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Original Study

## Process Evaluation of an Intervention for the Management of Neuropsychiatric Symptoms in Young-Onset Dementia



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### A B S T R A C T

#### Keywords:

Process evaluation  
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 young-onset dementia  
 neuropsychiatric symptoms

**Objectives:** A process evaluation was performed for an intervention aimed at improvement of the management of neuropsychiatric symptoms in young-onset dementia. Data about sample quality and intervention quality was evaluated to better understand internal and external validity. In addition, data about the implementation strategy and factors affecting implementation were evaluated to improve further implementation of the intervention.

**Design:** A model proposed by Leontjevas and colleagues consisting of first-order (validity) and second-order (implementation) data was used.

**Setting and Participants:** Care units delivering specialized treatment and support for residents with young-onset dementia.

**Measures:** A description of the recruitment, randomization procedure, and intervention reach was carried out to determine sample quality. To determine intervention quality, data on satisfaction, relevance, feasibility, and fidelity were collected through a questionnaire and reports logged on the server of the web-based intervention. A description of the implementation strategy was provided. Barriers and facilitators for implementation were collected by a questionnaire and analyzed by deductive content analysis.

**Results:** Care units varied in size and were recruited from different geographical regions in the Netherlands. The informed consent rate of the residents was 87.7%. The majority of the nursing home staff were satisfied with the intervention. However, parts of the intervention were perceived as less relevant for their own organization. The feasibility of the intervention was considered low. The fidelity differed between care units. The implementation strategy did not overcome all barriers. Factors affecting implementation covered 3 themes: organizational aspects, culture of the organization, and aspects of the intervention.

**Conclusions:** In general, our results showed sufficient internal and external validity, warranting further effect analyses. Adaptations to specific steps of the care program should be considered to increase

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feasibility and sustainability. In addition, integration of the care program into the electronic health records is expected to further improve implementation.

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In institutionalized people with young-onset dementia (YOD), neuropsychiatric symptoms (NPS) are highly prevalent.<sup>1,2</sup> NPS have been associated with negative health outcomes like a loss of quality of life, increased cost of care, and a high workload for nursing home (NH) staff.<sup>3–5</sup> Psychotropic drugs are often used in the treatment of NPS in institutionalized people with YOD,<sup>1</sup> which are negatively associated with quality of life in both YOD and LOD.<sup>3,6–8</sup> Therefore, in the Behavior and Evolution of Young-ONset Dementia part 2 (Beyond-II) study, an intervention for the management of NPS in YOD was implemented on long-term care units offering specialized treatment and support in YOD.<sup>9</sup>

A randomized controlled trial (RCT) was conducted to evaluate the effect of the intervention on the prevalence of NPS and psychotropic drug use (PDU) in NH residents with YOD, and workload, absenteeism, and job satisfaction of the NH staff.<sup>9</sup> To interpret the outcomes of the RCT, information about internal and external validity is important.<sup>10</sup> Internal validity refers to the extent to which effects are a result of the intervention.<sup>11</sup> For example, an RCT could fail to find an effect of a potential successful intervention because of too small sample sizes.<sup>11</sup> External validity refers to the generalizability of the effects of the intervention.<sup>11</sup> For instance, if recruitment rates are low, the research population might not be representative of a wider population.

Besides information on validity, a better understanding of the implementation process is necessary to understand why the intervention was or was not effective and how to improve sustainability in clinical practice.<sup>10,12,13</sup> A recent editorial stated that as a result of practical difficulties in conducting applied research in the context of daily practice, it is naïve to expect that complex intervention in NHs are always completely carried out as planned.<sup>14</sup> Therefore, potential successful interventions might fail to show effect because they were not delivered as intended.<sup>12,15–17</sup> This is expressed as low treatment fidelity.<sup>12,17</sup> To allow for conclusions about the effectiveness of the intervention in clinical practice, it is important to understand the relationship between contextual factors and the effectiveness of the intervention, rather than trying to control for contextual influences.<sup>13,16</sup> This context consists of all factors, external to the intervention, that might facilitate or hinder implementation.<sup>17</sup> Previous implementation studies in NHs have already reported on the contextual barriers for implementation such as staff turnover, staff shortage, low staff motivation, lack of leadership, absence of management support, and organizational changes.<sup>18–20</sup> To try to overcome these contextual barriers and increase effectiveness of our intervention, an implementation strategy was developed alongside the intervention. Reporting on the used implementation strategy and how it was received is important as it would provide future users of the intervention with vital information about how to reproduce the intervention.<sup>10,17,21</sup>

A process evaluation provides knowledge on validity and implementation.<sup>10</sup> Therefore, in this study, a process evaluation was performed for an intervention aimed at improvement of the management of NPS in institutionalized people with YOD (1) to establish internal and external validity and (2) to provide information about the implementation strategy and factors affecting implementation.

