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REVIEW

Systematic review on barriers and facilitators of complex interventions for residents with dementia in long-term care

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ABSTRACT

Objectives: Psychotropic drugs are frequently and sometimes inappropriately used for the treatment of neuropsychiatric symptoms of people with dementia, despite their limited efficacy and side effects. Interventions to address neuropsychiatric symptoms and psychotropic drug use are multifactorial and often multidisciplinary. Suboptimal implementation of these complex interventions often limits their effectiveness. This systematic review provides an overview of barriers and facilitators influencing the implementation of complex interventions targeting neuropsychiatric symptoms and psychotropic drug use in long-term care.

Design: To identify relevant studies, the following electronic databases were searched between 28 May and 4 June: PubMed, Web of Science, PsycINFO, Cochrane, and CINAHL. Two reviewers systematically reviewed the literature, and the quality of the included studies was assessed using the Critical Appraisal Skills Programme qualitative checklist. The frequency of barriers and facilitators was addressed, followed by deductive thematic analysis describing their positive or negative influence. The Consolidated Framework for Implementation Research guided data synthesis.

Results: Fifteen studies were included, using mostly a combination of intervention types and care programs, as well as different implementation strategies. Key factors to successful implementation included strong leadership and support of champions. Also, communication and coordination between disciplines, management support, sufficient resources, and culture (e.g. openness to change) influenced implementation positively. Barriers related mostly to unstable organizations, such as renovations to facility, changes toward self-directed teams, high staff turnover, and perceived work and time pressures.

Conclusions: Implementation is complex and needs to be tailored to the specific needs and characteristics of the organization in question. Champions should be carefully chosen, and the application of learned actions and knowledge into practice is expected to further improve implementation.

Key words: implementation, neuropsychiatric symptoms, psychotropic drugs, long-term care

Introduction

The prevalence of neuropsychiatric symptoms (NPSs) associated with dementia is high. Over 80% of people with dementia in nursing homes (NHs) exhibit NPS (Selbæk *et al.*, 2013). The treatment of NPS often consists of the prescription of

psychotropic drugs (Cornegé-Blokland *et al.*, 2012; Nijk *et al.*, 2009; Selbaek *et al.*, 2007; Wetzels *et al.*, 2011), despite concerns about their limited efficacy (Seitz *et al.*, 2013; Sink *et al.*, 2005; Zuidema *et al.*, 2007) and side effects (Zuidema *et al.*, 2006). Hence, nonpharmacological interventions are recommended as a first-line treatment for managing NPS.

NPSs are the result of interactions of biological, psychological, social, and physical environmental factors (Cohen-Mansfield, 2000; Steinberg *et al.*, 2006; Zuidema *et al.*, 2010). Complex, multicomponent interventions seem to be the most appropriate

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approach to address these, given the multifactorial origin of NPS. Complex interventions comprise multiple interacting components and are characterized by the number and difficulty of behaviors required by those delivering or receiving the intervention, the number of groups or organizational levels targeted by the intervention, the number and variability of outcomes, and the degree of flexibility or tailoring of the intervention permitted (Craig *et al.*, 2013).

Although complex interventions have the potential to reduce inappropriate prescribing of antipsychotic drugs in NHs (Livingston *et al.*, 2017; Thompson Coon *et al.*, 2014), these interventions commonly show small to modest effects (O'Connor *et al.*, 2009; Quasdorf *et al.*, 2016; Zwijsen *et al.*, 2014a), which often reflects suboptimal implementation rather than shortcomings of the implemented intervention (Anderson *et al.*, 2013; Craig *et al.*, 2013).

To examine barriers and facilitators influencing the implementation of complex interventions for people with dementia in long-term care, we reviewed literature on process evaluations, qualitative studies, and (cluster) randomized controlled trials targeting NPS and/or psychotropic drug use (PDU). By assembling knowledge about factors influencing implementation of complex interventions, effectiveness of interventions can be maximized, and translating results into practice is enabled which in turn enhances widespread implementation (Craig *et al.*, 2013; Lawrence *et al.*, 2012; Thompson Coon *et al.*, 2014; Quasdorf *et al.*, 2016; Zwijsen *et al.*, 2014b).

Methods

Eligibility criteria

A predefined protocol was developed and registered on PROSPERO (CRD42018112731), on November 9, 2018, and is available in full on the National Institute for Health Research website: <https://www.crd.york.ac.uk/prospero/> (Groot Kormelinck *et al.*, 2018).

Types of studies

We included process evaluations, qualitative studies (that may include quantitative process data), and (cluster) randomized controlled trial studies that reported barriers and facilitators affecting the implementation of complex interventions targeting NPS/PDU for residents with dementia in long-term care. Systematic reviews or studies not being published in peer-reviewed journals were excluded.

Types of interventions

This review was limited to studies targeting implementation barriers and facilitators of complex

interventions aimed at PDU (antipsychotics, anxiolytics, hypnotics, antidepressants, anticonvulsants, anti-dementia drugs) and/or NPS (umbrella term, or at least one symptom). We defined a complex intervention as introduced by Craig *et al.* (2013, p.588): “multiple interacting components, a certain number and difficulty of behavior of those delivering or receiving the intervention, the number of groups or organizational levels the intervention targets, the number and variability of outcomes and the degree of flexibility or tailoring of the intervention permitted.”

Search

Electronic databases were searched to identify relevant studies. The search was applied to PubMed, Web of Science, PsycINFO, Cochrane, and CINAHL. Searches were run between 28 May and 4 June 2018. No publication date restrictions were imposed. Studies published in English, German, and French were eligible for inclusion. Key search terms related to institution, outcome (barriers, facilitators), and psychotropic drugs or NPS. For full search strategy, see Appendix A1, published as supplementary material online.

Study selection method

Two reviewers (CMGK and SIMJ) independently screened titles and abstracts and selected potentially relevant articles for full-text review. Duplicates were removed using reference manager software (Refworks), after which two reviewers independently reviewed the full text for in- or exclusion. Reviewer findings were compared during the screening process, with disagreements being resolved by involvement of a third reviewer.

Data extraction

We used a predesigned data extraction sheet, which was piloted on several articles before actual use and refined it accordingly. One reviewer extracted data (CMGK), which was checked by a second (SIMJ). Additional reviewers were involved to reach consensus in the case of disagreement. Data that were extracted included setting, study aim, type, content, and results of intervention, implementation method, data collection method, method of analysis, data collection moment, and implementation barriers and facilitators.

