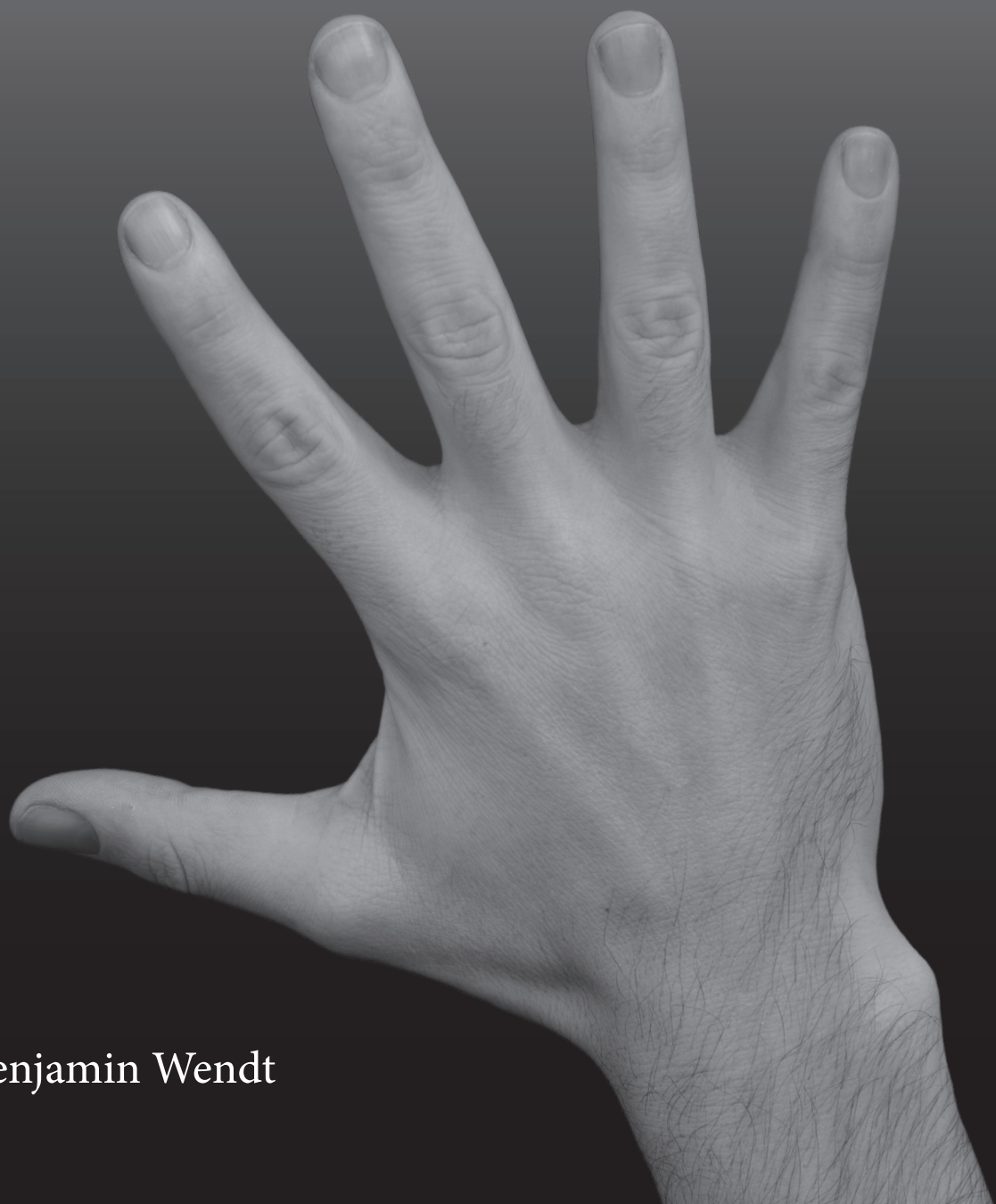


De-implementing low-value home-based nursing care



Benjamin Wendt

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Chapter 1

General introduction

General Introduction

Worldwide, the nursing profession is growing in both size and professionalism. However, this growth is inadequate to meet rising nursing care demands (World Health Organisation, 2020). Trends, such as the global aging of populations, technological and scientific advances, shifting societal values and attitudes towards more personalised care, and changes in epidemiology are important drivers of healthcare demands (Sharma et al., 2015; World Health Organisation, 2015). Left unattended, the global nursing shortage will likely lead to serious infringements on core components of the “right to health” such as the availability, accessibility, acceptability and quality of healthcare (Backman et al., 2008). In an effort to mitigate these challenges, government policies are increasingly moving institutional care - such as hospital and long-term care - towards the home environment (Tarricone & Tsouros, 2008). For example, the Dutch Ministry of Health, Welfare and Sport launched policies calling for the “joint movement” towards the concept of “appropriate care” containing four basic principles. Appropriate care needs to: “1. be value driven; therefore, demonstrably more effective with a limited use of funding, personnel and resources (evidence-based); 2. arise together with the patient and with the people around the patient (shared decision making); 3. call for the right care in the right place and, where possible, this is organised close to the patient and 4. concern health instead of illness (positive health approach)” (Ministry of Health Welfare and Sport, 2022). In the Netherlands, these trends have led to an increase of home-based nursing care to 3.4% of the Dutch population or 584.000 clients in 2021 (Vektis, 2022). As a result, shortages of nurses and certified nursing assistants working in home-based nursing care are expected to exceed 10% on a total of 105.000 home-based healthcare professionals in 2027 (Grijpstra, 2020).

Parallel to these trends and policy changes, recent research has established that not all nursing care in clinical practice is either effective or necessary. For example, “the use of dressings for primarily closed wounds” and “preoperative hair removal to prevent surgical site infections” are proven ineffective to prevent infections (Tanner & Melen, 2021; Vermeulen et al., 2005) and “inappropriate peripheral intravenous or urinary catheters” may lead to catheter-associated bloodstream infections and urinary tract infections (Laan et al., 2020). These examples have little or no benefit to the patient, can cause harm, waste limited resources and can therefore be considered –opposed to appropriate care - as “low-value (nursing) care” (Colla et al., 2017). While several definitions of “low-value care” exist (Niven et al., 2015), it is important to note that the majority of care belongs to what is referred to as the “grey zone”: 1. care that might benefit some clients, but offers little benefit to most clients; 2. care that shows a large variety in effect or 3. care for which there is simply not enough evidence to decide who benefits and how much (Brownlee et al., 2017).

A further distinction can be made between “non-nursing tasks” and “low-value nursing care”. “Non-nursing tasks” are practices where nurses perform tasks that are below their skill level, for example answering phones or obtaining equipment and supplies (Bruyneel et al., 2013). “Low-value nursing care” constitutes nursing care activities that are either: 1. ineffective; for example, proven ineffective or the harms outweigh the benefits; 2. inefficient; for example, essentially effective care but of low-value because it is performed double, too soon or continued too long or (3) unwanted; for example, essentially effective care but of low-value because it does not solve the patients’ problem or it does not fit the patients’ values and preferences (Verkerk, Tanke, et al., 2018). What “non-nursing tasks” and “low-value care” have in common is that they can both lead to “missed care” or “care left undone”. Recently, in survey studies involving home-based healthcare professionals, Phelan et al. (2018) reported high levels of “missed care” and Senek et al. (2020) reported that 34% of respondents indicated that during their last shift care was “left undone”. These are nursing activities that are either partially or fully omitted when resource shortages make delivery of all necessary care impossible. While it is an under researched topic in home-based nursing care, examples are “comforting” and “educating” patients (Ausserhofer et al., 2014).

Internationally and nationally lists of low-value care are available. One example are the lists of the Choosing Wisely campaign, which originated in the United States to encourage conversations between the public, patients and healthcare professionals on unnecessary practices (Born & Levinson, 2019). At the start, Choosing Wisely largely focussed on medical professionals, but other examples soon followed, including lists for nursing care. For instance, the list of 25 low-value nursing activities of the American Academy of Nurses (American Academy of Nursing, 2018), the list of nine things nurses and patients should question by the Canadian Nurses Association and the first five recommendations by the Australian College of Nursing (Australian College of Nursing, 2016; Canadian Nurses Association, 2017). In Spain, a survey study was conducted in tertiary hospitals to quantify and see if nurses agreed with a large number of Choosing Wisely practices and found a high level of consensus (Osorio et al., 2019). In the Netherlands initiatives like “Smart caring, 15 sensible choices” (Stapersma, 2016) and the first systematic review of 125 national nursing guidelines by the Verkerk, Huisman-de Waal, et al. (2018) led to the identification of 66 low-value nursing care practices in 2017. In 2023, this review was updated with 65 low-value care practices (Bahlman-van Ooijen et al.; Dutch Nursing Association, 2023).

While ranking, prioritising and developing lists might be the first step towards identifying opportunities for (de-)implementation, it was repeatedly stated that it takes an average of 17 years for research evidence to be implemented in clinical practice (Balas & Boren, 2000; Grant et al., 2003; Morris et al., 2011). A striking example is the faltering implementation of the Dutch national multidisciplinary guideline intertrigo (prevention and treatment). While the guideline was published in 2011, a 2018 report concluded to “invest in implementation and investigate

why [...] exactly the implementation of the [...] guideline failed” (De Groot et al., 2018). Since then, little progress has been made. Together with creating awareness amongst nurses and certified nursing assistants, stimulating the dialogue on low-value nursing care and facilitating learning through evidence-based quality improvement projects, experimental research is needed. De-implementation - actively *reduce, replace or stop* low-value care - as a science is still emerging and it has been largely targeted at the medical disciplines (Raudasoja et al., 2022; Rietbergen et al., 2020; Walsh-Bailey et al., 2021). Experimental research therefore must include analyses of barriers and facilitators, controlled intervention studies, process evaluations and economic evaluations to quantify and reduce low-value nursing care (Rietbergen et al., 2020; Verkerk et al., 2022).

Accordingly, this thesis aims to contribute to evidence-based practice in home-based nursing care and to empower nurses to take control and accept responsibility. Specifically, we aim to provide evidence for low-value nursing care and learn with them to build on influencing factors – barriers and facilitators - for providing low-value care, and to develop pragmatic strategies to reduce these nursing care activities and guide them to use evidence-based care in an independently manner in the future.

Box 1. Home-based nursing care in the Netherlands

Internationally, significant variation exists in defining, organising and funding of care in the home environment, both between and within countries (Genet et al., 2011). Van Eenoo et al. (2016) separate three forms of care in the home environment: 1. domestic care (for example; shopping, housekeeping, financial administration), 2. personal care (for example; assistance with activities of daily living such as dressing, feeding, washing and toileting) and 3. nursing care (for example; nursing activities that are of a technical, medical, supportive or rehabilitative nature). In this thesis activities will be developed for both personal care and nursing care. It will be titled “*home-based nursing care*”, as this largely shows what kind of care is meant and where it will take place. Home-based nursing care will be defined as: “*care provided by professionals to people in their own homes with the ultimate goal of not only contributing to their life quality and functional health status, but also to replace hospital care with care in the home for societal reasons; home care cover[s] a wide range of activities, from preventive visits to end-of-life care (Thomé et al., 2003)*”. This definition is in line with Dutch quality and competency frameworks for home-based nursing care (de Bont et al., 2012; Wijkverpleging, 2018).

In 2023, 3,2 billion euros were spend on home-based nursing care in the Netherlands (VWS, 2024). 584.000 clients received a form of home-based nursing in 2021, of which, 80% were older than 66 years of age (Vektis, 2022). Clients can be differentiated in the following groups: short-term care after hospital admission (< three months), care for vulnerable elderly and chronically ill (> three months), psychogeriatric or psychiatric care, preventive care, palliative terminal care and child care. On average, a client in the Netherlands receives six hours of care for roughly five months (Vektis, 2022). Working closely together, general practitioners in the Netherlands act as gatekeepers for medical care and home-healthcare nurses act as gatekeepers for home-based nursing care. Registered nurses (BSc and MSc) determine what care is necessary for individual clients in the home environment using a “needs assessment”. These assessments are based on professional autonomy of the respective nurse, the nursing process, clinical reasoning and with a focus on self-reliance (Harder et al., 2019).

Box 2. Educational and professional status of care professionals in The Netherlands[^]

In the Netherlands, different professionals with diverse educational levels, roles and competencies work in home-based nursing care. While exact competency frameworks exist for differently educated professionals working in home-based nursing care, the following overview should offer the (international) reader some guidance.

Profession	Educational level*	General task description
Nurse Practitioner (<i>Master's degree</i>)	Level 7	Practitioner with both nursing and medical expertise – diagnosing patients – needs assessment and coordination of care and medical treatment – responsible for quality of care and team expertise
Registered Nurse (<i>Bachelor's degree</i>)	Level 6	High complex nursing and care – responsible for quality of care and team expertise – coaching colleagues – coordination of care – needs assessment
Registered Nurse (<i>Vocationally trained</i>)	Level 4	(Complex) nursing and care – coordination on patient level
Certified Nursing assistant	Level 3	Low complex nursing, care and support – care plan
Health and Welfare assistant	Level 2	Domestic and light care tasks (daily activities)

Note:

According to Dutch Qualification Framework (NCP NLQF, 2019)*

Adapted from (Wendt et al., 2022)[^]

Theoretical framework and programme theory

The four research questions in this thesis are based on the UK Medical Research Council's framework for developing and evaluating complex interventions (Skivington et al., 2021). This framework consists of four phases (in no specific order) and a research project can begin at any phase. The phases are: development or identification of the intervention, feasibility, evaluation, and implementation (Figure 1).

Each phase has a common set of core elements - considering context, developing and refining programme theory, engaging stakeholders, identifying key uncertainties, refining the intervention, and economic considerations – that should be considered early and continually throughout the research project. In research questions **one** and **two** of this thesis, insights will be gained in respectively the “what” and the “why” of low-value home-based nursing care and will consider the context, identify key uncertainties and engage stakeholders. Research questions **three** and **four** will build on these insights to develop a strategy to de-implement low-value home-based nursing care practices. The greatest potential for success lies in the use a strategy that is tailored to local influencing factors (here: the results of research question **one** and **two**) and are multifaceted, or contain multiple methods, tools, interventions and techniques that address the “how” part of de-implementation (Colla et al., 2017; Ingvarsson et al., 2022). Afterwards this strategy will be introduced in clinical practice to first assess feasibility and acceptability and later increase implementation together with more rigorous effectiveness evaluation.

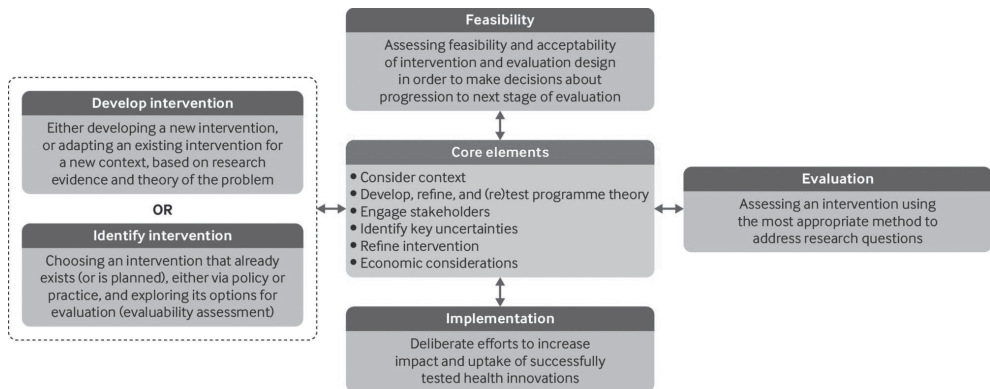


Figure 1. MRC-framework for developing and evaluating complex interventions (Skivington et al., 2021).

Now that a conceptual definition of “low-value nursing care” has been presented and different phases that can guide the development, testing and evaluation of complex interventions (here: a multifaceted de-implementation strategy) are given, a logical reasoning is also needed on how this de-implementation strategy is expected to lead to its desired effects and a change in behaviour(s). There are a number of models of human behaviour, all designed to give some understanding and reasoning on how decisions are being made and what leads to certain behaviours. For this thesis the “COM-B model of behaviour” will be used to link the “what” and “why” of research questions **one** and **two** to the “how” part needed in questions **three** and **four**.

The COM-B model starts with three components to behaviour (B): Capability (C), Opportunity (O) and Motivation (M). Therefore, for a professional to perform a particular behaviour (in this case: provide less low-value nursing care), one must feel that he or she is psychologically and physically capable (C), has the social and physical opportunity (O), and wants or needs to carry out the behaviour more than other competing behaviours (M). Each of these three components can interact, therefore, a strategy must target one or more components to sort a change in behaviour(s) (Michie et al., 2011). Additionally, the “Theoretical Domains Framework” (TDF) gives us examples of behaviour change techniques that have been tried and tested in practice (Atkins et al., 2017). The three components of the COM-B model, combined with evidence-based behaviour change techniques from the TDF-framework, presents us with the “building blocks” that are needed to overcome the possible barriers identified in research questions **one** and **two**, and to explain pathways of change and raise the chances of developing a successful de-implementation strategy to be used in research questions **three** and **four** (see Figure 2). To give an example, if a ‘lack of knowledge’ acts as a barrier to perform a certain Behaviour (B) in the Capability (C) component of the COM-B model and the Knowledge-domain of the TDF-framework, an intervention such as a “clinical lesson” or “information folder” might prove an effective educational tool in resolving the knowledge deficit.

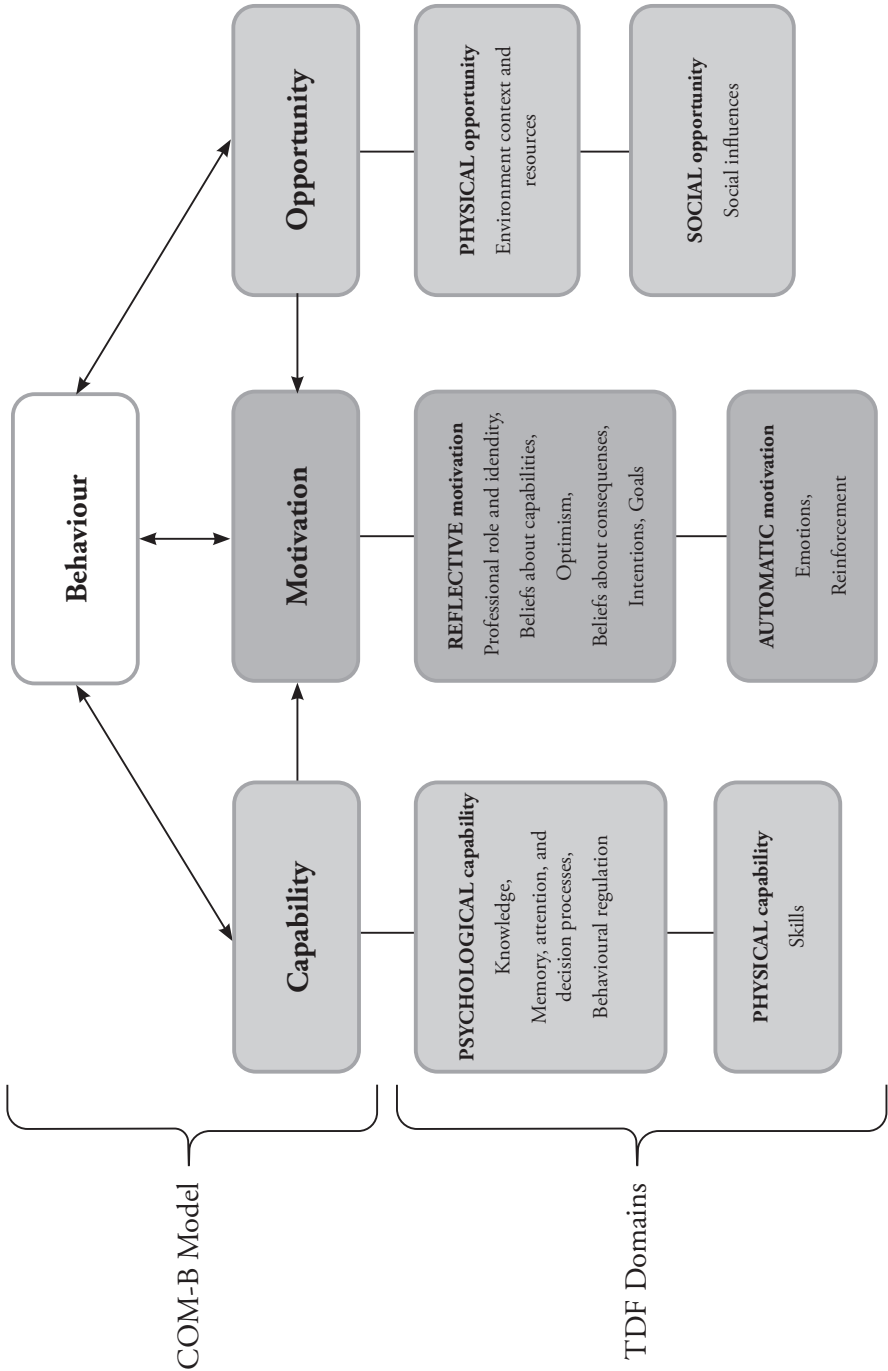


Figure 2. The COM-B model of behaviour combined with Theoretical Domains Framework (Adapted from Michie et al., 2011 & Atkins et al., 2017).

Goal and outline of this thesis

Objective: To facilitate the delivery of appropriate care by developing, testing and evaluating a tailored, multifaceted de-implementation strategy to reduce low-value nursing care in home-based nursing care.

1. What are potential areas and drivers of low-value nursing care in home-based nursing care and how prevalent are these? (**chapter 2**, context)
2. What are potential barriers to and facilitators of de-implementing low-value nursing care in home-based nursing care? (**chapter 3**, context)
3. Would a tailored, multifaceted de-implementation strategy (1) lead to less low-value nursing care and (2) be acceptable, implementable, cost effective and scalable in the home-based nursing care context? (**chapter 4**, feasibility)
4. What are the effects of a tailored, multifaceted de-implementation strategy to reduce low-value home-based nursing care on volume of care (time in minutes)? (**chapter 5**, evaluation)

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Chapter 2

Low-value home-based nursing care: a national survey study

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Introduction

In an effort to keep nursing care affordable and accessible, institutionalised care is increasingly shifting towards the home environment (World Health Organisation, 2020). Trends, such as an aging population, a societal attitude towards more personalised care and newly created home treatment options are important drivers (World Health Organisation, 2015). A similar shift is seen in the Netherlands, where the demand for home-based nursing care increased to 589,000 clients in 2018, a 32,000-increase compared to the year before (Vektis Intelligence, 2020). A major challenge that coincides with these changes is that nurses and certified nursing assistants working in home-based nursing care are scarce. Shortages are expected to increase in the Netherlands to more than 10.000 on a total of 105.000 home-based healthcare professionals in 2027 (Grijpstra, 2020). As a result, healthcare professionals in home-based nursing care experience that care is increasingly left undone; for example, comforting and educating patients or supporting and involving family or carers (Senek et al., 2020). In 2020, 34% of respondents in home-based nursing care reported that care was left undone in their last shift (Senek et al., 2020). Another challenge is that not all care that is provided is effective or efficient, for example, there is evidence that “the use of dressings for primarily closed wounds” or “preoperative hair removal to prevent surgical site infections” is ineffective to prevent infections, but are still prevalent in clinical practice (Dimelza Osorio et al., 2019). This type of care can therefore be considered of “low-value” and wastes limited resources and time, and may cause physical, psychological or financial harm to patients (Brownlee et al., 2017). For nurses and certified nursing assistants to reduce low-value care and free up time will therefore possibly, increase appropriate care, improve quality of care, patient safety, work satisfaction and contribute to a more sustainable healthcare system (Wei et al., 2018).

Background

Although there is no international consensus on what exactly constitutes “low-value care” (Niven et al., 2015), evidence is increasing that low-value care might be highly prevalent in nursing (Dimelza Osorio et al., 2019). In general, care can be considered of low-value when it is: (1) ineffective; for example, proven ineffective or the harms outweigh the benefits; (2) inefficient; for example, essentially effective care but of low-value because it is performed double, too soon or continued too long or (3) unwanted; for example, essentially effective care but of low-value because it does not solve the patients’ problem or it does not fit the patients’ preferences (Verkerk, Tanke, et al., 2018). Several lists identifying and compiling low-value nursing care practices have been developed (Plas et al., 2008; Shellian & Levinson, 2016). In 2017, the first systematic assessment of Dutch clinical nursing guidelines resulted in 66 do-not-do recommendations of low-value nursing care practices (Verkerk, Huisman-de Waal, et al., 2018).

The next step is to raise awareness and de-implement, that is actively reduce, replace or stop low-value nursing care practices with the help of theory- and evidence-based strategies (Rietbergen et al., 2020). These strategies address the “how” part and are methods, tools, interventions and techniques that aid the process of de-implementation (Sara Ingvarsson et al., 2022). However, to increase the chance of success for future de-implementation strategies, assessment is needed of the volume and types of low-value home-based nursing care and factors – barriers and facilitators – that influence the provision of low-value home-based nursing care (Norton & Chambers, 2020). Therefore, this study aimed to explore potential low-value home-based nursing care practices, their prevalence and related experiences and influencing factors according to nurses and nursing assistants working in home-based nursing care.

Methods

Research Design

The study had a quantitative, cross-sectional design using an online survey and is reported according to the STROBE checklist for cross-sectional studies. A questionnaire was developed based on two points of interest: 1. What are potential areas of low-value home-based nursing care and how prevalent are these? and 2. What are related experiences and influencing factors – barriers and facilitators - of low-value home-based nursing care?

Development of the survey

The survey contained three sections: (1) respondents’ demographics; (2) 46 specific low-value home-based nursing care practices that contained scaled frequencies on five-point Likert scales (never, monthly, weekly, daily or every client) and possible related influencing factors (multiple answers possible) and (3) experiences with low-value home-based nursing care in general that included open questions.

The questions on potential areas of low-value home-based nursing care were based on the 2017 Dutch low-value nursing care list with 66 do-not-do recommendations derived from clinical practice guidelines (Verkerk, Huisman-de Waal, et al., 2018), as well as the results of a 2017 survey of the Dutch Professional Nurses Association (V&VN, 2017). In addition, Dutch nursing clinical practice guidelines from 2017 to 2021 were screened on do-not-do recommendations and added to the list of low-value home-based nursing care practices (for the screening process: see Appendix A). We selected recommendations that were relevant for the home environment, for example, “measuring vital signs without a specific reason” or “re-use of a urinary catheter bag after removal/disconnection” and possible related influencing factors, for example, “because the client asks for it” or “not aware of the guideline(s)”.

The questions and possible answers on related influencing factors – barriers and facilitators - of low-value home-based nursing care were based on a previously developed questionnaire used for questioning general practitioners on low-value care (Rudolf Bertijn Kool et al., 2020). The questionnaire was complemented with questions derived from the seven domains of the Tailored Implementation for Chronic Diseases (TICD) framework: guideline related factors, individual health professional factors, patient factors, professional interactions, incentives and resources, capacity for organisational change and social, political and legal factors (Signe A Flottorp et al., 2013). The list of answers on related influencing factors was not meant to be exhaustive, but to give direction to explore these factors further in a qualitative follow-up study with healthcare professionals to identify barriers to and facilitators on reducing low-value home-based nursing care practices.

The survey was piloted by three registered nurses (Level 6) from our own network working in home-based nursing care. This resulted in the rephrasing of some practices and examples. The final version of the questionnaire can be found in Appendix B.

Setting, population and data collection

The survey was aimed at health and welfare assistants and certified nursing assistants (Level 2 and 3), registered nurses (Level 4 and 6) and nurse practitioners (Level 7) employed by a healthcare organisation active in home-based nursing care. Managers and students were excluded. An elaboration on the educational and professional competencies of care professionals in the Netherlands can be found in Table 1 (NCP NLQF, 2019).

Eight nursing care organisations in the west, middle and eastern parts of the Netherlands were purposively selected to take part in the study. These care organisations were active in both rural and urban settings and had between 2,000–13,500 employees providing nursing care in the home environment to 600–80,000 clients each. Key persons – quality officers, managers or nurses - from the participating organisations were asked to send out a digital invitation containing a link to the survey through e-mail and the organisations' intranet or employee portal, therefore we could not track the exact dissemination of the survey and calculate a response rate. To increase recruitment, the secretaries of the home-based nursing care constituency (n = 1,959) and the certified nursing assistant constituency (n = 3,125) of the Dutch Professional Nurses Organisation were asked to send out a digital invitation containing a distinguishing link to all the constituents' members e-mail addresses. Each organisation sent two reminders (after 2 weeks and 3 weeks). The data collection took place from February to April 2022.

Table 1. Educational and professional status of care professionals in The Netherlands

Profession	Educational level*	General task description
Nurse Practitioner (<i>Master's degree</i>)	Level 7	Practitioner with both nursing and medical expertise – diagnosing patients – needs assessment and coordination of care and medical treatment – responsible for quality of care and team expertise
Registered Nurse (<i>Bachelor's degree</i>)	Level 6	High complex nursing and care – responsible for quality of care and team expertise – coaching colleagues – coordination of care – needs assessment
Registered Nurse (<i>Vocationally trained</i>)	Level 4	(Complex) nursing and care – coordination on patient level
Certified Nursing assistant	Level 3	Low complex nursing, care and support – care plan
Health and Welfare assistant	Level 2	Domestic and light care tasks (daily activities)

Note:

According to Dutch Qualification Framework (NCP NLQF, 2019)

Data analysis

Descriptive statistics were used to summarise the characteristics of the respondents, the prevalence of low-value home-based nursing care practices and related influencing factors. For the possible related influencing factors multiple answers were possible. In this case the total given number of answers were added up and divided by the number of given answers of a specific factor. To assess relationships between the prevalence of low-value care and characteristics of the respondents multiple linear regression analyses (forward stepwise procedure) were performed with the following hypotheses: is there an association between the prevalence of low-value care and (1) educational level; (2) age and (3) working experience and (4) is age a confounder in the association between the prevalence of low-value care and educational level (Twisk, 2016). No missing data had to be dealt with. All analyses were performed with IBM SPSS Statistics for Windows, version 25.0 (IBM Corporation, 2017).

The 46 dependent variables “*low-value care practice*” did not meet the criteria for ordinal variables as the distance between “never”, “monthly”, “weekly”, “daily” and “every client” was arbitrary. Therefore the dependent variables “*low-value care practice*” were dichotomised as “never” = 0 and “monthly”, “weekly”, “daily” and “every client” = 1. To use all available prevalence data a sum score “*sum score low-value care*” of all 46 low-value nursing care practices was computed (continuous variable 0 - 46).

To make a meaningful comparison in educational level and meet assumptions for normal distribution, the independent categorical variable “*profession*” was recoded into three groups: Care and Certified Nursing assistant (Level 1, 2 and 3) = 0, Registered Nurse (Level 4) = 1 and Registered Nurse and Nurse Practitioner (Level 6 and 7) = 2.

To meet assumptions for normal distribution, the independent categorical variable “age” was recoded into five groups: 18-30 years = 0, 31-40 years = 1, 41-50 years = 2, 51-60 years = 3 and >61 years = 4.

Qualitative assessment of the “*sum score low-value care*” using a visual check showed a right skewed histogram with a statistically significant test of normality (Shapiro-Wilk $p < 0.001$). However, descriptive statistics showed that all groups contained sufficient respondents (>30 and most groups >100) to assume normal distribution for testing (see Table 5, column 1) (Kwak & Kim, 2017). Further model assumptions for (multiple) linear regression (linearity, homoscedasticity, multicollinearity) were verified without violations.

Ethical considerations

The research ethics committees of the Radboud University Medical Centre and University Medical Centre Rotterdam concluded that ethical approval was not required under Dutch law (CMO no. 2021-13325 and MEC-2021-0948). All procedures were conducted according to the Declaration of Helsinki.

Results

A total of 776 valid and fully answered questionnaires were included. The results will be presented under the following topics: (1) characteristics of the study respondents; (2) low-value home-based nursing care; (3) influencing factors related to low-value home-based nursing care (4) experiences with low-value care and (5) relationships between prevalence of low-value care and characteristics of respondents.

Characteristics of the study respondents

The majority of the respondents were female (723/776=93.2%), the largest age group was between 51-60 years old (286/776=36.9%). The three main educational levels that responded were Level 3 certified nursing assistants (208/776=26.8%), Level 4 registered nurses (197/776=25.4%) and Level 6 registered nurses (331/776=42.7%). Most of the respondents worked part-time between 21-30 hours a week (429/776=55.3%) and had more than 21 years’ experience in nursing care (412/776=53.1%) and generally less experience in home-based nursing care. The full characteristics of the study respondents are summarised in Table 2.

Table 2. Characteristics of the respondents in home-based nursing care (n = 776)

Characteristics	n	%
Educational level		
Care and Health and Welfare assistants (Level 1 and 2)	32	4.2
Certified Nursing assistant (Level 3)	208	26.8
Registered Nurse (Level 4)	197	25.4
Registered Nurse (Level 6)	331	42.7
Nurse Practitioner (Level 7)	8	1.0
Gender		
Female	723	93.2
Male	46	5.9
I do not want to say	7	0.9
Age		
<21 years	1	0.0
21-30 years	133	17.1
31-40 years	101	13.0
41-50 years	156	20.1
51-60 years	286	36.9
>61 years	99	12.8
Working Hours (week)		
<10 hours	14	1.8
11-20 hours	140	18.0
21-30 hours	429	55.3
>31 hours	193	24.9
Experience in nursing care (years)		
<5 years	83	10.7
5-10 years	122	15.7
11-20 years	159	20.5
>21 years	412	53.1
Experience in home-based nursing care (years)		
<5 years	211	27.2
5-10 years	204	26.3
11-20 years	208	26.8
>21 years	153	19.7

Low-value care practices in home-based nursing care

In Table 3 the top ten most delivered low-value care practices are reported as the sum of the answer categories "monthly", "weekly", "daily" and "in every client". A complete overview of low-value care practices can be found in Appendix C. While the majority of practices score highly on the category "not" (70.0-99.0%), the practices that do occur, however, score highly towards the answer category "daily". For example 1. "washing the client with water and soap by default" (360/776=46.4% daily), 2. "application of zinc cream, powders or pastes when treating intertrigo" (211/776=27.2% daily), 3. "washing the client from head to toe daily" (301/776=38.8% daily), 4. "re-use of a urinary catheter bag after removal/disconnection" (179/776=23.1% daily).