## Methods

This process evaluation is part of the Beyond-II study and was conducted before effect analysis of the intervention. The design of the

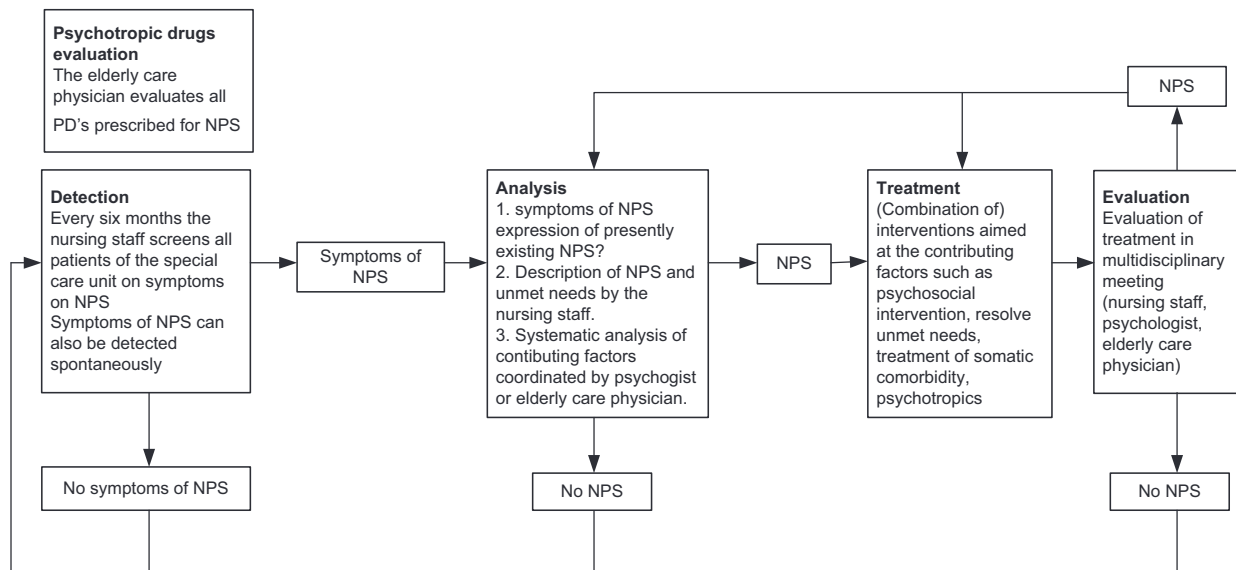
Beyond-II study and information about the development of the intervention are described in full detail elsewhere.<sup>9,22</sup>

## Intervention

The intervention in this study is based on the “Grip on Challenging Behavior” care program.<sup>22,23</sup> After implementation of this care program in late-onset dementia (LOD), a decrease in NPS and PDU as well as an increase in job satisfaction of the NH staff was found.<sup>24,25</sup> The care program provided guidance for the multidisciplinary team involved in the management of NPS in Dutch NHs (nursing staff, specially trained elderly care physicians and psychologists)<sup>26,27</sup> to structure the process of detection, analysis, treatment, and evaluation of NPS (Figure 1). NPS could be every form of behavior that is perceived as challenging by the NH resident or by people surrounding the residents (eg, NH staff, relatives, other residents), encompassing various symptoms including affective symptoms such as depression, anxiety, and apathy, and behavioral symptoms such as aggression, agitation, disinhibition, delusions, and hallucinations.

