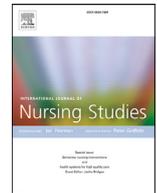




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Effects on staff outcomes and process evaluation of the educating nursing staff effectively (TENSE) program for managing challenging behavior in nursing home residents with dementia: A cluster-randomized controlled trial

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ABSTRACT

Background: Challenging behavior is prevalent in people with dementia residing in nursing homes and places a high burden on the nursing staff of dementia special care units. This study evaluates an educational program for nursing staff for managing challenging behavior: The Educating Nursing Staff Effectively (TENSE) program. This program can be tailored to care organizations' wishes and needs and combines various learning styles.

Objective: The aim of this cluster-randomized controlled trial was to examine the short-term (3 months) and long-term (9 months) effects of the TENSE training program on experienced stress, work contentment, and stress reactions at work in nursing staff working in dementia special care units.

Design: Cluster-randomized controlled trial.

Methods: Nursing staff members of 18 dementia special care units within nine nursing homes from different Netherlands regions were randomized into an intervention (n = 168) or control (n = 129) group. The TENSE program consisted of a three-day training course and two follow-up sessions after three and six months, respectively. The primary outcome was stress experienced by nursing staff measured with the *Utrecht Burnout Scale - C*. Secondary outcomes were work contentment and stress reactions at work. Furthermore, process evaluation data on the reach of and compliance with the program and the program's feasibility and relevance were collected. Data were collected between November 2012 and November 2014.

Results: In general, the participants appreciated the quality and relevance of the TENSE training and evaluated the content of the training as beneficial. The TENSE training had no effect on the components of experienced stress, i.e., emotional exhaustion (p = 0.751), depersonalization (p = 0.701), and personal accomplishment (p = 0.182). Furthermore, no statistically significant effects of the intervention on work contentment and stress reactions at work were found.

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Conclusions: The TENSE training program did not have an effect on experienced stress, work contentment, nor stress reactions at work of nursing staff working in dementia special care units. In future studies, more focus on practicing new skills seems needed.

Trial registration: NTR (Dutch Trial Registration) number NTR3620

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What is already known

- Challenging behavior places a high burden on nursing staff of dementia special care units.
- The impact of challenging behavior may be reduced by education training programs for nursing staff.
- Only a few studies investigated the effect of staff education programs on stress experienced by nursing staff, and these studies often lack methodological quality.

What this paper adds

- A new educational program for nursing staff on challenging behavior was developed: The Educating Nursing Staff Effectively (TENSE) program.
- This cluster-randomized controlled study did not demonstrate effects of the TENSE training program on experienced stress, work contentment or stress reactions at work of nursing staff working in dementia special care units.
- More focus on practicing new skills seems needed.

1. Background

Challenging behavior is prevalent in people with dementia (Selbaek et al., 2013). Around 82% of nursing home residents exhibit some kind of challenging behavior during their stay (Selbaek et al., 2013). This challenging behavior not only places a burden on the informal carers (de Vugt et al., 2005; Gaugler et al., 2009; Schoenmakers et al., 2009; Thomas et al., 2004), it has also been associated with adverse outcomes for formal carers, such as anxiety, decreased work satisfaction, emotional exhaustion, and physical health problems in nursing staff (Brodaty et al., 2003; Costello et al., 2018; Hazelhof et al., 2016; Hynninen et al., 2015; Matsumoto et al., 2007; Miyamoto et al., 2010; van Duinen-van den Ijssel et al., 2018; Zimmerman et al., 2005; Zwijsen et al., 2014b). Aggression and agitation, among the most frequently described types of challenging behavior, are particularly associated with high distress levels in nursing staff (Evers et al., 2001; Leone et al., 2013; Morgan et al., 2002; van Duinen-van den Ijssel et al., 2018; Zwijsen et al., 2014b). Nursing staff members are prone to experiencing stress when the cause of the behavior is not clear or when they consider themselves inadequately equipped to manage the behavior (Edberg et al., 2008; Kennedy, 2005; Zwijsen et al., 2014b). Our concept analysis about nursing staff stress showed that in addition to being influenced by resident behavior, the experienced stress in nursing staff is also influenced by staff factors such as age, work experience, level of nursing staff, and level of training (Hazelhof et al., 2016). In the long term, these feelings of stress are related to lower job satisfaction and a higher risk of experiencing burnout (Hazelhof et al., 2016; Kennedy, 2005; VonDras et al., 2009).

