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; Niik et al., 2009; Selbæk 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
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).

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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 behaviors 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...
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
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 Haeften-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 Haeften-Van Dijk et al., 2015). Also, experiencing visible effects and positive reactions of residents were facilitators (Ellard et al., 2014; Van Haeften-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 Haeften-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 Haeften-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; Wingenfeld 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 Haeften-Van Dijk et al., 2015; McAiney et al., 2007; Stein-Parbury et al., 2012; Wingenfeld 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 Haeften-Van Dijk et al., 2015; McAiney et al., 2007). Facilitators were sufficient funding for the proposed intervention (Van Haeften-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 Haeften-Van Dijk et al., 2015; McAiney et al., 2007).

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.
| AUTHOR | AIM INTERVENTION + SETTING | COUNTRY + STUDY DESIGN | RESULTS INTERVENTION | IMPLEMENTATION METHOD | DATA COLLECTION METHOD | METHOD ANALYSIS | MOMENT |
|--------|-----------------------------|------------------------|----------------------|-----------------------|------------------------|-----------------|---------|
| 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 |
| AUTHOR, YEAR | AIM + 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 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 study, notes, workshop | Hermeneutic, co-analysis | Post |
| 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 | Unknown | During and post |
| Van Haeften, 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 |
| Zwijsen et al., 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.
| 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   | ✓                      | ✓                        | x      | ✓                     | x               | x                                    | ✓              | ✓             | ✓        |        |
| Bourbonnais,    | ✓                      | ✓                        | ✓      | ?                     | ✓               | ✗                                    | ✓              | ✓             | ✓        |        |
| 2018            |                        |                          |        |                       |                 |                                      |                |               |          |        |
| McAiney, 2007   | ✓                      | N.A.                     | ✓      | ✓                     | ✓               | N.A.                                 | x              | ✓             | ✓        |        |
| Kovach, 2008    | ✓                      | ✓                        | ✓      | x                     | x               | x                                    | ✓              | ✓             | ✓        |        |
| Ellard, 2014    | ✓                      | ✓                        | ✓      | x                     | x               | x                                    | ✓              | ✓             | ✓        |        |
| Latham, 2017    | ✓                      | ✓                        | ✓      | ✓                     | ✓               | ✓                                    | ✓              | ✓             | ✓        |        |
| Lawrence, 2016  | ✓                      | ✓                        | ✓      | ✓                     | ✓               | ✓                                    | ✓              | ✓             | ✓        |        |
| Mekki, 2017     | ✓                      | ✓                        | ✓      | ✓                     | ✓               | ✓                                    | ✓              | ✓             | ✓        |        |
| Quasdorf, 2017  | ✓                      | ✓                        | ✓      | ✓                     | ✓               | ✓                                    | ✓              | ✓             | ✓        |        |
| Stein-Parbury,  | ✓                      | ✓                        | ✓      | ✓                     | ✓               | ✓                                    | ✓              | ✓             | ✓        |        |
| 2012            |                        |                          |        |                       |                 |                                      |                |               |          |        |
| Van Haeften,    | ✓                      | ✓                        | ✓      | ✓                     | ✓               | ✓                                    | ✓              | ✓             | ✓        |        |
| 2015            |                        |                          |        |                       |                 |                                      |                |               |          |        |
| Wingenfeld, 2011| ✓                      | ✓                        | ✓      | ✓                     | ✓               | ✓                                    | ✓              | ✓             | ✓        |        |
| Zwijsen et al., | ✓                      | ✓                        | ✓      | ✓                     | ✓               | ✓                                    | ✓              | ✓             | ✓        |        |
| 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

| Intervention characteristics | Intervention source | Evidence strength and quality | Relative advantage | Adaptability | Trialability | Complexity | Design quality and packaging | Cost | Outer setting | Patient needs and resources | Cosmopolitanism | Peer pressure | External policy and incentives | Inner setting | Networks and communications | Implementation climate: tension for change | Implementation climate: compatibility | Implementation climate: relative priority | Implementation climate: organizational incentives and rewards | Implementation climate: goals and feedback | Implementation climate: learning climate | Readiness for implementation: leadership engagement | Readiness for implementation: available resources | Readiness for implementation: access to knowledge and Information | Characteristics of individuals | Knowledge and beliefs about the intervention | Self-efficacy | Individual stage of change | Individual identification with organization | Other personal attributes | Planning | Engaging: opinion leaders | Engaging: formally appointed internal implementation leaders | Engaging: champions | Engaging: external change agents | Executing | Reflecting and evaluating | # of studies |
|-----------------------------|---------------------|-------------------------------|-------------------|-------------|-------------|------------|-----------------------------|-----|----------------|---------------------------|----------------|--------------|-----------------------------|------------|-----------------------------|---------------------------------|-----------------------------|-----------------------------|-------------------------------|-----------------------------|-------------------------------|----------------|-----------------------------|----------------------|----------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------|------------------------|----------------------|------------------------|----------------|
| APPELHOF | BOERSMA | BOBASI | BOURBONNASSI | ELLARD | VAN HAEFTEN | KOVACH | LATHAM | LAWRENCE | MCAINEY | MERKI | QUASDORF | STEIN- FARBURY | WINGENFELD | ZWIJSER ET AL., 2014b |
| 0 | 0 | 6 | 3 | 0 | 10 | 0 | 4 | 1 | 0 | 0 | 4 | 1 | 0 | 0 | 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 Haeften-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 Haeften-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 Haeften-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; Wingenfeld et al., 2011). Facilitators were communication and contact between staff members and across disciplines (Van Haeften-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 Haeften-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 subconstructs, 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 Haeften-Van Dijk et al., 2015; Latham and Brooker, 2017; Zwijsen et al., 2014b). Interventions being consistent with care goals facilitated implementation (Van Haeften-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; Borbası 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 (Borbası 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 (Borbası 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 Haeften-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 Haeften-Van Dijk et al., 2015; Lawrence et al., 2016). Staff feeling that their qualities were validated was helpful (Van Haeften-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 Haeften-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 Haeften-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 Haeften-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 Haeften-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 Haeften-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 Haeften-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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