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Published in:
Clinical Gerontologist

DOI:
[10.1080/07317115.2020.1740904](https://doi.org/10.1080/07317115.2020.1740904)

Publication date:
2022

Document Version
Peer reviewed version

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):

Ekiz, E., Videler, A. C., & Van Alphen, S. P. J. (2022). Feasibility of the cognitive model for behavioral interventions in older adults with behavioral and psychological symptoms of dementia. *Clinical Gerontologist*, 45(4), 903-914. <https://doi.org/10.1080/07317115.2020.1740904>

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To cite this article: Erol Ekiz, Arjan C. Videler & Sebastiaan P.J. van Alphen (2020): Feasibility of the Cognitive Model for Behavioral Interventions in Older Adults with Behavioral and Psychological Symptoms of Dementia, *Clinical Gerontologist*, DOI: [10.1080/07317115.2020.1740904](https://doi.org/10.1080/07317115.2020.1740904)

To link to this article: <https://doi.org/10.1080/07317115.2020.1740904>

Published online: 14 Apr 2020.

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Feasibility of the Cognitive Model for Behavioral Interventions in Older Adults with Behavioral and Psychological Symptoms of Dementia

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ABSTRACT

Objectives: The purpose of this study was to develop an individually tailored, non-pharmacological treatment model, the Cognitive Model for Behavioral Interventions (CoMBI), for patients with Behavioral and Psychological Symptoms of Dementia (BPSD) and comorbid maladaptive personality traits (CMPT), and to explore its feasibility and effectiveness.

Methods: CoMBI was developed and implemented in two geriatric psychiatric inpatient wards in the Netherlands. In this single-group pretest-posttest, feasibility study, 40 patients with BPSD and CMPT ($M = 73.8$, $SD = 8.5$) were treated with CoMBI. BPSD and CMPT were assessed using informant-based questionnaires. Wilcoxon signed-rank tests and effect size calculations were conducted to determine differences.

Results: Wilcoxon signed-rank tests demonstrated a significant decrease of BPSD with medium ($r = 0.45$) to large ($r = 0.56$) effect sizes. CoMBI demonstrated high acceptability and compliance by health-care professionals and family members.

Conclusions: CoMBI is a feasible treatment model for challenging behavior in patients with BPSD and CMPT. CoMBI is associated with a significant decrease in challenging behaviors regardless of etiology.

Clinical implications: Focusing on personality and associated core needs could have a key role in the non-pharmacological treatment of the elderly with BPSD.

KEYWORDS

behavioral therapy; bpsd; caregiver; CoMBI; dementia; disruptive behavior; neurocognitive disorders; non-pharmacological intervention; older adults; personality

Introduction

The global rising of life expectancy and an increasing proportion of elderly in the population are the main reasons for worldwide population aging (Heese, 2015). Because of this, the global prevalence of neurocognitive disorders such as dementia will increase. It is estimated that in 2030, 65.7 million people worldwide will suffer from neurocognitive disorders (Prince et al., 2013). Behavioral and Psychological Symptoms of Dementia (BPSD) are very common in geriatric psychiatry (Finkel, Costa E Silva, Cohen, Miller, & Sartorius, 1996). Up to 90% of the patients with a neurocognitive disorder will be affected with BPSD during the course of their illness (Cerejeira, Lagarto, & Mukaetova-Ladinska, 2012). BPSD comprise a group of heterogeneous neuropsychiatric symptoms including manifestations of aggression, agitation, depression, and hallucinations. Managing

these symptoms can be experienced as challenging for patients, family, and professional caregivers (Feast, Moniz-Cook, Stoner, Charlesworth, & Orrell, 2016). It has been consistently demonstrated that BPSD affect both patient's and caregiver's quality of life (Schumann, Alexopoulos, & Perneckzy, 2019), expedite institutionalization (Colombo et al., 2007), are associated with misuse of medication (Cerejeira et al., 2012) and increase the direct and indirect costs of care (Beeri, Werner, Davidson, & Noy, 2002; Finkel, 2000). To prevent or diminish these negative effects, management of BPSD is crucial.