To prevent burnout in nursing staff, strategies to equip nursing staff with knowledge and skills to adequately manage challenging behavior are needed (Hannan et al., 2001). In the last decades, various staff education training programs were developed. Several of

these programs seemed to have a positive effect on the residents' quality of life and the interaction between residents and nursing staff, and were shown to result in an increase in staff knowledge (Bird et al., 2016; Elvish et al., 2014; Karlin et al., 2017). However, only a few studies have investigated the effect of staff education training programs on stress experienced by nursing staff or their job satisfaction. Furthermore, these studies reported several methodological limitations (Spector et al., 2016). The systematic review of Spector et al. (2016) concluded that studies evaluating staff education programs often lack methodological quality as a result of, for example, small sample sizes and short follow-up times. In addition, many cluster-randomized controlled trials did not adjust for clustering effects, which increased the risk of a type 2 error. More recent studies also had methodological limitations, such as the absence of control groups (McCurry et al., 2017; Rokstad et al., 2017; Sarabia-Cobo, 2015; Scerri and Scerri, 2019), low sample size (Sprangers et al., 2015) or a small number of clusters (Reuther et al., 2014).

Therefore, a new educational program for nursing staff on challenging behavior was developed: The Educating Nursing Staff Effectively (TENSE) program. This program is different from previous programs in that it has been tailored to the wishes and needs of each care organization and combines various learning styles, as recommended in the review paper by Spector et al. (2016). In addition, two follow-up sessions were incorporated to promote implementation and to achieve long-term effects with the training program (Hazelhof et al., 2014). The aim of this cluster-randomized controlled study was to examine the short-term (3 months) and long-term (9 months) effects of this new nursing staff training program on experienced stress, work contentment, and stress reactions at work in nursing staff working in dementia special care units. In addition, a process evaluation was performed.

2. Methods

2.1. Study procedures and participants

The TENSE study is a cluster-randomized controlled study using parallel groups, including 18 dementia special care units (the clusters) in nine nursing homes from different Netherlands regions. The design of this study is described in detail in the paper by Hazelhof et al. (2014).

Dutch nursing homes from all Netherlands regions were asked to participate in this study through the researchers' professional network. Nursing homes could participate in this study if (1) they had at least two dementia special care units, (2) nursing staff teams worked on one of these units exclusively, (3) no reorganization was planned for the coming year, (4) the two units had a different physician and psychologist, and (5) each unit cared for at least 15 residents with dementia. Nursing homes participated after the consent of the organization's management, the board of representatives of residents, the unit manager, and the psychologist of the proposed units. In the Netherlands, nursing homes commonly employ a psychologist and a specially trained elderly care physician (Koopmans et al., 2017).

Two dementia special care units from each nursing home were included and randomly allocated to an intervention or control group (Hazelhof et al., 2014). Each dementia special care unit had its own nursing staff, so that the risk of study-contamination was minimal. As in most cluster-randomized-controlled intervention studies, blinding for the intervention was not possible because staff members who completed the questionnaires were personally involved in the intervention. In the participating nursing homes, nursing staff members who had been employed for at least three months, were not expected to be transferred to another unit, had a healthcare-related vocational education, and worked more than one day a week were invited to participate in this study. The participating units started with the baseline measurements between November 2012 and June 2013. The last follow-up measurements were executed in November 2014.

2.2. TENSE training program

All staff members of the intervention group participated in the new TENSE training program. A full description of the training program and the tailoring to each care organization can be found in the design article of the TENSE study (Hazelhof et al., 2014). The TENSE training program was developed based on three models regarding challenging behavior: the Unmet Needs model (Cohen-Mansfield, 2001), the Progressively Lowered Stress Threshold Theory (PLST) (Smith et al., 2004) and the ABC model (Moniz Cook et al., 2012). To facilitate using the knowledge from the training program in daily practice, we included four core elements: (1) Tailoring to each care organization based on interviewing staff, management, and nursing staff about their wishes and needs; (2) Two follow-up sessions to facilitate implementation; (3) Supervision, monitoring, facilitation, and stimulation by the local psychologist and middle management and (4) Combining educational strategies for different learning styles. The training program consisted of a three-day course (3 sessions of 2.5 hours) and was followed by two follow-up sessions (2 sessions of 2.5 hours) after three and six months respectively. Before the three-day course started, an extensive semi-structured interview was conducted by the trainer with the psychologist, the elderly care physician, the team manager and some members of the nursing staff. This interview aimed to explore current (multidisciplinary) work processes and collect wishes and needs of the institution for tailoring the program. Based on these interviews, a tailored plan was developed for each care organization. The training program and follow-up sessions were provided by an experienced professional nursing staff trainer. The control units continued usual care.

2.3. Measurements

Assessments took place at baseline (T0), immediately after the 3-day course (T1), at the 3-month follow-up (before follow-up session 1, T2), and at the 9-month follow-up (T3). The short-term effects (T2, 3 months) and the long-term effects (T3, 9 months) of the intervention were the focus of this paper. Analyses were repeated, including T1, at which only data for the primary outcome were collected. Online questionnaires were used to assess the primary and secondary outcomes, completed by participating nursing staff.

