

Reducing Depressive Symptoms in Nursing Home Residents: Evaluation of the Pennsylvania Depression Collaborative Quality Improvement Program

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Abstract: Depression reduces quality of life for nursing home (NH) residents and places them at greater risk for disability, medical morbidity, and mortality. However, accumulating evidence suggests that interventions for early detection and treatment can mitigate symptoms of clinical and subclinical levels of depression. The Promoting Positive Well-Being (PPW) program is a quality improvement (QI) intervention that features tools and strategies to assist NHs in early identification, assessment, treatment, and monitoring of residents with depressive symptoms. The PPW was evaluated in 40 NHs through an 8-month QI collaborative that provided participants with tools, webinar training, and technical support. Results showed a significant group by time interaction effect with facility quality rating as a covariate; the active group ($n = 18$ NHs) outperformed the waitlist control group ($n = 19$ NHs). In all, there was a 58% relative reduction in the percentage of residents with self-reported moderate-to-severe depressive symptoms. Most NHs reported that they were satisfied with the collaborative (97%) and would recommend it to others (86%); only 15% reported significant challenges. The rate of webinar attendance and data submission compliance was 92%. Results suggest that PPW is a promising approach that should be further evaluated in larger NH initiatives and other settings.

Nursing homes diagnose depression more frequently than ever before (Gaboda et al., 2012), but the quality of care and range of interventions and monitoring remains uneven. In many NHs, antidepressant medications are the first-line treatment (Thakur and Blazer, 2008). Although beneficial for some residents, psychopharmacotherapy carries the risk of side effects, and experts have raised concerns about the quality of medication management (Meeks et al., 2015). A growing body of evidence suggests that psychosocial interventions, such as behavioral activation, psychotherapy, and social support, can alleviate depressive symptoms. However, these approaches are used in NHs much less commonly than medications (American Geriatrics Society and American Association for Geriatric Psychiatry, 2003; Bharucha et al., 2006; Blazer and Hybels, 2005; Cohen and Wills, 1985; Dimidjian et al., 2006; Geerlings et al., 2000; Meeks et al., 2015; Snowden et al., 2003; Taylor and Lynch, 2004).

As new research findings emerge, NHs face the challenge of integrating into daily operations the latest evidence-based practices to reduce depressive symptoms. To address this problem, a team of researchers and clinicians developed the Promoting Positive Well-Being (PPW) program, a quality improvement (QI) intervention that features tools and strategies designed to assist NH care teams in early identification, assessment, treatment, and monitoring of residents with depressive symptoms. The PPW aims to provide NHs with an efficient system to track and improve the effectiveness of depression management for individuals and facility wide. It is designed for ease of

Keywords

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Introduction

Depression is a serious and persistent concern in nursing homes (NHs). Estimates of depressive symptoms for the nation's 1.5 million NH residents range from 22% to 40% (American Geriatrics Society and American Association for Geriatric Psychiatry, 2003; Sahyoun et al., 2001). Depression not only causes psychological suffering and reduces quality of life but also places residents at higher risk for disability, medical morbidity, and mortality (Gerritsen et al., 2011; Meeks et al., 2015; Volicer et al., 2011).

implementation in traditional NHs, without the addition of staff or other resources.

Developing the Promoting Positive Well-Being Toolkit

In 2007, the research team created PPW and the associated implementation toolkit. The program is based on the theoretical model by Lewinsohn (1975), which posits that depression results from an interaction of individual vulnerabilities, environmental stressors, disruption of preferred behavioral patterns, and emotional responses. Promoting Positive Well-Being has four main components:

1. Patient Health Questionnaire (PHQ-9) depression screening tool (Kroenke et al., 2001). This validated instrument identifies depressive symptoms from mild to severe and is part of the federally mandated Minimum Data Set (MDS) 3.0, which all NHs are required to administer to residents at least every quarter (Centers for Medicare and Medicaid Services, 2014). Residents scoring 5 or greater are candidates for PPW.
2. Clinical guidelines for evidence-based treatment: PPW provides for three levels of intervention: (1) Behavioral Activation, which aims to increase the availability and frequency of preferred activities, restorative nursing, and exercise; (2) Enhanced Social Support, involving family as well as social work and chaplaincy services; and (3) Mental Health treatment, administered by psychologists or psychiatrists and including psychotherapy and/or antidepressant medications. Generally, psychosocial interventions are recommended as the first-line treatment for residents with mild levels of depression. Psychological and psychiatric services are advised for residents with more significant or sustained symptoms, suicidal ideation, or a history or preference for this form of care.
3. Wellness Rounds: Interdisciplinary care teams plan services based on each resident's individual needs,