There is consensus that patients with BPSD should first be treated non-pharmacologically. This is mainly because pharmacotherapy carries the risk of complications and drug-interaction effects (Hersch & Falzgraf, 2007; Tible, Riese, Savaskan, & von Gunten, 2017; Wang et al., 2016). Current guidelines

in the management of BPSD recommend non-pharmacological interventions as first-line treatment (Kales, Gitlin, & Lyketsos, 2015). However, there is a variety of non-pharmacological practices demonstrating promising but mixed results, with no practice prevailing above the others (Abraha et al., 2017; Livingston et al., 2014; Scales, Zimmerman, & Miller, 2018). There are indications that individually tailored interventions increase effect size (Scales et al., 2018). Person-centered care, in which the individuality and unmet needs of the patient are recognized, seems to improve BPSD and quality of life as well (Kim & Park, 2017). In addition (cognitive), behavioral techniques have a positive effect on BPSD, especially when caregivers and staff are involved in the treatment (Abraha et al., 2017; Tible et al., 2017). Novel approaches to the treatment of BPSD, combining the above-mentioned working mechanisms, are urgently needed and might lead to a more efficacious treatment (Cerejeira et al., 2012; Cohen-Mansfield, 2018).

There are indications that BPSD can be caused or maintained by comorbid maladaptive personality traits (CMPT; Osborne, Simpson, & Stokes, 2010) and unmet needs (Algase et al., 1996). Certain premorbid personality traits, such as neuroticism, have been consistently shown to predict, or at least be associated with, specific BPSD, like depression (Low, Brodaty, & Draper, 2002; Sutin, Stephan, Luchetti, & Terracciano, 2017; Tabata et al., 2017). Prior et al. (2016) also found premorbid personality traits to be associated with elevated levels of BPSD. Especially the presence of premorbid cluster A (solitary/paranoid) and C (anxious/dependent) personality traits is associated with agitation, psychosis, and depression in patients with dementia. Osborne et al. (2010) conclude in their systematic review to direct interventions toward more psychological, person-centered models of care considering the patient's personality. So, to create a novel, person-centered approach, the premorbid personality of the patient might be a sensible starting point.

To date, cognitive-behavioral therapy, aimed at behavior change through the patient's environment, has been studied extensively as a treatment for BPSD, with moderate effect sizes (Moniz Cook et al., 2012). However, no research has been conducted focusing specifically on cognitive-behavioral therapy in patients with BPSD and CMPT. Cognitive

therapy for personality disorders (Beck, Davis, & Freeman, 2015) might be a useful framework for treating patients with BPSD and CMPT. Cognitive therapy for personality disorders assumes that every person with a personality disorder according to DSM-5 (American Psychiatric Association, 2013; e.g., narcissistic personality disorder) has core beliefs about oneself (e.g., superior), core beliefs about others (e.g., inferior) and core needs (e.g., admiration). The cognitive-behavioral framework has been rephrased as the 'ABC-model' to enhance its feasibility for nurses (Cohn, Smyer, & Horgas, 1994), and is commonly used in Dutch nursing homes as a treatment of BPSD. In this model, every Action starts Because of something in the environment and is continued by Consequences: Action Because of Consequences (ABC). 'A' refers to problematic Actions of the patient (e.g., seeking admiration over-active), 'B' refers to internal (e.g., emotional hurt) and external (e.g., retirement leading to inability to excel at work) motivators or events (the Because) threatening the core beliefs, and 'C' refers to Consequences often maintaining the problematic actions (e.g., physical and emotional abandonment by others). Consequently, when core needs remain unfulfilled due to changing circumstances (i.e., 'B'), this can induce problematic behaviors and emotions (i.e., 'A'). Intervening at 'B' (e.g., finding suitable volunteer work) or 'C' (e.g., taking the time to talk about past achievements), can avoid the core needs to be threatened and diminish or prevent problematic actions. The ABC-model puts emphasis on behaviors and environmental influences rather than cognitions and therefore seems useful in treating challenging behaviors in patients with dementia. Providing therapy for BPSD based on cognitive therapy for personality disorders might improve quality of life, increase the sense of competence of the environment, and decrease BPSD.

Cognitive therapy for personality disorders is based on a formulation that incorporates CMPT. However, it does not provide set behavioral interventions for fulfilling core needs. To that end, in this study, cognitive therapy for personality disorders was supplemented with nursing interventions from the Nursing Intervention Classification (NIC; Bulechek, Butcher, Dochterman, & Wagner, 2013). This was done in order to enhance treatment fidelity, feasibility, and predictability of the interventions for all mental health

professionals at the geriatric psychiatric health units (mainly psychiatric nurses). Main reasons for incorporating NIC-interventions were: (a) NIC is an internationally used nursing classification system, (b) psychiatric nurses in the Netherlands are accustomed to working with NIC, (c) the described nursing interventions offer concrete nursing and treatment activities, emphasizing the observational and behavioral skills of psychiatric nurses, (d) NIC has previously been associated with the treatment of personality disorders in the Netherlands (i.e., relevant NIC-categories were listed as optional nursing activities in treating patients with personality disorders), providing promising ideas for future intervention models (Bakker, Habes, Quist, van der Sande, & van der Vrie, 2016).

