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Original Study

Coming to Grips With Challenging Behavior: A Cluster Randomized Controlled Trial on the Effects of a Multidisciplinary Care Program for Challenging Behavior in Dementia



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A B S T R A C T

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Objectives: The Grip on Challenging Behavior care program was developed using the current guidelines and models on managing challenging behavior in dementia in nursing homes. It was hypothesized that the use of the care program would lead to a decrease in challenging behavior and in the prescription of psychoactive drugs without increase in use of restraints.

Design: A randomized controlled trial was undertaken using a stepped-wedge design to implement the care program and to evaluate the effects. An assessment of challenging behavior and psychoactive medication was undertaken every 4 months on all participating units followed by the introduction of the care program in a group of 3 to 4 units. A total of 6 time assessments took place over 20 months.

Setting: Seventeen dementia special care units of different nursing homes.

Participants: A total of 659 residents of dementia special care units. All residents with dementia on the unit were included. Units were assigned by random allocation software to 1 of 5 groups with different starting points for the implementation of the care program.

Intervention: A care program consisting of various assessment procedures and tools, which ensure a multidisciplinary approach and which structure the process of managing challenging behavior in dementia.
Measurements: Challenging behavior was measured using the Cohen-Mansfield Agitation Inventory (CMAI) and the Neuropsychiatric Inventory. Research assistants (blinded for intervention status of the unit) interviewed nurses on the units about challenging behavior. Data on psychoactive drugs and restraints were retrieved from resident charts.

Results: A total of 2292 assessments took place involving 659 residents (1126 control measurements, 1166 intervention measurements). The group of residents who remained in the intervention condition compared with the group in the control condition differed significantly in the CMAI change scores between successive assessments [−2.4 CMAI points, 95% confidence interval (CI) −4.3 to −0.6]. No significant effects were found for the control-to-intervention group compared with the group who remained in the control group (0.0 CMAI points, 95% CI −2.3 to 2.4). Significant effects were found on 5 of the 12 Neuropsychiatric

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Inventory items and on the use of antipsychotics (odds ratio 0.54, 95% CI 0.37–0.80) and antidepressants (odds ratio 0.65, 95% CI 0.44–0.94). No effect on use of restraints was observed.

Conclusions: The Grip on Challenging behavior program was able to diminish some forms of challenging behavior and the use of psychoactive drugs.

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Challenging behavior is very common in nursing homes; over 80% of nursing home residents with dementia show 1 or more forms of challenging behavior.¹ The presence of challenging behavior in nursing homes diminishes quality of life of residents, is associated with the use of physical restraints, and results in higher costs.^{2–4}

Although several effective psychosocial interventions have been developed,^{5–7} the prescription of psychoactive drugs currently dominates the treatment of challenging behavior.^{8,9} The effects of drugs on behavior, however, are limited.¹⁰ What is more, the adverse effects of this type of intervention can be very serious,^{11–14} which underlines the need for other, more effective, and less harmful methods of managing challenging behavior.

Even though prescribing psychoactive drugs or using restraints to control challenging behavior is a relatively straightforward treatment, many current models emphasize that the management of challenging behavior requires an analysis of the meaning of behavior. In line with the work of Kitwood¹⁵ on the concept of person-centered care, Cohen-Mansfield proposed the model of unmet needs to explain the challenging behavior of people with dementia.¹⁶ A thorough analysis of those needs (which may have various causes such as physical illness, cognitive impairments, psychological needs, or personality features) is needed to understand and diminish challenging behavior. Other models place more emphasis on the influence of (environmental) stimuli. In the model of progressive lowered stress threshold, for example, it is assumed that people with dementia have more difficulty with processing environmental stimuli than healthy people, which makes them experience more stress than healthy elderly. When there are too much environmental stimuli, the stress threshold is exceeded and symptoms of challenging behavior may appear. To prevent challenging behavior, the amount of stimuli should, therefore, be adjusted to the processing capabilities of the person with dementia.¹⁷ There has also been attention for explaining challenging behavior as a result of the way in which people with dementia cope with the complex changes in life they experience.^{18–21}

Understanding challenging behavior as a symptom of underlying problems implies analysis, and treatment should be focused on the biological, psychological, or social factors that can help explain the challenging behavior, instead of the behavior itself.²² To achieve this, several professional disciplines (ie, physician, psychologist, nursing staff, recreational therapist) should work together in determining the type of treatment needed and the goals to be reached, based on the underlying causes of the behavior or on better techniques for care staff to cope with the behavior. Current international and Dutch guidelines follow this view and state that the management of challenging behavior in nursing homes should be undertaken as a multidisciplinary venture by using an individually tailored care plan that is based on thorough analyses of the behavior and that consists of 1 or more psychosocial interventions combined with limited and nonpermanent use of psychoactive drugs when indicated.^{23–28}

The Grip on Challenging Behavior care program was developed using the current guidelines and models on challenging behavior in dementia.^{26–28} It structures the process of detection, analysis, treatment, and evaluation of the treatment of challenging behavior and pre-arranges multidisciplinary consultation. The care program provides tools for multidisciplinary care teams that help them in taking the right steps and asking the right questions to identify and, if possible, treat the underlying problem of the challenging behavior.²⁹ The aim of this study was to determine the effects of the Grip on Challenging Behavior care program.

This article reports on the effects that using the care program has on challenging behavior and on the use of psychoactive drugs and restraints.

Methods

Ethics

The full trial protocol has been published elsewhere.²⁹ The study protocol is in accordance with the declaration of Helsinki and with the Dutch legislation on medical research; it is in agreement with the Conduct Health Research of the Dutch federation of Biomedical Scientific Societies. The study protocol was approved by the Medical Ethics Review Committee of the VU University Medical Centre. The committee stated that, in accordance with Dutch legislation, the study can be performed without a review procedure by the committee because in the study, only observational data gathered by nursing staff as part of their daily work were used.

Setting

In The Netherlands, nursing home care is divided into units for people with predominantly physical disorders (somatic units) and units for people with dementia [dementia special care units (DSCU)s]. For this study, only DSCUs were included. In these units, a psychologist and an elderly care physician usually have a permanent position and work with care staff in a multidisciplinary team.

The care program was introduced in 17 DSCUs of 17 different nursing homes in The Netherlands. The main hypothesis was that the use of the care program would diminish challenging behavior and the use of antipsychotics without a concomitant increase in the use of other psychoactive drugs and restraints. The study was registered in The Netherlands National Trial register, under number NTR 2141.

Design

A stepped-wedge design was used, which is considered appropriate when an intervention will probably do more good than harm and when there are practical and logistic constraints to implementing the intervention simultaneously to all participants,³⁰ which is applicable to the Grip on Challenging Behavior care program. Practical and logistic considerations (training and support of implementation of the units on different time points instead of all at once) also influenced the decision, but more importantly, the stepped-wedge design is far more efficient in terms of sample size than a traditional parallel analysis of covariance design.³¹

The participating care units were randomly divided into 5 groups by using random allocation software.³² Challenging behavior was assessed every 4 months for 20 months (February 2010–October 2012), resulting in 6 time assessments. The first group was trained in using the care program after the baseline assessment. The second group was trained after the next assessment point, and so on, resulting in all care units using the care program at the time of the last assessment.