background, and preferences. At prescribed intervals, teams review each person's response to treatment and refine the care plan as needed. An integral part of the program, Wellness Rounds use QI approaches, including the Plan-Do-Study-Act (PDSA) cycle and root cause analysis, to identify when interventions are working and when they are not, as well as to devise more effective treatment strategies for each resident.

4. Case management tools and pre-programmed Excel spreadsheet to track resident depression symptom severity scores and levels of intervention. Residents are assessed upon admission to the NH and every 3 months thereafter (or sooner if there is a significant change in status). The frequency of assessment follows Centers for Medicare and Medicaid Services (2014) procedures mandated for NHs. Care teams document in an Excel spreadsheet each resident's depression severity score and interventions received. The resulting report allows staff to easily see trends in each individual's depression scores, measure progress toward symptom relief, and problem solve during Wellness Rounds. Also, the spreadsheet automatically calculates population statistics (aggregate results) for all NH residents, month by month and year to date. This information is valuable for making improvements at the system level.

The PPW toolkit describes each component in depth and is available for free download (Abramson Center for Jewish Life, 2011).

In 2007, PPW was piloted for 10 months within a 324-bed not-for-profit NH. Sixty-seven residents were enrolled in the program and received follow-up screening. Results were promising: two thirds of the participants experienced some improvement in their depressive symptoms and 42% went from a positive screen (Geriatric Depression Scale—Short Form score ≥ 15 ; Cornell Scale for Depression in Dementia

score ≥ 12) on the initial depression screening to a negative screen (indicating fewer depressive symptoms) at follow-up (Alexopoulos et al., 1988; Crespy, et al., 2008; Yesavage, 1988).

In 2011, 40 Pennsylvania NHs took part in a proof-of-concept study for the PPW program. The goal was to evaluate whether (1) residents receiving the PPW program would experience a reduction in depressive symptoms as compared with others in a waitlist control group and (2) diverse NHs would find the program acceptable and feasible to implement.

Study Design and Methods

The PPW project was conducted as a QI initiative. A federally assured institutional review board reviewed the project and granted a waiver of informed consent.

Identification, Enrollment, and Randomization of Participating NHs

The project recruited participating NHs with the help of four Pennsylvania health-care provider associations, which either contacted facilities directly or provided a mailing list to the project team. The first 40 NHs that volunteered to participate became the convenience sample for the project. Administrators at the participating sites signed a letter pledging that the facility would identify an onsite project coordinator, provide information about organizational characteristics, take part in training sessions and monthly conference calls, use PPW tools during the project, submit monthly aggregate QI tracking forms, and complete periodic surveys. In most NHs (60%), a social worker served as the site coordinator.

Nursing homes were randomly assigned to the active ($n = 20$) or waitlist control group ($n = 20$). Based on data from the sites, the two groups were balanced both by facility size (small: <100 beds, large: ≥ 100 beds) and ownership type (for-profit, not-for-profit, county). Facilities in the active group had a total of 2,256 dually certified beds; those in the waitlist control group had a total of 3,169 beds.

Nursing homes in the active group began offering the PPW program immediately

after receiving training. Waitlist control NHs offered usual care for the first 4 months of the study; at the end of this period, they received PPW training and began implementation.

Procedures for Nursing Homes Implementing Promoting Positive Well-Being

Training. The research team provided four live 1-hour training webinars covering depression in older adults, PHQ-9 screening, and recommended clinical interventions, including therapeutic recreation, restorative nursing, exercise, social work, chaplaincy, and psychological and psychiatric services. Also, the training addressed special needs of suicidal residents as well as Wellness Rounds, the QI process, and data collection requirements. Webinars were audio recorded and available for staff who could not attend live sessions. The PPW training resources are available online (Abramson Center for Jewish Life, 2011).