The steps of the care program were consecutive and formed a cycle, except for the evaluation of appropriateness of psychotropic drug prescription, which was a separate step (Figure 1). The first step of the care program was detection of NPS. This occurred through usual observations of the multidisciplinary team or with the use of a screening tool every 6 months by a vocational nurse. The screening tool was based on the Neuropsychiatric Inventory–Questionnaire (NPI-Q).<sup>28</sup> After NPS were detected, a structured analysis of the NPS was conducted by the vocational nurse. The analysis contained questions regarding the time and place of occurrence of the NPS, possible causes, and actions already undertaken by the care staff. In addition, a tool for the detection of unmet needs possibly underlying the NPS was used by the vocational nurse. The tool was adapted and extended based on the Dutch version of the Camberwell Assessment of Need for the Elderly (CANE).<sup>29,30</sup> When necessary, the physician and/or the psychologist continued the analysis. Their analyses consisted of a checklist to rule out physical or psychiatric causes (physician) or a functional analysis of the NPS (psychologist). After the analysis of the clinician, treatment options were discussed within the multidisciplinary team and a treatment plan was established by a clinician (psychologist or physician). The treatment plan contained a specifically defined, measurable treatment goal. The care program did not prescribe a specific intervention. The choice of the intervention relied on the hypothesized causes of the NPS, the preferences of the resident, and the available options in the NH. However, in accordance with the guidelines on the management of NPS,<sup>31–33</sup> psychosocial treatments were preferred, with PDU only if other treatments had little or no effect. Treatment outcomes were evaluated by the multidisciplinary team. The frequency and severity of NPS before and after treatment were compared and if unsatisfactory, other treatments were considered or the analysis was performed again.

In a separate step of the care program, the physician used a tool for the evaluation of appropriateness of psychotropic drug prescription within the first 2 months after implementation for all residents (with or without NPS). The tool was adapted and extended based on the Appropriateness of Psychotropic Drug Prescription In Dementia (APID) instrument.<sup>34,35</sup> After this initial screening, the tool was used at the physician's own discretion.



**Fig. 1.** The 5 steps of the care program “Grip on NPS” in institutionalized people with YOD.<sup>24</sup> Reprinted with permission. PDs, psychotropic drugs.

### Process Evaluation Model

Previous NH intervention studies successfully used a model proposed by Leontjevas and colleagues, following the framework of Linnan and Steckler.<sup>10,18,36</sup> In line with this model, first-order process evaluation data consisting of sample quality and intervention quality are evaluated to better understand the internal and external validity. In addition, second-order process evaluation data consisting of knowledge on the implementation strategy and factors affecting implementation is evaluated to improve further implementation.<sup>10</sup>

### First-Order Process Evaluation

To evaluate sample quality, a description was provided of (1) the recruitment and randomization of the YOD SCUs and (2) the recruitment and informed consent procedure of the NH residents. Also, intervention reach was described by (3) a description of the proportion of residents participating in the study in relation to the number of residents eligible for inclusion and (4) the proportion of staff involved in the use of the care program.

Intervention quality was determined by (1) the satisfaction with and relevance of the care program, (2) the feasibility of the care program, and (3) fidelity of the intervention. The satisfaction with and relevance of the care program were investigated at the end of the study with a questionnaire, which was distributed among vocational nurses, physicians, and psychologists. Participants were asked if they would recommend the care program to other colleagues (answer categories: yes, no, unknown). Additionally, for each step of the care program (Figure 1), they were asked if they perceived it as relevant steps in the management of NPS (answer categories: yes, no, unknown).

To investigate feasibility, participants were asked if they were able to perform the care program in the current available time, using a questionnaire (answer categories: yes, no). Fidelity of the intervention was evaluated by establishing the proportion of the multidisciplinary team participating in an educational program (which was part of the implementation strategy). In addition, the extent to which the care program was performed for each NH was logged on the server of the web-based environment providing data on the number of identified residents with NPS and data on how often each step of the care program was completed.

### Second-Order Process Evaluation

A detailed description of the implementation strategy used alongside the intervention was provided. Furthermore, barriers and facilitators for the implementation of the intervention were inventoried through open-ended questions on a questionnaire.

### Data Collection Procedure

Quantitative data were analyzed with the Statistical Package for the Social Sciences (SPSS) version 22 by calculating descriptive data (frequencies, percentages, and standard deviations). To analyze the qualitative data, a deductive content analysis was performed.<sup>37</sup> The first author (B.A.) developed a structured analysis matrix based on the implementation knowledge of the original care program developed in the “Grip on Challenging Behavior” study.<sup>18,22</sup> This study identified 3 themes of implementation knowledge: organizational aspects, culture of the organization, and aspects of the intervention. Two authors (J.D. and B.A.) coded the data for correspondence with the themes separately. Disagreements were solved by discussion.

## Results

### First-Order Process Evaluation

#### Recruitment and randomization of young-onset dementia special care units

YOD special care units (SCUs) were recruited through NHs that are affiliated with the Dutch YOD Knowledge Center (DKC). Twenty-five NHs were approached, of which 15 decided to participate. Two YOD SCUs were excluded because they were considered to be small (less than 12 residents). Reasons for refusing to participate were planned reorganizations and participation in other research projects. The 13 SCUs that participated varied in size at time of inclusion (mean = 25.9 residents, standard deviation = 11.9). The SCUs were located in different geographical regions of the Netherlands, of which 5 were in the densely populated western part of the Netherlands.

