In this path, the patient participates in a regular cardiac rehabilitation program, yet patients are easily referred to a cognitive rehabilitation specialist if signs of cognitive impairments appear.

In this proposed integrated rehabilitation program, healthcare professionals of the cardiac rehabilitation team should have knowledge about cognitive problems. But also, healthcare professionals of the cognitive rehabilitation team should have knowledge about cardiac capability

principles. The workbook is established according to the treatment framework of rehabilitation medicine [33].

However, despite the availability of this workbook, the reliable cognitive screening tool MoCA, the guideline for cognitive rehabilitation, and the recommendation in the cardiac rehabilitation guideline, systematic cognitive screening and rehabilitation are not yet implemented in cardiac rehabilitation programs nationwide.

Factors that facilitate or hinder implementation of innovations

Implementation frameworks provide guidance when identifying barriers and facilitators of innovations. One of such frameworks is the comprehensive Tailored Implementation in Chronic Diseases (TICD) checklist of Flottorp et al for identifying determinants for improvements in healthcare practice [11]. The TICD checklist aims to provide guidance for the data collection and analysis.

The TICD checklist is based on 12 other frameworks that were reviewed by Flottorp et al to create a comprehensive framework without overlap or repetition. The checklists on their own are not comprehensive in comparison with the list of determinants based on the 12 checklists together [11].

The TICD checklist contains 57 factors which are categorized into 7 domains: guideline factors, individual health professional factors, patient factors, professional interactions, incentives and resources, capacity of organisational change, and social, political, and legal factors.

TICD checklist applied in previously conducted research

Several previously conducted studies applied the TICD checklist in their research. For example, Cadilhac et al used the framework of Flottorp et al to check whether all domains were included in their interview scheme to identify barriers and facilitators for the implementation of evidence-based stroke care [22]. A result of this study is the absence of a stroke unit in hospitals which was identified as a

major barrier. Other barriers that were found are lack of capable leadership, financial constraints resulting in limited staff resources, and equipment. These barriers can be placed in the domains: incentives and resources and capacity for organisational change. The guideline factor domain is identified as a facilitator due to presence and availability of protocols and guidelines for stroke care. Furthermore, Lescure et al used Flottorp's framework to explore determinants of hand hygiene compliance in long-term care facilities for elderly residents [24]. The researchers used the TICD checklist for developing their topic guide for the focus groups and performing the content analysis. The findings of this study cover all domains of the Flottorp checklist besides the social, political, and legal factors. For example, the researchers found that usage of gloves as a substitute for handwashing was a barrier in the knowledge and skills in the individual health professional factors domain. In addition, replenishment of soap and tissues and understaffing in the domain of incentives and resources are identified as a barrier.

Also, Tobiano et al applied the TICD checklist as a determinant framework when researching the barriers to bedside handover in the perception of nurses. Barriers were found in the domains of individual health professional factors, patient factors, guideline factors and social, political, and legal factors. For example, the barriers found in individual health professional factors are self-efficacy and intention and motivation of the nurses to perform handover. Some examples of the patient factors are patient behavior and patient preferences, this mostly resulted from patients' capability to participate in handover [34].

In addition, Hoffmann et al applied the TICD checklist as a coding framework to identify barriers and facilitators of the acceptance of video consultations in the opinion of mental health specialists. In this research, the individual health professional factors and patient factors resulted as most relevant determinants [23]. A facilitator in these domains resulted from the benefits for patients in rural areas, being low-threshold access and quick help. Another facilitator is professional interaction between the mental health specialist and family physician due to the video consultation that involves the family doctor in the care process. Barriers found in patient factors are the concerns about the technology and suitability of various mental health conditions for the video consultations. In contrast with Tobiano's

research, the domains guideline factors and social, political, and legal factors were barely mentioned. This could be due to Hoffmann's limitations of including small sample size and one mental health specialist from a rural area.

At last, Skolarus et al used the TICD checklist to gain insight in the determinants of acute stroke thrombolysis [35]. The research is one of the first studies that applied the TICD checklist in an acute setting for data collection, analysis, and interpretation. The results of the research state that most determinants found in practice were covered by the TICD. However, Skolarus et al. found three additional determinants which could be added to the checklist for acute settings. These determinants are healthcare professional turnover, healthcare professional burnout, and surrogate decision-making [35]. Furthermore, the researchers found guideline factors, individual health professional factors, and patient factors as barriers to the thrombolysis treatment. These resulted from the specialists being skeptical of the benefits of the thrombolysis treatment. Their skepticism may have had negative effects on the patients that can influence the decision for the treatment. In addition, facilitators are found in professional interactions and in the determinants of capable leadership and quality assurance for guiding the thrombolysis treatment. These findings come from the strength of communication and competent leaders in the emergency department.

Overall, the most mentioned domains in which these researchers found determinants are individual health professional factors, incentives and resources, guideline factors, and patient factors. The least cited determinants come from the domain social, political, and legal factors. The three additional determinants in the research of Skolarus et al. have not been investigated yet in other research or other settings, and therefore these determinants will not be added to the TICD checklist in this research [35]. Eventually, the outcome of the determinants is context specific and thus all seven categories of the TICD checklist will be applied to this research.

Factors that facilitate or hinder implementation of cognitive screening and rehabilitation: previously conducted research

In 2018, Boyce and colleagues performed a study to assess the uptake of the recommendations for OHCA patients [10]. This study explored the barriers and facilitators for an integrated cardiac and cognitive rehabilitation program based upon the framework of Grol and Wensing. This framework categorises factors influencing the implementation of innovations into six levels: the innovation itself (e.g. advantages in practice and feasibility), the individual professional (e.g. awareness, knowledge, and attitude), the patient (e.g. knowledge, attitude, and compliance), the social context (e.g. opinion of colleagues and collaboration), the organisational context (e.g. resources and structures) and the economic & political context (e.g. financial arrangements, regulations, and policies) [36]. An internet-based questionnaire was sent and completed by 16 cardiologists and 29 rehabilitation specialists in Dutch rehabilitation centres and hospitals that provide cardiac and or cognitive rehabilitation [10]. A facilitator at the level of the innovation itself was identified, namely the added value of an integrated cardiac and cognitive rehabilitation program for OHCA patients that was recognized by a majority of the cardiologists and rehabilitation specialists. Also, the organisational facilitator of already existing collaborations between departments was identified. Barriers found in the study of Boyce et al can be categorised into the levels of the individual professional, the organisational context, and the economic and political context. One identified barrier is the lack of knowledge of specialists regarding cognitive problems for an accurate referral. Identified organisational barriers are logistic problems, the small number of patients, and difficulties in structural cooperation between cardiac and cognitive rehabilitation. Additionally, the study identified the fear of an increase of administrative load and not achieving production agreements as a barrier.

APPENDIX B

Argumentation data collection method

In the methods section it was already discussed why a qualitative research was performed. Below our other choices with regards to the data collection method will be elaborated on.

It was chosen to perform individual interviews and not focus groups. The aim of this research was to gain an understanding of why implementation has not occurred from multiple perspectives. Therefore, a broad range of stakeholders was asked to participate. For this research, it was not desirable that the different stakeholders exchange their ideas and influence each other's perspectives. Also, there could be power differences between different stakeholders, such as for example between a cardiologist and a specialized nurse, which could influence the outcome of a focus group negatively. With individual interviews insights could be gained for each perspective separately [16,37]. Furthermore, it was decided to conduct semi-structured interviews and not open or structured interviews. Semi-structured interviews offer the possibility to address the categories of the TICD checklist, to ask further about specific topics and to not leave the entire conversation in the hands of the respondent.

In addition, this research is a qualitative descriptive research, because it did aim to provide a description of one phenomenon, namely the implementation of systematic cognitive screening and rehabilitation, and did not aim to test a relation between two or more phenomena or variables [38].

