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Severe Behavioral Health Manifestations in Nursing Homes: Associations with Service Availability?

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Abstract

Objectives: Despite high prevalence of behavioral health (BH) manifestations among nursing home (NH) residents, availability of BH services in this care setting is often inadequate. Our objective was to examine associations between availability of BH services and presence of severe depression, suicidal ideation (SI), and severe aggressive behaviors (ABs) among NH residents.

Design: Cross-sectional.

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Conflict of Interest Checklist:

Elements of Financial/Personal Conflicts	Jessica Orth		Yue Li		Adam Simning		Helena Temkin-Greener	
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Employment or Affiliation		X		X		X		X
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Speaker Forum		X		X		X		X
Consultant		X		X		X		X
Stocks		X		X		X		X
Royalties		X		X		X		X
Expert Testimony		X		X		X		X
Board Member		X		X		X		X
Patents		X		X		X		X
Personal Relationship		X		X		X		X

For “yes”, provide a brief explanation:

Setting/Participants: This study employed 2017 survey data about BH service availability obtained from 1,051 NHs. The Minimum Data Set (MDS) was used to identify long-stay residents in these facilities (N=101,238) and prevalence of BH manifestations. Descriptive statistics and multivariable logistic regressions were employed.

Measurements: We constructed measures of three severe BH manifestations based on the MDS: presence of depression, SI, and ABs. Three independent measures of service availability based on survey items asked about degrees of inadequate: 1) staff BH education; 2) coordination/collaboration between facility/community providers; and 3) facility infrastructure (i.e., ability to make referrals/transport residents to services).

Results: Odds of severe depression were 21% higher (OR:1.21;p-value:<0.001) when NHs reported inadequate BH staff education. Residents with SI had 13% higher odds (OR:1.13;p-value:0.027) of living in NHs that reported inadequate coordination between facility and community providers. Severe ABs were 10% more likely among residents in NHs reporting inadequate facility infrastructure (OR:1.10;p-value:0.002) and 7% more likely in facilities with self-reported inadequate coordination between facility/community providers (OR: 1.07;p-value:0.019). Several facility-level factors (e.g., staffing, training, turnover) were also statistically significantly associated with these severe BH manifestations.

Conclusion: Residents in NHs reporting inadequate BH services were more likely to experience adverse severe BH manifestations even after controlling for individual and facility-level risk factors. Higher nurse staffing and more staff psychiatric training were associated with lower prevalence of severe BH manifestations. Policy changes and modifications to Medicaid NH reimbursements may be warranted to better incentivize NHs to improve provision of BH services.

Keywords

Behavioral health services; depression; suicidal ideation; aggressive behaviors; nursing homes

INTRODUCTION

Behavioral health (BH) disorders and/or dementia are very common among nursing home (NH) residents.^{1,2} Major depression is the most prevalent BH symptom among the newly admitted.³ Estimates show a 37% increase in proportions of NH residents with BH disorders from 2009-2016.⁴ Despite increasing prevalence, NHs' provision of BH services is often inadequate, especially in NHs with greater share of residents with serious mental illness.⁵ A recent national survey found 20–40% of NHs reporting difficulty providing BH services, and over 60% identified difficulty accessing psychiatric support after admission.⁶

Presentations of depression, suicidal ideation (SI), and aggressive behaviors (ABs) are common among residents with BH disorders and/or dementia.^{7–9} High prevalence of these manifestations, and great variability in BH services across NHs, are of significant concern among providers and policy makers.^{10,11} Empirical evidence demonstrating how BH service availability may impact presentations of these manifestations among residents is lacking. Several prior studies, however, have found associations between presentation of BH manifestations and facility-level factors. For example, ABs and SI were less likely among residents of for-profit^{7,9} and higher-quality NHs,⁷ while SI was more prevalent among

residents in NHs with higher levels of certified nurse assistant (CNA) staffing.⁹ These associations are not well understood specifically in relation to availability of BH services in NHs. Characterizing and more comprehensively understanding such associations is an important initial step in targeting meaningful policy changes aimed at decreasing severe BH manifestations and improving BH care practices in NHs.

