Feasibility of a Communication Rehabilitation Program for Patients with Aphasia after Stroke: a Mixed-Methods Study

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English abstract

Title: Feasibility of a Communication Rehabilitation Program for Patients with Aphasia after Stroke: a Mixed-Methods Study.

Background and aim: Twenty to twenty-five per cent of all stroke survivors have aphasia. The Dutch Guideline for Stroke (2008) recommends at least two hours of aphasia therapy per week. However, the intensity of aphasia therapy in the Netherlands is significantly lower. To provide hospitalized patients with aphasia after stroke more aphasia therapy, a Communication Rehabilitation Program (CR-program) was developed that nurses can provide on a Stroke Unit.

Research question: The research question was: *What is the feasibility of a Communication Rehabilitation Program provided by nurses for patients with aphasia after stroke on a Stroke Unit of a University Medical Centre?*

Method: A mixed-methods feasibility study was conducted. Feasibility of the CR-program was assessed by evaluating attitudes of nurses towards the program and compliance with the program. In the pre-test, nurses filled in a questionnaire focusing on barriers to and facilitators for implementation. The CR-program was then implemented during ten weeks. In the post-test, nurses filled in the questionnaire for barriers and facilitators and a newly developed feasibility questionnaire. Nurses' attitudes were further explored in a focus group discussion.

Results: Fourteen out of eighteen nurses provided informed consent. The questionnaire for barriers and facilitators, the feasibility questionnaire and the focus group discussion revealed that, despite initial time barriers on the Stroke Unit, nurses generally found the CR-program feasible on their Stroke Unit. Compliance with the CR-program improved during implementation.

Conclusion: The CR-program was feasible for nurses on a Stroke Unit.

Recommendations: Further research should focus on long-term follow up and effectiveness of the CR-program. The CR-program should also be investigated in other contexts such as rehabilitation centres.

Keywords: stroke, aphasia, feasibility, intervention, nurses

Dutch summary

Titel: Bruikbaarheid en haalbaarheid van een Communicatie Revalidatie Interventie voor Patiënten met Afasie na een Beroerte: een Mixed-Methods studie.

Achtergrond en doel: Afasie na een beroerte is een gezondheidsprobleem met ernstige gevolgen. De intensiteit van afasietherapie in Nederland is lager dan wordt aanbevolen in de Richtlijn Beroerte (2008). Om afasiepatiënten in het ziekenhuis meer afasietherapie te bieden, werd een Communicatie Revalidatie Programma (CR-programma) ontwikkeld die door verpleegkundigen kan worden toegepast op een Neurologie afdeling.

Onderzoeksvraag: De onderzoeksvraag van deze studie luidde: wat is de bruikbaarheid en haalbaarheid van een Communicatie Revalidatie Programma die wordt toegepast door verpleegkundigen op de Neurologie afdeling van een Universitair Medisch Centrum?

Methode: Er werd een mixed-methoden bruikbaarheid en haalbaarheid studie uitgevoerd. Bruikbaarheid en haalbaarheid van het CR-programma werd geëvalueerd aan de hand van de mening van verpleegkundigen over het programma en aan de hand van compliance met het programma. In de pre-test vulden verpleegkundigen een vragenlijst in over knelpunten- en behoeften bij implementatie. Daarna werd het CR-programma gedurende tien weken geïmplementeerd. In de post-test vulden verpleegkundigen de vragenlijst voor knelpunten en behoeften en een ontwikkelde bruikbaarheid/haalbaarheid vragenlijst in. De mening van verpleegkundigen over het CR-programma werd verder geanalyseerd in een focus groep discussie.

Resultaten: Veertien uit de achttien verpleegkundigen gaven toestemming voor deelname. De uitkomsten van de vragenlijsten en de focus groep discussie lieten zien dat verpleegkundigen het CR-programma bruikbaar en haalbaar vonden, ondanks de tijdsdruk op hun afdeling. Compliance verbeterde gedurende implementatie.

Conclusie: Het CR-programma was volgens verpleegkundigen bruikbaar en haalbaar op een Neurologie afdeling.

Aanbevelingen: Vervolgonderzoek moet zich richten op de langere termijn en op de effectiviteit van het CR-programma. Het programma zou ook geëvalueerd moeten worden op andere locaties, zoals in revalidatiecentra.

Kernwoorden: beroerte, afasie, bruikbaarheid, interventie, verpleegkundigen

Introduction

According to the National Stroke Association, 800.000 people suffer from a stroke worldwide every year (1). In the Netherlands, the incidence of stroke in 2008 was estimated at 40.000 people per year, and was expected to increase (2). Patients after stroke receive and benefit from rehabilitation on Stroke Units (SU) provided by a multidisciplinary team that includes medics, nurses, physiotherapists, occupational therapists and speech and language therapists (3). Twenty to twenty-five per cent of all stroke patients have aphasia (4,5), which is defined as a reduction of the patients' ability to communicate by language expression and/or comprehension (6). Aphasia is a health problem with dramatic consequences for quality of life (5) and a higher risk for depression (6) and social isolation (7). Speech and language therapists (SLTs) treat aphasia in patients with stroke (8).

The Dutch Guideline for Stroke (2008) recommends a minimum of two hours of aphasia therapy per week (9). However, on average, patients in the Netherlands with aphasia after stroke receive less than one hour of aphasia therapy per week (2). The reason for this may be organizational changes in health care, such as budget cuts and staff reductions. According to the Royal College of Speech and Language Therapy, these organizational changes may lead to limited SLT (10).

Solutions to provide more aphasia therapy must be found. Studies have shown that more aphasia therapy can be realised by involving nurses in applying communication interventions in collaboration with SLTs (11).