APPENDIX C

Consolidated criteria for reporting qualitative research (COREQ) [15]

No.	Item	Guide questions/description	Reported on page No.
Domain 1: Research team and reflexivity			
Personal Characteristics			
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group?	9
2.	Credentials	What were the researcher's credentials? *E.g., PhD, MD*	0
3.	Occupation	What was their occupation at the time of the study?	0
4.	Gender	Was the researcher male or female?	♀♀
5.	Experience and training	What experience or training did the researcher have?	0
Relationship with participants			
6.	Relationship established	Was a relationship established prior to study commencement?	8
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? e*.g., personal goals, reasons for doing the research*	10
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g., *Bias, assumptions, reasons and interests in the research topic*	10
Domain 2: study design			
Theoretical framework			

9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis*	7
Participant selection			
10.	Sampling	How were participants selected? *e.g. purposive, convenience, consecutive, snowball*	8
11.	Method of approach	How were participants approached? e.*g. face-to-face, telephone, mail, email*	8
12.	Sample size	How many participants were in the study?	10
13.	Non-participation	How many people refused to participate or dropped out? Reasons?	10
Setting			
14.	Setting of data collection	Where was the data collected? e.*g. home, clinic, workplace*	9
15.	Presence of non-participants	Was anyone else present besides the participants and researchers?	9
16.	Description of sample	What are the important characteristics of the sample? *e.g. demographic data, date*	8 (expertise)
Data collection			
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	8+9
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many?	9
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data?	9
20.	Field notes	Were field notes made during and/or after the interview or focus group?	9

21.	Duration	What was the duration of the interviews or focus group?	9
22.	Data saturation	Was data saturation discussed?	10+ 23,24
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction?	9
Domain 3: analysis and findings			
Data analysis			
24.	Number of data coders	How many data coders coded the data?	8
25.	Description of the coding tree	Did authors provide a description of the coding tree?	9
26.	Derivation of themes	Were themes identified in advance or derived from the data?	9
27.	Software	What software, if applicable, was used to manage the data?	9
28.	Participant checking	Did participants provide feedback on the findings?	11
Reporting			
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? E.g. *participant number*	11-17
30.	Data and findings consistent	Was there consistency between the data presented and the findings?	11-17 +23
31.	Clarity of major themes	Were major themes clearly presented in the findings?	11-17+ 21,22
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	11-17+ 21,22

APPENDIX D

List of Stakeholders

The list of stakeholders is based on findings in literature and personal communication with a neurologist, a cardiovascular nurse, and an expert in rehabilitation after resuscitation. There are already some stakeholders identified from the Flottorp et al checklist [11]. In the checklist is also stated to look at the availability of resources. In which they refer to financial and human resources, facilities, equipment, supplies, and technical capacity. From this, the following stakeholders can be identified: insurance companies and the ICT department.

Other stakeholders are found in the research of Lilja et al, the cardiac rehabilitation guideline, and in the workbook of Boyce [4,20,30].

The complete list of stakeholders:

Patients	Neurologists	Speech therapist
Hospital manager	Rehabilitation physician	General Practitioner
Rehabilitation centre	Neuropsychologist	Psychologist
manager	Dietitian	Sexologist
Policymakers	Specialized nurse	
Insurance company	Cardiologist	
ICT department	Social worker	
Occupational therapist	Physiotherapist	

APPENDIX E

Power-interest grid

To get insight into to most relevant stakeholders a power interest grid has been used [39]. The grid is filled out based on the findings in the list above, Appendix D. Two questions were used to determine where the stakeholders stand in the grid: How close do they stand to the problem? And how much influence do they have on the problem? The following power-interest grid is a result of this:

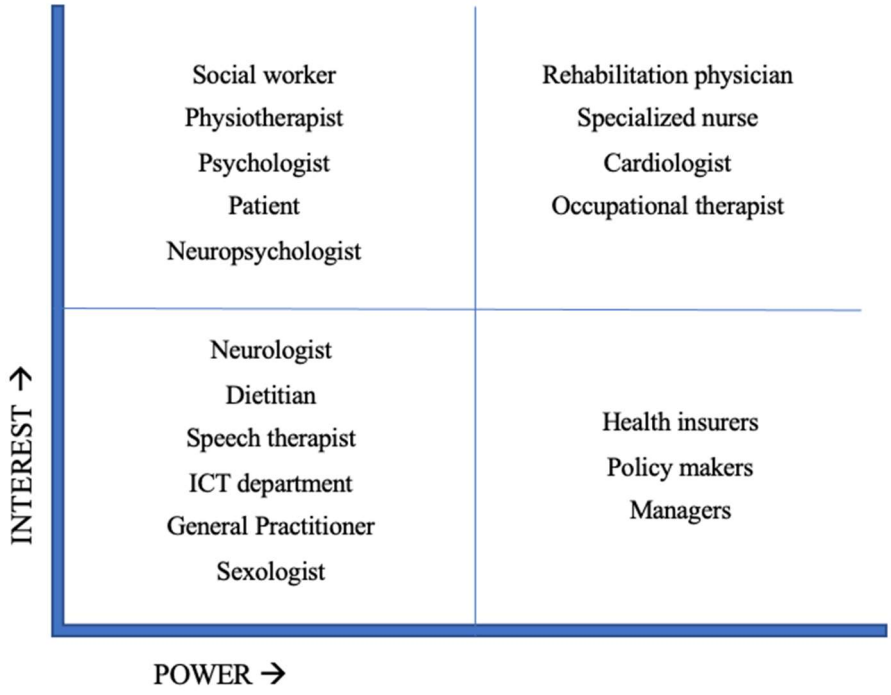

Figure 2: Power-Interest Grid

Ackermann and Eden [39] describe the four quadrants of the grid as four categories of stakeholders. Stakeholders in the top right quadrant are people who have high interest and high power these need the most attention. Power refers to the influence to affects a firm's strategy. The interest refers to the amount of stake a person has in the firm.

Based on this power-interest grid, see figure 2, the most relevant stakeholders are identified: the cardiologist, the rehabilitation physician, the specialized nurse, and the occupational therapist. These stakeholders are directly involved in the care of OHCA survivors and have the power to influence the current care process. Other relevant stakeholders are the health insurer, policymaker, and managers.

These are the stakeholders with high power to influence the implementation of the intervention. For this research has been decided to create two groups of stakeholders to get a broader view of the stakeholders involved in the implementation of cognitive screening and rehabilitation. The groups are the healthcare professionals and the insurers, managers, and policymakers.

APPENDIX F

Interview topic guide

1. Guideline Factors
    - Recommendation
    - Recommended clinical intervention
    - Recommended behaviour

2. Individual Health Professional Factors
    - Knowledge and skills
    - Cognitions
    - Professional behaviour

3. Patient Factors

4. Professional interactions

5. Incentives and resources

6. Capacity for organisational change

7. Social, political, and legal factors

APPENDIX G

Semi-structured interview scheme general

Introduction:

Hi, thank you very much for participating in our research. We are Lieneke & Lois, third-year students Health Sciences at the University of Twente. We are currently working on our bachelor thesis which is about the implementation of systematic cognitive screening and rehabilitation for patients after a cardiac arrest. The aim of our study is to identify barriers and facilitators for the implementation in cardiac rehabilitation programs. Therefore, we conduct interviews with various stakeholders, so with amongst others you as …

Before we start the interview, I would like to ask if you give us permission to record this interview, so that we can listen to it and analyse this interview later. The recordings will be deleted afterwards. Do you give permission for this?

[Start recording and ask again for permission]

We would like to emphasize that there are no right or wrong answers to the questions we will be asking. Furthermore, the answers will be anonymized, so that the answers given cannot be traced back to you. Your identity will not be revealed in any publication resulting from this interview. We may use quotes of your interview, but your answers are completely anonymous. The collected data will be stored for a maximum of 15 years on a secure server of the University of Twente.

Your participation in this interview is voluntary. You may withdraw the interview at any time, and you may always ask for clarification if you do not understand a question. The interview will last approximately 30 minutes. Do you have any questions before we start?

1. To begin with, can you tell us something about yourself and your professional background?
    - How are you involved in the current care for patients after cardiac arrest?
2. What do you already know about cognitive screening and rehabilitation? (Informative text)
    - What do you think of systematic cognitive screening and rehabilitation for patients after cardiac arrest?
        - Added value
    - In the current care process for patients after cardiac arrest, there is no systematic screening and referral to cognitive rehabilitation.
        - Wat do you think about that?
        - What do you think is the reason for that?