To fill this knowledge gap, we addressed two objectives. First, we examined variations across NHs self-reporting inadequate BH service availability and in presentations of severe depression, SI, and severe ABs among NH residents. Second, we identified associations between these BH manifestations and facility-level factors, especially BH service availability.

METHODS

Data Sources and Sample

We used 2017 survey data about BH service availability from a national random NH sample.⁶ Survey questions were based on prior studies and an extensive literature review. NH administrators and directors of nursing completed the survey regarding availability, quality, and satisfaction with BH services and providers (e.g., what BH services are available and who provides them, difficulty providing BH services), and staffing, staff education, and turnover (e.g., proportion of staff with psychiatric/BH training). More than 1,200 surveys were returned from 1,079 NHs, a 27% NH response rate (surveys from responders with the longest NH tenure were used if NHs returned multiple surveys). Responding NHs were more likely non-profit and had Alzheimer disease units compared to non-responding NHs.

Residents in responding NHs; prevalence of severe depression, SI, and severe ABs; and resident-level covariates were identified using 2017 Minimum Data Set (MDS) assessments.¹² We also used data from the Centers for Medicare & Medicaid Services' (CMS) Nursing Home Compare (NHC) file,¹³ LTCfocus data set,¹⁴ and Rural Urban Commuting Area Codes (RUCA) data set¹⁵ to identify NH-level covariates.

Because availability of BH services in NHs impacts individuals with prolonged stays the greatest, we focused on long-stay residents, identified in survey-responding NHs based on presence of quarterly or annual assessments (N=103,242; 1,073 NHs). After excluding residents with missing information on key covariates, the analytical sample included 101,238 long-stay residents in 1,051 NHs.

This study protocol was reviewed and approved by the University of Rochester institutional review board.

Outcomes

The Aggressive Behavior Scale (ABS),¹⁶ a validated scale to assess resident behavior, is calculated by summing four MDS items: physical behavioral symptoms directed toward others; verbal behavioral symptoms directed toward others; other behavioral symptoms not directed toward others; and rejection of care. The scale ranges from 0 (behavior not exhibited) to 12 (behavior occurred daily) and is categorized into four severity levels: none

(score=0); moderate (score=1-2); severe (score=3-5); and very severe (score=6-12).¹⁶ We classified residents as having severe ABs if scores were 3-12 on any assessment.

We used the MDS Patient Health Questionnaire (PHQ)-9 item *i* to determine resident or staff-reported SI. This is a validated approach used previously for identifying presence and severity of mood disorders among NH residents.^{9,17-19} The specific question asks residents whether they had thoughts of being better off dead or of hurting themselves in some way over the last two weeks. For residents are unable to respond, staff provide their assessment. SI was coded as '1' if this item was checked on any assessment.

The remaining 8 items on the PHQ-9 questionnaire, with 88% sensitivity and specificity for major depression detection,¹⁹ were used to determine presence of severe depression. We classified residents as having severe depression if the PHQ-8 score was at least 15 on any assessment, representing moderately severe or severe depressive symptoms.¹⁷⁻¹⁹ We focused on severe depression because detection of major depressive disorders requires immediate staff attention and has been associated with increased BH services utilization.¹⁸

Key Covariates

Key covariates were derived from the BH services survey.⁶ Responses to three statements: 1) *the level of BH education among our staff is an issue in our ability to provide good BH services*; 2) *there is inadequate coordination/collaboration between facility staff and community providers*; and 3) *we lack adequate facility infrastructure (i.e., to make referrals/transport residents to services)* were based on five-point Likert scale ranging from totally disagree (1) to totally agree (5). Scores of 4-5 were combined, creating dichotomous variables representing inadequate availability of BH services.