In this study, we wanted to include the earlier mentioned working mechanisms in the treatment of BPSD: an individually tailored approach, combining cognitive-behavioral techniques and involving caregivers/staff in the treatment. Therefore, we wanted to create a novel approach, in which we aimed to identify patients' core needs, analyze the environmental influences on the BPSD, and aim at behavior change via concrete interventions carried out by the patient's environment. We named this approach the Cognitive Model for Behavioral Interventions (CoMBI; Osterloh, Videler, Rossi, & van Alphen, 2018). Since this is the first study using CoMBI, the purpose of this study was to investigate the feasibility, acceptability, and explore the effectiveness of CoMBI. Elderly patients with BPSD and CMPT received treatment according to CoMBI. The hypothesis of this study was that CoMBI would be feasible and applicable to the treatment of challenging behavior in patients with BPSD *and* CMPT. We expected that treatment with CoMBI would be associated with a significant decrease in BPSD.

Methods

Design and participants

The current study is a feasibility study, entailing a single-group pretest-posttest research design. The study was conducted between February 2017 and January 2018 at a geriatric psychiatric ward in Heerlen, the Netherlands, and between February 2017

and January 2019 at a geriatric psychiatric ward in Tilburg, the Netherlands. The study was approved by the Medical Ethics Committee Zuyderland and both research ethics committees of the participating psychiatric wards. The study was registered in the Netherlands Trial Register database (Trial NL6478/NTR6665).

Patients admitted to both wards were screened for eligibility. At admittance, patients were found eligible for this study if three conditions were met: (1) Patient or patient's legal representative accepts participation in this study, (2) The patient is proficient in Dutch, (3) Patient's age is at least 55 years. After admittance, the patient's medical records (if available) were reviewed by the first author to determine in- and exclusion criteria. All patients demonstrating challenging behavior regardless of etiology were assessed for CMPT and treated with CoMBI. However, only patients with a major or minor neurocognitive disorder (retrieved from patient's medical record), BPSD (observed by nurses during patient's stay at the ward) and CMPT (retrieved from the medical record and/or assessed with questionnaires) were included for the study. Patients with behavioral symptoms caused by delirium, current drug-related disorders, psychotic disorders, bipolar disorders, and behavioral symptoms without CMPT were excluded. Once excluded, the patient's medical records were not reviewed again for possible changes in diagnoses. If the presence of an emerging neurocognitive disorder was unclear during their stay, the patient's medical records were reviewed again (maximum) a month after discharge to evaluate in- and exclusion criteria. If the diagnosis was still unknown, the patient was retrospectively excluded because of (probable) absence of a neurocognitive disorder.

G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) was used for the sample size calculation (Type I error: 5%, power: 80%). We expected a medium effect size (.50) based on a similar study by Bakker et al. (2011), in which patients with BPSD received person-oriented therapy, however, without incorporation of CMPT. Our study was calculated to require a sample size of $n = 34$.

Procedure

CoMBI

Firstly, we want to describe the procedure in which we supplemented the cognitive therapy for personality disorders with NIC-interventions. Relevant NIC-nursing categories (e.g., anxiety reduction) and NIC-nursing interventions within these categories (e.g., take a calm, reassuring attitude) were connected to core needs (e.g., safety) described in cognitive therapy for personality disorders (e.g., paranoid personality). Subsequently, selected nursing interventions were subdivided into three categories of interventions, namely (1) interventions for conversation content, (2) intervention attitude, (3) interventions aimed at the environment. These three categories reflect the stage of neurocognitive disorders, with the assumption patients with a minor neurocognitive disorder are more likely to benefit from interventions for conversation content, and patients with a major neurocognitive disorder are more likely to benefit from interventions aimed at the environment. Finally, in order to prevent double interventions and to keep intervention options limited and clear, a selection was made of the most appropriate interventions. This was done in consultation with psychiatric nurses and field experts, resulting in a minimum of eight and a maximum of nine nursing interventions per core need. This process led to CoMBI, the BPSD treatment model used in this study (see Table 1 for an example of CoMBI for three personality disorders). Each psychiatric nurse and occupational therapist participated in one day of training, in which the theory of the treatment model was explained and the health-care professionals practiced assessing BPSD and working with CoMBI.

Feasibility study

At admission, a psychiatrist or resident assessed the patient's mental competence regarding informed consent for the present study. This was done based on the clinical impression of the psychiatrist or resident, during the admission interview with the patient and the family member. In the case of mental competence, the patient was given oral and written information about the study. In the case of mental incompetency, the patient's representative was asked for his/her informed consent. After the informed consent, the most involved family member

Table 1. Cognitive model for behavioral interventions.

