Reducing Behavioral and Psychological Symptoms of Dementia in Acutely Ill Patients via Patient Engagement Specialists: A Pilot Feasibility Study

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Abstract

Behavioral and psychological symptoms of dementia (BPSD) are common in hospitalized persons living with dementia (PLWD). This pilot aimed to test the feasibility of an innovative model of care, PES-4-BPSD (a dementia unit staffed with Patient Engagement Specialists, PES). Non-randomized pilot feasibility trial was conducted, enrolling $N = 158$ patients to the intervention unit ($n = 79$, a 10-bed dementia unit, staffed with nursing assistants, NAs, with mental health backgrounds, PES) and an enhanced control unit ($n = 79$, 40-bed medicine unit, staffed with NAs). All NAs/PES ($N = 63$) received dementia training, with completion rate of 82.5%. Overall, patients had ~1 NPI-Q (Neuropsychiatric Inventory Questionnaire) assessment/48 hr. 97% ($n = 153$) of PLWD exhibited at least one behavior. Average NPI-Q scores did not differ across intervention (5.36) and control (3.87) units ($p = .23$). Patients on the intervention unit had 88% ($p = .002$) shorter duration of constant observation. A dementia care unit staffed by PES is an innovative model requiring further research.

Keywords

dementia, behavioral and psychological symptoms of dementia, acute care, nursing assistants, patient engagement specialists

What this paper adds

Point 1: It is one of the first studies to target and measure BPSD in the hospital setting using a standardized measure (NPI-Q).

Point 2: The study integrates a practical dementia care training program for NAs that can be used in the real-world setting.

Point 3: it is the first study to explore the adaptation of mental health attendants as PES for the care of hospitalized PLWD.

Applications of study findings

Point 1: There is an urgent need to improve the provision of care for hospitalized PLWD. A dementia care unit staffed by NAs with mental health backgrounds is an innovative model of care that requires further research.

Point 2: Future studies must further validate the measurement of BPSD in the hospital setting and evaluate the impact of dementia care training on NAs.

Point 3: Given the specialized nature of dementia care units, future studies must better account for

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differences in control versus intervention groups as well as clinically important outcomes.

Background

Persons living with dementia (PLWD) have two times more hospitalizations than persons without dementia (Bynum et al., 2004; Feng et al., 2014; Phelan et al., 2012). Hospitalization in these patients is a seminal event that often leads to delirium, lasting functional and cognitive impairment, institutionalization, premature death, increased resource consumption, and caregiver distress (Bloomer et al., 2016; Boltz et al., 2015; Burgstaller et al., 2018; Dewing & Dijk, 2016; Fick et al., 2013; Shankar et al., 2014; Stern et al., 1997; Wancata et al., 2003).

For PLWD, the unfamiliar, complex environment of the hospital setting as well as hospital-related triggers (e.g., lack of meaningful cognitive and physical stimulation, medication changes), results in behavioral and psychological symptoms of dementia (BPSD), also referred to as "behavioral manifestations of distress," or "responsive behaviors." BPSD consist of behaviors including agitation, depression, apathy, repetitive questioning, psychosis, aggression, sleep problems, and wandering. Despite its high prevalence, BPSD during hospitalization remains largely unexplored (Sampson et al., 2014; Tannenbaum et al., 2022; White et al., 2016).

Hospital caregivers (HCGs) are currently ill-prepared to prevent and manage BPSD, which leads to poor patient outcomes as well as lower HCG job satisfaction, stress and burnout (Aström et al., 1991; Coffey et al., 2014; Dewing & Dijk, 2016; Hessler et al., 2018; Kales et al., 2015; Royal College of Psychiatrists, 2017; Scerri et al., 2017; Surr et al., 2016, 2017; Tannenbaum et al., 2022; Timmons et al., 2016). Indeed, despite the known association with adverse events, the management of BPSD in the hospital setting often consists of psychoactive drugs (antipsychotics and benzodiazepines) and at times even physical restraints (Gill et al., 2007; Jeste et al., 2008; Jones et al., 2007; Lyketsos et al., 2006; Nirmalan et al., 2004; Schneider et al., 2006; Tannenbaum et al., 2022; White et al., 2016). A national United Kingdom (UK) audit found that less than 5% of acute care hospital staff receive mandatory dementia training (Royal College of Psychiatrists, 2017).