#### Recruitment and informed consent procedure of the NH residents

The inclusion and exclusion criteria<sup>9</sup> were provided to the staff of the participating YOD SCUs for the initial selection of residents eligible

for the study. The NH staff provided the legal representatives of the residents who probably met inclusion criteria with informed consent (IC) forms and folders with information about the study. The SCU implemented the intervention on a unit level. Therefore, all legal representatives were informed that residents without IC also would be exposed to the intervention. To respect privacy, no data on demographic characteristics and the presence of NPS were collected by researchers from residents who did not provide IC. During the study, deceased residents could be replaced by newly admitted residents.

#### Residents' reach

Before the first assessment, IC was provided for 213 (87.7%) residents. In 11 SCUs, IC was provided for more than 87.0% of the residents,

and in 2 SCUs approximately 60.0% of the legal representatives did provide IC (Figure 2). At each of the 4 assessments, approximately 15% of the participating residents had moved to another unit or had deceased. Of the newly admitted residents, only few legal representatives did not provide IC. Although IC was often provided for newly admitted residents, there was a small decline in the number of residents participating in the study (Figure 2). This decline was due to a decrease in size of the SCUs. Two SCUs closed beds because of organizational changes.

#### Nursing home staff reach

In total, 323 nurses, 16 psychologists, 16 physicians, and 9 team leaders were involved in the use of the care program at the time of the