<p>Paranoid (core need: <i>safety</i>)</p> <p>Conversation content</p> <ul style="list-style-type: none"> ● Involve the patient in health-care decisions and provide factual information. ● Ask non-threatening, factual questions (ask: who, what, where, when, how; do not ask: why). ● Do not argue with the patient about his fantasies or unreal thoughts. <p>Attitude</p> <ul style="list-style-type: none"> ● Take a calm, reassuring, and neutral attitude. ● Be aware of the non-verbal message that you convey with your body language (e.g., keep physical distance). ● Prevent the patient from feeling cornered. <p>Environment</p> <ul style="list-style-type: none"> ● Ensure structure, regularity, and consistency. ● Limit the number of caregivers for the patient. ● Limit measures and environmental incentives that affect the privacy and autonomy of the patient and provide individual activities that promote autonomy and a sense of security. 	<p>Histrionic (core need: <i>admiration</i>)</p> <p>Conversation content</p> <ul style="list-style-type: none"> ● Underline the patient's strengths. ● Express admiration, praise, and compliment positive behavior. ● Check whether you have understood the message the patient wants to convey to you. <p>Attitude</p> <ul style="list-style-type: none"> ● Express interest and empathy for what the patient is saying. ● Focus all your attention on the interaction (providing the patient a sense of importance). <p>Environment</p> <ul style="list-style-type: none"> ● Contact the patient regularly to show care and create an opportunity to talk about feelings. ● Ensure that all care providers behave consistently. ● Create a stimulating climate and provide the opportunity for activities that promote patient's self-esteem.
<p>Obsessive-compulsive (core need: <i>avoidance of failure</i>)</p> <p>Conversation content</p> <ul style="list-style-type: none"> ● Explain procedures and provide information concerning expected impressions. ● Encourage noncompetitive activities. ● Do not give negative criticism and do not argue with the patient. <p>Attitude</p> <ul style="list-style-type: none"> ● Let the patient be in control. ● Change as few habits as possible in the care routine. ● Be punctual and respectful. <p>Environment</p> <ul style="list-style-type: none"> ● Schedule appointments at set times as much as possible. ● Ensure structure and regularity in the environment. ● Change as few rules as possible. 	

corroborated by patient and medical records (i.e., spouse, child) was requested to complete questionnaires to assess premorbid personality traits of the patient. All questionnaires were completed within 2 weeks after admission. Subsequently, also within 2 weeks after admission, BPSD were assessed by the first responsible nurse as the pre-measurement (T1). During the weekly multidisciplinary consultation, the staff formulated an ABC-model on one particular BPSD and a diagnostic working hypothesis according to DSM-5 diagnosis (i.e. objectified CMPT were accommodated to a DSM-5 (personality) diagnosis or core need). Based on this information, the staff chose up to three nursing interventions as compensation strategies for the activating event, which were applied at least until the next multidisciplinary consultation. During any interaction with the patient, these chosen nursing interventions were applied. The effect of the intervention was evaluated using the Neuropsychiatric Inventory – Questionnaire (NPI-Q; De Jonghe, Kat, Kalisvaart, & Boelaarts, 2003; Kaufer et al., 2000) and the Cohen-Mansfield Agitation Inventory (CMAI-D; Cohen-Mansfield, Marx, & Rosenthal, 1989; De Jonghe & Kat, 1996); for a description of both measures, see the Measures section. If the BPSD was not decreased, up to three new and/or previously tried interventions were applied again until the next multidisciplinary consultation. This was repeated until the particular BPSD did not occur, had decreased sufficiently or until the patient's discharge. Whether BPSD decreased was assessed through observations by the staff and a significant decrease in the CMAI-D and the NPI-Q. Ten weeks after T1 or on the day of discharge, the same first responsible nurse assessed BPSD as the post-measurement (T2). On average once every 3 months, the psychologists of the psychiatric units were supervised in CoMBI by the first and second author. In addition, two staff meetings were organized in order to evaluate the feasibility of CoMBI. Treatment fidelity was evaluated during the weekly multidisciplinary consultation and the supervision sessions.

Measures

Primary outcome

The primary outcome, BPSD, was assessed using the NPI-Q and CMAI-D. The NPI-Q is an informant-

administered questionnaire, evaluating 12 domains of emotional and behavioral problems on severity (0–3), frequency (0–4), and informant distress (0–5). These domains contain delusions, hallucinations, agitation/aggression, depression/dysphoria, anxiety, elation/euphoria, apathy/indifference, disinhibition, irritability/lability, motor disturbance, nighttime behaviors, eating. For this study, we were interested in the severity scores (NPI-Q-S) of the individual domains (i.e., 0 = absent, 1 = mild, 2 = moderate, 3 = severe). The total severity score ranges from 0 to 36. The NPI-Q has demonstrated acceptable psychometric properties (De Jonghe et al., 2003; Kaufer et al., 2000).