Sample Size

The following assumptions were used in calculating the sample size. DSCUs house 20 residents on average, the prevalence of challenging behavior is 80%, and the mean Cohen-Mansfield Agitation

Inventory (CMAI) score is 47.7.¹ It was expected that 5% of the residents' (legal) representatives would not agree with the resident being enrolled in the research project. In the event a resident died or moved away from the unit, the new resident who was admitted instead was enrolled in the study so no further attrition was expected.

The CMAI,³³ as the primary outcome, was used to calculate the sample size. Based on an earlier study of Chenoweth in which training and support on person centered care was compared with dementia care mapping and usual care, it was expected that the Grip on Challenging Behavior care program would lead to a 10-point decrease on the CMAI.³⁴ Based on a recent Dutch study in nursing home residents,³⁵ a mean intraclass correlation coefficient of 0.1 was assumed for clustering of challenging behavior within a DSCU.

Based on these assumptions and a significance level (α) of 0.05 (2-sided) and a power (β) of 0.80, at least 14 dementia DSCUs with 6 time measurements were needed in a stepped-wedge design. Recruiting more than 14 DSCUs was preferred as the timeframe of the project (20 months) might have led to some DSCUs dropping out because of unforeseen circumstances, such as staffing problems or renovations.

Intervention

Grip on Challenging behavior is an evidence- and practice-based care program that consists of 4 steps: detection, analysis, treatment, and evaluation (Figure 1). The most recent scientific knowledge and evidence-based guidelines were incorporated into the care program. Expert meetings with nurses, psychologists, and elderly care physicians were held to ensure fit between science and practice. Representatives of the professional associations of nurses, psychologists, and elderly care physicians were consulted in the development process of the care program.³⁶

Care staff detected challenging behavior in daily care after which they commenced using the structured analysis form (as described below). To ensure that no signs of challenging behavior were missed during daily observations, every 6 months (prior to the standard multidisciplinary meeting about the resident, which is compulsory in The Netherlands) the units' care staff filled in a screening tool to detect signs of challenging behavior that they did not already address spontaneously. If signs of challenging behavior were detected (either in daily care or by using the screening tool), a structured analysis form was used by the care staff. This form could also be used whenever signs of challenging behavior were detected in daily care. Following this, the unit psychologist or the unit elderly care physician was called in to

undertake further analysis. Both the physician and the psychologist had their own analysis form, based on and structured by the explanatory models of challenging behavior and national guidelines. After the analysis was completed, the treatment goal, the outline of the treatment plan, and an evaluation date—all defined in a multidisciplinary meeting with the involved disciplines—were filled-in on the treatment form. At the predetermined evaluation date, a multidisciplinary evaluation took place by using a flowchart on the evaluation form.

A full day of training was organized on the unit before the Grip on Challenging Behavior care program was implemented on a DSCU. The training was split-up into 2 sessions: 1 kick-off meeting in which the care program was introduced and 1 follow-up meeting 2 weeks after the care program was implemented on the unit. In the training session, several models regarding challenging behavior were discussed and used to explain different forms of behavior, such as the unmet-needs model, the model of progressive lowered stress threshold, and the adaptation-coping model. Care teams were encouraged to think about their own residents and the behavior of their residents in light of these models. Part of the training was also focused on the negative consequences of using psychoactive medication and on the alternatives to medication, in particular psychosocial interventions.

Participating DSCUs

Care organizations were approached by the University Network of Organizations for Care for the Elderly of the VU University Medical Center and the University Nursing Home Network of the Radboud University Medical Center to allow 1 of their DSCUs to take part in the study. In addition, convenient sampling was used by 1 of the researchers (MS) to further invite nursing homes that were not affiliated with universities. The participating organizations were free to select which one of their DSCUs would take part in the research project; however, units for special target groups (Korsakov patients, Huntington patients, etc.) were excluded. All residents with a diagnosis of dementia were included in the study.

Measurements

Primary outcome

The primary outcome for this study was challenging behavior. There are different ways to define and measure challenging behavior, but for this research project, every form of behavior that may challenge the person with dementia or the people living with and/or caring for the

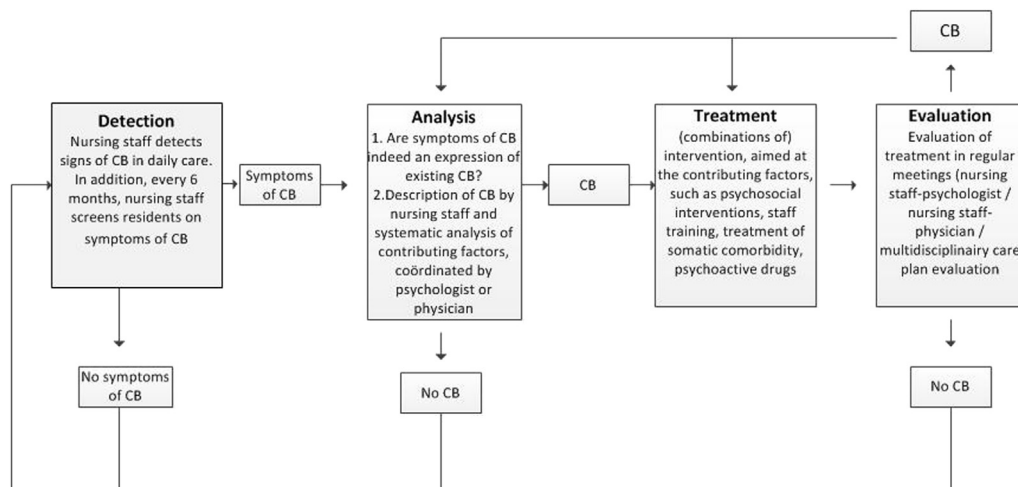


Fig. 1. Outline of the care program. CB, challenging behavior.

person with dementia is considered 'challenging behavior'.²⁶ This means that both externalized behavior such as aggression or calling out as well as more silent behavior such as apathetic or depressive behavior was considered as challenging behavior.

As agitation and agitation-related behaviors are the most prevalent and persistent form of challenging behavior,³⁷ causing diminished quality of life and high caregiver burden,^{38,39} an instrument specifically focused on these behaviors was used (ie, CMAI).³³ The CMAI is a questionnaire containing 29 items regarding agitated behavior. Each item may be scored from 1 (this behavior never occurs) to 7 (behavior occurring multiple times per hour).

To determine effects on other forms of challenging behavior than agitation, the Neuropsychiatric Inventory for Nursing Homes (NPI-NH)^{40,41} was used. The NPI-NH is a structured interview concerning 12 different domains of challenging behavior. For each domain the severity and the frequency of the behavior can be scored. The total score is the product of the severity and frequency score and ranges from 0–12. A total score of at least 4 is considered clinically relevant.^{1,42}

Both the CMAI and the NPI-NH have been translated into Dutch and have been found to be reliable and valid in Dutch settings.^{41,43}

The questionnaires were administered by interviewing the care staff member who was most involved in the daily care of the resident. The research assistants conducting the interviews were trained in administering the CMAI and NPI-NH questionnaires. The interview assistants were blinded for intervention or control status of the DSCUs. Neither the care staff members nor the psychologist or physician were informed about the CMAI and NPI-NH scores.