Depression Screening. Nursing home residents capable of being interviewed were screened, usually by a social worker, at regular intervals outlined by MDS 3.0 requirements (i.e., typically upon facility admission and at least 3-month intervals). The PHQ-9 scores range from 0 to 27. Scores of 5–9 were considered to reflect mild depression; 10–14 reflected moderate depression; 15–19, moderately severe depression; and 20–27, severe depression. Nursing home residents scoring 5 or greater were enrolled in the PPW program. When residents were not capable of answering questions on their own, NHs followed MDS 3.0 procedures to interview staff regarding residents' depressive symptoms. Facilities were encouraged to exclude short-stay residents from the QI study because the PPW program was developed with long-stay residents in mind. However, the extent to which NHs excluded short-stay residents is unknown.

Care Planning. Interdisciplinary care teams met for Wellness Rounds to review each enrolled resident's needs, preferences, and history. Teams created an individualized treatment plan that drew on

PPW guidelines for (1) Behavioral Activation, (2) Enhanced Social Support, and (3) Mental Health Treatment (for details, see Abramson Center for Jewish Life, 2011).

Follow-up Screening and Wellness Rounds. Every 6 weeks, the social worker brought current PHQ-9 screening tool scores, along with clinical observations, to Wellness Rounds. During these sessions, the team reviewed the resident's response to treatment and modified the care plan as needed.

Discharge From Promoting Positive Well-Being. Residents stayed in the PPW program as long as depressive symptoms (PHQ-9 score of 5 or above) remained. Those discharged from the program received quarterly depression screenings as part of the MDS 3.0.

Telephone Support. Throughout the project, facilities in the active group were encouraged to contact the principal investigator with questions and attend monthly conference calls (typically lasting 45 minutes) to problem solve and share best practices with staff from other NHs in the active group.

Recording Resident Data and Calculating Aggregate Depression Indicators. Facilities were asked to use the PPW Excel spreadsheet and case management tools to record PHQ-9 scores for all NH residents on a monthly basis. The spreadsheet automatically calculated a percentage of positive depression screens based on the ratio of positive PHQ-9 depression screens in the numerator to the total number of MDS assessments completed per month as the denominator.

Evaluation of Promoting Positive Well-Being Feasibility. At Month 6, site coordinators completed a questionnaire (40 items) regarding staff experiences with PPW. The evaluation form asked about the webinar training experience, training manual, monthly collaborative conference calls, Wellness Rounds, case management and spreadsheet tool, implementation

challenges, and overall satisfaction with the PPW program and collaborative. Responses for most questions used a 5-point Likert scale with a range from "Completely Agree" to "Completely Disagree." Also, the questionnaire asked about leadership turnover (NH administrator and directors of nursing, medicine, social work, and recreation therapy) and staffing levels.

Procedures for Waitlist Control Nursing Homes

During the first 4 months of the project, each NH in the waitlist control group screened residents using the PHQ-9 and provided usual care. The facilities followed their own organizational policies and procedures, as well as governmental recommendations regarding triggers for care planning development, implementation, and evaluation. Recommended triggers are symptoms of anhedonia, suicidal ideation, and an elevated total PHQ-9 severity score (≥ 10) (Centers for Medicare and Medicaid Services, 2014). These recommendations applied equally to participants in the active and usual care groups. The waitlist control NHs followed the same procedures as active sites to record individual resident data, calculate aggregate depression indicators, and fax results to the research team.

After 4 months, waitlist control facilities took part in the same webinar training, monthly teleconference calls, and implementation procedures as the active group. During Month 6 of the collaborative, site coordinators completed the evaluation questionnaire asking about their experience with PPW. At this point, waitlist control facilities had implemented PPW for 2 months, whereas the active group had offered the program for 6 months.

Primary Outcome Measure

Nursing homes delivering the intervention faxed the aggregate level depression indicator results to the research team on a monthly basis. The data included number of MDS assessments completed per month, number of positive depression

screens (i.e., PHQ-9 of ≥ 10 , MDS Section D: Mood), and number of residents who received care planned interventions by level type (i.e., Level 1: Behavioral Activation, Level 2: Enhanced Social Support/Adjustment, Level 3: Mental Health Treatment). Individual resident-level information was not shared with researchers. Nursing home staff satisfaction with PPW was assessed at 6 months from the project start by way of a mailed staff evaluation form.

Study Design and Analytic Strategy

The study hypothesis was that facilities in the active group would experience a decrease in the percentage of residents with depressive symptoms compared with waitlist control facilities.