The primary outcome was stress experienced by nursing staff. Stress was operationalized using the Dutch version of the Maslach Burnout Inventory: the 'Utrecht Burnout Scale - C' (UBOS-C) (Maslach and Jackson, 1986; Schaufeli and van Dierendonck, 2000). This 20-item questionnaire assessed the three components of burnout: emotional exhaustion, depersonalization, and decreased personal accomplishment. The scores were considered separately for each subscale and were not combined into a total score. The

items were answered on a 7-point Likert scale ranging from never to always. A higher score on these subscales suggested higher stress (Schaufeli et al., 2001). The validity of the three dimensions has been confirmed; reported internal consistency of the subscales was 0.70 or higher (Schaufeli et al., 2001).

Work contentment and stress reactions at work in dementia care were secondary outcomes. For evaluating work contentment, job satisfaction and job demands were measured using two subscales (with 6 and 5 items, respectively) of the Dutch questionnaire "the Leiden Quality of Work Questionnaire for nurses" (LQWQ-nurses) (Maes et al., 1999), an adaptation of "the Leiden Quality of Work Questionnaire" (LAKS) (van der Doef and Maes, 1999). We used the same version of the questionnaire as used by Zwijzen et al. (2015) and Te Boekhorst et al. (2008) (te Boekhorst et al., 2008; Zwijzen et al., 2015). In our sample, the two subscales' internal consistency appeared acceptable (Cronbach's alpha of 0.83 and 0.66, respectively). Higher scores suggested higher job satisfaction and lower job demands. *Stress reactions at work* were measured by the 2 subscales "emotional reactions at work" of the Dutch questionnaire "Questionnaire on the Experience and Evaluation of Work" (QEEW) (van Veldhoven and Meijman, 1994; van Veldhoven et al., 2002). Both 6-item scales use a sum score, with higher scores indicating more negative emotions or more positive emotions, respectively. The reported validity and reliability of the scales were good and can be considered uni-dimensional (van Veldhoven et al., 2002). In our sample, internal consistency was acceptable, with a Cronbach's alpha of 0.78 for negative emotions and 0.75 for positive emotions.

Besides the outcome measures, information about the following nursing staff characteristics was collected: age, sex, marital status (cohabitation, partner without cohabitation, single), having minor children (yes/no), level of education (primary, secondary, tertiary), and level of vocational education (registered nurse, registered nurse assistant, nurse assistant, occupational therapist). In addition, information on several work-related characteristics was collected: previous education in managing challenging behavior (yes/no), weekly working hours, being a primary nurse (yes/no), length of tenure (in months), total working time at the unit (in months), and the number of previous healthcare-related jobs (zero, one, more than one).

In addition, a process evaluation was performed according to the model of Leontjevas et al. (2012) to evaluate sampling quality and intervention quality by investigating the reach of and compliance with the program and its feasibility and relevance. To study the reach of and compliance with the program, attendance to training sessions was registered. To evaluate the feasibility and relevance of the training program, participants from the intervention units completed an evaluation questionnaire about their experiences. Information about the motivation of participants (scoring statements on a 5-point Likert scale, from strongly disagree to strongly agree), and information about the quality of several characteristics of the program (rated on a 4-point Likert scale, from poor to very good) were collected. The program content was evaluated by closed-ended questions (scoring statements on a 5-point Likert scale, from strongly disagree to strongly agree) and open-ended questions about lessons learned.

2.4. Sample size calculation

We assumed that we would include 18 nursing staff members per dementia special care unit on average and that the intervention might lead to a 4-point decrease in the primary outcome. Based on these assumptions and on a significance level alpha of 0.05, a power of 0.80, a conservative estimated correlation between two measurements of 0.6 and an ICC of 0.05, we calculated that a sample size of 121 nursing staff members in each group was nec-

essary to detect intervention effects. We needed 16 clusters, eight intervention, and eight control units to reach this sample size. Staff members who moved to another job were replaced by their successors. This study included an extra unit to compensate for possible drop out, resulting in nine control units and nine intervention units in total. A more detailed description of the sample size calculation is described in the protocol paper (Hazelhof et al., 2014).

2.5. Statistical analysis

Baseline differences between intervention and control groups were tested using independent t-tests or Mann-Whitney U tests, depending on the distribution for continuous variables and chi-square tests for categorical variables. Because of the hierarchical structure of our study (nursing staff members nested within special care units within nursing homes), we performed multilevel (mixed-model) analyses. We used a model with a random intercept and all other variables fixed and corrected for the repeated measurements on the same nursing staff member by assuming correlated errors within a member.