Study quality

The methodological quality of each study was assessed using the Critical Appraisal Skills Programme qualitative checklist (Critical Appraisal Skills Programme, 2017). The quality of the studies

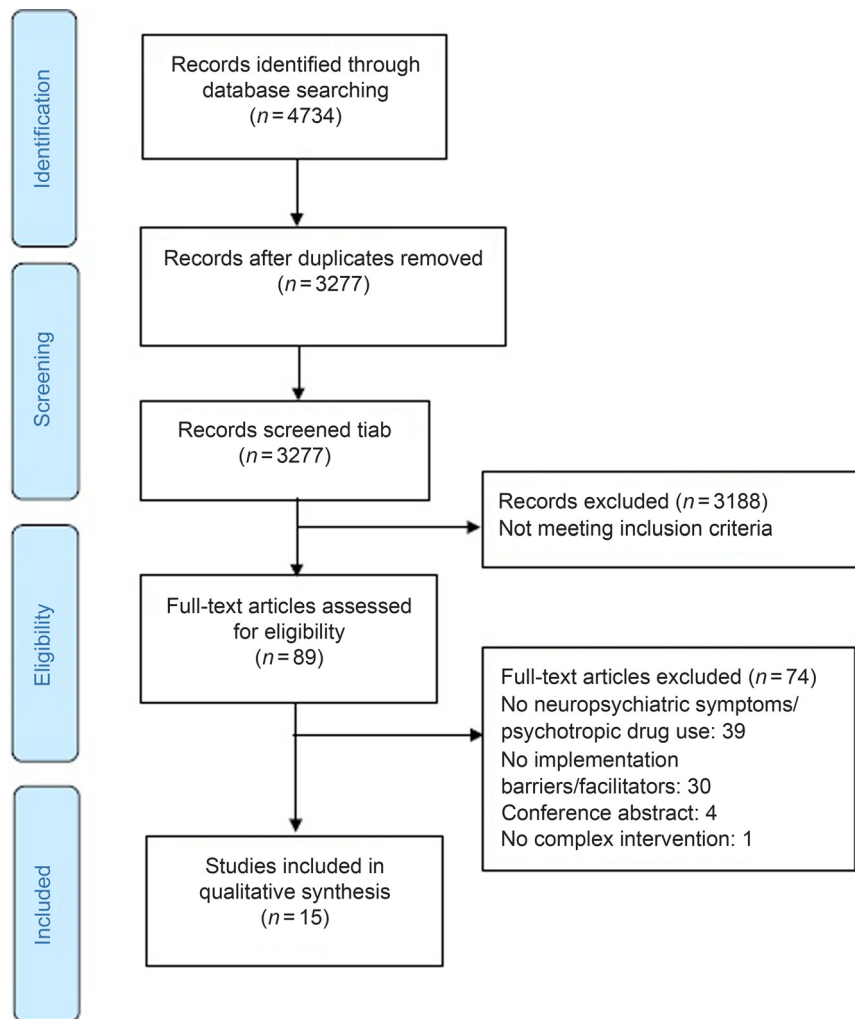


Figure 1. Flowchart of study selection process.

was appraised by one reviewer (CMGK) and scores were checked by a second (SIMJ). Disagreements were resolved by discussion. Papers were not excluded based on quality. Instead, quality of studies is addressed in the discussion section.

Data synthesis

Each barrier or facilitator was given a code, using Atlas.ti 8.3. The Consolidated Framework for Implementation Research (CFIR) was used to guide data synthesis, following a deductive approach. The CFIR is a comprehensive, “meta-theoretical” framework. The standardized list of constructs allows researchers to identify variables that are most relevant to a particular intervention (Damschroder *et al.*, 2009). The codes were subdivided into the five domains of the CFIR framework: intervention characteristics, outer setting, inner setting, characteristics of individuals, and process. We kept in mind the possibility that codes might not fit the CFIR.

The importance of the barrier/facilitator was addressed by gaining insight into their frequency. Deductive thematic analysis was used to assess a factor’s positive or negative influence (Elo and Kyngäs, 2008; Hsieh and Shannon, 2005).

Two reviewers (SIMJ and CMGK) independently coded four studies, and findings were compared and discussed. After this, one reviewer (CMGK) continued with coding the other studies. The coding of each study was discussed by both reviewers to reach agreement. The other reviewers were involved to obtain consensus in case of disagreements.

Results

Study selection

The search of all the databases yielded 4734 records of which 15 studies were included. See Preferred Reporting Items for Systematic Reviews and

Meta-analysis flow for application of eligibility criteria (Figure 1).

Study characteristics

Table 1 presents the study characteristics. With the exception of one German study, all studies were published in English. Studies were carried out in Australia ($n=2$), Canada ($n=2$), the U.S.A. ($n=1$), the U.K. ($n=3$), Norway ($n=1$), Germany ($n=2$), and the Netherlands ($n=4$). The majority of the studies were qualitative (process) evaluations, sometimes combined with quantitative data. Most studies pertained to residents with dementia in NHs, residential aged care facilities, or long-term care homes. We identified four types of interventions, often combined: (1) managing NPS by methodical and multidisciplinary collaboration ($n=10$); (2) psychosocial interventions tailored to the resident or person-centered care (PCC) approaches ($n=9$); (3) training and education ($n=2$); and (4) an activity or exercise program ($n=2$). Several implementation strategies were used, such as coaching on the job, follow-up meetings, sharing experiences, and telephone support. Multiple methods of data collection were used, among others questionnaires, focus groups, and individual interviews. Most studies applied triangulation to enhance credibility of findings. A range of stakeholders provided the data on implementation factors, mostly being staff, managers, and/or project coordinators.

Study quality

Table 2 provides a detailed overview of the quality assessments of the studies. On a scale from 0 to 10 (the higher the more quality), five studies scored 5 to 7 points (Borbasi *et al.*, 2011; Kovach *et al.*, 2008; McAiney *et al.*, 2007; Stein-Parbury *et al.*, 2012; Wingefeld *et al.*, 2011), and ten studies scored 8 to 10 points (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Ellard *et al.*, 2014; Van Haften-Van Dijk *et al.*, 2015; Latham and Brooker, 2017; Lawrence *et al.*, 2016; Mekki *et al.*, 2017; Quasdorf *et al.*, 2016; Zwijsen *et al.*, 2014b).