Secondary outcomes

Data on psychoactive drug use were retrieved from patient charts and classified according to the Anatomical Therapeutic Chemical (ATC) classification system.⁴⁴ The drugs were categorized into antipsychotics (ATC code N05A), antidepressants (ATC code N06A), anxiolytics/hypnotics (ATC code N05B and N05C), anti-epileptics (ATC code N03), and anti-dementia drugs (ATC code N06D). The interview assistant also collected an up-to-date overview of (physical) restraints that were used on the unit. For analyses, the restraints were divided into 4 categories: bedrails, other night-time restraints (belts in bed, restraining blanket), and daytime restraints (table-top, fixation in chair or wheelchair, geriatric chair, separation). Because of the ongoing debate on the ethical, legal, and practical aspects of using surveillance technology in long-term dementia care, the use of surveillance technology (movement sensor, bed exit alarm, chips in clothing) was also analyzed as a separate 'restraints' category.

Other measurements

Characteristics of the residents (sex, age, and time of institutionalization) were retrieved from the patient's charts. The units' elderly care physicians classified the type of dementia according to the DSM-IV⁴⁵ and they determined the severity of the dementia, using the Global Deterioration Scale (GDS).⁴⁶ This is a 7-point scale that describes 7 stages from 'no global impairment' (1) to 'very severe global impairment' (7).

After the last assessment, a questionnaire about the degree of implementation of the care program was distributed amongst the unit leader, the psychologist, and the physician of the DSCUs. These key persons rated the percentage of cases with challenging behavior they were currently treating by means of the care program. The questionnaire contained 4 questions to determine what percentage of the cases concerned challenging behavior. They are (1) the analysis form for care staff used; (2) the analysis form for psychologist or physician used; (3) the treatment form used; and (4) the evaluation form used. Response categories were never, <25%, 25%–50%, 50%–75%, and 75%–100%. A score for the degree of implementation of the care program was assigned to each DSCUs based on the questionnaire. When a DSCU

consistently scored above average compared with the other DSCUs, they were categorized as 'good implementation (score = 3)'; and when a DSCU consistently scored below average they were categorized as 'poor implementation (score = 1)'. DSCUs scoring variably were categorized as 'moderate implementation (score = 2)'.

The interviewed care staff were obviously aware whether their DSCU was in the intervention condition, which could potentially introduce information bias. It was assumed that determining whether the attitude toward the care program is associated with CMAI scoring and determining whether the effect of participation in the training about the care program is associated with CMAI scoring, could both provide an indication of the importance of this bias.

To determine whether the attitude toward the care program is associated with CMAI scoring, the attitudes of staff members were investigated in the first 2 intervention groups at T1 and T2. The interviewed care staff member of the DSCU in the intervention group received a questionnaire containing 3 items. (1) Do you think the introduction of a care program for managing challenging behavior is necessary on your unit? (not at all necessary, hardly necessary, necessary, very necessary). (2) What do you think of the way the care program has been set up (bad, not good, good, very good)? (3) How much faith do you have in the care program being able to decrease challenging behavior on your unit (rating 1 to 10).

To determine whether the effect of participation in the training about the care program is associated with CMAI scoring, differences between the CMAI scoring of the same residents scored by a care staff member who participated in the training session and was actively involved in the care program vs care staff members who did not participate in the training were investigated.

Analyses

SPSS 20.0 (IBM Corp., Armonk, NY) was used for the descriptive analyses. For all other analyses, MLwin v. 2.26 (University of Bristol, Bristol, UK) was used. Mixed models were used to adjust for dependency of the repeated measures over time within the individual residents and for dependency of the residents within the DSCU when necessary (eg, when intercorrelations were significant; $P < .05$). No missing CMAI or NPI data were imputed.

Although the stepped-wedge design has advantages in practical and logistic ways which were crucial for the realization of the implementation of the care program on 17 DSCUs, there are several viewpoints on the correct way to analyze data from stepped-wedge designs.^{47,48} For the current study, differences in changes of CMAI scores were analyzed between 3 different groups: (1) the change in CMAI score when remaining in the control condition; (2) the change in CMAI score after changing from control to intervention; and (3) the change in CMAI score when remaining in the intervention condition. The difference in change of CMAI scores were analyzed using linear mixed models. Because change scores might be influenced by the initial baseline score of the CMAI (higher baseline scores increase the probability of finding larger changes scores), it was tested whether the baseline CMAI scores of the 5 separate intervention groups differed from the baseline score to the rest of the group, using independent *t* tests.

Because the NPI-NH measures quite heterogeneous areas of behavior, the 12 individual symptoms were dichotomized into clinically relevant symptoms (NPI-NH score per item ≥ 4).^{1,49} Analyses were undertaken on the total amount of clinically relevant symptoms (range 0–12) and on the presence of each individual symptom before and after the intervention. The NPI-NH analyses were undertaken using binomial logistic mixed models with a second order penalized quasi-likelihood (PQL) estimation procedure.⁵⁰

Medication data and data on (physical) restraints were dichotomized for each category (antipsychotics, anxiolytics, antidepressants,

anti-epileptics, antidementia drugs; bedrails, other night-time physical restraints, daytime physical restraints, surveillance technology) and analyzed with binomial logistic mixed models using a second order PQL estimation procedure.⁵⁰ Data were dichotomized because almost none of the residents were prescribed more than 1 restraint or drug of one category. Because of logistic reasons, for 1 DSCU data on antidepressants and anxiolytics was not available for the first measurement. Data were imputed from the second measurement for these 32 residents, as this unit was still in the control group during the second assessment.

Following the initial analyses, adjusted analyses were performed correcting for the confounding variables age, sex, GDS stage, type of dementia, and length of stay on DSCUs. Finally, if prevalence rates allowed it, interaction of the intervention with these variables and with degree of implementation and duration of the intervention were performed.

For the analyses on information bias, an independent *t* test was performed between the CMAI scores of care staff that trusted the care program to be beneficial and the CMAI scores of care staff who did not think the care program would make a difference.

The difference between CMAI scores obtained from the care staff member actively involved in the care program and from the care staff member who did not participate in the training on the care program was analyzed by paired *t* tests and by calculating Pearson correlation coefficients. For all analyses, a cut off score of $P < .05$ was used for statistical significance.

Results

Of the 22 organizations that originally showed interest in participation, 5 decided not to take part. Four of these organizations declined because of organizational changes in the near future, and 1 organization had planned to introduce their own new approach for the management of behavioral problems. One unit that did participate moved to another location after T3. Only data from T0–T3 were used in this study for this DSCU.

Of the 17 participating organizations, 9 were affiliated with 1 of the university networks. Nine of the participating units were located in the densely populated Randstad area of The Netherlands; the other 8 were situated in less densely populated areas (Noord-Brabant, Gelderland, and Friesland). All units were organized into several shared living rooms in which a set group of residents resided. The mean size of the unit was 29 residents (range 18–43) and a mean number of 11 (range 6–19) residents resided in 1 living room.

