

Tailored implementation with the guideline 'Education CVA patients and caregivers', an effect study.

Name:	Vos, L.J. (Luanne)
Student number:	3262200
Status:	Definitive version
Date:	June 4, 2014
Supervisor:	Dr. R.H. van Linge
2 nd Supervisor:	Dr. T.B. Hafsteinsdóttir
Course instructor:	Dr. J. de Man- van Ginkel
Research Institute:	Diakonessenhuis Utrecht, the Netherlands
Journal aim:	Journal of Advanced Nursing (JAN)
Reference style and words:	Harvard and 5.000
Words:	3.475/3.500
Guideline for transparent reporting:	SQUIRE guideline
Words Dutch summary:	299/300
Words English abstract:	292/300

TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND RELEVANT DEFINITIONS.....	3
ABSTRACT	4
SAMENVATTING (DUTCH SUMMARY)	5
INTRODUCTION.....	6
Problem statement.....	8
Aim	8
Research Question	8
METHODS	9
Design	9
Participants.....	9
IC-model.....	9
Data collection	10
Data analysis	11
Procedure	11
RESULTS.....	13
Participants.....	13
Implementation strategy.....	13
Effect tailored implementation.....	14
DISCUSSION.....	15
CONCLUSION	17
RECOMMENDATIONS	17
REFERENCES.....	18
TABLES and FIGURES.....	21
APPENDIXES	24

LIST OF ABBREVIATIONS AND RELEVANT DEFINITIONS

CVA = Cerebral Vascular Accident

IC = Innovation Characteristics

IC-model = Innovation Contingency model

METC = Medical Ethical Review Committee

MRC = Medical Research Council

OC = Organizational Characteristics

RN = Registered Nurses

SPSS= Statistical Package for the Social Sciences

UMC = University Medical Center

WMO [Dutch] = Medical Research Involving Human Subjects Act

ABSTRACT

Title: Tailored implementation with the guideline 'Education CVA patients and caregivers', an effect study.

Background: Implementation of nursing innovations is often not achieved, which can lead to suboptimal care for many patients. Tailored implementation strategies seem to be promising for the implementation effectiveness, however empirical studies are missing.

Aims and Research Question: This study was accomplished, to obtain insight into tailoring and how to implement nursing innovations into clinical practice. An effective implementation strategy will lead to more nursing compliance to evidence based guidelines, thereby providing optimal care to patients. The research question was: What is the effect of a tailored implementation strategy with the guideline 'Education CVA patients and caregivers' on the Neurology ward on (I) organizational characteristics, (II) team learning and (III) nurses' attitude?

Methods: A prospective quasi-experimental study with a one group pretest-posttest design was used. All Registered Nurses from a Neurology ward were included.

Results: Organizational outcomes improved, however the change was not significant. One aspect of team learning, 'storage and retrieval of production oriented information', decreased significantly ($p=0.001$). For nurses' attitude, a significant improvement was found for 'complexity of the innovation' ($p = 0.061$). No significant change was found on the remaining aspects of team learning and nurses' attitude.

Conclusion: This study shows that the tailored implementation strategy for the guideline education CVA patients and caregivers was partially successful.

Recommendations: Further research should focus on patients' outcomes as well as cost-effectiveness of tailored implementation strategies. Furthermore, a longer follow-up period and a time-series design or RCT are recommended to measure implementation effectiveness and reduce the risk of bias. To increase the understanding of effect mechanisms and practice behavior change, quantitative effect studies need to be accompanied by qualitative studies.

Keywords: Tailored implementation, effect, CVA, education.

SAMENVATTING (DUTCH SUMMARY)

Titel: Tailored implementatie van de richtlijn ‘Voorlichting aan CVA patiënten en naasten’, een effect studie.

Inleiding: De implementatie van verpleegkundige innovaties verloopt vaak niet succesvol. Als gevolg krijgen patiënten niet de optimale zorg. Tailored (op maat gemaakte) implementatie strategieën lijken veelbelovend voor de implementatie effectiviteit.

Doel en onderzoeksvraag: De studie is uitgevoerd om inzicht te krijgen in hoe een implementatie strategie kan worden getailored en in het tailored implementeren van een verpleegkundige innovatie in de praktijk. Een effectieve implementatie strategie zal leiden tot meer verpleegkundige verantwoordelijkheid naar evidence based richtlijnen, waardoor er optimale zorg aan patiënten geven kan worden. De onderzoeksvraag was: Wat is het effect van een tailored implementatie strategie van de richtlijn ‘Voorlichting aan CVA patiënten en naasten’ op organisatie uitkomsten, team leren en verpleegkundige attitude?

Methode: Een prospectief quasi-experimenteel studie design met één groep voor- en nameting is toegepast. Alle geregistreerde verpleegkundigen van een Neurologie afdeling zijn geïncludeerd.

Resultaten: De organisatie uitkomsten zijn verbeterd, maar er werd geen significant effect gevonden. Voor team leren werd er een significant negatief effect gevonden voor de subschaal ‘vastlegging en opslag van productie georiënteerde informatie’ ($p=0.001$). Voor de verpleegkundige attitude werd een significant positief effect gevonden voor de subschaal complexiteit van de innovatie ($p=0.061$).