Barriers and facilitators

The barriers and facilitators reported in the studies were grouped according to the five domains and 36 constructs of the CFIR. All codes fitted within the CFIR. Table 3 shows the frequency with which the CFIR constructs were addressed and provides an overview of the CFIR constructs pertaining to the individual studies. A short description of each construct can be found in Table S1, published as supplementary material online.

Domain 1. Intervention characteristics

Relative advantage was addressed in six articles (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Ellard *et al.*, 2014; Van Haften-Van Dijk *et al.*, 2015; Lawrence *et al.*, 2016). The added value of the intervention was having a shared method for multidisciplinary consultations (Boersma *et al.*, 2016), and expected gains in care time led to increased implementation willingness and efforts of staff (Van Haften-Van Dijk *et al.*, 2015). Also, experiencing visible effects and positive reactions of residents were facilitators (Ellard *et al.*, 2014; Van Haften-Van Dijk *et al.*, 2015; Boersma *et al.*, 2016). Concerns about consequences of the intervention, such as how to deal with aggression when PDU is reduced, impeded implementation (Bourbonnais *et al.*, 2018; Lawrence *et al.*, 2016).

Adaptability was addressed by three articles as a facilitating factor (Bourbonnais *et al.*, 2018; Van Haften-Van Dijk *et al.*, 2015; Mekki *et al.*, 2017). For example, the transfer of information and knowledge was tailored to the local NH culture, which stimulated implementation (Bourbonnais *et al.*, 2018).

Complexity was addressed in ten articles (Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Van Haften-Van Dijk *et al.*, 2015; Kovach *et al.*, 2008; Latham and Brooker, 2017; McAiney *et al.*, 2007; Quasdorf *et al.*, 2016; Stein-Parbury *et al.*, 2012; Wingefeld *et al.*, 2011; Zwijsen *et al.*, 2014b). Six articles reported that perceived easiness to apply the intervention in everyday working life was a facilitator (Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Van Haften-Van Dijk *et al.*, 2015; McAiney *et al.*, 2007; Stein-Parbury *et al.*, 2012; Wingefeld *et al.*, 2011). This was especially true for interventions that encouraged on-the-job reinforcement of the learning, role modeling, and assisting in integrating knowledge into practice (McAiney *et al.*, 2007). Barriers were experienced difficulty in applying the learned actions and knowledge into practice (Latham and Brooker, 2017; Quasdorf *et al.*, 2016), and the required use of multiple forms and tools (Zwijsen *et al.*, 2014b).

Cost was addressed in four articles (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Van Haften-Van Dijk *et al.*, 2015; McAiney *et al.*, 2007). Facilitators were sufficient funding for the proposed intervention (Van Haften-Van Dijk *et al.*, 2015), wards receiving extra budget from the NH (Appelhof *et al.*, 2018), and inexpensive training, especially if a regular training budget exists that can be used to provide the intervention (Boersma *et al.*, 2016). Pressures on financial resources such as budget cuts negatively affected the implementation process (Boersma *et al.*, 2016; Van Haften-Van Dijk *et al.*, 2015; McAiney *et al.*, 2007).

Table 1. Characteristics of included studies

AUTHOR	AIM INTERVENTION + SETTING	COUNTRY + STUDY DESIGN	TYPE *	RESULTS INTERVENTION	IMPLEMENTATION METHOD	DATA	METHOD ANALYSIS	MOMENT
						COLLECTION METHOD		
Appelhof, 2018	Effect intervention based on “Grip on Challenging Behavior” care program on prevalence of NPS, PDU, workload, absenteeism, job satisfaction of NH staff delivering specialized treatment + support for residents with young-onset dementia	Netherlands, process evaluation	1	No differences in agitation, aggression, NPS, PDU	Educational program, training, champions supporting implementation	Open-ended questionnaire	Deductive content analysis	Pre, during, post
Boersma, 2016	Veder contact method: combines elements from psychosocial and PC interventions with theatrical, poetic, musical communication into daily care to improve communication, reciprocity in contact, QoL, behavior, identity, self-esteem for people with dementia in NHs. Adapted version	Netherlands, qualitative process analysis with multiple cases	2	Original method: positive effect QoL, mood, behavior; only performed by actors not nurses	Training and coaching, team meetings + follow-up, feedback, coaching on the job, program evaluation	Focus groups + interviews	Deductive + inductive	Post
Borbasi, 2011	Dementia outreach service. Implementation of tailored interventions in aged care facilities suited to resident’s needs. Aim: increased QoL, reduction inappropriate referrals to other services, improved management of BPSD, increased capacity + clinical skills of staff	Australia, evaluation of quantitative and qualitative data	1 + 2	Increased self-confidence dealing with residents. Reduction stress, referrals, difficult behaviors	NP, clinical facilitator, social worker, administrative assistant. Coaching, educational material, face-to-face instruction	Focus groups, interviews, reflective journals	Open coding	Post
Bourbonnais, 2018	Development and implementation of individualized interventions based on meanings of screams of older people with Alzheimer’s disease or related disorder in NHs. Assessing strategies useful in implementing complex intervention	Canada, qualitative pilot using action research	1 + 2	Unknown (in press)	Local leaders, training, workshop, study coordinators; monitoring obstacles	Focus groups, interviews	Content analysis, inductive	During
McAiney, 2007	Gain knowledge for assessing and managing older person’s complex physical and mental health needs + associated behaviors in long-term care homes. Learning strategy (intensive program/core curriculum) to develop role of in-house resource psychogeriatric person and team	Canada, evaluation of quantitative data	3	Increased ability to use assessment tools, recognize + understand challenging behaviors, mental health problems	Active participation, sharing experiences, homework, ongoing evaluation, leadership support, educator team, post-education	Evaluation survey	Quantitative	Post

