The development and evaluation of a guiding system for quality improvement of pressure ulcer care

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Final version; 5 July 2013

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Journal of publication:

Journal of advanced nursing

Number of words according to journal of publication: 5000

Words: 3218

Words Dutch abstract: 281

Words English abstract: 300

Reference style: Harvard

INTRODUCTION

Pressure ulcers are a painful and frequently avoidable care problem that hampers quality of life and results in high health care costs (Halfens et al. 2011, Agrawal & Chauhan 2012). Pressure ulcers have been mentioned as one of the most costly and physically debilitating complications in the 20th century (Burdette-Taylor & Kass 2002). The European and National Pressure Ulcer Advisory panel (EPUAP and NPUAP) define a pressure ulcer as "a localized injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, or pressure in combination with shear" (NPUAP and EPUAP 2009).

Developed during hospitalization pressure ulcers are an independent and significant predictor of a longer hospital stay for older patients (Theisen, Drabik and Stock 2011). If not adequately treated, open ulcers can become a source of infection, pain and disability (Zeller & Lynm 2006). Pressure ulcers are a matter of concern for caregivers, especially nurses (Agrawal & Chauhan 2012). Overall prevalence rates of 12.1–33.3% were found in European hospitals (Theisen, Drabik and Stock 2011). The Dutch National Prevalence Measurement of Care Problems (LPZ) found in 2011 an average prevalence of pressure ulcers of 8,7%; the highest in academic hospitals (13,1%) and the lowest in home care (6,1%) (Halfens et al. 2011).

EPUAP guidelines for prevention of pressure ulcers state most pressure ulcers can be avoided and therefore it is important to have prevention strategies which are based on the best available evidence (NPUAP and EPUAP 2009).

In current practice, problems occur in the diagnosis of pressure ulcers, the use of risk scores, the time of deployment of preventive measures and the use of recent current wound management techniques (Decubitus richtlijn 2011), which may lead to more suffering and discomfort for patients. To reduce these problems a National multidisciplinary guideline for pressure ulcer prevention and treatment (Decubitus richtlijn 2011) was developed based on the NPUAP/EPUAP guideline. Implementing this guideline in the policy of healthcare institutions is of great importance for patients' care; to improve the quality of life and health of patients and to generate a quality improvement in the care for these patients.

Before a guideline can be implemented, it is important to get insight in the local situation to get awareness of the issue and the need for change which are the first critical steps to improve practice (Dunn et al. 2013). An instrument which can help institutions getting insight in their actual situation is the National Prevalence Measurement of Care Problems (LPZ) which is an annual, independent prevalence audit, which performs measurements of care

problems of prevalence, prevention and treatment and policy within Dutch healthcare. Each participating institution receives an overview of its own and the national results, in that way they get indications on which parts they can improve care. However, healthcare professionals struggle transforming LPZ results into relevant actions to improve care (Nie et al., 2013).

Meijers et al. (2013) developed a feedback system, consisting of a decision tree with action tables, to support healthcare institutions to interpret their own results regarding the care problem malnutrition and to convert these results into actions to eventually improve the quality of care on an institutional level. This system consists of a decision tree and five action tables concerning risk assessment, nutritional treatment interventions, improvement of quality indicators, actions to improve and maintain awareness and tips on how to implement an improvement action. A decision tree is a structural way of questioning; the answer to one question generates a sequential question or possible actions which are organized into action tables. The user answers questions and after a negative answer the advice follows to use an action table with advices for improvement or another question. Every action table in Meijers' system has an identical layout; six columns: the focus, question, target group, who could make use of it, what tool can be considered and source. Every action consists of a hyperlink to that improvement tool or to more information (Meijers et. al., 2013).

Besides difficulties in transforming the LPZ results into useful actions, the implementation of actions is also problematic in nursing practice. Therefore Meijer's system gives suggestions how these actions could be implemented by giving examples of best practices developed in earlier projects in the Netherlands (Meijers et al. 2013). Franx et al. (2011) also mentioned the need of attention on the implementation of guidelines and on innovative implementation strategies that make optimal use of the possibilities of information technology.

The report of Meijers (2012) recommended that due to the positive feedback and enthusiasm of the participants the development of similar systems for the other care problems of the LPZ measurement must be encouraged.