Conclusie: Deze studie toont aan dat de tailored implementatie strategie van de richtlijn ‘Voorlichting aan CVA patiënten en naasten’ deels succesvol was.

Aanbevelingen: Verder onderzoek moet zich richten op patiënt uitkomsten en de kosteneffectiviteit van een tailored implementatie strategie. Om een significant effect te kunnen meten wordt een langere follow-up periode aangeraden en om de kans op bias te verminderen een time-series design of een RCT. Om de effect mechanismes en de veranderingen in praktijk gedrag beter te begrijpen, kunnen kwantitatieve studies gecombineerd worden met kwalitatieve studies.

Trefwoorden: Tailored implementatie, effect, CVA, voorlichting.

INTRODUCTION

In the Netherlands, over 175.000 persons are living with the consequences of a cerebral vascular accident (CVA) and the number of CVA patients is expected to increase by 43% in 2025 (Bots *et al.* 2006). CVA patients face serious health problems, like physical disabilities and psychosocial consequences (Knapp *et al.* 2000). By providing education, CVA patients are supported in understanding their illness and with decision-making (Smith *et al.* 2009). However, many studies demonstrate that CVA patients and informal caregivers express a lack of understanding, which can lead to misconceptions, anxiety, fear, poor health status and emotional problems (Smith *et al.* 2009, Hafsteinsdóttir *et al.* 2011). To prevent these consequences, it is important for nurses to provide effective education to CVA patients and caregivers. Therefore, a new guideline is developed in cooperation with the Neurology department of a Dutch Hospital (guideline 'Education CVA patients and caregivers', see appendix I).

New or changed clinical guidelines, protocols or ways of working are daily realities for nursing teams. Consequently, nursing teams are committed to adapt and implement innovations in their nursing practices (Holleman *et al.* 2009, Carman *et al.* 2010). Implementation can be defined as the introduction of an innovation in daily routines, demanding effective communication, and removing obstacles (van Achterberg *et al.* 2008). Unfortunately, literature shows that implementation of innovations is often not achieved (van Achterberg *et al.* 2008). Not following the evidence based innovations leads to suboptimal care for many patients (van Achterberg *et al.* 2008). An effective implementation can be the pivot between evidence based innovations and nursing practices.

Different implementation strategies exist, however they have a variable impact (Baker *et al.* 2010). Effectiveness of the implementation differs between strategies as well as when the same strategy is used on different locations (Baker *et al.* 2010, Grimshaw *et al.* 2004). Many barriers and facilitators may influence implementation effectiveness (Grol, Wensing 2004). By adapting an implementation strategy to the nature of the innovation, the specific setting and the target group, possible barriers and facilitators are considered (Grol, Wensing 2004, van Os-Medendorp *et al.* 2008). This strategy is named a tailored implementation strategy. Baker *et al.* (2010) showed in a review that tailored implementation strategies seem to be effective in changing the professional practice, however empirical studies are missing.

It is recommended to use diagnostic analysis and a theory for implementation strategies (NHS 1998, Davies *et al.* 2010). A theoretical framework which is used for tailored implementation is the Innovation Contingency (IC) model of van Linge (van Linge 2006). The use of the IC-model has led to a successful tailored implementation of a nursing innovation (van Os-Medendorp *et al.* 2008). The basic assumption of the IC-model, that a fit between

context characteristics and innovation process leads to implementation success, is proved to be sustainable (Figure 1) (van Linge 2006). Context characteristics are for example organizational characteristics, like culture, team learning and nurses' attitude. Team learning is the ability of a team to work together, which is an important aspect to facilitate the production and development of nursing care (Timmermans *et al.* 2013). Nurses' attitude plays a principal role in guiding nurses' behavior towards achieving goals, awareness of its consequences and effective processing of complex information (Koushali *et al.* 2012). A tailored implementation strategy can be determined based on the characteristics of the context (van Linge 2006). Besides, context characteristics can be used to determine implementation effectiveness (Chaudoir *et al.* 2013).

Insert Figure 1

Problem statement

For nurses, to provide effective education to CVA, an effective implementation strategy of the guideline 'Education CVA patients and caregivers' is needed. Tailored implementation strategies seems to be promising for implementation effectiveness. Baker *et al.* (2010) concluded that empirical effect studies on tailored implementation are missing. In addition, effect studies also lack a description of the followed implementation procedure, which is necessary to understand the effect mechanism of the implementation.

Aim

The aim of this study was to determine the effect of a tailored implementation strategy with the guideline 'Education CVA patients and caregivers', on organizational outcomes, team learning and nurses' attitude. Besides, the aim was to give a description of the tailored implementation procedure using the IC-model. The knowledge obtained will provide insight into tailoring an implementation strategy according to the IC-model and how to implement nursing interventions into clinical practice. An effective implementation strategy will lead to more nursing compliance to evidence based guidelines, thereby providing optimal care to patients.

Research Question

What is the effect of a tailored implementation strategy with the guideline 'Education CVA patients and caregivers' on the Neurology ward on (I) organizational characteristics, (II) team learning and (III) nurses' attitude.