Table 1. Continued

AUTHOR	AIM INTERVENTION + SETTING	COUNTRY + STUDY DESIGN	TYPE*	RESULTS INTERVENTION	IMPLEMENTATION METHOD	DATA COLLECTION METHOD	METHOD ANALYSIS	MOMENT
Kovach, 2008	Serial trial intervention: assessing and treating unmet needs of people with advanced dementia in NHs who do not report needs verbally. Goal: to improve assessment + treatment of pain, to identify changes in behavior, appropriate use of PDs	U.S.A., feasibility study, pilot	1	Less discomfort, behavior to baseline, broader scope physical + affective assessment, more pharmacological comfort treatments	1-day training for nursing staff, follow-up meetings. Feedback on changes in care	Survey; open-ended questions	Unknown	Post
Ellard, 2014	Older people's exercise intervention in residential and nursing accommodation: training for staff with twice weekly, physiotherapist-led exercise classes on depressive symptoms in care home residents	U.K., process evaluation, mixed methods	4	No effect on prevalence or incidence of depression	A home "champion"	Interviews, focus groups, observation	Thematic analysis	Post
Latham, 2017	Focused intervention training and support program for care home staff. Aim: reducing inappropriate antipsychotic prescribing for people with dementia by implementing psychosocial interventions. Adapted program of original trial: using lower level of resources	U.K., mixed methods evaluation, in-depth case studies	1 + 2 + 3	Reduction antipsychotic prescribing	Supervision, expert + peer support, sharing experiences, coaching	Interviews, reflective diaries	Inductive, thematic analysis	During and post
Lawrence, 2016	Training in PCC, antipsychotic review, social interaction, and pleasant events + exercise. Aim: to improve mental health and reduce sedative drug use for people with dementia in long-term care homes	U.K., qualitative study part of cRCT	2 + 4	Unknown	Trained therapists for delivery of intervention. Champions, coaching, and supervision	Focus groups	Thematic analysis	Pre
Mekki, 2017	The Modelling and Evaluating eviDence-based Continuing Education program. Increased understanding of PCC, dementia, and agitation would help NH staff to find PC and confidence-building alternatives to the use of restraint and PDs	Norway, qualitative exploratory study in cRCT	1 + 2	Use of restraint reduced in intervention + control group. Reduction CMAI score	Two external facilitators delivering intervention: 2-day seminar, 6 monthly coaching sessions	Focus group, field studie, notes, workshop	Hermeneutic, co-analysis	Post

Table 1. Continued

AUTHOR	AIM INTERVENTION + SETTING	COUNTRY + STUDY DESIGN	TYPE*	RESULTS INTERVENTION	IMPLEMENTATION METHOD	DATA COLLECTION METHOD	METHOD ANALYSIS	MOMENT
Quasdorf, 2017	DCM: multicomponent method to develop PCC practice at various levels of the NH. Standardized observation of residents' well-being, cyclic approach	Germany, process evaluation, convergent parallel mixed methods in quasi-experimental trial	1 + 2	No effect on QoL or challenging behavior	Project coordinator, qualified trainer (intervention) + nursing manager (control)	Interviews, report/e-mails, questionnaire	Deductive, descriptive statistics	Pre, during, post
Stein-Parbury, 2012	CADRES: compared the effectiveness of PCC, DCM, and usual care on reducing agitation in residential settings for people with dementia	Australia, evaluation in cRCT study	1 + 2	PCC cost-effective of reducing level of agitation	Champions, site visits, telephone support	Evaluations, open-ended questions	Unkown	During and post
Van Haefen, 2015	Veder method; Care staff trained to apply theatrical stimuli combined with PC communication for people with dementia in NHs. Aim: improve reciprocity in interaction, positively influence behavior, mood, QoL + enhance work satisfaction of care staff	Netherlands, qualitative process evaluation	2	Positive effects on behavior, mood, and quality of life	On-the-job coaching, feedback, refresher days, consultation, sharing experiences, knowledge transfer	Interviews, focus groups	Deductive + inductive	Pre, during, post
Wingenfeld, 2011	Complex intervention developed to prevent disruptive behavior of residents with dementia in NHs, without using restrictive means. Five steps for NH staff (assessment, aim, intervention, process, evaluation)	Germany, experiences, and utilization, part of prospective controlled study	1	Problem behavior decreased more in intervention group	Training by researchers	Interviews	Unknown	Post
Zwijzen <i>et al.</i> , 2014b	Grip on challenging behavior: stepwise, structured approach to manage challenging behavior for residents with dementia in NHs. Aim: decrease in challenging behavior + in prescription of PDU without increase in use of restraints	Netherlands, process evaluation along-side cRCT effect study	1	Diminished some forms of challenging behavior + use of PDU	Training, telephone + email support. Evaluation sessions, tailored communication	Digital questionnaire, interviews	Directed content analysis	Post

Overview of the aim and setting, type and results of intervention, implementation method, data collection method, analysis, and moment of data collection.

* Intervention type: 1 = methodical/multidisciplinary collaboration; 2 = tailored psychosocial interventions/PCC; 3 = training and education; 4 = activity or exercise program.

Abbreviations: BPSD, behavioral psychological symptoms dementia; CADRES, Caring for Aged Dementia Care Resident Study; CMAI, Cohen-Mansfield Agitation Inventory; cRCT, cluster randomized controlled trial; DCM, Dementia Care Mapping; NP, nurse practitioner; PC(C), person-centered (care); PD, psychotropic drug; QoL, quality of life.

Table 2. Indicators of study quality

AUTHOR	CLEAR STATEMENT OF AIM	QUALITATIVE METHODOLOGY	DESIGN	RECRUITMENT STRATEGY	DATA COLLECTION	RELATIONSHIP RESEARCHER/PARTICIPANTS	ETHICAL ISSUES	DATA ANALYSIS	FINDINGS	VALUE
Appelhof, 2018	✓	✓	✓	?	✓	✗	✓	✓	✓	✓
Boersma, 2016	✓	✓	✓	?	✓	✓	✓	✓	✓	✓
Borbasi, 2011	✓	✓	✓	✗	✓	✗	✓	?	✓	✓
Bourbonnais, 2018	✓	✓	✓	?	✓	✗	✓	✓	✓	✓
McAiney, 2007*	✓	N.A.	✓	✓	✓	N.A.	✗	✓	✓	✓
Kovach, 2008	✓	✓	✓	✗	✗	✗	✓	✗	✓	✓
Ellard, 2014	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓
Latham, 2017	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lawrence, 2016	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓
Mekki, 2017	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Quasdorf, 2017	✓	✓	✓	✓	✓	?	✓	✓	✓	✓
Stein-Parbury, 2012	✓	✓	✗	✗	✗	✗	✓	✗	✓	✓
Van Haeften, 2015	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓
Wingenfeld, 2011	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓
Zwijnsen <i>et al.</i> , 2014b	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓

Including study aim, qualitative methodology, design, recruitment strategy, data collection, relationship researcher/participants, ethical issues, data analysis, findings, and value.

*McAiney, 2007. This study is quantitative. Therefore, the two fields are scored as N.A. These fields are considered not relevant in this type of study.