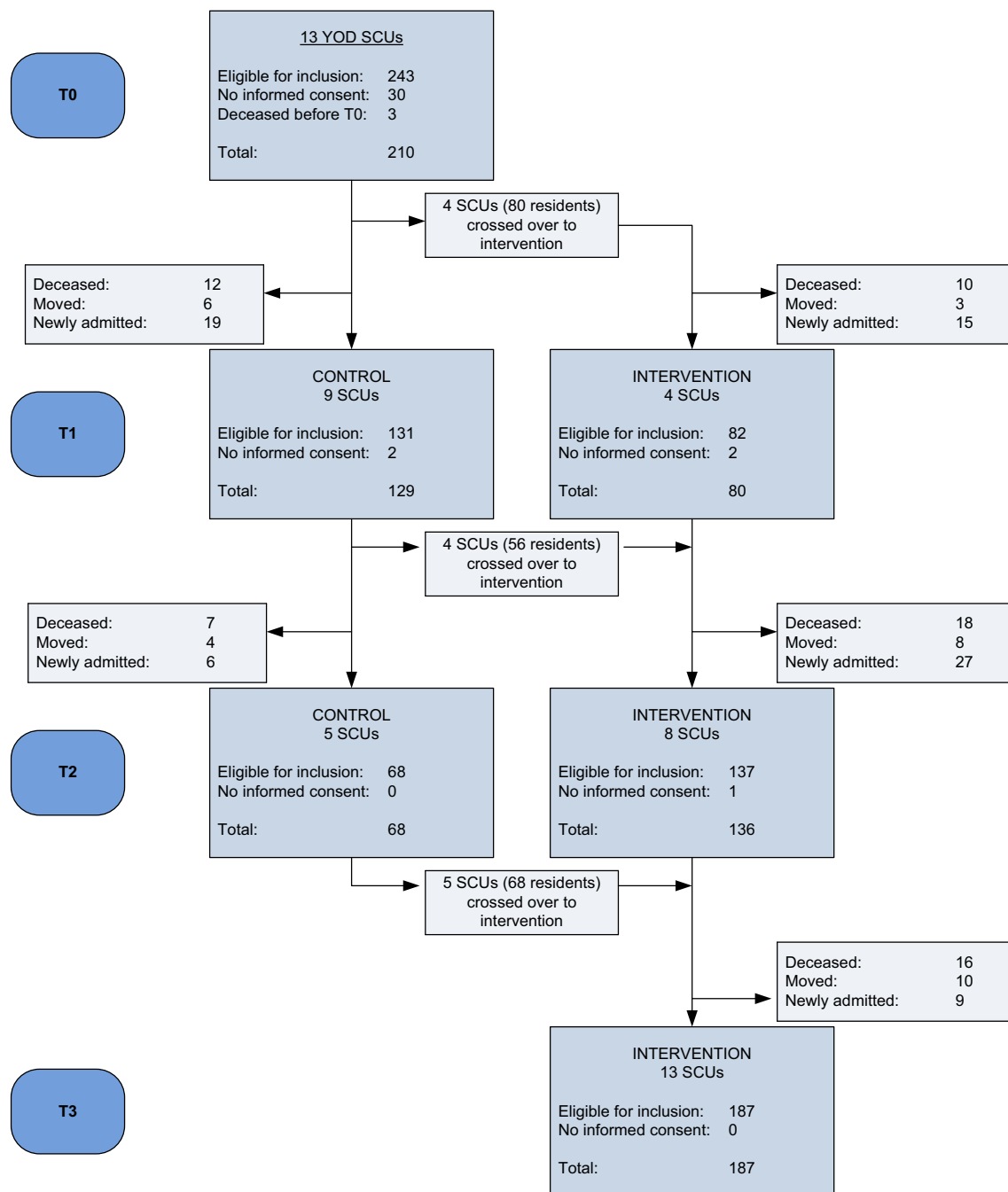


Fig. 2. Results of recruitment of the residents of the Beyond-II study. There were 4 half-yearly assessments: T0, T1, T2, T3.



first assessment. Of these, 23.8% (n = 77) of the nursing staff, 25.0% (n = 4) of the psychologists, 25.0% (n = 4) of the physicians, and 44.4% (n = 4) of the team leaders were not working on the SCU anymore at the last assessment. Main reasons were organizational changes, transfer to another unit or other health care organization, retirement, or maternity leave. For all physicians and psychologists who left during implementation, new clinicians were employed. They received information and instruction about the care program from colleagues or from one of the researchers. Four team leaders left because of organizational changes and were not replaced.

*Satisfaction with and relevance of the care program*

At time of the last assessment, 82 NH staff members (74.6%) responded on a web-based questionnaire. Fifty-eight percent (n = 35) of the respondents were satisfied with the overall content of the care program, and 55.0% (n = 33) would recommend the care program to other colleagues. The step analysis by the nursing staff was perceived as the most relevant in the management of NPS (perceived as relevant by 43.9%, n = 29) (Table 1). After the analysis by the nursing staff, the step evaluation was perceived as most relevant in the treatment of NPS (perceived as relevant by 42.1%, n = 8). The critical appraisal of the appropriateness of PDU was most often perceived as irrelevant (83.3%, n = 5).

*Feasibility of the care program*

With regard to the feasibility of the care program, most respondents (61.9%, n = 39) stated that it was not feasible to use the care program in the time available to them in day-to-day practice. Especially the steps “analysis by the nursing staff” and the “detection of unmet needs” were rated as too time consuming.

*Fidelity of the intervention*

Of the nursing staff, 48.0% (n = 155, standard deviation = 24.3) participated in the educational program (part of the implementation strategy). In 3 SCUs, 76.0% to 95.0% participated, in six 32.0% to 54.0% participated, and in 4 SCUs 17.0% to 26.0% participated. With regard to the clinicians, 50.0% (n = 8) of the psychologists and 43.8% (n = 7) of the physicians participated in the educational program. Of the 9 SCUs that employed a team leader, all but 1 team leader (88.9%, n = 8) participated in both training sessions. The main reasons for both the nursing staff and the clinicians not participating were being on leave or being ill.

Server logs of the care program showed that the care program was used for 368 residents (range per SCU = 6–66 residents). Although we only collected data from residents who met inclusion criteria and for whom IC was provided, the anonymous server logs also contain

residents not participating in the study. This might result in an overestimation of fidelity. Furthermore, after detection and analysis, the NH staff may conclude that there are no signs of NPS (Figure 1). Therefore, the number of times the steps “treatment” and “evaluation” are completed will be lower compared to the other steps. The step of the detection of NPS was performed most often (completed 415 times). The step of the construction of a treatment plan was used the least (completed 41 times), followed by the PDU assessment (completed 45 times) (Table 2). Fidelity differed among the SCUs. Only 1 SCU performed the step detection twice. The assessment of PDU was not (or only once) used by 9 SCUs. Six SCUs did not (or only once) use the later steps of the care program: treatment and evaluation.