There is limited evidence regarding the most effective approaches to support HCGs in delivering care for hospitalized PLWD. Although geriatric models of care, such as Acute Care for Elderly (ACE) units, Hospital Elder Life Program (HELP), and Nurses Improving Care for Healthsystem Elders (NICHE) have demonstrated improved outcomes, they do not specifically address the needs of PLWD or BPSD (Baztán et al., 2009; Fulmer et al., 2002; Reuben et al., 2000). Nursing assistants (NAs) are instrumental in providing care for hospitalized PLWD, yet, they have rarely been targeted

in hospital dementia care research. Further, two review articles suggested that hospitalized PLWD and HCGs might benefit from increasing involvement of mental health staff who work with patients with psychiatric conditions (Dewing & Dijk, 2016; Handley et al., 2017). Mental health staff workers have experience in behavioral communication as well as de-escalation and re-direction. Therefore, we hypothesized that training in dementia care that builds upon these PES skills will decrease BPSD and the use of constant observation. The training emphasizes brain-related changes associated with dementia and behavioral approaches that support a sense of well-being and security in hospitalized PLWD. The etiology of BPSD and evidence-based strategies are also contrasted to those behaviors discussed in the traditional PES curriculum, which focuses on serious mental illness (SMI).

Given the need for novel and practical approaches to improve dementia care, our objective was to test the feasibility of an innovative model of care, PES-4-BPSD, for reducing BPSD and improving management of hospitalized PLWD. PES-4-BPSD cohorts PLWD who display BPSD on a specialized dementia unit that utilizes NAs with a mental health background (Patient Engagement Specialists, PES).

Methods

Design. We conducted an Institutional Review Board approved (19-0800-Feinstein Institutes for Medical Research), prospective, non-randomized pilot feasibility trial to evaluate an innovative model of care (PES-4-BPSD) for hospitalized older adults (age 65 years and older) with dementia over 18 months. The intervention was implemented on one medical unit in a tertiary hospital and the enhanced control was implemented on one medical unit in a second tertiary hospital, 2.2 miles away; both located in Northeast USA. HCGs on these units had not received prior dementia care training. Inclusion criteria were: age 65 years and older and electronic health record (EHR) documentation of dementia (ICD-10 codes). A waiver of consent was obtained to pre-screen potential participants for age and history of dementia. All patients were further screened for dementia using an AD8 score of ≥ 2 (AD8 = eight item informant-based interview, obtained from family caregiver, FCG) (Galvin et al., 2005). Exclusion criteria were: terminally-ill patients and/or receiving hospice or surgery; and length of stay (LOS) of <48 hr. Medical team approval was obtained prior to enrollment. For those eligible, within 48 hr of admission, the research coordinator (RC) provided study information and obtained assent from the patient, and consent from the patient's legally authorized representative (LAR) and FCGs (if different than the LAR).

Intervention unit (PES-4-BPSD) was comprised of three parts: *I. Cohorting.* Patients with dementia and past or present indication of BPSD, acutely admitted to

the medicine or telemetry service, were cohorted on a 10-bed dementia care unit. The unit had a 1:5, 1:10, and 1:5 nurse, NA, and PES to patient ratio, respectively. *II. PES* were defined as mental health assistants with at least high school level education, who received training in de-escalation and crisis prevention techniques and provided direct personal care to psychiatric patients. In addition to constant observation (CO) and restraining suicidal or violent patients, they recorded vital signs and assisted patients with bathing, grooming and dressing, under the supervision of nurses. On the intervention unit, PES purposefully engaged patients with BPSD as an added layer of staff working 8-hr shifts. *III. Dementia Care Education and Training.* The PI, with the support of the research team, spent 12 weeks implementing the program for the PES staff. Based on the John A. Hartford Institute for Geriatric Nursing and the National Alzheimer Association publications "Try This: Best Practices in Nursing Care for Persons with Dementia," and the "Person-Centered Care Training Programme for Acute Hospitals (PCTAH)," respectively, the PES staff received 7 weekly 20-min sessions (Palmer et al., 2014; Surr et al., 2016, 2017). Sessions consisted of: dementia overview (including types and etiology, contrasted with SMI), providing person-centered care, identification of and meeting people's emotional and physical needs, effective communication, connecting to the family caregiver, the impact of the physical environment, and reframing responsive behaviors, and addressing underlying needs. To ensure all PES/NA staff received training, sessions were repeated during three shift changes.

The enhanced control unit consisted of a 40-bed medicine unit, with a 1:6 nurse/patient ratio and 1:8 NA to patient ratio, that cohorted older patients with geriatric syndromes. The management of patients with BPSD was performed by NAs (no PES). The NAs received dementia care education and training (equivalent to the intervention unit). The control unit is considered enhanced based on the element of a geriatrics-focused unit and receipt of dementia care training for NAs.