The sub-question was:

What is, for the Neurology ward, according to the IC-model, the best tailored implementation strategy of the guideline 'Education CVA patients and caregivers'?

METHODS

Design

The research question focused on change within one group over time. Therefore, a prospective quasi-experimental study with a one group pretest-posttest design was used (Dimitrov & Rumrill 2003). For the sub-question, an observational and cross-sectional approach was appropriate, because only the outcomes of the pretest were used.

Ethics committee approval was obtained from the Medical Ethical Review Committee (in Dutch: METC) of the University Medical Center (UMC) Utrecht. No ethical approval was needed.

Participants

The study was conducted on a Neurology ward of a general hospital, in the Netherlands. The inclusion criteria were Registered Nurses (RN), working at the Neurology ward at the time of the study. The exclusion criteria was nurses working less than two months on the ward. All RN (n=29) working on the ward during this study were approached for participating. A consecutive sampling method was used, since all people of the accessible population, who meet the eligibility criteria were recruited (Polit & Beck 2012). All RN were informed, verbally and in written, about the purpose of the study and the confidentiality of their data. By returning the first questionnaires, the RN had consented to participate in the study.

A sample size of 24 RN was calculated based on an estimated effect size of 0.60, an alpha set at 0.05 and a power of 0.80.

IC-model

The IC-model of van Linge was used to determine the best strategy for the tailored implementation of the guideline. First, an (mis)fit between the systems organization and innovation was determined (organization-innovation fit). Four configurations of each of the two systems were analysed: rule-, result, team- and developmental-orientated. A configuration is defined as a system with coherent characteristics (van Linge 2006). Each configuration exist of three layers: operational features, explicit values (i.e. purpose) and basic assumptions (i.e. vision). An internal fit of the system is reached when all the layers of the configuration are in balance (van Linge 2006). An external fit is present when there is an internal fit on the same configuration for the organization and innovation. Based on the (mis)fit of the configurations and according to the decision rules of van Linge, a tailored implementation strategy was chosen.

Data collection

Data were collected between January and May 2014. Self-reported data from RN were collected pre- and post-test concerning socio-demographic data, organizational characteristics data (Organizational Characteristics (OC) questionnaire), team learning data (team learning scale for nursing teams) and innovation attitude data (Innovation Attitude questionnaire). The innovation characteristics was determined only pre-test through the Innovation Characteristics (IC) questionnaire, by self-reported data from seven experts (RvL, TH, EdK, LV and three RN of the Neurology ward).

Socio-demographic data of the RN were collected, concerning gender, age, educational level, years of working experience, years of working on the Neurology ward and part-time or full-time employment.

The OC questionnaire consists of 12 questions which are assessed on a five point likert scale (from 'totally disagree' to 'totally agree'). The OC questionnaire measures the configuration of the organization (team-, rule-, result- and development-orientated). The internal consistency of the questionnaire was 0.70-0.81, measured with Cronbach's alpha (Roodbergen 2007).

The team learning scale for nursing teams consists of 26 items which are assessed on a five point likert scale (from 'never' to 'very often'). The items are divided in five subscales: gathering of production-oriented information and developmental-oriented information, processing of information, storage and retrieval of production-oriented information and developmental-oriented information (Cronbach's alpha = 0.80-0.94) (Timmermans *et al.* 2011).

The Innovation Attitude questionnaire consists of 21 questions which are assessed on a five point likert scale (from 'totally disagree' to 'totally agree'). The questionnaire consists of five subscales (Cronbach's alpha= 0.76-0.87), which measures the degree of: complexity; trialability; compatibility on operational level; compatibility on goals and values of the nurses and the relative advantage of the innovation (Buwalda 2006).

The IC questionnaire consists of 12 questions which are assessed on a five point likert scale (from 'totally disagree' to 'totally agree'). The IC questionnaire measures the configuration of the innovation (team-, rule-, result- and developmental-orientated) (Cronbach's alpha= 0.71-0.78) (Berkom 2009).

Data analysis

Socio-demographic data were analysed by descriptive analyses. For discrete data, frequencies and percentages were presented and for interval/ratio data, mean and standard deviation were presented.

For the subscale values of the questionnaires, the averages scores of the aggregated individual items were computed. Next, the subscale values were aggregated from an individual to a team level. Because all questionnaires are scored on a five point likert scale, the produced subscale values ranged from 1 to 5.

Because average outcomes are used for the analyses, the outcomes were treated as continues outcomes (Johnson & Creech 1983, Zumbo & Zimmerman 1993). The normality of the average outcomes was calculated with the Shapiro-Wilk test. When normality was demonstrated, the parametric tests were performed.

For the analysis of the organisation-innovation fit, a fit was present with an average configuration score of 4.0 or higher.

An independent sample T-test was performed to calculate the difference between the pre- and post-test outcomes and to indicate a significant effect.

All quantitative data were processed and analysed either using SPSS version 20.0 or Microsoft Office Excel 2010. The statistical significance level was set at a p-value of <0.10 (two-sided) instead of <0.05 to rather detect any differences. Random missing data on items were replaced by the scale mean; 2.14% of the data were imputed this way.

Procedure

The study consisted of four, partially overlapping, stages: a guideline development stage, an introduction and pretest stage, an implementation period and a posttest stage (see Table 1).