In total, 659 unique residents participated in this study, with a mean age of 84 (standard deviation 7.3), and 69.7% was female (Table 1). One hundred seventy-eight residents participated in all assessments, other residents either enrolled at a later moment, or they had died, been discharged, or moved away to another unit before the end of the study (Figure 2). The mean scores for challenging behavior and the mean percentages of the use of psychoactive medication are shown in Table 2.

Five of the units consistently scored above average on the implementation questionnaire (good implementation; score = 3). Eight units scored moderately on the implementation (score = 2). Three units scored consistently below average (bad implementation; score = 1). The unit, which moved to another location after T3, had not as yet implemented the care program.

Primary Outcome

None of the analyses showed significant differences in CMAI scores at baseline. Table 3 shows the results of the analyses of the changes in CMAI score between subsequent measurements. These analyses yielded significant effects in the group that maintained in

Table 1
Characteristics of the Residents Enrolled in the Study

Unique residents	659
Mean age	84 (SD 7.3)
Sex (% female)	69.7
Duration of institutionalization (months)	Median 20 (range 0–203)
Mean GDS	5.67 (SD 0.76)
GDS unknown	1.3%
GDS ≤3	0.4%
GDS 4	6.6%
GDS 5	27.8%
GDS 6	53.9%
GDS 7	10.0%
Type of dementia	
Alzheimer's	49.0%
Vascular	15.6%
Mixed Alzheimer/vascular	16.3%
Lewy Body/Parkinson	2.5%
Fronto temporal	2.5%
Other/unknown	14.0%

GDS, Global deterioration score; SD, standard deviation.

the intervention condition compared to the group that maintained in the control condition [−2.4, 95% confidence interval (CI) −4.3 to −0.6]. The analyses were corrected for age, sex, severity of dementia, type of dementia, length of stay on the DSCU, and for prescription of psychoactive medication. The effect of the degree of implementation and the degree of implementation. The effect of the program on the differences of CMAI scores was −3.2 (95% CI −6.4 to 0.0) between the intervention-intervention and the control-control group when implementation was good.

Figure 3 shows the results of the analyses of the number of clinically relevant neuropsychiatric symptoms in the measurements before and after the implementation of the care program. An odds ratio (OR) of 0.83 (95% CI 0.67–1.04) was found between the control and intervention measurements.

The analysis of the number of clinically relevant NPI-NH symptoms revealed an interaction effect for severity of dementia (GDS stage). No effects were found for less severe stages of dementia (GDS <6) (OR 0.99; 95% CI 0.77–1.26), whereas significant effects were found (OR 0.79; 95% CI 0.63–0.99) for the severe stages of dementia (GDS ≥6). An interaction effect was also found for degree of implementation. When the implementation of the care program was good, the OR for the number of clinically relevant NPI-NH symptoms was 0.59 (95% CI 0.42–0.83).

Figure 3 and Table 4 show the results of the analyses of the 12 separate symptoms of the NPI-NH. A significant decrease in clinically relevant symptoms of delusions, depression, apathy, disinhibition, and aberrant motor behavior was found. A trend toward a decrease of the prevalence of clinically relevant symptoms was found for all other symptoms except for irritability. Because of the prevalence rates of the symptoms, these analyses were undertaken with smaller group sizes. As a consequence, models for adjusted analyses did not converge; therefore, only the initial analyses can be reported.

Secondary Outcomes

Figure 3 also shows the effects of the care program on the prescription of psychoactive drugs. Analyses on antiepileptic drugs and antidementia drugs could not be performed because of low prevalence rates (5.1% and 9.6%, respectively). For the other categories except anxiolytics, the odds of being prescribed psychoactive drugs were significantly lower after the introduction of the care program (antipsychotics: OR 0.54; 95% CI 0.37–0.80; antidepressants: OR 0.65;

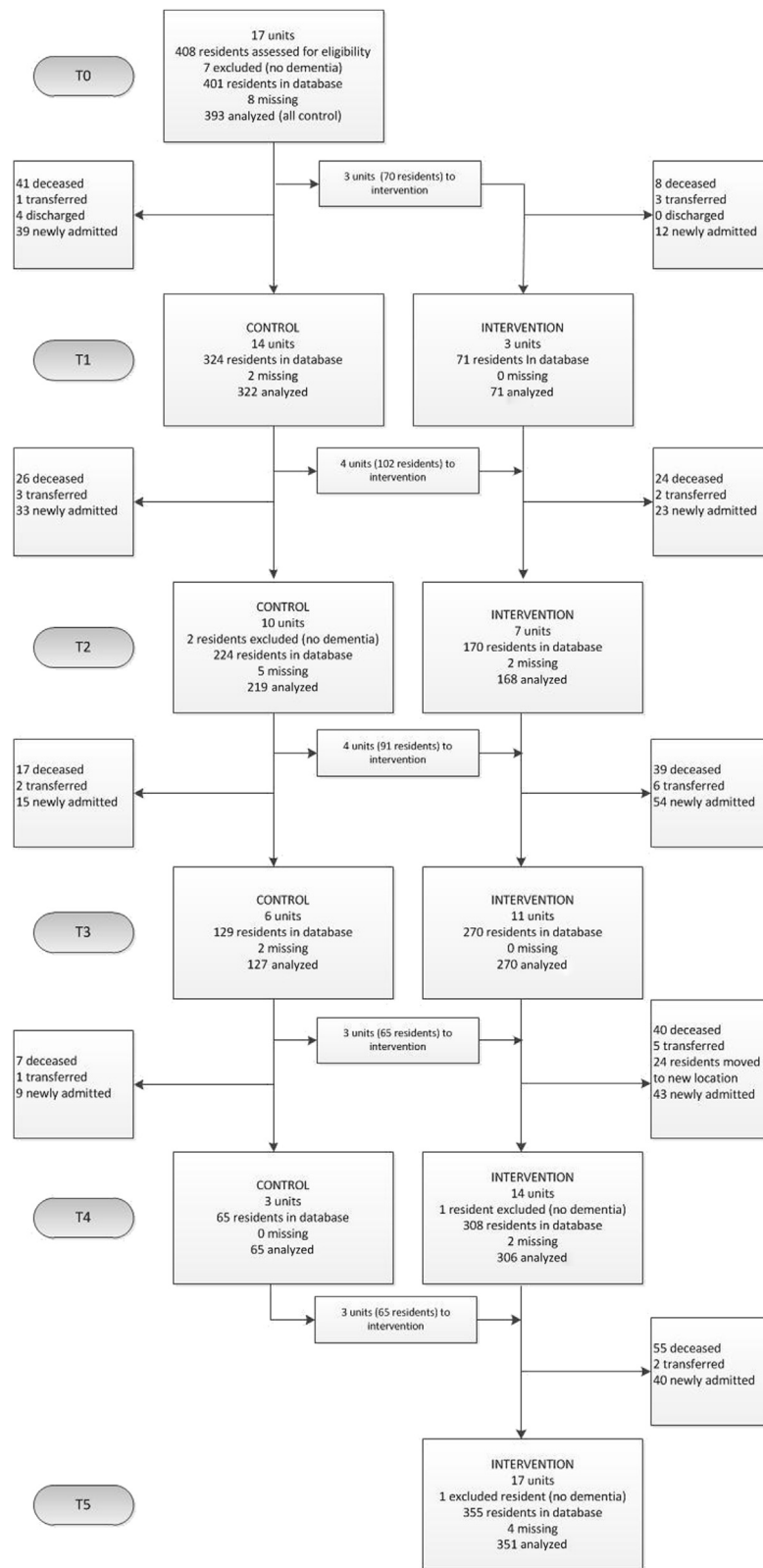


Fig. 2. Flowchart for the primary outcome analysis. A total of 2292 measurements of the total CMAI score were conducted on 659 unique residents. Data were missing when 1 or more CMAI items were missing or a resident was absent (eg, admission into hospital). Residents without dementia were excluded. Residents could drop out of the study because of dying, discharge to home, or transfer to another unit or nursing home. CMAI, Cohen-Mansfield Agitation Inventory.