Variables, Measures, and Data Collection

Descriptive Measures. Demographic information was obtained from the EHR, including: age, gender, race, ethnicity, marital status, current living situation, and comorbidities (Charlson Comorbidity Index, CCI) (van Doorn et al., 2001). The RC conducted brief interviews with FCGs ($N = 158$) to verify patient background information and obtained dementia severity (Clinical Dementia Rating Scale, CDRS) and baseline BPSD using the Neuropsychiatric Inventory Questionary (NPI-Q) (Kaufer et al., 2000; Morris, 1997). BPSD during the time in the Emergency Department (ED) was recorded using the NPI-Q and based solely on retrospective chart review. Delirium was assessed daily by the RC using "Recognizing Acute Delirium As part of your Routine (RADAR)" (Voyer et al., 2015). The RC completed the

Brief Training and Reliability Protocol (BTRP) for CDRS and a random selection of assessments were supervised by clinical psychologists to ensure assessment accuracy (Morris, 1997).

Feasibility Outcomes: (1) Feasibility outcomes included the percentage of PES and NA dementia care training completion across all shifts (i.e., day, evening, night); (2) patient/FCG recruitment and retention rate; and (3) average number of NPI-Q assessments per patient.

Clinical Outcomes. The patient's total NPI-Q score was calculated as an average of the total scores over the course of hospitalization. The NPI-Q is a validated tool for the assessment of neuropsychiatric symptomatology (12 behavioral domains), designed to be completed by FCGs of PLWD (Kaufer et al., 2000). The NPI-Q has a sensitivity and specificity of 74.1% and 79.5%, respectively. Internal consistency of the NPI-Q was acceptable (Cronbach's $\alpha = .756$) (Kaufer et al., 2000; Wong et al., 2014). A recent Rasch analysis in hospitalized persons with dementia showed internal consistency and invariance across Black and White race and gender (Resnick et al., 2022). The presence and severity of each behavioral symptom is rated on a scale from 0 (absent) to 3 (severe), with the total score ranging from 0 to 36. Patient NPI-Q assessments were performed by a trained RC every 24 to 48 hr using a multi-modal approach consisting of EHR review and HCG (NA, PES) report (Hessler et al., 2018). HCG report was based verbatim on the NPI-Q (e.g., for nighttime behaviors the HCGs were asked, "Does the patient awaken you during the night, rise too early in the morning, or take excessive naps during the day?"). EHR review by the RA was based on the NPI-Q key words (e.g., for nighttime behaviors, words included nighttime awakenings, reversal of sleep/wake cycle, excessive sleeping during the day; for appetite/eating, words included change in eating behavior, decreased appetite; for motor disturbance, words included repetitive activities or movements). In an exploratory analysis, the NPI-Q total score was calculated by summing the maximum severity ratings observed for each of 12 symptoms during hospitalization.

Reliability of NPI-Q scores were evaluated for a subset of scores comparing RC and clinical psychologist assessments for the same patient/day; differences in scoring were discussed and resolved in a blinded manner with the geriatrician hospitalist.

BPSD management and hospital outcomes (collected via EHR) included use of CO, restraints, psychoactive medications, LOS, and falls. FCG satisfaction was obtained within 48 hr of discharge using the "Carer Questionnaire Data," a validated 10-item survey assessing perceptions of care quality, communication, and overall support (Royal College of Psychiatrists, 2017).

The data collection component of REDCap was used for screening of participants, collection of study data, and data storage (Harris et al., 2009, 2019).

Sample Size Calculation

Sample size was based on a priori power calculations showing 63 patients per group would provide at least 80% power to detect a difference of three units (Mao et al., 2015) in mean NPI-Q score at the .05 alpha level, assuming a *SD* of 6.0 (Kaufer et al., 2000). To account for the possibility of 20% attrition, target enrollment was 79 patients per group ($N=158$ total).

Analysis

Analysis of covariance (ANCOVA) was used to compare the primary outcome (mean NPI-Q total score) between patients on the intervention and enhanced control units. Significance was evaluated based on a two-sided test, with $\alpha=.05$. To control for potential confounding, the model included a set of covariates selected a priori: age, gender, race, ethnicity, marital status, CCI, dementia severity, baseline and ED arrival BPSD (NPI-Q).