The difference in change over time between the control and the intervention groups was analyzed using a linear model, with the factors group, time, and the interaction between group and time. Outcome variables used in the analyses were experienced stress, job satisfaction, job demands and stress reactions at work of nursing staff members. The interaction effect between time and group was adjusted for potential confounders, such as level of vocational education, previous education in managing challenging behavior, working as a primary nurse, marital status, and resident children. Analyses were executed according to the intention-to-treat principle and involved all staff members who were randomly assigned. The short-term effects (T2 measurement, 3 months) and the long-term effects (T3 measurement, 9 months) of the intervention were analyzed. Missing data were not imputed.

Intra-cluster correlation coefficients at unit level for primary and secondary outcomes were calculated to determine whether adjusting for clustering effects is required. Furthermore, analyses were repeated, including the T1 measurement for the primary outcome experienced stress.

A value of $p < 0.05$ was considered statistically significant for all analyses, based on two-sided testing. Analyses were performed using the Statistical Package for Social Sciences (SPSS, IBM Corp., Armonk, NY) version 22.

2.6. Ethical approval

The TENSE study was conducted in accordance with the declaration of Helsinki (2013) and Dutch legislation, and in agreement with the Conduct Health Research (2004). The Medical Ethics Committee of the region Arnhem-Nijmegen confirmed that the study could be carried out without a review procedure by the committee (2012/182). The local scientific committees of the participating nursing homes approved the study. People only participated after giving their informed consent. This study was registered in the Dutch Trial Register (NTR), number NTR3620.

3. Results

3.1. Participants

Seventeen nursing homes were asked to participate in the study. Eight nursing homes decided not to participate for various reasons (e.g., too much time investment necessary, not possible to integrate into other change processes). In total, nine nursing homes, including 18 dementia special care units, participated

in this study. Participating nursing homes were spread throughout five different provinces in the Netherlands, including both rural and urban areas. All units completed the study.

At baseline, data was collected from 168 nursing staff members from the intervention units and 129 from the control units. The mean number of residents per unit was 27 in the intervention group and 21 in the control group. The mean number of nursing staff members per unit was 19 in the intervention group and 14 in the control group. The flowchart (Fig. 1) shows the losses to follow-up and the newly included staff members. In total, 109 staff members discontinued participation in the study, mostly because they were transferred to another unit or changed jobs. During the study, 52 staff members were newly included. In total, 235 staff members participated in all the measurements.

Table 1 shows the baseline characteristics of the participating nursing staff members. The majority of the participants (96%) were female, and the mean age was 41 years. Most participants were working as registered nurse assistant. The average work experience in healthcare was 15 years, and participants worked 25 hours per week on average. At baseline, participants in the intervention group had received education in managing challenging behavior less often ($p = 0.008$), worked as a primary nurse less often ($p = 0.003$), and had resident minor children less often ($p = 0.005$) compared with the control group. In addition, the level of vocational education differed between the intervention and control group ($p = 0.009$).

3.2. Primary and secondary outcomes

Table 2 shows the mean outcomes at baseline (T0), at 3-month follow-up (T2), and 9-month follow-up (T3). The analyses showed no statistically significant effect of the intervention on the components of experienced stress i.e., emotional exhaustion ($p = 0.751$), depersonalization ($p = 0.701$) and personal accomplishment ($p = 0.182$). Furthermore, no significant effect of the intervention on the secondary outcomes work contentment (job satisfaction, job demands) and stress reactions at work (positive and negative emotions) were found (Table 2). Intra-cluster correlation coefficients at unit level for primary and secondary outcomes ranged between 0.015 and 0.095, indicating that adjusting for clustering effect was required. We repeated the analyses, including T1 measurements for the primary outcome (experienced stress), but found no differences in results ($p = 0.442$; $p = 0.610$; $p = 0.214$, respectively).

Table 3 shows the short-term and long-term treatment effects of the TENSE program. Overall, the treatment effects were very small (-1.3 - 0.4).

3.3. Process evaluation

Reach of and compliance with the program. The attendance rates of the TENSE program were good (day 1: 88%; day 2: 84%; day 3: 83%). In total, 95.2% of the participants attended two or more days of the TENSE program, and 70.1% of the participants attended all three course days. The follow-up modules 1 and 2 were attended by 85.5% and 77.6%, respectively. Most nurses participated in the TENSE program because they were instructed to do so by their (team) manager ($n = 78$; 75.7%). Half of the participants thought it was a good decision to participate ($n = 53$; 51.1%) and two-third were motivated to start with the program ($n = 69$; 67.0%). Around one-third of the participants became more motivated during the TENSE program (36.0%).

Quality of the program. After the three course days, the quality of several characteristics of the TENSE program was evaluated, as displayed in Table 4 ($n = 113$). Overall, the participants considered the quality of the TENSE program fair to good. Most attendees of

Table 1
Baseline characteristics of nursing staff members in intervention and control group (n = 297).