Guideline factors

3. Do you think cognitive screening and rehabilitation fit in the current care process for patients after cardiac arrest? Why? *(Fits with current practices and with existing guidelines)*
    a. Feasibility
    b. Effort/benefits ratio
4. To what extent do you think that the presence of (scientific) evidence can be a barrier or facilitator for the implementation of systematic cognitive screening and rehabilitation?

Individual health professional factors

5.
    a. To what extent is the information available to you to perform cognitive screening and rehabilitation? And for other healthcare professionals?
        - Availability protocols and guidelines
    b. Do you think healthcare professionals have to develop additional knowledge and skills to perform the cognitive screening and rehabilitation? If yes, which?

Patient factors

6. How do you think patients feel about cognitive screening and rehabilitation? *(What will be their attitude towards it?)*
    a. Need
    b. Motivation
    c. Other barriers or facilitators *(Practical issues)*

Professional interactions

7.
    a. Are there aspects about the cooperation of professionals that influence the implementation of systematic cognitive screening and rehabilitation?
        - Are there influences of colleagues, organizations or other influential people?
    b. To what extent does existing communication between healthcare professionals facilitator or hinder the implementation of systematic cognitive screening and rehabilitation?
        - Structural cooperation between cardiology and neurology
        - Communication and referral between rehabilitation centres and hospitals
        - What is needed for this?

Incentives and resources

8. To what extent are the resources required for cognitive screening and rehabilitation available?
    a. Facilities *(e.g., equipment, space, etc.)*
    b. Capacities *(e.g., personnel)*
    c. Information systems *(e.g., EPD, intranet, ICT)*
    d. Training
    e. Support
    f. Logistics *(is it logistically feasible in terms of planning, cardio-neuro, rehabilitation centres-hospitals)*
    g. Screening instrument
        - Are there financial motives to do perform or do not perform the cognitive screening and rehabilitation? If yes, which?

Capacity for organisational change

9. Do you think organization changes are needed to perform cognitive screening and rehabilitation? If yes, which?
    a. Who will be responsible for this?
    b. Changes in leadership and management?
10. To what extent do regulations or policies facilitate or hinder the implementation and execution of systematic cognitive screening and rehabilitation?
    a. Internal
    b. External

Social, political and legal factors

11. To what extent do you think the implementation and execution of cognitive screening and rehabilitation is influenced by social, political or legal factors?
    (e.g., budget, contracts (healthcare providers), legislation, payer or funder policies, influential people)

Other / closure

12. Are there any other barriers or facilitators for the implementation of systematic cognitive screening and rehabilitation that we have not discussed yet, but are relevant?
13. Do you have any other additions or questions?

    - *Are you interested in checking the transcript of this interview?*
    - *May we ask you for clarification for the analysis if needed?*

Informative text

The text below is used to inform the participant when the participant had no pre-existing knowledge about cognitive screening and rehabilitation. The follow-up questions of question two about the opinion of the participant about the intervention and the added value, were not asked if the participant had no pre-existing knowledge about the intervention.

In the Netherlands about one-third survives a cardiac arrest. Over the last decades it has become clear that about half of those survivors have cognitive impairment after resuscitation. The current care process for patients after a cardiac arrest is mainly focused on cardiac functioning. The patients receive cardiac rehabilitation that focuses on physical, psychological and social goals. Systematic cognitive screening and rehabilitation are not implemented yet in most cardiac rehabilitation programs.
Long-term effects: It has been shown that rehabilitation treatment aimed at cognitive impairment can have a positive effect on quality of life, participation and healthcare costs.
The Dutch cardiac rehabilitation guideline recommends healthcare professionals to pay attention to cognitive impairments. No practical instruction is given, only a recommendation.
Information about cognitive screening: the European guideline recommends the MoCA test. This test can be taken in 10 minutes. There is no validated cognitive screening tool for patients after cardiac arrest.
Information about cognitive rehabilitation: guideline cognitive rehabilitation non-congenital brain damage can be used: first neuropsychological examination and then therapy that focuses on learning to deal with or cope with cognitive impairments. Cognitive rehabilitation has not yet been proven effective for patients after cardiac arrest. It has been proven effective for patients with other types of non-congenital brain damage, such as a stroke or traumatic brain injury, and it is likely that patients after cardiac arrest will benefit in the same way as these patients.

Semi-structured interview scheme healthcare professionals (Dutch)

Introduction:

Hallo, hartelijk bedankt dat u bereid bent om deel te nemen aan ons onderzoek. Wij zijn Lieneke & Lois en wij zijn derdejaars studenten Gezondheidswetenschappen aan de Universiteit Twente. Op dit moment zijn wij bezig met onze afstudeeropdracht voor de bachelor die gaat over de implementatie van systematische cognitieve screening en revalidatie voor patiënten na een harstilstand. Het doel van ons onderzoek is om de belemmerende en bevorderende factoren te identificeren voor implementatie binnen hartrevalidatieprogamma's. Daarvoor nemen wij verschillende stakeholder interviews af, met dus onder andere u als …

Voordat we starten met het interview wil ik u vragen of u ons toestemming geeft dit interview op te nemen, zodat we dit interview later kunnen terugluisteren en analyseren. De opnames zullen daarna worden verwijderd. Gaat u hiermee akkoord?

[Start opname en nogmaals vragen om toestemming]

Wij willen nog graag benadrukken dat er geen goede of foute antwoorden zijn op de vragen die we zullen stellen. Verder zullen de antwoorden geanonimiseerd worden waardoor de gegeven antwoorden niet naar u te herleiden zijn. Uw identiteit zal in geen enkele publicatie resulterend van dit interview genoemd worden. We kunnen quotes gebruiken, maar uw antwoorden zijn compleet anoniem. De gegevens zullen maximaal 15 jaar bewaard worden op een beveiligde server van de Universiteit Twente.

Uw deelname is vrijwillig. U heeft op elk moment de mogelijkheid te stoppen met dit interview en u mag altijd om verduidelijking vragen wanneer u een vraag niet helemaal begrijpt. Het interview zal ongeveer 30 minuten duren. Heeft u nog vragen voordat we beginnen met het interview?

1. Om te beginnen, kunt u iets vertellen over uzelf en uw professionele achtergrond?
    - Hoe bent u betrokken bij de huidige zorg voor patiënten na een harstilstand?
2. Wat weet u over cognitieve screening en revalidatie? (*Informatieve tekst)*
    - Wat vindt u van cognitieve screening en revalidatie voor patiënten na een hartstilstand?
        - Meerwaarde
    - In de reguliere zorg voor patiënten na een harstilstand wordt er niet systematisch gescreend en doorverwezen naar de cognitieve revalidatie.
        a. Wat vindt u daarvan?
        b. Waar denkt u dat dit door komt?

Guideline Factors

3. Denkt u dat cognitieve screening en revalidatie passend is in het huidige zorgproces voor patiënten na een hartstilstand? Waarom? *(Passend in de huidige praktijk en bij bestaande richtlijnen)*
    a. Uitvoerbaarheid
    b. Moeite/voordelen verhouding

Individual health professional factors

4.
    a. In hoeverre is de informatie voor u beschikbaar om de cognitieve screening en revalidatie uit te voeren? En voor andere zorgprofessionals?
        - Beschikbaarheid protocollen en richtlijnen
    b. Denkt u dat zorgprofessionals aanvullende kennis en vaardigheden moeten ontwikkelen om de cognitieve screening en revalidatie uit te voeren? Zo ja, welke?
        - In hoeverre zou u iets moeten veranderen aan uw huidige praktijk om de cognitieve screening en revalidatie uit te voeren?

Patient Factors

5. Hoe denkt u dat patiënten tegenover de cognitieve screening en revalidatie staan?

a. Behoefte
b. Motivatie
c. Andere belemmeringen of bevorderingen *(praktische zaken)*

Professional interactions

6.
   a. Zijn er aspecten rondom de samenwerking van professionals die de implementatie van cognitieve screening en revalidatie beïnvloeden?
      - Zijn er invloeden van collega's, organisaties of andere invloedrijke mensen?
   b. In welke mate bevordert of belemmert de bestaande communicatie tussen zorgprofessionals de uitvoering van systematische c ognitieve screening en revalidatie?
      - Structurele samenwerking tussen cardiologie en neurologie
      - Communicatie en verwijzing tussen revalidatiecentra en ziekenhuizen
      - Wat is daarvoor nodig?