Insert Table 1

Guideline development

First, a guideline was developed, because no suitable guideline for education CVA patients and caregivers existed. A variant of the UK Medical Research Council (MRC) framework was used to develop the guideline (see Figure 2) (Kirkevold *et al.* 2012, Craig *et al.* 2013). In phase I, an CVA workgroup (three RN of the Neurology ward) identified the needs of the Neurology department and a literature review was done by the researchers (LV and EdK). With the knowledge from phase I, an initial guideline was established and presented to different experts (phase 2). According to the feedback of the experts, the

guideline was changed to a definitive version. In phase 3, the guideline was tested in practice. During the implementation, the guideline was regularly evaluated and changed when necessary.

Insert Figure 2

Introduction guideline and pre-test

At the start of this stage, a meeting with the nurses and managers of the neurology ward took place. During this meeting, the researcher gave information about the importance of the study and about the purpose of the guideline. Also, it was made clear that data from nurses would be treated confidentially and anonymously, according to the Medical Research Involving Human Subjects Act (WMO) and the Dutch Personal Data Protection Act (WMA 2013, Borst-Eilers *et al.* 1998). At the end, socio-demographic data was collected and two questionnaires (OC and team learning) were distributed among the nurses.

When the definitive guideline 'Education CVA patients and caregivers' was developed, a verbal introduction of the guideline took place during the nursing sessions, for two weeks. Also, a digital and paper version of the guideline was available for each nurse. After the verbal introduction, the Innovation Attitude questionnaire was distributed.

To reduce non-response, the manager of the ward supervised the distribution and returning of the questionnaires.

In this stage, the IC questionnaire was also completed.

Implementation

From February to May 2014 the implementation stage of the guideline took place. The results of the questionnaires were analyzed by the researcher (LV) and an expert (RvL). According to the IC-model, a strategy was chosen. Depending on the outcomes of the attitude and team learning questionnaire, corresponding interventions were added to the chosen strategy.

During the implementation period a record of proceedings was maintained by the researcher.

Posttest

After the implementation period, the posttest occurred. All the questionnaires from the pretest were repeated, except the IC questionnaire.

RESULTS

Participants

A total of 29 RN of the Neurology ward were approached. Because the pre-test questionnaires were distributed on two moments, the response rate varied from 22 (76%) nurses to 14 (48%) nurses. For the post-test, the response rate was 18 nurses (62%). The socio-demographic characteristics of the participated nurses per test are presented in Table 2.

Insert Table 2

Implementation strategy

The tailored implementation strategy was determined with the outcomes of the pretest (Table 3 and Table 4, T1). The organizational vision (basic assumptions) and policy (explicit values) scored the highest on the team-oriented configuration (respectively 4.00 and 3.95). The operational features of the organization are mainly developmental-oriented (3.82). No internal fit was present at the organizational characteristics. The operational features of the innovation were mainly rule-oriented (4.00). The purpose was result- and team-oriented (explicit values= 4.50) and the vision of the innovation was mainly team-oriented (basic assumptions= 4.17). No internal fit was present for the IC, and subsequently there was no external fit between the IC and OC. Notable is the large standard deviation of the pretest outcomes. According to the decision rules of van Linge, a consensus strategy was chosen. The ultimate goal of the consensus strategy is to overcome the different perceptions (van Linge 2006).

The outcomes of the pretest from team learning were low, except for 'the storage and retrieval of production-oriented information' (3.91). The innovation attitude outcomes scored low to moderate, with the highest score on 'compatibility on goals and values of the nurses' (3.71).

With the outcomes of the pretest, the following tailored implementation strategy was performed:

- To reach consensus, the use of the guideline was evaluated during weekly meetings with the researchers (LV and EdK) and the CVA workgroup. Audit and feedback was possible during nursing sessions and in written feedback was possible through e-mail. When necessary, adaptation of the guideline and the implementation process were made.

- To increase team learning, plenary feedback sessions were done during the nursing sessions and a clinical lesson about education was given. Besides, nurse leaders were designated to lead the realization of the guideline.
- To increase nurses' attitude towards the innovation, the importance and the content of the guideline was highlighted by nurse leaders, flyers, newsletters (by mail) and a plenary introduction of the guideline. Practical adaptations were made to facilitate the use of the guideline. During the whole implementation period, the researchers, the nurse leaders and the CVA workgroup were present almost every day for questions and suggestions about the implementation and the innovation .

Insert Table 3

Effect tailored implementation

Organizational characteristics

All configurations of the organizational characteristics improved, however no significant differences were found. The configuration team-oriented was the strongest both pre- and post-test (3.86 and 3.93).

Team learning

For all subscales of team learning, the post-test outcomes were lower than the pre-test outcomes. For 'storage and retrieval of production oriented information', this difference is found significant ($p=0.001$).

Innovation attitude

A significant improvement is present between the pre- and posttest outcomes of the subscale 'complexity of the innovation' ($p=0.061$). The remaining subscales decreased. Nurses' attitude towards the innovation was the highest on 'compatibility on goals and values' (3.66 and 3.48).