*Second-Order Process Evaluation*

*Implementation strategy*

A multicomponent implementation strategy was used to increase acceptability (the perception that the care program is satisfactory) and adoption (the intention to use) of the NH staff and increase feasibility, fidelity, and sustainability (the extent to which the care program will be maintained) of the intervention.<sup>12,21</sup> The strategy was based on perceived barriers in implementation of the original care program in LOD.<sup>18</sup>

To increase acceptability and adoption, at the start of the implementation the NH staff received an educational program that consisted of 2 training sessions (of 2.5 and 1.5 hours, respectively). In the educational program, the causes and mechanisms of NPS were explained and the need for a specific intervention in YOD was discussed. In addition, instruction in the use of the care program was provided. This educational program was given by one of the authors (J.D. or B. A.). To increase fidelity and sustainability, 6 months after implementation all NH staff received an additional training (of 1.5 hours). In this training session, facilitators and barriers for implementation of the care program in the own organization were discussed and the NH staff was stimulated to think about how to address these barriers and therewith facilitate further implementation.

To increase acceptability, fidelity, and sustainability, a champion supporting the implementation of the care program was appointed in all participating YOD SCUs. The NH staff working on the YOD SCUs decided who would become champion using the following selection criteria: has to be a user of the care program or closely involved (eg, team leader), has to have leadership in the multidisciplinary team (eg, vocational nurse, physician, psychologist, or team leader), has to be easy to approach, has to be supporting of the care program, and has to be capable of motivating the team. Together with this champion, possible barriers and facilitators for successful implementation were explored using a questionnaire before and every 6 months during the implementation of the intervention. If possible, the barriers were addressed and facilitators were used to further enhance implementation in that particular SCU.

In the original care program, providing the care program on paper forms was perceived as a barrier for implementation because it did not attune with the current working methods and electronic health records.<sup>18</sup> Therefore, to increase feasibility, the current care program was offered in a web-based format.

*Factors affecting implementation*

Data on barriers and facilitators for implementation were organized into the 3 major themes identified in previous implementation research<sup>18,22</sup>: organizational aspects, culture of the organization, and aspects of the intervention (Table 3).

*Organizational Aspects*

Barriers from an organizational perspective were high rates of temporary staff or low-educated staff and organizational changes (eg,

**Table 1**  
Perceived Relevance of Each Step of the Care Program by Nursing Home Staff Members

	Relevant, % (n)	Irrelevant, % (n)	Not Able to Rate, % (n)
Detection	27.50 (19)	49.30 (34)	23.2 (16)
Analysis nurses	43.90 (29)	30.30 (20)	25.80 (17)
Needs assessment*	34.50 (20)	19.00 (11)	46.60 (27)
Involving family in needs assessment	29.50 (13)	13.60 (6)	56.80 (15)
Analysis clinician <sup>†</sup>	37.50 (9)	37.50 (9)	25.00 (6)
Treatment <sup>‡</sup>	31.80 (7)	36.40 (8)	31.80 (7)
Evaluation <sup>‡</sup>	42.10 (8)	26.30 (5)	31.60 (6)
PDU assessment <sup>‡</sup>	16.70 (1)	83.30 (5)	—

Overall, 22.7% (n = 25) of the questionnaires were incomplete. Questions that were available were also included in the analysis.

\*Part of analysis nurses.

<sup>†</sup>Only rated by psychologists and physicians.

<sup>‡</sup>Only rated by physicians.

**Table 2**  
The Extent to Which Each Step of the Care Program Was Performed

	Unit Size* (Residents)	Group <sup>†</sup>	Residents in Care Program <sup>‡</sup>	PDU Assessment <sup>§</sup>	Detection	Analysis Nurses (After Screening Tool) <sup>  </sup>	Analysis Clinician	Treatment <sup>¶</sup>	Evaluation <sup>¶</sup>
YOD SCU number									
1	36	1	49	1	95	56 (42)	43	6	6
2	48	1	66	1	129	106 (85)	99	11	17
3	32	1	32	0	42	29 (24)	14	2	2
4	18	1	22	11	33	36 (26)	22	1	1
5	14	2	16	0	11	7 (3)	5	0	0
6	14	2	13	12	16	9 (4)	8	2	2
7	18	2	22	0	2	14 (2)	21	10	14
8	45	2	37	0	9	10 (7)	10	0	0
9	22	3	39	12	16	18 (10)	18	5	3
10	21	3	6	0	6	5 (5)	7	0	0
11	20	3	20	8	19	13 (11)	9	1	1
12	35	3	39	0	28	18 (15)	11	3	7
13	14	3	7	0	9	8 (7)	11	0	0

\*At time of inclusion (T0).

<sup>†</sup>Period of working with care program Group 1: 18 months, Group 2: 12 months, Group 3: 6 months.

<sup>‡</sup>Including residents who moved, those deceased, newly admitted residents during implementation, and residents residing on the care unit who did not participate in the study. Therefore, for an SCU the unit size can be smaller than the number of residents in the care program.