During the 4-month randomized controlled portion of the QI initiative, the design used a two-group by four time-period repeated-measures analysis of variance (ANOVA). Facilities were nested within one of the two groups: the active group offered the PPW intervention and the waitlist control provided usual care for the first 4 months of the study. The comparison between the two groups has a separate error term with facilities nested within groups. The “within” effects of time and group \times time interactions uses the residual error term for its F ratios.

Statistical Analyses

An ANOVA was used to analyze the data, contrasting Group 1 versus Group 2 during the first four time months. There was a minimal amount of missing data, substantially less than 10% at each time period. Missing data were imputed using Stata’s regression procedure. Effect size (ES) information was generated for all of the ANOVA main effects. The calculations were accomplished by estimating the η^2 for each F ratio from the sum of squares in the source table output. The $\eta^2 = SS(\text{effect}) / (SS[\text{effect}] + SS[\text{error term}])$. The ANOVA ES, f , were then estimated from the $\sqrt{\eta^2 / (1 - \eta^2)}$.

Results

Nursing Home Characteristics

Participating NHs had an average of 135.6 beds (compared with the national average, 107.6). Nursing homes were randomly assigned to the active or waitlist control group; groups were balanced based on type of ownership (for-profit, not-for-profit, or county) and by size (small: < 100 beds or large: ≥ 100 beds). There were no significant differences between the two groups in four key areas: (1) reported turnover among facility leaders (i.e., long-term care administrator and directors of nursing, medicine, social work, and recreation); (2) staff-to-resident ratios (for social services and recreation personnel as well as certified nursing assistants on the day or afternoon shift); (3) hours per week the medical director, psychiatrist or psychiatric nurse, and psychologist were physically present in the facility; and (4) facility 5-star Centers for Medicare and Medicaid Services (CMS) quality ratings (mean = 3.45 waitlist controls, mean = 3.55 active group) (Tables 1 and 2).

Completion Rates

Altogether, 37 NHs participated and submitted data throughout the 8-month collaborative (92% completion rate). Twenty-nine completed the evaluation survey (72.5%). Three NHs did not complete the project (two from the active and one from the waitlist control group). Reasons for not completing the project were that two facilities lost key staff members and a third reported having too many organizational changes to continue participation.

Participation in Training Webinars

The majority of facilities attended the four live 1-hour webinars (percentage of sites per session: 85–100%).

Comparison of Percentage of Residents Experiencing Moderate-to-Severe Depression in Active and Waitlist Control Group

At Month 4, the analysis examined results for residents scoring 10 or greater

Table 1. Pennsylvania Depression Collaborative: Characteristics of Nursing Home Sample: Facilities by Number of Certified Beds and Ownership Type (N = 40)

| Small <100 Beds; Large ≥100 Beds | Ownership Type | | | Total |
|-------------------------------------|----------------|------------|----------------|-------|
| | County | For Profit | Not for Profit | |
| Small Group | | | | |
| Active Group* | 0 | 2 | 8 | 10 |
| Control Group† | 0 | 2 | 6 | 8 |
| Total | 0 | 4 | 14 | 18 |
| Large Group | | | | |
| Active Group | 1 | 3 | 6 | 10 |
| Control Group | 3 | 4 | 5 | 12 |
| Total | 4 | 7 | 11 | 22 |
| Total Group | | | | |
| Active Group | 1 | 5 | 14 | 20 |
| Control Group | 3 | 6 | 11 | 20 |
| Total | 4 | 11 | 25 | 40 |

Source: <http://www.medicare.gov/nursinghomecompare/search.html>. The active and waitlist control groups were balanced by size (small or large) and ownership status (county, for profit, or nonprofit).

*Nursing homes in the active group had a total of 2,256 certified beds.

†Nursing homes in the waitlist control group had a total of 3,169 certified beds.

on the PHQ-9 MDS 3.0 screening tool. Individuals scoring in this range are important as a group because (1) a score of 10 is the traditional indicator for being “at risk” for moderate-to-severe depression on the PHQ-9, (2) this level triggers an MDS-related Care Area Assessment process, or more thorough

exploration, for the resident, and (3) scores at this level appear on a facility’s CMS quality indicator, “Percentage of long-stay residents who have depressive symptoms.”