Table 3. Top 10 most delivered low-value care practices reported as the sum of the answer categories ‘monthly’, ‘weekly’, ‘daily’ and ‘every client’, together with top three related influencing factors# as reported by respondents in home-based nursing care (n = 776)

Low-value care practice (within the last two months) and <i>related influencing factor*</i>		n	%	n	%
1. Washing the client with water and soap by default		694	89.4		
	<i>Because the client asks for it</i>			505	65.1
	<i>Because it is written in the clients' care plan</i>			227	29.3
	<i>Wanting to offer the client something</i>			109	14.0
2. Application of zinc cream, powders or pastes when treating intertrigo		582	75.0		
	<i>Because a (general) practitioner advises / prescribes it</i>			295	38.0
	<i>Because it is written in the clients' care plan</i>			292	37.6
	<i>Because the client asks for it</i>			137	17.7
3. Washing the client from head to toe daily		552	71.1		
	<i>Because it is written in the clients' care plan</i>			329	42.4
	<i>Because the client asks for it</i>			270	34.8
	<i>Wanting to offer the client something</i>			114	14.7
4. Re-use of a urinary catheter bag after removal/disconnection		436	56.2		
	<i>Because of the influence of healthcare insurers</i>			236	30.4
	<i>Because it is written in the clients' care plan</i>			159	20.5
	<i>Because a (general) practitioner advises / prescribes it</i>			80	10.3
5. Bladder irrigation to prevent clogging of urinary tract catheter		349	45.0		
	<i>Because a (general) practitioner advises / prescribes it</i>			299	38.5
	<i>Because it is written in the clients' care plan</i>			99	12.8
	<i>Because the client asks for it</i>			18	2.3
6. Choosing short-stretch bandages by default instead of using techniques such as Coban, UrgoK2, FarrowWrap or JuxtaLite		322	41.5		
	<i>Because a (general) practitioner advises / prescribes it</i>			626	33.8
	<i>Because of the influence of healthcare insurers</i>			69	8.9
	<i>Because it is always done like this in the team</i>			53	6.8
7. Use an extra inlay to prevent leaking of continence material		290	37.4		
	<i>Because the client asks for it</i>			180	23.2
	<i>Because it is written in the clients' care plan</i>			67	8.6
	<i>Wanting to offer the client something</i>			66	8.5
8. Measuring vital signs (blood pressure, temperature, pulse, respiration rate) without a specific reason.		257	33.1		
	<i>Because a (general) practitioner advises / prescribes it</i>			202	28.4
	<i>Because it is written in the clients' care plan</i>			84	10.8
	<i>Because the client asks for it</i>			49	6.3

Table 3. Continued

Low-value care practice (within the last two months) and <i>related influencing factor*</i>		n	%	n	%
9. Assist with putting on/taking off compression stockings while the client can do this him/herself (possibly with an aid)		248	32.0		
	<i>Because the client asks for it</i>			90	11.6
	<i>Because it is written in the clients' care plan</i>			79	10.2
	<i>Because it is always done like this in the team</i>			54	7.0
10. Assist with (un)dressing while the client can do this him/herself		230	29.6		
	<i>Because the client asks for it</i>			108	13.9
	<i>Because it is written in the clients' care plan</i>			85	11.0
	<i>Wanting to offer the client something**</i>			67	8.6
	<i>It is faster to do it as a professional**</i>			67	8.6

Note:

*multiple answers were possible

**shared third place

influencing factors are shown in italic font

Influencing factors related to low-value home-based nursing care

The most frequently given answers on influencing factors related to providing low-value care were: 1. "because a (general) practitioner advises or prescribes it" (2,888/12,295=23.5%), 2. "because it is written in the clients' care plan" (2,830/12,295=23.0%) and 3. "because the client asks for it" (2,177/12,295=17.7%). The totals of all influencing factors are presented in Table 4. However, depending on the specific low-value care practice differing factors might be dominant. For example, related to "washing with water and soap" the dominant factor was "because the client asks for it" (505/776=65.1%). Related to "application of zinc cream, powders or pastes when treating intertrigo" the dominant factors were "because a (general) practitioner advises or prescribes it" (295/776=38.0%) and "because it is written in the clients' care plan" (292/776=37.6%). The "re-use of a urinary catheter bag after removal/disconnection" was mainly driven by "the influence of healthcare insurers" (236/776=30.4%) and "because it is written in the clients' care plan" (159/776=20.5%).

Table 4. Totals of influencing factors related to low-value care as reported by respondents in home-based nursing care (n = 776).*

Influencing factor	n	%
1. Because a (general) practitioner advises / prescribes it	2888	23.5
2. Because it is written in the clients' care plan	2830	23.0
3. Because the client asks for it	2177	17.7
4. Wanting to offer the client something	1055	8.6
5. Because it is always done like this in the team	1042	8.5
6. Maintaining a good relationship with the client	579	4.7
7. Because of the influence of healthcare insurers	523	4.3
8. Because of team culture	340	2.8
9. It is faster to do it as a professional	278	2.3
10. It is not clear how to handle in the situation	226	1.8
11. Not aware of the guideline(s)	180	1.5
12. Do not agree with the guideline(s)	177	1.4

Note:

* multiple answers were possible

Experiences with low-value home-based nursing care

Respondents estimated that low-value home-based nursing care regularly occurs in the Netherlands (744/776=95.9%) and the majority expected it to occur on a daily basis (458/776=59.0%). Meanwhile, the estimated occurrence of low-value care in the respondents' own team were considerably lower, more on a monthly (189/776=24.4%) and weekly (255/776=32.9%) basis and less on a daily (220/776=28.4%) basis.

The topic of low-value care was regularly discussed in home-based nursing care teams, for example, on a yearly (88/776=11.3%), monthly (425/776=54.8%) or weekly (151/776=19.5%) basis. Respondents were actively trying to reduce low-value care (676/776=87.1%) through raising awareness during team meetings (603/776=77.7%), discussing it face-to-face with co-workers (464/776=59.8%), with management (151/776=19.5%) as well as with clients and caregivers (523/776=67.4%). During the "needs assessments" (365/776=47%) home healthcare nurses took low-value care into account. An often mentioned answer to the 'open question' on the reduction of low-value care in the questionnaire was to consult other disciplines such as occupational therapists, physical therapists and case managers.

Relationships between of low-value care and characteristics of respondents

Hypothesis 1. *Association between the prevalence of low-value care and educational level.*

Hypothesis 1 is partly supported. Linear regression indicated a negative relation between educational level and the prevalence of low-value care. The difference between the lowest educational level (Care and Certified Nursing assistants (Level 1, 2 and 3)) and the highest educational level (Registered Nurse and Nurse Practitioners (Level 6 and 7)) on the outcome prevalence of low-value care was -1.743 (95% CI [-2.576, -0.910], $p < 0.001$). No statistically significant associations were found between the other educational levels and the outcome (see Table 5, column 2).

Hypothesis 2. *Association between the prevalence of low-value care and age.*

Hypothesis 2 is partly supported. The lowest age group performed low-value care significantly more often than the three oldest age groups ($p = 0.016$) (see Table 5, column 2).

Hypothesis 3. *Association between the prevalence of low-value care and work experience (in nursing care, and in home-based nursing care).*

Hypothesis 3 is rejected as no statistically significant results were found between work experience in (home-based) nursing care and the prevalence of low-value care (see Table 5, column 2).

Hypothesis 4. *Confounding of age on the association between the prevalence of low-value care and educational level.*

Age (variables with the lowest p-values) was added as an explanatory variable in a multiple regression model with educational level on the outcome prevalence of low-value care resulting in a stronger association between middle and highest educational levels and increased the $R^2 = 0.049$ (see Table 5, column 3). Therefore, hypothesis 4 is supported.

Table 5. Results of linear regression of dependent variable “sum score low value care” in relation to several independent variables

Independent variable	Descriptive		Univariate linear regression			Multiple linear regression		
	n	%	Beta*	P-value [^]	95% CI	Beta*	P-value [^]	95% CI
Educational level								
Care and Certified Nursing assistant (Level 1, 2 and 3)	240	30.9	ref.	ref.	ref.	ref.	ref.	ref.
Registered Nurse (Level 4)	197	25.4	-0.745	0.124	-1.694 – 0.205	-0.942	0.050	-1.885 – 0.001
Registered Nurse and Nurse Practitioner (Level 6 and 7)	339	43.7	-1.743	<0.001	-2.576 – -0.910	-2.230	<0.001	-3.080 – -1.380
Test of Model								
Age			R² = 0.022 F(2,773) = 8.658, p < 0.001					
18-30 years	134	17.1	ref.	ref.	ref.	ref.	ref.	ref.
31-40 years	101	13.0	-0.213	0.749	-1.520 – 1.094	-0.602	0.363	-1.898 – 0.695
41-50 years	156	20.1	-1.169	0.050	-2.337 – -0.001	-1.576	0.008	-2.736 – -0.416
51-60 years	286	36.9	-1.578	0.003	-2.616 – -0.540	-2.246	<0.001	-3.299 – -1.194
>61 years	99	12.8	-1.439	0.032	-2.753 – -0.125	-2.133	0.002	-3.452 – -0.813
Test of Model								
Experience in nursing care (years)			R² = 0.016 F(4,771) = 3.086, p 0.016					R² = 0.049 F(6,769) = 6.652, p < 0.001
<5 years	83	10.7	ref.	ref.	ref.			
5-10 years	122	15.7	0.876	0.223	-0.534 – 2.286			
11-20 years	159	20.5	0.416	0.543	-0.926 – 1.757			
>21 years	412	53.1	-0.739	0.224	-1.931 – 0.453			
Test of Model								
Experience in home-based nursing care (years)			R² = 0.016 F(4,772) = 4.239, p 0.006					
<5 years	211	27.2	ref.	ref.	ref.			
5-10 years	204	26.3	0.019	0.969	-0.958 – 0.996			
11-20 years	208	26.8	0.199	0.688	-0.773 – 1.171			
>21 years	153	19.7	-1.010	0.061	-2.067 – 0.046			
Test of Model								
			R² = 0.007 F(3,772) = 1.934, p 0.123					

Note:

*Unstandardised Beta, [^]P-value less than or equal to 0.050 is considered significant

Discussion

This study intended to explore potential areas of low-value home-based nursing care practices, their prevalence and related influencing factors. Our survey showed that according to registered nurses and certified nursing assistants a number of low-value care practices were frequently provided in home-based nursing care. Respondents estimated that low-value home-based nursing care regularly occurs (95.9%) and the majority (59.0%) expected it to occur on a daily basis. The majority of respondents reported to have taken steps to reduce low-value home-based nursing care and expected their own team to perform better than the Netherlands as a whole. These results are consistent with literature where respondents tend to overestimate their own performance and are limited in their ability to accurately reflect on their own performance (Cawthorne & Cooke, 2020).

In addition, the results showed a negative relation on the prevalence of low-value care and respondent characteristics on educational level and age, that is, a higher educational level and age is associated with a lower provision of low-value care practices. However, while statistically significant, the found effect sizes are small and hardly explained a significant proportion of variance in prevalence of low-value care and should therefore be interpreted with caution. There is also risk of selection bias as there seems to be an underrepresentation of level 3 certified nursing assistants: 26.8% (this study) versus 52.7% (national average in home-based nursing care) (Grijpstra, 2020). Differences might also be explained by the fact that higher education nurses perhaps perform more office duties and spend less time in actual practice. However, other characteristics appear to be representative for age, gender and work experience as health and welfare assistants (Level 1 and 2) are hardly employed in home-based nursing care (Grijpstra, 2020), the majority of the workforce is female and the average age and work experience are high compared to intramural settings (CBS StatLine, 2022a, 2022b; Grijpstra, 2020).

The results show that influencing factors related to the provision of low-value care practices were different, depending on the type of low-value practice. However, client preferences, requests and demands as an influencing factor for low-value home-based nursing care were reported the most and showed similarities with studies on general practitioners and primary care (Rudolf Bertijn Kool et al., 2020; Zikmund-Fisher et al., 2017). As "client preferences and values" together with the "best available research evidence" and "clinical expertise" are the pillars of Evidence Based Practice (Sackett et al., 1996), this result manifests a tension between these three elements. Which of these elements should prevail in the provision of care: evidence that a practice is of low-value or the clients' preferences? Elwyn et al. (2022) argue that this is one of the limitations of "shared decision making" as the interests of the broader population override "individual wishes" for which there are no simple solutions. However, a questionnaire on the needs of Dutch general practitioners showed that "more time for a good explanation to the patient and education for

both healthcare professionals and patients” might help to reduce low-value care (Rudolf Bertijn Kool et al., 2020).

The second, third and fourth most reported influencing factor were “a (general) practitioner advises / prescribes it”, “because it is written in the client’s care plan” and “wanting to offer the client something”. These influencing factors raise questions on who has control over home-based nursing care practice. For example, how home-based nursing care professionals fulfil their role in “needs assessments” and how clinically autonomous they are, in other words, “the authority and freedom of the nurse to make nursing care decisions concerning the content of clinical patient care” (Kramer et al., 2006). In the Netherlands, registered nurses (BSc and MSc) are exclusively entitled to determine what care is necessary for the individual client in his/her “own environment”. A “needs assessment” is performed based on professional autonomy, the nursing process, clinical reasoning and with a focus on self-reliance. The results however, show that respondents have a somewhat indulgent attitude, which is in line with a Dutch survey study among general practitioners, that concluded that an indulgent attitude was associated with “the delivery of too much care” and “deviation from guidelines and professional norms” (Wammes et al., 2014). Further research is therefore warranted on the relation between clinical nursing autonomy, the performance of “needs assessments” and the provision of low-value nursing care. Performance feedback on practice variation and audits are seen as effective ways to gain insights in these relationships (Ivers et al., 2014). Reflective activities, for example, intervision and peer review, where professionals analyse their own actions to learn for the future, are expected to improve the performance of “needs assessments”, however, the effects of these practices remain unclear and warrant further investigation (Schwenke et al., 2022).

Influencing factors related to professional guidelines, such as, not being aware of or not agreeing with guidelines, were among the least reported in this study. Despite the fact that clinical guidelines are regarded as helpful means to lower unjustified variation in nursing care practice, nurses’ adherence to guidelines is often suboptimal (Spoon et al., 2020). Possible explanations for these results may be “intentional non-adherence due to contra-indications” or “client preferences” (Arts et al., 2016). However, according to Spoon et al. (2020), there is not one single strategy, or combination of strategies, that is definitely successful in implementing nursing guidelines (Spoon et al., 2020). Evidence also seems to suggest that there is correlation between different forms of “waste” or low-value practices on different levels: the system level, the organisational level, the network level and the level of individual healthcare providers (van Dulmen et al., 2022). Therefore, future research should focus on identification of possible barriers and facilitators, from the perspective of home-based nursing care professionals, clients and general practitioners, as they differ for each specific low-value care practice. In addition, research needs to focus on the needs of home-based nursing care professionals to transform daily practice. These insights could be used for the development, testing and scaling of tailored, multifaceted, de-implementation

strategies (Spoon et al., 2020). It is recommended that home-based nursing care professionals use professional guidelines as a requisite part of the "needs assessment" and that both vocational and bachelor's nursing education pay specific attention to finding and applying guidelines in clients' care plans.

Strengths and weaknesses

This is the first assessment of low-value home-based nursing care. We established a satisfactory response that seems representative for age, gender and work experience and with a spread across the Netherlands. Selection bias might have had an influence as there seems to be an underrepresentation of certified nursing assistants (level 3). Moreover, the majority of respondents were employed by healthcare organisations that had contracts with health insurers defining, for example, volume of care and certain quality standards. Respondents from non-contracted healthcare organisations or self-employed nurses were a minority. A report on the differences between contracted and non-contracted healthcare organisation suggests that non-contracted organisations perform considerably less efficient than contracted organisations (Puijk et al., 2017). Therefore, it is suspected that the reported delivery of low-value care practices in this study are an underestimation. The increasing demand and shift toward home-based nursing care, together with an aging workforce, makes the results both relevant and important.

Conclusion

According to registered nurses and certified nursing assistants, a number of low-value nursing care practices occurred frequently in home-based nursing care. They actively tried to reduce it but experienced multiple factors that influenced the provision of low-value care such as (lack of) clinical autonomy and handling clients' requests, preferences and demands. The results can be used to increase awareness of low-value nursing care among home-based nursing care professionals, and may serve as a starting point for tailored, multifaceted de-implementation strategies, that need to be tried, tested and refined in practice.

CRedit authorship contribution statement

Benjamin Wendt: Equal first authors, Conceptualization, Methodology, Investigation, Formal analysis, Data Curation, Writing –original draft, Writing –review & editing, Supervision, Project administration **Milou Cremers:** Equal first authors, Conceptualization, Methodology, Investigation, Formal analysis, Data Curation, Writing –original draft, Writing –review & editing, Supervision, Project administration **Simone van Dulmen:** Conceptualizing, Writing – review& editing, final review **Monique van Dijk:** Conceptualizing, Writing – review& editing, final review **Erwin Ista:** Conceptualization, Methodology, Writing –review & editing, Supervision, Project administration **Minke S. Nieuwboer:** Writing -review & editing, Supervision **Getty Huisman-De Waal:** Conceptualization, Methodology, Writing –review & editing, Supervision, Project administration **Hester Vermeulen:** Conceptualizing, Supervision, Writing – review& editing, final review **Lisette Schoonhoven:** Conceptualizing, Supervision, final review.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this study.

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Appendix A

Including and screening do-not-do recommendations

We began with several lists containing do-not-do recommendations for nursing care, namely:

- Rituelen in de zorg (rituals in nursing care, eight unnecessary procedures) (Plas et al., 2008).
- Slim Zorgen (smart caring, 15 sensible choices) (Stapersma, 2016)
- de 'Beter Laten Lijst' (better do-not-do list, 66 procedures) (Verkerk, Huisman-de Waal, et al., 2018).

In addition the results of a member consultation of the Dutch Nursing Association were included (Dutch Nursing Association, 2017).

To include more recent recommendation guidelines (Table 6) from between 2017 and 2021 were screened with the same words as the 2017 Dutch do-not-do nursing and specialist lists: 'not', 'no', 'stop', 'insufficient', 'seldom', 'only', 'cost', 'avoid', 'omit', 'unnecessary', 'discourage', 'dissuade' and 'cease' (Verkerk, Huisman-de Waal, et al., 2018; Wammes et al., 2016). The 46 selected do-not-do recommendations for home-based nursing care can be found in the final survey (Appendix C).

Table 6. Guidelines screened for do-not-do recommendations between 2017 and 2021*

Dutch	English
Richtlijn Postoperatieve pijn	Guideline Postoperative pain
Richtlijn Pijn bij volwassenen met een verstandelijke beperking	Guideline Pain in Adults with Intellectual Disabilities
Richtlijn Pijn bij Patiënten met Kanker/ Pijn bij patiënten met gevorderde stadia van COPD of hartfalen	Guideline Pain in Patients with Cancer/Pain in Patients with Advanced Stages of COPD or Heart Failure
Richtlijn Wondzorg	Guideline Wound Care
Richtlijn Decubitus	Guideline pressure ulcers
Richtlijn smetten (intertrigo) preventie en behandeling	Guideline on blemishes (intertrigo) prevention and treatment
Richtlijn Zorg voor gezonde slaap en zorg bij slaapproblemen	Guideline Care for healthy sleep and care for sleep problems
Handreiking palliatieve zorg thuis: uitgewerkt van het kwaliteitskader	Guide to palliative care at home: elaboration of the quality framework
Richtlijn eenzaamheid ouderen	Guideline loneliness elderly
Richtlijn palliatieve zorg bij COPD	Guideline palliative care for COPD
Richtlijn stomazorg	Guideline ostomy care
Richtlijn probleem gedrag bij mensen met dementie	Guideline for problem behavior in people with dementia

Table 6. Continued

Dutch	English
Richtlijn delier bij volwassene	Guideline delirium in adults
Richtlijn zorg bij eindstadium nierfalen	Guideline for care in end stage renal failure
Richtlijn bij ziekte van Parkinson	Guideline for Parkinson's disease
Richtlijn palliatieve zorg bij nierfalen	Guideline palliative care in renal failure
Richtlijn palliatieve zorg bij hartfalen	Guideline palliative care in heart failure
Richtlijn neusmaagsonde	Guideline nasal catheter
Richtlijn zorg bij Algemene Dagelijkse Levensverrichtingen (ADL)	Guideline for care in general daily living
Richtlijn zorgmijding in de eerste lijn	Guideline care avoidance in primary care
Richtlijn signalering en preventie van zorginfecties	Guideline signaling and prevention of healthcare-associated infections
Zorgstandaard Chronische Pijn en addendum TENS	Care Standard Chronic Pain and addendum TENS

Note:

Guidelines are findable and accessible through (Dutch Nursing Association, 2022a)*

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Appendix B

Final Survey

Item - General information

The following questions deal with general matters such as age, position and work experience

2.1 What is your age?

- Younger than 21 years old
- 21-30 years old
- 31-40 years old
- 41-50 years old
- 51-60 years old
- Older than 61 years old

2.2 What is your gender?

- Male
- Female
- Will not say

2.3 What organization are you currently working for?

2.4 What is your position? (If you specialize in lung, wound, palliation or another specialty, for example, please fill in your 'core function')

- Care assistant
- Health and Welfare assistant
- Certified Nursing assistant
- Registered Nurse (*Vocationally trained*)
- Registered Nurse (*Bachelor's degree*)
- Nurse Practitioner (*Master's degree*)

2.5 How many years have you worked in healthcare?

- Less than 5 years
- 5-10 years
- 11-20 years
- More than 21 years

2.6 How many years have you worked in district nursing?

- Less than 5 years
- 5-10 years

- o 11-20 years
- o More than 21 years

2.7 On average, how many hours do you work per week?

- 0-10 hours per week
- 11-20 hours per week
- 21-30 hours per week
- 31 or more per week

The following questions are about specific care actions in daily practice.

Can you indicate how often you performed the following care act in the past month?

3.1 Measure vital signs (blood pressure, temperature, respiratory rate, pulse) without specific reason

- o Not
- o (Almost) every client
- o Daily
- o Weekly
- o Monthly

3.1.1 If the answer is unequal to never then the follow-up question comes:

What are the main reasons for you to perform this action?

(Multiple answers possible)

- o To maintain a good relationship with the client
- o To offer something to the client
- o Because the client asks for it
- o It is faster to do it as a caregiver than to let the client do it him/herself
- o Do not agree with the guideline(s)
- o Not aware of the guideline(s)
- o Because of the culture prevailing in a team
- o Because it is always done that way on the team
- o Because the general practitioner or medical specialist advises/prescribes it
- o It is not clear how to act
- o Because it is in the care plan
- o Because of the influence of the health insurance company, for example by not (partly) reimbursing an aid

Below are only the care actions, answer categories idem as above.

3.2 Weighing without specific cause

3.3 Taking blood sugar for no specific reason

3.4 Monitoring fluid balance without specific prompting

Item – Care actions: Support stockings and bandaging

4.1 Putting on and/or removing compression stockings while clients are able to do this themselves with aids if necessary

4.2 Applying/removing bandages daily for the night or replacing them without a specific reason

4.3 Choosing to bandage with short-stretch bandages by default rather than using techniques such as, Coban, UrgoK2, FarrowWrap, JuxtaLite

Item - Care Operations: Catheter/infusion/stoma/drains

5.1 Daily replacement of catheter bag

5.2 Reuse of urine collection bag after disconnection

5.3 Bladder flushing to prevent clogging of the bladder catheter

5.4 Bladder flushing to prevent urinary tract infection

5.5 Changing the bladder catheter after 6 weeks without regard to ‘catheter life’* and the needs of the individual client.

* Catheter life depends on the catheter, catheter material and calculation of the ideal change period for the client.

5.6 Use disinfectant in daily care of the external genitalia at the urethral catheter

5.7 Placement of an indwelling catheter due to urinary incontinence and pressure ulcers

5.8 Using soap/disinfectants/wash-without-water products to care for suprapubic catheter insertion.

5.9 Using a catheter to irrigate (rinse clean) a stoma

5.10 Leaving catheter/infusion/drain/probe in place in a delirious client

Item - Care Operations: Probe Feeding

6.1 Check position of nasogastric tube by injecting air and listening for a bubbling sound (auscultation method)

6.2 Whenever acting on the nasogastric tube (such as administering nutrition or medication), check the pH as standard to verify the position

6.3 Using the feeding wire to clear blockage of the nasogastric tube

6.4 Using carbonated beverages to clear nasogastric tube blockage

6.5 Using syringes smaller than 10ml to clear nasogastric tube blockage

6.6 Adding medication to tube feeding

Item - Care Operations: General daily living activities.

7.1 Complete daily washing

7.2 Washing with soap and water

7.3 Administer eye drops while the client is able to do this himself or with an aid if necessary

7.4 Assist with shaving while the client is able to do this him/herself

7.5 Assist with washing while the client is able to do it himself

7.6 Assist with dressing and undressing while the client is able to do this him/herself

7.7 Using an extra pad to prevent leaking

7.8 Prepare/provide medication/insulin while the client is able to do so himself or with an aid if necessary

7.9 Making or changing the bed while the client is able to do so him/herself

Item - Care actions: Wound care and blemishes

8.1 Cleaning or covering with (grease) gauze or dressing for surgically closed wounds

8.2 Daily changing of (foam) dressings

8.3 Rinse wound with NaCl 0.9% or sterile water

8.4 Rub and/or massage painful or sensitive skin to prevent pressure sores

8.5 Using sheepskin, heel pads or ring and doughnut-shaped devices to prevent pressure sores

8.6 Bathing as wound cleansing (e.g., in soda)

8.7 Lubricating zinc ointment, powders and pastes when treating blemish spots.

Item - Care Operations: Infection Prevention

9.1 Using hot water while washing hands

What are the main reasons for you to perform this act?

(Multiple answers possible)

- To maintain a good relationship with the client
- To offer something to the client
- Because the client asks for it
- Do not agree with the guideline(s)
- Not aware of the guideline(s)
- Because of the culture prevailing in a team
- Because it is always done this way in the team
- It is not clear how to act
- Because it is in the care plan

9.2 Disinfecting hands after washing hands with soap and water

What are the main reasons for you to perform this action(s)?

(Multiple answers possible)

- To maintain a good relationship with the client
- To be able to offer the client something
- Because the client asks for it
- Do not agree with the guideline(s)
- Not aware of the guideline(s)
- Because of the culture prevailing in a team
- Because it is always done this way in the team
- It is not clear how to act
- Because it is in the care plan

9.3 Preventing dehydration or irritation of the hands by using hand cream from a jar

What are the main reasons for you to perform this act(s)?

(Multiple answers possible)

- To maintain a good relationship with the client
- To offer something to the client
- Because the client asks for it
- Do not agree with the guideline(s)
- Not aware of the guideline(s)
- Because of the culture prevailing in a team
- Because it is always done this way in the team
- It is not clear how to act
- Because it is in the care plan

9.4 Applying hand hygiene on gloved hands

What are the main reasons for you to perform this action(s)?

(Multiple answers possible)

- To maintain a good relationship with the client
 - To offer something to the client
 - Because the client asks for it
 - Do not agree with the guideline(s)
 - Not aware of the guideline(s)
 - Because of the culture prevailing in a team
 - Because it is always done this way in the team
 - It is not clear how to act
 - Because it is in the care plan
- 9.5 Disinfecting/disinfecting the client's skin before injection

What are the main reasons for you to perform this action(s)?

- To maintain a good relationship with the client
- To offer something to the client
- Because the client asks for it
- It is quicker to do it as a caregiver than to let the client do it themselves
- Do not agree with the guideline(s)
- Not aware of the guideline(s)
- Because of the culture prevailing in a team
- Because it is always done that way on the team
- Because the general practitioner or medical specialist advises/prescribes it
- It is not clear how to act
- Because it is in the care plan

o Because of the influence of the health insurance company, for example by not (partly) reimbursing a device

Item - Care Actions: Freedom restricting measures

10.1 Application of freedom restricting measures such as restraining the client

10.2 Application of restraint measures such as raising bed rails

Item - Care Actions: Otherwise

11.1 Are there any actions that you now think are “inappropriate” that you encounter while working in the district that are not listed here?

o No

o Yes, namely

Item - Experience with inappropriate care

The following questions are about your experiences with “inappropriate care.” To make sure that everyone who fills out this questionnaire understands the same thing by “inappropriate care,” we explain below once again what we mean by this. It is not about registration and/or administration tasks, but about actions related to daily care of the client.

15.1 In your opinion, how often does non-appropriate care occur in daily activities within district nursing in the Netherlands?

o Never

o Daily

o Weekly

o Monthly

o Annually

15.2 In your opinion, how often does inappropriate care occur in your team’s daily activities?

o Never

o Daily

o Weekly

o Monthly

o Annually

15.3 What do you think are the main reasons for caregivers in district nursing to provide inappropriate care? (Multiple responses possible)

o To maintain a good relationship with the client

o To be able to offer something to the client

o Because the client asks for it

- o It is quicker to do it as a caregiver than to let the client do it themselves
- o Do not agree with the guideline(s)
- o Not aware of the guideline(s)
- o Because of the culture prevailing in a team
- o Because it is always done that way on the team
- o Because the general practitioner or medical specialist advises/prescribes it
- o It is not clear how to act
- o Because it is in the care plan
- o Because of the influence of the health insurance company, for example by not (partly) reimbursing a device
- o Otherwise

15.4 If there is a reason not mentioned above that you think is important, please fill it in here:

15.5 How often do you discuss the topic of inappropriate care with your colleagues?

- o Never
- o Daily
- o Weekly
- o Monthly
- o Annually

15.6 Do you actively try to reduce inappropriate care in your team?

- o No
- o Yes

15.7 How do you actively try to reduce inappropriate care?

- o Yes, namely by discussing it during a team meeting
- o Yes, by taking it into account when indicating care
- o Yes, by discussing it with the client or their loved ones/family
- o Yes, by discussing it with individual colleagues
- o Yes, by discussing it with managers
- o Yes, otherwise....

15.8 Fill in here how you try to reduce inappropriate care in your team:

Appendix C

Table 7. Delivered low-value care as reported by respondents in home-based nursing care (n = 776).