PROBLEM STATEMENT, AIM AND RESEARCH QUESTIONS

Problem statement

Quality improvement is possible in the care for patients with, or at risk of developing, pressure ulcers in the Netherlands. LPZ gives insights in the institutions' existing situation but participants need help translating this into useful evidence based actions to improve the quality of pressure ulcer care. A guiding system with a decision tree and action tables is a possible solution to solve this problem.

Aim

The aim of this study is to develop a guiding system with a decision tree and action tables for pressure ulcer care that is suitable for managers and quality employees in hospitals, home care and long-term care settings which enables them to make decisions to improve the quality of care for patients with, or at risk of developing, pressure ulcers in the Netherlands.

Research questions

Two research questions were formulated in succession:

1)Which elements need to be included in a guiding system, existing of a decision tree and action tables, for quality improvement of pressure ulcer care?

2)Is the developed guiding system useful for managers and quality employees in hospitals, home care and long-term care settings to improve the quality of pressure ulcer care in their institutions?

THE STUDY

METHOD

Design

This study was conducted using an exploratory sequential mixed-methods design (Creswell and Plano - Clark 2010), existing of a qualitative and quantitative phase. This design is especially advantageous when developing and testing an instrument because of the need to explore the topic qualitatively before it can be tested quantitatively (Creswell and Plano-Clark 2010, Tashakkori & Teddlie 2003). The study existed of two phases. In the first phase the guiding system for pressure ulcer care (GSP) was developed by using expert meetings, while in the second phase the GSP was evaluated with a written questionnaire about the usefulness of the GSP. The contents of the process are shown in a flowchart in figure 1.

Insert figure 1 here

Development phase

A first concept GSP was developed, based on the structure of the guiding system of Meijers et al. (2013), the Dutch national pressure ulcer prevention and treatment guideline (Decubitus richtlijn 2011), the Care for Better improvement program conducted by the Centre of Expertise for Long-term Care in The Netherlands (Vilans) (www.zorgvoorbeter.nl) and the LPZ questionnaire. The GSP was developed in Dutch and consists of a decision tree with action tables. Next this concept was evaluated by pressure ulcer experts.

Participants

A convenience sample of five pressure ulcer experts from different settings and functions, was interviewed in a semi-structured way to get more insight in the usefulness, clarity and completeness of this instrument. The inclusion criteria of this purposeful sample were that the experts were familiar with the Dutch national pressure ulcer prevention and treatment guideline (Decubitus richtlijn 2011) and were able to provide information about usefulness, clarity and completeness of this instrument. A sample size of five experts was sufficient to obtain various and extensive information according to Creswell & Plano Clark (2010).

Data collection

The researcher invited the experts by email and sent the participants the concept GSP one week before the meeting to give them the opportunity to prepare for the meeting. The expert meetings were held in February 2013. The first expert reacted by email and this feedback

was adapted in the concept GSP. After this a meeting with two experts was held in Utrecht during two hours, led by the researcher. The decision tree and action tables were discussed step by step to check if nothing was missing or if something should be removed. Besides, the experts were asked to give professional feedback and their opinion regarding the usability, clarity and completeness of this instrument. After adapting this feedback two other experts were asked to give a reaction by email. They also received the concept GSP and were also asked to check the instrument step by step if no information was missing or if something should be removed and to give their opinion about the usability, clarity and completeness of this instrument. To improve the reliability the most important additions were, after adapting the decision tree, sent back to the experts to check if they agreed with this adapted version (Boeije, 2005).

Data analysis

Feedback was encoded in accordance with thematic analysis using the themes: usefulness, clarity and completeness (Polit & Beck 2012). Each point of the decision tree or action table was adapted with the feedback or the feedback was discussed in the project team. The development phase led to the concept GSP whereby performance data of LPZ can be linked to evidence or practice based actions.

Evaluation phase

The evaluation took place in April 2013.

Participants

A purposive sample of 30 coordinators of institutions who participated in the pressure ulcer module of the LPZ measurement of 2012 was selected. All participants of the LPZ measurement received an announcement of this study in the LPZ newsletter of January 2013.