Insert Table 4

DISCUSSION

This study shows that a tailored implementation of the guideline CVA patients and caregivers on the neurology ward was partially effective. According to the IC-model, the best tailored implementation strategy for the Neurology ward is the consensus strategy with components to increase team learning and nurses attitude.

All configurations of the organizational characteristics improved, however the change was not significant. The variance of the organizational outcomes can be explained by the small sample size. Another explanation is the possibility of the presence of two subcultures on the Neurology ward. Neurology nurses works mainly on either the stroke care unit or the nursing care ward, and therefore the presence of subcultures is possible.

For team learning, only a significant decrease is measured for 'storage and retrieval of production-oriented information'. This can be the consequence of the cancelling of two team meetings and the replacement of the team leader because of maternity leave during the implementation.

For innovation attitude, only a significant improvement is measured on the 'complexity of the innovation'. This can be due to the guideline adaptations that were made during the implementation.

Time is an important factor in measuring implementation effectiveness. According to Rogers (2003) theory, in an early stage of the implementation, only the innovators and the early adopters have adopted the innovation. The relative short implementation period in this study may explain the main absence of a significant effect. O'Farrell & Zou (2008) studied nurses values and perceptions on the implementation of a innovation on a Neurology ward. They indicated also that a three month period of implementation is too short to assimilate a change in practice. Other factors which may influenced implementation effectiveness are the complex innovation and organizational barriers. The complexity of the innovation increased significantly, however the score was still low. Ivers *et al.* (2012) underlines the use of audit and feedback to change professional practice. However, because one team meeting had no time reserved for evaluation of the implementation and the cancelling of two other team meetings, it was only possible to reach a part of the team during coffee breaks of nursing sessions for audit and feedback.

Benefits of this study are the use of a theoretical framework for implementation and the description of the implementation procedure. A procedure description makes it possible to interpret to some extend why the implementation was (in)effective, and to replicate the implementation strategy, which is missing in many implementation studies (Baker *et al.* 2010). Besides, the followed implementation strategy contained active and multifaceted aspects, an approach supported in the systematic review of Prior *et al.* (2008).

The outcomes should be considered regarding the limitations of this study. Because the questionnaires were based on self-reports, the results can be biased by social desirability. Also, the desirable power was not reached and the sample of RN was small. Because of the tailored implementation strategy, results can only be generalized to other organizational settings who have the same characteristics as the Neurology ward and the nurses. At last, the post-test measurement followed too short on the pre-test to enable significant change in organizational characteristics, and partly team learning and nurses' attitude. Since the implementation of the guideline is still processing, an intermediate outcome would have been a more appropriate term instead of a posttest outcome.

Our main findings are in line with a review which concluded that results about the effectiveness of tailored implementation strategies are not conclusive (Baker *et al.* 2010). The low response rate of nurses' attitude are in line with studies identifying nurses attitude towards research utilization. They showed a response rate of 11% and 27% (McCloskey 2008, Fink *et al.* 2005).

The findings regarding the organizational characteristics, team learning and nurses' attitude towards the guideline should serve as important information for implementation. The findings can assist nurse administrators in preparing for further tailored implementation of this guideline or the implementation of other guidelines in clinical practice.

CONCLUSION

Our study showed that a tailored implementation strategy with the guideline 'education CVA patients and caregivers' was significant effective on nurses' attitude towards the complexity of the guideline. The organizational characteristics improved, however not significant. The remaining innovation attitude and team learning outcomes decreased over time, possible due to a short implementation period. The best tailored implementation strategy for the Neurology ward was the consensus strategy with components to increase team learning and nurses attitude.

RECOMMENDATIONS

In this study, significant effect of a tailored implementation strategy is partly measured on individual level. To detect a significant change on team and organizational level, studies with a longer follow-up period are recommended. In addition, studies with a time-series design or RCTs are preferable, to reduce the risk of bias. Further research should also focus on patients' outcomes as well as cost-effectiveness, to give more insight in the effect of tailored implementation strategies. Furthermore, quantitative effect studies needs to be accompanied by qualitative studies, to achieve increased understanding of effect mechanisms of implementation strategies and practice behavior change.