Table 3. Count of CFIR constructs and overview of individual studies

		APPELHOF	BOERSMA	BORBASI	BOURBONNAISS	ELLARD	VAN HAERTEN	KOVACH	LATHAM	LAWRENCE	MCAINEY	MEKKI	QUASDORF	STEIN- PARBURY	WINGENFELD	ZWIJSEN ET AL., 2014B	# OF STUDIES
Intervention characteristics	Intervention source																0
	Evidence strength and quality																0
	Relative advantage	X	X		X	X	X			X							6
	Adaptability				X		X					X					3
	Trialability																0
	Complexity		X		X		X	X	X			X	X	X	X	X	10
	Design quality and packaging																0
Outer setting	Cost	X	X				X				X					4	
	Patient needs and resources		X														1
	Cosmopolitanism																0
	Peer pressure																0
Inner setting	External policy and incentives						X										1
	Structural characteristics	X	X		X	X	X		X				X			X	8
	Networks and communications	X	X		X	X	X	X	X	X		X	X	X		X	12
	Culture		X									X	X	X			5
	Implementation climate: tension for change										X						1
	Implementation climate: compatibility	X	X				X		X							X	5
	Implementation climate: relative priority	X	X		X		X		X							X	6
	Implementation climate: organizational incentives and rewards																0
	Implementation climate: goals and feedback												X				1
	Implementation climate: learning climate	X	X	X		X			X	X		X				X	8
	Readiness for implementation: leadership engagement										X	X	X	X	X	X	6
	Readiness for implementation: available resources	X	X		X	X	X	X	X	X	X		X	X		X	12
Characteristics of individuals	Readiness for implementation: access to knowledge and Information												X		X	X	0
	Knowledge and beliefs about the intervention	X	X		X	X	X	X		X			X		X	X	10
	Self-efficacy			X			X							X			3
	Individual stage of change		X	X	X	X		X		X		X					7
	Individual identification with organization						X			X							2
	Other personal attributes	X	X		X		X	X	X	X		X	X				8
Process	Planning		X			X	X						X				4
	Engaging: opinion leaders																0
	Engaging: formally appointed internal implementation leaders		X		X							X					3
	Engaging: champions	X	X			X	X		X	X		X	X	X	X	X	11
	Engaging: external change agents																0
	Executing																0
	Reflecting and evaluating						X										1

Abbreviation: CFIR, Consolidated Framework for Implementation Research.

Four constructs within the domain intervention characteristics yielded no relevant factors affecting implementation in the included articles (see Table 3).

Domain 2. Outer setting

Only few studies reported about factors affecting implementation within this domain. The domain contains four constructs, of which cosmopolitanism and peer pressure were not represented in the reviewed articles (see Table S1 CFIR constructs with short definitions).

Patient needs and resources were addressed by one article. A lack of background information about the residents was a barrier for implementation (Boersma *et al.*, 2016).

External policy was addressed by one article, which stated that changing laws and regulations can negatively affect the implementation (Van Haefen-Van Dijk *et al.*, 2015).

Domain 3. Inner setting

Structural characteristics were addressed by eight articles (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Ellard *et al.*, 2014; Van Haefen-Van Dijk *et al.*, 2015; Latham and Brooker, 2017; Quasdorf *et al.*, 2016; Zwijsen *et al.*, 2014b). Facilitating factors were a well-functioning and stable team, a less hierarchical structure and flexible organizational structures, being specialized in dementia care (Quasdorf *et al.*, 2016), and having a small-scale care setting and rural environment (Boersma *et al.*, 2016). Barriers regarding high patient-to-caregiver ratios (Bourbonnais *et al.*, 2018), and multiple levels of management made access to resources challenging (Latham and Brooker, 2017). Half of the articles found staff turnover/absenteeism/fluctuations, shortages, and changing positions to be an impeding factor (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Ellard *et al.*, 2014; Van Haefen-Van Dijk *et al.*, 2015; Quasdorf *et al.*, 2016; Zwijsen *et al.*, 2014b). It might lead to hindering factors such as new staff not being informed about, or familiar with, the program (Appelhof *et al.*, 2018; Bourbonnais *et al.*, 2018; Zwijsen *et al.*, 2014b), and new staff needing time to get acquainted with the intervention (Appelhof *et al.*, 2018; Zwijsen *et al.*, 2014b).

Networks and communications was mentioned by all but three articles (Borbasi *et al.*, 2011; McAiney *et al.*, 2007; Wingefeld *et al.*, 2011). Facilitators were communication and contact between staff members and across disciplines (Van Haefen-Van Dijk *et al.*, 2015; Kovach *et al.*, 2008; Stein-Parbury *et al.*, 2012), an open communication climate (Quasdorf *et al.*, 2016), and support within the team (Boersma *et al.*, 2016; Latham and Brooker,

2017; Mekki *et al.*, 2017). Implementation benefitted from regular multidisciplinary meetings (Appelhof *et al.*, 2018), whereas lack of (formal) meetings between staff hindered implementation (Bourbonnais *et al.*, 2018; Ellard *et al.*, 2014; Zwijsen *et al.*, 2014b). Conflicts and misunderstandings within the team (Quasdorf *et al.*, 2016), lack of contact between disciplines (Zwijsen *et al.*, 2014b), difficulty in transferring information between shifts (Bourbonnais *et al.*, 2018), and poor information dissemination were barriers (Ellard *et al.*, 2014). Consequences of communication difficulties were insufficient role awareness regarding responsibilities (Boersma *et al.*, 2016; Latham and Brooker, 2017), being unfamiliar with mutual expectations such as required time and commitment (Van Haefen-Van Dijk *et al.*, 2015; Latham and Brooker, 2017) and problems with receiving appropriate support (Latham and Brooker, 2017). Collaborative relationships with family facilitated implementation, and relationships strained by relatives being critical of staff impeded implementation (Lawrence *et al.*, 2016).

Culture was addressed in five articles (Boersma *et al.*, 2016; Lawrence *et al.*, 2016; Mekki *et al.*, 2017; Quasdorf *et al.*, 2016; Stein-Parbury *et al.*, 2012). A more dementia friendly culture as expressed in staff attitudes and the physical environment was helpful (Quasdorf *et al.*, 2016), as were mutual respect and reciprocity in relationships with residents (Lawrence *et al.*, 2016), a positive team culture where people acknowledge each other (Mekki *et al.*, 2017), and staff feeling able to voice opinions (Stein-Parbury *et al.*, 2012). Staff with different cultural backgrounds and difficulties with the Dutch language were barriers (Boersma *et al.*, 2016).