Low-value care practice	Not		Monthly		Weekly		Daily		Every client	
	N	%	N	%	N	%	N	%	N	%
Washing the client from head to toe daily (Dutch Nursing Association, 2023b; V&VN, 2017)	224	28.9%	16	2.1%	170	21.9%	301	38.8%	65	8.4%
Washing with water and soap by default (Stapersma, 2016; V&VN, 2017)	82	10.6%	14	1.8%	161	20.7%	360	46.4%	159	20.5%
Bladder irrigation to prevent clogging of urinary tract catheter (Dutch Nursing Association, 2017; Stapersma, 2016)	427	55.0%	80	10.3%	195	25.1%	69	8.9%	5	0.6%
Bladder irrigation to prevent urinary tract infection (Dutch Nursing Association, 2017; Stapersma, 2016)	629	81.1%	38	4.9%	79	10.2%	24	3.1%	6	0.8%
Measuring blood sugar without a specific reason (V&VN, 2017)	688	88.7%	38	4.9%	37	4.8%	12	1.5%	1	0.1%
Making or changing bedlinen while the client can do this him/herself (V&VN, 2017)	671	86.5%	29	3.7%	47	6.1%	28	3.6%	1	0.1%
Assist with (un)dressing while the client can do this him/herself (V&VN, 2017)	546	70.4%	46	5.9%	110	14.2%	66	8.5%	8	1.0%
Administering eyedrops while the client can do this him/herself (possibly with an aid) (Stapersma, 2016)	596	76.8%	39	5.0%	63	8.1%	74	9.5%	4	0.5%
Prepare or provide medication/insulin while the client can do this him/herself (possibly with an aid) (Stapersma, 2016)	621	80.0%	23	3.0%	70	9.0%	58	7.5%	4	0.5%
Assist with shaving while the client can do this him/herself (V&VN, 2017)	688	88.7%	20	2.6%	56	7.2%	10	1.3%	2	0.3%
Assist with washing while the client can do this him/herself (V&VN, 2017)	567	73.1%	52	6.7%	86	11.1%	67	8.6%	4	0.5%
Leaving a catheter/iv/drain/probe while the client is delirious (Dutch Nursing Association, 2017)	739	95.2%	20	2.6%	3	0.4%	5	0.6%	9	1.2%

Table 7. Continued

Low-value care practice	Not		Monthly		Weekly		Daily		Every client	
	N	%	N	%	N	%	N	%	N	%
Disinfection of the skin of the client before injection (Plas et al., 2008)	677	87.2%	41	5.3%	30	3.9%	13	1.7%	15	1.9%
Disinfection of the hands after washing the hands with water and soap (Dutch Nursing Association, 2023b)	607	78.2%	7	0.9%	15	1.9%	99	12.8%	48	6.2%
Using hot water when washing your hands (Dutch Nursing Association, 2022b)	616	79.4%	2	0.3%	14	1.8%	103	13.3%	41	5.3%
Use an extra inlay to prevent leaking of continence material (Stapersma, 2016)	486	62.6%	52	6.7%	100	12.9%	134	17.3%	4	0.5%
Daily changing of a urinary catheter bag (Dutch Nursing Association, 2017)	563	72.6%	20	2.6%	118	15.2%	70	9.0%	5	0.6%
Monitoring fluid balance without a specific reason (Plas et al., 2008)	755	97.3%	12	1.5%	5	0.6%	4	0.5%	0	0.0%
Placing an indwelling catheter because the client is incontinent or has pressure ulcers (Plas et al., 2008)	641	82.6%	117	15.1%	10	1.3%	2	0.3%	6	0.8%
Applying restrictive measures such as bodily restraints (Dutch Nursing Association, 2017)	763	98.3%	8	1.0%	1	0.1%	4	0.5%	0	0.0%
Applying restrictive measures such as raising bed rails (Dutch Nursing Association, 2017)	592	76.3%	67	8.6%	63	8.1%	52	6.7%	2	0.3%
Re-use of a urinary catheter bag after removal/disconnection (Dutch Nursing Association, 2017)	340	43.8%	36	4.6%	164	21.1%	179	23.1%	57	7.3%
Checking the position of the nasogastric tube by injecting air and listening for a bubbling sound (auscultation method) (Dutch Nursing Association, 2017; Stapersma, 2016)	752	96.9%	16	2.1%	1	0.1%	3	0.4%	4	0.5%
Using carbonated drinks to clear nasogastric tube blockage (Dutch Nursing Association, 2023b)	734	94.6%	34	4.4%	2	0.3%	1	0.1%	5	0.6%
Add medication to tube feeds (Dutch Nursing Association, 2023b)	687	88.5%	31	4.0%	15	1.9%	36	4.6%	7	0.9%
Routinely checking the ph-value with every action relating to the nasogastric tube (i.e., administering medication or nutrition) (Stapersma, 2016)	726	93.6%	8	1.0%	11	1.4%	14	1.8%	17	2.2%



Table 7. Continued

	Not		Monthly		Weekly		Daily		Every client	
	N	%	N	%	N	%	N	%	N	%
Using syringes smaller than 10ml to clear nasogastric tube blockage (Dutch Nursing Association, 2023b)	692	89.2%	47	6.1%	17	2.2%	4	0.5%	16	2.1%
Using the guidewire to clear nasogastric tube blockage (Dutch Nursing Association, 2023b)	772	99.5%	4	0.5%	0	0.0%	0	0.0%	0	0.0%
Assist with putting on/taking off compression stockings while the client can do this him/herself (possibly with an aid) (Stapersma, 2016)	528	68.0%	60	7.7%	93	12.0%	92	11.9%	3	0.4%
Using a catheter to irrigate (clean) an ostomy (Dutch Nursing Association, 2017)	763	98.3%	8	1.0%	4	0.5%	1	0.1%	0	0.0%
Application of zinc cream, powders or pastes when treating intertrigo (Stapersma, 2016)	194	25.0%	103	13.3%	247	31.8%	211	27.2%	21	2.7%
Measuring vital signs (blood pressure, temperature, pulse, respiration rate) without a specific reason (Plas et al., 2008; V&VN, 2017)	519	66.9%	155	20.0%	90	11.6%	11	1.4%	1	0.1%
Using hand cream from a jar to prevent drying or irritation of your hands (Dutch Nursing Association, 2022b)	705	90.9%	9	1.2%	18	2.3%	40	5.2%	4	0.5%
Application of hand hygiene (disinfection) on gloved hands (Dutch Nursing Association, 2017, 2022a)	669	86.2%	7	0.9%	19	2.4%	52	6.7%	29	3.7%
Using disinfectants when taking care of external genitalia in case of a urethral catheter (Dutch Nursing Association, 2017)	716	92.3%	3	0.4%	15	1.9%	30	3.9%	12	1.5%
Using soap/disinfectants/washing-without-water products when taking care of insertion site of suprapubic catheter (Dutch Nursing Association, 2017)	716	92.3%	11	1.4%	17	2.2%	23	3.0%	9	1.2%
Weighing a client without a specific reason (Stapersma, 2016)	603	77.7%	99	12.8%	66	8.5%	7	0.9%	1	0.1%
Changing of indwelling urinary catheter after 6 weeks without considering 'catheter life' and the needs of the client (Stapersma, 2016)	615	79.3%	119	15.3%	3	0.4%	0	0.0%	39	5.0%
Covering primarily closed wounds with (paraffine) gauze or other wound dressing materials. (Dutch Nursing Association, 2017)	643	82.9%	58	7.5%	54	7.0%	17	2.2%	4	0.5%

Table 7. Continued

Low-value care practice	Not		Monthly		Weekly		Daily		Every client	
	N	%	N	%	N	%	N	%	N	%
Bathing for wound cleansing (i.e., baking soda bath) (Dutch Nursing Association, 2017)	741	95.5%	25	3.2%	7	0.9%	3	0.4%	0	0.0%
Daily changing of (foam) wound dressings or bandages (Dutch Nursing Association, 2017)	656	84.5%	19	2.4%	66	8.5%	33	4.3%	2	0.3%
Rubbing and/or massaging painful or sensitive skin to prevent pressure sores (Plas et al., 2008; Stapersma, 2016)	667	86.0%	26	3.4%	31	4.0%	48	6.2%	4	0.5%
Using sheepskin, heel protectors or ring and doughnut shaped aids to prevent pressure sores (Plas et al., 2008)	597	76.9%	82	10.6%	58	7.5%	34	4.4%	5	0.6%
Cleaning a wound with NaCl 0.9% or sterile water (Dutch Nursing Association, 2017)	573	73.8%	64	8.2%	93	12.0%	39	5.0%	7	0.9%
Choosing short-stretch bandages by default instead of using techniques such as Coban, UrgoK2, FarrowWrap or JuxtaLite (Stapersma, 2016)	454	58.5%	134	17.3%	77	9.9%	19	2.4%	92	11.9%
Daily application/removal for the night or replacement of bandages without a specific reason (WCS Kenniscentrum Wondzorg, 2015)	706	91.0%	25	3.2%	26	3.4%	19	2.4%	0	0.0%

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Chapter 3

Barriers and facilitators for reducing low-value home-based nursing care: a qualitative exploratory study among homecare professionals

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Introduction

Demand for home-based nursing care is rising, driven by the global ageing population and an increase in multi-morbidity (Rudnicka et al., 2020). Concurrently, there is shift in nursing care from hospitals to the home environment, and older people tend to stay at home longer, often requiring more complex care (van de Maat et al., 2015). Alongside the increased demand, there is a global shortage of nurses and nursing assistants, which is expected to worsen in the near future. This shortage is also evident in the homecare setting in the Netherlands, where a shortage of 11% (10,600) of nurses and nursing assistants is anticipated by 2027 (Grijpstra et al., 2020). At the same time, some care provided by homecare nurses and nursing assistants is not evidence based or not beneficial for the client. Despite the absence of an international consensus on the precise definition of what exactly constitutes ‘low-value care’, the available literature identifies three categories of care: 1) ineffective care, which causes more harm than good; 2) inefficient care; which is not as effective as it could be, is continued for an extensive period, is administered too frequently, or could be replaced by a care aid; and 3) unwanted care, which does not improve clients’ conditions or align with their preferences (Verkerk, Tanke, et al., 2018). An example of low-value care in nursing, in general, is ‘dressing a primarily closed wound with bandages’, when a closed wound does not need bandaging (D. Osorio et al., 2019). It is a waste of resources and time that could be better spent on providing more evidence-based care (Berwick & Hackbarth, 2012). To address future challenges in homecare, it is important to reduce low-value home-based nursing care practices.

A recent survey study among homecare professionals in the Netherlands found that the majority (59%) experienced low-value home-based nursing care on a daily basis (Wendt et al., 2023). Some low-value practices occur regularly in homecare settings, such as putting on compression stockings when a client can do it with the use of a care aid, or washing clients with water and soap by default (Verkerk, Huisman-de Waal, et al., 2018; Wendt et al., 2023). Reducing low-value care in home-based nursing care can create opportunities to provide more appropriate care, based on increased clinical expertise, evidence-based practice, context-specificity, and person-centered care (Robertson-Preidler et al., 2017).

Background

In the Netherlands, home-based nursing care is provided to clients with chronic illnesses, dementia, those in the final stages of palliative care, and individuals requiring temporary care after hospital discharge (Impact, 2018). All residents and non-residents paying Dutch income tax must purchase health insurance from a private insurer. However, certain care services, such as care aids, may necessitate an additional contribution from residents (Wammes et al., 2020).

In the Netherlands, homecare professionals collaborate closely with clients, families, and other disciplines such as social workers and general practitioners (GPs) (Impact, 2018; Rosendal et al., 2019). GPs play a central role in primary care as gatekeepers who refer clients to specialist hospital care or home-healthcare when necessary. They typically operate independently or in self-employed partnerships (Wammes et al., 2020). Such collaborative efforts between homecare professionals, clients, families, and other disciplines, including GPs, could effectively address the reduction of low-value home-based nursing care.

The process of reducing low-value care is known as de-implementation. Two types of de-implementation can be distinguished: 1) the current practice can be substituted with an alternative practice, e.g. by implementing a care aid for putting on compression stockings and de-implementing providing the care by homecare professionals, and 2) new knowledge recommends to eliminate the current provided practice, e.g. when the care is not of benefit to the client and does not justify the cost (van Bodegom-Vos et al., 2017). However, changing or abandoning current clinical practices is often more challenging than adopting new ones. This applies universally to behavior modification, even when evidence has demonstrated that current practices hold little or no value (van Bodegom-Vos et al., 2017; van Dulmen et al., 2020). De-implementing requires a structured plan encompassing multiple strategies, along with a comprehensive understanding of possible barriers and facilitators across all involved stakeholders (Augustsson et al., 2021; van Bodegom-Vos et al., 2017; van Dulmen et al., 2020). It should be noted, though, that the value of care can vary depending on the client and the client's specific situation (S. Ingvarsson et al., 2022). To develop tailored de-implementation strategies to reduce low-value home-based nursing care, knowledge about barriers and facilitators in homecare is needed.

Previous understanding of barriers for nurses included attitudes such as reluctance to use recommended guidelines due to time restraints and tendency to prioritize client expectations and preferences, along with having to deal with the impact of nursing culture and work routines (Halm, 2022; van Achterberg et al., 2008). Examples of facilitators include providing education on low-value care practices, nurturing the desire to learn and restrict low-value care practices, and fostering a positive environment for communication and collaboration between healthcare professionals (Halm, 2022; van Dulmen et al., 2020). Specific knowledge about barriers and facilitators in the context of home-based nursing care is currently lacking, and acquiring this knowledge is imperative to effectively de-implement low-value home-based nursing care practices.

A survey study among Dutch homecare professionals revealed influencing factors for providing low-value home-based nursing care, including instances where low-value care is 'prescribed by a general practitioner', documented in the client's care plan, and consequently carried out, as well as situations where homecare professionals aim to offer something to the client (Wendt et al., 2023). However, as indicated by Wendt et al. (2023), a more in-depth insight of these

influencing factors is necessary to specifically and qualitatively explore the perceived barriers and facilitators influencing the provision of low-value home-based nursing care. This insight is crucial for informing strategies aimed at de-implementing these care practices. This study aims to explore influencing factors -- barriers and facilitators -- perceived by professionals working in home-based nursing care for reducing low-value home-based nursing care practices.

Methods

Design

We conducted a qualitative exploratory study using focus group interviews with homecare professionals and two additional individual interviews with quality improvement staff members. The qualitative design allowed us to obtain detailed and rich data. This study was embedded in the DIMPLE-project (De-IMPLEMENTation of low-value care in home care nursing) and RENEW-project (More appropriate care in home-based nursing care).

Theoretical framework

An interview guide was developed based on the Tailored Implementation for Chronic Diseases (TICD) checklist, which includes the following domains: (1) guidelines, (2) individual health professional factors, (3) professional interaction factors, (4) patient factors, (5) organizational factors, (6) social, political, and legal factors, and (7) incentives and resources. The TICD checklist serves as a general framework for broad use in different contexts for identifying barriers and facilitators that are crucial for implementing guideline recommendations, such as those for low-value home-based nursing care practices (S. A. Flottorp et al., 2013). The interview guide can be found in Appendix A.

Setting, population and recruitment

In total 27 teams were included, representing seven different homecare organizations in the western (n=1), mid-central (n=2) and eastern (n=4) regions of the Netherlands. The study population comprised nursing assistants (levels 2 and 3), registered nurses (levels 4 and 6), nurse students, healthcare managers, quality care nurses, and quality improvement staff members. These homecare organizations were active in rural and urban settings throughout the Netherlands, had between 8 and 1.000 teams and between 95 and 14.000 employees per organization. A homecare teams includes 10 to 20 homecare professionals. Inclusion involved both urban and rural teams, larger and smaller healthcare organizations, and being active in different regions.

The included teams vary in the level of training and the care performed by healthcare professionals is adapted to their knowledge and skills. Some care requires nursing expertise, while procedures such as dressing and bathing can be performed by nursing assistants with lower education levels.

Nursing assistants focus primarily on daily activities and low complex nursing care. Registered nurses focus on more complex nursing care and coordination of care. In addition, level 6 registered nurse's responsibilities also included conducting needs assessment. This entails evaluating with clients and their networks about what nursing care is needed, aiming to strengthen the ability to care for oneself and to promote, achieve, and maintain the performance of necessary activities, known as self-care (Richard & Shea, 2011; Schwenke et al., 2023). Appendix B provides detailed information on the professions, educational levels, and job descriptions of homecare professionals in the Netherlands.

Key individuals – either registered nurses or nurse assistants – within the participating teams were invited by email. In the e-mail, we instructed these key individuals to invite one or two colleagues, ensuring variation in education level, years of experience, and involvement in low value home-based nursing care practices. This approach aimed to create heterogenic groups. In addition, at least one manager or quality improvement staff member per organization was invited. For each focus group interview, at least eight to ten participants were invited, including a manager or a quality improvement staff member. Self-employed healthcare professionals were excluded because they work only occasionally with the teams and do not play an active role in initiating care or in documenting and adjusting care plans. In cases where a quality improvement staff member could not participate in the focus group interview, they were interviewed individually, as they constituted the minority of the participants and could not be replaced by others. Participation of quality improvement staff members was particularly valuable for providing insights on quality improvement, organizational factors, and external factors.

Data collection

Focus group interviews and individual interviews were conducted in person or through video calls when COVID-19 restrictions were in place between March and June 2022. Each focus group interview was led by one moderator (MC or BW), who guided the discussion, asked probing questions to aid the discussion, and requested additional explanations when necessary. A second researcher (ES, ABJ, GHW, SvD) made observational notes on behaviors and interactions to facilitate evaluation and analysis, took notes on the content of the focus group interview, and sought clarification based on the notes. Two researchers (MC and ES) independently conducted an individual interview with a quality improvement staff member.

The focus group interviews and individual interviews began with an introduction to the subject. Next, a top ten low-value home-based nursing care practices was presented, which was compiled from previous research (Wendt et al., 2023). Appendix C presents a list of low-value home-based nursing care practices, which varied depending on the organization. Participants were asked whether they performed these practices, what their initial reaction was to the idea of these practices being considered as low value, which motivations there were to continue providing

these practices and which factors could help reduce them. The interview guide was employed to pose questions aimed at identifying barriers and facilitators for reducing low-value home-based nursing care. All interviews were audio-recorded and transcribed verbatim.

Data analysis

We employed a directed content analysis with multiple analytical steps (Kibiswa, 2019). Prior to the analysis, a codebook was developed, structured around themes and subthemes derived from the domains of the TICD checklist (S. A. Flottorp et al., 2013). Guided by the codebook, we approached the data deductively and clustered insights on barriers and facilitators for low-value home-based nursing care (Kibiswa, 2019).

The analysis proceeded through several steps:

1. Two groups of researchers (MC and ES for focus group interviews 1, 2, and 3 and individual interviews 1 and 2; BW and ABJ for focus group interviews 4, 5, 6, and 7) read the transcripts of the interviews.
2. In each group, both researchers independently reviewed the transcripts and extracted relevant segments pertaining to the study. These segments were then organized in alignment with the predetermined themes and subthemes based on the TICD checklist (S. A. Flottorp et al., 2013).
3. All extracted content was compared and discussed by MC and BW until a consensus was reached. If consensus could not be reached, a third researcher (EI or GHW) was consulted for resolution. In the end, all relevant domains were comprehensively covered.

Data analysis started after the first focus group interview. The interview guide was reviewed after each focus group interview and individual interview, with a shift of focus to themes that required further examination. This iterative approach was employed to achieve data saturation. During the analysis, we incorporated the ‘guideline factors’ domain in the ‘individual health professional factors’ domain because the data primarily reflected the participants’ perspectives on guidelines rather than their reliability, quality, or strength. Furthermore, within the ‘patient factors’ domain, we made a distinction between clients, relatives and/or caregivers, recognizing that these parties might differ in their attitudes, behaviors, and knowledge. All coding was performed using ATLAS.ti Windows (Version 22.0.11.0).

Ethical considerations

The Medical Ethics Committee of the Erasmus University Medical Center and the Research Ethics committee of the Radboud University Medical Center concluded that ethical approval was not required under Dutch law (MEC-2021-0948 and CMO no. 2022-13545). Prior to inclusion in the study, all participants signed an informed consent form, acknowledging that they had been informed about the purpose of the study, that participation was voluntary, and

that they could withdraw from the study at any time without providing a reason. They also gave permission to use the collected data and were informed that their data would be used anonymously and confidentially, and that it would not be possible to trace the data back to them.

Rigor and reflexivity

To ensure credibility, researcher's triangulation was applied as described in the data analysis. In addition, all participants received a summary of the interviews. They were given the opportunity to respond to the summary, give comments, feedback, or make additions to the data. Transferability in a similar setting is considered possible because of a comprehensive description of the characteristics, context of homecare environment and extensive description of data collection. To ensure explicit and comprehensive reporting of the data, we employed the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (Tong et al., 2007).

Results

Seven focus group interviews and two individual interviews were conducted with durations from 74 to 121 minutes. Three focus group interviews and two individual interviews were conducted online due to COVID-19 restrictions. In each focus group interview, six to ten participants attended. A summary of the participants' characteristics is presented in Table 1.

Characteristics of the participants

In total, 55 homecare professionals participated in the study. The majority of participants were female (87.3%) and within the age range of 21-30 years (36.4%). The largest proportion were employed as registered nurses at level 4 (23.6%) and level 6 (38.2%), or as certified nursing assistants at level 3 (20%). Most of the participants had less than five years (32.7%) or five to ten years (29.1%) of work experience in home-based nursing care.

Table 1. Characteristics of the participants (n = 55)

Characteristics	n	%
Sex		
Female	48	87.3%
Male	7	12.7%
Age		
<21 years	1	1.8%
21-30 years	20	36.4%
31-40 years	10	18.2%
41-50 years	9	16.4%
>51 years	15	27.2%
Profession		
Nurse student	2	3.6%
Health and Welfare assistant (Level 2)	2	3.6%
Certified Nursing assistant (Level 3)	11	20%
Registered Nurse (Level 4)*	13	23.6%
Registered Nurse (Level 6)*	21	38.2%
Quality improvement staff member	4	7.4%
Healthcare manager	2	3.6%
Experience in home-based nursing care (years)		
<5 years	18	32.7%
5-10 years	16	29.1%
11-20 years	12	21.8%
>21 years	9	16.4%

* Level 4 is vocationally trained registered nurses and level 6 is bachelor trained registered nurses. Level 6 has expanded tasks compared to level 4, these can be found in Appendix B

Barriers and facilitators

The majority of barriers and facilitators were identified within the domains of ‘individual health professional factors’ and ‘professional interaction factors’. A smaller majority was identified in the domains of ‘client and relatives’ factors’ and ‘external factors’. External factors include the domains of ‘incentives and resources factors’, ‘capacity of organizational changes factors’, and social, political and legal factors’. Table 2 provides an overview of barriers and facilitators identified per domain. Results of barriers and facilitators are presented in order of most found by domain.

Barriers of low-value home-based nursing care

The individual health professionals' factors:

As illustrated in the following quote, homecare professionals expressed their willingness to change current practices, but at times, they do not feel the urgency to discontinue low-value care practices, for example, because of social monitoring of clients. Homecare professionals also considered daily routines as a reason for providing low-value care. According to them, if new practices are not regularly repeated before becoming embedded, there is a risk of reverting to old habits.

“It’s not so much willingness, it’s sometimes necessity and that also has to do with the sense of urgency, some don’t see that.” Focus group interview 6

Homecare professionals also sometimes feel the need to offer the client ‘something’, because it goes against their nature to step back and offer less. On the other hand, homecare professionals also mentioned engaging in low-value care practices because it would take less time than if the client were to do it themselves. Additionally, they might do so to avoid difficult conversations with resistant relatives or agitated clients, as the following quote illustrates. Moreover, homecare professionals might experience pressure from clients, for example, when clients claim that a colleague still provides the care that the homecare professional refused to do.

“Sometimes I think that if you don’t go along with it, then you have a lot more work than if you do go along with it, and maybe you will deliver low-value care, but in the end, it’s less work than dealing with angry families or agitated clients.” Focus group interview 1

In addition, homecare professionals often experience a lack of summary and specific details within guidelines. For example, there might be a lack of information on the frequency of performing an intervention on a daily basis. Furthermore, homecare professionals also find that guideline recommendations in general are not always directly applicable in the context of homecare. With regard to compliance with guidelines, homecare professionals feel they have less control within the homecare context and are more dependent on the specific situations they encounter compared to intramural care settings, as the following quote illustrates:

“Guidelines are often not concrete enough such that you can literally cut and paste them in a situation. In the homecare situation we are dependent on all sorts of factors. When you have a guideline in an intramural setting, you have more influence on factors. We have less influence on that, and we just have to deal with what we got”. Focus group Interview 3

Homecare professionals also acknowledged that while they themselves may lack specific skills, they also note a lack of professional skills among colleagues in their team. An example of this is

the ability to engage in conversations with other healthcare professionals or clients and relatives. They also note a lack of skills for the use of care aids, as well as digital skills in their team. Furthermore, another skill for homecare professionals (level 6) which needs improvement is ‘conduct of needs assessment’ as variance in this procedure is observed between teams in one organization.

Professional interactions’ factors:

Homecare professionals believed that team culture also influenced the provision of low-value care. Achieving consensus on the quality of care is mentioned as challenging because each team member had their own view on care quality, as shown in the following quote. In addition, homecare professionals also encountered difficulties in ensuring that team members adhered to their agreements. The limited opportunities for communication in homecare may further complicate reaching a mutual understanding within the team.

“You can never get everyone exactly on the same page. Everyone will always have a personal view I think.” Focus group interview 4

In addition, the homecare professionals also observed barriers in the collaboration with other healthcare professionals external to the homecare organization – such as general practitioners or hospital staff – who are often unaware of the work responsibilities of a homecare professional. Furthermore, the transition from hospital to homecare often does not proceed as initially agreed on. Homecare professionals also experienced that clients’ self-care is not sufficiently addressed in hospitals, as the following quote demonstrates:

“We very often notice that nothing is done with self-care in hospitals. I have worked in hospitals myself. It is sometimes more efficient for a nurse to do it quickly [...] but there is no working towards self-care, not at all. Actually I think a lot of care could be prevented if this was already being worked on in the ward.” Focus group interview 6

Similarly, creating expectations among clients and their support networks and the prescription of low-value care by other external homecare professionals promoted the use of low-value care.

Client and relatives’ factors:

From the perspective of homecare professionals, some clients and their networks are more outspoken about the care they believe they are entitled to. Homecare professionals have also encountered high and unrealistic expectations from clients about the care they should provide, as evident in the following quote:

“In addition, I think there is another expectation from clients about what we can offer. When clients call to request care, they often expect us to be at their doorstep every day at 8 a.m. and make them a sandwich. And if we do the shopping, they are completely happy, but that is totally unrealistic given the current situation. I see this with a lot of new clients, but with old clients [client who receive care for a longer period] too.” Focus group interview 7

Homecare professionals expect that clients who have received care for an extended period may pose a challenge in that they may be very hard to motivate for agreeing with reducing low-value care, as demonstrated in the following quote:

“Yes, I also think that it is mostly the category of clients that received care for a longer period of time. I don’t know if you can change the habit of receiving care and I don’t know what it takes to change it.” Focus group interview 1

Homecare professionals have also previously encountered situations where these ‘long-term clients’ switched to other organizations when their care was reduced, as the following quote demonstrates:

“[the client] had received care from our organization for 12 years, but [the client] didn’t agree to reduce the care. We were planning to reduce the care and the client sought another organization that would be willing to provide the care we reduced.” Focus group interview 2

External factors:

Homecare professionals held the belief that the role of health insurance in reducing low-value care was primarily associated with the non-reimbursement of materials or care aids, such as a care aid for putting on or changing compression stockings. These expenses are often incurred by clients who are either unable or unwilling to cover the costs themselves. Healthcare organizations typically hesitate to cover these costs for clients. Homecare professionals have also noted the need of time to educate clients on the use of care aids, yet they face constraints in requesting extra time:

“I think that you temporarily need more time to calmly guide and encourage the client. We don’t get that, that time, which is why everything gets squeezed in and then it’s hurry, hurry and then you don’t convince the client.” Focus group interview 3

On the other hand, homecare professionals also mentioned that financial incentives within the organization of care played a role. Currently, there is a strong emphasis on dedicating more time to clients rather than less, as illustrated in the following quote:

You have to make your hours with those clients anyway, because those are the productive [claimable] hours". Focus group interview 5

Homecare professionals suggested that organizations were in competition with each other and that it could be helpful to counter this competition with collaboration between organizations to jointly address projects and issues, as demonstrated in the following quote:

"We also suffer from market forces in healthcare. Because one organization does something and the other can't. We all work independently [...] we all pay [the three healthcare organizations in the city name] the same price for travelling and consulting. Still, we compete with each other and we all just stand in the same apartment block looking at the same doors." Focus group interview 5

Facilitators of low-value home-based nursing care

The individual health professionals' factors:

Healthcare professionals indicate that reflecting on current practices encourages reducing low-value care. It could create awareness, ensure that old patterns are broken, and embed new innovations. Reflecting together with their team could facilitate their transformation, as illustrated in the quote below:

"Why do you do the things you do? Do you do them because others do them, do you do them for the sake of doing them or could you do them in a different way? Just discuss this [...] with your colleagues." Focus group interview 1

Homecare professionals emphasized that staying updated on new technological innovations and care aids are essential for reducing low-value care. They would also appreciate receiving notifications about adjustments to guideline recommendations in general. In this way they are immediately informed about new developed guidelines and they also prefer that adjustments are marked in the guideline, as described in the following quote.

"When guidelines have been amended, you should be informed about which guidelines have been amended and that they mark for example in red font in the guidelines such that the changes immediately stand out." Focus group interview 2

To address the lack of knowledge and skills, they suggested that taking courses or receiving training to develop such skills would be helpful, for example, guidance on how to engage conversation reducing this care. In the quote below, a homecare professional took the initiative by assisting colleagues in developing their skills to use a care aid for compression stockings.

“For example, with the new care aid [brand name], some colleagues did not know how to use the care aid and they had to find out at the client’s home. [...] We put a [brand name] to practice at the office. When you provide enough space and care aids to get experienced, then it is okay.” Focus group interview 2

To improve conducting needs assessments and counteract variation between team within the organization, healthcare professionals (level 6) suggested that it would be helpful to get guidance on conducting needs assessments and to have a clear policy on this matter, as the following quote illustrates:

“Homecare organizations should make a clear policy with the people who conduct needs assessments. We all conduct need assessments differently, so some would request time to provide guidance and others would not, because they don’t see the need for it or the advantages to provide guidance to clients.” Focus group interview 3

Homecare professionals (level 6) commented that when agreements, goals, and boundaries, are established and communicated from the start of providing care, clients are generally more willing to agree to these agreements. When establishing and communicating expectations with clients and their support networks, it is important to consider the clients’ level of self-care and the involvement of their network.

Professional interactions’ factors:

To improve the communication within teams, one team held weekly meetings in which a team member serving as a contact person for several clients discussed these clients’ progress and assistance requests. This approach allowed for maintaining an overview of the clients, the establishment of agreements, and the identification of activities to be addressed in a subsequent meeting, as exemplified in the following quote:

“In the team, I am the only homecare nurse [level 6] and the rest of the colleagues are all contact persons for clients, but I have to keep an overview and if everyone is doing their thing then I have no idea what still needs to be done and how things are going. So I thought, well, let’s just meet once a week with the colleagues who are working and discuss their clients [...] Then I just keep a bit of an overview of the clients.” Focus group interview 1

To enhance collaboration and interaction with other healthcare professionals within and outside the organization, homecare professionals suggested involving other disciplines in approaches to reduce low-value care and discussing together what care is required for the client. For example, having an occupational therapist assess what clients could do themselves.

Client and relatives' factors:

In contrast to the barriers for client and relatives, some clients prefer to be independent and are more motivated to reduce care and regain their independence. During the COVID-19 pandemic, homecare professionals noticed an increase in self-care among many clients, as they preferred to limit the number of visitors in their homes, as the following quote illustrates. This goes to show that when clients were motivated, there are opportunities to reduce low-value care.

“In the first wave of COVID, it amazed me how many people who received care could do things independently. From I am too sick, too weak, too nauseous. From I can't do it by myself to we're going to do it ourselves. You can come only twice a week.” Focus group interview 1

External factors:

Regarding the barriers 'lack of time for educating clients' and 'additional costs of unused care aid', homecare professionals suggested that facilitating clients by homecare organizations in practicing with and finding the appropriate care aid before purchasing it could be helpful in the use of the care aid and clients' willingness to pay, as demonstrated in the following quote:

“[...] If you have the right care aid, the motivation for using it, and you take the time to teach the client how to use it, then it's easier [...]. I also think that some people end up not being able to use it themselves, so if you have bought an expensive care aid like [brand name] or [brand name] [...] clients end up not being able to use it themselves, you [...] spend a lot of money on something that you, as a client, can no longer use”. Focus group interview 2

Homecare professionals also pointed out that community and healthcare organizations are promoting projects aimed at fostering clients' self-care. For example, one project focuses on enabling older persons to live longer at home while addressing issues like loneliness and self-care. Activities are organized to help them connect with peers. Lastly, it was emphasized that having support for de-implementation from the organization, including from managers, was considered important, as illustrated in the following quote:

“I think it is also good that you have the support of the organization. So, when there is trouble, a client is acting difficult, or doesn't want to cooperate with new developments, that an organization or manager support you and may also be prepared to do something about it.” Focus group interview 2

Table 2. Overview of barriers and facilitators for reducing low-value home-based nursing care

TICD * Theme	Homecare professionals experience this as a facilitator ...	Homecare professionals experience this as a barrier ...
1 Awareness, behavior and attitude of the individual homecare professional	<ul style="list-style-type: none"> - Setting, defining and communicating goals and boundaries: When you state boundaries and state goals than clients go along - Reflecting with you team on (your own) actions/performance - Involving of network with de-implementation process of low-value care - Taking self-care of the client in to account (when conducting needs assessment) - It is motivating seeing the client's benefits - Being aware of 'low-value home-based nursing care' 	<ul style="list-style-type: none"> - Working on a routine basis, without reflecting on your own (and team's) actions - Not using a method to set, measure and/or evaluate health outcomes or goals (for example, RUMBA**) - Having difficulty going against clients, carers and/or family members - Wanting to offer clients, carers and/or family members 'something' - Wanting to take care of clients - Differing or conflicting views on care - Care is provided faster when a homecare professional takes over - Fear of losing work: e.g. the loss of hours and/or payment - Peer pressure - Experience the recommended care is no more efficient than the current provided care - To follow guidelines, the benefits must be significant in comparison to the disadvantages - Retaining client in care longer for social monitoring - Aware that care is low-value, but still perform it, e.g. because general practitioner prescribe it
Guidelines, knowledge, skills and variation in care of the individual homecare professional	<ul style="list-style-type: none"> - Getting information about guideline updates in general - Highlighting adjustments in the recommendation: e.g. mark changes in red in the guideline in general - Being up-to-date of care innovations/technology/aids - The profession of homecare professionals is evolving, with professionals becoming more knowledgeable - Providing courses or training to develop skills - Shadowing colleagues to peer and learn from another - Receiving guidance in conducting needs assessments - Managing expectations (of clients, family and/or caretakers) 	<ul style="list-style-type: none"> - Lack of clarity of the guideline, such as lack of a summary and specification: e.g. information about how often and when an intervention should take place - Lack of applicability of the recommended care, such as that the recommend care is not practical in the home-based context - Lack of (digital) skills - Lack of sense of urgency to change - Lack of professional autonomy - Falling back in old patterns if new practices are not yet embedded and not repeated regularly - Variation in needs assessments

Table 2. Continued

TICD * Theme	Homecare professionals experience this as a facilitator ...	Homecare professionals experience this as a barrier ...
2 Clients' behavior and attitude	<ul style="list-style-type: none"> - Clients who want to be independent 	<ul style="list-style-type: none"> - Hospitalization of clients, (for example, more passive attitude, receiving long-term care, want to retain habits) - Clients are more empowered and outspoken - Clients feeling they have the right to receive care - Clients switching homecare organization when reducing care - Clients gradually demand more care (accept little at first and then try to expand or reversing previous agreements) - Clients using nursing care as social contact - Clients appreciate being looked after - Clients who don't want to be independent
2 Family and/or caretakers' behavior and attitude		<ul style="list-style-type: none"> - Family and caretakers are more empowered and outspoken - Family and caretakers have the feeling client have the right to receive care - Family and caretakers have distorted view of care needed by clients - Family and caretakers having high demands and expectations: For example, want to receive specific care
2 Clients' motivation	<ul style="list-style-type: none"> - It is motivating for clients to take the time to guide them to self-care. At first it takes time, but afterwards it saves time, because the clients are able to take care of (partly) themselves - It is motivating to show clients the benefits 	<ul style="list-style-type: none"> - Clients trying out multiple alternatives without success works demotivating - Inconsistency of performing interventions by team can create confusion for clients - Clients that are not willing and motivated to increase their self-care
2 Clients, family and/or caretakers' knowledge	<ul style="list-style-type: none"> - Availability of educational materials for client and caregivers 	<ul style="list-style-type: none"> - Clients, family and caretakers not being aware of the urgency to change
3 Behavior and attitude of the other individual healthcare professional****	<ul style="list-style-type: none"> - Use of support services such as social work or community teams - Being up-to-date of care innovations/technology/aids 	<ul style="list-style-type: none"> - Raising expectations of clients and/or their carers towards the care and the volume of care by other healthcare professionals. - Prescribing unnecessary frequency of interventions - Prescribing care that's not in line with (nursing) guidelines - Prescribing unsuitable materials for the prescribed care - Other healthcare professionals deciding and prescribing care that is not within their authority and responsibility. - Not stimulating self-care of clients in the hospital - Differing or conflicting views on care

Table 2. Continued

TICD * Theme	Homecare professionals experience this as a facilitator ...	Homecare professionals experience this as a barrier ...
3 Behavior and attitude within homocare teams	<ul style="list-style-type: none"> - Receive regular, brief and concise updates form guidelines specified within their homocare team. - Discuss necessary care in consultation with general practitioners - Involving other disciplines to tackle low-value care - Client meetings in the team 	<ul style="list-style-type: none"> - Conflicting vision or attitudes of team members towards what constitutes 'good care' - Team culture - Agreements are not followed by the entire team - Frequency and lack of meetings to communicate agreements - Engaging with other disciplines is seen as difficult experience
3 Interactive behavior and attitude of other healthcare professionals towards homocare professionals***	<ul style="list-style-type: none"> - Regular interdisciplinary interaction facilitates interdisciplinary communication - Tackling low-value care practices together, for example, working together with occupational therapist to empower client self-care - Returning incorrect care requests to the requesting healthcare professional 	<ul style="list-style-type: none"> - Interdisciplinary communication is seen as difficult - Receiving incorrect care requests from other healthcare professionals - Image of profession and their tasks
3 Cooperation between hospitals and homocare organizations	<ul style="list-style-type: none"> - Start practicing in hospital to work towards self-care - Screening care requests from the hospital by a care intermediary before entering care 	<ul style="list-style-type: none"> - Transfer care from hospital to homocare proceed not as agreed - Returning incorrect care requests to the requesting hospital
4 Attitude of clients towards incentives and resources	<ul style="list-style-type: none"> - Take the time to guide clients to encourage self-care 	<ul style="list-style-type: none"> - Not willing to pay for aids or out-of-pocket payments
4 Attitude of homocare professionals towards incentives and resources	<ul style="list-style-type: none"> - Professional autonomy 	<ul style="list-style-type: none"> - Yielding to low-value care results in less work
4 Role of health insurers in incentives and resources		<ul style="list-style-type: none"> - Non-reimbursement of meeting or discussion time for homocare professionals - Non-reimbursement of aid offer care aids/materials for clients

Table 2. Continued

TICD * Theme	Homecare professionals experience this as a facilitator ...	Homecare professionals experience this as a barrier ...
4	<p>Role of homecare organizations in incentives and resources</p> <ul style="list-style-type: none"> - Opportunities to practice with different care aids before the client buys them - Organization could facilitate materials and care aids - Shadowing colleagues - Manage expectations: explicit agreements on what the organization offers and doesn't offer - Step-by-step plan for taking on clients 	<ul style="list-style-type: none"> - Shortage of homecare professionals - Financial incentives of the organization for delivering low value care - Competition between organizations results in taking on care requests
5	<p>Mandate/ authority/ accountability of homecare professionals</p> <ul style="list-style-type: none"> - Capable leadership 	<ul style="list-style-type: none"> - Lack of authority or having a say in decision making - Experience a top-down management
5	<p>Mandate/ authority/ accountability of the organization</p> <ul style="list-style-type: none"> - A plan to inform the entire organization on innovations or (de-) implementations - Multi organizational cooperation to address regional projects and problems 	<ul style="list-style-type: none"> - Teams are not adequate included or informed about new (de-) implementations
6	<p>Funding of home-based nursing care</p>	<ul style="list-style-type: none"> - Production stimulus (price x quantity) - Experience lack of space to request (extra) time - Care aids and supplies are not (sufficiently) reimbursed - Experience no funding for support services, such as volunteers or social workers
6	<p>Homecare organization</p> <ul style="list-style-type: none"> - Stimulate projects to promote self-care 	<ul style="list-style-type: none"> - Lack of cooperation and fragmentation of home-based nursing care organizations
6	<p>Societal awareness</p> <ul style="list-style-type: none"> - Media attention to increase the sense of urgency to de-implement low value care urgency 	
6	<p>Influential people</p> <ul style="list-style-type: none"> - Person of contact in de organization as role model - Organizational support for the de-implementation 	

* TICD Domains 1) Individual health professional factors 2) Client and relatives' factors. 3) Professional interactions factors 4) Incentives and resources factors 5) Capacity for organizational change factors 6) Social, political and legal factors S. A. Flottorp et al. (2013)

Domains 4, 5 and 6 will be described in 'external factors'

** Relevant Understandable, Measurable, Behavioral and Attainable (RUMBA)

*** Other healthcare professionals, for example general practitioners/ medical specialists, occupational therapist

Discussion

This study aimed to gain insight into barriers and facilitators perceived by homecare professionals regarding the reduction of low-value home-based nursing care. Barriers and facilitators for individual homecare professional included factors such as awareness, behavior, attitude and lack of skills, aligning with the findings of van Achterberg et al. (2008) and Halm (2022). According to Halm (2022), the success of de-implementation is more likely when healthcare professionals are aware of both human and system barriers and facilitators.