In their review, Poslawsky et al. (2010) identified studies where communication interventions that were provided by nurses were effective for patients with aphasia (6). The review identified three types of interventions that may be feasible for nurses to use: task-specific interventions, including semantic- and phonological tasks, augmentative alternative communication (AAC), including all forms of non-verbal communication, and computer therapy such as computer reading. Task-specific interventions were found to be effective in reading comprehension and language formulation (12,13). AAC therapy activated the use of gestures by patients (14). Computer therapy improved speech- and language skills (12). Although Poslawsky and colleagues concluded that these SLT-interventions may be feasible for nursing practice, the included studies had varying methodological limitations with mainly small sample sizes and varying types or phases of aphasia. Additionally, Poslawsky and colleagues used a Nursing Intervention Classification to evaluate whether these SLT-interventions were feasible for nursing practice, but the feasibility of these nursing interventions was not *assessed* in any study (6).

Assessing feasibility is, according to the guideline of the Medical Research Council (MRC) for complex interventions, one of the first key steps when developing an intervention:

1) developing the intervention by exploring evidence based theories, 2) evaluating the feasibility of using the intervention, 3) evaluating effectiveness of the intervention and 4) implementing the intervention (15). Feasibility is defined as 'the quality of being useful and practical' and involves the study of practicability and applicability (16). Another important aspect in developing interventions is to secure compliance with the intervention. In this study, compliance was defined as 'the ability and willingness of nurses to yield to the intervention' (17).

In 2011, the feasibility of a communication intervention was investigated for patients with communication impairments after stroke (18). Individualized communication plans were developed by SLTs that described how to communicate with a patient. Nurses provided these communication plans and their attitudes towards the plans were evaluated during the first month and the third month after hospitalization. On average, nurses provided 85% of the communication plans during the first observation and 73% during the second observation. The communication plans were found to be feasible and gave nurses direction towards communicating with patients with *speech- and language impairments*. However, the feasibility of an intervention provided by nurses for *hospitalized patients with aphasia on a Stroke Unit* has not yet been assessed.

Based on this background, this study aims to fill that gap and contribute to providing more communication therapy for patients with aphasia, by evaluating the feasibility of a communication program that nurses can provide on a SU.

Research question

The research question of this study is:

What is the feasibility of a Communication Rehabilitation Program provided by nurses for patients with aphasia after stroke on a Stroke Unit of a University Medical Centre?

Methods

Study design

In line with the MRC-model for complex interventions that recommends the testing of feasibility (19), a mixed-methods feasibility study was conducted with an explanatory sequential design (20) (Figure 1). First, a pre-test was conducted where nurses filled in an existing questionnaire focusing on barriers and facilitators (21). Then, a Communication Rehabilitation Program was developed in the context of this study and implemented during ten weeks. A post-test was conducted using the questionnaire for barriers and facilitators, a feasibility questionnaire (22,23) and a focus group discussion. The study took place on a Stroke Unit (SU) of a University Medical Centre in the Netherlands.

Population and study sample

This study targeted nurses working on a SU. All nurses working on the SU of a University Medical Centre were included who were registered in the Dutch (BIG)-register, attended to patients with aphasia after stroke (N=18) and gave informed consent (N=14). A subgroup of six participants attended at a focus group discussion.

The Communication Rehabilitation Program (CR-program)

Following the MRC-model (19), a blueprint of the CR-program was developed based on recent systematic reviews of literature and intervention studies describing communication interventions for nursing practice (6,18,23,24). A group of experts evaluated content, readability and usability of the CR-program. This group of experts consisted of three nurses, two nurses working on the participating SU and one clinical researcher with a PhD-degree and years of experience in stroke research, and two SLTs with many years of experience in aphasia rehabilitation. Based on their feedback, the program was adapted and optimized. The final program consisted of 12 recommendations and 10 interventions, which were categorised as follows: 1) general recommendations for communicating with patients with aphasia, 2) recommendations for patients with expressional problems, 3) recommendations for patients with comprehension problems, 4) interventions to improve language expression and 5) interventions to improve language comprehension (Figure 2). One example is: ‘Ask the patient to name five objects in the room’.

Data collection

Feasibility of the CR-program was assessed by evaluating attitudes of nurses towards the program and by evaluating compliance rates (25).

Demographic characteristics. Demographic characteristics of nurses were collected to describe the study sample: age, gender, years of experience on a SU, educational background and full-time equivalent (fte).

Questionnaires. Attitudes of nurses towards the CR-program were evaluated by a feasibility questionnaire and a questionnaire for barriers and facilitators. The feasibility questionnaire (Appendix 1A) was developed based on questionnaires used by Hafsteinsdottir (2013) (23) and Bowen et al. (2009) (25), and includes 24 questions with response on a dichotomous scale with 'yes' or 'no'. Although no studies have evaluated the clinimetric properties of this questionnaire, it was used because it identifies the general aspects of feasibility studies: acceptability, demand, implementation, practicality and integration of the intervention (25). The questionnaire for barriers and facilitators was developed by Harmsen et al. (2002) (21) and further adapted for this study by leaving out questions that targeted preventive care. The adapted version (Appendix 1B) includes 14 questions with a five-point Likert scale to evaluate if nurses agreed or disagreed with a statement, where the scale ranged from 1 (strongly disagree) to 5 (strongly agree). Concerning reliability, the item response of this questionnaire was found to be >90% and each item has a distinctive character. This questionnaire is standardized and a reliable instrument for evaluating barriers and facilitators (21).