Implementation climate consists of six sub-constructs, of which five were addressed (see Table 3)

- (1) Tension for change was reported in one article. Pressure from peers to resist change negatively affected implementation (McAiney *et al.*, 2007).
- (2) Compatibility was addressed by five articles (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Van Haefen-Van Dijk *et al.*, 2015; Latham and Brooker, 2017; Zwijsen *et al.*, 2014b). Interventions being consistent with care goals facilitated implementation (Van Haefen-Van Dijk *et al.*, 2015), while a barrier was that the intervention – as perceived by the care professionals – may not necessarily be in line with the corporate image – as set by the management (Latham and Brooker, 2017). Overlap with current working was reported as a barrier in two studies. For example, an overlap with tools already available in the electronic health record led to staff being more inclined to keep working according to their old working routine (Appelhof *et al.*, 2018).

- (3) Relative priority was addressed by six articles (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Van Haeften-Van Dijk *et al.*, 2015; Latham and Brooker, 2017; Zwijsen *et al.*, 2014b). Limited involvement in research projects promoted implementation (Appelhof *et al.*, 2018), while other innovations implemented at the same time were a barrier (Van Haeften-Van Dijk *et al.*, 2015). Implementation of the care program was easier on wards that rarely initiated new projects, which helped staff to remain motivated. Being involved in several new projects seemed to interfere with implementation, since time was scarce (Zwijsen *et al.*, 2014b). Ward issues such as renovations to the facility (Appelhof *et al.*, 2018), transition toward self-directed teams (Appelhof *et al.*, 2018; Boersma *et al.*, 2016), staff turnover (Bourbonnais *et al.*, 2018; Latham and Brooker, 2017), and changes in staff members' positions and management structure were barriers (Zwijsen *et al.*, 2014b).
- (4) Goals and feedback were reported by one article. Little or no feedback and collaboration with internal facilitators, and a low level of feedback and engagement within the team and on the individual level hindered implementation (Mekki *et al.*, 2017).
- (5) Learning climate was addressed by eight articles (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Borbasi *et al.*, 2011; Ellard *et al.*, 2014; Latham and Brooker, 2017; Lawrence *et al.*, 2016; Mekki *et al.*, 2017; Zwijsen *et al.*, 2014b). Openness to changing working routines facilitated implementation (Appelhof *et al.*, 2018; Mekki *et al.*, 2017), while an insufficient learning climate limited implementation (Boersma *et al.*, 2016; Ellard *et al.*, 2014). The degree of learning climate can depend on the ward. In one study, several wards were reluctant to alter routines, whereas wards that were enthusiastic to work with the care program seemed to have a more open attitude toward change and welcomed external input (Zwijsen *et al.*, 2014b). Other facilitators were that the intervention team worked on the floor together with the staff and provided compliments and encouragement (Borbasi *et al.*, 2011). Also, sufficient support and meetings to discuss events during the day and their negative and positive sides led to positive experiences (Latham and Brooker, 2017), as did reporting details of success stories and sharing strategies that worked (Borbasi *et al.*, 2011; Mekki *et al.*, 2017). Staff fearing criticism of the training team hindered implementation (Lawrence *et al.*, 2016).

Readiness for implementation contains three subconstructs, of which two were addressed (see Table 3).

- (1) Leadership engagement was addressed by six articles (Mekki *et al.*, 2017; McAiney *et al.*, 2007; Stein-Parbury *et al.*, 2012; Wingenfeld, *et al.*, 2011; Quasdorf *et al.*, 2016; Zwijsen *et al.*, 2014b). Key

stakeholders taking the lead and an engaged leader acting as internal facilitator were mentioned (Mekki *et al.*, 2017; Quasdorf *et al.*, 2016; Stein-Parbury *et al.*, 2012; Zwijsen *et al.*, 2014b), as well as insufficient authority or guidance, absent or disengaged leaders limiting implementation (Mekki *et al.*, 2017; McAiney *et al.*, 2007; Wingenfeld *et al.*, 2011).

- (2) Available resources were reported in all but three articles (Borbasi *et al.*, 2011; Mekki *et al.*, 2017; Wingenfeld *et al.*, 2011). Work and time pressures were common barriers and existed in eight studies (Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Ellard *et al.*, 2014; Van Haeften-Van Dijk *et al.*, 2015; Latham and Brooker, 2017; Lawrence *et al.*, 2016; McAiney *et al.*, 2007; Zwijsen *et al.*, 2014b). Management support facilitated implementation (Appelhof *et al.*, 2018; McAiney *et al.*, 2007; Quasdorf *et al.*, 2016; Stein-Parbury *et al.*, 2012; Zwijsen *et al.*, 2014b), while other studies reported lack of management support (Ellard *et al.*, 2014; Latham and Brooker, 2017). Lack of sufficient resources for implementation was described as a barrier in four studies (Ellard *et al.*, 2014; Latham and Brooker, 2017; Lawrence *et al.*, 2016; McAiney *et al.*, 2007). For example, the absence of a quiet space for staff to attend training impeded implementation (Ellard *et al.*, 2014). Enabling staff members to participate in the training by offering it at two moments facilitated implementation (Boersma *et al.*, 2016), while staff members failing to attend training due to inconvenient shift arrangements impeded implementation (Ellard *et al.*, 2014).

Domain 4. Characteristics of individuals

Knowledge and beliefs about the intervention were addressed in all but five articles (Borbasi *et al.*, 2011; McAiney *et al.*, 2007; Mekki *et al.*, 2017; Latham and Brooker, 2017; Stein-Parbury *et al.*, 2012). In one study, management had limited awareness of the added value of the intervention and some staff had critical attitudes. However, the expected gains in terms of care time and experienced positive effects on residents made staff enthusiastic to implement the intervention (Van Haeften-Van Dijk *et al.*, 2015). Implementation of the program (Appelhof *et al.*, 2018) or managing disruptive behaviors (Kovach *et al.*, 2008) was time-consuming and increased stress and frustration. Repeatedly starting a functional analysis of behavior was perceived as discouraging (Bourbonnais *et al.*, 2018), and interventions being perceived as childish or disrespectful to people with dementia hindered implementation (Boersma *et al.*, 2016; Van Haeften-Van Dijk *et al.*, 2015).