A specific barrier for reducing low-value home-based nursing care within the homecare environment mentioned was the 'variation in conducting needs assessments'. This variation implies that clients with the same medical condition may receive different care without a specific explanation. In the homecare environment, person-centred care could contribute to the variation in needs assessment, because client preferences are included (Brabers et al., 2019). In needs assessments, homecare nurses collaborate with the client and the client's support network in making decisions regarding the care needed, with the goal of enhancing the client's self-care and self-management skills. Schwenke et al. (2023) also pointed out that homecare nurses could benefit from more guidance in conducting needs assessments. This issue corresponds to the facilitator 'receiving guidance in conducting needs assessments' mentioned by the homecare nurses in our study, emphasizing the need for guidance, a clear policy for needs assessments, and reducing low-value care.

Homecare nurses and nursing assistants are primarily playing an executive role and may perform these low-value care practices when they are requested by general practitioners. The homecare professionals in our study experienced requesting low-value home-based nursing care by general practitioners as a barrier. There are several drivers why general practitioners (in the Netherlands) prescribe low-value care, including wanting to maintain a good relationship with clients, wanting to offer the client something, lack of time, and lack of knowledge (R. B. Kool et al., 2020). In a study of Augustsson et al. (2021), expectations, attitudes, and behaviors of physicians were also related to higher use of low-value care. In our study, homecare professionals indicated that discussing low-value care and involving other disciplines would facilitate addressing these low-value care practices. A specific example in the homecare environment is the early involvement of occupational therapists. In the context of the 'reablement' project in the Netherlands, different disciplines work together in an integrated approach to establish shared goals by clients, their relatives, and healthcare professionals (Clotworthy et al., 2021). Working in interdisciplinary teams was experienced as positive, strengthening team members' professional identities, broadening their professional competencies, and fostering a sense of community and mutual support (Birkeland et al., 2017; Hjelle et al., 2018).

From the perspective of homecare professionals', barriers related to clients and relatives encompass attitudes, behaviors, and a lack of knowledge. Examples of attitude and behavior barriers in our study include clients and relatives feeling entitled to receiving care, the habit of expecting care for extended periods, clients and relatives being assertive about the care the client should receive, and clients and relatives having high and unrealistic expectations of care. The latter finding aligns with the finding of Augustsson et al. (2021), where patients showed high expectations and a lack of knowledge, leading them to request low-value care practices from physicians. Patients interviewed in the studies by Verkerk et al. (2023) and Sypes et al. (2020) suggested that if physicians had sufficient time and the necessary educational materials, they could better inform them about different care options and their benefits and drawbacks, thereby promoting more realistic expectations of care. In our study, the use of educational materials for clients and motivating them by showing the benefits of self-care were seen as facilitators to ensure that clients become motivated to reduce low-value home-based nursing care. We anticipate that enhancing communication between nurses, nursing assistants, and clients – by engaging clients, using educational materials, demonstrating benefits, communicating expectations, and taking the time to inform clients – could facilitate the reduction of low-value home-based nursing care.

External factors identified as barriers include non-reimbursement of materials for clients and resources for homecare professionals, and financial incentives for organizations to promote the provision of low-value care. Stimulation of financial incentives from organizations was also observed among physicians, as some payment models prioritize the volume of care over reducing care (van Dulmen et al., 2020). In the Dutch homecare system, homecare nurses and nursing assistants are compensated for the hours they spend providing care. This policy can create financial incentives to provide more care instead of reducing it. According to homecare professionals in the present study, organizational support for de-implementing low-value care could facilitate the reduction. However, it is important to note that this support does not guarantee that a healthcare organization will save costs when de-implementing low-value care, as outlined by Kroon et al. (2023). This challenge extends to government and health insurance companies, according to Kroon et al. (2023). Still, these financial considerations should not deter the efforts to de-implement low-value care. From a societal point of view, de-implementing of low-value care is seen as providing care of higher quality, promoting efficient use of time and resources in healthcare, and addressing the shortage of homecare professionals (Kroon et al., 2023). This shortage is a barrier, currently also experienced by homecare professionals in their efforts to reduce low-value home-based nursing care, because they need time to guide clients towards self-care.

The findings presented in this paper can assist in the development of de-implementation strategies aimed at reducing low-value home-based nursing care. Implementation mapping, an approach derived from intervention mapping, can aid in developing de-implementation strategies by aligning identified barriers and facilitators with the specific context of de-implementation

(Fernandez et al., 2019; Kok et al., 2017). In our study, we identified several barriers to de-implementation, such as the 'lack of knowledge about low-value care', 'reluctance of clients and relatives in reducing low-value care', and 'lack of cross-professional collaboration'. To address these, potential strategies include 'conducting educational meetings', 'involving clients and relatives in the process of reducing', and 'promoting network weaving' (Powell et al., 2015). Effectively de-implementing low value home-based nursing care requires a structured plan incorporating multiple strategies across all involved stakeholders (Augustsson et al., 2021; van Bodegom-Vos et al., 2017; van Dulmen et al., 2020). In the context of implementation mapping, a step-by-step plan is formulated, encompassing the development, de-implementation, and evaluation of strategies within an iterative process (Fernandez et al., 2019; Kok et al., 2017).

Strengths and limitations

One of the strengths of our study is that it is the first to examine barriers and facilitators of reducing low-value home-based nursing care. These insights enable the development of de-implementation strategies and create opportunities for more appropriate care. Another strength is that it presents the perspective of homecare professionals who are directly involved in low-value home-based nursing care practices. They possess valuable insights into the different factors driving these practices and can identify the key stakeholders involved. In addition, it is a strength that 27 teams from different organizations from a wide region in the Netherlands have been reached, with different levels of education and homecare experience. Furthermore, the data was analyzed with a broad group of experts, increasing the trustworthiness of the findings. On the other hand, the interviews were performed by different researchers due to logistical and geographical reasons. Although they used the same interview guide, it is possible that this had led to observer bias. In addition, while homecare professionals provided insights about other stakeholders, including general practitioners, occupational therapists, clients, and clients' relatives, any real experienced barriers and facilitators experienced by these stakeholders were not captured. This information would be relevant to develop tailored de-implementation strategies for these stakeholders.

Recommendations for Further Research

Further research is needed on the effectiveness of tailored de-implementation strategies and the overall process of de-implementation. In addition, further examining barriers and facilitators experienced in collaboration with other disciplines, such as general practitioners or hospital staff, and developing de-implementation strategies focused on these stakeholders as well are recommended.

Conclusion

We explored specific barriers and facilitators faced by homecare professionals in reducing low-value home-based nursing care across multiple homecare organizations. Professionals identified lack of knowledge and skills, for example to use care aids, and variation in needs assessments, as a barrier. Providing guidance and training could enhance development of these skills, ensuring adherence to guidelines and team agreements. Additionally, expectations from clients and relatives, as well as prescriptions for low-value care by other healthcare professionals, were noted as barriers. Promoting cross-professional and cross-organizational collaboration could facilitate tackling these practices together. Involvement of relatives and encouraging clients to self-care could help addressing these issues. Externally, non-reimbursement of care aids, additional cost for clients, and not using the purchased care aids encouraged the provision of low-value care. Allowing clients to practice with care aids before purchase could facilitate their use and eventually replace the need for homecare professionals to provide this care. These insights form the foundation for developing tailored de-implementation strategies to reduce low-value home-based nursing care, creating opportunities for more appropriate care, and accommodating waitlisted clients.

CRedit authorship contribution statement

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Elise Schipper: Conceptualizing, Data Collection, Data Analysis, Writing – review& editing, final review **Monique van Dijk:** Conceptualizing, Writing – review& editing, final review **Erwin Ista:** Conceptualization, Methodology, Data Analysis, Writing –review & editing, Supervision, Project administration.

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Appendix A: Interview guide

○ Introduction of the topic

“The topic of the focus group interview is low-value home-based nursing care practices. These are practices of low value or no value to the clients. We would like to discuss reasons for providing these practices. We would like to emphasize that performing these practices is neither right nor wrong, and can also depend on the client’s wish. That is why we would like to elaborate on these reasons. We also want to explore whether we can reduce these practices in certain situations. We want to look at barriers to reduce these practices and facilitators that can encourage reducing low-value home-based nursing care practices.”

Start data collection:

○ Opening question:

- To what extent do you provide these practices and what is your reaction to the idea that these practices are considered as low value in home-based nursing care (LVHBNC).

○ Questions for barriers

- What factors cause that these [LVHBNC] are provided?
- What factors complicate reducing these [LVHBNC]?

○ Questions to continue the conversation based on the Tailored Implementation for Chronic Diseases checklist (TICD) (S. A. Flottorp et al., 2013).

- What do you think about the fact that, for example, [LVHBNC] is not recommended according to the latest guidelines?
- What do you think about available literature/guidelines and protocols on these LVHBNC? Consider clarity, availability, accessibility, quality and evidence, strength of recommendation, sources and consistency of guidelines.
- What information do you need or want to know for stopping or reducing the LVHBNC
- What might help you become aware or more conscious of your own actions?
- To what extent do you think the recommendations will lead to desired outcomes? For example, time savings, improved client outcomes or fewer wasted materials?
- What barriers do you expect from your team to stop/reduce the LVHBNC?
- What reactions do you expect from the clients who were previously receiving the LVHBNC? Would they be open to the change?
- What reactions are expected from other healthcare professionals (e.g., general practitioner, (nursing) specialist)
- In what ways do safety and quality improvement staff members influence performing LVHBNC?
- What organizational aspects hinder changes?
- What influence does the health insurer have on the barriers?

- Might certain individuals in certain positions hinder changes? Do not mention names here, but what barriers would be involved?
- How would budget, liability, legislation or agreements affect changes?

Summary of the discussion

- Questions regarding facilitators
 - What would help you to stop or reduce LVHBNC?
 - Have you ever stopped LVHBNC before?
- Questions to continue the conversation based on the TICD.
 - What was your experience with that?
 - What was the success factor in reducing?
- Questions to continue the conversation based on the TICD.
 - What would motivate you to change your own actions?
 - What would motivate you or your colleagues to stop or reduce LVHBNC?
 - What motivating influence can clients have in reducing a particular LVHBNC?
 - What is your team's influence on stopping/reducing LVHBNC?
 - What materials/resources are needed to encourage a change?
 - What support do you need/has the team needed? For example: decision aids, supervision, client information
 - What organizational aspects are needed to encourage, motivate and support the change?
 - Who are the key people that could stimulate/support the change?
 - What external support is needed to support the changes?
 - What is the impact of budget, liability, legislation or agreements?

Summary of the discussion

- Completion
 - Anything else you guys want to say on this topic? Did I forget to ask anything?
 - What did you find most important in this session / What will you remember?
 - How did you experience the session?
 - Reminder for the member check
 - Thank them for active participation
 - Take notes or leave recorder on until participants have left

Turn of the recorder

- Evaluation (moderator and assistant)
 - Review of impressions, themes and notes
 - If possible, compare with previous focus group interviews
 - Evaluate roles and performances of moderator and assistant
 - Evaluate the quality of the focus group (e.g., responses, interactions and behavior)

-
- Evaluate time schedule
 - Discuss notes and first impression of findings.

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Appendix B: educational and professional status

Educational, professional status and job descriptions of homecare professionals in the Netherlands

Profession	Educational level*	General task description
Nurse Practitioner (<i>Master's degree</i>)	Level 7	Practitioner with both nursing and medical expertise – diagnosing patients – needs assessment and coordination of care and medical treatment – responsible for quality of care and team expertise
Registered Nurse (<i>Bachelor's degree</i>)	Level 6 **	High complex nursing and care – responsible for quality of care and team expertise – coaching colleagues – coordination of care – needs assessment
Registered Nurse (<i>Vocationally trained</i>)	Level 4	(Complex) nursing and care – coordination on patient level
Certified Nursing assistant	Level 3	Low complex nursing, care and support – care plan
Health and Welfare assistant	Level 2	Domestic and light care tasks (daily activities)

Note:

* According to Dutch Qualification Framework (NCP NLQF, 2019)

** Registered nurses have the responsibility of conducting needs assessments with the client and the client's network to determine the necessary nursing care in light of strengthening the client's self-reliance and self-management (M. Schwenke et al., 2023).

Appendix C: The list of low value home-based nursing care practices presented during focus group interviews

Low value home-based nursing care practices *:

- Washing the client from head to toe daily
 - Washing with water and soap by default
 - Bladder irrigation to prevent clogging of urinary tract catheter
 - Bladder irrigation to prevent urinary tract infection
 - Assist with (un)dressing while the client ca do this him/herself
 - Assist with washing while the client ca do this him/herself
 - Re-use of a urinary catheter bag after removal/disconnection
 - Use an extra inlay to prevent leaking of continence material
 - Assist with putting on/taking off compression stockings while the client can do this him/herself (possibly with an care aid)
 - Daily application/removal for the night or replacement of bandages without a specific reason
 - Choosing short-stretch bandages by default instead of using techniques such as Coban, UrgoK2, FarrowWrap or JuxtaLife
 - Daily changing of a urinary catheter
 - Application of zinc cream, powders or pastes when treating intertrigo
 - Measuring vital signs (blood pressure, temperature, pulse, respiration rate) without a specific reason
-

* These low value home-based nursing care practices is presented in a random order



Chapter 4

**A tailored de-implementation strategy to
reduce low-value home-based nursing care:
a mixed-methods feasibility study**

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Introduction

Internationally, the demand for home-based care is rapidly increasing (World Health Organisation, 2015). Demographic, societal and political trends contribute to shifting institutional care towards the home environment (Chabouh et al., 2023). In recent years, the Netherlands has not been an exception in this trend (Vektis Intelligence, 2022). Meanwhile, shortages of nurses and certified nursing assistants working in home-based nursing care are expected to increase in the Netherlands to more than 10% on a total of 105.000 home-based healthcare professionals in 2027 (Grijpstra, 2020). Concurrently, there is increasing evidence that not all nursing care that is being provided is effective or efficient (Osorio et al., 2019).

Nursing care for which there is evidence that it is either: “(1) ineffective; from research or in clinical guidelines, or the harms outweigh the benefits; (2) inefficient; essentially effective care but of low-value because it is performed double, too soon or continued too long or (3) unwanted; essentially effective care but of low-value because it does not solve the patients’ problem or it does not fit the clients’ preferences’, can be considered “low-value nursing care” (Verkerk et al., 2018). Low-value nursing care wastes limited resources and time, can be harmful to clients and creates an unnecessary burden on clients (Brownlee et al., 2017) and the environment. Recent studies suggest that the healthcare sector is responsible for nearly five percent global emissions and seven percent of the Dutch national carbon footprint (Lenzen et al., 2020; Steenmeijer et al., 2022). A national survey study has shown that a number of low-value home-based nursing care practices might be highly prevalent (Wendt et al., 2023). The reduction of these care practices might therefore save time, increase appropriate care, improve quality of care, increase client safety and work satisfaction, and contribute to a more sustainable, affordable and accessible healthcare system (Wei et al., 2018).

Background

Derived from Dutch national nursing guidelines, and surveyed in a recent questionnaire study, examples of high prevalent low-value home-based nursing care practices are: ‘washing the client with water and soap by default’, ‘washing the client from head to toe daily’, ‘application of zinc cream, powders or pastes when treating intertrigo’, and ‘re-use of a urinary catheter bag after removal/disconnection’ (Wendt et al., 2023). Important factors – barriers and facilitators – that influence the provision of these care practices predominantly concern individual homecare professionals, clients and their relatives and include awareness, behaviour, attitude and lack of knowledge and skills (Cremers et al., 2024). The next step is to de-implement – actively reduce, replace or stop - low-value home-based nursing care practices (Rietbergen et al., 2020). The greatest potential for success lies in the use of tailored and multifaceted strategies (Colla et al.,

2017). Recently, seven hospitals reduced the rate of inappropriate urinary catheters from 32% to 24% and the rate of inappropriate peripheral intravenous catheters from 22% to 14% using a multifaceted de-implementation strategy based on local determinants of practice (Laan et al., 2020).

However, such examples do not exist for the home-based nursing care context. Therefore, we developed and introduced a tailored, multifaceted strategy with components on education, persuasion, enablement, incentives and training to reduce low-value in seven home-based nursing care teams in the Netherlands. To facilitate the delivery of appropriate care, the aim was to test if the developed strategy (1) would lead to less low-value nursing care and (2) was acceptable, implementable, cost effective and scalable in the home-based nursing care context.

Methods

Research design and population

A mixed-methods approach comprising a pragmatic, multicentre, quantitative, before and after study and a qualitative evaluation was undertaken in two home-based nursing care organisations. The before and after study was undertaken to estimate the possible effect size on the primary outcomes to inform future, more rigorous scaling of the strategy. The qualitative evaluation was conducted to understand feasibility aspects (acceptability, implementability, estimate cost effectiveness and scalability) see how the strategy works and identify influencing factors. The results are reported according to the Standards for Reporting Implementation Studies (StaRI) guidelines (Pinnock et al., 2017).

At baseline seven home-based nursing care teams from two healthcare organisations in the Netherlands were purposively and conveniently selected to participate in the study. That means that some teams were selected because they were easily available, and some teams were chosen for their motivation to participate in quality improvements projects. One large healthcare organisation was purposively contacted and one was conveniently recruited because of their willingness to participate. Access to these organisation could be either bottom-up, or top-down, that is, for first contact a home-healthcare nurse was approached who then asked for permission and cooperation higher up in the organisation, or vice versa. The only inclusion criterium for healthcare organisations was that they were contracted by an healthcare insurer. These contracts, for example, define a maximum volume of care and see to certain quality standards. Each of these healthcare organisations had 3,000–13,500 employees providing home-based nursing care to 9,000–80,000 clients each in both urban and rural environments.

De-implementation strategy (RENEW-strategy)

The multifaceted de-implementation strategy ‘more appropriate care with do-not-do recommendations in home-based nursing care’ (RENEW) was developed by linking and tailoring known barriers - on team, client and organisational levels - to strategy components based on the COM-B behaviour change model. The premise of the COM-B model is that for individuals to change their behaviour (B) they need to be capable (C), along with opportunity (O) and personal motivation (M) (Michie et al., 2014). In three research team meetings with BW, GHW and SvD pathways were discussed on how the underlying mechanisms of change, and which behaviour change techniques could influence the behaviour and related outcomes based on the Theoretical Domains Framework (TDF) (Cane et al., 2012). For example, a number of barriers related to handling clients’ requests, preferences and demands. According to literature role-play, feedback, and small group discussions are effective communication training strategies (Berkhof et al., 2011). Therefore, training tools were developed to practice communication skills.

As motivation to participate in quality improvement projects, attitude towards change and management or organisational support are known influencing factors in relation to the success of (de-)implementation efforts (Bemelmans et al., 2022; Dearing, 2009; van Dulmen et al., 2020), managers from the participating organisations and responsible for multiple teams, were briefed on the outline and goals of the project and were asked to provide support to any participating teams. As a selection criterium, managers were then asked to recruit teams whereby teams had to sign themselves up as proof of motivation to participate.

To further increase the chance of success, each participating team appointed two voluntary ‘clinical champions’ (Nieuwboer et al., 2022) of which at least one had to be a BSc-trained nurse. These clinical champions were mentored by a ‘workplace coach’ (KN & MS). In periodical coaching sessions (where the frequency was tailored to individual needs and varied) progress, team performance and integrity of the de-implementation strategy and components were discussed (Cannon-Bowers et al., 2023). In a working group meeting with the clinical champions, workplace coaches of the participating teams and members of the research team, a proposed strategy was presented for assessment on the basis of consensus on the following criteria: acceptability, practicability, perceived effectiveness and affordability (Proctor et al., 2013) (see Table 1).

Each team had a physical kick-off meeting with the clinical champions and team members led by one or both external coaches (KN & MS). All seven participating teams targeted the following low-value care practices: (1) ‘washing the client from head to toe daily’ and (2) ‘washing the client with water and soap by default’ and chose to replace these practices with “washing without water”: an evidence based alternative to washing with water and soap (Groven et al., 2017). From this point the de-implementation strategy will be referred to as the “RENEW-strategy”.

Table 1. Logic model for the RENEW-strategy

Determinants			Strategy components	
TICD-domain*	Sub-theme(s)	Known barrier(s) [†]	Behaviour change technique(s): textual description on how this was translated in our study [‡]	COM-B functions & (component(s)) [#]
Individual health professional factors	Knowledge, skills & awareness	Not being aware of 'low-value care'	<p>Discrepancy between current behaviour and goal: In all teams and coaching sessions with clinical champions attention was drawn to the discrepancy between the formulated outcome goals and current performance by showing the results of a survey study on the volume of low-value nursing care in which these teams were included (Wendt et al., 2024).</p> <p>Information about health consequences: Written, verbal and visual information was provided about prevalence and health consequences of performing low-value care, for example, pictures of the deterioration of skin lacerations by the clumping of wrongly used products when treating intertrigo.</p> <p>Verbal persuasion about capability: external team coaches encouraged the teams and participants that change was possible and that barriers could be overcome in their meetings by providing examples of 'best practices' that seemed to sort effect in other teams, for example, sending reluctant team members to enthusiastic clients to learn from their experiences.</p> <p>Feedback on behaviour: At the start of the project teams were given feedback on the type and volume of low-value home-based nursing care practices on both team and organisational level (kick-off meeting).</p> <p>Demonstration of the behaviour & instruction on how to perform the behaviour: One hour of instruction was given by a sales representative of a wholesaler in medical supplies.</p> <p>Behavioural practice/rehearsal: Written and verbal information was provided on how to practice communication skills, for example, by using role-play exercises where professionals take the role of client and VV.</p> <p>Prompts/cues: Electronic health records were adapted to prompt a cue when making a client care plan, for example, a reminder would pop-up when a certain type of care would be indicated.</p> <p>Reward (outcome): each team was promised and given EUR 500,00 unconditionally at completion of the project.</p> <p>Action planning & goal-setting (outcome): all teams made an action plan with a planning on performing intermediary and outcome goals, for example, a reduction of a low-value care practice by 20% at the end of the project.</p> <p>Review outcome goals: Half-way through the project clinical champions were aided by the team coaches to fill in a reflection tool to identify new barriers and facilitators, and review the outcome goals set at the start of the project.</p> <p>Social support (practical): All teams and clinical champions were supported in the change process by an external workplace coach, for example, giving guidance on personal leadership goals.</p> <p>Social support (unspecified): All teams had one or two clinical champions.</p> <p>Social support (unspecified) & information about others' approval: Managers were briefed on the outline and goals of the project and were asked to provide support to any participating teams.</p> <p>Problem Solving: All teams and clinical champions were supported an external team coach to analyse behaviours (barriers) and select strategies to overcome these barriers, both at the start and during the implementation phase.</p> <p>Commitment: Managers, clinical champions and team members were asked to affirm commitment to the project.</p> <p>Remove punishment: Reimbursement by employer for professionals in time and money to participate in the project.</p>	<p>Education (Capability & Motivation)</p> <p>Persuasion (Capability & Motivation)</p> <p>Training (Capability)</p> <p>Environmental Restructure (Opportunity)</p> <p>Incentive (Motivation)</p> <p>Enablement (Capability & Motivation)</p>
		Not being aware of urgency to change		
		Not managing expectations (of clients, family and/or caretakers)		
		Lack of (digital) skills		
	Behaviour	Not using a method to set, measure and/or evaluate health outcomes or goals		
		Working on a routine basis, without reflecting on your own (and team's) actions		
		Home healthcare professionals want to offer clients, carers and/or family members 'something'		
Attitude	Home healthcare professionals tend to be too nice and yielding towards clients, carers and/or family members			
	Differing or conflicting views on care			
	Patient factors (including family and/or caretakers)	Knowledge Clients, family and caretakers not being aware of the urgency to change		
Behaviour Family and caretakers are more empowered and outspoken				
Attitude Clients feeling they have the right to receive care				
Professional interactions	Attitude Family and caretakers having high demands and expectations: For example, want to receive specific care			
	Behaviour Frequency and lack of meetings to communicate agreements (within home care teams)			
	Attitude Conflicting vision or attitudes of team members towards what constitutes 'good care' (within home care teams)			
Incentives and resources	Team culture			
	Attitude Clients are not willing to pay for aids or out-of-pocket payments			
	Role of healthcare insurers Non-reimbursement of meeting or discussion time for healthcare professionals			
		Non-reimbursement of aids/materials for clients		

Note: * according to Flottorp et al. (Flottorp et al., 2013); [†] from Wendt et al. (Wendt et al.)

Note: [‡] from (Michie et al., 2013); [#] from (Michie et al., 2014)

Quantitative data collection

Primary Outcomes (volume of care)

The assessment of the volume of care was developed with the researchers' own network to see if we could find a relevant outcome, that was easily extractable and would not violate any ethical guidelines and led to the development of an excel-sheet. The excel-sheet was then pretested which led to minor revisions. The result was the absolute volume of a low-value home-based nursing care practice in both frequency and time in minutes per week. Data were collected at baseline (T0), after which the RENEW-strategy was introduced (six months). Data were then collected at a follow-up measurement (T1) (see Figure 1).

Participating teams completed a sheet - based on client care plans - on the following outcomes:

- Total number of clients on *date of measurement*
- Total number of clients that receive *low-value home-based nursing care practice*
- Per client: frequency/week of *low-value home-based nursing care practice*
- Per client: time/minutes per performed *low-value home-based nursing care practice*
- Optional: *product(s)* used to perform practice

The nurse responsible for the client care plans was asked to give a 'best educated guess' on the time needed for the practice eligible for de-implementation.

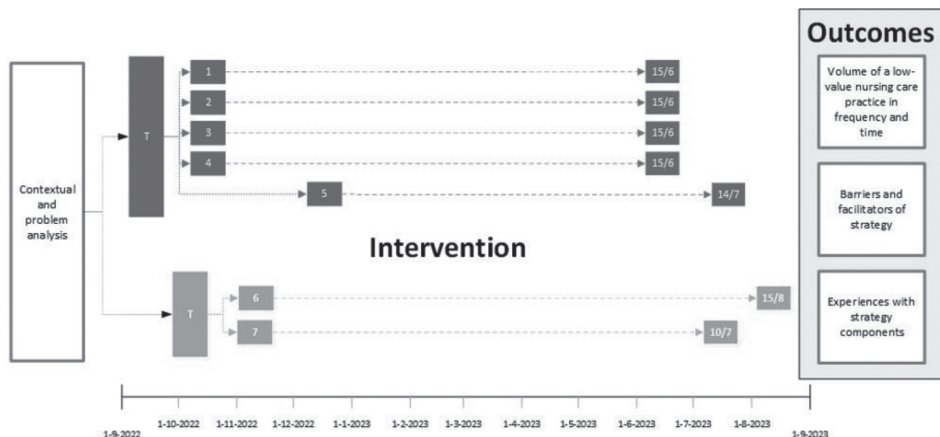


Figure 1. Timeline of participating teams in the RENEW-strategy where “T” stands for “tailoring” and the end date of the intervention phase is marked in a day/month-type reference.

Secondary out

comes (guideline knowledge and skills)

As ‘knowledge’ and ‘skills’ are known influencing factors and components of the RENEW-strategy members of all teams were asked to fill in a short questionnaire at T0 and T1 with the following questions:

Knowledge

‘Are you aware of the existence of guideline “x”?’ where “x” stands for the relevant guideline in relation to the chosen low-value care practices of that team (‘no’ = 0, ‘yes’ = 1).

‘Are you aware of the content of guideline “x”?’ where “x” stands for the relevant guideline in relation to the chosen low-value care practices of that team (‘no’ = 0, ‘yes’ = 1).

Skills

‘I give the client advice on care questions based on the above-mentioned guideline.’ (‘no’ = 1, ‘to a limited extent’ = 2, ‘regularly’ = 3, ‘very often’ = 4).

‘Based on my professional knowledge, can I express my doubts about choices/decisions with respect for the client/practitioner?’ (‘no’ = 1, ‘to a limited extent’ = 2, ‘regularly’ = 3, ‘very often’ = 4).

Secondary outcomes (cost-benefit analysis)

To estimate the cost effectiveness of the RENEW-strategy one organisation has prospectively kept records (June 2022 – July 2023) of the time spent of all personnel involved in the project (teams 1-5). Clinical champions and team members had to electronically register their time spend on the project. Time spent with a client and/or relatives related to the project was registered differently and excluded in this analysis. An overview of the registered time can be found in Appendix A.

Qualitative data collection

Process evaluation (document analyses)

- *Logbook*

The external coaches (KN and MS) kept logbooks based on their coaching sessions with the clinical champions and team members. To allow for a more detailed interpretation of the primary outcome(s) additional questions were asked on client and team characteristics and possible seasonal and flooring effects that could skew the data.

- *Action plans*

As part of the RENEW-strategy the teams made action plans with a global planning for the duration of the project and included intermediary and/or outcome goals.

- *Reflection tool*

With the help of the external coaches (KN and MS) the clinical champions of each team filled out a ‘reflection tool’ with questions on the performance and integrity of the project half way

through the project. The tool contained questions on the initial team outcome goal, whether that goal had changed during the project and what were the most important barriers and facilitators up until that point.

Process evaluation (semi-structured interviews)

To evaluate the process of the RENEW-strategy eight semi-structured interviews were conducted with the clinical champions of each team (n = 16) and some team members (n = 2) or team leaders (n = 2). An interview guide was developed based on the Tailored Implementation for Chronic Diseases (TICD) (Flottorp et al., 2013) with a main focus on participant responsiveness and experiences (to allow revision to enhance future effectiveness), influencing factors (barriers and facilitators), and circumstances that influence the study outcomes (to explore working mechanisms). The developed interview guide was tested with two home-based nursing care professionals from the researchers' own network, resulting in minor changes. After six interviews no new codes were found, however, to include data from all participating teams and ensure data saturation two more interviews were conducted. The interview guide can be found in Appendix B. The semi-structured interviews were video recorded with the help of Microsoft Teams, transcribed verbatim and lasted between 18 and 53 min. Interviews were conducted by BW, KN & MS.

Quantitative data analyses

Primary Outcomes (volume of care)

Descriptive statistics were used to summarise the characteristics of the respondents (for a more detailed description of the profession, educational levels and task description, see Appendix C), the total number of clients and the number of clients that received a low-value care practice in a team. Qualitative assessment of the frequencies (times per week) and time (minutes per week) spent on a low-value care practice (per team) using visual checks showed right skewed histograms with statistically significant tests of normality (Shapiro-Wilk $p < 0.001$) for all individual teams. Descriptive statistics showed that for teams 5, 6 and 7 this might be problematic, as they also suffered from small sample sizes. Therefore, the sum of all teams was used as the total contained sufficient respondents (>200) to assume normal distribution for testing (Kwak & Kim, 2017). The aim was for teams to provide less low-value care; therefore it did not matter if a team had the same or different clients in T0 and T1. Independent samples t-tests were performed to test the mean (both frequency as time in minutes) difference between T0 and T1. All statistical tests were two-sided, with a level of significance set at 0.05. No missing data had to be dealt with.