Table 2
Overview of the Measurement Data

	T0	T1	T2	T3	T4	T5
Mean CMAI (SD) C	51 (18)	55 (19)	53 (20)	53 (20)	56 (22)	–
Mean CMAI (SD) I	–	47 (18)	52 (19)	51 (18)	50 (17)	51 (19)
Mean clin.rel. NPI (SD) C	2.7 (2.2)	3.0 (2.5)	3.0 (2.5)	2.3 (2.3)	3.3 (2.8)	–
Mean clin.rel. NPI (SD) I	–	1.9 (2.2)	2.4 (2.2)	2.4 (2.3)	2.4 (2.3)	2.4 (2.4)
% Antipsychotics C	27.9	28.1	27.4	26.0	20.0	–
% Antipsychotics I	–	23.3	25.9	24.3	23.0	22.6
% Anxiolytics C	23.5	21.3	25.1	27.6	26.2	–
% Anxiolytics I	–	21.7	17.3	17.6	18.4	21.2
% Antidepressants C	32.3	33.5	33.0	30.1	27.7	–
% Antidepressants I	–	28.3	29.5	27.0	25.7	28.5

C, control; clin.rel., clinically relevant; CMAI, Cohen-Mansfield Agitation Inventory; I, intervention; NPI, Neuropsychiatric Inventory; SD, standard deviation.

For each intervention condition, data are presented as mean total CMAI scores, mean amount of clinically relevant NPI symptoms, and percentages of residents using antipsychotics, anxiolytics, and antidepressants. Note that the stepped-wedge design causes the group sizes of the control and intervention condition to change. Every intervention group contains residents who were in the control group on the previous measurement.

95% CI 0.44–0.94). Models for adjusted analyses did not converge because of low prevalence rates.

No significant effects were found in any of the restraint categories (bedrails, night-time restraints, daytime restraints, and surveillance technology). Both before and after the introduction of the care program, 31.7% of the residents were being restrained or monitored by surveillance technology. Most of these residents had bedrails ($\pm 85\%$).

Analyses of Information Bias

All but 1 care staff member ($N = 16$) believed the introduction of the care program was necessary and judged the design of the care program to be good, and, therefore, no analyses were possible on these data. There were differences in the care staff rating as to whether they believed the care program would be able to decrease challenging behavior on the unit. Twelve care staff members scored a rate of 6 or higher on this question (range 1–10; 12 care staff members scoring the CMAI of 45 residents) and 4 care staff members rated 5 or lower (4 care staff members scoring the CMAI of 22 residents). No significant differences were found in the CMAI scoring between these 2 groups (mean difference = 3 points, $t(65) = 0.55$, $P = .59$).

The analyses of CMAI scoring by staff care members actively involved in the care program and by care staff members who did not participate in the training of the care program, ($N = 240$ residents; 56 actively involved care staff members, 33 care staff members not

involved) showed high correlation between raters ($r > 0.70$) and on both time points a nonsignificant difference of 1 point between raters ($t(69) = -0.446$, $P = .657$, on T1 and $t(169) = 1213$, $P = .227$ on T2).

Discussion

The aim of this study was to determine the effect of using the Grip on Challenging Behavior care program on the prevalence of challenging behavior and on the use of psychoactive medication and restraints. The care program was implemented in 17 DSCUs and challenging behavior and the use of psychoactive medication and restraints was measured over a 20-month period. A significant decrease of challenging behavior, measured as differences in total CMAI score between subsequent measurements, was found in the group of DSCUs that were using the care program for over 8 months compared with the control group, but this difference was smaller than expected. No significant effects were found on differences in CMAI score on the first assessment, 4 months after the care program was introduced. The frequency of the use of the detection tool, which was administered semi-annually, might have resulted in this delayed effect. A decrease of the odds for several individual NPI items was found but for the total number of clinically relevant neuropsychiatric symptoms a decrease was only found for residents with severe dementia. For the secondary outcomes, a decrease in prescribed psychoactive drugs (antipsychotics and antidepressants) was found after the care program was introduced. Although it is regularly supposed that a decrease in use of psychoactive drugs might lead to an increase in use of restraints (and vice versa),⁵¹ no such effect was found in our study.

Even though not all effects were statistically significant, analyses of individual clinically relevant behavioral symptoms consistently show the benefit of the use of the care program. A significant decrease of delusions, depression, apathy, disinhibition, and aberrant motor behavior was found. The significant effects on depression and apathy are promising, as these 'quiet' symptoms are easily overlooked.^{52,53} Care staff have to be really vigilant for signs of depression and apathy, particularly in the more severe stages of dementia, as they are more difficult to detect than in the less severe stages. The introduction of a detection tool and the emphasis in the training sessions on detecting these symptoms probably raised more awareness about these symptoms, including in the more severe stages of dementia. The interaction effect that was found for severity of dementia on the effect on total number of clinically relevant NPI symptoms might be explained by the additional attentiveness to depression and apathy in severe stages of dementia.

In spite of growing awareness regarding negative side effects and limited effectiveness, the prescription rates of psychoactive drugs remain high.^{54,55} It is quite remarkable that up until now, medication has had such a significant place in the approach to challenging behavior. Although in general, the focus in care-giving for people with dementia has gradually evolved from a pure disease-oriented view to a more person-centered and tailored approach, it seems that the treatment of challenging behavior has not fully benefited from this progression. In Dutch nursing homes, every resident has his/her own individual care plan; there are protocols for pressure ulcers, feeding problems, the use of antibiotics, and so on. In contrast, there is no protocol that assures a structured and tailored approach when challenging behavior occurs. Cornegé-Blokland et al.⁵⁶ concluded in earlier research that better implementation of guidelines would help bringing down inappropriate prescription rates and that as long as alternative approaches to challenging behavior are not adequately implemented, physicians will more often feel that they have run out of other options and prescribe psychoactive drugs. However, a structure of communication and collaboration between different disciplines is necessary to apply the guidelines.

Table 3
Effects of the Care Program on the Change in CMAI Scores

	Regression coefficient (SE)	95% CI	P
Control-control (reference category)			
Control-intervention	-0.1 (1.1)	-2.3 to 2.2	.96
Control-intervention*	0.0 (1.2)	-2.3 to 2.4	.99
Intervention-intervention	-2.2 (0.9)	-3.9 to -0.4	.02
Intervention-intervention*	-2.5 (0.9)	-4.3 to -0.6	.01

CI, confidence interval; CMAI, Cohen-Mansfield Agitation Inventory; DSCU, dementia special care unit; GDS, Global Deterioration Scale; SE, standard error.