REFERENCES

- Baker R, Camosso-Stefinovic J, Gillies C, Shaw EJ, Cheater F, Flottorp S & Robertson N (2010) Tailored interventions to overcome identified barriers to change: effects on professional practice and health care outcomes. *Cochrane database of systematic reviews (Online)*. Art. no. CD005470. DOI: 10.1002/14651858.
- Berkom van PFJ (2009) Unpublished study. [in Dutch: Verpleegkundigen als inspiratiebron. In hoeverre is de (mis)fit tussen individuele kenmerken van verpleegkundigen en teamkenmerken van invloed op diverse soorten creativiteit? Afstudeerscriptie Verplegingswetenschap Utrecht: UMC Utrecht]. Available at: <http://dspace.library.uu.nl/handle/1874/34908>.
- Borst-Eilers E & Sordrager W (1998) [in Dutch: Wet medisch-wetenschappelijk onderzoek met mensen]. Dutch government. Available at: http://wetten.overheid.nl/BWBR0009408/geldigheidsdatum_03-07-2014
- Bots ML, Berger-van Sijl M, Jager-Geurts MH, Bos M, Reitsma JB, Breteler MMB & Bruin A (2006) Incidence of cerebrovascular diseases in the Netherlands [In Dutch: Incidentie van cerebrovasculaire ziekte in Nederland in 2000]. In *Hart- en vaatziekten in Nederland* (Bots ML ed.), Nederlandse Hartstichting, Den Haag, pp. 35-56.
- Buwalda IJ (2006) [In Dutch: Adoptie van functie differentiatie Onderzoek naar de invloed van organisatiecultuur, persoonlijke waarden en innovatiekenmerken op de adoptie van een innovatie] [Dissertation]. University Utrecht.
- Carman JM, Shortell SM, Foster RW, Hughes EF, Boerstler H, O'Brien JL & O'Connor EJ (2010) Keys for successful implementation of total quality management in hospitals. *Health care management review* 35(4), 283-293.
- Chaudoir SR, Dugan AG & Barr CHI (2013) Measuring factors affecting implementation of health innovations: a systemic review of structural, organizational, provider, patient and innovation level measures. *Implementation science*. Published online. DOI: 10.1186/1748-5908-8-22.
- Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I & Petticrew M (2013) Developing and evaluating complex interventions: the new Medical Research Council guidance. *International journal of nursing studies* 50(5), 587-592.
- Davies P, Walker AE & Grimshaw JM (2010) A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Implementation science*. Published online. DOI: 10.1186/1748-5908-5-14.
- Dimitrov DM & Rumrill PD (2003) Pretest-posttest designs and measurement of change. *Journal of Prevention, Assessment and Rehabilitation* 20(2), 159-165.

- Fink R, Thomson CJ & Bonnes D (2005) Overcoming barriers and promoting the use of research in practice. *Journal of Nursing Administration* 35,121-129.
- Grol R & Wensing M (2004) What drives change? Barriers to and incentives for achieving evidence-based practice. *The Medical journal of Australia* 180(6), S57-60.
- Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay CR, Vale L, *et al.* (2004) Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment* 8(6), 1-72.
- Hafsteinsdóttir TB, Vergunst M, Lindeman E & Schuurmans M (2011) Educational needs of patients with a stroke and their caregivers: a systematic review of the literature. *Patient education and counseling* 85(1), 14-25.
- Holleman G, Poot E, Mintjes-de Groot J & van Achterberg T (2009) The relevance of team characteristics and team directed strategies in the implementation of nursing innovations: a literature review. *International journal of nursing studies* 46(9), 1256-1264.
- Ivers N, Jamtvedt G, Flottorp S, Young JM, Odgaard-Jensen J, French SD *et al.* (2012) Audit and feedback: effects on professional practice and healthcare outcomes. *Cochrane Database of Systematic Reviews (Online)*. Art. No.: CD000259. DOI: 10.1002/14651858.CD000259.pub3.
- Johnson DR & Creech JC (1983) Ordinal measures in multiple indicator models: A simulation study of categorization error. *American Sociological Review* 48, 398-407.
- Kirkevold M, Bronken BA, Martinsen R & Kvigne K (2012) Promoting psychosocial well-being following a stroke: developing a theoretically and empirically sound complex intervention. *International journal of nursing studies* 49(4), 386-397.
- Knapp P, Young J, House A & Forster A (2000) Non-drug strategies to resolve psychosocial difficulties after stroke *Age and Ageing* 29, 23-30
- Koushali AN, Hajiamini Z, Ebadi A (2012) Comparison of nursing students' and clinical nurses' attitude toward the nursing profession. *Iranian Journal of Nursing and Midwifery Research* 17(5), 375-380.
- McCloskey DJ (2008) Nurses' perceptions of research utilization in a corporate health care system. *Journal of Nursing Scholarship* 40, 39-45.
- NHS (1998) Centre for Reviews and Dissemination: *Effective Health Care*. The Royal Society of Medicine Press Ltd. York, University of York.
- O'Farrell B & Zou GY (2008) Implementation of the Canadian Neurological Scale on an acute care neuroscience unit: a program evaluation. *Journal of Neuroscience Nursing* 40(4), 201-211.