Incentives and resources

7. In hoeverre zijn de middelen die nodig zijn voor cognitieve screening en revalidatie beschikbaar?
   a. Faciliteiten *(e.g. apparatuur, ruimte, etc.)*
   b. Capaciteiten *(e.g. personeel)*
   c. Informatiesystemen *(e.g. EPD, intranet, ICT)*
   d. Scholing
   e. Steun *(van bovenaf en onder collega's)*
   f. Logistiek *(is het logistiek haalbaar qua planning, cardio-neuro, revalidatiecentra-ziekenhuizen)*
      - Zijn er financiële motieven om de cognitieve screening en revalidatie wel of niet uit te voeren? Zo ja, welke?

Capacity for organisational change

8. Zijn er volgens u organisatorische veranderingen nodig om de cognitieve screening en revalidatie uit te voeren? Zo ja, welke?
   a. Wie is daar verantwoordelijk voor?
   b. Veranderingen in leiderschap en management?
9. In welke mate bevorderen of belemmeren regelgeving of beleid de implementatie en uitvoering van cognitieve screening en revalidatie?
   a. Intern
   b. Externe

Social, political and legal factors

10. In hoeverre denkt u dat de implementatie en uitvoering van cognitieve screening en revalidatie wordt beïnvloed door sociale, politieke of juridische factoren? *(Bijv. Budget, Contracten (zorgaanbieders), Wet- en regelgeving, Beleid van betalers/financiers, Invloedrijke mensen)*

Overig/afsluiting

11. Zijn er verder nog belemmeringen of bevorderingen voor de implementatie van systematische cognitieve screening en revalidatie, die we nog niet besproken hebben maar wel relevant zijn?
12. Heeft u verder nog toevoegingen of vragen?
    - *Heeft u interesse om het transcript van dit interview te controleren?*
    - *Mogen wij u om verduidelijking vragen bij de analyse van het transcript mocht dat nodig zijn?*

Semi-structured interview scheme health insurers (Dutch)

Introduction

1. Om te beginnen, kunt u iets vertellen over uzelf en uw professionele achtergrond?
2. Wat weet u over cognitieve screening en revalidatie? *(Zie informatieve tekst)*
    - *Wat vindt u van cognitieve screening en revalidatie voor patiënten na een hartstilstand?*
    - *Systematische cognitieve screening en revalidatie is geen onderdeel van de reguliere zorg voor patiënten na een hartstilstand.*
        a. *Wat vindt u daarvan?*
        b. *Waar denkt u dat dit door komt?*
3. Wat weet u over de vergoeding voor cognitieve screening en revalidatie voor patiënten na een hartstilstand?
    - Komt het in aanmerking voor vergoeding?
    - Hoe werkt dat dan? (Vergoeding structuur)
        - Binnen DBC-hartrevalidatie?
        - Binnen nazorg cardioloog?
            - (Waar is de cognitieve screening en revalidatie in het zorgproces voor patiënten na een hartstilstand het meest passend?)
4. In hoeverre denkt u dat de verzekeraar bevorderend kan zijn voor de implementatie van systematische cognitieve screening en revalidatie?
    a. Hoe werkt dat dan?
    b. Belemmeringen.

Guideline factors

5.
    a. In hoeverre kan een richtlijn belemmerend of bevorderend zijn voor een zorginnovatie om in aanmerking te komen voor een vergoeding?
    b. In de huidige richtlijn hartrevalidatie staat een aanbeveling om aandacht te besteden aan cognitieve problematiek, in hoeverre kan dit belemmerend of bevorderend werken?

6. In hoeverre denkt u dat de aanwezigheid van (wetenschappelijk) bewijs een belemmering of bevordering kan zijn voor het vergoeden van de cognitieve screening en revalidatie?
    a. Er is nog geen gevalideerd screeningsinstrument voor cognitieve problematiek voor patiënten na een harstilstand. In de Europese richtlijn wordt de MoCA geadviseerd. In hoeverre denkt u dat dit wel of geen probleem is voor het vergoeden van de cognitieve screening?
    b. De cognitieve revalidatie is nog niet bewezen effectief voor patiënten na een harstilstand. Deze is voor patiënten met andere vormen van niet aangeboren hersenschade effectief bewezen en het is waarschijnlijk dat patiënten na een hartstilstand er op dezelfde manier van zullen profiteren. In hoeverre denkt u dat dit wel of geen probleem is voor het vergoeden van de cognitieve revalidatie?

Incentives and resources

7. Wat is er nodig voor zorgverzekeraars om de cognitieve screening en revalidatie te vergoeden?
    - Uit de interviews met zorgprofessionals is gebleken dat vooral personeel, scholing, tijd en geld belangrijke middelen zijn voor de implementatie van cognitieve screening en revalidatie. In hoeverre denkt u dat deze benodigde

middelen voor cognitieve screening en revalidatie een bevorderende of belemmerende factor kunnen zijn voor de zorgverzekeraar?

8. Zijn er financiële motieven om de cognitieve screening en revalidatie wel of niet vergoeden? Zo ja, welke?

Social, political land legal factors

9. In hoeverre denkt u dat de implementatie en uitvoering van cognitieve screening en revalidatie beïnvloed wordt door sociale, politieke of juridische factoren?
   (Bijv. Budget, Contracten (zorgaanbieders), Wet- en regelgeving, Beleid van betalers/financiers, invloedrijke mensen)

Overig/afsluiting

10. Zijn er verder nog belemmeringen of bevorderingen voor de implementatie van systematische cognitieve screening en revalidatie, die we nog niet besproken hebben maar wel relevant zijn?
11. Heeft u verder nog toevoegingen of vragen?
    - *Heeft u interesse om het transcript van dit interview te controleren?*
    - *Mogen wij u om verduidelijking vragen bij de analyse van het transcript mocht dat nodig zijn?*

Semi-structured interview scheme manager (Dutch)

Introduction

1. Om te beginnen, kunt u iets vertellen over uzelf en uw professionele achtergrond?
2. Wat weet u over cognitieve screening en revalidatie? *(Zie informatieve tekst)*
    - Wat vindt u van cognitieve screening en revalidatie voor patiënten na een hartstilstand?
        - Meerwaarde?
    - Systematische cognitieve screening en revalidatie is geen onderdeel van de reguliere zorg voor patiënten na een hartstilstand.
        a. Wat vindt u daarvan?
        b. Waar denkt u dat dit door komt?

3. Hoe stond het management tegenover het project? (Steun)
4. *In uw ziekenhuis is een project opgezet waarbij al wordt gescreend op cognitieve problematiek en is er aandacht voor bij de revalidatie.* In hoeverre is het management volgens u bevorderend geweest voor de implementatie van dit project?
    a. Belemmerend
5. In hoeverre denkt u dat het management bevorderend kan zijn bij andere ziekenhuizen voor de implementatie van systematische cognitieve screening en revalidatie? Zo ja, hoe?
    a. Belemmeringen

Guideline Factors

6. Denkt u dat cognitieve screening en revalidatie passend is in het huidige zorgproces voor patiënten na een hartstilstand? Waarom? *(Passend in de huidige praktijk en bij bestaande richtlijnen)*
    a. Uitvoerbaarheid
    b. Moeite/voordelen verhouding?

Capacity for organisational change

7. Zijn er organisatorische veranderingen nodig geweest om de cognitieve screening en revalidatie uit te voeren? Zo ja, welke?
    a. Wie was daar verantwoordelijk voor?
    b. Zijn er veranderingen geweest in leiderschap en management voor het uitvoeren van cognitieve screening en revalidatie?
    c. Hoe ziet u dat voor andere ziekenhuizen?
8. In welke mate bevorderen of belemmeren regelgeving of beleid de implementatie en uitvoering van cognitieve screening en revalidatie?
    a. Intern
    b. Externe

Incentives and resources

9. In hoeverre zijn de middelen die nodig zijn voor cognitieve screening en revalidatie beschikbaar geweest?
    a. Faciliteiten *(e.g. apparatuur, ruimte, etc.)*
    b. Capaciteiten *(e.g. personeel)*
    c. Informatiesystemen *(e.g. EPD, intranet, ICT)*
    d. Scholing
    e. Steun *(van management aan zorgprofessionals, onder collega's)*
    f. Logistiek *(is het logistiek haalbaar qua planning, cardio-neuro, revalidatiecentra-ziekenhuizen)*

10. Uit interviews met zorgprofessionals is gebleken dat mankracht, tijd en geschoold personeel belangrijke middelen zijn. In hoeverre denkt u dat de beschikbaarheid van deze middelen een bevordering of belemmering kan zijn?
11. Zijn er financiële motieven om de cognitieve screening en revalidatie wel of niet uit te voeren? Zo ja, welke?