The CMAI-D evaluates 29 observable behaviors on a 7-point scale of frequency (1 = never, 7 = several times an hour), providing a sum score ranging from 29 to 203. Factor analysis discriminated three categories of problematic behavior by patients with dementia, i.e., physical aggression, physically non-aggressive behavior, and verbally agitated behavior (Zuidema, de Jonghe, Verhey, & Koopmans, 2007). The CMAI-D is useful for measuring agitated behaviors in patients with dementia, demonstrating good reliability (Cronbach's alpha 0,82) and validity (De Jonghe & Kat, 1996)

Personality traits

Since the participants of this study were patients with a neurocognitive disorder, self-report questionnaires or interviews could not be validly applied to assess personality traits. Thence, CMPT were assessed using the following informant-based questionnaires: the Dutch Informant Personality questionnaire (*Hetero-Anamnestiche Persoonlijkheidsvragenlijst*: HAP; Barendse & Thissen, 2006; Barendse, Thissen, Rossi, Oei, & van Alphen, 2013), the Gerontological Personality disorders Scale (GPS; Van Alphen, Engelen, Kuin, Hoijsink, & Derksen, 2006) and the Personality Inventory for DSM-5 – Informant Brief Form (PID-5-IBF-NL; Krueger, Derringer, Markon, Watson, & Skodol, 2012; Rossi, van Alphen, de Weerd, Markon, & Krueger, 2014). These questionnaires were selected, because they have been specifically developed for, and studied in, older adults (Barendse et al., 2013; Penders, Rossi, Metsemakers, Duimel-Peeters, & van Alphen, 2016), or were found to be age neutral (Debast, Rossi, & Van Alphen, 2018; Van den Broeck,

Bastiaansen, Rossi, Dierckx, & De Clercq, 2013). Finally, the patient's prior DSM-5 personality disorder diagnoses (if present) were also used.

The HAP is validated for the elderly and aims to assess premorbid personality traits. The questionnaire is completed by a close relative of the patient. The questionnaire consists of 62 questions administered on a 3-point scale, measuring 10 personality scales. Interrater reliability and test-retest reliability are good to excellent (Barendse et al., 2013). Furthermore, internal consistency of the content scales varies from .63 to .82 Cronbach's alpha for the total population (Barendse & Thissen, 2006). In this study, a CMPT was identified as one if the patient's standard score on a HAP-subscale was 'high' or 'very high,' corresponding to a percentile score of ≥ 85 . The test instruction states that this is a clinically significant deviation (Barendse & Thissen, 2006).

The GPS is a brief Dutch questionnaire, developed to screen for personality disorders in the elderly. The questionnaire consists of 16 'true/false' items, measuring two domains (Habitual Behavior and Biographical Data). A sum score of ≥ 5 on at least one domain of the self-report version confirms the suspicion of a (premorbid) personality disorder (Van Alphen et al., 2006). In this study, the same cutoff score was used for the informant version. GPS demonstrated good psychometric properties. The test-retest correlation of the two domains is respectively moderate (Cronbach's alpha .72) to excellent (Cronbach's alpha .89). The criterion validity is fair, with both sensitivity and specificity of 70% (Van Alphen et al., 2006).

The PID-5-IBF is an informant-inventory that ties in with the alternative model for personality disorders of DSM-5, assessing criterion B, the five maladaptive personality domains (Negative Affect, Detachment, Antagonism, Disinhibition, Psychoticism). PID-5-IBF appears to be a promising and relatively age-neutral questionnaire (Van den Broeck et al., 2013). PID-5 is available as an extensive and shortened self-report and informant list. The shortened informant Dutch version contains 25 items that can be administered on a 4-point scale (Rossi et al., 2014). The PID-5 shows good reliability (Cronbach's alpha above .70) and validity (Quilty, Ayearst, Chmielewski, Pollock, & Bagby, 2013). PID-5-IBF has no cutoff score marking

problematic personality traits. In the extensive version, however, a mean score of ≥ 2 can be considered as clinically relevant (Bach, Markon, Simonsen, & Krueger, 2015).

Feasibility

To assess acceptability and feasibility of the intervention, we were interested in the willingness of patients to participate, the percentage of eligible patients, willingness of family members of participants to be involved in assessment procedures, response rates of nurses and family members to questionnaires, and the acceptability of the treatment to patients and professionals (Eldridge et al., 2016). We also wanted to examine these variables to guide the planning of future research on CoMBI.