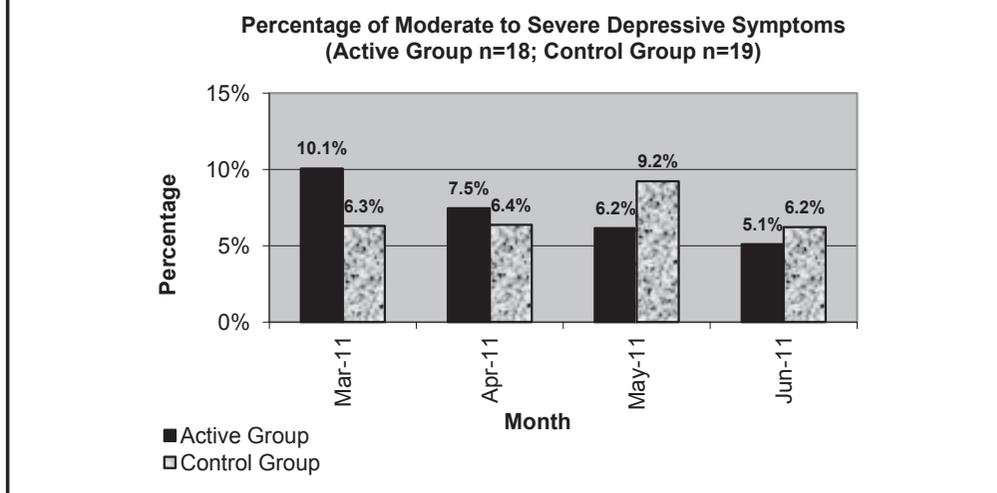
Altogether, 22,682 depression screenings occurred across groups during the 8-month study period. Figure 1 shows the

Table 2. Pennsylvania Depression Collaborative: Characteristics of Nursing Home Sample: Facilities by Medicare Quality Measure Rating (N = 40)

| Medicare 5-Star Quality Rating | 1 Star | 2 Stars | 3 Stars | 4 Stars | 5 Stars | Total NHs |
|-----------------------------------|--------|---------|---------|---------|---------|-----------|
| Active | 1 | 2 | 7 | 5 | 5 | 20 |
| Waitlist control | 1 | 2 | 8 | 5 | 4 | 20 |
| Total | 2 | 4 | 15 | 10 | 9 | 40 |

Source: <http://www.medicare.gov/nursinghomecompare/search.html>. NH, nursing home.

Figure 1. Depressive symptoms in 37 facilities over 4 months for active (black bars) versus waitlist control group facilities (gray bars).



For subjects with PHQ-9 scores of 10 or more, there were no significant findings for the contrasts among groups ($F_{1,37} = 0.01, p = .92, f = 0.02$ [low ES]) or over time ($F_{3,111} = 1.99, p = .12, f = 0.23$ [medium ES]). However, the group \times time interaction was significant ($F_{3,111} = 3.73, p = .01, f = 0.32$ [high medium ES]). Percentage of moderate-to-severe depressive symptoms: months 1 through 4 (active group $n = 18$; control group $n = 19$) and moderate-to-severe depression ($\text{PHQ-9} \geq 10$). ES, effect size; PHQ-9, Patient Health Questionnaire.

percentage of subjects with moderate-to-severe levels of depressive symptoms.

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higher percentages of residents with significant depressive symptoms over time.

Follow-up Comparison of Percent of Residents Experiencing Moderate-to-Severe Depression

Residents scoring 10 or greater on the PHQ-9 MDS screening tool in the active group were followed for an additional 4 months (8 months in total).

Eight months after training, NHs in the active group continued to demonstrate a decline in the percentage of residents with depressive symptoms (Figure 2). In all, there was a 58% relative reduction in the percentage of residents with moderate-to-severe depressive symptoms (10.1% in March 2011; 4.2% in October 2011). Although across the 8 months the ANOVA was not statistically significant, the results remained intriguing given the low-to-moderate ES; this suggests the need for more facilities to adequately test the intervention's impact over an 8-month period.