Secondary outcomes (guideline knowledge and skills)

Descriptive statistics are presented as means with standard deviations (SD) for interval variables, and frequencies to summarise the responses to the binary 'knowledge'-questions. Qualitative assessment of the 'skills'-questions (four-point Likert scales) using visual checks showed left

skewed histograms, however, the totals contained sufficient respondents (>50) to assume normal distribution for testing (Kwak & Kim, 2017). As appropriate, either Fisher's exact test or independent samples t-tests were carried out. Missing data were excluded from the analyses. All statistical tests were two-sided, with a level of significance set at 0.05. All analyses were performed with IBM SPSS Statistics for Windows, version 25.0.

Qualitative data analyses

Process evaluation (document analyses and semi-structured interviews)

All interview transcripts and documents (logbooks, action plans and reflection tools) were re-read and first coded independently by BW & ABJ. The use of the TICD-framework allowed for deductive coding. After the first round of coding differences and similarities in coding were discussed between ABJ and BW to ensure consistency, obtain intercoder agreement and monitor data saturation (Creswell & Poth, 2016). Final decisions were based on consensus. In case consensus was difficult to reach a third researcher was consulted to make the final decision (GHW). All coding took place with the help of ATLAS.ti version 23.1.1 (Friese, 2019).

Ethical approval

The research ethics committees of the Radboud University Medical Centre concluded that ethical approval was not required under Dutch law (CMO no. 2022-15872). According to Dutch legislation, data collection from electronic patient files was performed by personnel with a treatment relationship with the patient and by the researcher(s) upon consent by the study participant. The privacy of the participants was warranted by the analysis of anonymous data.

Results

The results will be presented under (1) characteristics of the participating teams; (2) volume of care in time and frequency; (3) guideline knowledge and skills; (4) cost-benefit analysis; (5) experiences with the RENEW-strategy components and (6) barriers to and facilitators of de-implementation.

Characteristics of participating teams

Participating teams had between 9 and 14 team members at T1. The largest age group was between 51-60 years old (22/69 = 31.9%). The three main educational levels were certified nursing assistants AG + IG (32/69 = 46.3%), registered nurses (vocationally trained; 18/69 = 26.1%) and registered nurses (Bachelor's degree; 11/69 = 15.9%). The majority of participants worked part-time between 21 – 30 hours per week (45/69 = 65.2%) and had between 11 – 20 years' experience in nursing care (24/69 = 34.4%) (see Table 2).

Table 2. Characteristics of participating teams at T1

	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7	Total (sum)
Team member changes (None (0) /Some (1-2) /Many (>3))	Some	Many	Some	None	None	Many	Some	
Team members (total)	n = 10	n = 11	n = 9	n = 10	n = 14	n = 6	n = 9	n = 69
Age (years)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
< 30	1 (10.0)	2 (18.2)	1 (11.1)	2 (20.0)	2 (14.3)	1 (16.7)	1 (11.1)	10 (14.4)
31 - 40	2 (20.0)	1 (9.1)	2 (22.2)	6 (60.0)	3 (21.4)	3 (50.0)	1 (11.1)	18 (26.1)
41 - 50	3 (30.0)	3 (27.3)	1 (11.1)	1 (10.0)	2 (14.3)	2 (33.3)	1 (11.1)	13 (18.8)
51 - 60	4 (40.0)	3 (27.3)	3 (33.3)	1 (10.0)	5 (35.7)	-	6 (66.7)	22 (31.9)
> 61	-	2 (18.2)	2 (22.2)	-	2 (14.3)	-	-	6 (8.7)
Profession								
Health and Welfare assistant	-	4 (36.4)	4 (44.4)	-	-	-	-	8 (11.6)
Certified Nursing assistant (AG)	4 (40.0)	-	-	5 (50.0)	4 (28.6)	-	-	13 (18.8)
Certified Nursing assistant (IG)	2 (20.0)	3 (27.3)	2 (22.2)	1 (10.0)	5 (35.7)	1 (16.7)	5 (55.6)	19 (27.5)
Registered Nurse	2 (20.0)	2 (18.2)	2 (22.2)	3 (30.0)	3 (21.4)	4 (66.7)	1 (22.2)	18 (26.1)
<i>(Vocationally trained)</i>								
Registered Nurse (<i>Bachelor's degree</i>)	2 (20.0)	2 (18.2)	1 (11.1)	1 (10.0)	2 (14.3)	1 (16.7)	1 (22.2)	11 (15.9)
Experience in nursing care (years)								
< 5	-	2 (18.2)	-	-	3 (21.4)	-	-	6 (8.7)
5 - 10	6 (60.0)	1 (9.1)	1 (11.1)	4 (40.0)	-	-	-	12 (17.4)
11 - 20	1 (10.0)	3 (27.3)	3 (33.3)	4 (40.0)	4 (28.6)	1 (16.7)	7 (77.8)	24 (34.4)
21 - 30	3 (30.0)	5 (45.5)	2 (22.2)	2 (20.0)	5 (35.7)	4 (66.7)	2 (22.2)	20 (29.0)
> 31	-	-	3 (33.3)	-	2 (14.3)	1 (16.7)	-	7 (10.1)
Working hours (week)								
< 10	-	-	-	-	2 (14.3)	1 (16.6)	-	3 (4.3)
11 - 20	-	5 (45.5)	-	-	3 (21.4)	-	2 (22.2)	10 (14.5)
21 - 30	7 (70.0)	3 (18.2)	8 (88.9)	9 (90.0)	7 (50.0)	5 (83.3)	7 (77.8)	45 (65.2)
> 31	3 (30.0)	4 (36.4)	1 (11.1)	1 (10.0)	2 (14.3)	-	-	11 (15.9)

Primary Outcomes (volume of care)

The time spent on low-value nursing care (mean, minutes per week per client) in seven teams for the 210 clients in T1 (M = 74.17, SD = 50.78) compared to the 222 clients in T0 (M = 90.38, SD = 74.13) was statistically significantly less, $t(392.52) = 2.67$, $p = 0.008$. The difference between T0 and T1 $(16.21 / 90.38 * 100)$ equals 17.94%.

The frequency of delivered low-value nursing care (mean per week) in seven teams for the 210 clients in T1 (M = 3.57, SD = 2.26) compared to the 222 clients in T0 (M = 3.75, SD = 2.52) was not statistically significantly less, $t(430) = 0.79$, $p = 0.43$.

Secondary outcomes (guideline knowledge and skills)

The difference between T1 and T0 on the two 'knowledge'-component questions showed mixed results and were not statistically significant. The questions related to the skills showed both an improvement. The question related to the advice on care showed a statistically significant improvement ($p = 0.004$) with T1 (M = 2.92, SD = 0.76) compared to T0 (M = 2.45, SD = 0.98) (see Table 3).

Table 3. Results on secondary outcomes 'knowledge' (frequencies) and 'skills' (mean) (teams 1 – 7)

Topic	Respondents		Respondents that answered 'yes'		Fisher's exact test	
	T0 N (missing)	T1 N (missing)	T0 n (%)	T1 n (%)	T1-T0 n (%)	P-value*
Knowledge						
<i>'Are you aware of the existence of guideline "x"?'</i>	63 (0)	61 (1)	59 (93.7)	57 (93.4)	-2 (0.7)	0.75
<i>'Are you aware of the content of guideline "x"?'</i>	62 (1)	59 (3)	37 (59.7)	44 (74.6)	7 (14.9)	0.19
Skills						
	Mean score (1-4)		Mean score (1-4)		Independent Samples t-test	
	T0 N (missing)	T1 N (missing)	T0 Mean (SD)	T1 Mean (SD)	T1-T0 Mean	P-value* SD (95% CI) Cohen's d
<i>'I give the client advice on care questions based on the above-mentioned guideline.'</i>	60 (3)	61 (1)	2.45 (0.98)	2.92 (0.76)	0.47	0.004 0.16 (-0.79 - -0.15) 0.53
<i>'Based on my professional knowledge, can I express my doubts about choices/decisions with respect for the client/practitioner?'</i>	61 (2)	59 (3)	2.90 (0.72)	3.02 (0.54)	0.12	0.32 0.12 (-0.35 - 0.12) 0.18

Note: *P-value less than or equal to 0.05 is considered significant

Secondary outcomes (cost-benefit analysis)

In the period June 2022 – July 2023 teams 1 - 5 together spent 138 hours on the de-implementation strategy which on average was $138 * 60 / 5 = 1656$ minutes per team (Appendix A). The mean reduction (T0 – T1, time in minutes) per client per week was 16.22 minutes. These results suggest that a team needs to deliver the “RENEW-strategy” (i.e. introduce “washing-without-water”) to $1656 / 16.22 = 102$ clients for a period of one week to reach the ‘break-even-point’ (where the total investment in time is met by total gains in time).

Process evaluation (experiences with RENEW-strategy components)

From the transcripts and documents (logbooks, action plans and reflection tools) insights into the experiences of participants were identified on the following RENEW-strategy components: Education, Persuasion and Enablement, Incentive and Training.

Education

Where professional guidelines were often considered as too long, the formatted “kick-off meeting”, “client” and “professional” educational tools with background information were regarded supportive and appealing and helped to create awareness and understanding on the subject of low-value nursing care and the specific replacement intervention “washing-without-water”:

“And if you know what something entails and [...] how it should work, and how to get to it, then it’s just also really pleasant if you want to use it in the future. That you’re a little better prepared, also for questions. [...] A good preparation is really half the battle.”

Interview 10 – Respondent 2

“It does make everybody aware of ‘we did that and this is what we’re doing,’ and, be aware of that. So it does keep everybody ‘awake’ and ‘alert’.”

Interview 2 – Respondent 3

Persuasion and Enablement

Autonomy and being able to make voluntary choices as a team or a lack thereof was experienced as an important influencing factor:

“What may have been helpful [...] is that we are a small team where everyone is enthusiastic. It were all voluntary choices people made. No one was forced to work in this team or had to choose to do so.”

Interview 5 – Respondent 2

“[...]it hasn't been a choice of the team to participate in this [project]”

Interview 2 – Respondent 3

Setting (team) goals and writing an “action plan” were regarded by clinical champions as useful and supportive, especially as time progressed it helped to reflect on the progress being made and ultimately if the set goals were achieved. Facilitation in time and money by the organisation or not generating enough income as a team (‘production driven care’), as well as an ambivalence towards measuring outcomes of team members were considered important influencing factors:

“It's [...] been a cost issue, [...] we were operating at a loss. So yes, how sensible are you then that you then talk about it during a team meeting, conduct surveys, give information? It all wastes ‘revenue’ which [...] we don't get reimbursed for.”

Interview 1 - Respondent 3

Achieving small goals, progress and successes and sharing these stories with team members and clinical champions within, and between participating teams were regarded as highly valuable:

“So, we also found out a lot about how we actually worked from each other, you never see that in home healthcare, because it's so independent.”

Interview 9 – Respondent 2

“I think if we had had some more success stories like what [Name] is naming, that colleagues themselves would be a bit more supportive and the moment you yourself support it and see the benefits you can also convey it more enthusiastically and in a different way to clients as well.”

Interview 3 – Respondent 5

Workplace coaching was received positively across all participating teams and considered acceptable, accessible and beneficial:

“[...] in the beginning that colleagues, especially those who were not yet convinced themselves, found it difficult to enter into those conversations. But through the coaching and guidance [...], they did eventually do it all themselves.

Interview 2 - Respondent 2

Incentive

At the start of the project some team members were concerned that the goal and aim of the RENEW-strategy would lead to more work:

“We need to do more, in less time”

Interview 4 – Respondent 6

But as time progressed positive experiences became evident and worked as an incentive to continue:

“What I liked most about it is that someone [a client] is so happy that they [clients] are independent again, whereas beforehand we might have thought: they won't like that.”

Interview 4 – Respondent 5

“We mainly saw a lot of bumps in the road [...] gradually, after several meetings and studying the subject in depth, we came out of it very positive”

Interview 4 – Respondent 6

The 500,00 EUR “reward” upon completion of the project was regarded by one team as “insufficient” for the total amount of time that needed to be invested, but was generally received positively and motivated team members to complete the data collection and set a “favourable mood” towards future collaboration and projects.

Training

A number of teams asked one or more manufacturer(s) of “washing-without-water” products to explain the benefits of the products for clients and demonstrate the product. Depending on the attitude (business/corporate – informal/humble) the representative of the company was met with either suspicion, ambivalence or regarded as valuable and positive:

“[brand name] was a woman and she indeed came across differently, a bit more informal perhaps. And the one at [brand name], then, [...] But that was just very businesslike.

Interview 8 – Respondent 2

“We didn't see any added value in that.”

Interview 10 – Respondent 2

While communication skills were considered vital by clinical champions and team members in the development of the RENEW-strategy and training tools were made to practice communication skills, it proved difficult for the coaches to motivate teams to engage in training and use the tools:

“We are working on this [...] every day, so we don't really need those tools at all”

Interview 2 – Respondent 2

Another point of concern raised was on how to keep or sustain the achieved change over time:

“You notice that colleagues quickly fall back into old patterns.”

Interview 4 - Respondent 5

Process evaluation (barriers to and facilitators of de-implementation strategy)

From the transcripts and documents (logbooks, action plans and reflection tools) a comprehensive list of 79 influencing factors – barriers and facilitators - were identified and grouped according to the following TICD-framework domains: Guideline factors, Individual health professional factors, Patient factors, Professional interactions, Incentives and Resources and Capacity for organisational change. The majority of influencing factors are found in the Individual health professional and Professional interactions domains (See Table 4).

Table 4. Barriers to and facilitators of the RENEW-strategy according to clinical champions and coaches

Domain*	(Sub)theme	Facilitator	Barrier
Guideline factors	Guidelines	Practical, short and simple implementation tools for guidelines (folder, presentation)	Guidelines are too long
Individual health professional factors	Attitude	Available information was seen as adequate	Person-centered care is seen as 'asking what a client wants' Lack of reflection on own practice Going against a "caring/nurturing" instinct or "care-heart" Not convinced of need for change
	The home-based nursing care environment		Being a 'guest' in a clients' house Working alone leads to practice variation
	Communication and influence	Being able to convince a client Discuss topics multiple times with a client Persevere/be persistent	Reducing care is harder than increasing care
	Intention and motivation	Need for positive experiences that motivate	High experience work pressure Loss of job satisfaction Rapid developments in healthcare lead to feeling overwhelmed Ambivalence towards measuring outcomes
	Awareness	Increased stimulation/inspiration/awareness on change and deimplementation	False assumptions/thinking for the client instead of letting client decide
	Knowledge and skills	Active enquiry/pro-active questioning clients/really engage in conversation Explain the reasoning behind change Adjusting to each client (customisation) Physical training by a manufacturer	Lack of knowledge and skills on how to engage in conversation with a colleague/client Falling back into old habits/patterns Lack of knowledge about available care aids
	Self-monitoring	Being prepared for a conversation Noticing benefits for clients (less fatigue, more comfort, increased self-reliance) Small achievements motivate to continue	

Table 4. Continued

Patient factors	Attitude	Open to change	Assertive clients and/or relatives
			Hospitalised clients/not willing to cooperate
			Changing existing care is much harder than starting with 'new clients'.
	Intention and motivation	Discuss reasoning and background of change multiple times	
	Awareness	Less physical strain Left with more energy	
Professional interactions	Team Processes	Setting clear boundaries as a team Being 'on the same page' as a team Giving it attention in every team meeting Streamlining work processes Having two clinical champions per team working together Focussing on team members who are 'willing to change' aids motivation of clinical champion Persevere/be persistent as a team	Resistance from team members Lack of support Team members do not feel responsible Team members see all kinds of bears on the road Lack of continuity in the team Lack of intrinsic motivation to change Being the only clinical champion can lead to feelings of isolation
	Communication and influence	Build support Being enthusiastic Making shared decisions in a team Making sure all team members stick to team agreements Pre-scheduled moments to reflect with each other (every 4 to 6 weeks). Pro-active, enthusiastic and decisive clinical champions	Other professionals raise expectations in clients on the amount of care that they will receive
	Intention and motivation	Being enthusiastic and cooperative Having a small team aids motivation	
	Attitude	Attitude changed from negative towards positive during the project	
	Coaching	The support of on-the-job coaching was received accessible positive, clear, and useful.	
	Share experiences and success	Sharing success stories creates positive group dynamics Sharing with colleagues', other teams and other organisation makes you can exchange ideas learn from each other	

Table 4. Continued

Incentives and Resources	Financial	Compensation in time and resources for employees	Client costs/non-reimbursement Production driven care/loss of revenue for a team
	Non-financial	High experienced work pressure creates urgency to change	Time-consuming High turnover of colleague's Temporary or substitute employees High experienced work pressure
Capacity for organisational change	Autonomy	Opportunity to experiment Making voluntary choices as a team Team involvement	Not a team decision/top-down decision making Self-managing teams make it more difficult to plan change
	Organisational support	Facilitation in time and resources Organisational support for continuing education (tools, workshops, digital platforms)	

Note: According to Flottorp et al. (Flottorp et al., 2013)*

Discussion

This study aimed to test if the RENEW-strategy (1) would lead to less low-value nursing care and (2) was acceptable, implementable, cost effective and scalable in the home-based nursing care context.

The results on the primary outcomes (volume of care) indicate that, while the frequency of low-value nursing care activities did not change between T0 and T1, the time spent on low-value nursing care tasks per activity did reduce statistically significant with an absolute mean reduction of nearly 18%. This finding shows similarities with an analysis of de-implementation studies in primary care (Heus et al., 2022). The standard deviations suggest a large variance in the observed data translating to teams with higher and lower volumes of low-value nursing care. Selection bias might be a possible explanation for this, meaning that several teams were already more aware of and trying to reduce low-value care before participating in the RENEW-strategy therefore showing “flooring effects”: teams with little room for improvement on the outcome variable.

The results on the secondary outcomes showed mixed results with both statistically significant improvements (skills) and non-significant results (knowledge). It may be that - in relation to guideline use - the knowledge-question already scored highly at T0, and therefore a significant improvement was difficult, or that participants focused more on the “what” and less on the “why”. However, the discrepancy also raises questions on the quality of the questionnaire, for example, they may be unreliable as a result of self-reporting and a lack of validation, but especially as it was felt by participants as adding to the workload.

The small-scale cost-benefit analysis suggests an interesting result for decision-makers in home-based nursing care: the ‘break-even-point’ (where the total investment in time was met by the total gains in time) of the RENEW-strategy, depending on the size and number of clients a team tends to, is a matter of weeks rather than months. However, prudence is needed in offsetting costs against benefits, as it is often unclear if estimated savings can be fully utilised (Kroon et al., 2023). Nevertheless, these results show potential and further research is warranted to gain additional insights into labour demands, potential benefits and return of investment of de-implementing low-value nursing care.

The process evaluation on the experiences of participants with different strategy components focussed on the feasibility and applicability of the strategy. In general, the RENEW-strategy was perceived acceptable and beneficial. It helped to create awareness, understanding and enabled to adopt “change” in the participating teams, all important “drivers of change” (Grol & Wensing, 2004). Practical implementation tools, workplace coaching and sharing experiences within and between teams were considered as the most contributing elements. Underutilised elements were

the practice tools for training communication skills to strengthen nurse-client communication. This is important, as low-value nursing care is not an absolute “truth”, but needs to be tailored to clients’ “needs, preferences and values”: pillars of both “evidence-based practice” and “shared decision making” (Sackett et al., 1996).

Nevertheless, a number of key uncertainties remain. The first is “keeping the gains”. Most studies on de-implementation in healthcare do not evaluate long term effects and this study is no exception (Born et al., 2019). There is a risk that the effects of de-implementation efforts – similar to implementation – will lose attention. Continuing the “sharing experiences within and between teams” on a more regular basis in a so called “learning collaborative” appears to be an effective way to facilitate sustainability (Laan et al., 2020). Further research is needed on long-term effects and sustainability of de-implementation efforts in nursing care and more insights are needed on effective interventions to keep the gains (Shelton et al., 2018).

Another omission is the client perspective. Clients are both on the requesting and receiving side of low-value care and are often targeted in (de)implementation projects. One recent study showed that a group of patients with a femoral fracture who did not undergo surgery after a careful “shared decision-making” process, quality of life was maintained and patients were satisfied with the chosen treatment (Loggers et al., 2022). While promising, more research is warranted on the outcomes of de-implementation efforts in (home-based) nursing care from the perspective of clients and/or their relatives.

More rigorous testing and evaluation of the effects of the RENEW-strategy is needed with the help of stronger designs such as randomised controlled trials or interrupted time series studies. To increase the impact of the RENEW-strategy scaling is needed. Literature on scaling de-implementation strategies is limited, and might need a different approach than the scaling of innovations (Kool et al., 2023). Kroon et al. (2022) identified four items that need to be addressed: (1) a scaling plan to raise awareness and support, (2) the external context with incentives to participate, (3) a feasible de-implementation strategy with strong evidence and (4) early adopters that support the change.

Strengths and Limitations

This study chose a pragmatic approach to test the feasibility whilst striking a balance between workload and taxability of the participating teams and some important limitations should be considered. There is risk of selection bias by a lack of randomisation and selecting teams that were motivated to participate in the project which might have led to “flooring effects” in the primary quantitative outcome skewing the overall effect. Other characteristics of participants, however, appear to be representative: educational levels of certified nursing assistants (AG + IG): 46.3% (this study) versus 52.7% (national average in home-based nursing care) (Grijpstra, 2020), as

well as age and working experience in nursing that are both in the higher categories compared to intramural settings (CBS StatLine, 2022a, 2022b; Grijpstra, 2020).

In addition, access, collection and extraction of routine data from electronic client records deserves specific attention. In this study the collection of data was largely dependent on manual work by nurses, possibly introducing bias and keeping nurses from working in practice. The diversity, complexity, and severity of the clients in home-based nursing care teams might be a possible confounder or effect modifier in the relation between low-value care and the volume of care delivery and easily extractable insights in these factors are needed to further improve data quality. Despite these shortcomings, evidence related to successful de-implementation strategies to reduce low-value nursing care is limited, especially in home-based nursing care, and the results are an important step towards the “proof of concept” and scaling of de-implementation of low-value nursing care.

Conclusion

The findings show that for the seven home-healthcare teams in this study, the RENEW-strategy (1) leads to a reduction of low-value care and (2) is - conditional upon minor modifications - acceptable, implementable, cost effective and scalable. To facilitate the delivery of appropriate home-based nursing care, future efforts should focus on stronger designs such as randomised controlled trials or interrupted time series for more rigorous scaling and testing of the RENEW-strategy.

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Appendix

Appendix A. Cost-benefit time registration teams 1-5

Month	Year	Project number	Registered Hours
June	2022	579701	34.25
July	2022	579701	7.50
August	2022	579701	1.00
September	2022	579701	10.50
October	2022	579701	18.50
November	2022	579701	11.00
December	2022	579701	11.92
January	2023	579701	15.13
February	2023	579701	9.50
March	2023	579701	6.00
April	2023	579701	3.00
May	2023	579701	4.00
June	2023	579701	4.50
July	2023	579701	1.00
			Total 138.80

Appendix B: Topic guide process evaluation

Purpose

The aim of the interview(s)/group discussion(s) is to understand barriers and facilitators regarding the implementation of the RENEW-strategy as experienced by healthcare professionals during the preparation and implementation of the strategy.

Questions

1) What is your role in the team and the project and can you tell us a bit more about it?

2) What are your *experiences* with the project (so far)?

Probing questions on:

- a. Impact? Which part of the project works/does not work and why?
- b. Objectives achieved? Why?
- c. Meaningful? Why?
- d. Understandable? Why?
- e. Acceptable? Why?

3) What *barriers* did you encounter in the implementation of the project?

Inquire further on*:

- a. Guidelines and protocols: presence, accessibility, applicability
- b. Individual health professional : knowledge, skills, attitude, (incorrect) routines
- c. Client factors: What are the experiences and preferences/behaviours of client and/or relatives?
- d. Professional interaction: does the team in which you work consider the project important? In what ways does this manifest itself? Norm and goal setting, addressing each other, exemplary behaviour
- e. Resources, materials, facilities: sufficient time, information systems, structural training,
- f. Capacity for organisational change: (informal) leadership, priority, support management performance feedback (audit and feedback) support for change and innovations (quality team/ shared governance)
- g. Social, political or legal factors: e.g. clients increasingly at home with complex care for longer, increasing demand for care, staff shortages

4) What contributed most to the implementation of the project?

5) Will you continue to implement the intervention in this way? Why yes/no?

6) What is needed to make a lasting impact?

7) If you could do it over again in the future, what would you do differently?

8) Are there any issues we haven't talked about that you would like to comment on?

Form

- Semi-structured interview based on the questions. Not all sub-questions need to be answered. Other interviews follow where we can focus on sub-questions not covered. Possibly topics from the written evaluation can be added to question 2 to go into them in more detail.

*based on the domains of Flottorp et al. (2013).

Appendix C: Educational and professional status of care professionals in The Netherlands

Profession	Educational level*	General task description
Nurse Practitioner (<i>Master's degree</i>)	Level 7	Practitioner with both nursing and medical expertise – diagnosing patients – needs assessment and coordination of care and medical treatment – responsible for quality of care and team expertise
Registered Nurse (<i>Bachelor's degree</i>)	Level 6	High complex nursing and care – responsible for quality of care and team expertise – coaching colleagues – coordination of care – needs assessment
Registered Nurse (<i>Vocationally trained</i>)	Level 4	(Complex) nursing and care – coordination on patient level
Certified Nursing assistant	Level 3	Low complex nursing, care and support – care plan
Health and Welfare assistant	Level 2	Domestic and light care tasks (daily activities)

Note:

According to Dutch Qualification Framework (NCP NLQF, 2019)*

Adapted from (Wendt et al., 2022)^

NCP NLQF. (2019). *Dutch Qualification Framework (NLQF): Increases visibility and value of learning.*

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Chapter 5

**A tailored de-implementation strategy to reduce
low-value home-based nursing care: a multiple
interrupted time series study**

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Introduction

Globally, the growth of the nursing workforce is insufficient to meet increasing healthcare demands (World Health Organisation, 2020). Simultaneously, various studies show that not all nursing practices are effective or necessary (Miller et al., 2015; Osorio et al., 2019). Nursing care that is not based on valid evidence, not cost-effective or inconsistent with the values or preferences of the patient can be considered ‘inappropriate’ or of ‘low-value’ (Verkerk, Tanke, et al., 2018; World Health Organization, 2000). These practices waste limited resources and time, and creates an avoidable burden on patients (Brownlee et al., 2017). In the United States, it has been estimated that up to 25% of healthcare expenditure could be regarded as ‘wasteful spending’, including low-value care (Shrank et al., 2019). Internationally, there is an increasing interest in reducing low-value care. To raise awareness and encourage the debate around low-value care, campaigns were launched such as Choosing Wisely in the United States, which has since gathered a large international following (Levinson et al., 2015). As part of these campaigns, do-not-do recommendations were listed based on clinical guidelines, and what started out for mainly medical disciplines, was soon followed up by lists for the nursing profession (American Academy of Nursing, 2018; Australian College of Nursing, 2016; Shellian & Levinson, 2016).

In the Netherlands, and in particular Dutch home-based nursing care, similar trends are visible where demands are rising and shortages are expected to increase to more than 10% on a total of 105.000 home-based healthcare professionals in 2027 (Grijpstra, 2020). In 2017, the first systematic review of 125 Dutch national nursing guidelines identified 66 low-value nursing practices, followed by an update in 2023, identifying a further 66 practices (Bahlman-van Ooijen et al.; Verkerk, Huisman-de Waal, et al., 2018). A recent survey study showed that a number of these low-value nursing care practices are highly prevalent in Dutch home-based nursing care, for example: ‘bladder irrigation to prevent clogging of urinary tract catheter’ (Wendt, Cremers, et al., 2024). With increasing attention for the environmental impact of healthcare, data from several studies showed that the healthcare sector is responsible for nearly five percent global emissions and seven percent of the Dutch national carbon footprint (Lenzen et al., 2020; Steenmeijer et al., 2022). Therefore, reducing low-value nursing care and increasing appropriate care is expected to improve patient safety and contribute to a more affordable, accessible and sustainable healthcare system (Beks et al., 2024).

Parallel to the rise of the Choosing Wisely campaigns, a growing interest is seen in the field of de-implementation or de-adoption research, focused on reducing, replacing or stopping low-value care practices (Heus et al., 2022). This included the development of a Choosing Wisely De-implementation framework. This framework suggests a number of key activities such as the “identification of potential areas and priorities of low-value healthcare” and “identifying barriers and potential interventions for de-implementation”. These activities come before the “evaluation

of a program” that then needs to be followed by the “spread of an effective program” (Grimshaw & Patey, 2023).

Using these steps as guidance, a number of existing low-value practices in Dutch home-based nursing care were identified, such as: ‘washing the client with water and soap by default’ and the ‘application of zinc cream, powders or pastes when treating intertrigo’ (Verkerk, Huisman-de Waal, et al., 2018; Wendt et al., 2022). In a qualitative focus group study, barriers and facilitators related to the delivery of these care practices were then identified and included: (lack of) awareness, behaviour(s), attitude(s) and (lack of) knowledge and skills of individual homecare professionals, clients and their relatives (Cremers et al., 2024). To effectively reduce, replace or stop (or de-implement) these low-value care practices a multifaceted de-implementation strategy was developed and introduced in seven Dutch home-based nursing care teams and tested in a feasibility study. This strategy focused on well-known elements for change that were used effectively in previous de-implementation efforts, including ‘education’, ‘persuasion’, ‘enablement’, ‘incentives’ and ‘training’ (Heus et al., 2022). The feasibility study showed favourable results in the form of proof of concept, feasibility and acceptability and a reduction of low-value nursing care of nearly 18% (Wendt, Nieuwboer, et al., 2024). However, it suffered from a lack of randomisation and controlling and needed more robust evaluation. Therefore, the aim of this study is to evaluate the effects of the RENEW-strategy on the volume (time in minutes) spent by home-based nursing care teams on three low-value nursing practices.

Methods

Research Design and population

A multicenter, quasi-experimental multiple interrupted time series design was performed. Two home healthcare organisations in the center and south of the Netherlands agreed to participate in the study, as it aligned with these organisations’ policy objectives to keep home-based nursing care affordable and accessible. In both organisations, an a-priori executive decision was made that all teams would be included in the study. One organisation therefore included 10 teams and the other organisation 25 teams (35 in total). Data was collected consistently in each team before and after the implementation of the intervention (here: the RENEW-strategy) to participants (individuals or clusters of individuals, here: home-based nursing care teams) over a number of time periods (here: two before, three post measurements, with an 8 week implementation period), looking for a change in the underlying trend over time.

Before the start of the data collection, the different teams were divided in clusters (a group of teams) based on their geographical location to limit contamination that would occur when of nearby teams, one team would be in the intervention at a time the other was not. However, care

was taken that not all clusters would start at the same time to exclude that the change before-after could be ascribed to a common external factor. Therefore, only three teams could sign up for a given cluster (each cluster had a different start period: T0-T2), with the help of a subscription list where full meant full. Five teams were an exception to this procedure, because of instability in the teams (for example, teams that had many team-members suffering long-term illness, or a high number of vacancies), and were therefore automatically placed in the last cluster (T3). The aim was that by the end of the study (before summer to reduce possible seasonal effects) all participating teams would have implemented the RENEW-strategy (See Appendix A).

De-implementation strategy (RENEW-strategy)

The previously developed multifaceted de-implementation-strategy (RENEW) was based on a context and problem analysis (Wendt, Cremers, et al., 2024), tailored to known context specific barriers on team, client and organisational levels (Cremers et al., 2024) and then tested to see if the strategy was feasible, acceptable and cost-effective in practice (Wendt, Nieuwboer, et al., 2024). Based on the experiences and feedback from professionals in practice the RENEW-strategy was further refined for the purpose of this scale-up evaluation study. A logic model linking barriers to activities through intermediary steps can be found in Appendix B where the iterations that followed the feasibility study are shown in *italics* and ~~strikethrough~~.

Similar to the feasibility study, two voluntary ‘clinical champions’ were appointed in each participating team (Nieuwboer et al., 2022). Periodical coaching sessions (both physically and with online video calls) took place with the clinical champions and ‘workplace coaches’ (JJ, SS & JT) to discuss progress, possible barriers, team performance and fidelity of the de-implementation strategy (Cannon-Bowers et al., 2023). The frequency of these coaching sessions were tailored to the individual needs of clinical champions and varied. At the start of each cluster (T0 - T3), a physical kick-off meeting with the clinical champions and team members was organised and led by one or two external coaches to give an overview, familiarise and set goals for the project (JJ, SS & JT).

Interrupted Time Series power calculations

A priori power was determined based on the pre-post comparison accounting for clustering within clusters using a design effect and autocorrelation across repeated measurements. Six scenarios were considered that included 35 teams, two pre-measurements, three post-measurements, an alpha of 0.05 (two-sided), an intra cluster correlation ranging from 0.05 – 0.08 (Campbell et al., 2005; Smeeth & Ng, 2002), a variation in team size of 50% of teams around 35% (size = 60 clients), 25% of teams around 10% (size = 70 clients) and 25% of teams around 50% (size = 50 clients), a variation in autocorrelation between measurements ranging from 0.03-0.08, and a variation in reduction of low-value care of either 15 or 17% (Heus et al., 2022; Wendt, Nieuwboer, et al., 2024). The results across the scenarios showed that it was possible to achieve a

power ranging from 86 - 95% to detect a difference with a 0.05 two-sided significance level. The complete scenarios can be found in Appendix C and D.

Selection of low-value home-based nursing care practices

Because we only wanted to investigate one practice per cluster (to avoid overburdening the teams in the cluster) and we had only 35 teams (so 10-11 clusters), the number of low practices that could be investigated were limited. Three low-value home-based nursing care practices were prioritised and pre-selected in a meeting with managers, senior nurses and the research team. To familiarise themselves and learn the process of de-implementation and to prevent focus on too many practices at the same time, teams were advised to choose one practice - based on consensus within their team - to target for de-implementation from three pre-selected practices (see Table 1).