Other Covariates

We included several individual-level covariates known to be important risk factors for our outcomes, per literature review and consultations with clinicians. As we were unable to identify MDS assessments nearest to the time of survey completion, we used all assessments for residents in 2017 to capture individual-level factors. Each resident contributed a single observation to analyses, with continuous variables representing averages across all assessments for a resident, and binary covariates coded as '1' if a condition was present on any assessment. Covariates included age; gender (female/male); race (white/non-white); marital status (married/not married); moderate/severe cognitive impairment (Cognitive Function Scale=2-3);²⁰ number of diagnoses; PHQ-8 score; and presence/absence of Alzheimer's disease and related dementia (MDS check boxes for Alzheimer's Disease or Dementia, ICD-10 codes), hallucinations, delusions, neurological conditions (aphasia; cerebral palsy; cerebrovascular accident, transient ischemic attack, or stroke; hemiplegia or hemiparesis; paraplegia; quadriplegia; multiple sclerosis; Huntington's disease; Parkinson's disease; Tourette's syndrome; seizure disorder or epilepsy; traumatic brain injury), psychiatric conditions (anxiety disorder; depression; manic depression; psychotic disorder; schizophrenia; post-traumatic stress disorder), and pain affecting sleep/activities.

Prior NH studies identified important facility-level factors associated with resident outcomes and BH manifestations, including staffing,²¹ staff turnover,²² and ownership.²³ NH-level

covariates were included from the NHC file (state, ownership [for-profit vs. government-owned/non-profit], CNA hours per resident day (HPRD), registered nurse [RN] and licensed practical nurse HPRD, five-star ratings for quality and staffing [reference=2–4 stars], and county NH bed competition [Herfindahl-Hirschman Index: 0–1; higher values indicate higher competition]), LTCfocus data (chain membership [yes/no], NH bed size, occupancy rate, Alzheimer disease unit [yes/no], percentage Medicare/Medicaid residents), and BH survey (RN and CNA turnover; proportions of psychiatrically trained physicians, nurse practitioners/physician assistants (NP/PAs), RNs, and social workers). Zip codes from the RUCA database determined rural/urban location.

Statistical Analyses

We examined bivariate associations between severe BH manifestations and covariates using chi-square tests and analyses of variance. Multivariable logistic regression models, adjusting for resident and NH-level covariates and state indicators, were estimated for each outcome. P-values for the three key covariates were adjusted using the Bonferroni correction for each outcome (p-values<0.017 considered statistically significant).²⁴

Analyses were performed using SAS version 9.4 (SAS Institute, Inc. Cary, NC).

RESULTS

Among our sample, 3.3% had severe depression, 2.8% had SI, and 12.0% had severe ABs. Approximately 25.0% of residents in NHs reporting inadequate coordination between facility/community providers, BH education, and infrastructure had severe ABs, while observed rates for severe depression and SI were approximately 7.0% and 6.0%, respectively (Figure 1). Detailed sample characteristics are presented in Table 1.

Results from multivariable models are shown in Table 2. Odds of residents having severe depression were 21% higher in NHs reporting inadequate BH staff education. Residents with SI had 13% higher odds of living in NHs with inadequate coordination between facility and community providers; but this finding was no longer significant after the Bonferroni correction. Presentation of severe ABs was 10% more likely among residents in NHs reporting inadequate infrastructure and 7% more likely in facilities with inadequate coordination between facility and community providers.

We also identified several associations between severe BH manifestations and facility-level covariates. For example, higher licensed nurse staffing was associated with 15% lower odds of severe ABs. Residents in NHs with more psychiatrically trained RNs and NP/PAs had 17% and 14% lower odds of severe ABs, respectively. Higher CNA turnover was associated with 34% higher odds of SI and 16% higher odds of severe depression. Odds of severe ABs and SI were 11% lower among residents in 5-star rated NHs, but residents in 1-star rated NHs were 29% more likely to have severe depression. Residents in NHs with Alzheimer disease units were 35% and 7% more likely to have severe depression and ABs, respectively.

Results for individual-level covariates are presented in Supplementary Table S1.