Social, political land legal factors

12. In hoeverre denkt u dat de implementatie en uitvoering van cognitieve screening en revalidatie worden beïnvloed door sociale, politieke of juridische factoren?
(Bijv. Budget, Contracten (zorgaanbieders), Wet- en regelgeving, Beleid van betalers/financiers, invloedrijke mensen)

Professional interactions

13.
    a. Zijn er aspecten rondom de samenwerking van professionals die de implementatie van cognitieve screening en revalidatie beïnvloeden?
        - Zijn er invloeden van collega's, organisaties of andere invloedrijke mensen?
    b. In welke mate bevordert of belemmert de bestaande communicatie tussen professionals de uitvoering van systematische cognitieve screening en revalidatie?
        - Structurele samenwerking tussen cardiologie en neurologie
        - Communicatie en verwijzing tussen revalidatiecentra en ziekenhuizen
        - Wat is daarvoor nodig?
            - Kunt u dat bieden?

Overig/afsluiting

14. Zijn er verder nog belemmeringen of bevorderingen voor de implementatie van systematische cognitieve screening en revalidatie, die we nog niet besproken hebben maar wel relevant zijn?
15. Heeft u verder nog toevoegingen of vragen?
    - *Heeft u interesse om het transcript van dit interview te controleren?*
    - *Mogen wij u om verduidelijking vragen bij de analyse van het transcript mocht dat nodig zijn?*

Semi-structured interview guideline maker (Dutch)

Introduction

1. Om te beginnen, kunt u iets vertellen over uzelf en uw professionele achtergrond?
2. Wat weet u over cognitieve screening en revalidatie? *(Zie informatieve tekst)*
    - *Wat vindt u van cognitieve screening en revalidatie voor patiënten na een hartstilstand?*
    - *Systematische cognitieve screening en revalidatie is geen onderdeel van de reguliere zorg voor patiënten na een hartstilstand.*
        a. *Wat vindt u daarvan?*
        b. *Waar denkt u dat dit door komt?*

3. In hoeverre denkt u dat een richtlijn bevorderend kan zijn voor de implementatie van systematische cognitieve screening en revalidatie? Zo ja, hoe?
    - Belemmeringen.
4. In hoeverre denkt u dat de implementatie van systematische cognitieve screening en revalidatie bevordert of belemmerd wordt door de huidige richtlijn voor de hartrevalidatie?

Guideline Factors

5. Denkt u dat cognitieve screening en revalidatie passend is in de huidige richtlijn voor de hartrevalidatie? Waarom*? (Passend in het huidige beleid en bij bestaande richtlijnen)*
    a. Uitvoerbaarheid
    b. Moeite/voordelen verhouding?

6. Er is geen specifieke richtlijn voor de revalidatie van patiënten na een hartstilstand. Zowel de richtlijn voor hartrevalidatie als voor cognitieve revalidatie zijn niet geschreven specifiek voor deze patiëntengroep. In hoeverre denkt u dat de afwezigheid hiervan invloed heeft op de zorg van deze patiëntengroep?

7. In hoeverre denkt u dat de aanwezigheid van (wetenschappelijk) bewijs voor de cognitieve screening en revalidatie voor patiënten na een hartstilstand een belemmering of bevordering kan zijn voor het opnemen van deze in de richtlijn?
    a. Er is nog geen gevalideerd screeningsinstrument voor cognitieve problematiek voor patiënten na een harstilstand. In de Europese richtlijn wordt de MoCA geadviseerd. In hoeverre denkt u dat dit wel of geen probleem is voor het opnemen van de cognitieve screening in de richtlijn?
    b. De cognitieve revalidatie is ook nog niet bewezen effectief voor patiënten na een harstilstand. Deze is voor patiënten met andere vormen van niet aangeboren hersenschade effectief bewezen en het is waarschijnlijk dat patiënten na een hartstilstand er op dezelfde manier van zullen profiteren. In hoeverre denkt u dat dit wel of geen probleem is voor het opnemen van de cognitieve revalidatie in de richtlijn?

Incentives and resources

8. In hoeverre denkt u dat de beschikbaarheid van de middelen die nodig zijn voor systematische cognitieve screening en revalidatie een belemmering of bevordering kunnen zijn voor implementatie/ opname in de richtlijn?
(Faciliteiten, Capaciteiten, Informatiesystemen, Scholing, Steun, Logistiek)

Capacity for organisational change

9. Zijn er volgens u organisatorische veranderingen nodig om de cognitieve screening en revalidatie te implementeren? Zo ja, welke?

Social, political land legal factors

10. In hoeverre denkt u dat de implementatie en uitvoering van cognitieve screening en revalidatie wordt beïnvloed door sociale, politieke of juridische factoren?
    (Bijv. Budget, Contracten (zorgaanbieders), Wet- en regelgeving, Beleid van betalers/financiers, invloedrijke mensen)

Overig/afsluiting

11. Zijn er verder nog belemmeringen of bevorderingen voor de implementatie van systematische cognitieve screening en revalidatie, die we nog niet besproken hebben maar wel relevant zijn?
12. Heeft u verder nog toevoegingen of vragen?
    - *Heeft u interesse om het transcript van dit interview te controleren?*
    - *Mogen wij u om verduidelijking vragen bij de analyse van het transcript mocht dat nodig zijn?*

Semi-structured interview policy advisors (Dutch)

Introduction

1. Om te beginnen, kunt u iets vertellen over uzelf en uw professionele achtergrond?
2. Welke factoren zijn volgens u het meest belangrijk voor het bepalen of een nieuwe innovatie in een bestaande behandelrichtlijn kan worden opgenomen?

3. En als we dan kijken naar het onderwerp dat wij onderzoeken, dat is de cognitieve screening en revalidatie. Wat weet u hier al over? *(Zie informatieve tekst)*
4. Welke factoren zouden een belemmering of bevordering kunnen zijn voor het opnemen van de cognitieve screening en revalidatie in de richtlijn hartrevalidatie?
    - *Wat vindt u van cognitieve screening revalidatie voor patiënten na een hartstilstand?*
    - *Systematische cognitieve screening en revalidatie is geen onderdeel van de reguliere zorg voor patiënten na een hartstilstand.*
        a. *Wat vindt u daarvan?*
        b. *Waar denkt u dat dit door komt?*

Guideline Factors

5. Denkt u dat de huidige regelgeving en het beleid in Nederland een belemmering of bevordering kan zijn voor de implementatie van deze zorginnovatie?
6. Denkt u dat cognitieve screening en revalidatie passend is in het huidige beleid voor patiënten na een hartstilstand/ huidige richtlijn voor de hartrevalidatie? Waarom? *(Passend in het huidige beleid en bij bestaande richtlijnen)*
    - Uitvoerbaarheid
    - Moeite/voordelen verhouding?

7. In hoeverre denkt u dat de aanwezigheid van (wetenschappelijk) bewijs voor de cognitieve screening en revalidatie voor patiënten na een hartstilstand een belemmering of bevordering kan zijn voor het opnemen van deze in de richtlijn?
    a. Er is nog geen gevalideerd screeningsinstrument voor cognitieve problematiek voor patiënten na een harstilstand. In de Europese richtlijn wordt de moca geadviseerd. In hoeverre denkt u dat dit wel of geen probleem is voor het opnemen van de cognitieve screening in de richtlijn?
    b. De cognitieve revalidatie is ook nog niet bewezen effectief voor patiënten na een harstilstand. Deze is voor patiënten met andere vormen van niet aangeboren hersenschade effectief bewezen en het is waarschijnlijk dat patiënten na een hartstilstand er op dezelfde manier van zullen profiteren. In hoeverre denkt u dat dit wel of geen probleem is voor het opnemen van de cognitieve revalidatie in de richtlijn?