Characteristics	Intervention (n = 168)	Control (n = 129)	Difference between groups (p-value) ^a
Age, mean ± SD	41.1 ± 12.2	40.3 ± 10.4	0.589
Sex, n (% female)	160 (96.4)	124 (96.9)	0.818
Level of education, n (%)			0.853
Secondary education	31 (18.7)	25 (19.5)	
Tertiary education	135 (81.3)	103 (80.5)	
Level of vocational education, n (%)			0.009*
Registered nurse	17 (10.4)	5 (4.0)	
Registered nurse assistant	103 (62.8)	100 (80.0)	
Nurse assistant	38 (23.2)	15 (12.0)	
Occupational therapist	6 (3.7)	5 (4.0)	
Number of previous healthcare-related jobs, n (%)			0.993
None	88 (53)	67 (52.3)	
One	50 (30.1)	39 (30.5)	
More than one	28 (16.9)	22 (17.2)	
Tenure in healthcare (years), mean ± SD	14.7 ± 10.2	16.1 ± 9.7	0.228
Working time at the unit (years), mean ± SD	5.6 ± 6.4	5.5 ± 5.9	0.914
Previous education in managing challenging behavior, n (%)			0.008*
Yes	84 (50.9)	85 (66.4)	
No	81 (49.1)	43 (33.6)	
Weekly working hours, mean ± SD	25.9 ± 6.6	25.0 ± 6.9	0.241
Marital status, n (%)			0.017*
Cohabitation/living together	116 (69.9)	103 (80.5)	
Partner without cohabitation	9 (5.4)	10 (7.8)	
Single	41 (24.7)	15 (11.7)	
Resident children, n (%)			0.005*
Yes	62 (37.3)	69 (53.9)	
No	104 (62.7)	59 (46.1)	

^a Baseline differences between intervention and control group were tested using independent t-test for continuous variables and chi-square test for categorical variables.

* p < 0.05.

Table 2
Effects of TENSE training program on primary and secondary outcomes in intervention and control group.

	Baseline (T0)		3-Month follow-up, (T2)		9-Month follow-up (T3)		P-value ^a
	Intervention (95% CI) N = 158	Control (95% CI) N = 125	Intervention (95% CI) N = 120	Control (95% CI) N = 98	Intervention (95% CI) N = 119	Control (95% CI) N = 104	
Experienced stress							
Emotional exhaustion	10.4 (8.6–12.2)	9.9 (8.0–11.8)	10.2 (8.4–12.1)	9.5 (7.6–11.5)	9.5 (7.6–11.3)	9.3 (7.4–11.3)	0.751
Depersonalization	2.8 (2.0–3.6)	2.6 (1.8–3.4)	3.0 (2.2–3.8)	2.6 (1.7–3.4)	3.0 (2.2–3.8)	2.5 (1.6–3.3)	0.701
Personal accomplishment	12.9 (11.2–14.5)	12.7 (11.0–14.5)	12.9 (11.2–14.6)	12.8 (11.0–14.6)	12.6 (10.9–14.3)	13.8 (12.0–15.6)	0.182
Work contentment							
Job satisfaction	16.3 (15.9–16.7)	16.2 (15.7–16.6)	16.1 (15.7–16.6)	16.1 (15.6–16.6)	16.0 (15.6–16.5)	15.9 (15.5–16.4)	0.940
Job demands	11.8 (11.4–12.1)	11.7 (11.3–12.1)	11.7 (11.4–12.1)	11.6 (11.2–12.0)	11.9 (11.5–12.2)	11.8 (11.4–12.2)	0.976
Stress reactions at work							
Negative emotions	9.2 (8.4–10.0)	9.4 (8.5–10.2)	9.2 (8.3–10.0)	9.0 (8.1–9.9)	8.9 (8.0–9.7)	9.2 (8.3–10.1)	0.444
Positive emotions	20.7 (19.9–21.5)	20.6 (19.7–21.5)	20.2 (19.3–21.0)	20.1 (19.2–21.0)	20.7 (19.9–21.6)	20.2 (19.3–21.1)	0.452

^a P-value of Group * Time interaction effect. N differs per analysis due to missing items.

Table 3
Treatment effects of the TENSE program.

	Treatment effect (95% CI)	
	Short-term effect (3 months)	Long-term effect (9 months)
Experienced stress^a		
Emotional exhaustion	0.2 (−1.1 to 1.5)	−0.3 (−1.7 to 1.0)
Depersonalization	0.2 (−0.5 to 0.8)	0.3 (−0.4 to 1.0)
Personal accomplishment	−0.1 (−1.6 to 1.4)	−1.3 (−2.8 to 0.2)
Work contentment^b		
Job satisfaction	−0.1 (−0.6 to 0.4)	0.0 (−0.5 to 0.4)
Job demands	0.0 (−0.4 to 0.5)	0.0 (−0.5 to 0.5)
Stress reactions at work		
Negative emotions ^c	0.4 (−0.4 to 1.2)	−0.1 (−0.9 to 0.7)
Positive emotions ^d	0.0 (−0.8 to 0.7)	0.4 (−0.3 to 1.1)

^a Higher scores indicate higher rates of experienced stress.