We also compared patients on the intervention and enhanced control units on the mean number of distinct NPI-Q behaviors (range 0–12) occurring during hospitalization using negative binomial regression. Secondary BPSD management outcomes (i.e., use of restraints, CO) were treated as binary (yes/no) variables and compared using logistic regression. Differences in LOS were assessed based on a Cox proportional hazards regression model. Regression models for secondary outcomes were adjusted for the covariates described previously. The difference in the proportion of intervention and control patients treated with new antipsychotics were assessed with a chi-square test. Differences in FCG satisfaction were assessed based on responses to "Overall, how would you rate the care received by the person you look after during the hospital stay?" (Royal College of Psychiatrists, 2017). Patient responses (excellent, very good, good, fair, and poor) were compared using the Mann-Whitney U test. Lastly, we measured study feasibility to inform the planning of a future multi-site trial of the PES-4-BPSD intervention, namely: (1) number/percent of intervention and control unit patients meeting study eligibility criteria; (2) recruitment rate; and (3) attrition rate.

Results

Feasibility Data

HCGs Dementia Care Training. Dementia care training completion rates (defined as completing all seven training sessions) for PES and NAs on the intervention unit were ($N=31$): day shift 100% (10/10); evening shift 81.8% (9/11); and night shift 60% (6/10). For the enhanced control unit, dementia care training completion rates for NAs ($N=32$) were: day shift 100% (12/12); evening shift 81.8% (9/11); and night shift 66.7% (6/9).

Patients and FCGs Recruitment and Retention. On preliminary EHR review, there were 715 potentially eligible

patients on the intervention and enhanced control units. Out of the FCGs ($N=316$) that met all inclusion/exclusion criteria (including AD8), 158 agreed to participate (recruitment rate of 22.1% of overall sample and 50% of those that met all inclusion/exclusion criteria). Patient level data was 100% complete for both intervention and enhanced control units. For post-hospital FCG satisfaction, outcomes were ascertained for 98.7% 89.9% for the intervention versus enhanced control units, respectively).

Reliability of CDRS and NPI-Q. With regard to the CDRS, out of 20 randomly selected charts that were independently reviewed by the RC and a clinical psychologist, the correct score was assessed 90% (18 out of 20), with resolution of discrepancies for the remaining two charts. Out of 54 randomly selected charts in which the 12 symptoms of the NPI-Q were independently reviewed by the RC and a clinical psychologist, there was 94.1% agreement (610 out of 648 symptoms).

Feasibility of Collecting the NPI-Q. Across all patients ($N=158$), the mean number of NPI-Q assessments per calendar day of hospitalization was 0.57 (IQR:0.44, 0.69), corresponding to slightly more than one assessment per 48 hr.

Patient Characteristics

Patients on the intervention unit were more likely to be: younger (83.5 [$SD=8.44$] vs. 86.9 [$SD=7.48$]), male (39%vs. 33%), and Black/African American (34%vs. 11%); and less likely to be Hispanic or Latino (7.6%vs. 13%). Regarding place of residence prior to hospitalization, patients on the intervention unit were more likely to live in a private residence (91%vs. 73%) and less likely to live in assisted living (6.3%vs. 15%) or nursing home (0%vs. 10%). Patients on the intervention unit had a slightly lower CCI (8.09 [$SD=2.66$] vs. 8.77 [$SD=2.65$]). Patients on the intervention unit were more likely to have moderate dementia (38%vs. 27%) and less likely to have mild cognitive impairment (3.8%vs. 11%) (Table 1).

Patients on the intervention unit displayed more BPSD at baseline: mean NPI-Q 15.8 ($SD=7.49$) versus 10.5 ($SD=6.60$). Patients on the intervention unit also displayed more BPSD in the ED 1.97 ($SD=3.21$) versus 1.55 ($SD=2.52$). Of note, the presence of delirium during hospitalization (as measured by RADAR) was similar in the intervention and enhanced control units (45.6%vs. 44.3%, respectively) (Table 1).

BPSD

The most common BPSD during hospitalization included changes in appetite/eating (74%), agitation/aggression (61%), irritability/lability (61%), and nighttime behaviors (60%). The least common behaviors were elation/euphoria (11%), hallucinations (22%), and delusion

Table 1. Patient Characteristics.