- Polit DF & Beck CT (2012) *Nursing Research, generating and Assessing Evidence for Nursing Practice*. Wolters Kluwer Health, Philadelphia, pp.278-279.
- Prior M, Guerin M & Grimmer-Sommers K (2008) The effectiveness of clinical guideline implementation strategies- a synthesis of systematic review findings. *Journal of Evaluation in Clinical Practice* 14(5), 888-897.
- Rogers EM (2003) *Diffusion of innovations*. Free Press, New York. pp. 11-23
- Roodbergen GC (2007) [In Dutch: *Sustainability: Is er een relatie tussen enerzijds de fit tussen de kenmerken van het AMK en afdelingskenmerken en anderzijds het behoud van het AMK?*] [Dissertation]. University Utrecht.
- Smith J, Forster A, Young J & Cochrane Group for information provision after stroke (2009) Cochrane review: information provision for stroke patients and their caregivers. *Clinical rehabilitation* 23(3), 195-206.
- Timmermans O, van Linge R, Van Petegem P & Elseviers M and Denekens J (2011) Team learning and team composition in nursing. *Journal of Workplace Learning* 23(4), 258-275.
- Timmermans O, van Linge R, Van Petegem P, Van Rompaey B & Denekens J (2013) A contingency perspective on team learning and innovation in nursing. *Journal of advanced nursing* 69(2), 363-373.
- van Achterberg T, Schoonhoven L & Grol R (2008) Nursing implementation science: how evidence-based nursing requires evidence-based implementation. *Journal of nursing scholarship : an official publication of Sigma Theta Tau International Honor Society of Nursing / Sigma Theta Tau*, 40(4), 302-310.
- van Linge R (2006) [in Dutch: *Integrerende benaderingen: contingenties en configuraties*. In *Innoveren in de gezondheidszorg Theorie, praktijk en onderzoek*] Reed Business, Amsterdam, pp. 143-175.
- van Os-Medendorp H, Eland-de Kok P, van Linge R, Bruijnzeel-Koomen C, Grypdonck M & Ros W (2008) The tailored implementation of the nursing programme 'Coping with Itch'. *Journal of Clinical Nursing* 17(11), 1460-1470.
- WMA (2013) World medical association declaration of Helsinki (2008) Ethical principles of medical research involving human subjects 64th WMA General Assembly, Fortaleza, Brazil, October 2013. Available at: <http://www.wma.net/en/30publications/10policies/b3/>
- Zumbo BD & Zimmerman DW (1993) Is the selection of statistical methods governed by level of measurement? *Canadian Psychology* 34, 390-400.

TABLES and FIGURES

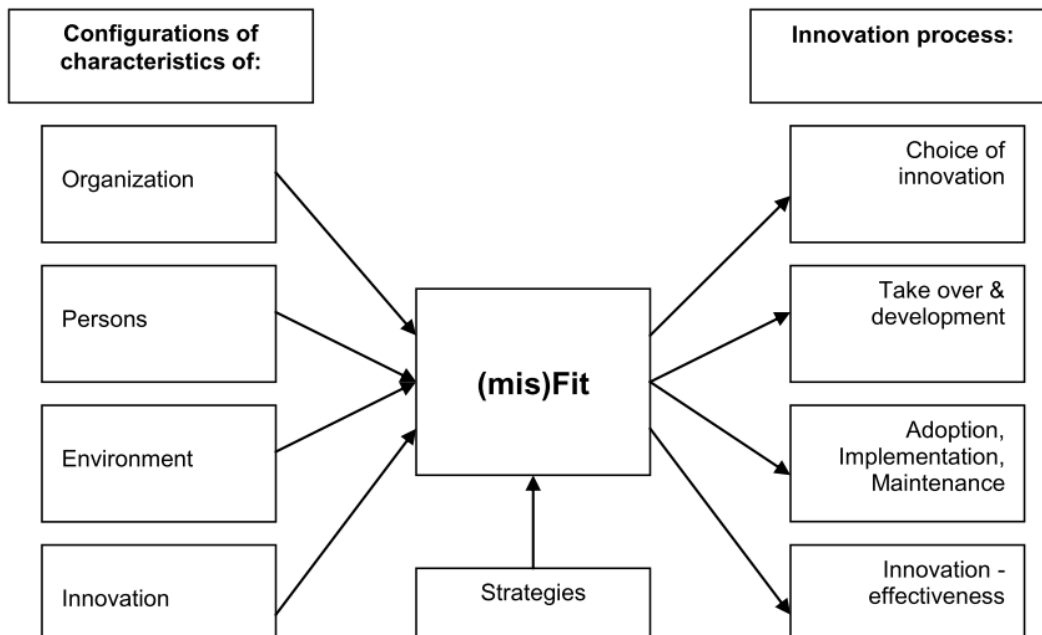


Figure 1: Innovation contingency (IC) model of van Linge (van Linge 2006).

Table 1: Schedule of the study procedure.

Month	January				February					March					April				May		
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Guideline development																					
Introduction and pretest																					
Implementation																					
Posttest																					