<sup>§</sup>Times each step of the care program was completed.

<sup>||</sup>Times that the analysis was followed after the screening tool for the detection of NPS revealed symptoms of NPS. The remaining times followed after the detection of NPS in daily observations (without the use of the screening tool).

<sup>¶</sup>Step is only completed if step analysis nurses reveals neuropsychiatric symptoms and clinician perceives treatment as necessary. Therefore, these steps will be less often completed compared to the other step.

**Table 3**  
Facilitators and Barriers During the Implementation

Themes	Categories	Barrier	Facilitator
Organizational Aspects	Multidisciplinary collaboration		Regular multidisciplinary meetings facilitated collaboration and regular contact in which the forms were discussed.
	Staff shortage	High rates of temporary staff or low-educated staff increased the workload and hindered implementation.	
	Staff turnover	New staff members are not always well informed and did therefore not work according to the intervention. Also, when new staff members do receive sufficient instruction in the use, it takes time to really get acquainted with the use.	
	Organizational changes	Changes like renovation of the care unit or transition toward self-directed teams interfered with implementation of the care program.	
	Involvement in other projects		Limited involvement in new (research) projects, which could interfere with carrying out the care program.
Culture of the care unit	Openness to the change in working routines and procedures		NH staff that expected the care program to be beneficial and agreed with participation in the study were more eager to invest time.
	Support of the ambassador		An ambassador who motivated involved disciplines facilitated implementation.
	Support of the management		Some care units received extra budget from the management to facilitate successful implementation.
	Involvement in educational program		Involvement of the whole multidisciplinary team (nursing staff, psychologist, elderly care physician) in the educational program increased commitment and motivation for the use of the care program. However, not all NH staff participated.
Aspects of the intervention	Overlap with current working method	Overlap between steps of the care program and the NHs' usual working methods in the management of NPS.	

renovations or transitions toward self-directed teams). In addition, high rates of staff turnover was perceived as a barrier, as new staff members were not always well informed about the care program and needed time to get acquainted with the use.

An organizational facilitator was limited involvement in new research projects during the implementation of the care program that could interfere with carrying out the care program. In addition, regular multidisciplinary meetings were perceived as a facilitator. Several SCUs, in which the disciplines did not meet each other regularly, started with multidisciplinary meetings (at least once every 2 weeks) before implementation of the care program.

Being made aware that involvement in new research projects could interfere with implementation, made it easier to reject requests for participation of the care unit in other important projects. [P7]

### *Culture of the Organization*

A barrier related to the culture of the organization was lack of involvement of the multidisciplinary team in the educational program. Involvement in the educational program increased commitment and motivation in the use of the care program. However, not all NH staff participated.

A cultural facilitator was the openness to changing working routines. The NH staff often mentioned that they found it necessary that a care program for the management of NPS would be implemented on their care unit and were confident that the care program would diminish NPS, which made them more eager to invest time in implementation. In addition, the support of the champion and support of the management were often mentioned as facilitators for implementation.

Implementation is time consuming and sometimes frustrating. To be honest, we are still not there yet. However, I believe our residents will benefit from this intervention and therefore we will continue with implementation. [A12]

### *Aspects of the Intervention*

Respondents mentioned overlap with current working methods, especially with tools already available in the electronic health record. Because it was mandatory to report information on the management of NPS in the electronic health record, the NH staff was more inclined to continue to work according to their old working routine. No facilitators were revealed within this theme.

We did not let go our own working methods during implementation. In addition to the forms of the digital care program, it was mandatory to still use our own forms in the electronic health record. In my experience this doubled the work. [Z5]

## **Discussion**

First-order process data on validity showed that the participating SCUs varied in size and location. The informed consent rate of the residents was 87.7%. Most NH staff members were satisfied with the overall content of the care program. However, parts of the intervention were perceived as less relevant for the own organization. The feasibility of the intervention was considered low. The fidelity differed between steps of the care program and SCUs. Second-order process data on implementation showed that staff turnover and shortage, organizational changes, lack of involvement in educational program, and overlap with current working methods were barriers for

implementation. Facilitators for implementation were multidisciplinary collaboration, limited involvement in other projects, openness to change in working procedures, and support of the ambassador and management.

### *First-Order Process Evaluation*

The variety in size of the SCUs and the location of the SCUs in different geographical regions of the Netherlands, the high proportion of residents with IC, and the sufficient sample size allow for effect analyses and generalization of the study effects.