	Enhanced control (*n* = 79)	PES-4-BPSD (*n* = 79)
Age		
Mean (*SD*)	86.9 (7.48)	83.5 (8.44)
Median [Q1, Q3]	88 [82, 91.5]	84 [77, 90]
Gender		
Male	27 (34)	31 (39)
Female	52 (66)	48 (61)
Race		
White	59 (75)	34 (43)
Black or African American	9 (11)	27 (34)
Asian	9 (11)	14 (18)
Other/multi-racial	2 (2.5%)	4 (5.1%)
Ethnicity		
Hispanic or Latino	10 (13)	6 (7.6)
Missing	3 (3.8%)	1 (1.3)
Marital status		
Married/domestic partnership	26 (33)	28 (35)
Divorced	10 (13)	8 (10)
Separated	1 (1.3%)	3 (3.8%)
Widowed	40 (51)	35 (44)
Single/never married	2 (2.5)	5 (6.3)
Residence		
Still in own home	49 (62)	47 (59)
Caregiver's home	9 (11)	25 (32)
Assisted-living facility	12 (15)	5 (6.3)
Independent living	1 (1.3)	1 (1.3)
Nursing home	8 (10)	0 (0)
Other	0 (0)	1 (1.3)
Charlson comorbidity index		
Mean (*SD*)	8.77 (2.65)	8.09 (2.66)
Median [Q1, Q3]	8.00 [7, 11]	8.00 [6, 9.5]
Clinical dementia rating worksheet final score		
Mild cognitive impairment (0.5)	9 (11)	3 (3.8)
Mild dementia (1)	12 (15)	13 (17)
Moderate dementia (2)	21 (27)	30 (38)
Severe dementia (3)	37 (47)	33 (42)
Neuropsychiatric inventory questionnaire at baseline		
Mean (*SD*)	10.5 (6.60)	15.8 (7.49)
Median [Q1, Q3]	9 [6, 16.5]	16 [10, 22]
Neuropsychiatric inventory questionnaire in ED		
Mean (*SD*)	1.55 (2.52)	1.97 (3.21)
Median [Q1, Q3]	0 [0, 3]	0 [0, 3]
Missing	1 (1.3)	0 (0)

(37%). The majority of patients 97% (*n* = 153) exhibited at least one BPSD during hospitalization (Figure 1).

Mean NPI-Q total scores were 5.36 (*SD* = 4.64) and 3.87 (*SD* = 3.37) among patients in the PES intervention unit and enhanced control unit, respectively (mean difference 1.49, 95% CI [0.22, 2.77]. After adjustment for covariates, mean NPI-Q score was 0.82 units higher in the intervention unit, though this difference was not statistically significant (95% CI [−0.51, 2.16]; *p* = .23). In an exploratory analysis based on patients' maximum symptom scores throughout hospitalization, mean NPI-Q total score was 12.43 and 8.67 in the intervention

and control units, respectively. Lastly, the mean number of NPI-Q behaviors was greater on the intervention unit, compared to control unit, 6.44 (*SD* = 3.38) versus 4.55 (*SD* = 2.69), respectively (*p* = .04) (Table 2).

Regarding covariates, Asian race was associated with significantly lower mean NPI-Q total score (−3.18 points relative to white; 95% CI [−1.43, −4.92]; *p* < .001). In addition, baseline and ED NPI-Q total scores were associated with mean daily NPI-Q total score during hospitalization, whereas a 5-point increase in baseline NPI-Q was associated with an increase of 0.64 (95% CI [0.20, 1.09]; *p* = .006) in mean daily NPI-Q
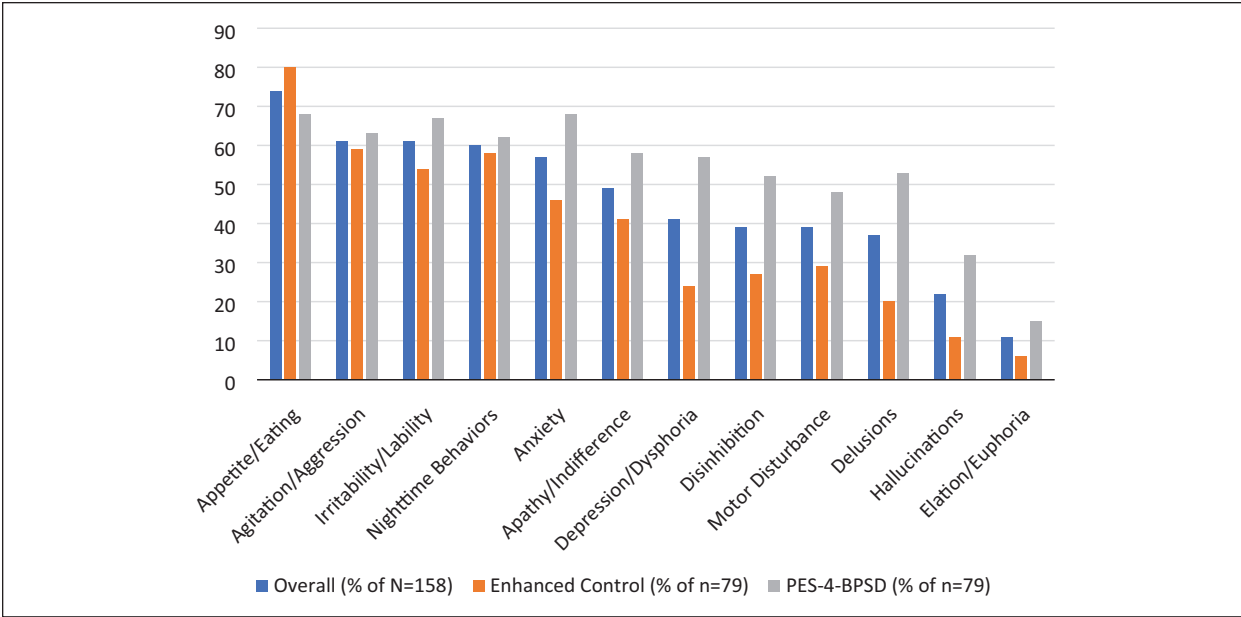
Figure 1. Frequency of behavioral and psychological symptoms of dementia (as measured by the neuropsychiatric inventory questionnaire, NPI-Q).
[a]At least one occurrence.