Data analysis

Obtained data were analyzed using SPSS 22.0. Outcome variables were examined for normality using the Shapiro-Wilk test. Because the normality assumption was violated, Wilcoxon signed-rank tests were conducted to determine differences between T1 and T2. The effect size was calculated using the effect size formula for the Wilcoxon signed-rank test: $r = Z/(\sqrt{N_{\text{pairs}}})$ with .1 indicating a small effect size, .3 = medium and .5 = large (Cohen, 1988; Pallant, 2007).

Results

Patient flow

The CoMBI study included 40 participants. Figure 1 presents the number of included and excluded patients. Baseline characteristics can be seen in Table 2. Generally, patients and representatives were willing to participate, with 28 (9.0%) patients declining to participate. We found 138 (44.2%) patients admitted to the Mental Health-care clinics eligible for this study. However, 64 (46.4%) patients were discharged from the wards before or shortly after T1, resulting in too limited time for treatment with CoMBI. In 28 (20.3%) cases CoMBI did not seem applicable, partly because of missing informant information. Eventually, 40 (29.0%) of the eligible patients

were included for analyses (i.e., 12.8% of the admitted patients).

Main reason for exclusion was the absence of a neurocognitive disorder. A significant number of patients were hospitalized because of psychotic or bipolar symptoms. A number of these patients were initially included in the study due to diagnostic uncertainties, since there can be an overlap in symptoms of a neurocognitive disorder and other psychiatric disorders such as psychotic of bipolar disorder. Twenty-one patients were retrospectively excluded. During or after their stay at the wards, it became clear that these patients did not meet the inclusion criteria (i.e., the presence of a major or minor neurocognitive disorder). Nevertheless, all 21 excluded patients were treated with CoMBI. Main diagnoses of these patients were: depressive ($n = 8$), schizophrenia spectrum ($n = 5$), autism spectrum ($n = 2$), trauma- and stressor-related ($n = 2$), bipolar ($n = 2$), and personality disorders ($n = 1$), and brain-tumor associated personality changes ($n = 1$).

Compliance

We found family members of patients generally willing to participate in this study. In 20 cases family declined participation ($n = 7$) or did not complete any of the questionnaires ($n = 13$). Compliance of family members completing the questionnaires was best for HAP (40/40), followed by GPS (38/40) and PID-5-IBF (33/40). Missing data within these completed questionnaires were highest for HAP (5/40 had at least one missing value), followed by GPS (4/38) and PID-5-IBF (4/33). The outcome measurements had the following response ratios: T1 NPI-Q-S = 39/40, T2 NPI-Q-S = 40/40, T1 CMAI-D = 38/40, T2 CMAI-D = 34/40. Ratios of missing data within these measurements were: T1 NPI-Q-S = 0/39 had at least one missing value, T2 NPI-Q-S = 2/40 (both contained >5% missing values), T1 CMAI-D = 2/38 (both contained ≤5% missing values), T2 CMAI-D = 1/34 (contained ≤5% missing values). All measurements containing >5% missing values were excluded from the analysis. In measurements containing ≤5 missing values, these values were imputed with the mean of participant's test scores.

Figure 1. Flow chart.

CMPT = comorbid maladaptive personality traits;
BPSD = behavioral and psychological symptoms of dementia;
CoMBI = cognitive model for behavioral interventions

Acceptability of the treatment

Psychiatric nurses were enthusiastic about treating patients with CoMBI. They found the ABC-model very useful for detecting antecedents of problematic behavior. Furthermore, during staff meetings in order to evaluate the feasibility of CoMBI and in informal conversations, professionals mentioned a number of opportunities

Table 2. Baseline characteristics.

Characteristics	
Mean age, years	73.8 (SD: 8.49) [range: 57–98]
Gender	
Female, n (%)	24 (60%)
Male, n (%)	16 (40%)
Marital status	
Married, n (%)	18 (45%)
Not married, n (%)	22 (55%)
Geriatric psychiatric ward	
Heerlen, n (%)	11 (27,5%)
Tilburg, n (%)	29 (72,5%)
Mean time between measurements, days	52.1 (SD: 19.85) [range: 13–80]
Neurocognitive disorder	
Major, n (%)	30 (75%)
Alzheimer's disease	6 (15%)
Frontotemporal	1 (2.5%)
Multiple Etiologies	1 (2.5%)
Parkinson's disease	1 (2.5%)
Substance/medication-induced	1 (2.5%)
Unspecified	15 (37.5%)
Vascular	4 (10%)
With Lewy Bodies	1 (2.5%)
Minor, n (%)	10 (25%)
Personality	
DSM5-personality disorder, n (%)	9 (22.5%)
Borderline PD	3 (7.5%)
Dependent PD	1 (2.5%)
Histrionic PD	1 (2.5%)
Narcissistic PD	1 (2.5%)
Obsessive-compulsive PD	1 (2.5%)
Unspecified PD	2 (5%)
CMPT, n (%)	31 (77.5%)