Results of the analyses of the difference between 2 measurements. The control-control group is the reference category, which means a score of -0.01 is the contrast of the difference between 2 subsequent measurements of the control-control group and the control-intervention group.

*Corrected for age, sex, type of dementia, GDS stage, length of stay on DSCU, and prescription of psychoactive drugs. All analyses were adjusted for significant influences of inter-correlation of repeated measures and clustering on the unit.

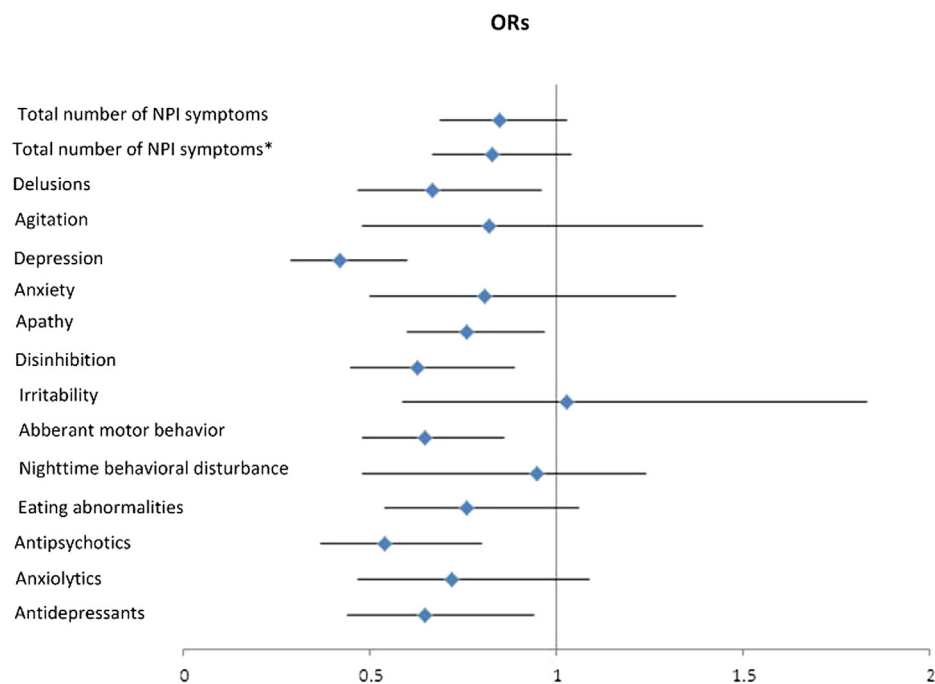


Fig. 3. Forest plot of the odds ratios for NPI symptoms and psychoactive medication. NPI, Neuropsychiatric Inventory; OR, odds ratio.

The evident effects on prescription of psychoactive drugs, especially on antipsychotics, are thus an important finding of this study. The Grip on Challenging behavior care program provides a tool that structures the multidisciplinary process of analyzing behavior and developing a treatment plan. It is likely that the structured analysis and the more explicit involvement of a psychologist have led to the use of more psychosocial treatments. Furthermore, the trainings sessions and the use of the care program probably made care staff and clinicians reflect on the negative side effects of psychoactive drugs use and gave physicians a feeling of support in trying other treatment options and not revert to medication. Hence, the care program had more effects on (prescribing) behavior of clinicians and care staff than on the actual challenging behavior of the residents, in particular agitation, on which only small effects were found. Even though the assessment of agitation with 1 NPI-NH item might have been too broad and unspecified to measure subtle changes, the CMAI was especially developed to measure several aspects of agitation. The effects that were found on the CMAI are, however, relatively small. It is, of course, no surprise that

behavior of clinicians is more easily influenced than the behavior of residents with dementia. It might be that more fundamental changes in (the environment of) long-term dementia care are needed to diminish agitation in dementia residents. More research into the effects of, for example, small scale living and home-like facilities would, therefore, be very welcome.⁵⁷ Nevertheless, the effects on challenging behavior found in this study are also smaller than those of earlier multidisciplinary interventions.^{34,58,59} However, there are significant differences between these studies and ours that can explain these discrepancies. Most of these studies made a preselection of residents with severe forms of challenging behavior, either selected by facility managers³⁴ or by a cut-off score for frequency of the behavior.^{58,59} The Grip on Challenging Behavior care program, on the other hand, does not use a cut-off score for inclusion. This means that all of the residents of the DSCU were included in (analysis of) the care program, including residents without challenging behavior, which mutes the effect size of the study. The only study known to us that did analyze all residents is the study of Fossey et al.⁶⁰ in which the effects of a training and support package for managing agitated behavior in dementia were analyzed. Similar to the current study, Fossey et al found effects on the use of psychoactive drugs, but in their study, no effects on challenging behavior were found.

In addition, in the Grip on Challenging Behavior study, the DSCUs stemmed from 17 different care organizations, which all had their own care system and culture, whereas other studies limited the inclusion of residents to 1 facility⁵⁸ or to multiple facilities with the same care and management structure.³⁴ Although including several different kinds of organizations does improve generalizability of the results, it also meant that the way in which the care program was implemented had to be adjusted to the daily routine of each separate DSCU, which increased the risk of implementation problems. Problems with implementation indeed did arise during the study and adjusted analyses for CMAI scores showed larger effects for the DSCUs in which implementation was good, which supports the idea that larger effects would have been possible with better implementation.

Finally, 1 of the strengths of the Grip on Challenging Behavior study is the fact that once the care program is implemented, the team of the DSCU is able to use it without involvement of external parties. In contrast, earlier studies involved an external expert team, which

Table 4
Effects of the Care Program on Individual Clinically Relevant NPI-NH Symptoms

	OR	95% CI	P
Delusions	0.67	0.47–0.96	.03
Hallucinations	DNC	–	–
Agitation	0.82	0.48–1.39	.47
Depression	0.42	0.29–0.60	<.01
Anxiety	0.81	0.50–1.32	.41
Euphoria	DNC	–	–
Apathy	0.76	0.60–0.97	.03
Disinhibition	0.63	0.45–0.89	.01
Irritability	1.03	0.59–1.83	.91
Aberrant motor behavior	0.65	0.48–0.86	<.01
Night-time behavior disturbance	0.91	0.68–1.24	.57
Eating abnormalities	0.76	0.54–1.06	.10

CI, confidence interval; DNC, did not converge; NPI-NH, Neuropsychiatric Inventory for Nursing Homes; OR, odds ratio.

Results of mixed model analyses on the prevalence of clinically relevant NPI-NH symptoms. Models for hallucinations and euphoria DNC because of low prevalence rates. All analyses were adjusted for significant influences of intercorrelation of repeated measures and clustering on the unit.

carried out the intervention.^{58–60} The effects that were measured in the Grip on Challenging Behavior Study, however, cannot be attributed to extra staffing or availability of extra expertise on a unit. Furthermore, the effects found in the Grip on Challenging Behavior study can be obtained without the investment of external parties once the training sessions are finished, which is of great relevance to nursing home practice.