DISCUSSION

This is the first national study linking severe BH manifestations among residents to NH service availability. The NH Reform Act was enacted by Congress in 1987 in order to improve NHs' provision of BH services.²⁵ However, supply of BH services in NHs is yet to meet growing demand.⁶ NHs face difficulties providing BH services,⁶ and our findings demonstrate these shortcomings are associated with higher rates of severe depression, SI, and severe ABs among residents.

Our findings suggest that severe BH manifestations are associated with modifiable facility-level factors, in agreement with prior studies.^{7,9} In particular, we found lower likelihoods of severe BH manifestations in NHs with higher staffing levels and more training. Furthermore, we found significant associations between severe BH manifestations and NH quality measured by star ratings. That residents of higher-quality NHs have lower odds of severe ABs and SI, and residents of lower-quality NHs have higher odds of severe depression may corroborate previous work demonstrating disparities in access to high-quality NHs among residents with BH disorders.²⁶ However, we were unable to distinguish whether individuals with these manifestations tend to be admitted to lower-quality NHs or whether residing in NHs with inadequate BH services exacerbates these manifestations.

BH education among staff was less problematic in NHs with Alzheimer disease units,⁶ which have been associated with better care quality and resident outcomes.²⁷ However, we found higher likelihoods of severe depression and ABs among residents in NHs with Alzheimer disease units, even though NHs with these units may have better care practices and more knowledgeable staff²⁸ who may be better able to manage severe BH manifestations among residents. NHs with these units may be more likely to admit residents with dementia (i.e., residents more likely to exhibit BH manifestations),⁷ but future research is needed to fully explain these findings.

A large proportion (70%) of NH residents finance their care through Medicaid²⁹, which covered \$55 billion of NH care in 2015.³⁰ However, shortfalls between state Medicaid payment rates and care costs exceed \$7 billion nationally,³¹ leaving NHs with limited resources to meet demands for BH services. In addition, mental illness is rarely mentioned in state NH regulations.³² Broader policy changes and modifications to NH reimbursement may be needed to ensure residents with BH manifestations are afforded needed BH services. For example, states may consider expansion of Medicaid BH reimbursement add-ons to incentivize NHs to invest in BH services.

Several limitations should be noted. Omitted variable bias may be present, although we included numerous covariates identified as important risk-adjusters, which likely diminish this concern. Additionally, our sample is limited to residents in NHs responding to a voluntary survey, with responding NHs having higher five-star staffing ratings compared to non-responding NHs.⁶ Since our objective was to examine associations between severe BH manifestations and facility-level factors among NH residents, rather than to generalize findings from this survey to all NHs, it is unlikely that the response bias affected our

findings. Further, we were unable to identify psychiatry-specialty NHs in analyses, which future studies may address.

In conclusion, residents in NHs reporting inadequate BH services were more likely to have severe depression SI, and severe ABs. Higher nurse staffing and more psychiatrically trained staff were also associated with lower prevalence of severe BH manifestations among residents.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Funding sources and related paper presentations:

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Figure 1.

Distribution of severe aggressive behaviors, severe depression, and suicidal ideation among nursing home residents in nursing homes where staff reported adequate (score of 1-2) or inadequate (score of 4-5) coordination, behavioral health education, and facility infrastructure.

Table 1.

Sample Characteristics: Long-stay nursing home (NH) residents in NHs responding to the behavioral health survey.