Data collection

To evaluate the GSP a questionnaire was developed based on the questionnaire used in the study of Meijers et al. (2013). The questionnaire contained nineteen questions around three main themes; usefulness, clarity and completeness. The first two questions were about the setting and the function of the responder, followed by questions about the decision tree and the action tables. Likert-scale items as well as dichotomous answer categories and open answer questions were used.

The questionnaire was presented in an online program, SurveyMonkey (www.surveymonkey.com). The link to the questionnaire and the latest version of the GSP

were sent to the selected coordinators in April 2013. The questionnaire took approximately 45 minutes time. Nine and fifteen days after sending the questionnaire reminders were sent. One week later LPZ coordinators were called to fill in the questionnaire, coordinators who didn't answer the phone got a personal email.

Data analysis

Quantitative data were analysed by descriptive statistics. Questionnaires with missing values were included if not only questions about function and setting were answered but also questions about the instrument.

Ethical considerations

Testing by the Medical research ethics committee (METC) was in both phases not necessary because only healthcare professionals were involved and the study does not expose persons to treatment or require people to behave in a certain way.

RESULTS

Development phase

The GSP was based on the structure of the system of Meijers et al. (2013) and the items of the action tables were based on the questions of the LPZ measurement. The difference with the system of Meijers et al. (2013) is one extra action table: prevention. An example of a piece of an action table is shown in figure 2.

Insert figure 2 here

The group of five experts consisted of a pressure sores prevention/wound care nurse in a general hospital, a staff member in a long-term care institution, a tissue viability nurse, a geriatric specialist and a programme officer of quality and innovation for the elderly.

One expert mentioned about the usability, "*I read the decision tree with great pleasure. It is a clear and concise translation of the various directives in a well-designed and simple system. I think this will be a good useful tool for many"*. There were some recommendations about the words 'celebrate', or, 'do you think', these terms are not objective and therefore not useful. The other experts were positive about the usability of this GSP.

A comment about clarity was that in every organization, a different officer is responsible for quality improvement of pressure ulcer policy and in every organization this function is called differently. Because of this the experts suggested to make the action tables clearer by deleting both columns about target and who can use it.

The action table about treatment was not complete enough according to the experts, this action table was extended. The rest of the GSP was complete and contained all elements that were needed according to these five experts.

Evaluation phase

Seventeen coordinators started filling out the questionnaire (response 57%). Seven of them only answered the questions about function and setting, ten completed the questionnaire and their responses were used for the results. The response rate was ten out of thirty (33%). Reasons for not filling out or not completing were time related or because they did not join the LPZ this year. Table 1 shows the participants and their function and setting.

Insert table 1 here

Usability

The usability of the GSP, the decision tree with action tables, was assessed as very good by one participant, good by six participants, two considered it moderate and one considered it bad. The references to the different websites were stated as usable. Advices specifically for hospitals and department-specific were missed.

The majority of the participants mentioned the quality of the information in the decision tree very good (one) or good (seven) as well as the quality of the information in the action tables. Seven participants thought the layout of the action tables was logical and workable and the comments of the others were about the sequence, they thought awareness or activating must come first.

Three participants mentioned that they had to work with this system before they could say if more items could be improved. Seven participants thought they were going to use this decision tree and action tables. Reasons mentioned are "*our prevalence is not low enough*", "*it's a good guidance*", *"with this GSP we can find potential gaps in the current policy and make them visible and the action tables can give direction"*, "*we can use it in the analysis*", "*when there are more actions specific for hospitals but it can be good to have a reference to the departments*", "*it is a methodical way to see potential gaps"*. Of the three participants who answered "no" to this question, one is doubting and one missed the department specific actions so for now this was the reason for not using it.

Clarity

Nine participants said this instrument fits well with the LPZ measurement. Reactions were*: "it's a clear instrument and the LPZ was the basis of this instrument and from this the fit with the questions is good."* "*The alertness on the numbers is not obvious"* and "*it gives clarity"*. Eight mentioned that the steps of the decision tree fits well with the LPZ measurement. One of the other two mentioned the fact that if attention and awareness improve the prevention and treatment will improve and the prevalence will decline.

Seven participants thought the steps of the decision tree were logical and clear. Nine thought the action tables fit well with the decision tree and eight participants thought the mapping of the action tables is clear.