Table 2. Behavioral and Psychological Symptoms of Dementia (as Measured by the Neuropsychiatric Inventory Questionnaire, NPI-Q) in the Enhanced Control versus PES-4-BPSD.

	Enhanced Control (n = 79)	PES-4-BPSD (n = 79)	Difference in means, adjusted[a] (PES—Control)	p-value, Adjusted mean difference
Mean NPI-Q Total (SD)[b]	3.87 (3.37)	5.36 (4.64)	0.82 (−0.51, 2.16)	.23
Mean NPI-Q Max Total, (SD)[c]	8.67 (6.56)	12.43 (8.58)	1.66 (−0.86, 4.18)	.19
Mean # of NPI-Q behaviors (SD)[d]	4.55 (2.69)	6.44 (3.38)	1.06 (0.05, 2.06)	.04

[a]Based on a multiple linear regression model (or negative binomial regression for behaviors outcome), adjusting for age, sex, race, marital status (married, not married), Charlson comorbidity Index, Clinical Dementia Rating Worksheet final score, and NPI-Q total scores during 1-month prior to hospitalization and in the emergency department.
[b]Based on the average of the patient's daily NPI-Q total scores.
[c]Based on summing the maximum severity ratings observed for each of the 12 symptoms over the patient's entire hospitalization.
[d]Based on total number of distinct NPI-Q behaviors (range: 0–12) during hospitalization.

during hospitalization and a 5-point increase in ED NPI-Q was associated with an increase of 1.87 (95% CI [0.81, 2.94]; $p < .001$) in mean daily NPI-Q (Table 3).

BPSD Management, LOS, and FCG Satisfaction—Secondary Outcomes

CO was used for 21.5% of patients on the intervention unit and 19.0% of those on the enhanced control unit (Adjusted odds ratio, OR:0.68, 95% CI [0.23, 2.00], $p = .49$). Among patients requiring CO, the length of time was approximately 88% shorter for those on the intervention unit (95% CI [−97%, −53%], $p = .002$). Restraints were used for 3.8% of patients in the intervention unit and 10.1% of those in the control unit (OR: 0.35, 95% CI [0.09, 1.37], $p = .13$). Baseline (Home)

antipsychotic use was more common for patients on the intervention unit (56%vs. 13%). The use of new antipsychotics during hospitalization was 34%versus 20% (OR:2.04, 95% CI [0.80, 5.14], $p = .19$) on the intervention versus control, respectively, but was not statistically significant. The study was associated with no falls (Table 4).

Median LOS on the intervention and control units were 7.0 and 7.9 days, respectively. The hazard ratio (HR) for time to discharge indicated similar LOS between the two units in unadjusted (HR 1.06, 95% CI [0.77, 1.45], $p = .73$), and adjusted analyses (HR 1.12, 95% CI [0.76, 1.64], $p = .57$). Two patients (2.5%) expired during the study; both were on the enhanced controlled unit. In each unit, 53% of FCGs rated the overall quality of care during hospitalization as "very

Table 3. Regression Coefficients for Covariates: Mean NPI-Q Total Outcome.