Incentives and resources

8. Wat is er vanuit het perspectief van een beleidsmaker nodig om de systematische cognitieve screening en revalidatie landelijk te kunnen implementeren?
    - Middelen
    - Zijn er financiële motieven om de cognitieve screening en revalidatie te gaan implementeren of op te nemen in het beleid?

Capacity for organisational change

9. Zijn er volgens u organisatorische veranderingen nodig om de cognitieve screening en revalidatie te implementeren? Zo ja, welke?

Social, political land legal factors

10. In hoeverre denkt u dat de implementatie en uitvoering van cognitieve screening en revalidatie wordt beïnvloed door sociale, politieke of juridische factoren?
    - Gezondheidszorg budget
    - Contracten (zorgaanbieders)
    - Wet- en regelgeving
    - Beleid van betalers/financiers
    - Invloedrijke mensen

Overig/afsluiting

11. In hoeverre denkt u dat beleidsmakers/ het beleid bevorderend kunnen zijn voor de implementatie van systematische cognitieve screening en revalidatie? Zo ja, hoe?
    - Belemmeringen

11. Zijn er verder nog belemmeringen of bevorderingen voor de implementatie van systematische cognitieve screening en revalidatie, die we nog niet besproken hebben maar wel relevant zijn?
12. Heeft u verder nog toevoegingen of vragen?
    - *Heeft u interesse om het transcript van dit interview te controleren?*
    - *Mogen wij u om verduidelijking vragen bij de analyse van het transcript mocht dat nodig zijn?*

Informatieve tekst indien respondent geen kennis heeft van cognitieve screening en revalidatie:
In Nederland overleefd ongeveer 1/3 een hartstilstand. De laatste tien jaar is steeds duidelijker geworden dat ongeveer de helft van de patiënten na een reanimatie cognitieve stoornissen heeft. Het huidige zorgproces voor patiënten na een harstilstand is vooral gericht op het functioneren van het hart. De patiënten krijgen hartrevalidatie dat zich richt op fysieke, psychische en sociale doelen. Cognitieve screening en revalidatie zijn maar heel mondjesmaat opgenomen in hartrevalidatieprogramma's.
Lange termijneffecten: Er is aangetoond dat revalidatiebehandeling gericht op de cognitieve stoornissen een positief effect kan hebben op kwaliteit van leven, participatie en zorgkosten.
De richtlijn hartrevalidatie beveelt zorgprofessionals ook aan om aandacht te besteden aan cognitieve problematiek, maar er staat nog niet precies in hoe dat dan moet.
Informatie cognitieve screening: de Europese richtlijn adviseert de MoCA test. Deze kan in 10 minuten worden afgenomen. Er is nog geen gevalideerd screeningsinstrument voor patiënten na een hartstilstand.
Informatie cognitieve revalidatie: richtlijn cognitieve revalidatie niet aangeboren hersenschade gebruiken. Eerst neuropsychologisch onderzoek en vervolgens therapie dat zich richt op het leren omgaan met de mogelijke beperkingen. De cognitieve revalidatie is nog niet bewezen effectief voor patiënten na een harstilstand. Deze is voor patiënten met andere vormen van niet aangeboren hersenschade, zoals een beroerte of traumatisch hersenletsel, effectief bewezen en het is waarschijnlijk dat patiënten na een hartstilstand er op dezelfde manier van zullen profiteren.

APPENDIX H

Codebook

TICD Domain	Subcategory	Construct/ Subcode	Definition
Guideline factors	Recommendation	Quality of evidence supporting the recommendation	How confident we are in the estimates of effects
		Strength of recommendation	How confident we are that the desirable effects of adherence to the recommendation outweigh the undesirable effects
		Clarity	The clearness of the target population, the settings in which the recommendation is to be used and the recommended action
		Cultural appropriateness	The extent to which the recommendation is suitable in the social context where it is being implemented
		Accessibility of the recommendation	How accessible the guideline or recommendation is
		Source of the recommendation	The organisation(s) and people that made the recommendation
		Consistency with other guidelines	The extent to which the recommendation is consistent with recommendations in other guidelines with which the targeted healthcare professionals might be familiar
	Recommended clinical intervention	Feasibility	The extent to which the recommended clinical intervention is practical
		Accessibility of the intervention	The extent to which the recommended clinical intervention is accessible
	Recommended behaviour	Compatibility	The extent to which the recommended behaviour fits with current practices
		Effort	The amount of effort required to change or adhere
		Trialability	The ability to try out the recommended behaviour
		Observability	The degree to which benefits of the recommended behaviour are visible
	Inductive	Current guideline cardiac rehabilitation	The extent to which the current guideline cardiac rehabilitation facilitates or hinders adherence
		Added value of the innovation	The extent to which the targeted healthcare professionals acknowledge the added value of the innovation

Individual health professional factors	Knowledge and skills	Domain knowledge	The extent to which the targeted healthcare professionals have pre-existing knowledge or expertise about the targeted condition
		Awareness and familiarity with the recommendation	The extent to which the targeted healthcare professionals are aware of and familiar with the recommendation
		Knowledge about own practice	The extent to which the targeted healthcare professionals are aware of their own practice in relationship to the recommended practice
		Skills needed to adhere	The extent to which the targeted health professionals have skills that they need to adhere
	Cognitions (including attitudes)	Agreement with the recommendation	The extent to which the targeted healthcare professionals agree with the recommendation
		Attitudes towards guidelines in general	The perceptions that the targeted healthcare professionals have regarding guidelines in general
		Expected outcome	The extent to which the targeted healthcare professionals believe that adherence with the recommendation will lead to desired outcomes
		Intention and motivation	The extent to which the targeted healthcare professionals intend to adhere and are motivated to do so
		Self-efficacy	The targeted healthcare professionals' self-perceived competence or confidence in their abilities
		Learning style	The preferred ways in which the targeted healthcare professionals learn
		Emotions	The extent to which emotions affect adherence
	Professional behaviour	Nature of behaviour	Characteristics of the behaviour, including frequency of performance for a patient, frequency of performance for a population of patients, the degree of habit or automaticity, whether it is within a sequence of other

			behaviours that have to be performed, and whether it is performed by one person or by different people
		Capacity to plan change	The extent to which the targeted healthcare professionals have the capacity to plan necessary changes in order to adhere
		Self-monitoring or feedback	The extent to which the targeted healthcare professionals have the capacity for self-monitoring or feedback to reinforce adherence with the recommendation
Patient factors		Patient needs	Real or perceived needs and demands of the patient
		Patient beliefs and knowledge	Patients' beliefs or knowledge or ability to learn, or the targeted healthcare professionals' ability or perceived ability to inform or teach patients necessary knowledge and skills
		Patient preferences	Patients' values in relationship to professional values or those in the recommendation
		Patient motivation	The targeted healthcare professionals' ability or perceived ability to motivate patients to adhere
		Patient behaviour	Patient behaviours that motivate or demotivate adherence with the recommendation
	Inductive	Family	Family's values and behaviours that motivate or demotivate adherence with the recommendation
Professional interactions		Communication and influence	The extent to which the targeted healthcare professionals' adherence is influenced by professional opinions and communication
		Team processes	The extent to which professional teams or groups have the skills needed to adhere and interact in ways that facilitate or hinder adherence
		Referral processes	Processes for transferring patients and communication between different levels of

			care, between health and social services, and between the targeted healthcare professionals and targeted patients
Incentives and resources		Availability of necessary resources	The extent to which the resources that are needed to adhere are available
		Financial incentives and disincentives	The extent to which patients, individual health professionals and organisations have financial incentives or disincentives to adhere
		Nonfinancial incentives and disincentives	The extent to which patients, individual health professionals and organisations have nonfinancial incentives or disincentives to adhere
		Information system	The extent to which the information system facilitates or hinders adherence
		Quality assurance and patient safety systems	The extent to which existing quality assurance or patient safety systems facilitate or hinder adherence
		Continuing education system	The extent to which the continuing education system facilitates or hinders adherence
		Assistance for clinicians	The extent to which clinicians have the assistance they need to adhere
	Inductive	Screening instrument	The extent to which the availability of a validated screening instrument facilitates or hinders adherence
Capacity for organisational change		Mandate, authority, accountability	The mandate, authority and accountability for making necessary changes
		Capable leadership	The extent to which clinical leaders or managers are capable of making necessary changes
		Relative strength of supporters and opponents	The extent of support and opposition to necessary changes
		Regulations, rules, policies	The extent to which organisational regulations, rules or policies facilitate or hinder necessary changes
		Priority of necessary change	The relative priority given to making necessary changes
		Monitoring and feedback	The extent to which monitoring, and feedback are needed at organisational level