Completeness

Nine participants missed no steps in the decision tree and one mentioned that it is to extensive. Eight participants missed no information in the decision tree, one mentioned just

as the experts missing information about how to celebrate success. Eight participants mentioned to miss no information (sources) in the action tables.

DISCUSSION

This study is, to our best knowledge, one of the first studies that developed and evaluated a guiding system by using a decision tree and action tables, that is conductive in the interpretation of performance data and links these data to relevant interventions for pressure ulcer care. This guiding system can be a start in translating LPZ measurement findings about pressure ulcer care into better patient care with actions for quality improvement. Audit with feedback commonly leads to small but potentially important improvements in practice (Ivers et al. 2012).

This study suggests that this guiding system is useful for managers and quality employees to improve the quality of pressure ulcer care in their institutions. Grol (2001) endorses this: 'The development and implementation of (evidence-based) clinical practice guidelines is one of the promising and effective tools for improving the quality of care'. Mugford, Banfield and O'Hanlon (1991) stated that information feedback was probably influencing practice if it was part of a strategy of decision makers who had already agreed to review their practice, like LPZ participants do. The effectiveness of audits with feedback seems to depend on the way how the feedback is provided (Ivers et al. 2012). This underlines the importance of doing research into the opinion of users about the clarity, completeness and usefulness during the development of an instrument.

This research had a few limitations that could have influenced the results. It proved to be difficult to bring the experts together. That's why only two experts had a face to face meeting and the others reacted by email. A meeting with five experts had probably given more information because of the interaction between participants.
The responses of some participants were not always an answer on the actual question of the questionnaire but these answers also were used in the analysis; for example a question one participant called the steps of the GSP bad with the reason, "I don't see the added value of the GSP". Another limitation was the small sample size in the evaluation phase. Most participants in the evaluation phase were working in a hospital, therefore the settings were not proportionally represented. Only one coordinator of a home care institution and one coordinator of a long-term care institution fulfilled the questionnaire. Feedback of several participants was that they first wanted to get practical experience with this system to give a better feedback on the GSP, the fact that participants had no experience with the GSP could influence the results.

CONCLUSION

This mixed methods study indicates that the GSP was developed and evaluated as a useful, clear and complete instrument for LPZ participants for quality improvement of pressure ulcer care.

RECOMMENDATIONS

This study is a first step in the evaluation of this GSP but to improve this, further research is required over a longer period to give participants time to work with the guiding system before they participate in the evaluation phase. A longitudinal research is necessary to measure the effects of working with this GSP on pressure ulcer care in the next LPZ measurements.

A questionnaire is a useful instrument but a disadvantage is that participants not always give an answer on the question, which gives bias. Nineteen questions, a few nearly similar, were proved difficult to answer for the participants in this study. In further research it is to be taken into consideration to interview a part of the participants or to simplify the questionnaire.

Other recommendations for further studies are to try to get a larger group of participants for the questionnaire and to try to get a more equally divided group of institutions of different settings. It is a good option to give participants the opportunity to work with the instrument before they have to give their feedback.