Focus group discussion. Nurses attitudes towards the CR-program were further explored in a focus group discussion, which is considered an appropriate technique for exploring views and needs of nurses (26). Participants were selected by purposive sampling to acquire a heterogeneous group of nurses with different backgrounds, to evaluate different experiences. Six nurses participated; an ideal group size for group dynamics (26). An experienced leader who had no interest in the outcomes of the study moderated the discussion. The first author acted as secretary and made field notes. Nurses were encouraged to ask questions and comment on each others experiences (26). The discussion was conducted through inductive methodology (26), but the following topics were described beforehand to guide the discussion: acceptability and practicality of the CR-program, improvement of the CR-program and compliance with the CR-program.

Compliance of nurses with using the CR-program was measured using an A4-sized registration form that included all the recommendations and interventions of the CR-program. The SLTs could mark the recommendations and interventions that were relevant for a patient and should be provided. After applying the CR-program, nurses could mark which recommendations and interventions had been provided for each patient.

Procedure

The CR-program was implemented during ten weeks using the following implementation strategies: 1) opinion leaders were identified among nurses to highlight the importance of the CR-program, 2) posters were placed on the SU to act as a reminder, 3) e-mail was sent to all nurses explaining the program protocol and 4) four one- hour interactive training sessions were provided to nurses where they were trained in how to use the program. The researcher and SLTs working on the SU organized and took part in the training. All nurses on the SU took part in one training session and were then invited to participate. At the pre-measurement, demographic characteristics of nurses and their expectations towards the program were collected by using the questionnaire for barriers and facilitators (21) (Appendix 1B).

After the training sessions, nurses started using the CR-program (Figure 2). SLTs diagnosed patients with aphasia and marked relevant recommendations and interventions on the registration form, which was placed at the bedside of each patient. Nurses were instructed to provide the CR-program during the daily patient care and registered which recommendations and interventions were applied. Directly after applying the program, at the post-measurement, nurses filled in the feasibility questionnaire (Appendix 1A) and the questionnaire for barriers and facilitators (Appendix 1B).

The focus group discussion was conducted in the ninth week of implementation, in an appropriate, quiet room on the SU. Participants were invited and thoroughly informed of the purpose of the discussion beforehand by e-mail. The moderator used a topic-list as a guideline to ask in-depth questions about nurses' attitudes towards the CR-program; such as questions concerning their opinions about the layout of the program. The focus group discussion lasted 60 minutes, was video recorded and subsequently transcribed and analysed. Transcripts were returned to participants for comment and correction.

Integration of quantitative and qualitative results occurred after data analysis and results were presented separately.

Analyses

All data were analysed anonymously. Data from the feasibility questionnaire and the questionnaire for barriers and facilitators were analysed per question. Nurses' compliance with the *whole CR-program* was presented as the total number of interventions that were provided by nurses divided by the total number of interventions that were marked by an SLT during ten weeks. Compliance with *each intervention or recommendation* was presented as the total number of times this individual recommendation or intervention was provided divided by the total number of times this item was marked by an SLT during ten weeks. These quantitative outcomes were analysed using IBM SPSS Statistics version 21.

Qualitative data from the focus group discussion were transcribed using NVIVO software. Transcripts were thematically analysed by open coding, axial coding and selective coding, and checked by a second researcher (MvR/TBH) (27). Emerging themes were identified from the data and the researchers reached agreement on these themes, which were then coded into a codebook. The codes were analysed to identify cross cutting themes on the SU (28). Deviant cases were analysed individually.

Ethical issues

This study was reviewed and approved by the Medical-Ethical Committee of the University Medical Centre in Utrecht. The researcher and participating nurses signed an informed consent form.

Results

Recruitment

Eighteen nurses were asked to participate. Four nurses could not participate because they had (temporarily) stopped working on the SU. Therefore, fourteen nurses gave their informed consent (N=14).

Demographic characteristics

Participating nurses had a mean age of 32 years (+-10 years). The majority of participants were female (93%) (Table 1).

Nurses' attitudes towards the CR-program

Eighteen nurses returned the questionnaire for barriers and facilitators before implementation (N=18). Ten weeks after implementation, fourteen nurses (N=14) had applied the CR-program with a varying number of patients and thirteen nurses returned the questionnaire for barriers and facilitators (N=13) and the feasibility questionnaire (N=13).

In the questionnaire for barriers and facilitators, some experiences (post-measurement) did not meet the expectations (pre-measurement) (Table 2). In the pre-test, most nurses (N=13/18) had doubts whether patients would cooperate with the CR-program, but in the post-test most nurses (N=9/13) reported that patients were cooperative. The majority of nurses (N=11/18) had doubts in the pre-test whether they the CR-program would be too time-consuming, whereas in the post-test, most nurses (N=10/13) reported that the program had not been too time-consuming. In the pre-test, most nurses (N=11/18) reported that they had doubts whether other professionals would cooperate and in the post-test most nurses (N=9/13) confirmed that they missed collaboration with SLTs.

The feasibility questionnaire showed that, after implementation, the majority of nurses (N=12/13) was satisfied about the CR-program (Table 2). Most nurses (N=9/13) felt they had enough time to provide the program. The large majority reported that the CR-program was important for patients with aphasia (N=12/13) and sustainable in the organization (N=13/13). Most nurses (N=12/13) intend to continue use of the CR-program. One nurse (N=1/13) does not intend to continue use of the CR-program because the CR-program did not provide her with new insights in the treatment of patients with aphasia. Most nurses (N=11/13) reported that they had not been able to carry out *all* recommendations and interventions that were marked by a SLT.

Transcripts of the focus group discussion revealed six main themes: 1) expectations of nurses before implementation, 2) practicality of the program, 3) acceptability of the program, 4) compliance with the program, 5) nurses' experience with the implementation process and 6) adaptation of the program (Table 3). Citation chosen by two researchers (MvR/TBH) as typical examples representing the main themes, are presented below.