	Severe Depression		Suicidal Ideation		Severe Aggressive Behaviors	
	Yes ¹ N: 3,321 620 NHs	No N: 97,579 1,051 NHs	Yes N: 2,781 586 NHs	No N: 98,132 1,051 NHs	Yes N: 12,119 998 NHs	No N: 88,941 1,051 NHs
Age	77.2±13.5	79.2±13.4	78.9±13.7	79.2±13.4	78.3±13.5	79.3±13.4
	p-value ² : <0.001		p-value: 0.22		p-value: <0.001	
Female	66.2%	65.3%	62.0%	65.4%	62.2%	65.7%
	p-value: 0.30		p-value: <0.001		p-value: <0.001	
White	85.6%	81.9%	90.3%	81.8%	83.6%	81.8%
	p-value: <0.001		p-value: <0.001		p-value: <0.001	
Married	22.6%	20.6%	22.3%	20.7%	21.8%	20.5%
	p-value: 0.005		p-value: 0.033		p-value: 0.001	
Moderate or severe cognitive impairment	62.3%	54.6%	44.7%	55.1%	76.7%	51.9%
	p-value: <0.001		p-value: <0.001		p-value: <0.001	
Alzheimer's disease and related dementias	57.1%	58.1%	48.8%	58.3%	75.1%	55.8%
	p-value: 0.26		p-value: <0.001		p-value: <0.001	
ADL ³ score	17.7±5.8	16.5±6.4	16.1±5.7	16.5±6.4	17.4±5.8	16.4±6.5
	p-value: <0.001		p-value: 0.001		p-value: <0.001	
Number diagnoses	5.6± 2.9	5.5± 2.9	5.8± 2.8	5.4± 2.9	5.5± 2.9	5.5± 2.9
	p-value: 0.004		p-value: <0.001		p-value: 0.25	
PHQ8	---	---	6.2±4.1	2.2±2.9	---	---
			p-value: <0.001			
Staff observed	49.9%	30.0%	25.5%	30.8%	---	---
	p-value: <0.001		p-value: <0.001			
Hallucinations	12.5%	5.4%	10.6%	5.5%	16.8%	4.1%
	p-value: <0.001		p-value: <0.001		p-value: <0.001	
Delusions	21.8%	10.9%	18.8%	11.0%	32.9%	8.3%
	p-value: <0.001		p-value: <0.001		p-value: <0.001	
Neurologic ⁴	40.8%	36.6%	40.9%	36.7%	35.7%	36.9%
	p-value: <0.001		p-value: <0.001		p-value: 0.009	
Psychiatric ⁵	85.7%	71.5%	82.3%	71.7%	84.6%	70.3%
	p-value: <0.001		p-value: <0.001		p-value: <0.001	
Pain	30.5%	17.2%	36.0%	17.1%	15.6%	17.9%
	p-value: <0.001		p-value: <0.001		p-value: <0.001	

¹: Mean +/- SD

²: P-values test associations between residents with and without each outcome measure (Chi-square or ANOVA).

³: Activities of daily living

^{4:}Neurological conditions included: aphasia, cerebral palsy, cerebrovascular accident, transient ischemic attack, stroke, hemiplegia/hemiparesis, paraplegia, quadriplegia, multiple sclerosis, Huntington's disease, Parkinson's disease, Tourette's syndrome, seizure disorder/epilepsy, and traumatic brain injury.

^{5:}Psychiatric conditions included: anxiety disorder, depression, manic depression, psychotic disorder, schizophrenia, and post-traumatic stress disorder.

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Table 2.

Selected logistic regression results for severe depression, suicidal ideation, and severe aggressive behaviors among long-stay nursing home (NH) residents.