			and available to sustain necessary changes (including evaluations of improvement programs)
		Assistance for organisational changes	The extent to which external support is needed and available for necessary changes
Social, political and legal factors		Economic constraints on the health care budget	Limits on the total healthcare budget or its growth
		Contracts	The extent to which contracts may affect implementation of necessary changes
		Legislation	The extent to which legislation may affect implementation of necessary changes
		Payer or funder policies	The extent to which payer or funder policies may affect implementation of necessary changes
		Malpractice liability	The extent to which malpractice liability may affect implementation of necessary changes
		Influential people	The extent to which influential people may affect implementation of necessary changes
		Corruption	The extent to which corruption may affect implementation of necessary changes
		Political stability	The extent to which political stability may affect implementation of necessary changes

APPENDIX I

Table 4: Identified Barriers and Facilitators from Interviews Healthcare Professionals (n =11)

(*Inductive code)

TICD Domain	Barrier or Facilitator	Total frequency BARRIERS	Frequency over interviews BARRIERS	Total frequency FACILITATORS	Frequency over interviews FACILITATORS
Guideline Factors	Quality of evidence supporting the recommendation	4	2	1	1
	Strength of recommendation	8	4	2	2
	Clarity	11	6		
	Accessibility of the recommendation	1	1		
	Consistency with other guidelines			2	1
	Feasibility			10	8
	Compatibility	8	6	22	11
	Effort	1	1	2	2
	*Current guideline cardiac rehabilitation**	19	7	4	3
	*Added value of the innovation**			10	6
Individual health professional factors	Domain knowledge	20	10	8	4
	Awareness and familiarity with the recommendation	27	9	11	6
	Knowledge about own practice			8	6
	Skills needed to adhere	22	8	6	5
	Agreement with the recommendation	1	1	18	9
	Attitudes towards guidelines in general	1	1	2	2
	Expected outcome			4	4
	Intention and motivation	11	5	11	7
	Self-efficacy			2	2
	Nature of the behaviour	3	2	1	1
	Capacity to plan change	3	2	3	2
Patient factors	Patient needs			4	3
	Patient beliefs and knowledge	11	5	5	2
	Patient preferences	1	1	12	9
	Patient motivation			7	7
	Patient behaviour	3	3		
	*Family**			2	2
Professional interactions	Communication and influence	3	3	4	3
	Team processes	14	7	18	8
	Referral processes	16	8	13	8
Incentives and resources	Availability of necessary resources	33	11	33	8
	Financial incentives and disincentives	15	8	13	8

	Continuing education system	1	1		
	Assistance for clinicians			9	6
	*Screening instrument**	9	2	3	3
	Mandate, authority, accountability	1	1	1	1
Capacity for organisational change	Relative strength of supporters and opponents			4	4
	Regulations, rules, policies			9	7
	Assistance for organisational changes	2	2		
Social, political and legal factors	Legislation			5	5
	Payer or funder policies	1	1	1	1
	Influential people	3	1	3	2

Table 5: Identified Barriers and Facilitators from Interview Health Insurer (n=1)

TICD Domain	Construct/ Subcode	Total frequency BARRIERS	Total frequency FACILITATORS
Guideline factors	Quality of evidence supporting the recommendation	2	
	Strength of recommendation	6	
	Clarity	3	
	Compatibility	2	
	*Current guideline cardiac rehabilitation**	1	
Individual health professional factors	Nature of behaviour	4	
Patient factors	Patient needs		3
Professional interactions	Referral processes	1	2
Incentives and resources	Availability of necessary resources	1	1
Capacity for organisational change	Regulations, rules, policies		2
Social, political and legal factors	Economic constraints on the health care budget	1	
	Payer or funder policies		1

* Inductive code

Table 6: Identified Barriers and Facilitators from Interviews Policy Makers (n=2**)

TICD Domain	Construct/ Subcode	Total frequency BARRIERS	Frequency over interviews BARRIERS	Total frequency FACILITATORS	Frequency over interviews FACILITATORS
Guideline factors	Quality of evidence supporting the recommendation	4	2		
	Strength of recommendation	5	1	1	1
	Feasibility	2	2	3	2
	Compatibility	3	1	2	1
	Effort			1	1
	*Current guideline cardiac rehabilitation**	1	1		
	*Added value of the innovation**			1	1
Individual health professional factors	Domain knowledge	2	1		
	Awareness and familiarity with the recommendation	2	1		
	Skills needed to adhere	2	1		
	Agreement with the recommendation			4	2
	Attitudes towards guidelines in general			2	2
	Expected outcome			1	1
	Intention and motivation			1	1
	Nature of behaviour			1	1
Patient factors	Patient motivation			1	1
Professional interactions	Referral processes	1	1		
Incentives and resources	Availability of necessary resources	1	1	2	2
	Financial incentives and disincentives	3	2	2	2
Capacity for organisational change	Mandate, authority, accountability			3	1
	Regulations, rules, policies			2	2
	Assistance for organisational changes			1	1

* Inductive codes

** The policy advisors participated together in one interview and are therefore considered as one.

Table 7: Identified Barriers and Facilitators from Interviews Managers (n=2)

TICD Domain	Barrier or Facilitator	Total frequency BARRIERS	Frequency over interviews BARRIERS	Total frequency FACILITATORS	Frequency over interviews FACILITATORS
Guideline Factors	Quality of evidence supporting the recommendation			1	1
	Compatibility	1	1	1	1
Individual health professional factors	Awareness and familiarity with the recommendation	1	1	1	1
	Agreement with the recommendation			5	2
	Intention and motivation	1	1	3	2
	Capacity to plan change			1	1
Professional interactions	Communication and influence			2	1
	Team processes	3	2		
Incentives and resources	Availability of necessary resources	1	1	2	1
	Financial incentives and disincentives	8	2		
Capacity for organisational change	Mandate, authority, accountability			2	2
	Capable leadership	1	1	5	2
	Relative strength of supporters and opponents			3	2
	Regulations, rules, policies			1	1
	Priority of necessary change	1	1		
	Assistance for organisational changes	1	1		
Social, political and legal factors	Legislation			1	1
	Payer or funder policies	3	2		

APPENDIX J

Table 8: Data Saturation: Dimensions of Codes by Interview Where Code Identified

TICD Domain	Code Name	Code Dimensions			
		By Interview 4	By Interview 7	By Interview 10	After Interview 10
Guideline Factors	**Quality of evidence supporting the recommendation**	B: No validated screenings instrument (4)	B: Lack of evidence from multiple health providers (6) B: No solid research results supporting the intervention: current practice vs intervention (6)	B: Lack of evidence about impact on healthcare costs versus quality of care and patient satisfaction: cost-effectiveness (10)	F: Many researches have been started (16)
	Strength of recommendation	B: Lack of evidence added value (1) F: Evidence about number of OHCA patients with cognitive impairments (3) F: Alasca research (3)	B: Lack of evidence effectiveness for OHCA patients (6)		F: Evidence from similar use cases (13) B: Assumptions (13)
	Clarity	B: Targeted patient group (2) B: Uncertainty about primary responsibility (3) B: Uncertainty about settings (3) B: Uncertainty about tasks (4)		B: Uncertainty about insurance domain (10)	
	Accessibility of the recommendation	B: Information cognitive rehabilitation is hard to find (3)			
	Consistency with other guidelines		F: Fits in current guideline cardiac rehabilitation (6)		
	Feasibility	F: Logistically feasible (1) F: Well feasible (2)	B: Hard to organize an integrated care pathway (6)		