CMPT = Comorbid maladaptive personality traits

provided by CoMBI. Firstly, the interventions were highly familiar to most professionals at the geriatric psychiatric wards, which especially gave the psychiatric nurses the opportunity to emphasize their observational and behavioral skills. Secondly, the interventions were arranged around personal emotional needs which gave caregivers the opportunity to look through and behind the challenging behavior presented. Thirdly, professionals claimed an increased sense of competence during the treatment of BPSD. Finally, nurses associated CoMBI with an increased feeling of treating the patient holistically as a team. In the end, 42.8% of the eligible patients were treated with CoMBI, supporting the acceptability of this treatment for patients, family members, and professionals. Most patients (46.4%) were discharged before or shortly after T1 providing limited time to intervene. In a small number of cases (10.9%), the staff chose not to apply CoMBI. This happened mainly short after the introduction of

CoMBI to the staff and during the absence of the psychologists leading the multidisciplinary consultation. CoMBI was also used in the treatment of patients without a neurocognitive disorder, providing notably decreased challenging behaviors.

Outcome

The Shapiro–Wilk test showed the distributions of NPI-Q-S T2, CMAI-D T1, and CMAI-D T2 scores to be non-normal ($p = <.05$) and the distribution of NPI-Q-S T1 to be normal ($p = .153$). To examine changes in severity and frequency of BPSD between T1 and T2, non-parametric Wilcoxon signed-rank tests were performed. Table 3 demonstrates the changes in measures through time. There was a statistically significant decrease in NPI-Q-S median scores between T1 (Mdn = 8) and T2 (Mdn = 6.5); $Z = -3.466$, $p = .001$. A similar decrease was observed for CMAI-D median scores between T1 (Mdn = 44) and T2 (Mdn = 37.5); $Z = -2.604$, $p = .009$. Furthermore, respectively medium to large effect sizes were found for CMAI-D ($r = 3.466/\sqrt{38} = .45$) and NPI-Q-S ($r = 2.604/\sqrt{34} = .56$) scores.

An incidental finding was a decrease in challenging behaviors in patients without a neurocognitive disorder. Since all 21 previously mentioned patients were elaborately treated with CoMBI, were excluded only after T2 and had given written permission to use collected data, we decided to tests on these data. In this sample, the distribution of outcome variables did not violate the normality assumption ($p = >.05$), so a paired samples t -test was performed to determine differences between T1 and T2. Effect size was calculated with Cohen's d (.2 small; .5 medium; .8 large; Cohen, 1988). Informants reported less severe emotional and behavioral problems: NPI-Q-S T1 ($M = 12.95$, $SD = 5.58$); T2 ($M = 6.53$, $SD = 2.84$); $t(18) = 4.26$, $p = .000$. Furthermore, informants experienced a reduced frequency of challenging behaviors: CMAI-D T1 ($M = 46.71$, $SD = 12.02$); T2 ($M = 36.52$, $SD = 5.38$); $t(20) = 3.46$, $p = .002$. Medium to large pretest to posttest effect sizes were found for respectively CMAI-D (Cohen's d of .76) and NPI-Q-S (Cohen's d of .98).

Table 3. Wilcoxon signed-rank tests and paired samples *t*-test results before and after the intervention.

Group	Outcome	T1			T2			<i>r</i>	<i>Z</i> -value	<i>t</i> -value	ES
		N	M	SD	N	M	SD				
NCD	NPI-Q-S	39	9.82	5.50	38	6.66	5.27	-	-3.47*	-	0.56
NCD	CMAI-D	38	50.24	16.35	34	45.71	19.36	-	-2.60*	-	0.45
Non-NCD	NPI-Q-S	20	12.95	5.58	20	6.53	2.84	-.12	-	4.26*	0.98
Non-NCD	CMAI-D	21	46.71	12.02	21	36.52	5.38	-.07	-	3.46*	0.74

NCD = Neurocognitive disorder, NPI-Q-S = Neuropsychiatric Inventory – Questionnaire – Severity; CMAI-D = Cohen-Mansfield Agitation Inventory – Dutch

* $p < .05$.