Theme 1: Expectations of nurses before implementation. Most nurses (N=5/6) had expected that the CR-program would be too difficult for patients with severe communication problems and too time-consuming.

'I was afraid that this program would become a time-consuming business, jeopardizing available time to care for patients' (Nurse A).

Theme 2: Practicality of the program. All nurses (N=6/6) indicated that they generally found the CR-program practical to use. Tallying how often each intervention was provided was not practical (N=6/6). Also, nurses preferred a larger, plasticized program rather than a small paper version (N=3/6). All nurses (N=6/6) agreed that two interventions were not practical, either because they were too difficult for patients or patients were unwilling to cooperate. These interventions were: 'Name the food that is given to the patient and ask patient to repeat' and 'Name three words (e.g. table, pable, zable) and ask which word is correct.*'* All nurses (N=6/6) reported that the CR-program would be more practical when family members were involved.

'Involving family members would make this program more practical. If family members can provide the CR-program, this would save us a lot of time' (Nurse B).

Theme 3: Acceptability of the program. Two interventions were too time-consuming (N=6/6), especially when patients had a paralysis affecting one or two sides of the body. These interventions were: 'Name objects during washing and ask patient to repeat' and 'Ask patient to write down words*.'* However, the CR-program as a whole was acceptable to all nurses and time limitations were not found to be a barrier (N=6/6).

'*The program is tailored to patients' needs, which makes it small-sized and acceptable' (Nurse B). 'The program did not rule out care for patients because we were able to provide it during the daily care' (Nurse A).*

Theme 4: Compliance with the program. The majority (N=5/6) indicated that compliance was mainly determined by patients' capacities and by time pressure.

'*Patients with severe aphasia or tired patients got frustrated during practice. This held me back from providing the program' (Nurse D).* '*When it's busy on the ward I tend to neglect the program. However, at the end of the shift, I consider this a missed opportunity for patients' (Nurse D).*

Theme 5: Nurses' experience with the implementation process. Five nurses (N=5/6) indicated that they would have preferred a non-mandatory training, and training sessions for students with an internship, who could give support to nurses during the implementation. The largest problem during the implementation, according to all nurses (N=6/6), was that they missed collaboration with SLTs.

'Sometimes SLTs were not timely consulted during the implementation, resulting in untimely provision of the CR-program' (Nurse E).

Theme 6: Adaptation of the program. One nurse (N=1/6) suggested that the non-practical and non-acceptable interventions should be removed from the CR-program and replaced by an intervention instructing family members how to provide the CR-program. All nurses (N=6/6) indicated that, in the future, they would prefer more visual material.

'Images and pictograms such as texts, smileys and pictures that we can use as visual material to support each intervention would benefit this program' (Nurse F).

Nurses' compliance with the CR-program

After ten weeks, eleven out of fourteen nurses had provided the CR-program once; two nurses had provided it twice and one nurse had provided it three times. Compliance with the CR-program generally improved during implementation (Table 4). Compliance varied largely between nurses (5%-100%). Compliance with individual recommendations and interventions also ranged largely (17%-94%) (Table 5). The recommendations for communicating with patients were provided much more frequently (mean compliance of 76%) than interventions to improve language comprehension or -expression (mean compliance of 43%). Interventions that targeted *language expression* were provided more frequently (mean compliance of 51%) than interventions that targeted *language reception* (mean compliance of 35%).

Discussion

The findings of this study indicate that nurses perceive the CR-program as a feasible program to provide for patients with aphasia after stroke on a Stroke Unit (SU).

Nurses reported in a feasibility questionnaire, a barriers and facilitators questionnaire and during a focus group discussion that the CR-program was both practicable and acceptable to use on their SU. Before implementation, time limitations were a major barrier on the SU. However, after implementation, nurses reported that providing the CR-program in general was not too time-consuming, because they were able to provide the program during their daily activities. Some nurses felt they had not successfully executed the program, because some interventions in the CR-program were too time-consuming. Nurses' compliance with these time-consuming interventions depended on patients' capacities and busyness on the SU. The CR-program was therefore adapted to fit to the needs of nurses, by for example deleting time-consuming interventions.

Other studies have also found that time restrictions are a barrier when implementing nursing interventions on a SU (23,29,30). However, this study shows that time limitations can be overcome by involving nurses in the implementation process, frequently and thoroughly evaluating nurses' experiences and adapting the intervention to the needs of nurses. Another barrier for implementing interventions on a SU is knowledge and skills required for providing *new* interventions (31). Our study supports this; the recommendations in the CR-program, that were to some extent already provided on the SU *before* this study, were provided more frequently than the interventions in the CR-program, which were generally *new* to nurses.

Compliance with the CR-program improved during implementation. McGilton and colleagues who implemented communication plans provided by nurses for patients with communication impairments found that compliance declined during implementation (29). Reasons for this difference may be that McGilton and colleagues measured nurses' use of behavioural strategies, which may be harder to sustain than the demarcated interventions in the CR-program. The large majority of nurses intends to continue use of the CR-program. However, some nurses still experienced certain barriers after implementation, such as difficulties in changing their old routines. McGilton and colleagues also found that experiences differed between nurses after implementation (18). Nurses may therefore need different support during the implementation of the CR-program (32).

Literature states that organizational changes may have led to limited SLT for patients with aphasia (10). Nurses reported that, due to organizational changes, they missed collaboration with SLTs. Clearly, the involvement of SLTs is imperative because they tailor

the CR-program to patients' individual needs. Continuation of the CR-program is feasible, but full collaboration and involvement of staff, including SLTs and opinion leaders, is important to maintain attention and control over the intervention (32). The continuum and effectiveness of the CR-program could also be strengthened by involving family members (32).