There are some limitations to this study which should be considered when interpreting the results. First, the participating nursing homes were not randomly selected and one-half of them were part of university networks of long-term care. Although the variety in participating nursing homes represents the Dutch situation, the nursing homes that were part of university networks are obviously eager to participate in scientific research projects and are more used to research circumstances, which by definition, distinguishes them from nursing homes that do not collaborate with universities. The participating units from these nursing homes, however, did not differ in implementation rates from the other involved DSCUs. Second, the care program is aimed at improving the structure and multidisciplinary of the process of managing challenging behavior. Therefore, outcomes of working according to the care program instead of measuring the effects of different interventions that were used were measured. The success rate of different intervention methods could nevertheless be important for the overall effects. Further research into the effectiveness of the separate parts of the care program and the use of different (psychosocial) interventions in the treatment phase would, therefore, be useful. Finally, the Grip on Challenging Behavior care program was developed for use in Dutch nursing home care practice, which has unique characteristics such as the availability of a specialized physician and a psychologist. To transfer the results to long-term care in other countries, adaptations are probably needed.

There are also some methodological considerations. First, the choice for using a stepped-wedge design was based on both practical and statistical benefits. By using this design, the research team was able to guide the implementation on all units. Also, fewer participants are needed to achieve enough power over a limited period of time, which makes it a particularly strong design that is very suitable for this specific type of complex intervention studies. Because this is a relatively new design, however, there is no consensus yet over how to analyze the data. Moreover, because of clustering on unit level and switching from control to intervention status at different time points, and because of possible collinearity between time of intervention and unit, the analysis for this specific study was very complicated and the best possible solution, in our view, was to analyze change scores. Nevertheless, the interpretation of the effects on change scores is not as straightforward as one might hope. Second, the interviewed nursing staff were obviously not blinded for the intervention, although the interview assistants were. When performing intervention research in a population of people in the more severe stages of dementia living in long-term care facilities, nursing staff are an essential source of information. In this type of intervention study they are, however, also usually the people who perform (parts of) the intervention, which could potentially introduce information bias. Therefore, a bias analysis was conducted in this study, which, as reported in the results section, did not show any signs of influence of information bias. In our view, this is the best way to deal with the area of tension between conducting complex intervention studies in nursing home care and performing methodologically sound research.

Conclusions

A small but significant decrease in prevalence of challenging behavior was found after implementation of the Grip on Challenging Behavior program. The program considerably diminished the use of

psychoactive drugs, especially antipsychotics and antidepressants, whereas no difference in restraint use was found.

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Supplementary Data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.jamda.2014.04.007>.

References

- Zuidema SU, Derksen E, Verhey FR, Koopmans RT. Prevalence of neuropsychiatric symptoms in a large sample of Dutch nursing home patients with dementia. *Int J Geriatr Psychiatry* 2007;22:632–638.
- Murman DL, Chen Q, Powell MC, et al. The incremental direct costs associated with behavioral symptoms in AD. *Neurology* 2002;59:1721–1729.
- van de Ven-Vakhteeva J, Bor H, Wetzels RB, et al. The impact of antipsychotics and neuropsychiatric symptoms on the quality of life of people with dementia living in nursing homes. *Int J Geriatr Psychiatry* 2012;8:530–538.
- Zuidema S, Koopmans R, Verhey F. Prevalence and predictors of neuropsychiatric symptoms in cognitively impaired nursing home patients. *J Geriatr Psychiatry Neurol* 2007;20:41–49.
- Livingston G, Johnston K, Katona C, et al. Systematic review of psychological approaches to the management of neuropsychiatric symptoms of dementia. *Am J Psychiatry* 2005;162:1996–2021.
- Ayalon L, Gum AM, Feliciano L, Arean PA. Effectiveness of nonpharmacological interventions for the management of neuropsychiatric symptoms in patients with dementia: A systematic review. *Arch Intern Med* 2006;166:2182–2188.
- Olazaran J, Reisberg B, Clare L, et al. Nonpharmacological therapies in Alzheimer's disease: A systematic review of efficacy. *Dement Geriatr Cogn Disord* 2010;30:161–178.
- Nuijen J. Trendrapportage GGZ 2010. Deel 2: Toegang en zorggebruik. Utrecht, Trimbos-instituut. 2010; 272–287.
- Willemsse B, Smit D, de Lange J, Pot AM. Monitor Woonvormen Dementie. Utrecht: Trimbos-instituut; 2012.
- Gauthier S, Cummings J, Ballard C, et al. Management of behavioral problems in Alzheimer's disease. *Int Psychogeriatr* 2010;22:346–372.
- van Iersel MB, Zuidema SU, Koopmans RTCM, et al. Antipsychotics for behavioural and psychological problems in elderly people with dementia: A systematic review of adverse events. *Drugs Aging* 2005;22:845–858.
- Zuidema SU, van Iersel MB, Koopmans RTCM, et al. Efficacy and adverse reactions of antipsychotics for neuropsychiatric symptoms in dementia: A systematic review. *Ned Tijdschr Geneesk* 2006;150:1565–1573.
- Schneider LS, Dagerman K, Insel PS. Efficacy and adverse effects of atypical antipsychotics for dementia: Meta-analysis of randomized, placebo-controlled trials. *Am J Geriatr Psychiatry* 2006;14:191–210.
- Engberg J, Castle NG, McCaffrey D. Physical restraint initiation in nursing homes and subsequent resident health. *Gerontologist* 2008;48:442–452.
- Kitwood T. *Dementia Reconsidered. The person comes first.* Buckingham: Open University Press; 1997.
- Cohen-Mansfield J. Nonpharmacologic interventions for inappropriate behaviors in dementia: A review, summary, and critique. *Am J Geriatr Psychiatry* 2001;9:361–381.
- Hall GR, Buckwalter KC. Progressively lowered stress threshold: A conceptual model for care of adults with Alzheimer's disease. *Arch Psychiatr Nurs* 1987;1:399–406.
- Finnema E, Droes RM, Ettema T, et al. The effect of integrated emotion-oriented care versus usual care on elderly persons with dementia in the nursing home and on nursing assistants: A randomized clinical trial. *Int J Geriatr Psychiatry* 2005;20:330–343.
- Dröes RM. *Psychosocial care for elderly with dementia.* Amsterdam: Vrije Universiteit; 1991.
- Folkman S, Moskowitz JT. Coping: Pitfalls and promise. *Annu Rev Psychol* 2004;55:745–774.
- Clare L, Rowlands J, Bruce E, et al. The experience of living with dementia in residential care: An interpretative phenomenological analysis. *Gerontologist* 2008;48:711–720.
- Cohen-Mansfield J. Heterogeneity in dementia: Challenges and opportunities. *Alzheimer Dis Assoc Disord* 2000;14:60–63.
- CBO. *Richtlijn Diagnostiek en medicamenteuze behandeling van dementie.* Nederlandse Vereniging voor Klinische Geriatrie, 2005.
- IPA. *Behavioral and Psychological Symptoms of Dementia (BPSD) Educational Pack.* Belgium: The International Psychogeriatric Association (IPA); 2002.
- NICE. *Dementia. Supporting people with dementia and their carers in health and social care.* London: National Institute for Health and Clinical Excellence; 2006.