		F: Already implemented in some hospitals or rehabilitation centres (4) F: Screening takes only 10 minutes (4)			
	Compatibility	F: Fits with tasks cardiac rehabilitation team (1) F: Fits in current care process (2) F: Fits in follow-up care cardiologist or cardiovascular nurse (3) F: Already implemented in some hospitals or rehabilitation centres (4) B: Patients are between two different disciplines (3) B: Uncertainty about settings (3) B: Not every hospital has the expertise or facilities to perform this intervention (4)	B: Adjustments from providing individual therapy to multidisciplinary (5) F: Informing can already be done at the ED (8)	B: Fits better at neurology (9) B: Does currently not fit in DTC cardiac rehabilitation (10)	B: Adjustments needed to fit in current care process (12) B: Not every patient after OHCA is referred to cardiac rehabilitation (15)
	Effort	F: Relatively little effort to implement (2)			
	Current guideline cardiac rehabilitation*	B: Not included (1) B: Practical instruction is missing (1) F: European guideline pays more attention to cognitive impairments (3)	F: Recommendation to pay attention to cognitive (7)	B: Not up to date (8)	
	Added value of the innovation*	F: Early intervention improving care adjusted to patients' needs and societal participation (2) F: Many OHCA patients with cognitive impairments who will profit (3)	F: Patients are treated in time and do not have to come back later for unaddressed problems (7)		

Individual health professional factors	**Domain knowledge**	B: Cardio lack of knowledge about cognitive consequences (1) B: Cognitive impairments are invisible/vague and are therefore not recognized (3) F: Rehabilitation experts do have the knowledge (3)			
	Awareness and familiarity with the recommendation	B: Cognitive impairments are not the area of attention for the cardiology (1) B: Mild cognitive impairments are not recognized (3) B: Cardio not familiar with various available questionnaires or cognitive screening tools (4) F: Increasing awareness of cognitive consequences (1)			
	Knowledge about own practice	F: Knowledge about own current practice versus innovation (1)			
	Skills needed to adhere	B: Lack of skills cardio to perform cognitive screening (1) B: Lack of skills cardio to recognize and assess cognitive impairments (1) F: Skills are not difficult to learn (3)			
	Agreement with the recommendation	F: Acknowledgment of relevancy (1)	F: Some centra were sceptical but they also perform it now (5)		
	Attitudes towards guidelines in general	F: Inclusion will result in wider application (1)			B: Guideline cannot cover exceptions (11)

					F: Inclusion in the guideline means proven quality (13)
	Expected outcome	F: Improving through early intervention (1) F: Many OHCA patients with cognitive impairments who will profit (3)	F: Effect seen at neurology (5)	F: With relatively little effort big impact (8)	
	Intention and motivation	B: Do not assign the cardiologist (3) B: Not everyone has affinity with it (3) B: Rehabilitation is not attractive (4) F: Intention to provide best care (1) F: Personal commitment (3)	B: Contribution of the nurses (7)		B: Intention to collaborate with other disciplines (16) F: Starts with commitment healthcare professionals (12)
	Self-efficacy	F: Ability nurses (4)			
	Nature of the behaviour	B: Relatively little patient group (1)		F: Many patients after cardiac arrest (8)	
	Capacity to plan change	B: Complex and lengthy process if you want to implement it over the whole organization (3) F: Personal commitment (3)		F: Clear goal (9)	
Patient factors	**Patient needs**	F: Patients cannot participate well in cardiac rehabilitation program due to cognitive impairments (2)	F: Patients notice that something is not right, experience limitations in daily functioning (5)		
	Patient beliefs and knowledge	B: Anxiety because of unknown (1)	B: Patients' ability (5)		

		B: Patients are not aware of cognitive consequences after cardiac arrest (3), cognitive consequences are invisible (4) B: Lack of knowledge about the patient's own health status (3)			
	Patient preferences	F: Positive attitude (1)	F: Patients feel recognized (5) F: More patient friendly (5)		
	Patient motivation	F: Ability professional to inform patient and motivate to participate (1)	F: Adjust treatment goals to patients' needs to motivate patients to participate (5)		
	Patient behaviour	B: Some patients think it is exaggerated (2)			B: Some patients have resistance because of fear for limitations (11)
	Family*	F: Positive attitude (1)			
Professional interactions	**Communication and influence**	B: Little communication cardio and neuro in large hospitals (3) B: Personal commitment determines if it happens or not (4) F: Collegial (1) F: Often people find each other and start something up because of personal commitment / common interest (3)		B: Little communication cardiologist and cardio rehabilitation team (9)	
	Team processes	B: No knowledge sharing (1) B: Collaboration cardio and neuro is difficult (1) B: No structural cooperation (3) B: Care is fragmented (4)	F: Neurology and cardiology have much in common (5) F: Implementation improved collaboration (5)		

		F: Set up an MDC (1) F: Clear agreements and task division (2) F: Already existing multidisciplinary cardiac rehabilitation team (2) F: Set up a core team for OHCA patients (3)	F: In relatively small hospitals or hospitals with cardio and neuro departments close to each other the collaboration is better (5)		
	Referral processes	B: Unclear referral processes (2) B: Uncertainty about primary responsibility (3) B: Right healthcare professionals are not asked for a consultation in time or not at all (3) B: Care for people with cognitive damage can be very fragmented (4) F: Report rehabilitation physician to cardiologist (1) F: Refer to already existing programs, centra or experts (3)	B: Only patients with severe complaints are referred to neurology (5) B: Cardiologist has to agree otherwise you get no reference (7) F: Good connections with rehabilitation centres (7)	B: Little networking of healthcare providers (10)	
Incentives and resources	**Availability of necessary resources**	B: Personnel (1) B: Training (1) B: Time (1) B: No national protocols/implementation plan (2) F: Cardiac rehabilitation team (1) F: Availability of local protocols (2)	B: Beds (5) B: Space (5) B: No other hospitals or centra with expertise nearby (6) F: Eventually time saving (5) F: Available resources and expertise of neurology (5)		

		F: Use already existing knowledge and expertise (3) F: Use the cardiovascular nurse (4)	F: No physical resources required (7) F: No barriers regarding resources (7)		
	Financial incentives and disincentives	B: No financing (2) B: No national statement (3) B: Costs resources (4) B: Rehabilitation costs are relatively high (4) F: Reduction healthcare costs (1) F: With a simple relatively low-price intervention you can already do a lot (3) F: No barriers if patient has a reference for cognitive rehabilitation (4)	F: Leaner (5) F: Small patient group (6)		B: Financing of specialists with own benchmarks (16)
	Continuing education system	B: No continuing education due to relatively few patients (2)			
	Assistance for clinicians	F: Hix (1) F: Local protocols (2)	F: Protocols neurology (5)		
	Screening instrument*	B: No validated screenings instrument (4) B: Objections MoCA (4) F: Available alternatives, for example CLCE 24 and ADL observations (4)			
Capacity for organisational change	**Mandate, authority, accountability**		F: Rehabilitation physician is responsible (5) B: Cardiologist is responsible (6)	B: Who will lead this and organize it? (8)	F: Healthcare providers are primary to move (13)

					F: Involve all relevant stakeholders from the start (13) F: Managers can facilitate, healthcare professionals are responsible (16) B: Health insurer is determining factor (12)
	Capable leadership				F: Most managers in healthcare are open to innovations (12) F: Managers can facilitate space and time for the healthcare professionals to collaborate (12) B: A manager can be a barrier if he/she is not open to innovations (16)
	Relative strength of supporters and opponents	F: Support management (2)			
	Regulations, rules, policies	F: No barriers regarding regulations and policies (1) F: Inclusion in guideline (2) F: Mandatory registration (3)			

	Priority of necessary change				B: Managers sometimes have to prioritize (16)
	Assistance for organisational changes	B: Management has to support it (2)		B: NVVC little attention for cognitive and rehabilitation (8)	F: Public authorities support healthcare innovations (13)
	Economic constraints on healthcare budget			B: Consideration between affordability and quality of care (10)	
Social, political and legal factors	**Legislation**	F: No legal barriers (1)			
	Payer or funder policies	B: Insurance policies (1)		F: No barriers if there is enough evidence (10)	B: Negotiating procedures (12)
	Influential people	B: Society is not aware (4) F: Use media, public campaigns and conferences to raise more awareness (3)			

Note: Numbers in parentheses denote the interview number where the code was identified. * Inductive codes