In their review, Poslawsky and colleagues found effective SLT-interventions that may be feasible for nurses to use on a SU (6). However, until now, no feasibility study on SLT-interventions provided by nurses for patients with aphasia on a SU was ever conducted. The feasibility of a communication program provided by nurses for patients with aphasia in the acute phase after stroke, in a routine clinical setting, including its potential barriers, are now better understood (3). This is a step forward to intensifying aphasia therapy in the Netherlands.

To appreciate the findings of this study, some aspects require further consideration. Although the findings of this study indicate that it is feasible to implement communication interventions that nurses can provide, the reliability of these findings is limited. This study had a small sample of fourteen nurses despite the large recruitment rates on the SU. During implementation, there were eight patients with aphasia on the SU; at busier times, compliance with the program may have been lower. The study design did not include a control group, which may influence the internal validity of the findings. Whether the results of this study are applicable for the long term and generalizable to other settings remains unclear. Strength of this study, however, was that mixed methods were used so that experiences of nurses could be analysed in-depth.

Although this study did not intend to evaluate effectiveness of the CR-program, literature shows that intensifying aphasia therapy in the acute phase is prerequisite and effective for improving conversational abilities of patients (33). Therefore, further research should focus on continuously optimizing and evaluating communication interventions, such as the CR-program, that nurses can provide. Also, research should focus on evaluating the effectiveness of the CR-program on patients' language comprehension and -expression and quality of life. The CR-program needs to be investigated in other contexts including general hospitals, rehabilitation centres, nursing homes and in the home setting (32).

Conclusion and Recommendations

In conclusion, the CR-program was feasible on a Stroke Unit. Measuring long-term follow-up of the CR-program, investigating feasibility and effectiveness of the program in other contexts and including family members in applying the program are recommendations for future research.

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Table 1. Demographic characteristics of nurses

	N
Mean age in years (SD)	32 (10)
Gender	
Male	1
Female	13
Mean years of experience on this ward (SD)	6,4 (5,3)
Mean years of experience on a neurological ward (SD)	7,8 (6,3)
Educational background	
MBO-degree	6
Bachelor degree	8
Master degree	0
Mean full-time equivalent (SD)	0,82 (0,14)

SD= Standard Deviation

Table 2. Overview of perceived barriers by nurses before- and after implementation

	n nurses that perceive factor as barrier before implementation N= 18			n nurses that perceive factor as barrier after provision N= 13		
	Agree	Agree nor disagree	Disagree	Agree	Agree nor disagree	Disagree
Barriers and facilitators						
Specificity						
Not enough room to make my own decisions	2	0	16	1	0	12
Not enough room to weigh the wishes of a patient	2	1	15	1	1	11
Didactic worth						
Intervention is not a good starting point for self-study	0	7	11	0	5	8
Knowledge and expertise						
Did not thoroughly read and remember intervention	3	2	13	1	2	10
Not enough knowledge about the intervention to apply it	0	3	15	1	3	9
Work style						
Problems changing old routines	4	0	14	3	2	8
General resistance to work according to protocols	0	1	17	0	0	13
Does not fit into my ways of working	0	1	17	0	3	10
Scientific justification						
Not all parts of the intervention are correct	0	3	15	3	2	8
Cooperation						
Other professionals will not cooperate	0	11	7	2	7	4
Patients will not cooperate	0	13	5	0	4	9
Time consummation						
Intervention is too time consuming	1	11	6	0	3	10
Financial compensation is required	0	5	13	1	1	11
Lay-out of the intervention makes it handy to use	0	1	17	0	2	11
Feasibility questionnaire						
Acceptability						
Not satisfied about the intervention				1	0	12
Intervention is not clearly written and easily understandable				0	0	13

Not appropriate for patients with aphasia	0	0	13
Not important for patients with aphasia	1	0	12
No positive effects for the organization	7	0	6
Negative effects for the organization	1	0	12
Does not match your views on what is important in care	0	0	13
Will not continue use of the intervention	1	0	12
Demand			
Not easy to use	0	0	13
Does not provide new insights in care and treatment	3	0	10
Does not correspond to my vision on care	0	0	13
Implementation			
Did not successfully execute	5	0	8
Colleagues did not successfully execute	1	0	12
Not enough resources to implement the intervention	2	0	11
Practicality			
Problems occur when integrating the intervention	2	0	11
Not enough time to implement	4	0	9
No positive effects for patients	2	0	11
Negative effects for patients	1	0	12
Intervention is not efficient	2	0	11
Not able to carry out all marked interventions	11	0	2
Integration in setting			
Not sustainable in this organization	0	0	13
Cannot be applied in this organization	0	0	13
Cannot be integrated during care	0	0	13

N= number of participating nurses, n= number of nurses that perceive factor as a barrier. Based on: Peters, MAJ, Harmsen, M, Laurant, MGH, Wensing, M. Ruimte voor verandering? Knelpunten en mogelijkheden voor verbeteringen in de patiëntenzorg. [Room for improvement? Barriers to and facilitators for improvement of patient care]. Nijmegen: Centre for Quality of Care Research (WOK), Radboud University Nijmegen Medical Centre, 2002. Also based on: Bowen et al. (2009) and Hafsteindottir (2013).