^b Higher scores indicate more positive experiences.

^c Higher scores indicate more negative emotions.

^d Higher scores indicate more positive emotions.

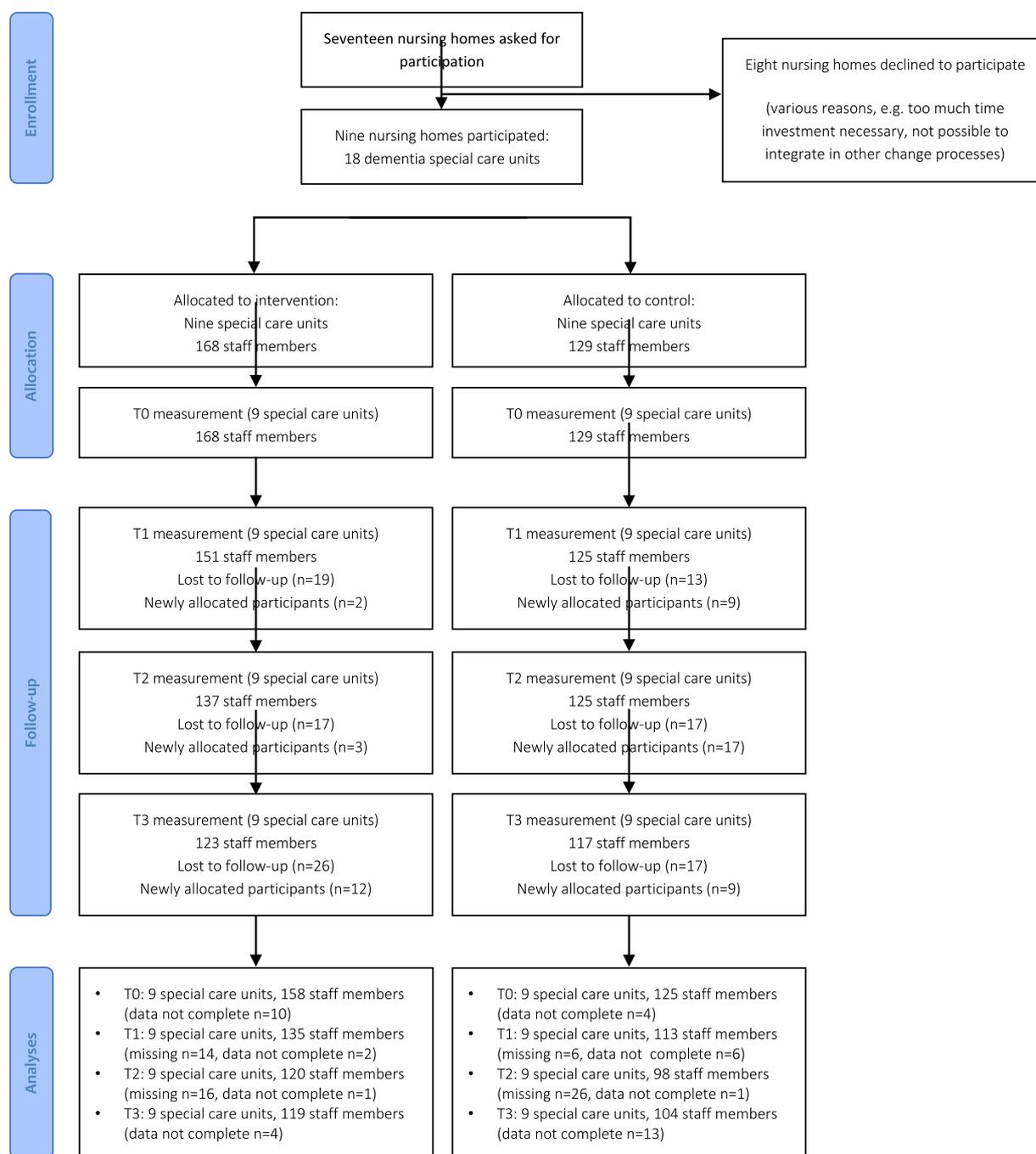


Fig. 1. Flowchart TENSE study.

Table 4
Quality of the TENSE program according to attendees (after Day 3) (n = 113).