Staff Evaluation Form Responses

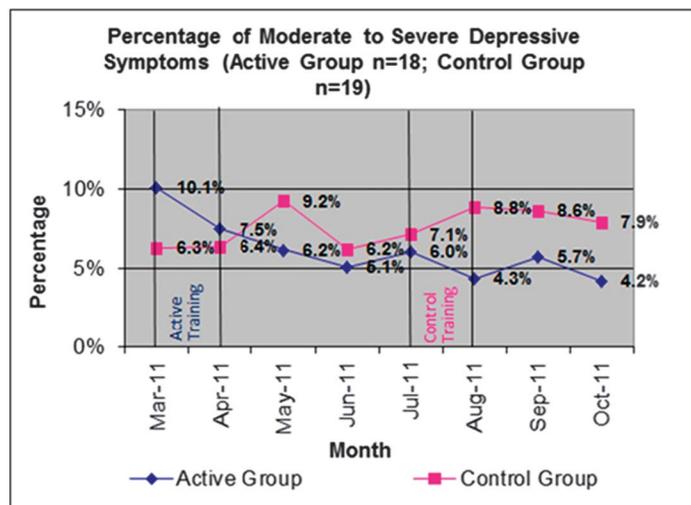
After the first 6 months of the project, coordinators at the 37 fully participating NHs were asked to provide feedback on PPW (Table 3). At this point, sites in the active group had 6 months of experience with the intervention, whereas waitlist control group facilities had only 2 months of experience with the intervention. Approximately three fourths (active 80%, waitlist control 65%) of participating NHs submitted the 6-month evaluation survey.

Despite the uneven evaluation time frame, there were no differences between mean ratings by active and waitlist facilities on the evaluation measures. Most site coordinators (97%) were satisfied with the materials, training, and support they received from the collaborative and would recommend it (86%) to other NHs. Site coordinators found the webinars comprehensive and of high quality (90%), the toolkit comprehensive (94%), and the database easy to use (89%). Three fourths said that the program helped them provide better services to residents at risk for depression. Most reported that the NH conducted Wellness Rounds (82%), with regular participation from social work, nursing, and recreation staff (93% respectively). In some cases, staff from chaplaincy (26%) as well as medicine, psychology, psychiatry, and quality (11% respectively) also attended regularly. Overall, 70% of NHs incorporated discussion of PHQ-9 scores and symptoms in interdisciplinary meetings. A majority of NHs found it easy to incorporate the depression and management program (63%), and only 15% reported significant implementation challenges. The most frequent issues were lack of staff or staff time, staff resistance to changing routines, and staff turnover.

Discussion

Implementation of PPW training sessions, tools, and QI strategies resulted in a significant reduction in depressive symptoms when comparing NHs in the active group versus waitlist controls. A 58% relative reduction was seen in the percentage of residents in the active group with depressive

Figure 2. Depressive symptoms in 18 active and 19 waitlist control group facilities over an 8-month period.



A 58% reduction in depressive symptoms was found in the active group from the first to last month measurement. Note: In July 2011, waitlist control facilities received training and began implementing the PPW intervention. Training for the control group occurred over a 4-week period in July 2011. Data for August, September, and October were the only data after intervention. Little to no quarterly depression reassessment data are included in the truncated measurement phase for the control group. Percentage of moderate-to-severe depressive symptoms: Months 1 through 8 (active group $n = 18$; control group $n = 19$) and moderate-to-severe depression (PHQ-9 ≥ 10). PHQ-9, Patient Health Questionnaire.

symptoms. The QI initiative results were encouraging, even in light of caveats about the depressive symptom data (notably, the low rates of depressive symptom detection using the PHQ-9). Generally, sites were highly satisfied with the program and found it feasible to implement. Challenges cited by staff were not remarkable for this setting.

Findings from the project suggest that the NH community may benefit from guidance which includes (1) effective use of a depression screening tool and a prevention focus, (2) evidenced-based discipline-specific practices offering a stepwise approach that uses behavioral interventions first for uncomplicated residents with mild levels of depression, and (3) QI methods, used in the context of an interdisciplinary team, to address both

individual clinical and aggregate system domains.

Horwath and colleagues (1992) suggested that an individual with sub-syndromal levels of depressive symptoms is more than four times more likely to develop new-onset major depressive disorder than an individual without depressive symptoms. The authors go on to recommend the use of early screening for depressive symptoms and the delivery of effective preventive intervention programs. The current PPW study trained NHs to identify residents whose depressive symptoms fell in the mild range (5–9) and in the moderate-to-severe range (≥ 10). Nursing homes were encouraged to administer behavioral approaches to residents experiencing mild levels of depression with the goal of avoiding symptom intensification.