Discussion

We developed CoMBI, a treatment model based on cognitive-behavioral therapy and nursing interventions concerning patient's core needs, associated with their CMPT, and tested the feasibility of this new model. CoMBI appeared feasible and associated with a meaningful reduction of BPSD. This effect is especially prominent in the reduction of the severity of BPSD reaching a large effect size. Furthermore, a medium and significant decrease was also measured in the frequency of BPSD. Interestingly, a group of heterogeneous participants without a neurocognitive disorder also seemed to profit from CoMBI, resulting in a decrease of challenging behaviors both on severity and frequency.

As perceived during staff meetings and in informal conversations, psychiatric nurses generally embraced the treatment approach offered by CoMBI. A number of factors may have been involved in their enthusiastic reception, but we believe it is mainly because CoMBI offers easily applicable interventions aimed at persistent challenging behaviors, emphasizing the therapeutic strengths of psychiatric nurses. In addition, CoMBI provides a highly structured treatment for BPSD, which we believe increases the sense of competence and decreases the emotional burden for professionals. The acceptability of CoMBI is also demonstrated in the compliance rates. Compliance on the outcome measurement by the nurses was best for NPI-Q-S. Family members were also willing to participate. This may be because CoMBI focusses on and incorporates defining personality traits of the elderly relative before the neurocognitive illness caused troublesome symptoms. Compliance of family

members on the personality questionnaires was best for HAP and worst for PID-5-IBF.

A strength of this clinical study is the development of a new non-pharmacological treatment model for a highly complex group of psychogeriatric patients (i.e., elderly patients with multimorbidity, polypharmacy and challenging behaviors). CoMBI can be applied by a broad range of mental health-care professionals in geriatric psychiatry (i.e. psychiatric nurses, occupational therapists, psychologists, psychiatrists). An asset of this model seems to be its easily understandable and applicable character. Moreover, data suggest CoMBI might be a transdiagnostic model, treating patients with challenging emotional and behavioral problems regardless of their etiology. Finally, although there are indications that CMPT are in some way involved in BPSD, there is a lack of evidence-based treatment models combining CMPT to BPSD. In our opinion this study contributes to effective personalized treatment for BPSD.

As in other non-experimental research designs, this study has several limitations. Firstly, since there is no control group, it cannot be concluded that it was the intervention that led to the decreased outcome. Another explanation for the significant decrease of BPSD could be applied pharmacotherapy causing a reduction in symptoms such as aggression and agitation. On the other hand, the efficacy of pharmacotherapy for BPSD is rather limited (Casey, 2015). Studies into other non-pharmacological treatments for BPSD found small to medium effect sizes, most of them smaller than the effects found in the current study (Abraha et al., 2017). A second limitation of this study is that treatment fidelity and acceptability by staff were evaluated but not formally assessed. Future research should ensure (assessment of) adherence to the treatment protocol, for instance with the use of behavioral checklists, rating

videotapes of interventions, or semi-structured interviews (Bellg et al., 2004; Proctor et al., 2011). Thirdly, the chosen nursing interventions for the core needs may be disputed. Other unselected nursing interventions may be better suiting for a core need, leading up to a more effective treatment model.

A future recommendation is to investigate to what extent specific patient factors (a specific BPSD or CMPT) predict a significantly better response to CoMBI: for whom is CoMBI effective, which type and stage of dementia, which type of personality? For example, patients with more severe stages of dementia may profit less from CoMBI because, as dementia progresses, the impact of certain premorbid personality traits on current behavior decreases (Osborne et al., 2010). Another barrier of CoMBI that needs to be taken into account in future research, is that the treatment protocol does not prescribe what core needs to address, when a patient has multiple CMPT (e.g. a patient with narcissistic and obsessive-compulsive personality traits). Finally, further research should also focus on treatment with CoMBI in older adults with challenging behavior without neurocognitive disorders.

In conclusion, this study provides evidence that CoMBI is a feasible treatment model for challenging behavior in patients with BPSD and CMPT. Our findings suggest that focusing on comorbid personality traits and associated core needs could have a key role in the non-pharmacological treatment of the elderly with BPSD. However, due to the non-experimental study design, further research is needed before conclusions can be made whether it was the intervention which led to the decreased outcome. Future research could examine the effectiveness of CoMBI in a randomized and controlled study design.

Clinical Implications

- Efficacious treatment models for BPSD should be individually tailored and involve caregivers and family members.
- Focusing on personality and core needs in the treatment of BPSD is associated with a meaningful reduction of these challenging behaviors.
- CoMBI is a promising treatment model in treating BPSD in patients with CMPT.

Acknowledgments

Conflict of interest: The authors have no conflicts of interest.

Funding

This research did not receive any funding from agencies in the public, commercial, or not-for-profit sectors.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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