The differences in perceived relevance and low feasibility of steps of the care program can negatively influence the applicability of the intervention and therewith hinder external validity. Adaptations to increase relevance and feasibility of some steps of the care program should be considered. The analysis by the nursing staff was most often rated as too time consuming and the needs assessment in this analysis was not perceived relevant for all residents (ie, in advanced dementia or for residents who had been residing on the SCU for a long period). To increase the relevance and feasibility, the needs assessment could be changed into an optional step in the care program reserved for newly admitted residents or residents whose needs are still unclear according to the vocational nurse. However, one should be aware that an extensive (and therewith possibly time consuming) analysis of the behavior is a precondition to identify the underlying cause. Therefore, special attention needs to be directed to strategies to further increase adoption of the care program by the NH staff.

Fidelity of the intervention was not optimal. The low participation rates in the educational program in some SCUs and the differences in degree of implementation between steps of the care program will likely reduce the effectiveness of the intervention and therewith decrease internal validity. To investigate possible differences in effects due to low treatment fidelity in some SCUs, subgroup analysis including participation rate and care program performance should be part of the effect analyses.

### *Second-Order Process Evaluation*

Despite the use of an implementation strategy that was successful in addressing some of the barriers already known from previous research, the implementation of the care program was not optimal. Some barriers known in advance, like staff turnover, staff shortage, and organizational changes, are part of daily practice and could not be resolved.<sup>18–20</sup>

In addition, steps of the program did not add to the working methods from the perspective of the NH staff. For instance, in some SCUs, a screening tool for NPS was already available in the electronic health record. To create commitment to change the old working routine, the staff needs to believe in the benefits of the intervention for the own organization.<sup>27</sup> Therefore, we believe that perceived irrelevance of some steps of the care program hindered implementation. In future implementation, more attention needs to be paid to the appropriateness (the compatibility of the intervention for the given setting) for the own organization.<sup>12</sup> Integration of the care program in the electronic health record could prevent overlap with current working methods. In addition, relevance of the intervention might increase if it is tailored to the specific working method of a specific SCU, rather than completely standardized.<sup>38</sup>

To increase fidelity by improving the participation rate of the NH staff in future implementation studies, changing the structure of the educational program could be considered. NH staff usually works according to a schedule. Enabling the NH staff to follow training in the intervention at different times and/or several days will likely create the opportunity for more NH staff members to participate.<sup>39</sup> This would also allow staff members who are on leave or ill—the main



reasons for not participating in our educational program—to participate.

Furthermore, although assigning champions indeed facilitated implementation, the dependency on one champion might make implementation vulnerable. Should the designated champion be less competent or depart, this would negatively impact sustainability. For future implementation, it could be helpful to share the responsibilities of the champion among several staff members.

At last, in future implementation studies, the readiness for change needs to be taken into account to increase adoption.<sup>40</sup> For example, in our study, the high prevalence rates of PDU in YOD and the high rates of inappropriate psychotropic drugs prescription found in dementia stresses the need for a tool for the evaluation of appropriateness of psychotropic drug prescription.<sup>1,2,41</sup> However, almost all physicians in our study perceived the tool as irrelevant, suggesting that they did not perceive changes were needed, thereby hindering adoption. To increase the readiness to change, more education specifically for the elderly care physicians about the importance of the tool before implementation could have been helpful.<sup>42</sup> Another solution might be to integrate the tool in the step “detection,” instead of using it as a separate step in the care program that could be used at the users’ own discretion. Consequently, the physicians would need to use the tool systematically every 6 months for all residents. By using the tool, they might perceive its benefit and thereby become more accepting. However, we should be aware that forcing the use of the tool could also create resistance and thus hinder implementation.<sup>42</sup>

## Conclusions

First-order process data revealed that the SCUs varied in size and location; the sample sizes were large enough to establish clinically relevant effects, and most respondents were satisfied with the overall content of the intervention. Therefore, sample and intervention quality allow for effect analyses.

With regard to the second-order process data, the implementation strategy was successful in addressing some of the barriers already known from previous research. However, it was impossible to control for all contextual influences. Still, we expect that creating awareness of these inevitable barriers before implementation will somewhat diminish their negative influence on the implementation process. Adaptations to specific steps of the care program should be considered to increase feasibility and relevance. We expect that integration of the care program in the electronic health records will further improve implementation. Also, tailoring the care program to the specific working method of each SCU should be considered. For future implementation studies, it is important to include strategies that take into account the readiness to change of the NH staff and increase commitment.

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