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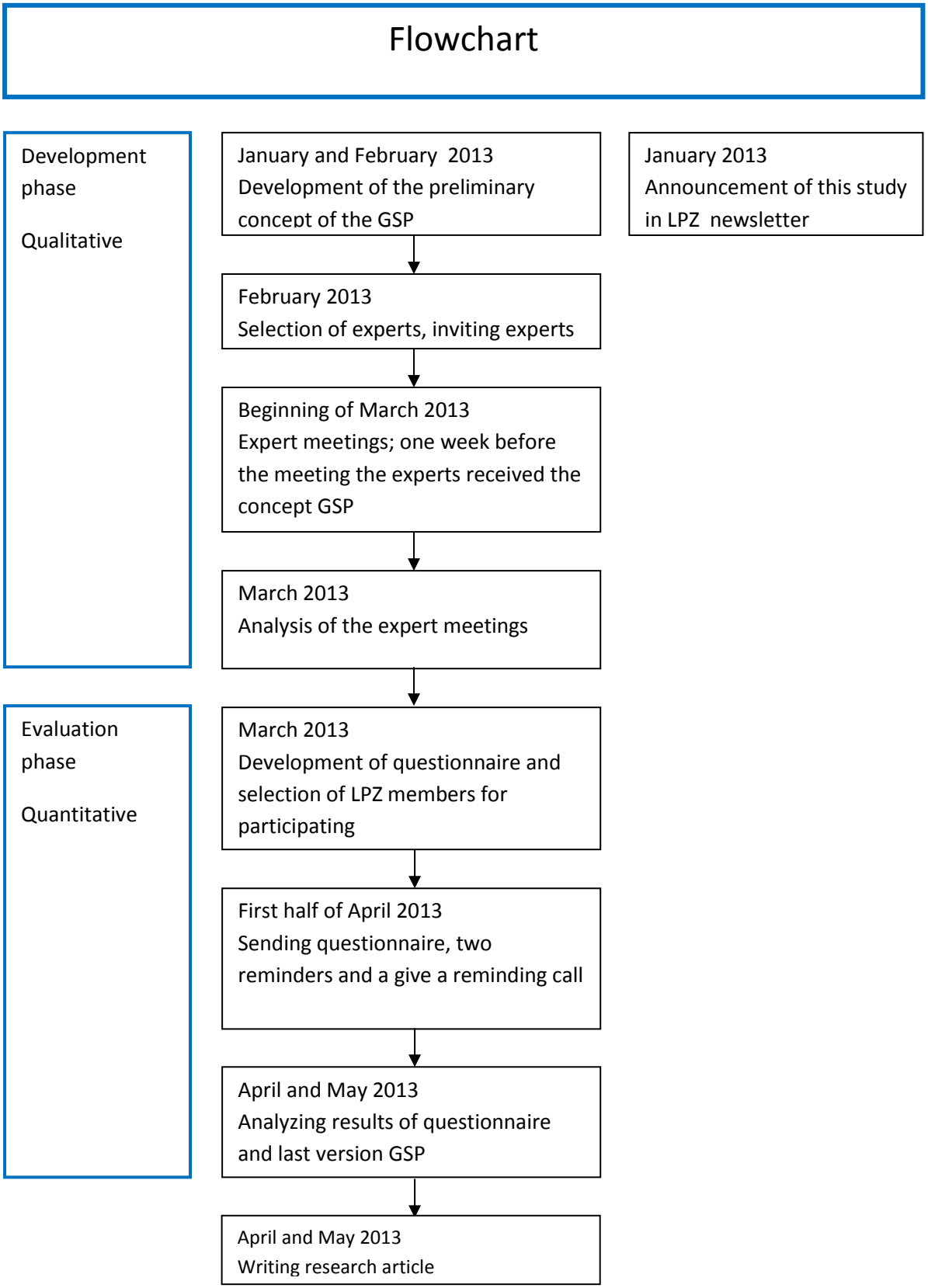

Figure 1; Flowchart of the components of the study

Action table; Improvement tools risk assessment pressure ulcer

Focus	**Question/ need**	**Target group**	**Who can use it?**	**What improvement tool can be considered?**	**Source**
Policies and agreements	Policies regarding pressure ulcer risk stocktaking	Quality officer	Manager, Quality officer, decubitus commission	National multidisciplinary guideline pressure ulcer prevention and treatment, V&VN, 2011; chapter 5 Take in all health care settings care for policies related to risk assessment, with recommendations on:….	National multidisciplinary guideline pressure ulcer prevention and treatment, V&VN, 2011; chapter 5

Figure 2: An example of the layout of an action table

Table 1: participants of the questionnaire research and their profession

	Completed	n	Not completed	n	Total
General hospital	Nurse specialist I Nurse, medic or paramedic IIII wound and pressure ulcer nursing consultant I	6	Nurse, medic or paramedic III wound care coordinator I	4	n=10
Academic hospital	Nurse, medic or paramedic I Staff advisor staff group nursing and VS intensive care I	2	Nurse, medic or paramedic I	1	n=3
Long-term care	Unit manager and coordinator LPZ I	1	Staff functionary I nurse, medic, paramedic I	2	n=3
Home care	Wound care nurse I	1	x	0	n=1
Total	**n=10**		n=7		N=17

SAMENVATTING/DUTCH SUMMARY

Titel: De ontwikkeling en evaluatie van een begeleidingssysteem voor kwaliteitsverbetering van decubituszorg