	Good or very good (%)	Fair (%)	Poor (%)
Atmosphere during the course	53.1	46.9	0.0
Composition of the group	50.4	46.9	2.7
Personal contribution to the course	46.9	51.3	1.8
Quality of training materials	45.1	51.3	3.5
Quality of the trainer	44.4	54.9	0.9
Content of the course	42.5	54.0	3.5
Quality of the training location	40.8	53.1	6.2
Quality of the exercises	36.2	56.6	6.2
Length of the program	31.9	61.9	6.2

the follow-up days rated the follow-up days as beneficial or more or less beneficial (36.9% and 33.0%, respectively) (n = 103). Two-thirds of the participants evaluated the number of follow-up days as adequate.

Feasibility and relevance of the program. Around half of the participants (n = 56; 54.4%) agreed or totally agreed that the things they learned in the TENSE program met the behavior problems they experienced in their daily work. In most care units, dealing with challenging behavior of residents had a high priority (n = 78; 85.4%).

In total, 59 persons answered the open-ended question, "What did you learn during the TENSE program?". Participants mentioned that they learned to deal with challenging behavior (n = 46), learned to work together as a team, including the psychologist and the elderly care physician (n = 16), gained knowledge about dementia and challenging behavior (n = 14), and learned to be more reflective about their own actions (n = 4). More specifically, participants learned to reward positive behavior of the person with dementia, to explore the background and history of the person with dementia, to work according to the ABC-method, to report challenging behavior, to identify and analyze challenging behavior, to discuss challenging behavior of specific clients with the team, and became more aware of the influence of their own actions on the person with dementia.

Responding to statements about the management of challenging behavior with the following format 'in case of challenging behavior [I pay attention to how it influences my own feelings] - as is addressed in the TENSE course', at least half of the participants agreed that they were aware of the effects of their own behavior on the person with dementia (65.9%), they tried to find the cause of (challenging) behavior (62.1%), were aware of the influence of the challenging behavior on their own feelings (58.4%), and observed behavior (57.6%) and set goals as addressed in the course (50.0%). A quarter of the participants experienced improved coordination within the multidisciplinary team after the TENSE program. Forty percent of the participants indicated that they were better able to contribute to the multidisciplinary meetings.

4. Discussion

This cluster-randomized controlled study did not demonstrate significant short-term (3 months) nor long-term (9 months) effects of the new TENSE training program on experienced stress, work contentment or stress reactions at work of nursing staff working in dementia special care units. The quality of the TENSE program and the beneficence of the content were moderately appreciated.

These results are partially in line with the systematic review of Spector et al. (2016). Interventions that focused on training the staff to manage challenging behavior seemed to improve staff knowledge but did not influence experienced stress or job satisfaction (Spector et al., 2016). Several other studies did find a significant effect of their training program on experienced stress (Dichter et al., 2017; McCurry et al., 2017; Sarabia-Cobo, 2015; Sprangers et al., 2015; Zwijsen et al., 2015) or job satisfaction (Rokstad et al., 2017). A possible explanation for the differences in effects could be that, according to most participants, managing residents' challenging behavior already had a high priority in their healthcare organization, in both control and intervention units. In addition, participants in the control group more often received previous education about managing challenging behavior compared to the intervention group. Furthermore, compared with other studies (Davison et al., 2007; Jeon et al., 2012; Kuske et al., 2009; Visser et al., 2008), the participants in our study experienced relatively low stress levels at baseline – as was found in another recent Dutch study (van Duinen-van den IJssel et al., 2019).

These findings may be related to their competence and expertise. Nursing staff working at dementia special care units seem to have better knowledge about, attitudes towards, and confidence in working with residents with dementia compared to nursing staff of non-specialized units (Attard et al., 2020; Scerri and Scerri, 2019). Still, the management of residents' challenging behavior is identified as an important learning need by nurses (Attard et al., 2020), including nursing staff of Dutch dementia special care units (Dijcks et al., 2020), and the results of our process evaluation showed that most participants were motivated to learn about managing challenging behavior. Therefore, educating and training nursing staff about challenging behavior on dementia special care units remains important. However, given the relatively low stress levels found in this study, when focusing on challenging behavior, other outcome measures that are more specific to the experience of challenging behavior or positive outcomes such as nursing staff well-being might be advisable for future studies.

The results of the process evaluation showed that some of the participants were more reflective and more aware of their own actions and the cooperation within the team after the TENSE program. These results may indicate that the training contributed to the skills of nursing staff that are required for managing challenging behavior. Being able to attune to the resident and their needs, skills and wishes is important for managing challenging behavior (Klaver and Baart, 2011, 2016; Mallon et al., 2019) and nursing staff's job-related wellbeing (Willemse et al., 2015). This requires self-awareness, reflective abilities and sharing thoughts and uncertainties (Berg et al., 1998; Younas et al., 2020). A training program such as TENSE may benefit from focusing more explicitly and extensively on education about (the importance of) these skills and on exercises in practicing them.