Coefficients	Estimate	Std. Error	*t*-value	*p*-value
PES-4-BPSD	1.660	1.273	1.304	.19
Age	−0.1449	0.0836	−1.734	.85
Sex (female)	−0.6251	1.339	−0.467	.64
Race (Black/African American)	1.2716	1.479	0.859	.39
Race (Asian)	−5.405	1.678	−3.221	.002*
Race (other/multi-racial)	3.955	2.990	1.323	.19
Marital status (not married)	0.729	1.471	0.495	.62
Charlson comorbidity index	−0.0154	0.225	−0.068	.95
CDRS 1	−2.296	2.501	−0.918	.36
CDRS 2	−0.561	2.366	−0.237	.81
CDRS 3	−2.769	2.316	−1.195	.23
NPI-Q, baseline	0.233	0.086	2.707	.008*
NPI-Q, ED	0.573	0.206	2.788	.006*

*$p < .05$.

Table 4. Management of Behavioral and Psychological Symptoms of Dementia and Outcomes on the Enhanced Control Versus PES-4-BPSD.

Outcome	Enhanced control (n = 79)	PES-4-PBSD (n = 79)	Odds ratio (95% CI)	*p*-value
Constant observation, *n* (%)	15 (19)	17 (22)	0.68[a] [0.23, 2.00]	.49
Constant observation hours,[b] mean (*SD*)	57.6 (65.3)	20.1 (44.3)	−88%[a] [−97%, −53%]	.002
Restraints, *n* (%)	8 (10.1)	3 (3.8)	0.35 [0.09, 1.37]	.13
New antipsychotic use,[c] n/N (%)	14/69 (20)	12/35 (34)	2.04 [0.80, 5.14]	.19
Length of stay	7.86 (5.88–9.38)	7.00 (6.40–8.14)	1.12[a] (95% CI [0.76, 1.64]	.57
Family caregiver overall satisfaction, *n* (%)				
Excellent	26 (37)	34 (44)		
Very Good	27 (38)	19 (24)		
Good	9 (13)	14 (18)		
Fair	5 (7.0)	7 (9.0)		
Poor	4 (5.6)	4 (5.1)		.86[d]

[a]Adjusted for age, sex, race, marital status (married, not married), Charlson comorbidity Index, Clinical Dementia Rating Worksheet final score, and Neuropsychiatric Inventory Questionnaire total scores during 1-month prior to hospitalization and in the emergency department. Effect measure for length of stay variable is a hazard ratio from Cox proportional hazards regression.
[b]Compares treatment units with respect to the average length of constant observation, among those patients who were under constant observation.
[c]Denominator is the number of patients in each unit with no history of home antipsychotic use.
[d]*p*-value from Mann-Whitney U test.

good" or "excellent." The overall distribution of FCGs ratings did not differ significantly between units ($p = .86$ from Mann-Whitney U test) (Table 4).

Discussion

PLWD are frequently admitted to the hospital and the quality of their care is a national concern (Alzheimer's Association, 2017; Jutkowitz et al., 2017). HCGs report lack of knowledge, skills and confidence in caring for hospitalized PLWD (Aström et al., 1991; Coffey et al., 2014; Dewing & Dijk, 2016; Hessler et al., 2018). The objective of the study was to conduct a pilot feasibility study of an innovative model of care, PES-4-BPSD (a dementia unit staffed with PES) aimed at reducing BPSD and improving management for hospitalized PLWD. Our study

demonstrated the feasibility of utilizing mental health attendants as NAs (PES) for the care of hospitalized PLWD; integrating a dementia care training program for NAs; and measuring BPSD in the hospital setting. However, our intervention unit, PES-4-BPSD, did not result in a reduction in BPSD compared to our enhanced control unit, which may be due to significant differences in baseline BPSD between the two groups. Future studies are needed to further evaluate the role of mental health attendants in the care of hospitalized PLWD.

NAs are a vital yet understudied personnel in the care of hospitalized PLWD (Dobbs et al., 2018). NAs are unique in terms of their own characteristics, including racial/ethnic diversity (mainly underserved populations), high school level education, minimum wage salaries, as well as specialized job requirements

(e.g., addressing and managing BPSD and ADLs). Yet, most hospital-based NAs receive little to no classroom and supervised practical dementia care training (Coffey et al., 2014; Peterson et al., 2002; Scerri et al., 2017; Surr et al., 2017). NAs working with cognitively impaired patients often experience low job satisfaction, stress, and burnout (Aström et al., 1991; Surr et al., 2016).