With access to facility aggregate data only, it is beyond the scope of the PPW study to know whether the prevention focus (i.e., addressing mild level of symptoms) contributed significantly to an overall reduction in the percentage of residents with moderate-to-severe levels of depression. However, future studies using resident-specific data may examine whether the prevention focus helped stave off deepening depression.

The results suggest that NHs may benefit from incorporating QI elements, such as regular interdisciplinary rounds and systems to assess individual gains and identify effective interventions, when implementing a depression prevention and management program. The PDSA cycle is a valuable tool to track and trend results and make individual and system-level improvements. The continuous monitoring of aggregate data provides NHs with information to make changes when variation occurs. Future studies may better isolate and measure the effectiveness of these QI strategies.

Study Limitations and Directions for Future Research

The reduction in the percentage of residents with depressive symptoms was achieved despite the low ES of the PPW

intervention. According to the 6-month evaluation findings, several challenges may have contributed to the overall small ES: (1) staff turnover and competing priorities at NHs, (2) lack of specificity regarding intervention intensity/dosage, (3) brief time period for intervention implementation, (4) unknown sustainability over longer periods, and (5) lack of participation by some interdisciplinary team members, particularly the medical director.

Given the project's limited scope and focus on aggregate facility outcomes, we were unable to determine the extent to which individual NHs used suggested evidence-based practices for a given resident. Therefore, we were unable to determine the "dosage" of treatment approaches. Issues of treatment fidelity and dosage would be important next steps in this work.

Despite the randomization of facilities, NHs in the active group started at a higher baseline rate of depressive symptoms compared with waitlist control facilities. A regression to the mean effect cannot be ruled out as contributing to the results. However, the prevalence of significant depressive symptoms in the active group dropped below the control group during the comparison period and continued to decline during the 8-month study without returning to previous levels.

It is important to note that, because the research team did not receive resident-level data, the analyses cannot be adjusted by case mix. It is unknown whether differences between the waitlist control and active groups could have been due to differences in case mix, length of stay, or other characteristics of residents across the NHs randomly assigned to each group. The data reflect the dynamic and fluctuating population being served by each NH at any given time; although changes at the individual level are unknown, the results reflect overall rates of depressive symptoms and deployment of depression management services.

The strong potential for a reporting bias exists as NHs were not blinded to their respective arm of the QI collaborative. This potential is somewhat tempered by

Table 3. Pennsylvania Depression Collaborative: 6-Month Evaluation (N = 29)

| | Total | | Active Group NHs | | Control Group NHs | | t (p) |
|---|-------------------------|----|------------------|----|-------------------|----|-------------|
| | Mean (SD) ^{*†} | N | Mean (SD) | N | Mean (SD) | N | |
| Webinar training experience | | | | | | | |
| Learning sessions were comprehensive | 4.07 (1.00) | 29 | 4.06 (1.81) | 16 | 4.0 (0.76) | 13 | -0.04 (.97) |
| Information was of high quality | 4.24 (0.64) | 29 | 4.31 (0.70) | 16 | 4.15 (0.56) | 13 | 0.66 (.51) |
| Presenters were knowledgeable | 4.48 (0.51) | 29 | 4.50 (0.52) | 16 | 4.46 (0.52) | 13 | 0.20 (.84) |
| Number of learning sessions was just right | 4.10 (0.77) | 29 | 4.13 (0.81) | 16 | 4.08 (0.76) | 13 | 0.16 (.87) |
| Length of each session was just right | 4.17 (0.71) | 29 | 4.13 (0.62) | 16 | 4.23 (0.83) | 13 | -0.39 (.70) |
| I would recommend these sessions to a colleague | 3.97 (0.78) | 29 | 4.00 (0.89) | 16 | 3.92 (0.64) | 13 | 0.26 (.80) |
| Toolkit | | | | | | | |
| Toolkit was comprehensive | 4.32 (0.61) | 28 | 4.47 (0.52) | 15 | 4.15 (0.69) | 13 | 1.37 (.18) |
| Toolkit was of high quality | 4.29 (0.71) | 28 | 4.53 (0.64) | 15 | 4.00 (0.71) | 13 | 2.10 (.05) |
| Toolkit was easy to use | 4.21 (0.74) | 28 | 4.40 (0.63) | 15 | 4.00 (0.82) | 13 | 1.46 (.16) |
| I would share this toolkit with a colleague | 4.18 (0.67) | 28 | 4.27 (0.59) | 15 | 4.08 (0.76) | 13 | 0.74 (.47) |
| Monthly collaborative conference calls | | | | | | | |
| A once-a-month call was just about the right number | 3.79 (0.73) | 29 | 3.75 (0.78) | 16 | 3.85 (0.69) | 13 | -0.35 (.73) |
| I learned a lot from other participants on the call | 3.33 (0.73) | 27 | 3.27 (0.70) | 15 | 3.42 (0.79) | 12 | -0.52 (.61) |
| The format of the calls is helpful | 3.48 (0.75) | 27 | 3.40 (0.91) | 15 | 3.58 (0.52) | 12 | -0.66 (.54) |
| Intervention implementation | | | | | | | |
| It was easy to incorporate the depression prevention and management program at our facility | 3.74 (0.90) | 27 | 3.88 (0.72) | 16 | 3.55 (1.13) | 11 | 0.93 (.36) |
| We encountered significant implementation challenges when starting this program | 2.22 (1.12) | 27 | 2.44 (1.09) | 16 | 1.91 (1.14) | 11 | 1.22 (.24) |
| Our facility will maintain or expand this program | 3.63 (0.79) | 27 | 3.50 (0.89) | 16 | 3.82 (0.60) | 11 | -1.03 (.31) |
| This program has helped to identify more residents at risk for depression | 3.70 (0.91) | 27 | 3.81 (0.91) | 16 | 3.55 (0.93) | 11 | 0.74 (.47) |
| This program has helped to provide better services to residents at risk for depression | 3.96 (0.90) | 27 | 4.00 (0.97) | 16 | 3.91 (0.83) | 11 | 0.25 (.80) |