26. Verenso. Richtlijn Probleemgedrag - met herziene medicatieparagraaf. Utrecht: Verenso; 2008.
27. V&VN. Richtlijn omgaan met gedragsproblemen bij patiënten met dementie. Nijmegen: V&VN; 2005.
28. NIP. Handreiking Psychologische hulpverlening bij gedragsproblemen bij dementie. Amsterdam: NIP, SPO; 2013.
29. Zwijsen SA, Smalbrugge M, Zuidema SU, et al. Grip on challenging behaviour: A multidisciplinary care programme for managing behavioural problems in nursing home residents with dementia. Study protocol. BMC Health Serv Res 2011;11:41.
30. Brown CA, Lilford RJ. The stepped wedge trial design: A systematic review. BMC Med Res Methodol 2006;6:54.
31. Woertman W, de Hoop E, Moerbeek M, et al. Stepped wedge designs could reduce the required sample size in cluster randomized trials. J Clin Epidemiol 2013;66:752–758.
32. Random Allocation Software Isfahan. Iran: Department of Anesthesia, University of Medical Science; 2006.
33. Cohen-Mansfield J, Marx MS, Rosenthal AS. A description of agitation in a nursing home. J Gerontol 1989;44:M77–M84.
34. Chenoweth L, King MT, Jeon Y, et al. Caring for Aged Dementia Care Resident Study (CADRES). of person-centred care, dementia-care mapping, and usual care in dementia: A cluster-randomised trial. Lancet Neurol 2009;8:317–325.
35. Zuidema SU, de Jonghe JF, Verhey FR, Koopmans RT. Environmental correlates of neuropsychiatric symptoms in nursing home patients with dementia. Int J Geriatr Psychiatry 2010;25:14–22.
36. Zwijsen SA, Gerritsen DL, Eefsting JA, et al. Grip on challenging behavior: The development of a care program. Int J Palliative Nurs 2014;20:15–21.
37. Wetzels RB, Zuidema SU, de Jonghe JF, et al. Course of neuropsychiatric symptoms in residents with dementia in nursing homes over 2-year period. Am J Geriatr Psychiatry 2010;18:1054–1065.
38. Samus QM, Rosenblatt A, Steele C, et al. The association of neuropsychiatric symptoms and environment with quality of life in assisted living residents with dementia. Gerontologist 2005;45(Spec No 1):19–26.
39. Evers W, Tomic W, Brouwers A. Aggressive behaviour and burnout among staff of homes for the elderly. Int J Ment Health Nurs 2002;11:2–9.
40. Cummings JL, Mega M, Gray K, et al. The Neuropsychiatric Inventory: Comprehensive assessment of psychopathology in dementia. Neurology 1994;44:2308–2314.
41. Kat MG, de Jonghe JF, Aalten P, et al. [Neuropsychiatric symptoms of dementia: Psychometric aspects of the Dutch Neuropsychiatric Inventory (NPI)]. Tijdschr Gerontol Geriatr 2002;33:150–155.
42. Wood S, Cummings JL, Hsu MA, et al. The use of the neuropsychiatric inventory in nursing home residents. Characterization and measurement. Am J Geriatr Psychiatry 2000;8:75–83.
43. Zuidema SU, Buursema AL, Gerritsen MG, et al. Assessing neuropsychiatric symptoms in nursing home patients with dementia: Reliability and the Cohen-Mansfield Agitation Inventory. Int J Geriatr Psychiatry 2011;26:127–134.
44. World Health Organisation Collaborating Centre for Drug Statistics Methodology. Anatomical Therapeutic Chemical (ATC) classification index including defined daily doses (DDDs) for plain substances. Oslo, 1997.
45. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th (text revision) ed. Washington, DC, 2000.
46. Reisberg B, Ferris SH, de Leon MJ, Crook T. The Global Deterioration Scale for assessment of primary degenerative dementia. Am J Psychiatry 1982;139:1136–1139.
47. Brown CA, Lilford RJ. The stepped wedge trial design: A systematic review. BMC Med Res Methodol 2006;6:54.
48. Hussey MA, Hughes JP. Design and analysis of stepped wedge cluster randomized trials. Contemp Clin Trials 2007;28:182–191.
49. Di IF, Palmer K, Blundo C, et al. Occurrence of neuropsychiatric symptoms and psychiatric disorders in mild Alzheimer's disease and mild cognitive impairment subtypes. Int Psychogeriatr 2010;22:629–640.
50. Bauer DJ, Sterba SK. Fitting multilevel models with ordinal outcomes: Performance of alternative specifications and methods of estimation. Psychol Methods 2011;16:373–390.
51. Dutch Health Inspectorate. The cultural change in deminishing restraint use on frail people in long term care is going strong. Clear ambitions for 2011 are needed. [Cultuuromslag terugdringen vrijheidsbeperking bij kwetsbare groepen in langdurige zorg volop gaande. Duidelijke ambities voor 2011 nodig]. Ministry of Health, Welfare and Sports, ed. The Hague, 2010.
52. Prado-Jean A, Couratier P, Druet-Cabanac M, et al. Specific psychological and behavioral symptoms of depression in patients with dementia. Int J Geriatr Psychiatry 2010;25:1065–1072.
53. Leone E, Deudon A, Bauchet M, et al. Management of apathy in nursing homes using a teaching program for care staff: The STIM-EHPAD study. Int J Geriatr Psychiatry 2012;28:383–392.
54. Nijk RM, Zuidema SU, Koopmans RT. Prevalence and correlates of psychotropic drug use in Dutch nursing-home patients with dementia. Int Psychogeriatr 2009;21:485–493.
55. Koopmans RT. [Are psychotropic drugs too frequently prescribed in Dutch nursing homes?]. Tijdschr Gerontol Geriatr 2007;38:270–273.
56. Cornege-Blokland E, Kleijer BC, Hertogh CM, van Marum RJ. Reasons to prescribe antipsychotics for the behavioral symptoms of dementia: A survey in Dutch nursing homes among physicians, nurses, and family caregivers. J Am Med Dir Assoc 2012;13:80–86.
57. Verbeek H, Zwakhalen SM, van Rossem E, et al. Effects of small-scale, home-like facilities in dementia care on residents' behavior, and use of physical restraints and psychotropic drugs: A quasi-experimental study. Int Psychogeriatr 2014;26:657–668.
58. Rovner BW, Steele CD, Shmueli Y, Folstein MF. A randomized trial of dementia care in nursing homes. J Am Geriatr Soc 1996;44:7–13.
59. Opie J, Doyle C, O'Connor DW. Challenging behaviours in nursing home residents with dementia: A randomized controlled trial of multidisciplinary interventions. Int J Geriatr Psychiatry 2002;17:6–13.
60. Fossey J, Ballard C, Juszcak E, et al. Effect of enhanced psychosocial care on antipsychotic use in nursing home residents with severe dementia: Cluster randomised trial. BMJ 2006;332:756–761.