Table 1. Pre-selected low-value practices and operationalisation

Low-value care practice	Operationalisation (Replace, reduce or stop)
'washing the client with water and soap by default' & 'washing the client from head to toe daily' (Dutch Nursing Association, 2017)	Replace with 'washing without water': an evidence-based alternative to washing with water and soap (Groven et al., 2017)
'application of zinc cream, powders or pastes when treating intertrigo' (Stapersma, 2016)	Stop and Replace with working according to the 'national multidisciplinary guideline intertrigo (prevention and treatment)' (Dutch Nursing Association, 2011)
'assisting with putting on/taking off compression stockings while the client can do this him/herself (possibly with an aid)' (Stapersma, 2016)	Reduce and Replace with a care aid ('doff n' donner') with or without consulting an occupational therapist.

Primary outcome (quantitative; volume of care)

The primary outcome was the mean relative volume of a low-value home-based nursing care practice in time in minutes per client per week.

Participating teams completed a sheet - based on client care plans - on the following outcomes:

- Total number of clients on *date of measurement*
- Total number of clients that receive *low-value home-based nursing care practice*
- Per client: frequency/week of *low-value home-based nursing care practice*
- Per client: time/minutes per performed *low-value home-based nursing care practice*
- Optional: *product(s)* used to perform practice

The nurse responsible for the client care plans was asked to consult the care plan to see how much time was planned for the specific practice (based on a needs assessment). If, based on personal experience of the nurse, the actual time needed for the practice would differ more than 10% from

the planned time, the nurse was asked to give a ‘best educated guess’ and come with a precise estimate of the actual time in practice.

Data collection

Interrupted time series

All home-based nursing care teams started with a two control measurements (here: care as usual). In every time period (here: a period of four weeks) nine home-based nursing care teams in three clusters entered the implementation phase. After the implementation phase three follow-up measurements took place. Data was partially self-collected via an Excel sheet. The researchers (BW, DO) assisted during the first two data measurements, to ensure protocolised data collection by the clinical champions. If the clinical champions wished further help to collect the data, the researchers assisted them during the follow-up measurements as well. The researchers reminded the clinical champions via e-mail or telephone when it was time for the next data-collection. Demographics of the home-based nursing teams were collected at the end of the data-collection and included nursing roles, age, work experience and changes in the team.

Process evaluation (qualitative; barriers and facilitators experienced by clinical champions and coaches)

To evaluate the process of change, the external coaches recorded (digital) logbooks of the meetings with the clinical champions (JJ, SS & JT). In addition - and as part of the RENEW-strategy - three physical meetings were organised with the coaches, researchers, clinical champions and team members to evaluate progress and exchange experiences and best practices. During these meetings participant responsiveness, experiences and influencing factors were documented.

Data Analyses

Interrupted Time Series

Categorical variables were presented as frequencies and percentages, and continuous variables as means (with a standard deviation). The data for each team was plotted – stratified for the three low-value home-based nursing care practices - in an interrupted time series, where variance appeared sufficiently stable over time (See Appendix E). For each team a separate autoregressive integrated moving average (ARIMA) model was fitted allowing for a level change and slope change, to account for time trends in absence of the RENEW-strategy (Schaffer et al., 2021). Given the limited number of five data points, model fit could not be assessed, and a model was fitted without adjustments for autocorrelation or seasonality (Hyndman & Kostenko, 2007). Model reduction (a model with level and slope change versus a model with level change only) was considered quantitatively by comparing fit measures (residual mean squared error RMSE) and qualitatively using the visual check of the fit. Although in principle each team could have a different type of model with the best fit, for interpretability the predominantly best model fit (here: level and slope change model) was applied to all the teams. We took the level change as

an interpretable summary measure for effect, and considered the slope change as a measure for stability of the level change.

As the RENEW-effects were sufficiently consistent across the teams, the following analysis was performed: the RENEW-effect, stratified for the three low-value home-based nursing care practices, was based on a meta-analysis of the team effects (level change and slope change) using an weighted inverse-variance approach by calculating the weighted mean of the level change and slope change using the inverse variance of the individual team outcomes as weights (Lee et al., 2016). The outcomes were presented as a change in mean time in minutes per client per week together with a 95%-confidence interval.

All analyses were performed with IBM SPSS Statistics for Windows, version 25.0 (IBM Corporation, 2017). All graphics were generated with RStudio: Integrated Development Environment for R (Posit team, 2024).

Process evaluation (qualitative; barriers and facilitators experienced by clinical champions and coaches)

The data was already summarised by the individual coaches, or processed by a group of professionals in physical meetings.. Therefore, the data were straight forward and the logbooks and documents were re-read and coded deductively by a single researcher (BW) according to the Tailored Implementation for Chronic Diseases (TICD) (Flottorp et al., 2013) framework. The codes and themes were then discussed in a research team meeting (BW, SvD, GH) where final decisions were made based on consensus. All coding took place with the help of ATLAS.ti version 23.1.1 (Friese, 2019).

Ethical Approval

The research ethics committees of the Radboud University Medical Centre concluded that ethical approval was not required under Dutch law (CMO no. 2023-16720). According to Dutch legislation, data collection from electronic patient files was performed by personnel with a treatment relationship with the patient. The privacy of the participants in this study was warranted by the use of anonymous data.

Results

The results will be presented under (1) Characteristics of the participating teams; (2) Outcomes (volume of low-value practices in mean time in minutes per client per week) and (3) Process evaluation (barriers and facilitators experienced by clinical champions and coaches).

Characteristics of participating teams at end of data collection (T8)

Of the 35 teams planned for inclusion, 31 teams started with data collection and the implementation phase. Five teams were lost to follow-up during data collection (attrition rate: 16.1%), and one team collected data on two practices: leaving 26 teams with 27 completed interrupted time data series. The 31 teams employed 432 healthcare professionals in teams (range 4 – 21 professionals per team). The majority were certified nursing assistant (level 3; 47.7%) followed by registered nurses (vocationally trained; Level 4; 18.3%) and registered nurses (Bachelor's degree; Level 6; 16.0%). The largest age group lay between 51 – 60 years old (30.6%) and work experience in nursing care was skewed towards the higher categories (21 – 30 years' work experience; 25.2%). The majority of healthcare professionals worked between 21 and 30 contract hours per week (52.5%) (see Appendix F).

Outcomes (volume of low-value practices in mean time in minutes per client per week)

1. 'washing the client with water and soap by default' & 'washing the client from head to toe daily'

The replacement of 'washing the client with water and soap by default' and 'washing the client from head to toe daily' by 'washing without water' in 10 teams was associated with an immediate reduction (level change) in weighted mean time in minutes per client per week of 13.61 (95% CI: 15.18 – 12.04) (See Figure 1), followed by an increase (slope change) in weighted mean time in minutes per client per week of 0.15 (95% CI: 0.55 - -0.24) every month (for the duration of the study) (See Appendix G). The reduction appears to be sustained as it would take $13.61/0.15 = 90$ months to neutralise the level change.

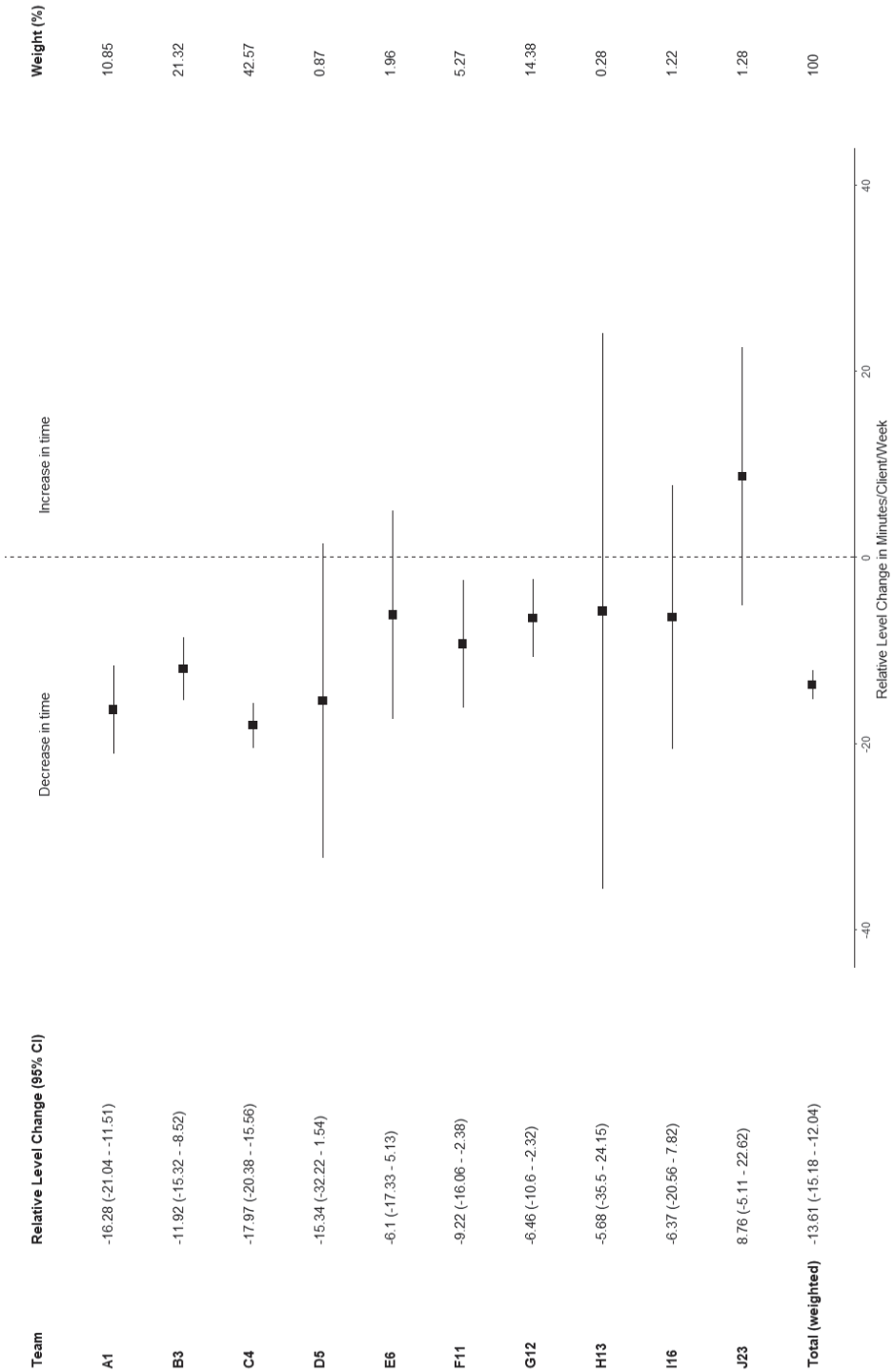


Figure 1. Weighted forest plot washing without water (level change)

2. *'application of zinc cream, powders or pastes when treating intertrigo'*

The replacement of the 'application of zinc cream, powders or pastes when treating intertrigo' by 'working according to the national multidisciplinary guideline intertrigo (prevention and treatment)' in 12 teams was associated with an immediate increase in weighted mean time in minutes per client per week of 1.25 (95% CI: 1.04 – 1.45) (See Figure 2), which was sustained by a plateau in weighted mean time in minutes per client per week of 0.00 (95% CI: 0.04 - -0.04) every month (for the duration of the study) (See Appendix H).

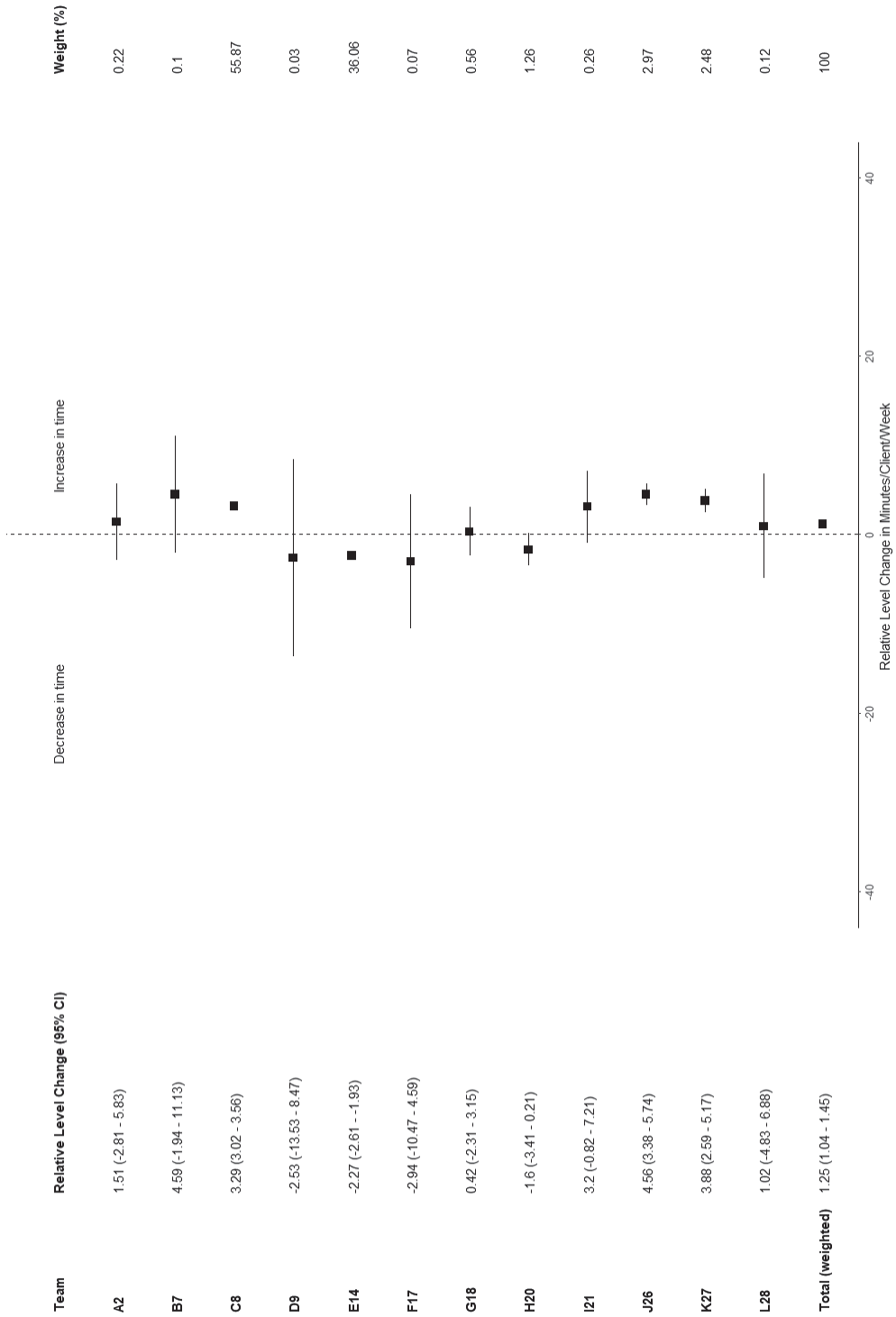


Figure 2. Weighted forest plot guideline interrater (level change)

3. *'assisting with putting on/taking off compression stockings'*

The replacement of 'assisting with putting on/taking off compression stockings while the client can do this him/herself (possibly with an aid)' by 'introducing care aid ('doff n' donner') with or without consulting an occupational therapist' in 5 teams was associated with an immediate reduction in weighted mean time in minutes per client per week of 4.42 (95% CI: 6.35 – 2.49) (See Figure 3), followed by an additional decrease (slope change) in weighted mean time in minutes per client per week of 1.66 (95% CI: 2.01 - -5.32) every month (for the duration of the study) (See Appendix I).

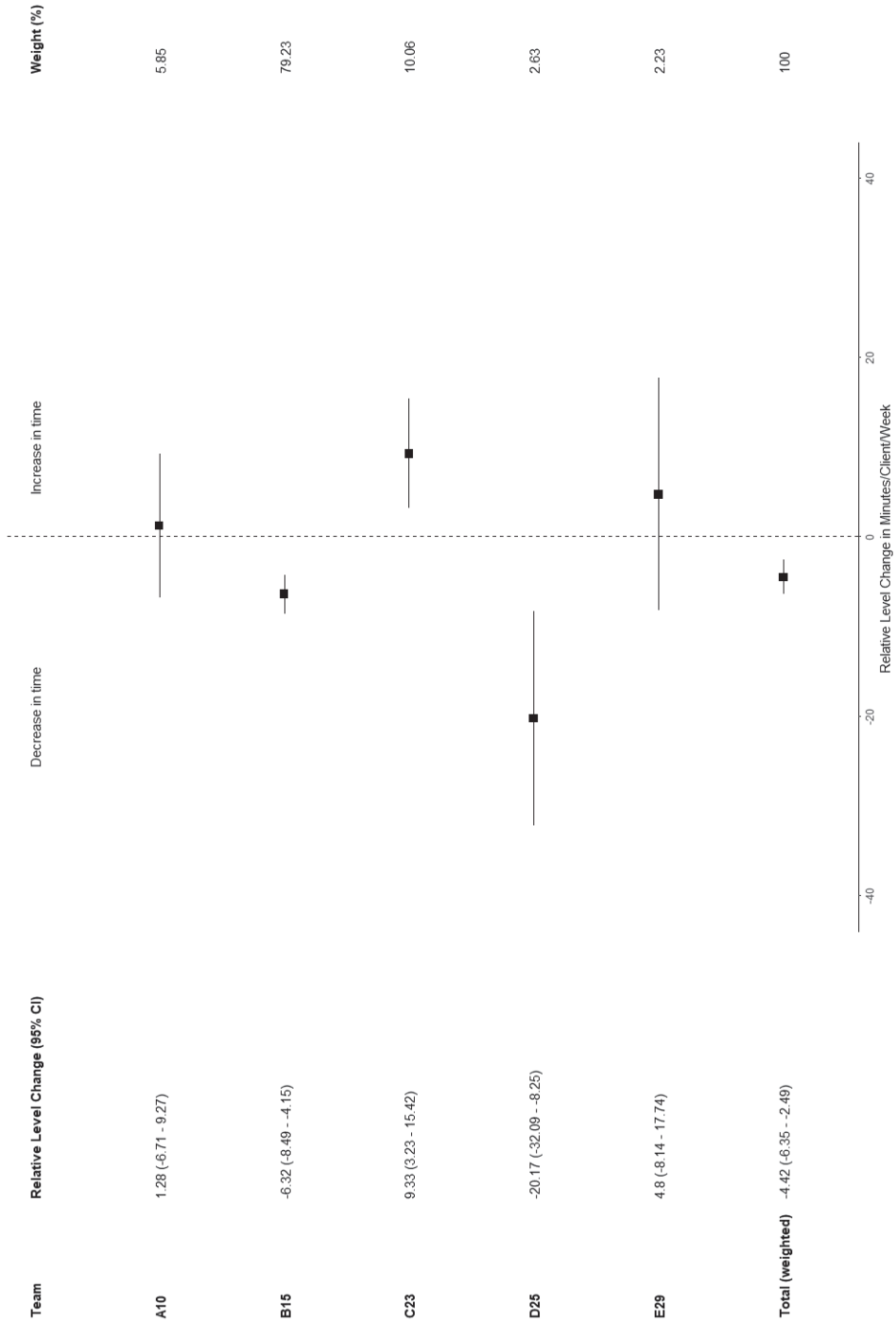


Figure 3. Weighted forest plot compression stockings (level change)

Process evaluation (barriers and facilitators experienced by clinical champions and coaches)

From the documents (logbooks, meeting minutes) a list of 45 influencing factors – barriers and facilitators - were identified and grouped according to the following TICD-framework domains: Guideline factors, Individual health professional factors, Patient factors, Professional interactions, Incentives and Resources and Capacity for organisational change (See Table 2).

Table 2. Barriers to and facilitators of the modified RENEW-strategy according to clinical champions and coaches

Domain*	(Sub)theme	Facilitator	Barrier
Guideline factors	Guidelines/tools	Practical, short and simple implementation tools for guidelines (folder, presentation, step-by-step planning)	Conflicting local (organisational) guidelines with national guidelines
	Individual health professional factors	Attitude	Not convinced of need for change
	Communication and influence	Available information was seen as helpful Avoid discussion: try alternative(s) for two weeks and then evaluate	
	Intention and motivation	Positive experiences lead to motivation	High experienced work pressure Lack of motivation to participate in change
	Awareness	Increased stimulation/inspiration/ awareness on change and de-implementation Less physical strain by working differently	
	Knowledge and skills		Lack of knowledge Falling back into old habits/ patterns
	Self-monitoring	Noticing direct benefits for clients (less fatigue, more comfort, increased self-reliance) Having personal learning objectives as clinical champion to discuss with coach	
Patient factors	Attitude	Open to change, experiencing change as something positive	Hospitalised clients/not willing to cooperate Having high expectations of professional care
	Intention and motivation	Facilitating time and products to get used to new intervention/ working method	
	Awareness	Less physical strain and discomfort Left with more energy	

Table 2. Continued

		Knowledge and skills	Lack of knowledge leading to resisting change
		Communication	Implementation tools (patient information) were in Dutch language only Using professional care as 'social contact'
Professional interactions	Team Processes	Being 'on the same page' as a team	Resistance from team members
		Streamlining work processes by making working agreements	Lack of support for clinical champions by other team members (therefore unable to free up time in their schedule) Lack of motivation to participate in change
	Communication and influence	Pre-scheduled moments to reflect with each other, discuss specific cases and progress as a team	
	Coaching	The support of on-the-job coaching was received accessible, approachable and useful.	
		Helped to reflect on personal learning objectives and team progress	
Share experiences and success	Sharing success stories with colleagues' and other teams makes you can exchange ideas learn from each other		
Incentives and Resources	Financial	Compensation in time and resources for clinical champions (two hours a week for the duration of the study)	Client costs/non-reimbursement of care aid or products
	Non-financial	Taking preventive measures save time later on	Delay in delivery of products Difficult to find time/schedule meeting(s) with coach/clinical champion(s) Temporary or substitute employees High experienced work pressure High number of vacancies in a team/lack of personnel
Capacity for organisational change	Organisational support	Organisational support for continuing education (tools, workshops, digital platforms)	Need permission from management to take action
		More innovative, professional organisation	Lack of working agreements on participating in quality improvement projects More basic, functional organisation

Note: According to Flottorp et al. (Flottorp et al., 2013)*

Discussion

This study intended to evaluate the effect of the RENEW-strategy on the volume (weighted mean time in minutes per client per week) spent by home-based nursing care teams on three low-value nursing care practices. For two of the three selected low-value care practices, the results on the effect (weighted mean time in minutes per client per week), indicate that the RENEW-strategy is associated with an immediate reduction of these practices (-4.42 and -13.61 minutes). Contrary to expectations, one practice showed an immediate increase (+1.25 minutes). The small and limited changes in time trends indicate that these effects were sustained for three months after the implementation phase.

Compared to the feasibility study the results for the de-implementation or replacement of *'washing the client with water and soap by default'* & *'washing the client from head to toe daily'* by *'washing without water'* showed a smaller effect size (-16.21 minutes vs -13.61 minutes), and considerably smaller confidence intervals. An explanation could be the larger number of included teams (seven versus 10), the higher number of measurements (two versus five) and/or a higher fidelity in the feasibility study. The duration of the implementation phase and data collection was more or less similar (six months) (Wendt, Nieuwboer, et al., 2024). A possible explanation for the increase in effect (for the de-implementation or replacement of *'application of zinc cream, powders or pastes when treating intertrigo'* by working according to the *'national multidisciplinary guideline intertrigo (prevention and treatment)'*), might be that the guidelines prescribe to take (more) preventive measures (such as daily skincare and measures to keep the skin dry). Therefore, home-based nursing care teams might have been underperforming compared to the guideline recommendations in the baseline measurements of this study. This explanation is supported by an analysis of barriers that states that four in 10 nurses and professional caregivers in the Netherlands often “forget” to take preventive measures when treating intertrigo (De Groot et al., 2018).

The most compelling finding, however, is that the increase in time of one practice, is surpassed by the savings in time of the other two practices. By making use of available alternatives, care aids and working according to clinical nursing guidelines, the results support the hypothesis that reducing low-value nursing care saves time to deliver more appropriate, high-value care or, for example, professional development. Health promotion or patient education are examples that are often identified as ‘care left undone’ in home-based nursing care (Senek et al., 2022). In a time where resources and professionals in home-based nursing care are becoming increasingly scarce, these results should encourage nurses, professional caregivers, healthcare managers and policy makers to continue the effort to de-implement low-value (nursing) care.

While the influencing factors found in this study are generally in line with those found in the feasibility study (Wendt, Nieuwboer, et al., 2024), two factors stand out. The first is a well-known barrier in (nursing) implementation studies: a lack of compensation in time and resources for those involved, and compensation is generally proposed as a solution to this barrier (Cremers et al., 2024; Mathieson et al., 2019; Spoon et al., 2020; Wendt, Cremers, et al., 2024). Therefore, in this study, compensation in time and resources was allocated for the clinical champions (two hours per week for the duration of the study). However, in a number of teams a new, workplace related, barriers presented itself: a part of the clinical champions were still unable to free up time in their schedule, either because of a lack of support by other teams members, and/or a lack of working agreements with colleagues on how to participate in quality improvement projects. These are important barriers as a positive work environment is associated with patient safety, quality of care, a reduction of employee turnover, and higher employee satisfaction (Aiken et al., 2012; Mathisen et al., 2021; Taylor et al., 2015).

In relation, the second factor (noted by the workplace coaches) were differences between organisations and teams in their capacity to support and facilitate “change”. Some teams were perceived as more “basic and functional”, mainly focused on “production” (working ‘task-based’ and not much else) and others as more “innovative and professional”, with a focus on learning and quality improvement and having effective working agreements. These findings show similarities with a qualitative study on the de-implementation of feeding tube auscultation in the United States where several nurses found variable levels of accountability displayed by colleagues. For example nurses who treated their practice as a “job” (“considering nursing only as a job to earn an income”) versus a “profession” (more “career oriented”) (Bourgault et al., 2022). These factors raise questions on the workplace culture towards quality care and how organisations and teams work together and therefore warrants further investigation. Recently, the Culture of Care Barometer, an instrument to identify needs among healthcare professionals in the workplace environment, has been validated for the Dutch hospital environment and might also prove itself useful in the context of home-based nursing care (Maassen et al., 2024).

Strengths and Limitations

This study should consider some important strengths and limitations. Contrary to the feasibility study - where teams were selected based on their motivation to participate - this study included all teams from two organisations a priori (Wendt, Nieuwboer, et al., 2024). This acts both as a strength, including the full range from “innovators” to “laggards” according to Rogers’ diffusion of innovations theory, as well as a limitation (Rogers et al., 2014). It is likely that this study selected teams with a higher chance to drop-out compared to the feasibility study, increasing the attrition rate and – despite the larger number of teams included - ended up underpowered. Also, the teams that dropped out, could be the teams less motivated, and had the outcomes been measured, it could be that the improvements observed may be less pronounced. For this reason

the results of this study are explorative and might show an overestimation of effect. Another possible limitation might be that data collection was partially self-reported. However, all baseline measurements and a large portion of teams were supported throughout all data collection by at least one researcher, limiting bias.

Despite these limitations, the fact that a relatively large scale interrupted time series study, making use of tried and tested strategies - was completed in the difficult context of home-based nursing care must be seen as a valuable addition to the discipline of nursing science. After the “proof of concept” in the feasibility study, these results are the first step towards the evaluating the RENEW-strategy in real life situations, with a quasi-experimental design to de-implement low-value home-based nursing care. The limited evidence on low-value nursing care, together with the increasing demands on the nursing workforce, make these results timely, important and relevant.

Conclusion

The findings of this study showed that for two of the three selected low-value care practices the RENEW-strategy lead to a reduction of low-value care. By replacing low-value practices with available (evidence-based) alternatives, clinical nursing guidelines and care aids, time can be saved that can be used for high-value alternatives or care left undone. The hands-on real life experiences in this study showed that nurses and certified nursing assistants are well positioned to (1) assist in undertaking research in this area, (2) have a key role in removing implementation barriers by providing patient education, establishing consensus and come to working agreements with colleagues and other professionals, and therefore (3) lead the effort of de-implementation of low-value nursing care.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this study.

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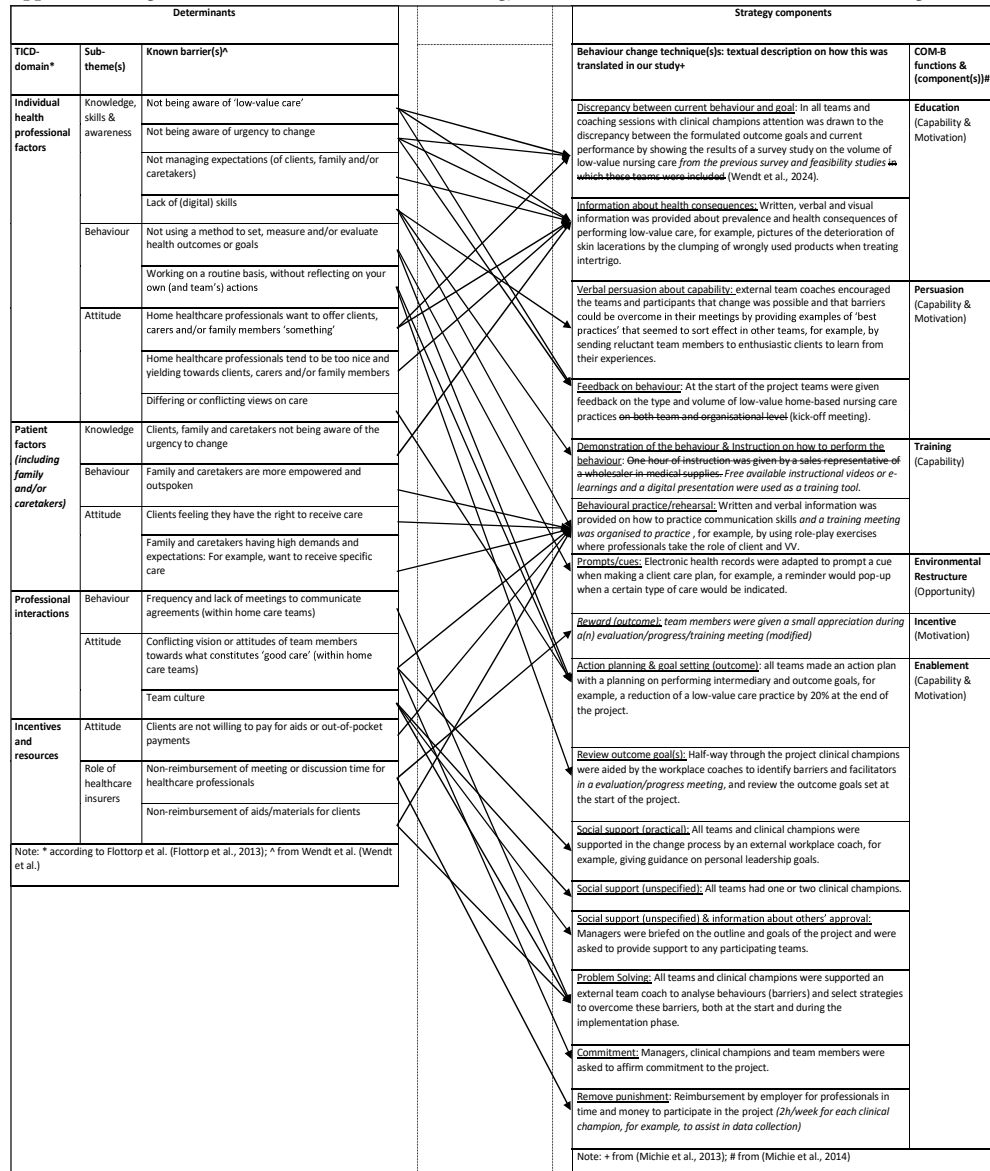
Appendix A

Appendix A: Interrupted time series (four clusters, nine steps) with two baseline measurements (Pre), the implementation phase 'I' and three follow-up measurements (Post).

Teams	Week 1-4 (T0)	Week 5-8 (T1)	Week 9-12 (T2)	Week 13-16 (T3)	Week 17-20 (T4)	Week 21-24 (T5)	Week 25-28 (T6)	Week 29-32 (T7)	Week 33-37 (T8)
	Oct	Nov	Dec	Jan	Feb	March	April	May	June
1-3	Pre	Pre	I	Post	Post	Post			
4-6	Pre	Pre	I	Post	Post	Post			
7-9	Pre	Pre	I	Post	Post	Post			
10-12		Pre	Pre	I	Post	Post	Post		
13-15		Pre	Pre	I	Post	Post	Post		
16-18		Pre	Pre	I	Post	Post	Post		
19-21			Pre	Pre	I	Post	Post	Post	
22-24			Pre	Pre	I	Post	Post	Post	
25-28			Pre	Pre	I	Post	Post	Post	
29-31				Pre	Pre	I	Post	Post	Post

Appendix B

Appendix B. Logic model for the modified RENEW-strategy (iterations are shown with *italics> and strikethrough*)



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Appendix C

RENEW: 35 clusters, alpha=0.05 (two-sided), icc=0.05

-50% of clusters around 35% (size=70), -25% of clusters around 10% (size=80), -25% of clusters around 50% (size=50)

power meta-analysis over the ITS of clusters

config=1: 2 pre, 2 post, 17% reduction

n_cluster	power_LEAR_df	power_CS_df	power_AR1_df
35	0.92422	0.99949	0.93033

config=2: 2 pre, 3 post, 17% reduction

n_cluster	power_LEAR_df	power_CS_df	power_AR1_df
35	0.94821	0.99989	0.90414

config=3: pre 2 post 3, 15% reduction

n_cluster	power_LEAR_df	power_CS_df	power_AR1_df
35	0.88768	0.99915	0.82212

config=4: pre 2 post 3, 17% reduction, low correlation 0.6 to 0.3

n_cluster	power_LEAR_df	power_CS_df	power_AR1_df
35	0.86545	0.98700	0.75373

n_cluster is the number of clusters in the meta-analysis

CS: corr. betw. all measurements the same; AR1/LEAR: corr decreases exponentially/linearly with distance betw.meas.