(Continued)

Table 3. (Continued)

| | Total Mean (SD)**† | N | Active Group NHs | | Control Group NHs | | t (p) |
|--|-----------------------|----|------------------|----|----------------------|----|-------------|
| | | | Mean (SD) | N | Mean (SD) | N | |
| Our facility has sufficient resources to implement this program | 3.44 (1.09) | 27 | 3.31 (1.08) | 16 | 3.64 (1.12) | 11 | -0.76 (.46) |
| Excel spreadsheet/caseload tool | | | | | | | |
| The spreadsheet/tool was easy to use | 4.21 (0.63) | 28 | 4.40 (0.63) | 15 | 4.00 (0.58) | 13 | 1.74 (.09) |
| The data submission procedure was easy to understand | 4.28 (0.70) | 29 | 4.38 (0.72) | 16 | 4.15 (0.69) | 13 | 0.84 (.41) |
| The spreadsheet/tool was helpful in managing our caseloads | 3.72 (0.84) | 29 | 3.75 (0.93) | 16 | 3.69 (0.75) | 13 | 0.18 (.86) |
| Overall satisfaction with program | | | | | | | |
| Overall, I am satisfied with the materials, training, and support from the PA Depression Collaborative | 4.34 (0.55) | 29 | 4.38 (0.62) | 16 | 4.31 (0.48) | 13 | 0.32 (.75) |
| I would recommend this collaborative to other nursing homes | 4.21 (0.68) | 29 | 4.25 (0.78) | 16 | 4.15 (0.56) | 13 | 0.38 (.71) |

*Response categories were 1 = Completely Disagree, 2 = Disagree, 3 = Neither, 4 = Agree and 5 = Completely Agree.
†For each item, the range was 1–5.
NH, nursing home.

regulations that govern the standard administration and reporting of MDS 3.0 depression screening results. A lack of indication of bias appears evident as the active group demonstrated initially higher levels of depressive symptoms and not lower levels as would be anticipated.

The PPW QI initiative produced promising results for treatment of NH residents with depressive symptoms. The findings support our hypothesis that the PPW program can improve quality of life measures for NH residents in a small convenience sample and suggest that a larger scale study of the intervention is warranted. Future research also may adapt the program for older adults receiving care in short-term skilled nursing, hospital, home care, personal care, and assisted living settings.

Findings provide support for the concept that treatment of depression is most effective when it is part of a comprehensive program that incorporates early detection of symptoms, interdisciplinary care planning, individualized care, including psychosocial and pharmacological approaches, and careful monitoring.

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The authors declare no conflict of interest.

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