Three articles addressed self-efficacy (Borbasi *et al.*, 2011; Van Haeften-Van Dijk *et al.*, 2015; Stein-Parbury *et al.*, 2012). Staff working together

with the intervention team improved self-confidence and capacity among staff to manage behaviors (Borbasi *et al.*, 2011). Yet, one study reported that staff became reserved and insecure during training, because they thought they could not acquire the necessary level of performance (Van Haefen-Van Dijk *et al.*, 2015).

Individual stage of change was addressed in seven articles (Boersma *et al.*, 2016; Borbasi *et al.*, 2011; Bourbonnais *et al.*, 2018; Ellard *et al.*, 2014; Kovach *et al.*, 2008; Lawrence *et al.*, 2016; Mekki *et al.*, 2017). Staff reluctance with respect to the intervention – or to alter routines – was an implementation barrier (Boersma *et al.*, 2016; Borbasi *et al.*, 2011; Bourbonnais *et al.*, 2018; Ellard *et al.*, 2014; Kovach *et al.*, 2008; Lawrence *et al.*, 2016).

Individual identification with the organization was addressed in two articles (Van Haefen-Van Dijk *et al.*, 2015; Lawrence *et al.*, 2016). Staff feeling that their qualities were validated was helpful (Van Haefen-Van Dijk *et al.*, 2015). A lack of recognition from managers and relatives (and society) limited implementation (Lawrence *et al.*, 2016).

Other personal attributes were mentioned in eight articles (Appelhof *et al.*, 2018; Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Van Haefen-Van Dijk *et al.*, 2015; Kovach *et al.*, 2008; Lawrence *et al.*, 2016; Mekki *et al.*, 2017; Quasdorf *et al.*, 2016). Educated staff (Kovach *et al.*, 2008), and having had earlier experience with PCC methods facilitated implementation (Van Haefen-Van Dijk *et al.*, 2015). Low-educated staff impeded implementation (Boersma *et al.*, 2016; Appelhof *et al.*, 2018), and staff having limited knowledge about their residents' personal and medical aspects restricted the creativity to find restraint-free solutions (Mekki *et al.*, 2017). For staff, several skill-related barriers were mentioned; limited communication skills (Boersma *et al.*, 2016), having difficulties initiating partnerships with family (Bourbonnais *et al.*, 2018), low willingness and ability to analyze and express reflections (Bourbonnais *et al.*, 2018; Mekki *et al.*, 2017), and a too strong reliance on other persons (Bourbonnais *et al.*, 2018; Lawrence *et al.*, 2016). The staff's functional understanding of care/"to-do" task-oriented focus was found to be impeding (Boersma *et al.*, 2016; Van Haefen-Van Dijk *et al.*, 2015; Quasdorf *et al.*, 2016), as was poor mastery of the Dutch language by staff (Boersma *et al.*, 2016).

Domain 5. Process

Planning was addressed in four articles (Boersma *et al.*, 2016; Ellard *et al.*, 2014; Van Haefen-Van Dijk *et al.*, 2015; Quasdorf *et al.*, 2016). A strict procedure for implementation was a facilitating factor, although a plan for sustaining the intervention

was lacking (Boersma *et al.*, 2016). Considerable performance differences were found between wards with a detailed study protocol with defined implementation components and wards lacking this (Quasdorf *et al.*, 2016).

Engaging consists of four subconstructs. Engaging formally appointed internal implementation leaders was addressed in three articles (Boersma *et al.*, 2016; Bourbonnais *et al.*, 2018; Mekki *et al.*, 2017). An engaged, participative leader facilitated implementation (Bourbonnais *et al.*, 2018; Mekki *et al.*, 2017). The support of the study coordinators who worked actively with staff and key persons of the NH was essential. This contributed to overcoming organizational challenges such as staff turnover and transfer of information between shifts (Bourbonnais *et al.*, 2018). However, identifying such a leader might not be easy. Insufficient directive guidance to identify a project leader was a barrier (Boersma *et al.*, 2016).

Engaging champions was addressed in all but four articles (Borbasi *et al.*, 2011; Bourbonnais *et al.*, 2018; Kovach *et al.*, 2008; McAiney *et al.*, 2007). Indeed, the support of champions is acknowledged as a facilitating factor (Appelhof *et al.*, 2018; Ellard *et al.*, 2014; Quasdorf *et al.*, 2016; Wingenfeld *et al.*, 2011; Zwijsen *et al.*, 2014b). However, sometimes no champions were identified at all, or problems with shifts, time, or enthusiasm limited their effectiveness (Ellard *et al.*, 2014). Change of champions was also a hindering factor (Boersma *et al.*, 2016; Van Haefen-Van Dijk *et al.*, 2015; Quasdorf *et al.*, 2016; Zwijsen *et al.*, 2014b). Changes of the ward leader, psychologist, and physician were detrimental due to their crucial role in implementation (Zwijsen *et al.*, 2014b). Also, champions need to be able to effectively influence their colleagues (Latham and Brooker, 2017; Stein-Parbury *et al.*, 2012). Their success depends on drive and enthusiasm (Stein-Parbury *et al.*, 2012), as well as having listening skills, confidence, to be able to team work, and having good relationships with colleagues (Latham and Brooker, 2017). Hence, the ways in which the individual was able to fulfill the role seemed more important than power and experience (Latham and Brooker, 2017).

Reflecting and evaluating are addressed by one article. Timely solving of bottlenecks and continuous evaluation were seen as facilitating factors (Van Haefen-Van Dijk *et al.*, 2015).

Discussion

Key factors to successful implementation identified in this review included perceived easiness to apply the intervention in practice, strong leadership, support of champions, communication and

coordination between disciplines, management support, sufficient resources, educated staff, and culture. Barriers related mostly to unstable organizations, such as renovations, changes toward self-directed teams, high staff turnover, perceived work and time pressures, and being involved in several projects.

Similar to our findings, other reviews demonstrated that lack of time, high staff turnover (Vlaeyen *et al.*, 2017), and lack of organizational support (Beeber *et al.*, 2010) can be barriers to implementation. In a review on implementation of evidence-based practice in community nursing, organizational changes such as decentralization were a barrier, while facilitators were the use of local champions, training being embedded in practice, actual or perceived skills, perceptions about usefulness and evidence that the intervention will positively impact the resident or caregiver (Mathieson *et al.*, 2018). Despite the fact that these reviews took place in a different setting, the barriers and facilitating factors found are comparable to our findings, implying that some barriers and facilitators are generic in nature. However, several “setting specific” factors seem to affect implementation as well. For example, in a systematic review on fall prevention in residential care facilities, poor information transfer among care providers, staff, and family, and across shifts and lack of care plan communication were barriers (Vlaeyen *et al.*, 2017). Similar barriers emerged in our review, implying that these “setting specific” factors should be taken into account in care innovations. As is suggested by Vlaeyen *et al.* (2017), we also underline that a focus on modifiable barriers and facilitators such as communication is needed in implementation projects in daily practice.