Appendix D

RENEW: 35 clusters, alpha=0.05 (two-sided), icc=0.05

-50% of clusters around 35% (size=60), -25% of clusters around 10% (size=70), -25% of clusters around 50% (size=50)

power meta-analysis over the ITS of clusters

config=5: pre 2 post 3, 15% reduction, autocorrelation from 0.8 (close) to 0.5 (far)

n_cluster	power_LEAR_df	power_CS_df	power_AR1_df
35	0.86243	0.99850	0.79114

config=6: pre 2 post 3, 15% reduction, autocorrelation from 0.6 (close) to 0.4 (far)

n_cluster	power_LEAR_df	power_CS_df	power_AR1_df
35	0.88640	0.94744	0.60910

n_cluster is the number of clusters in the meta-analysis

CS: corr. betw. all measurements the same; AR1/LEAR: corr decreases exponentially/linearly with distance betw.meas.

Appendix E

Appendix F. Characteristics of participating teams at the end of data collection (the sum of percentages might exceed 100% due to the rounding of decimals).

Team	1	2	3	4	5	6
Team member changes (None (0) /Some (1-2) /Many >3)	Some	Many	None	Some	Some	Some
Team members on sick leave (None (0) / Some (1-2) /Many (>3))	None	None	Many	Some	Some	None
Clinical champions changed (Yes/No)	Yes	No	No	No	No	No
Team members (total)	n = 12	n = 9	n = 19	n = 13	n = 18	n = 6
Age (years)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
< 30	3 (25.0)	-	1 (5.3)	-	-	3 (50.0)
31 - 40	2 (16.7)	4 (44.4)	3 (15.8)	2 (15.4)	4 (22.2)	-
41 - 50	2 (16.7)	2 (22.2)	3 (15.8)	1 (7.7)	3 (16.7)	1 (16.7)
51 - 60	4 (33.3)	2 (22.2)	11 (57.9)	6 (46.2)	5 (27.8)	1 (16.7)
> 61	1 (8.33)	1 (11.1)	1 (5.3)	4 (30.8)	6 (33.3)	1 (16.7)
Profession						
Health and Welfare assistant	2 (16.7)	1 (11.1)	-	-	-	-
Certified Nursing assistant (AG)	1 (8.33)	-	1 (5.3)	3 (23.1)	1 (5.6)	2 (33.3)
Certified Nursing assistant (IG)	5 (41.7)	5 (55.6)	14 (73.7)	9 (69.2)	12 (66.7)	2 (33.3)
Registered Nurse (<i>Vocationally trained</i>)	2 (16.7)	1 (11.1)	4 (21.1)	-	2 (11.1)	1 (16.7)
Registered Nurse (<i>Bachelor's degree</i>)	2 (16.7)	2 (18.2)	1 (5.3)	1 (7.7)	3 (16.7)	1 (16.7)
Experience in nursing care (years)						
< 5	1 (8.33)	1 (11.1)	1 (5.3)	-	-	1 (16.7)
5 - 10	-	3 (33.3)	-	1 (7.7)	1 (5.6)	2 (33.3)
11 - 20	5 (41.7)	3 (33.3)	3 (15.8)	-	1 (5.6)	-
21 - 30	2 (16.7)	1 (11.1)	4 (21.1)	8 (61.5)	10 (55.6)	1 (16.7)
> 31	4 (33.3)	1 (11.1)	11 (57.9)	4 (30.8)	6 (33.3)	2 (33.3)
Working hours (week)						
< 10	2 (16.7)	1 (11.1)	1 (5.3)	-	-	-
11 - 20	2 (16.7)	1 (11.1)	9 (47.4)	2 (15.4)	11 (61.1)	3 (50.0)
21 - 30	7 (58.3)	6 (66.7)	9 (47.4)	10 (76.9)	6 (33.3)	1 (16.7)
> 31	1 (30.0)	1 (11.1)	-	1 (7.7)	1 (5.6)	2 (33.3)

*LTF: Loss to follow-up

7	8	9	10	11	12	13	14	15	16
None	None	None	Many	None	None	None	None	Many	Some
None	None	Some	Some	None	None	None	None	None	None
No	No	No	Yes	No	No	No	No	No	No
n = 21	n = 18	n = 13	n = 14	n = 12	n = 15	n = 15	n = 16	n = 10	n = 20
n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
1 (4.8)	5 (27.8)	-	2 (14.3)	3 (25.0)	3 (20.0)	4 (26.7)	1 (6.3)	1 (10.0)	1 (5.0)
2 (9.5)	2 (11.1)	2 (15.4)	1 (7.1)	2 (16.7)	2 (13.3)	-	2 (12.5)	2 (20.0)	6 (30.0)
4 (19.0)	2 (11.1)	5 (38.5)	-	1 (8.3)	1 (6.7)	1 (6.7)	6 (37.5)	3 (30.0)	2 (10.0)
8 (38.1)	5 (27.8)	3 (23.1)	7 (50.0)	4 (33.3)	7 (46.7)	5 (33.3)	6 (37.5)	2 (20.0)	11 (33.3)
6 (28.6)	4 (22.2)	3 (23.1)	4 (28.6)	2 (16.7)	2 (13.3)	5 (33.3)	1 (6.3)	2 (20.0)	-
1 (4.8)	1 (5.6)	-	1 (7.1)	1 (8.3)	-	1 (6.7)	2 (12.5)	2 (20.0)	-
1 (4.8)	3 (16.7)	2 (15.4)	-	-	-	-	5 (31.3)	-	1 (5.0)
13 (61.9)	5 (27.8)	6 (46.2)	10 (71.4)	3 (25.0)	7 (46.7)	8 (53.3)	5 (31.3)	5 (50.0)	6 (30.0)
3 (14.3)	7 (38.9)	3 (23.1)	1 (7.1)	7 (58.3)	5 (33.3)	5 (33.3)	2 (12.5)	1 (10.0)	2 (10.0)
3 (14.3)	2 (11.1)	2 (15.4)	2 (14.3)	1 (8.3)	3 (20.0)	1 (6.7)	2 (12.5)	2 (20.0)	11 (55.0)
1 (4.8)	2 (11.1)	-	-	2 (16.7)	4 (26.7)	4 (26.7)	-	-	-
-	3 (16.7)	2 (15.4)	3 (21.4)	1 (8.3)	2 (13.3)	1 (6.7)	1 (6.3)	2 (20.0)	1 (5.0)
20 (95.2)	3 (16.7)	5 (38.5)	4 (28.6)	-	2 (13.3)	-	3 (18.8)	4 (40.0)	4 (20.0)
-	4 (22.2)	3 (23.1)	1 (7.1)	9 (75.0)	2 (13.3)	5 (33.3)	9 (56.3)	2 (20.0)	11 (55.0)
-	6 (33.3)	3 (23.1)	6 (42.9)	-	5 (33.3)	5 (33.3)	3 (18.8)	2 (20.0)	4 (20.0)
1 (4.8)	1 (5.6)	1 (7.7)	-	-	1 (6.7)	-	-	-	1 (5.0)
4 (19.0)	6 (33.3)	-	5 (35.7)	4 (33.3)	2 (13.3)	2 (13.3)	5 (31.3)	2 (20.0)	8 (40.0)
14 (66.7)	10 (55.6)	12 (92.3)	7 (50.0)	4 (33.3)	9 (60.0)	10 (66.7)	8 (50.0)	4 (40.0)	11 (55.0)
2 (9.5)	1 (5.6)	-	2 (14.3)	4 (33.3)	3 (20.0)	3 (20.0)	3 (18.8)	4 (40.0)	-

Appendix F. Characteristics of participating teams at the end of data collection (continued)

Team	17	18	19 LTF*	20	21	22 LTF*
Team member changes (None (0) /Some (1-2) /Many (>3))	Many	Some	Some	Some	None	Many
Team members on sick leave (None (0) / Some (1-2) /Many (>3))	Many	None	Many	Some	None	Many
Clinical champions changed or dropped out (Yes/No)	No	No	Yes	No	No	Yes
Team members (total)	n = 18	n = 14	n = 16	n = 4	n = 8	n = 18
Age (years)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
< 30	7 (38.9)	2 (14.3)	2 (12.5)	-	-	7 (38.9)
31 - 40	4 (22.2)	3 (21.4)	3 (18.8)	2 (50.0)	4 (50.0)	1 (5.6)
41 - 50	1 (5.6)	1 (7.1)	1 (6.3)	-	4 (50.0)	3 (16.7)
51 - 60	4 (22.2)	6 (42.9)	5 (31.3)	2 (50.0)	-	5 (27.8)
> 61	2 (11.1)	2 (14.3)	5 (31.3)	-	-	2 (11.1)
Profession						
Health and Welfare assistant	-	1 (7.1)	-	-	1 (12.5)	3 (16.7)
Certified Nursing assistant (AG)	2 (11.1)	1 (7.1)	4 (25.0)	-	-	-
Certified Nursing assistant (IG)	7 (38.9)	8 (57.1)	8 (50.0)	2 (50.0)	3 (37.5)	10 (55.6)
Registered Nurse (<i>Vocationally trained</i>)	7 (38.9)	2 (14.3)	2 (12.5)	-	2 (25.0)	3 (16.7)
Registered Nurse (<i>Bachelor's degree</i>)	2 (11.1)	2 (14.3)	2 (12.5)	2 (50.0)	2 (25.0)	2 (11.1)
Experience in nursing care (years)						
< 5	2 (11.1)	1 (7.1)	-	-	1 (12.5)	9 (50.0)
5 - 10	8 (33.3)	1 (7.1)	3 (18.8)	-	1 (12.5)	5 (27.8)
11 - 20	1 (5.6)	4 (28.6)	2 (12.5)	2 (50.0)	2 (25.0)	2 (11.1)
21 - 30	-	6 (42.9)	7 (43.8)	-	1 (12.5)	1 (5.6)
> 31	7 (38.9)	2 (14.3)	4 (25.0)	2 (50.0)	3 (37.5)	1 (5.6)
Working hours (week)						
< 10	-	-	1 (6.3)	-	-	7 (38.9)
11 - 20	2 (11.1)	4 (28.6)	9 (56.3)	1 (25.0)	1 (12.5)	4 (22.2)
21 - 30	12 (66.7)	8 (57.1)	6 (37.5)	3 (75.0)	7 (87.5)	4 (22.2)
> 31	4 (22.2)	2 (14.3)	-	-	-	-

*LTF: Loss to follow-up

23	24 LTF*	25	26	27	28	29	30 LTF*	31 LTF*	Total
Many	Many	Many	Many	Some	Some	Many	None	Many	
None	Some	Many	Some	None	None	None	None	Many	
Yes	Yes	No	No	No	No	No	No	Yes	
n = 12	n = 15	n = 17	n = 16	n = 7	n = 13	n = 16	n = 9	n = 18	n = 432
n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
1 (8.33)	7 (46.7)	8 (47.1)	6 (37.5)	1 (14.3)	6 (46.2)	7 (43.8)	1 (11.1)	-	83 (19.2)
3 (25.0)	3 (20.0)	2 (11.8)	4 (25.0)	1 (14.3)	2 (15.4)	2 (12.5)	1 (11.1)	4 (22.2)	75 (17.4)
3 (25.0)	4 (26.7)	2 (11.8)	3 (18.8)	2 (28.6)	1 (7.7)	3 (18.8)	3 (33.3)	7 (38.9)	75 (17.4)
2 (16.7)	1 (6.7)	4 (23.5)	3 (18.8)	-	2 (15.4)	3 (18.8)	3 (33.3)	5 (27.8)	132 (30.6)
3 (25.0)	-	1 (5.9)	-	3 (42.9)	2 (15.4)	1 (6.3)	1 (11.1)	2 (11.1)	67 (15.6)
5 (41.7)	3 (20.0)	7 (41.2)	3 (18.8)	-	4 (30.8)	7 (43.8)	1 (11.1)	-	47 (10.9)
-	-	-	-	-	-	-	-	4 (22.2)	31 (7.8)
4 (33.3)	5 (33.3)	7 (41.2)	7 (43.8)	4 (57.1)	5 (38.5)	6 (37.5)	5 (55.6)	10 (55.6)	206 (47.7)
-	5 (33.3)	1 (5.9)	5 (31.3)	1 (14.3)	2 (15.4)	1 (6.3)	1 (11.1)	2 (11.1)	79 (18.3)
3 (25.0)	2 (13.3)	2 (11.8)	1 (6.3)	2 (28.6)	2 (15.4)	2 (12.5)	2 (22.2)	2 (11.1)	69 (16.0)
2 (16.7)	5 (33.3)	8 (47.1)	3 (18.8)	1 (14.3)	4 (30.8)	6 (37.5)	3 (33.3)	-	62 (14.4)
3 (25.0)	4 (26.7)	2 (11.8)	6 (37.5)	-	4 (30.8)	1 (6.3)	1 (11.1)	2 (11.1)	64 (14.8)
3 (25.0)	5 (33.3)	3 (17.6)	5 (31.3)	2 (28.6)	2 (15.4)	5 (31.3)	1 (11.1)	7 (38.9)	103 (23.8)
2 (16.7)	1 (6.7)	3 (17.6)	2 (12.5)	1 (14.3)	2 (15.4)	2 (12.5)	3 (33.3)	6 (33.3)	109 (25.2)
2 (16.7)	-	1 (5.9)	-	3 (42.9)	1 (7.7)	2 (12.5)	1 (11.1)	3 (16.7)	94 (21.8)
1 (8.33)	3 (20.0)	8 (47.1)	6 (37.5)	-	2 (15.4)	-	1 (11.1)	-	38 (8.8)
3 (25.0)	3 (20.0)	4 (23.5)	1 (6.3)	2 (28.6)	2 (15.4)	4 (25.0)	3 (33.3)	3 (16.7)	112 (25.9)
8 (66.7)	5 (33.3)	4 (23.5)	8 (50.0)	5 (71.4)	6 (46.2)	5 (31.3)	5 (55.6)	13 (55.6)	227 (52.5)
2 (11.1)	-	-	-	-	3 (23.1)	7 (43.8)	-	2 (11.1)	55 (12.7)

Appendix G

ITS ARIMA washing-without-water (slope + level change)									
Org	Team	Letter	Handeling	E_levelchange	SE_levelchange	t_levelchange	sig_levelchange	level_high	level_low
1	1	A1	1	-16,28	2,43	-6,69	0,09	-11,51	-21,04
1	3	B3	1	-11,92	1,74	-6,87	0,09	-8,52	-15,32
1	4	C4	1	-17,97	1,23	-14,64	0,04	-15,56	-20,38
1	5	D5	1	-15,34	8,61	-1,78	0,33	1,54	-32,22
1	6	E6	1	-6,10	5,73	-1,07	0,48	5,13	-17,33
1	11	F11	1	-9,22	3,49	-2,64	0,23	-2,38	-16,06
1	12	G12	1	-6,46	2,11	-3,06	0,20	-2,32	-10,60
1	13	H13	1	-5,68	15,22	-0,37	0,77	24,15	-35,50
1	16	I16	1	-6,37	7,24	-0,88	0,54	7,82	-20,56
2	23	J23	1	8,76	7,07	1,24	0,43	22,62	-5,11
Total (weighted) Total (weighted)				-13,61	0,80			-12,04	-15,18
				E_slopechange	SE_slopechange	t_slopechange	sig_slopechange	slope_high	slope_low
				-3,50	1,59	-2,20	0,27	-0,38	-6,62
				1,80	1,14	1,59	0,36	4,03	-0,43
				-5,32	0,80	-6,62	0,10	-3,75	-6,90
				-5,01	5,64	-0,89	0,54	6,04	-16,06
				8,19	3,75	2,18	0,27	15,54	0,84
				-0,91	2,28	-0,40	0,76	3,56	-5,39
				3,68	1,38	2,66	0,23	6,39	0,97
				5,53	9,96	0,56	0,68	25,06	-13,99
				-2,97	4,74	-0,63	0,64	6,32	-12,26
				0,21	4,63	0,05	0,97	9,29	-8,87
				0,15	0,20			0,55	-0,24
				W_levelchang	W_slopechange	W*E_levelcha	W*E_slopechan	W_level_perc	W_slope_perc
				0,17	0,08	-2,75	-0,29	10,85	0,33
				0,33	0,31	-3,96	0,56	21,32	1,27
				0,66	0,04	-11,92	-0,19	42,57	0,14
				0,01	0,04	-0,21	-0,20	0,87	0,16
				0,03	0,01	-0,19	0,12	1,96	0,06
				0,08	1,20	-0,76	-1,10	5,27	4,93
				0,22	0,07	-1,45	0,27	14,38	0,30
				0,00	0,03	-0,02	0,18	0,28	0,13
				0,02	0,11	-0,12	-0,34	1,22	0,47
				0,02	22,46	0,18	4,74	1,28	92,19
				1,56	24,36	-21,20	3,76	100,00	100,00

Appendix H

ITS ARIMA guideline intertrigo (slope + level change)									
Org	Team	Letter	Handeling	E_levelchange	SE_levelchange	t_levelchange	sig_levelchange	level_high	level_low
1		2 A2	2	1,509	2,205	0,684	0,618	5,8308	-2,8128
1		7 B7	2	4,594	3,334	1,378	0,4	11,12864	-1,94064
1		8 C8	2	3,289	0,139	23,745	0,027	3,56144	3,01656
1		9 D9	2	-2,531	5,611	-0,451	0,73	8,46656	-13,52856
1		14 E14	2	-2,27	0,173	-13,125	0,048	-1,93092	-2,60908
1		17 F17	2	-2,941	3,842	-0,766	0,584	4,58932	-10,47132
1		18 G18	2	0,42	1,391	0,302	0,814	3,14636	-2,30636
1		20 H20	2	-1,601	0,925	-1,73	0,334	0,212	-3,414
1		21 I21	2	3,197	2,048	1,561	0,363	7,21108	-0,81708
2		26 J26	2	4,56	0,603	7,56	0,084	5,74188	3,37812
2		27 K27	2	3,879	0,66	5,877	0,107	5,1726	2,5854
2		28 L28	2	1,022	2,987	0,342	0,79	6,87652	-4,83252
Total (weighted)		Total (weighted)		1,246625888	0,103892716			1,450255611	1,042996165
E_slopechange SE_slopechange t_slopechange sig_slopechange slope_high slope_low									
				-1,464	1,443	-1,014	0,496	1,36428	-4,29228
				5,551	2,183	2,543	0,238	9,82968	1,27232
				-0,824	0,091	-9,086	0,07	-0,64564	-1,00236
				-1,67	3,673	-0,455	0,728	5,52908	-8,86908
				-0,296	0,113	-2,614	0,233	-0,07452	-0,51748
				-2,796	2,515	-1,112	0,466	2,1334	-7,7254
				1,162	0,911	1,277	0,423	2,94756	-0,62356
				0,304	0,606	0,502	0,704	1,49176	-0,88376
				0,594	1,341	0,443	0,734	3,22236	-2,03436
				-0,025	0,395	-0,064	0,959	0,7492	-0,7992
				0,036	0,432	0,082	0,948	0,88272	-0,81072
				1,227	1,956	0,628	0,643	5,06076	-2,60676
				-0,00484267	0,020410134			0,035161193	-0,044846533
W_levelchang W_slopechange W*E_levelcha W*E_slopechan W_level_perc									
				0,205675619	0,466571113	0,310364509	-0,683060109	0,22	
				0,089964011	0,032453201	0,413294666	0,180147721	0,10	
				51,75715543	1,472806108	170,2292842	-1,213592233	55,87	
				0,03176285	0,358564309	-0,080391773	-0,598802395	0,03	
				33,41240937	11,41344047	-75,84616927	-3,378378378	36,06	
				0,067746253	0,127916234	-0,19924173	-0,357653791	0,07	
				0,51682765	0,740606883	0,217067613	0,860585198	0,56	
				1,168736304	10,82063712	-1,871146822	3,289473684	1,26	
				0,238418579	2,834177918	0,762224197	1,683501684	0,26	
				2,750206953	1600	12,54094371	-40	2,97	
				2,295684114	771,6049383	8,904958678	27,77777778	2,48	
				0,11208037	0,664218358	0,114546138	0,814995925	0,12	
				92,6466675	2400,53633	115,4957341	-11,62500492	100	



Appendix I

ITS ARIMA Compression Stockings (slope + levelchange)										
Org	Team	Letter	Handeling	E_levelchange	SE_levelchange	t_levelch	sig_levelc	level_high	level_low	
1	10	A10		3	1,282	4,076	0,315	0,806	9,27096	-6,70696
1	15	B15		3	-6,323	1,108	-5,707	0,11	-4,15132	-8,49468
2	23	C23		3	9,326	3,11	2,999	0,205	15,4216	3,2304
2	25	D25		3	-20,171	6,081	-3,317	0,186	-8,25224	-32,08976
2	29	E29		3	4,801	6,603	0,727	0,6	17,74288	-8,14088
Total (weighted) Total (weighted)					-4,420140886	0,986232151			-2,48712587	-6,353155902
				E_slopechange	SE_slopechange	t_slopech	sig_slope	slope_high	slope_low	
					-2,946	2,668	-1,104	0,469	2,28328	-8,17528
					-3,029	0,725	-4,177	0,15	-1,608	-4,45
					10,286	2,036	5,053	0,124	14,27656	6,29544
					-9,621	3,981	-2,417	0,25	-1,81824	-17,42376
					4,921	4,322	1,138	0,459	13,39212	-3,55012
					-1,655535742	1,870662381			2,010962525	-5,322034009
				W_levelchang	W_slopechange	W*E_lev	W*E_slop	W_level_perc		
					0,060191013	0,115221763	0,077165	-0,33944	5,85	
					0,814555123	0,108993714	-5,15043	-0,33014	79,23	
					0,103390163	0,009451635	0,964217	0,09722	10,06	
					0,027042696	0,010803378	-0,54548	-0,10394	2,63	
					0,022935986	0,041294601	0,110116	0,203211	2,23	
					1,028114981	0,285765091	-4,54441	-0,47309	100,00	



Chapter 6

General Discussion / Summary

Samenvatting

Description of the research data management

List of publications

Dankwoord

Curriculum vitae

PhD portfolio of Benjamin Wendt

General Discussion

This final chapter will start with a ‘summary of the main findings’, to give the reader a quick overview of the most important facts, actions and results in this thesis. Following the summary there will be a section with ‘reflections on main findings, methodological considerations and implications’, where strengths, limitations and impact will be discussed, as well as opportunities for improvement and future research. This chapter will end with a final conclusion for the thesis as a whole.

Summary of the main findings

This thesis set out to facilitate the delivery of appropriate care by developing, testing and evaluating a tailored, multifaceted de-implementation strategy in order to reduce low-value home-based nursing care.

As a starting point and to explore the context, the first research question was: **What are potential areas and drivers of low-value nursing care in home-based nursing care and how prevalent are these?**

This question was answered using a quantitative, cross-sectional study design in **Chapter 2**. By employing an online survey, a nationwide sample of 776 certified nursing assistants, registered nurses and nurse practitioners answered questions on 46 pre-selected low-value nursing practices derived from national clinical guidelines. The questions contained scaled frequencies on five-point Likert scales and open questions on possible related influencing factors of low-value nursing care. The top five most delivered low-value care practices reported were: 1. “washing the client with water and soap by default”, 2. “application of zinc cream, powders or pastes when treating intertrigo”, 3. “washing the client from head to toe daily”, 4. “re-use of a urinary catheter bag after removal/disconnection” and 5. “bladder irrigation to prevent clogging of urinary tract catheter”.

To further explore the context and influencing factors in the provision of low-value home-based care, the second key research question was: **What are potential barriers to and facilitators of de-implementing low-value nursing care in home-based nursing care?**

In **Chapter 3**, a qualitative, exploratory study using seven focus group interviews and two individual interviews was conducted with certified nursing assistants, registered nurses, organisational managers and administrative personnel within seven homecare organisations. Data were analysed deductively using the Tailored Implementation for Chronic Diseases (TICD) framework (Flottorp et al., 2013). The main barriers included a lack of knowledge and skills, for example on using care aids. Moreover, other healthcare professionals and/or general practitioners

can create high expectations among clients and/or caregivers which are then difficult to refute. The non-reimbursement and additional costs of care aids were also perceived barriers. Facilitators included reflecting with colleagues on provided care, clearly communicating care agreements and managing expectations towards clients. Intrinsic motivation of clients to be independent and involving relatives and/or caregivers can enhance self-reliance and reduce low-value care. Lastly, support from organisational management for the reduction of low-value care was considered as a facilitator.

With the answers to research questions one and two, taking into account the perspective of clients and in close collaboration with certified nursing assistants and registered nurses, a de-implementation strategy was developed. The de-implementation strategy contained components on education, persuasion, enablement, incentives and training, of which the feasibility and acceptability was assessed using the following key research question: **Would a tailored, multifaceted de-implementation strategy (1) lead to less low-value nursing care and (2) be acceptable, implementable, cost effective and scalable in the home-based nursing care context?**

To answer this question in **Chapter 4**, a parallel mixed-methods design was carried out to implement the developed strategy in seven home-based nursing care teams from two healthcare organisations. Primary data was collected at baseline (T0) and one follow-up measurement (T1) on the volume of care in both frequency and time in minutes per week, and independent samples t-tests were performed to estimate the effect size. Parallel to the primary data collection, a qualitative evaluation that used document analyses and eight semi-structured interviews were performed to gain insights into the feasibility and acceptability of the strategy, and explore how the strategy worked.

The time spent on low-value nursing care (mean, minutes per week per client) in seven teams for 210 clients in T1 compared to 222 clients in T0 reduced statistically significant. The mean reduction (T0 – T1, time in minutes) per client per week was 16.22 minutes. The frequency of delivered low-value nursing care (mean per week) reduced, but not statistically significant. From the qualitative data-analysis a list of 79 influencing factors – barriers and facilitators - were identified. Practical implementation tools, workplace coaching and sharing experiences within and between teams were considered as the most contributing elements. In addition, the small-scale cost-benefit analysis suggested that the ‘break-even-point’ (where the total investment in time was met by the total gains in time) of the developed de-implementation strategy, depending on the size and number of clients a team tends to, is a matter of weeks rather than months.

As the previous chapter showed generally favourable results in the form of proof of concept, feasibility and acceptability and a reduction of low-value nursing care, a more robust evaluation

was needed that resulted in the following and final key research question: **What are the effects of a tailored, multifaceted de-implementation strategy to reduce low-value home-based nursing care on volume of care (time in minutes)?**

In **Chapter 5**, using a multicenter, multiple interrupted time series design, the previously developed de-implementation strategy was slightly modified based on feedback and local circumstances. The strategy was introduced in 31 teams (two organisations) where teams could choose one of three low-value care practices to be targeted for de-implementation. Data was collected consistently in all teams before and after the implementation of the strategy using two before measurements and three post measurements that were separated by an eight week implementation period. For each team an individual autoregressive integrated moving average (ARIMA) model was fitted allowing for a level change and slope change, looking for a difference in the underlying trend over time. The overall effect of the de-implementation strategy was then based on a meta-analysis of the team effects (level change and slope change) using an weighted inverse-variance approach and stratified for the three low-value home-based nursing care practices.

The results on the weighted mean time (minutes per client per week), indicate that the modified de-implementation strategy was associated with an immediate reduction (level change) for two of the three chosen low-value care practices: a reduction of 4.42 minutes for ‘assisting with putting on/taking off compression stockings while the client can do this him/herself (possibly with an aid)’, and a reduction of 13.61 minutes for ‘washing the client with water and soap by default’ & ‘washing the client from head to toe daily’. Somewhat surprisingly, one practice showed an immediate increase (level change) of 1.25 minutes (‘application of zinc cream, powders or pastes when treating intertrigo’). The changes in time trends (slope change) were limited and therefore indicate that these effects were sustained for at least three months after the implementation phase. The process evaluation found 44 influencing factors, and showed that the work environment in organisations and teams is an important barrier in implementing “change” in home-based nursing care.

Reflections on main findings, methodological considerations and implications

Real world evidence

Yearly, around 585.000 clients receive home-based nursing care in the Netherlands, delivered by roughly 80.000 professionals, costing 3,3 billion euros (Grijpstra, 2020; Vektis, 2020). Simultaneously, a number of low-value care practices are highly prevalent (**Chapter 2**). However, significant gains (in time, quality and professionalism) are possible by replacing low-value care for (evidence-based) alternatives, learning clients to use care aids and/or working according to guidelines and quality standards (**Chapter 5**). Even more when we consider the fact that the actual implementation phase in **Chapters 4** and **5** took 6-12 months and the ‘break-even point’

is reached in a matter of weeks rather than months. If we return to the issue presented in the **General Introduction**, it was stated that there exists an estimated time-lag of 17 years for research evidence to reach clinical practice (Balas & Boren, 2000; Grant et al., 2003; Morris et al., 2011). The faltering implementation of the Dutch national multidisciplinary guideline intertrigo was presented as an illustrative example (De Groot et al., 2018). It can now be concluded that the (de-)implementation process in the context of home-based nursing care can be accelerated considerably, for at least three months after the implementation phase (**Chapter 5**).

These results stem from research conducted, not under optimal circumstances, but in the complex and highly variable and fast-changing context of home-based nursing care. Traditional clinical trials are unquestionably the “golden standard” for producing robust scientific evidence on the efficacy of (medical) interventions. These trials, however, are often conducted with specific populations in a setting that employs specialised personnel that helps to control variability, ensure research protocol adherence and high data quality (Sherman et al., 2016). These conditions, are often lacking in the home-based nursing care environment. Real world evidence, such as electronic health records, insurance claims data and registry data in home-based nursing care, have proven to be valuable sources of information in this thesis. However, these sources often come at the price of technological and methodological challenges such as data availability, extraction and quality (Dang et al., 2023). In turn, that leads to a delicate and complicated balance between feasibility and validity.

This thesis provides a case in point. If we were to assess the quality of the studies in this thesis using the GRADE approach (a systematic way of rating the certainty of scientific evidence), we would interpret the different studies as (very) low quality evidence, as they are all non-randomised studies with (serious) imprecision. For example, in **Chapter 2**, a survey study based on national clinical guidelines, was employed to explore and identify the “what” of low-value care in the home environment. It is known that the quality of the low-value care recommendations in Dutch national clinical nursing guidelines, could be based on a whole range of evidence, from high quality ‘meta-analyses’ to lesser quality ‘expert opinion’ (Brownlee et al., 2017). Another example, in **Chapters 4 and 5**, registry data was used by healthcare professionals to estimate the volume of low-value care in time in minutes. As a result, the answers and data in **Chapters 2, 4 and 5**, were (partially) self-reported by healthcare professionals, possibly introducing bias.

If high quality insurance claims data, electronic health records or registry data would have been available and easily extractible (on the exact type of nursing care delivered by professionals to clients and for how long), this would have mitigated the self-report bias. Instead, electronic health records in the Netherlands are often not aligned with the nursing process, do not employ standardised terminologies, and suffer from a lack of user-friendliness (De Groot et al., 2022; De Groot et al., 2020). Insurance claims data on home-based nursing care, on the other hand,

uses indirect measures to examine, for example, geographical variation in the prevalence of care delivery, and are therefore too abstract to identify specific (low-value) care practices (Brownlee et al., 2017; Colla et al., 2015; Vektis, 2020).

To take it one step further, compared to traditional clinical trials, **Chapters 4 and 5** suffered from a lack of randomisation. Because of logistical and practical reasons a ‘parallel design’ was unfeasible as a large number of teams would either (1) not receive the de-implementation strategy (unwanted, and potentially unethical), or (2) after the data collection period (untimely due to funding constraints). In a ‘stepped wedge design’, the timing of the ‘implementation phase’ is randomised and teams would either need to wait long before they can start, but simultaneously need to be ready to start immediately as all teams are ‘at risk’ of being randomised to start early. It was anticipated that this would render teams unable to participate, or lead to high attrition rates, as it would not take into account local contextual factors (considered essential in all phases of the UK Medical Research Council’s framework) such as long term illness, vacancies, high workloads and other workplace related changes demanding attention (Skivington et al., 2021). The attrition rate in **Chapter 5**, where contextual factors were in fact considered, was already substantial (16.1%).

Balancing these considerations, a quasi-experimental approach such as the interrupted time series design in **Chapter 5**, has shown to be a practical and feasible way to conduct research in the complex and capricious real world environment of Dutch home-based nursing care and still be able to assess effectiveness of interventions. Nevertheless, there are more opportunities to balance the “observables” and “unobservables”, for which traditional trials use randomisation, with help from causal inference, such as “target trials” (Hernán & Robins, 2016). Target trials use data models to emulate a trial in order to predict the effect(s) of interventions on outcomes. To succeed, these target trials require sufficient and detailed observational data (“big data”) on the intervention and outcome, but also on possible confounders (Hernán et al., 2022).

In summary, to mitigate the presented methodological considerations, an increase in data quality, availability and extraction is needed by user-friendly access to transparent information on defining, measuring and monitoring (low-value) home-based nursing care. But also on possible confounders or effect modifiers such as - but not limited to - waiting times and available capacity of home-based nursing care and the diversity, complexity, and severity of clients (Ministry of Health Welfare and Sport, 2023). This will enable clients, healthcare professionals and organisations to identify potential room to further improve and professionalise home-based nursing care (Kool et al., 2024).

Client and professional perspectives

Another reflection on the thesis is that it heavily leans on the perspectives of healthcare professionals, and more specifically, registered nurses and certified nursing assistants. One of the core components in the Medical Research Council's framework is to engage relevant stakeholders in all phases. Therefore, a major omission is the lack of the perspective of clients (**Chapter 4**). **Chapters 2** and **3** demonstrated that clients (and/or their family, relatives and carers) often request and receive low-value nursing care, and they were therefore an important target for the developed de-implementation strategy that was tested in **Chapter 4** and evaluated in **Chapter 5**. While significant efforts were made to involve client councils of participating healthcare organisations and individual clients as the end-users of nursing care, it proved difficult to include sufficient clients that were also able to reflect on the changes at hand. Nurses and certified nursing assistants did receive planned and unplanned feedback from clients on the implemented changes and tools, such as 'washing-without-water' products and client information folders, but often during care delivery. This feedback would sometimes be recorded in electronic health records, but more often it was only available through the responsible professional as an intermediary. A more systematic, structured and objective approach to involve client perspectives to assess the impact of de-implementation efforts would be to use patient-reported experience measures (PREMs) or patient-reported outcome measures (PROMs) (Bhatia et al., 2015). A recent survey study has shown that professionals in home-based nursing care generally have a positive attitude towards using outcome measures. However, they feel insufficiently prepared and supported to use these measures and there is a need for more uniform and validated outcome measures (Veldhuizen et al., 2022).