Based on two previous review articles that posited the use of mental health workers and our pilot data (Sinvani et al., 2018), we posited that NA with mental health training (PES) may be able to prevent and address BPSD using tools such as de-escalation training and redirection, which are part of the PES curriculum. This training does teach PES to understand nonverbal behavior as well as the management of behaviors such as agitation, aggression, combativeness. Previous evidence shows that staff fail to appreciate behavioral communication by people with dementia as a means of expressing unmet need, often related to distress and fear. However, a background of mental health does not automatically qualify a NA as a PES in the context of dementia care. That is why both our intervention unit staff (PES) and control unit staff (NA) received dementia care training.

Our dementia training program was designed for NAs with a focus on prevention and management of BPSD for hospitalized PLWD. Unlike other hospital-based time intensive training programs, our program was delivered via 7 weekly 20-min training sessions (Coffey et al., 2014; Surr et al., 2017). All training sessions occurred during regular work hours to prevent additional burden. The dementia care training program was extremely well-received as evidence by the high completion rates. Future studies will need to evaluate the impact of such training programs on dementia knowledge as well as NA satisfaction and work experience as well as the scalability of training NAs across multiple units.

BPSD has rarely been measured or reported in the hospital setting. Our previous study utilized surrogate markers for BPSD, namely the use of CO, restraints, and/or psychoactive medications. Two previous studies from the United Kingdom utilized the BEHAVE AD to measure BPSD in the acute care setting and found a prevalence of approximately 75% (Sampson et al., 2014; White et al., 2016). For this trial, we used a multimodal approach of daily chart review and NA/PES interviews to complete the NPI-Q. Using this methodology, BPSD was identified in 97% of patients. The most common symptoms (e.g., change in appetite/eating, agitation/aggression, and anxiety) occurred in approximately 75% of PLWD. In addition, even some of the least commonly reported behaviors (e.g., hallucinations and delusions) still occurred frequently (>20%). These findings highlight the importance of identifying BPSD in the hospital setting.

Regarding the feasibility of assessing BPSD in the hospital setting, the NPI-Q appeared to be a practical tool. Hospital NPI-Q scores were derived from staff who spent the shift with the patient as well as documentation in the EHR. Using the total NPI-Q scores based on the maximum of individual symptom scores across a patient's entire stay, were more comparable to the distribution of baseline NPI-Q scores. This "maximum score" method may be more valid in the hospital setting than averaging daily scores. Future studies should continue to explore the NPI-Q as a measure of BPSD in the hospital setting, consider whether all NPI-Q symptoms should be counted the same, and the potential integration into the EHR.

Although we demonstrated the feasibility of utilizing mental health attendants as NAs and implementing a dementia care training program for NAs, our intervention unit, PES-4-BPSD, did not show a reduction in BPSD when compared to the enhanced control unit. We hypothesized that NAs with a background in mental health (PES), who received dementia care training, and whose role and slightly increased staffing ratio, allowed them to mainly focus on meeting the needs of hospitalized PLWD (PES-4-BPSD), as opposed to typical NA duties (blood draws, vitals, personal care), may be able to better prevent and manage BPSD. The negative findings could be for multiple reasons. First, patients on the intervention unit (PES-4-BPSD) had significantly higher baseline BPSD than the enhanced control unit. This could have occurred due to unanticipated cohorting of patient who displayed BPSD on the intervention unit, which did not occur on the enhanced control unit (did not cohort based on BPSD). Finding comparable intervention and control groups is essential for future studies. Secondly, BPSD management (i.e., CO, restraints, psychoactive medications) may be a preferable outcome to NPI-Q scores (as described above), however the study was not adequately powered for those outcomes. Lastly, study recruitment began immediately prior to the COVID-19 pandemic at which point there was a 6-month pause to the study. It is unknown what impact this had on the dementia care training that was provided prior to recruitment. Once our study was able to resume, the intervention unit was moved to a new location within the hospital. The extent to which widespread pandemic-related practices, namely, isolation, visitation restrictions, and personal protective equipment impacted BPSD, BPSD management, and FCG satisfaction are also unknown.

Despite these limitations, this study represents a substantive departure in the following ways: (1) it is one of the first to target and measure BPSD in the hospital setting using a standardized measure (NPI-Q), as opposed to surrogate markers (Sinvani et al., 2018; Tannenbaum et al., 2022; (2) it integrates a practical dementia care training program for NAs that can be used in the real-world setting; and (3) it is the first study to explore the adaptation of mental health attendants as PES for the care of hospitalized PLWD. In conclusion, there is an urgent need to improve the provision of care for

hospitalized PLWD. A dementia unit staffed by NAs with mental health backgrounds (PES-4-BPSD) may improve the management of BPSD. Further research of this model as well as the role of mental health attendants in the care of hospitalized PLWD is needed.

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