Other recently published papers in International Psychogeriatrics on implementation in long-term care had similar findings. A review on strategies for successful implementation of psychosocial (including multicomponent) interventions in daily residential dementia care, for instance, found that time required to learn and apply the intervention, having a learning culture, and putting knowledge into practice (such as on-the-job reinforcement of learning) were facilitators, whereas multiple projects running simultaneously impeded implementation (Boersma *et al.*, 2015). The commitment of higher management and professionals were important factors in two studies (Boersma *et al.*, 2015; Gerritsen *et al.*, 2019), which is in line with our results. Our systematic review specifically focuses on the implementation of complex interventions targeting NPS/PDU, while other studies focused on the implementation of guidelines for PCC in NHs (Vikström *et al.*, 2015), implementation of the Meeting Centers Support Program (Van Mierlo *et al.*, 2018), or

implementing best practice dementia care in hospitals (Tropea *et al.*, 2017), for example. Several barriers and facilitators identified in those studies are in line with our results, such as inadequate staffing levels (Tropea *et al.*, 2017; Vikström *et al.*, 2015), workload, insufficient time, communication difficulties within team and with family, and limited staff knowledge and skills of dementia (Tropea *et al.*, 2017). In addition, the need for qualified and motivated staff, the presence of a project manager to guide the implementation, and the possibility to target the program to the needs of the target population were identified as facilitators (Van Mierlo *et al.*, 2018). Although those studies had a different focus compared to our review, several barriers and facilitators were in line with our findings. Perhaps this implies that the barriers and facilitators identified in our review may account for different types of interventions and settings, beyond merely complex interventions targeting NPS/PDU.

To summarize, although some implementation factors are generic in nature, setting and organizational factors seem to play an important role in implementation. Our systematic review adds to this that the factors or issues that are perceived as impeding implementation in one care organization can be perceived as no barrier in another care organization. For instance, some organizations seemed to have more difficulties as a result of staff turnover than other organizations. In the study of Bourbonnais *et al.*, (2018), for example, staff turnover did not negatively affect implementation, since other persons such as study coordinators continued to work actively with staff. Differences may even exist between wards of a care organization. In the study of Zwijsen *et al.* (2014b), for instance, the degree of learning climate depended on the ward. Several wards were reluctant to alter routines, while other wards had an open, enthusiastic attitude toward the care program. Hence, perhaps the most important recommendation is that we stress to take into account the local conditions and specific barriers and facilitators of a care organization by means of a tailored implementation plan.

Strengths and limitations

A strength is the use of a well-known, meta-theoretical framework and the applied deductive thematic analysis to synthesize the results. Using the predefined codes of the CFIR provided the complex data with a clear direction (King, 2004). The coded data fitted the predefined constructs of the CFIR. Its standardized nature enhances comparison across studies. A limitation that warrants further consideration is that we did not exclude studies based on our qualitative appraisal. This

requires some caution in the interpretation of findings. Ten studies did not consider the relationship between researcher and participant, which potentially led to researcher bias (Critical Appraisal Skills Programme, 2017). Selection and recruitment of participants was also not thoroughly described, potentially leading to bias in the included studies, and consequently in our review. However, for the other categories, the quality of the included studies was generally considered sufficient. Also, the factors found in the included studies might not be the most important ones, but the ones focused on the most. Our results show that constructs within the domains “intervention characteristics,” “outer setting,” and “process” were less frequently addressed than the other domains. Apparently, several parts of the CFIR framework receive little research attention. This is contrary to a recent systematic review, which assessed the application of the CFIR in implementation research in a wide range of study aims and settings. In this review, all constructs were identified to a greater or lesser extent (Kirk *et al.*, 2016). This difference might be explained by the fact that Kirk *et al.* (2016) only included studies that used the CFIR, while in our review, the included studies used different theories or frameworks to evaluate implementation. CFIR constructs were not used as a “checklist” of variables for consideration. Possible consequences are that relevant factors were not assessed.

Although it might be relevant to distinguish between barriers and facilitators related to the intervention and those related to the implementation strategy, the reviewed articles rarely present their results in this manner. Furthermore, several interventions incorporate elements, such as training (Smeets *et al.*, 2013), that are considered implementation strategies by others (Gerritsen *et al.*, 2011). Further research could explore the added value of this distinction.

Conclusions and implications

Our study showed that the engagement of champions can be an important facilitator, but their effectiveness relies on personal skills and relationships with colleagues. Consequently, we stress that champions should be carefully chosen. Translating learned actions and knowledge into practice by means of on-the-job reinforcement of learning or role modeling should be part of the implementation strategy for complex interventions by default. Caution should be employed while participating in several projects/studies. The capacity of the involved key stakeholders should be leading. The current systematic review demonstrated that the implementation of complex

interventions requires a lot of effort of the organizations and their staff members, and the degree of implementation is subject to many factors, which makes it complex. Our results indicate that some factors are generic in nature, but the setting and factors related to the organization such as staff turnover and reorganizations seem to influence implementation as well. The presence of factors and degree to which these are perceived as a barrier might differ between organizations and even between wards, depending on potential facilitating factors that can reduce the influence of the barrier and on the coping strategies of staff. Organization problems on the ward as such may be not necessarily barriers to successful implementation, but the coping mechanisms of the team could be of greater importance. Therefore, barriers and facilitators might be best examined at the organizational level, being for instance an NH, or even on the level of an NH ward. We underline that implementation needs to be adapted to the specific needs and characteristics of the organization in question and needs to focus on modifiable barriers and facilitators. To implement a complex intervention with several interacting components, in a complex and dynamic organization, with its own local characteristics and specific barriers and facilitators, is challenging and advocates for a tailored intervention and implementation plan. Assessing and addressing possible barriers and facilitators before and during implementation by means of tailored implementation can increase effectiveness (Baker *et al.*, 2015).

Frameworks such as the CFIR can help identify which constructs have predictive ability, which can be manipulated to enhance implementation outcomes, and the situations in which specific constructs are salient.

Future studies could explore whether a focus on the “forgotten” constructs would be beneficial for implementation.

Conflict of interest

None.

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Supplementary material

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