Still, to be able to use PREMs/PROMs or other outcome measures, permission to access electronic health records needs to be asked or performed by "personnel with a treatment relationship" with the client according to European (General Data Protection Regulation (GDPR)) and Dutch legislation (Medical Treatment Contracts Act (WGBO)) (Council of the European Union, 2016). We witnessed a reluctance to ask or recruit clients by healthcare professionals, as they appeared to shield and protect their clients to avoid "overburdening" them. At first glance, this seems to lean towards a paternalistic culture where healthcare professionals decide for clients, something also witnessed and experienced as a barrier for change in **Chapter 4** ("false assumptions/thinking for the client instead of letting client decide") and a well-known barrier for patient and public involvement (Ocloo et al., 2021). A possible solution is for Dutch employers' associations and/or healthcare organisations in home-based nursing care to inform clients (in the 'treatment agreement' between healthcare providers and clients) that it is desirable for clients to participate in scientific research and give permission for electronic health records to be used in research, unless clients specifically object in a so called "opt-out plus" system. In this system - all well within current Dutch laws and regulations - clients will be informed on the use of health records

for a specific study, and given ample and easily accessible opportunity to object to participation (Ploem et al., 2020; Rebers et al., 2016).

Workplace environment to change/innovate

Another factor, that deserves further investigation is workplace culture and environment in home-based nursing care. A positive work environment is necessary for healthcare professionals to provide high quality care, reduce staff turnover and attract and maintain professionals (Aiken et al., 2012; Mathisen et al., 2021; Taylor et al., 2015; Wei et al., 2018). In **Chapters 2, 3, 4** and **5** we found several barriers that are in one way or another connected with the workplace environment and culture, such as (1) healthcare professional resistance to change, (2) working ‘task-based’, (3) a lack of resources, responsibility or continuity in teams and (4) high experienced work pressure. In **Chapter 5**, as a possible solution to the lack of resources (time) and high experienced work pressure, clinical champions were compensated in time and money (two hours/week per clinical champion). In some teams, however, new barriers appeared as the clinical champions were not supported by their peers, or a lack of clear working agreements prevented them from being able to free up time in their schedule. While a lack of support is a well-known implementation barrier, it is often associated on an organisational/managerial level, or mentioned in relation to other healthcare professionals (outside the nursing profession) (Mathieson et al., 2019). These new barriers point back towards the work environment.

To elaborate further on the high experienced work pressure, Jackson (2023) introduced the construct “culture of busyness” as a barrier to change and a section from a recent editorial is quoted to explain what it is and what needs to be done about it:

“Busyness has become the ‘go-to’ response to queries about care quality and in discussions about changing practices in any way, it is often not long before the issue of nurse busyness is raised as a barrier to change. However, we cannot continue to cite busyness (and its antecedents) as a reason [...] without interrogating the context and nature of this busyness and bringing a solution-focused stance to the issue. This means a critical evaluation of processes, practices and contextual factors that shape the nursing workplace.”

(Jackson, 2023)

One way to achieve this critical evaluation of the nursing workplace is with the help of a validated diagnostic tool designed to measure the ‘culture of care’ and explore related factors: the Culture of Care Barometer (CoC-B) (Rafferty et al., 2017). Recently, the Culture of Care Barometer, has been validated in the Dutch hospital environment (CoCB-NL), but it also seems promising to be used in the context of home-based nursing care (Maassen et al., 2024). The results of the Culture of Care Barometer can act as a starting point for discussions on how to continuously improve

and contribute to a ‘positive work environment’ for professionals in home-based nursing care. While this is recognised as a policy goal in the Dutch ‘Vision on primary care 2030’ (Ministry of Health Welfare and Sport, 2023), this should also be a key research, management and individual health care professional priority.

In addition, if we want to come face-to-face with a number of the challenges presented in this discussion, we should also look into helpful system level structures to improve the workplace environment. One model to aid an interdisciplinary collaboration that has proven itself to be sustainable over the last two decades is the University Knowledge network for Older adult care Nijmegen (UKON), founded by the Radboudumc, and the “Living Lab in Ageing and Long-Term Care” by Maastricht University in the Netherlands (Verbeek et al., 2020). The Living Lab is a network employing “linking pin roles”: professionals who hold joint appointments at both a university (of applied sciences) or vocational trainings institutions and a healthcare organisation, and coordinate research and teaching activities (Verbeek et al., 2013). To facilitate change, it relies on a “team science approach” by working in close relationship with clients, their families, carers or representatives as well as policy makers, healthcare managers, directors and funding agencies, connecting research, education and practice. Working together in such a network possibly offers significant potential and can be used to engage and include all stakeholders, develop continuing education programmes, facilitate the implementation of evidence-based interventions and improve or maintain quality of care (Baptiste et al., 2022; Hoekstra et al., 2020; Holly et al., 2014). It is therefore timely and important that the Dutch Ministry of Health, Welfare and Sport has requested the establishment of five initial “Living Labs for home-based nursing care” in 2025-2026 for the purpose of “strengthening the scientific infrastructure and knowledge development through close cooperation between education, practice and research in home-based nursing care” and “optimise the use and application of scientific knowledge in home-based nursing care practice” (ZonMW, 2024).

Simultaneously, in order to be able to play a valuable role in a Living Lab/team science approach, universities of applied sciences and vocational training institutes should prepare nurses (BSc and vocationally trained) and certified nursing assistants to understand, facilitate and/or guide change and implementation processes. It is promising that the next educational profile Bachelor of Nursing 2030 (an overview of the Dutch nationally established competencies of the Bachelor’s degree program in Nursing; BN2030) mentions professionals that are “*expected to play a proactive role by initiating, introducing and using innovations (and supporting their use) in nursing care*” by making use of “*change strategies*” (LOOV, 2023). There is a risk, however, that this will be operationalised in a narrow sense: focussed on a more personal, practice level, for example: is a professional able to work with or according to the latest scientific evidence and innovations? The experiences from **Chapter 4** and **5**, with a focus on interpersonal skills such as coaching, guiding, tailoring, reflecting, influencing and supporting team members, managers, professionals

and clients, family and carers to facilitate “change”, make a case for a broader scope. At a systems level it is important for universities and vocational training institutes to support their researchers and teachers to pursue joint appointments and to build and invest in good working relationships with their practice partners. This way they can anticipate, as discussed previously, “the technical aspects of managing research studies”, such as, for example ‘informed consent’ procedures (Williams et al., 2020).

Opportunities and core elements for reducing low-value nursing care

So far, scientific strengths and limitations have been discussed, together with a number of remaining barriers and suggestions and considerations for overcoming these challenges. This next section will focus on the opportunities and most effective elements that stand out from the results in the preceding chapters. The most helpful for home-based nursing care teams to facilitate change and overcome barriers were a multifaceted approach, based on programme theory, using the following principles and elements:

- a pragmatic approach (keep it short and simple in all steps),
- make use of two ‘clinical champions’ (in case one drops out),
- make an action plan (step-by-step),
- set small, realistic (intermediary) goals and share small successes,
- use (existing) practical implementation tools and summaries of information for both professionals and clients,
- employ role-play communications training with colleagues,
- use external workplace coaching and outside experts to aid data collection and analyses,
- make use of (continuous) peer-networks to exchange experiences, both for professionals as organisational leaders,
- visible support from organisation and management.

In addition, in order to unlock the full potential, the barriers and facilitators found in **Chapters 3, 4 and 5** need to be respectively mitigated or strengthened and together with the considerations in this discussion priority should be given to:

- bring a solution-based mindset,
- prioritise practices with high potential (depending on the outcome),
- invest in transparent, easily accessible and extractible, accurate and relevant data (depending on the process and/or outcome),
- invest in developing, training and employing interpersonal skills and competencies like coaching, guiding, tailoring, reflecting, influencing and supporting of clients, family and carers, as well as team members, managers and other professionals,

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- explore, invest and improve workplace culture and environment, with a focus on knowledge translation,
 - connect research, education and practice and work together with clients, their families, carers or representatives as well as policy makers, healthcare managers, directors, human resource professionals and funding agencies,
 - scale what works ('best practices') to increase impact,
 - make continuous improvement 'talk of the day' and part of everyday practice.

All things considered, this thesis revealed a major opportunity and potential for nurses and certified nursing assistants to initiate, lead and manage healthcare reform. By giving priority to the points suggested in this discussion, and tailored to their respective educational and professional levels, this thesis has shown that nurses and certified nursing assistants are well-positioned to save time, maintain quality of care, speed up implementation of guidelines and 'best practices' and professionalise home-based nursing care. In addition, they contribute to policy goals and in turn to a more accessible and sustainable healthcare system.

Conclusion

This thesis has shown that it is possible for professionals, in the complex setting of home-based nursing care, to facilitate the delivery of appropriate care by reducing widely used low-value nursing care practices. In a time of increasing healthcare demands unmet by the availability of home-based nursing care, a number of low-value care home-based nursing care practices are widely used. By engaging stakeholders and identifying key uncertainties, a de-implementation strategy based on programme theory - linking identified barriers to behaviour change strategies - was tried and tested in practice and was found acceptable, implementable, cost effective and scalable. In a quasi-experimental evaluation study the de-implementation strategy led to a reduction of low-value care in two of the three selected practices. The limited invested efforts in relation to the high rewards showed that nurses and certified nursing assistants in home-based nursing care are well positioned to start, lead and manage change in the complex context of home-based nursing care. These results should encourage nurses, certified nursing assistants, healthcare managers and policy makers to continue the effort to de-implement low-value (nursing) care.

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Samenvatting

Maatschappelijke ontwikkelingen zoals vergrijzing, voortschrijdende techniek en innovaties, en een grotere vraag om op de persoon afgestemde zorg, verhoogd de vraag naar (verpleegkundige) zorg. Om gezondheidszorg beschikbaar en bereikbaar te houden is beleid er veelal op gericht om ziekenhuis- en verpleeghuiszorg meer naar de thuisomgeving te verplaatsen. Dit leidt er toe dat er in 2027 een tekort wordt verwacht meer van meer dan 10.000 op een totaal van 105.000 verpleegkundigen en verzorgenden in de wijkverpleging. Daarnaast is vanuit wetenschappelijke literatuur bekend dat niet alle verleende zorg effectief of efficiënt is. Bekende voorbeelden zijn ‘het gebruik van verbanden voor primair gesloten wonden’ of ‘preoperatieve haarverwijdering om postoperatieve wondinfecties te voorkomen’. Deze handelingen zijn niet effectief om infecties te voorkomen, maar komen nog regelmatig voor in de verpleegkundige praktijk. Dergelijke zorg kan worden beschouwd als ‘van lage waarde’ en zijn binnen de verpleegkunde steeds meer bekend komen te staan als Beter Laten handelingen. Beter Laten handelingen verspillen beperkte middelen en tijd en kunnen lichamelijke, psychologische of financiële schade toebrengen aan cliënten. Door terughoudend te zijn met Beter Laten handelingen kunnen verpleegkundigen en verzorgenden tijd besparen die vervolgens gebruikt kan worden voor zorg die aantoonbaar bijdraagt aan de gezondheid van mensen, de kwaliteit van zorg behoud, bijdraagt aan “passende zorg” en daarmee aan een duurzamer zorgstelsel. Het doel van dit proefschrift was dan ook om bij te dragen aan “passende zorg” door het ontwikkelen, testen en evalueren van een op maat gemaakte, meervoudige de-implementationstrategie om Beter Laten handelingen in de wijkverpleging te verminderen.

Als startpunt en om de context van de wijkverpleging te verkennen was de eerste onderzoeksvraag: **Wat zijn de mogelijke onderwerpen en redenen voor het verlenen van Beter Laten handelingen in de wijkverpleging en hoe vaak komen deze voor?**

Deze vraag werd beantwoord met behulp van een kwantitatieve, cross-sectionele onderzoeksoepzet in **Hoofdstuk 2**. Door gebruik te maken van een online vragenlijst, beantwoordde een landelijke steekproef van 776 verzorgenden, (wijk)verpleegkundigen en verpleegkundig specialisten vragen over 46 vooraf geselecteerde Beter Laten handelingen, afkomstig uit nationale verpleegkundige richtlijnen. De antwoorden waren op basis van een vijfpunts Likertschaal, aangevuld met open vragen over mogelijke gerelateerde beïnvloedende factoren voor het verlenen van Beter Laten handelingen. De top vijf van meest gerapporteerde Beter Laten handelingen waren: 1. ‘de cliënt standaard wassen met water en zeep’, 2. ‘het aanbrengen van zinkzalf, poeders of pasta’s bij de behandeling van smetten’, 3. ‘de cliënt dagelijks volledig wassen’, 4. ‘hergebruik van een urineopvangzak na verwijdering/ontkoppeling’ en 5. ‘blaasspoeling om verstopping van een urinewegkatheter te voorkomen’.

Om de context en beïnvloedende factoren voor het verlenen van Beter Laten handelingen verder te onderzoeken, was de tweede onderzoeksvraag: **Wat zijn mogelijke bevorderende en belemmerende factoren voor het de-implementeren van Beter Laten handelingen in de wijkverpleging?**

In **Hoofdstuk 3** werd een kwalitatief onderzoek uitgevoerd middels zeven focusgroep interviews en twee individuele interviews met verzorgenden, (wijk)verpleegkundigen, organisatiemanagers en administratief personeel binnen zeven zorgorganisaties. De gegevens werden deductief gecodeerd en geanalyseerd met behulp van het TICD-raamwerk (Tailored Implementation for Chronic Diseases) (Flottorp et al., 2013). De belangrijkste belemmerende factoren waren een gebrek aan kennis en vaardigheden, bijvoorbeeld over het gebruik van zorg hulpmiddelen. Daarnaast kunnen andere zorgprofessionals en/of huisartsen hoge verwachtingen wekken bij cliënten en/of familie en mantelzorgers die vervolgens moeilijk te weerleggen zijn. Het niet vergoeden en de extra kosten van zorg hulpmiddelen werden ook als barrières ervaren. Bevorderende factoren waren onder andere het reflecteren met collega's op geleverde zorg, het duidelijk communiceren van zorgafspraken en het managen van verwachtingen naar cliënten en/of familie en mantelzorgers toe. Intrinsieke motivatie van cliënten om zelfredzaam te zijn en het betrekken van familieleden en mantelzorgers kan de zelf- en samenredzaamheid vergroten en het verlenen van Beter Laten handelingen verminderen. Tot slot werd steun van het management van de zorgorganisatie voor het verminderen van Beter Laten handelingen beschouwd als een bevorderende factor.

Met de antwoorden van onderzoeksvragen **één** en **twee**, rekening houdend met het perspectief van cliënten en in nauwe samenwerking met verzorgenden en (wijk)verpleegkundigen, werd een de-implémentatiestrategie ontwikkeld. De de-implémentatiestrategie bevatte componenten op het gebied van 'educatie', 'overtuigen', 'in staat stellen', 'stimuleren' en 'training'. Daarbij werd zoveel als mogelijk gebruik gemaakt van al bestaande informatie en kennisproducten, maar waar nodig werden deze ontwikkeld en zijn deze beschikbaar gesteld via de beroepsvereniging Verpleegkundigen en Verzorgenden (V&VN). De haalbaarheid en aanvaardbaarheid van de ontwikkelde strategie in de wijkverpleegkundige praktijk werd beoordeeld aan de hand van de volgende onderzoeksvraag: **Zou een op maat gemaakte, meervoudige de-implémentatiestrategie (1) kunnen leiden tot minder Beter Laten handelingen en (2) aanvaardbaar, implementeerbaar, kosteneffectief en schaalbaar zijn in de context van wijkverpleging?**

Om deze vraag in **Hoofdstuk 4** te beantwoorden, werd een parallel mixed-methods onderzoeksontwerp gebruikt om de ontwikkelde strategie te implementeren in zeven teams wijkverpleging van twee zorgorganisaties. Primaire data over het volume van een Beter Laten handeling (zowel de frequentie als de tijd in minuten per week), werden verzameld met een start-(T0) en eindmeting (T1). Ongepaarde t-toetsen werden gebruikt om de data te analyseren en de effectgrootte te schatten. Naast de primaire kwantitatieve dataverzameling werd een kwalitatieve

procesevaluatie uitgevoerd, waarbij gebruik werd gemaakt van documentanalyses en acht semigestructureerde interviews om inzicht te krijgen in de haalbaarheid en aanvaardbaarheid van de strategie en om te zien hoe de strategie tot de uitkomst leidde.

De gemiddelde tijd (minuten per week per cliënt) besteed aan Beter Laten handelingen ('dagelijks volledige wassen' & 'standaard wassen met water en zeep') in zeven wijkverpleegkundige teams voor 210 cliënten in T1 vergeleken met 222 cliënten in T0 verminderde statistisch significant. De gemiddelde afname (T0 - T1, tijd in minuten) per cliënt per week was 16,22 minuten. De frequentie van geleverde Beter Laten handelingen (gemiddeld per week) nam af, maar niet statistisch significant. Uit de kwalitatieve data-analyse werd een lijst van 79 beïnvloedende – bevorderende of belemmerende - factoren geïdentificeerd. Praktische implementatietools, werkplek coaching en het uitwisselen van ervaringen binnen en tussen teams werden beschouwd als de meest waardevolle onderdelen van strategie. Daarnaast suggereerde de kleinschalige kostenbatenanalyse dat het 'break-even' punt (waar de totale investering in tijd wordt geëvenaard door de totale winst in tijd) van de ontwikkelde de-implementatiestrategie - afhankelijk van de grootte en het aantal cliënten waar een team zich mee bezighoudt - eerder een kwestie van weken is dan van maanden.

Het vorige hoofdstuk liet gunstige resultaten zien: de ontwikkelde de-implementatiestrategie werd ervaren als praktisch, haalbaar, en aanvaardbaar en leidde tot een vermindering van Beter Laten handelingen. Daarom was een meer robuuste evaluatie nodig. Dat resulteerde in de volgende en tevens laatste onderzoeksvraag: **Wat zijn de effecten van een op maat gemaakte, meervoudige de-implementatiestrategie om Beter Laten zorghandelingen in de wijkverpleging te verminderen, op het zorgvolume (tijd in minuten)?**

In **Hoofdstuk 5** werd de eerder ontwikkelde de-implementatiestrategie licht aangepast op basis van feedback en lokale omstandigheden van de twee deelnemende zorgorganisaties. Vervolgens is met behulp van een multicenter, *multiple interrupted time series* (tijdreeks) ontwerp, de strategie geïntroduceerd in 31 teams, waar de teams één van drie Beter Laten handelingen konden kiezen voor de-implementatie. In alle teams werden voor en na implementatie van de strategie consequent gegevens verzameld aan de hand van twee voormetingen en drie nametingen, gescheiden door een implementatieperiode van acht weken. Voor elk team werd een individueel *Auto Regressive Integrated Moving Average* (ARIMA) model toegepast dat een niveauperandering (verschil direct na de implementatiefase) en een hellingverandering (verandering in de trend over de tijd voor- en na de implementatiefase) toeliet. Het totale effect van de de-implementatiestrategie werd vervolgens berekend door een meta-analyse van de teameffecten (niveauperandering en hellingverandering) met een gewogen inverse-variantiemethode en gestratificeerd voor de drie Beter Laten handelingen.

De resultaten - gewogen gemiddelde tijd in minuten per cliënt per week - geven aan dat de verfijnde de-implementatiestrategie geassocieerd was met een onmiddellijke vermindering (niveauperandering) voor twee van de drie gekozen Beter Laten handelingen: een vermindering van 4,42 minuten voor 'assisteren bij het aan- en uittrekken van steunkousen terwijl de cliënt dit zelf kan doen (eventueel met een hulpmiddel)', en een vermindering van 13,61 minuten voor 'standaard wassen met water en zeep' & 'de cliënt dagelijks volledig wassen'. Enigszins verrassend toonde één handeling een onmiddellijke toename (niveauperandering) van 1,25 minuten ('aanbrengen van zinkzalf, -poeders of -pasta's bij de behandeling van smetten'). De veranderingen in tijdtrends (hellingsverandering) waren beperkt en geven daarom aan dat deze effecten tot drie maanden na de implementatiefase aanhielden. De procesevaluatie vond 44 beïnvloedende factoren en toonde aan dat de werkomgeving in zorgorganisaties en wijkverpleegkundige teams een belangrijke belemmering is bij het "veranderen" van de dagelijkse praktijk in de wijkverpleging.

Met de resultaten uit de voorgaande hoofdstukken heeft dit proefschrift aangetoond dat het mogelijk is voor zorgprofessionals, in de complexe setting van de wijkverpleging, om bij te dragen aan "passende zorg", door het verminderen van Beter Laten handelingen. In een tijd van stijgende zorgbehoeften, en een toenemende schaarste aan zorgverleners, worden een aantal Beter Laten handelingen nog vaak uitgevoerd. Er werd een de-implementatiestrategie ontwikkeld gebaseerd op wetenschappelijke theorie, door het koppelen van de geïdentificeerde barrières aan bekende, onderbouwde strategieën voor gedragsverandering. Vervolgens werd de ontwikkelde strategie in de wijkverpleegkundige praktijk uitgetest en bleek deze aanvaardbaar, implementeerbaar, kosteneffectief en schaalbaar. Daarom werd gekozen de strategie op te schalen in een quasi-experimenteel evaluatieonderzoek. In dat onderzoek leidde de de-implementatiestrategie tot een vermindering Beter Laten handelingen in twee van de drie geselecteerde handelingen. De beperkte geïnvesteerde tijd en inzet in verhouding tot de hoge tijdsinstaat toonden aan dat zorgprofessionals in de wijkverpleging goed gepositioneerd zijn om veranderingen in de complexe context van de wijkverpleging op te starten, aan te jagen en te leiden. Deze resultaten zouden verpleegkundigen, verzorgenden, managers, bestuurders en beleidsmakers moeten aanmoedigen om door te gaan met de inspanningen om Beter Laten handelingen te de-implementeren.

Description of the research data management

Ethics and privacy

This thesis is based on the results of research involving humans, which were conducted in accordance with relevant national and international legislation and regulations, guidelines, codes of conduct and Radboudumc policy. A statement that the study was not subject to the Dutch Medical Research Involving Human Subjects Act (WMO), was obtained for all individual studies from the recognized Medical Ethics Review Committee of the Erasmus University Medical Center and/or the Radboud University Medical Center 'METC Oost-Nederland'. According to Dutch legislation, data collection from electronic patient files was performed by personnel with a treatment relationship with the patient and by the researcher(s) upon consent by the study participant. The privacy of the participants in all studies was warranted by the use of pseudonymised and anonymous data. The pseudonymisation key was stored separately from the research data. Informed consent was obtained from participants to collect and process their data for this research project.

Data collection and storage

Data from all chapters were stored and analyzed on the department server and in Castor EDC and are only accessible by project members working at the Radboudumc.

Data sharing according to the FAIR principles

All studies are published open access. To make the data from chapters 2, 3, 4 and 5 Findable, they will be archived and published under 'closed access' conditions in Data Acquisition Collections (DACs) in the Radboud Data Repository for 15 years after termination of the study. The datasets generated and analysed can be obtained by contacting the owners of the data collections. Data requests will be checked against the conditions for sharing the data as described in the signed Informed Consent.

Chapter	DAC	RDC	DSC	DSC License
2	DOI:10.1111/jan.15970			CC-BY-NC
3	DOI:10.1111/jan.16381			CC-BY-NC
4	DOI:10.1111/jan.16615			CC-BY-NC
5	<i>(Submitted)</i>			CC-BY-NC

List of publications

This thesis

- **Wendt, B.**, Cremers, M., Ista, E., van Dijk, M., Schoonhoven, L., Nieuwboer, M. S., ... & Huisman-de Waal, G. (2024). Low-value home-based nursing care: A national survey study. *Journal of Advanced Nursing*, 80(5), 1891-1901.
- Cremers, M., **Wendt, B.**, Huisman-de Waal, G., van Bodegom-Vos, L., van Dulmen, S. A., Schipper, E., van Dijk, M., & Ista, E. (2024). Barriers and facilitators for reducing low-value home-based nursing care: A qualitative exploratory study among homecare professionals. *Journal of Advanced Nursing*, 00, 1–14.
- **Wendt, B.**, Nieuwboer, M. S., Vermeulen, H., Huisman-de Waal, G., & van Dulmen, S. A. (2024). A Tailored De-Implementation Strategy to Reduce Low-Value Home-Based Nursing Care: A Mixed-Methods Feasibility Study. *Journal of Advanced Nursing*.
- **Wendt, B.**, Oostra, D., Teerenstra, S., Nieuwboer, M. S., Vermeulen, H., van Dulmen, S. A. & Huisman-de Waal, G., (2024). A Tailored De-Implementation Strategy to Reduce Low-Value Home-Based Nursing Care: a multiple interrupted time series study (Submitted)

Other publications

- **Wendt, B.**, Cremers, M., Ista, E., & Huisman-de Waal, G. (2024). Beter Laten in de wijk. *TVZ-Verpleegkunde in praktijk en wetenschap*, 134(4), 54-55.
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- **Wendt, B.**, van Dulmen, S., Vermeulen, H., & Huisman-de Waal, G. (2022). Ambitieuze nieuwe norm. *TVZ-Verpleegkunde in praktijk en wetenschap*, 132(6), 14-16.
- **Wendt, B.**, & Huis, A. (2022). Infecties voorkomen in de wijkverpleging. *TVZ-Verpleegkunde in praktijk en wetenschap*, 132(5), 46-47.
- **Wendt, B.**, Huisman-de Waal, G., Bakker-Jacobs, A., Hautvast, J. L., & Huis, A. (2022) Verkennen van infectiepreventiemaatregelen in de wijkverpleging: een kwalitatieve observatiestudie. *Verpleegkunde: Nederlands-Vlaams wetenschappelijk tijdschrift voor verpleegkundigen*, 37(3), 18-29
- **Wendt, B.**, Huisman-de Waal, G., Bakker-Jacobs, A., Hautvast, J. L., & Huis, A. (2022). Exploring infection prevention practices in home-based nursing care: a qualitative observational study. *International journal of nursing studies*, 125, 104130.

Dankwoord

Tijdens mijn buluitreiking in 2015 aan de Vrije Universiteit in Amsterdam betoogde mijn supervisor van destijds, dat het jammer is dat het Latijnse woord ‘doctorandus’ sinds de invoering van het bachelor-master-stelsel steeds meer in ongebruik raakt. Vooral omdat de Nederlandse vertaling een hoopvolle aansporing bevat, namelijk: *“hij die (nog) doctor worden kan”*. Met andere woorden, een mastergraad was geen bestemming, maar een start. Ik twijfel er niet aan dat ik slechts één van de vele studenten ben die deze boodschap heeft meegekregen, maar het heeft bij mij altijd geresoneerd. Ik ben dan ook blij en dankbaar dat ik nu kan zeggen dat dit manuscript er ligt. Uiteraard had ik dit niet kunnen doen zonder de hulp, flexibiliteit, inzet en mentorschap van onder andere - maar niet uitsluitend - de volgende personen:

Prof. Dr. Vermeulen, Beste Hester, in 2016 hebben wij kennis gemaakt. Jij, net benoemd als hoogleraar Verplegingswetenschap, en ik, net afgestudeerd gezondheidswetenschapper, werkzaam als wijkverpleegkundige. Nieuwsgierig naar de academisering van de verpleegkunde, maar dan wel wijkverpleging. We hadden het over een cultuur creëren die ontvankelijk is voor wetenschap, om met wetenschappelijk bewijs de kwaliteit van zorg voor patiënten en cliënten te verhogen of te behouden. Daarbij kwamen we tot de conclusie dat hierbij veel aandacht uitging naar de ziekenhuizen, en veel minder naar de wijkverpleging. Herhaalde initiatieven zijn om uiteenlopende redenen gestrand, maar ik heb altijd steun en regelmatige aanmoedigingen mogen ervaren op inhoud, werk en loopbaan. Ik ben dan ook dankbaar dat we nu, bijna 10 jaar later, kunnen zeggen dat er een manuscript ligt, waarin al het bovenstaande terug te zien is.

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Het springzaad knapt, de brempeulen
knallen open en jij ligt er in je wieg
als een popelend boontje bij.

Alles mag je worden van mij: zeeman,
boswachter, archeoloog. Of –
als je leven ingewikkelder loopt –
gesponsord ontdekker van aangroei
werende stoffen voor scheepsverf,
alleenstaand paddestoelenfotograaf,

pacht- en beestenlijstenonderzoeker
van verdwenen Drentse keuterijen...
Behalve ongelukkig. Beloofd?

Uit: Erik Menkveld: *Schapen nu!* (De Bezige Bij, 2001)

Voor **Ella**: “don’t change a hair for me”.

Uit: “My Funny Valentine” door Richard Rodgers and Lorenz Hart (1937)

About the author



Benjamin was born on the 1st of May, 1987 in Zwolle, The Netherlands. After finishing his secondary education he pursued a Bachelors' Degree in Nursing Studies at the Hanzehogeschool in Groningen. As a way to mend an unsuccessful internship in a hospital, he got involved in the goings-on of a local dispensary in Itete, Tanzania, East-Africa. Here, his interest in public health

and implementation research was sparked: for example, if we know how to treat and prevent hookworm infections with a pair of rubber boots and a cheap three-day treatment, then why is it so difficult to eliminate or eradicate hookworm infections? To learn more, he followed a Masters' Degree in Health Sciences; International Public Health at the Vrije Universiteit in Amsterdam.

Upon returning to working in home-based nursing care he got involved in a research project focussed on exploring infection prevention practices in home-based nursing care. While a major topic in public health, it appeared a neglected subject in the context of Dutch healthcare. This led to a publication in 2021 for which he won a scientific prize (Anna Reynvaan Wetenschapsprijs) in 2022. This acted as an encouragement and led to the pursuit of a PhD Degree in 2021, an extensive collaboration between IQ-Health, Radboudumc, HAN University of applied sciences, Vilans, V&VN (the Dutch Nursing Association) and many practice partners. The focus was on de-implementing low-value (home-based) nursing care, but still revolved on the same question: if we know what we should - or should not do - then why aren't we doing it?

PhD portfolio of Benjamin Wendt

Department: IQ-Health

PhD period: 01/11/2021 – 31/12/2024

PhD Supervisor(s): Prof. Dr. H. Vermeulen, Dr. G. Huisman-de Waal

PhD Co-supervisor(s): Dr. S. van Dulmen, Dr. M. Nieuwboer

Training activities Hours

Courses

- European Academy of Nursing Science Summer School (2025)	50
- European Academy of Nursing Science Summer School (2024)	50
- Course Analysing longitudinal and multilevel data using R (2024)	96
- Media training (2024)	4
- Course Guideline Development (2023)	8
- Course Implementation Science (2023)	12
- Course Scientific Integrity (2023)	20
- Course Radboudumc specifieke e-learning voor mensgebonden wetenschappelijk onderzoek (BROK / GCP-WMO)	2
- European Academy of Nursing Science Summer School (2023)	96
- Course Oriëntatieessies voor een aankomende rol als toezichthouder in de zorg (2023)	16
- Course Basiskwalificatie Didactische Bekwaamheid (BDB) (2022)	300
- Course Statistics for PhD's using SPSS (2022)	60
- Introduction course for PhD candidates (2022)	15

Seminars

- 12 x Learning community Lectorate Community Care (2022-2025)	18
- 8x Nursing Science Nijmegen seminars (2022-2025)	16
- 8x Wetenschappelijke Tafel Wijkverpleging (2022-2025)	16
- Invitational conference Evaluatie en Monitoring Richtlijnen in de wijkverpleging (2023)	4
- 2x Research Integrity Round (2023)	3
- Masterclass Passende zorg in de Wijkverpleging (2023)	8
- Seminar CDA Verpleegkundigen en Verzorgenden “passende zorg” (2023)	8
- 5x Webinar Zorgevaluatie en Gepast Gebruik (ZE&GG) (2022)	5
- Workshop Dealing effectively with work/time pressure (2022)	2.5
- EANS Winter Summit 2023 Moving Care to Home & Community (2023)	6

Conferences

- Poster presentation European Academy of Nursing Science Summer Conference (2025)	8
- Poster presentation Quarijn Congres (2024)	8
- Oral presentation Universitair Kennisnetwerk Ouderenzorg Nijmegen (2023)	8
- Oral presentation ABR Zorgnetwerk Euregio Zwolle (2023)	2.5
- 2x Oral presentation ABR Zorgnetwerk Noord-Holland Oost/Flevoland	8
- Keynote presentation AMPHI ARENA Symposium (2022)	8
- Oral presentation 6th European Nursing Congress (2022)	24
- Oral presentation and workshop Vilans Jubileumdag (2022)	8
- Oral presentation Anna Reynvaan Genomineerden bijeenkomst (2022)	2.5

Other

- Co-organizing 2 day conference “Over de Bogen” (2022-2024)	168
- Chair of CDA Verpleegkundigen en Verzorgenden (2022-2025)	148
- 4x Working group developing guideline ‘Compressietechnieken aan de onderste extremiteiten in de wijkverpleging’ (2023-2024)	12
- Reviewing a scientific article (2022)	4

Teaching activities	
Lecturing	
- 6x Lecture Bachelor of Nursing qualitative data collection and analyses (2023-2024)	9
- Lecture Master Healthcare Improvement Science (2022)	1.5
- Lecture Bachelor of Nursing OWE 8 introduction on 'appropriate care' (2022)	4
Supervision of internships / other	
- Supervision of two HGZO students' Masters' thesis (2022-2024)	48
- Supervision of four Nursing students' Bachelors' thesis (2023)	45
Total	1332

Omslag, ontwerp en opmaak

Handen zijn veelzeggend. Handen symboliseren culturele gedragingen, waarden en overtuigingen. En hoewel de hoeveelheid gepubliceerd materiaal over handen overweldigend is, is dit geen literatuurstudie. Voor een proefschrift dat in wezen over gedragsverandering gaat, is de hand een mooi symbool. Als we een gemeenschap aan mensen voorstellen (de hele hand) met daarin personen (de vingers) dan zou je kunnen zeggen dat cultuur zich afspeelt in de lege ruimte tussen de vingers. Je ziet het niet, maar het is er wel. Gedragsverandering gaat onherroepelijk over cultuur: een verzameling van normen, waarden en gedragingen, die ook terug te vinden zijn in dit proefschrift. Daarnaast is een opwaartse hand ook het symbool op de insignes voor de helpende, verzorgende en verplegende beroepsgroepen. De gekozen opmaak in zwart-wit slaat op het de-implementeren; minder is meer. Door het weglaten van kleur worden vorm, structuren, textuur en ritme, laten we zeggen de basis, duidelijker. Daarbij moet gezegd: “passende zorg” is niet zwart-wit, maar eerder een grijs gebied.