Table 3. Citations representing the main themes of the focus group discussion

Main theme	Citations representing main theme
Expectations of nurses before implementation	'I was curious how patients would experience this program, and if patients were willing to cooperate' (Nurse D). 'I was afraid that this program would become a time-consuming business, jeopardizing available time to care for patients' (Nurse A). 'I stepped into this implementation study with an open mind.' (Nurse D). 'I had thought, or maybe hoped, that something very new would be implemented. Something we did not do on our Stroke Unit, at this moment. It turned out that we already provide a lot of these interventions' (Nurse E). 'I thought, well, maybe this program will work' (Nurse F). 'My biggest concern was the time it would take us to provide this program' (Nurse E). 'Can I say this: we felt that there was yet another intervention that we had to take over from some other discipline because we are short of speech and language therapists. Whether we liked it or not, this was something we *had* to do' (Nurse A).
Practicality of the CR-program	''Name the food' was difficult for me, because patients were unwilling to cooperate when they wanted to eat' (Nurse E). 'Name three words and ask which word is correct' was very unpractical for me; patients react as though you treated them like kids. Also, this intervention was far too difficult for patients' (Nurse A). 'Someone who has a paralysis affecting one side of the body who is suddenly forced to write with his left hand; forget it' (Nurse E). 'Family members are often very willing to cooperate. Family should be involved more, to make the program more practical' (Nurse B). 'Involving family members would make this program more practical: if family members can provide the CR-program, this would save us a lot of time' (Nurse B). 'Tallying how often we provided each intervention was not practical: it took us too much time' (Nurse D).

	‘I am now more certain that what I do, is correct. This is what I should do, this is what I should aim for when communicating with patients with aphasia’ (Nurse C).
Acceptability of the CR-program	‘The program must not expanded, or it won’t be achievable any more’ (Nurse A). ‘The program is tailored to patients’ needs. Therefore, we are not required to provide every intervention or recommendation, which makes it achievable for us’ (Nurse C). ‘Asking patients to name words during washing is too time-consuming and too complex when you are busy washing someone. Patients with aphasia are often very slow…’ (Nurse D). ‘We have a lot of work to do. That creates these reactions. However, we were able provide this program during our daily routines…’ (Nurse A). ‘The program is tailored to patients’ needs, which makes it small-sized and acceptable’ (Nurse B). ’The program did not rule out care for patients because we were able to provide it during the daily care’ (Nurse A).
Compliance with the CR-program	‘We do not recognize that asking questions about patient’s personal background is never provided. We always do this on our Stroke Unit; this must be a mistake (Nurse D). (Other nurses agree). ‘Sometimes we just don’t have enough time to comply with every intervention’ (Nurse C). ‘Patients with severe aphasia or tired patients got frustrated during practice. This held me back from providing the intervention’ (Nurse D). ‘When it’s busy on the ward I tend to neglect the intervention. However, at the end of the shift, I consider this a missed opportunity for patients’ (Nurse D). ‘When someone has severe communication problems or when someone is very tired, I find it difficult to provide every intervention, because you’re making things very difficult for a patient.’ (Nurse C). ‘Name three words and ask the patient to repeat these words… naming the same words every time is childish and patients think: stop it. But changing these questions,

	for instance, oh, what have you eaten, is the same intervention, but the patient does not notice this' (Nurse D).
Nurses' experience with the implementation process	'It was unclear that the training sessions would take place and what was going to happen' (Nurse E). 'The start of this study had to be more prominent' (Nurse A). 'We were obliged to follow this training. We would have preferred a non-mandatory training' (Nurse E). 'Can I say something? I do not agree. We work in a University Medical Centre. We are open towards studies' (Nurse C). 'We missed collaboration with SLTs' (Nurse D). 'Sometimes SLTs were not timely consulted during the implementation, resulting in untimely provision of the CR-program' (Nurse E). 'SLTs could not provide us with feedback during the implementation' (Nurse E). 'Not everyone received the training, students with an internship were not present. Why not? They can give us support during the implementation' (Nurse D).
Adaptation of the CR-program	'I would prefer to delete the interventions that we think are too time-consuming and replace these with instructing family members' (Nurse A). 'I would delete the intervention where you ask a patient which one of three words is correct, because this intervention was too difficult and too time-consuming and weird for us to provide' (Nurse C). 'Point out, what is this, soap, I don't do that. I already say: there you go, here's your soap, and I hand patients soap, so this intervention should be deleted' (Nurse C). 'Images and pictograms such as texts, smileys and pictures that we can use as visual material to support each intervention would benefit this program' (Nurse F). 'These visual materials would help us, we would not have to write everything down ourselves … ' (Nurse C).

Table 4. Nurses' compliance with the Communication Rehabilitation Program during ten weeks

Weeks after implementation	n patients who received the program	n interventions marked by SLT (N)	n nurses who provided the program	n interventions provided by nurses (n)	n relevant interventions provided (n/N)
Week 1	1	22	2	13	59%
Week 2	0	0	0	0	0%
Week 3	1	13	3	8	62%
Week 4	1	13	4	12	92%
Week 5	0	0	0	0	0%
Week 6	1	15	2	12	80%
Week 7	2	36	2	30	83%
Week 8	1	21	1	14	67%
Week 9	0	0	0	0	0%
Week 10	1	41	1	39	95%

n= number

Table 5. Compliance with individual recommendations and interventions in the CR-program during ten weeks