	Severe Depression	Suicidal Ideation	Severe Aggressive Behaviors
	OR ¹ (95% CI ²)	OR (95% CI)	OR (95% CI)
Key Covariates³			
Staff education	1.21 (1.11, 1.32)	1.02 (0.92, 1.13)	1.00 (0.95, 1.05)
Coordination	0.95 (0.86, 1.05)	1.13 (1.01, 1.27)	1.07 (1.01, 1.13)
Infrastructure	1.08 (0.98, 1.20)	0.89 (0.79, 1.01)	1.10 (1.04, 1.17)
NH-level Covariates			
For profit	1.18 (1.07, 1.31)	0.54 (0.49, 0.61)	0.96 (0.91, 1.02)
Chain	0.75 (0.68, 0.82)	1.09 (0.98, 1.21)	0.86 (0.81, 0.91)
Quality rating ⁴ :			
1 star	1.29 (1.14, 1.46)	0.93 (0.80, 1.21)	1.03 (0.95, 1.10)
5 stars	0.94 (0.85, 1.04)	0.89 (0.80, 0.99)	0.89 (0.84, 0.94)
Staffing rating ⁴ :			
1 star	1.32 (1.16, 1.50)	1.24 (1.04, 1.46)	0.96 (0.88, 1.04)
5 stars	0.93 (0.80, 1.07)	1.12 (0.97, 1.28)	1.14 (1.05, 1.24)
Total beds	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
Alzheimer unit	1.35 (1.23, 1.48)	1.04 (0.93, 1.15)	1.07 (1.01, 1.13)
% Medicaid	1.00 (1.00, 1.00)	0.99 (0.99, 0.99)	1.01 (1.00, 1.01)
% Medicare	0.99 (0.98, 0.99)	0.99 (0.98, 1.00)	1.00 (1.00, 1.00)
Occupancy	1.01 (1.00, 1.01)	1.00 (1.00, 1.00)	1.00 (1.00, 1.01)
Urban NH	1.26 (1.14, 1.40)	1.20 (1.06, 1.36)	0.98 (0.92, 1.05)
Turnover ⁵ :			
RN ⁶ <15%	1.06 (0.96, 1.18)	1.08 (0.96, 1.21)	1.04 (0.98, 1.10)
RN 35+%	0.96 (0.84, 1.10)	0.85 (0.73, 0.99)	1.06 (0.98, 1.14)
CNA ⁷ <15%	1.22 (1.06, 1.39)	1.09 (0.94, 1.27)	1.17 (1.09, 1.26)
CNA 35+%	1.16 (1.04, 1.28)	1.34 (1.19, 1.50)	0.99 (0.93, 1.05)
CNA hrs/day	0.87 (0.79, 0.96)	0.89 (0.80, 0.99)	1.10 (1.04, 1.16)
RN+LPN ⁸ hrs/day	0.87 (0.74, 1.02)	1.24 (1.06, 1.45)	0.85 (0.78, 0.93)
Psychiatric training ⁹ :			
MD ¹⁰ 21–50%	1.07 (0.93, 1.24)	0.68 (0.58, 0.80)	1.33 (1.22, 1.44)
MD 51–100%	0.67 (0.57, 0.80)	0.69 (0.57, 0.82)	1.33 (1.22, 1.46)
NP ¹¹ /PA ¹² 21–50%	1.15 (0.99, 1.34)	1.00 (0.84, 1.19)	0.85 (0.78, 0.92)
NP/PA 51–100%	1.46 (1.23, 1.73)	1.33 (1.11, 1.59)	0.86 (0.78, 0.95)

	Severe Depression	Suicidal Ideation	Severe Aggressive Behaviors
	OR ¹ (95% CI ²)	OR (95% CI)	OR (95% CI)
RN 21–50%	0.88 (0.77, 0.99)	1.03 (0.89, 1.18)	0.83 (0.77, 0.89)
RN 51–100%	1.13 (0.96, 1.32)	1.37 (1.15, 1.63)	0.85 (0.78, 0.93)
SW ¹³ 21–50%	1.09 (0.96, 1.24)	1.43 (1.24, 1.65)	1.10 (1.02, 1.19)
SW 51–100%	0.99 (0.86, 1.13)	1.00 (0.86, 1.17)	1.06 (0.98, 1.15)
Competition	0.76 (0.65, 0.89)	0.84 (0.70, 1.02)	0.77 (0.70, 0.84)
Observations	88,936	88,936	89,010

¹: Odds ratio

²: Confidence interval

³: Key covariates denote extent of self-reported inadequate behavioral health service availability. Bolded values for key covariates are statistically significant (p-value<0.017) after Bonferroni correction.

⁴: Reference group: 2–4 stars

⁵: Reference group: 15–34%; missing controlled for in analysis but omitted in presentation

⁶: Registered nurse

⁷: Certified nurse assistant

⁸: Licensed practical nurse

⁹: Reference group: 0–20%; missing controlled for in analysis but omitted in presentation

¹⁰: Medical doctor

¹¹: Nurse practitioner

¹²: Physician assistant

¹³: Social worker