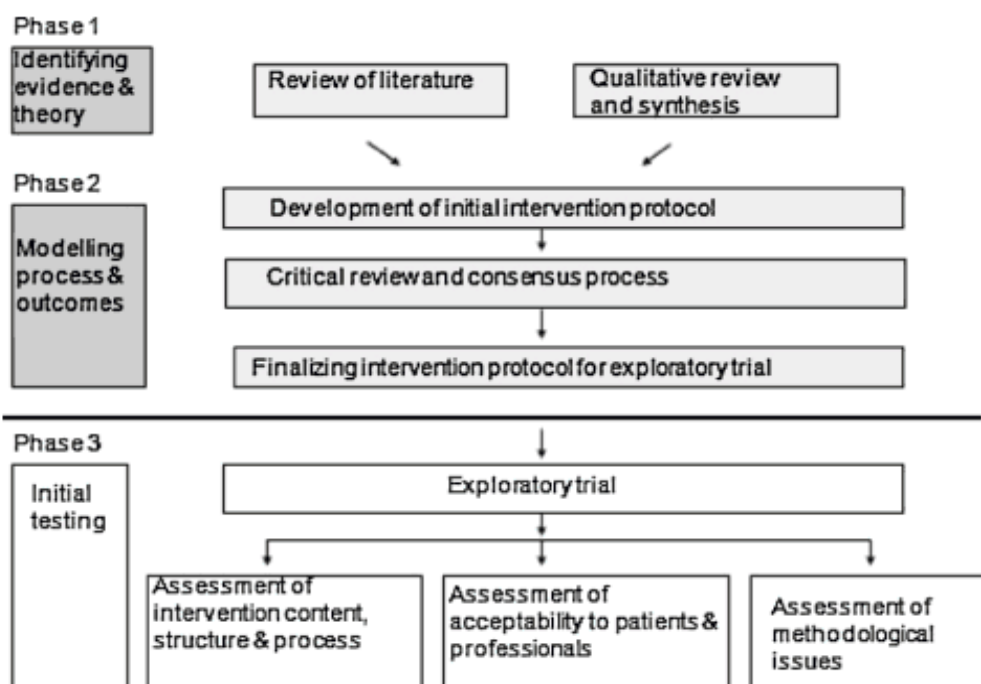


Figure 2: Schedule of an intervention development process (Kirkevold *et al.* 2012) .

Table 2: Socio-demographic characteristics of the participated nurses.

	T1 OC, TL N=22	Attitude N=14	T2 OC, TL & Attitude N=18
Gender			
Female	21 (95.5%)	13 (92.9%)	17 (94.4%)
Age (years)			
Mean (SD; range)	34.7 (10.3;24-59)	36.9 (12.4;25-59)	34.1 (9.5; 25-53)
missing	1	0	2
Educational level			
RN with a bachelors or nurse degree	11 (50.0%)	5 (35.7%)	10 (55.6%)
RN without a bachelors or nurse degree	11 (50.0%)	9 (64.3%)	7 (38.9%)
Missing	0	0	1
Years of work, nursing experience			
Mean (SD; range)	13.3 (10.4; 3-35)	12.6 (11.8;1-35)	11.8 (9.4;2-35)
Missing	0	0	1
Years of working on the neurology ward			
Mean (SD; range)	8.4 (5.5; 1-21)	7.8 (5.2;1-20)	8.6 (5.0;1-20)
Missing	0	0	1
Fulltime or part-time employment			
Fulltime	7 (31.8%)	4 (28.6%)	7 (38.9%)
Part-time	15 (68.2%)	10 (71.4%)	10 (55.6%)
Missing	0	0	1

Values are N (%) unless stated otherwise; T1, pretest; T2, posttest; OC, Organizational Characteristics questionnaire; TL, Team learning scale for nursing teams; Attitude, Innovation attitude questionnaire.

Table 3: Pretest outcomes of the organizational and innovation characteristics.

	Operational features	Explicit values	Basic assumptions	Subscale mean
Organizational characteristics (N=22)				
Team oriented	3.64 (0.85)	3.95 (0.72)	4.00 (0.98)	3.86 (0.75)
Developmental oriented	3.82 (0.85)	2.78 (0.68)	3.14 (0.77)	3.29 (0.58)
Rule oriented	3.77 (0.61)	3.09 (0.61)	3.38 (0.90)	3.41 (0.56)
Result oriented	3.45 (0.80)	3.55 (0.96)	3.52 (0.73)	3.51 (0.57)
Innovation characteristics (N=7)				
Team oriented	2.83 (1.33)	4.50 (0.84)	4.00 (0.89)	3.78 (1.22)
Developmental oriented	2.33 (1.03)	3.83 (1.17)	4.17 (0.75)	3.44 (1.25)
Rule oriented	4.00 (0.63)	4.33 (0.52)	3.33 (1.03)	3.89 (0.83)
Result oriented	3.33 (1.21)	4.50 (0.55)	3.50 (1.05)	3.78 (1.06)

Values are mean (SD). Outcomes ranged from 1 to 5.

Table 4: Independent sample T-test of the pre- and posttest outcomes of the Organizational characteristics questionnaire, Team learning scale and Innovation Attitude questionnaire.

	T1	T2	P-Value
Organizational characteristics (N=22/N=18)			
Team oriented	3.86	3.93	0.709
Developmental oriented	3.29	3.37	0.667
Rule oriented	3.41	3.59	0.260
Result oriented	3.51	3.70	0.239
Team learning (N=22/N=18)			
Gathering production oriented information	2.43	2.31	0.427
Gathering developmental oriented information	2.57	2.51	0.694
Processing information	2.98	2.83	0.417
Storage and retrieval of production oriented information	3.91	3.18	0.001*
Storage and retrieval of developmental oriented information	2.81	2.61	0.243
Innovation Attitude (N=14/N=18)			
Complexity	2.41	2.71	0.061*
Test ability	3.11	3.06	0.812
Compatibility on operational level	3.50	3.43	0.489
Compatibility on goals and values of the nurses	3.66	3.48	0.422
Relative advantage	3.39	3.19	0.402

Values are mean, unless stated otherwise; T1, pretest; T2, posttest; P value is set at $p < 0.10$. Outcomes ranged from 1 to 5.

APPENDIXES

Appendix I – Guideline education CVA patients and caregivers [in Dutch].

The guideline 'education CVA patients and caregivers' can be requested by the researcher [in Dutch].