Recommendation or intervention	Number of times this intervention should have been provided according to the SLT (N)	Number of times this intervention was provided by a nurse (n)	Percentage of provision in ten weeks (n/N)
General recommendations			
Reduce environmental noise during contact.	16	14	88%
Stimulate the use of gestures by using functional gestures yourself.	16	13	81%
Ask family about interests of patient and write down in activities plan.	16	3	19%
Stand on the unimpaired side and keep eye contact.	13	12	92%
Use a calm voice and calm approach.	16	15	94%
Recommendations for expression			
Verify yes/no answers by pointing to a yes or no.	16	8	50%
Ask patient to point or gesture when expressing himself is hard.	16	8	50%
Give patient *time* to express himself.	16	14	88%
Recommendations for reception			
Support your communication by stressing content words.	9	8	89%
Ask questions upon which patient can answer with yes or no.	9	8	89%
Discuss one subject at a time.	9	7	78%
Use short, simple sentences.	9	8	89%
Interventions for expression			
Name the food that is given to the patient one at a time and ask patient to repeat.	13	7	54%
Ask patient to name objects during eating and washing.	13	8	62%
Write down ‘man’ ‘table’ and ‘pen’ and ask patient to read these out loud.	13	7	54%
Ask patient to name five objects in this room.	12	8	67%
Name ‘door’ ‘chair’ and ‘table’ and ask patient to write down these words.	12	2	17%
Interventions for reception			
Name ‘door’ ‘chair and ‘table’ and ask patient to point these out in the room.	11	6	55%
Name objects during eating and washing.	9	2	22%
Name three words (table, pable, zable) and ask which word is correct.	5	2	40%
Ask patient questions about personal background (hobby’s, news, etc.).	11	3	27%
Write down ‘bed’, ‘curtain’, ‘nose’ and ask patient to point out words in the room.	6	2	33%

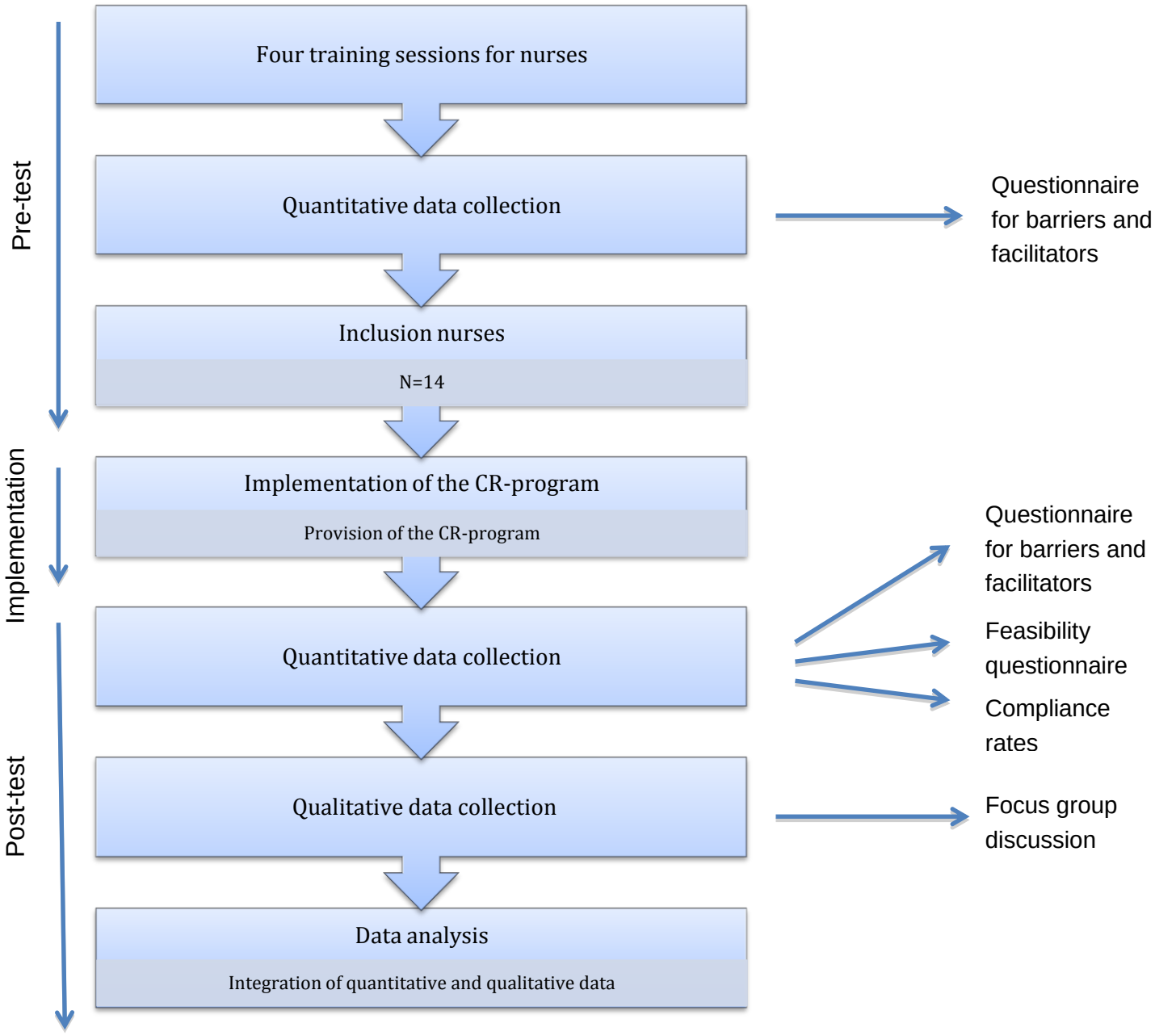

Figure 1. Flowchart of the study design

		Nurse (number):		Date:
Recommendations		**Apply (SLT)**	**Task done (nurse)**	**Number of times (tally) (nurse)**
1.	Reduce environmental noise during contact.			
2.	Stimulate the use of gestures by using functional gestures yourself.			
3.	Ask family about interests of patient and write down in activities plan.			
4.	Stand on the unimpaired side and keep eye contact.			
5.	Use a calm voice and calm approach.			
Recommendations for Expression				
6.	Verify yes/no answers by pointing to a yes or no.			
7.	Ask patient to point or gesture when expressing himself is hard.			
8.	Give patient *time* to express himself.			
Recommendations for Reception				
9.	Support your communication by stressing content words.			
10.	Ask questions upon which patient can answer with yes or no.			
11.	Discuss one subject at a time.			
12.	Use short, simple sentences.			