Inleiding: Decubitus is een pijnlijk en vaak te voorkomen zorgprobleem dat hoge kosten met zich meebrengt. De Landelijke Prevalentiemeting Zorgproblemen meet jaarlijks de prevalentie van enkele zorgproblemen, waaronder decubitus. Het vertalen van uitkomsten hiervan naar concrete acties blijkt in de praktijk vaak moeilijk voor zorgverleners. Om hen hierbij te helpen wordt in deze studie een begeleidingssysteem voor decubituszorg ontwikkeld; er wordt in deze studie gewerkt met een beslisboom met actietabellen. Hiervoor is gekozen omdat dit concept in een eerder onderzoek positief ontvangen is.

Doel en Onderzoeksvragen: Het doel van deze studie is een systeem te ontwikkelen dat managers en kwaliteitsmedewerkers van ziekenhuizen, thuiszorgorganisaties en verpleeghuizen helpt om keuzes te maken om de kwaliteit van decubituszorg te verbeteren. De vragen die achtereenvolgens onderzocht zijn waren:

1)Welke elementen moet een begeleidingssysteem voor verbetering van decubituszorg, dat bestaat uit een beslisboom en actietabellen, bevatten?

Hierna werd onderzocht:

2) Is het ontwikkelde begeleidingssysteem bruikbaar voor managers en kwaliteitsmedewerkers in ziekenhuizen, thuiszorgorganisaties en verpleeghuizen om de kwaliteit van decubituszorg in hun instellingen te verbeteren?

Methode: Dit is een studie met een gemixt design. In de ontwikkelingsfase is een concept begeleidingssysteem opgesteld en voorgelegd aan vijf experts. In de evaluatiefase is het systeem beoordeeld met behulp van een vragenlijst. De vragenlijst is naar 30 instellings-coördinatoren van de Landelijke Prevalentiemeting Zorgproblemen gestuurd en door tien van hen ingevuld. Er is gekeken naar bruikbaarheid, volledigheid en helderheid van het systeem.

Resultaten: De coördinatoren die meegedaan hebben in de evaluatiefase hebben dit systeem als bruikbaar, volledig en helder beoordeeld.

Conclusie: Het ontwikkelde begeleidingssysteem werd door de coördinatoren van de Landelijke Prevalentiemeting Zorgproblemen als bruikbaar beoordeeld.

Aanbevelingen: Verder onderzoek is nodig om de effecten op decubituszorg te meten.

Trefwoorden; decubituszorg, beslisboom, kwaliteitsverbetering, preventie, behandeling

SUMMARY

Title:The development and evaluation of a guiding system for quality improvement of pressure ulcer care

Background: Pressure ulcers are a painful and frequently avoidable care problem with high health care costs. The National Prevalence Measurement of Care Problems is an annual measurement on prevalence of several care problems, like pressure ulcers. Health care professionals struggle translating outcomes of this measurement into actions. In this study a decision tree for pressure ulcer care with action tables will be developed to assist these professionals, since a previous developed decision tree for malnutrition was received positively.

Aim and research question(s) The purpose of this study is to develop a guiding system for pressure ulcer care that is suitable for managers and quality employees in hospitals, home care and long-term care settings to improve the quality of pressure ulcer care.

Two research questions were formulated in succession:

1)Which elements need to be included in a guiding system, existing of a decision tree and action tables, for quality improvement of pressure ulcer care?

2)Is the developed system useful for managers and quality employees in hospitals, home care and long-term care settings to improve the quality of pressure ulcer care in their institutions?

Method A mixed method was used in this study. The development phase consisted of conducting the concept decision tree and five expert interviews. In the evaluation phase a questionnaire was sent to 30 coordinators of participants of the National Prevalence Measurement of Care Problems to determine their opinion, ten of them fulfilled it. Questions about usability, clarity and completeness were in the questionnaire.

Results: Coordinators evaluated this system as useful, complete and clear.

Conclusion: The developed guiding system was rated as useful by the coordinators of joining institutions of the National Prevalence Measurement of Care Problems.

Recommendations: Further research is required over a longer period. A longitudinal research is necessary to measure the effects on pressure ulcer care.

Keywords pressure ulcer care, decision tree, quality improvement, prevention, treatment