Given our aim to reduce nursing staff stress, the focus of the program may have been too much on the resident and their challenging behavior. Factors leading to stress associated with challenging behavior are related to both the resident and the nursing staff. For example, the behavior and the physical condition of the resident and personal factors of the nurse influence the stress experienced by the nurse (Hazelhof et al., 2016). The TENSE training program primarily focused on one aspect (dealing with challenging resident behavior), and did not focus on personal factors that influence stress levels. Although the direction of the relationship between challenging behavior in residents and experienced stress in nursing staff remains unclear, focusing too much on managing challenging behavior and not personal factors and strategies to personally cope with the behavior could well be insufficient to reduce nursing staff stress levels.

Additionally, organizational factors, such as work environment, staffing levels and leadership styles also influence nursing staff's job satisfaction and experienced stress (Baek et al., 2019; Cummings et al., 2018; Moon and Shin, 2018). As such, these organizational factors may hinder or, alternatively, facilitate and enable the expression of individual needs of nursing staff and personal development. Moreover, supportive supervisors and leaders in nursing homes have been shown to be of value for job satisfaction of nursing staff (Rodríguez-Monforte et al., 2021). Also, nurse managers are key to implementing changes and bringing new knowledge and skills into practice (Verkaik et al., 2011; Brooks et al., 2011). Importantly, literature shows that implementation of skills that were newly learned in a training program could be very difficult for nursing staff because of the culture and structure of nursing home settings (Appelhof et al., 2018; Groot Kormelinck et al., 2020; Leontjevas et al., 2012; Zwijsen et al., 2014a). It is important that their managers feel that the changes fit their unit's and staff's needs and priorities and that they have discretion and control over how changes are implemented (Chuang et al., 2011). The nurse managers are important for realizing change through diffu-

ing and synthesizing information; mediating between strategy and day-to-day activities; and 'selling' the changes (Birken et al., 2012). Possibly, these managers have not been involved enough in the TENSE program. Moreover, the program did not address strategies for implementation of new skills.

These issues indicate that to reduce nursing staff stress levels, a more comprehensive approach is required. In addition to training and education, the personal needs of the staff members need to be addressed (Nolan et al., 2004). Furthermore, the involvement of supportive supervisors and leaders in nursing homes is of value to bring about change and stimulate personal development, which can result in greater job satisfaction and less stress of nursing staff (Cummings et al., 2018; Rodríguez-Monforte et al., 2021). Future training programs should further incorporate elaborate strategies to enable nursing staff members to put the learned skills into practice. It may also be advisable to include an accompanying training for supervisors addressing the creation of a working climate that facilitates wellbeing of nursing staff.

One strength of our study was that we included a relatively high number of nursing homes and dementia special care units throughout the Netherlands. Furthermore, we were able to examine both short-term (3 months) and long-term (9 months) effects. In the analyses, we controlled for the clustering of participants within units. In addition, in contrast to several earlier studies investigating nursing staff training programs, we included a control group and used validated questionnaires. Some limitations should also be considered. Due to loss to follow-up, we were not able to include the intended number of participants as calculated beforehand (Hazelhof et al., 2014). In addition, the selection of nursing homes was not entirely at random. Interested nursing homes responded to a request to participate, which could have caused sampling bias. Furthermore, we were not able to include a follow-up measurement longer than nine months for practical reasons. Therefore, we were unable to establish intervention effects over one year. Also, although participants were randomized into groups, the control and intervention group differed at baseline in terms of vocational education and previous education about managing challenging behavior, which may have influenced the results. Last, in this study only staff outcomes have been studied. For future studies it would be helpful to investigate the effects of training programs on resident outcomes as well. Irrespective of effects on stress in nursing staff, improved skills in the management of challenging behavior might lead to important increases in resident wellbeing.

5. Conclusions

The TENSE training program did not have an effect on experienced stress, work contentment, and stress reactions at work of nursing staff working in dementia care units. However, developing skills to manage challenging behavioral and to cope with the receding physical condition of residents seems important to prevent experienced stress and burnout in nursing staff. In future studies, including elaborate strategies enabling nursing staff members to put the learned skills into practice seems necessary. Furthermore, effects of training programs for nursing staff on resident outcomes need to be investigated.

Declaration of Competing Interest

None.

CRediT authorship contribution statement

Annemiek Bielderman: Data curation, Formal analysis, Writing – original draft. **Aniek Nieuwenhuis:** Data curation, Formal

analysis, Writing – original draft. **Theo J.G.M. Hazelhof:** Investigation, Data curation, Formal analysis, Writing – review & editing. **Betsie G.I. van Gaal:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Lisette Schoonhoven:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Reinier P. Akkermans:** Formal analysis, Methodology, Data curation, Validation. **Anouk Spijker:** Supervision, Data curation, Formal analysis, Validation. **Raymond T.C.M. Koopmans:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Debby L. Gerritsen:** Conceptualization, Methodology, Supervision, Writing – review & editing, Project administration.

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