Functional tasks for patient		**Apply (SLT)**	**Task done (nurse)**	**Number of times (tally) (nurse)**
Expressional tasks				
1.	Name the food that is given to the patient one at a time and ask patient to repeat.			
2.	Ask patient to name objects during eating and washing.			
3.	Write down 'man' 'table' and 'pen' and ask patient to read these out loud.			
4.	Ask patient to name five objects in this room.			
5.	Name 'door' 'chair' and 'table' and ask patient to write down these words.			
Reception tasks				
6.	Name 'door' 'chair and 'table' and ask patient to point these out in the room.			
7.	Name objects during eating and washing.			
8.	Name three words (table, pable, gable) and ask which word is correct.			
9.	Ask patient questions about personal background (hobby's, news, etc.).			
10.	Write down 'bed', 'curtain', 'nose' and ask patient to point out words in the room.			

Figure 2. The Communication Rehabilitation Program

Appendices

A. Feasibility questionnaire.

Following are a couple of questions concerning the feasibility of the Communication Rehabilitation Program.

Please read the instructions, before filling in the questionnaires:

- Read each question, including the answering options, before giving an answer.
- Choose the answer that is most applicable to your situation.
- Choose only one answer, unless stated differently.
- Fill in these questionnaires only for yourself and your situation.

	Area of focus	Question	Answer
1.	Acceptability	Are you satisfied about the intervention?	Yes □ no □
2.	Acceptability	Is the intervention protocol clearly written and easily understandable?	Yes □ no □
3.	Acceptability	Do you think the intervention is appropriate for patients with aphasia?	Yes □ no □
4.	Acceptability	Do you think the intervention is important for patients with aphasia?	Yes □ no □
5.	Acceptability	Do you perceive positive effects for the organization?	Yes □ no □
6.	Acceptability	Do you perceive negative effects for the organization?	Yes □ no □
7.	Acceptability	Does this intervention match your views on what is important in the care of patients with aphasia?	Yes □ no □
8.	Acceptability	Do you intend to continue use of the intervention?	Yes □ no □
9.	Demand	Is the intervention easy to use?	Yes □ no □
10.	Demand	Does this intervention provide you new insights in the care, management and treatment of patients with aphasia?	Yes □ no □
11.	Demand	Does this intervention correspond to your vision on care?	Yes □ no □
12.	Implementation	Do you feel you successfully executed the intervention?	Yes □ no □
13.	Implementation	Do you feel your colleagues could successfully execute the intervention?	Yes □ no □
14.	Implementation	Do you have enough resources to implement the intervention?	Yes □ no □
15.	Practicality	Are there any problems when integrating the intervention?	Yes □ no □
16.	Practicality	Do you have enough time to implement the	Yes □ no □

		intervention?	
17.	Practicality	Do you perceive positive effects for patients?	Yes □ no □
18.	Practicality	Do you perceive negative effects for patients?	Yes □ no □
19.	Practicality	Do you find the intervention to be efficient?	Yes □ no □
20.	Practicality	Were you able to carry out all marked items of the intervention?	Yes □ no □
21.	Integration	Do you think the intervention is sustainable?	Yes □ no □
22.	Integration	Do you think the intervention can be applied in your organization?	Yes □ no □
23.	Integration	Do you think the intervention can be integrated during the care of patients with aphasia?	Yes □ no □
24.	Overall impression	What grade do you give the Communication Rehabilitation Intervention from 1 to 10 where 1 is not feasible on the ward and 10 very feasible on the ward?	Grade: ……

Appendix 1A. Feasibility questionnaire. *Based on Hafsteindottir et al (2013) and Bowen et al. (2009).*

B. Questionnaire for barriers to and facilitators for implementation.

Following are a couple of questions about your background, educational background and work experience.

1. What is you birth date (dd/mm/yy)? ..../…./….
2. What is your age? ……. Year
3. How many years have you worked on this neurological ward?

   ……..……
4. How many years of experience do you have on a neurological ward, in total?

   ……..……
5. Which nurses' education have you completed?

   Nurse on Master – degree □
   Nurse on Bachelor/HBO – degree □
   Nurse on MBO– degree □
6. What is your full-time equivalent (fte)? …… fte

Following are a couple of statements about barriers to implementing the Communication Rehabilitation Program. What barriers do you experience at this moment?

	Fully	**Disagree**	**Do not**	**Agree**	**Fully**

	disagree		**agree nor disagree**		**agree**
1. This intervention leaves enough room for me to make my own conclusions.					
2. This intervention leaves enough room to weigh the wishes of the patient.					
3. This intervention is a good starting point for my self-study.					
4. I thoroughly read and remember the intervention.					
5. I know enough about the intervention to apply it.					
6. I have no problems changing my old routines.					
7. I think all parts of the intervention are correct.					
8. I have no general resistance to working according to protocols.					
9. Other assistants cooperate in applying the intervention.					
10. Patients cooperate in applying the intervention.					
11. Working to the intervention is not too time consuming.					
12. The intervention fits into my ways of working at my practice.					
13. Working according to this intervention requires no financial compensation.					
14. The lay-out of this intervention makes it handy to use.					

Appendix 1B. Questionnaire for Barriers and Facilitators. *Based on: Peters, MAJ, Harmsen, M, Laurant, MGH, Wensing, M. Ruimte voor verandering? Knelpunten en mogelijkheden voor verbeteringen in de patiëntenzorg. [Room for improvement? Barriers to and facilitators for improvement of patient care]. Nijmegen: Centre for Quality of Care Research (WOK), Radboud University Nijmegen Medical Centre, 2002.*