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Pain Management Algorithms for Implementing Best Practices in Nursing Homes: Results of a Randomized Controlled Trial

Mary Ersek PhD, RN [a,b,*], Moni Blazej Neradilek MS [c], Keela Herr PhD, RN, AGSF, FAAN [d], Anita Jablonski PhD, RN [e], Nayak Polissar PhD [c], Anna Du Pen ARNP, MN [f]

[a] *Corporal Michael J. Crescenz VA Medical Center, Philadelphia, PA*
[b] *University of Pennsylvania School of Nursing, Philadelphia, PA*
[c] *The Mountain-Whisper-Light Statistics, Seattle, WA*
[d] *Adult and Gerontology Nursing, College of Nursing, University of Iowa, Iowa City, IA*
[e] *College of Nursing, Seattle University, Seattle, WA*
[f] *Bainbridge Island, WA*

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A B S T R A C T

Objective: To enhance pain practices in nursing homes (NHs) using pain assessment and management algorithms and intense diffusion strategies.
Design: A cluster, randomized controlled trial. The intervention consisted of intensive training and support for the use of recommended pain assessment and management practices using algorithms (ALGs). Control facilities received pain education (EDU) only.
Setting: Twenty-seven NHs in the greater Puget Sound area participated. Facilities were diverse in terms of size, quality, and ownership.
Participants: Data were collected from 485 NH residents; 259 for the intervention and 226 for the control group.
Measurements: Resident outcomes were nursing assistant (proxy) report and self-reported resident pain intensity. Process outcomes were adherence to recommended pain practices. Outcomes were measured at baseline, completion of the intervention (ALG) or training (EDU), and again 6 months later.
Results: Among 8 comparisons of outcome measures between ALG and EDU (changes in 4 primary pain measures compared at 2 postintervention time points) there was only 1 statistically significant but small treatment difference in proxy- or self-reported pain intensity. Resident-reported worst pain decreased by an average of 0.8 points from baseline to 6 months among the EDU group and increased by 0.2 points among the ALG ($P = .005$), a clinically nonsignificant difference. There were no statistically significant differences in adherence to clinical guideline practice recommendations between ALG and EDU following the intervention.
Conclusions: Future research needs to identify and test effective implementation methods for changing complex clinical practices in NHs, including those to reduce pain.

Pain is common among nursing home (NH) residents[1,2] and has significant negative effects on mood, sleep, and function.[3–5] Despite these serious consequences, pain assessment and management for this vulnerable group are inadequate.[1,6–8] Barriers to pain assessment and treatment in the NH are numerous and include both general difficulties in evaluating and treating pain in the older adults as well as challenges associated with the long-term care setting.[9–12]

Several evidence-based clinical guidelines to enhance pain management for older adults, including those in NHs, have been disseminated.[13–17] However, practice guidelines are often insufficient to change practice,[18] and studies of interventions to implement pain guidelines have not demonstrated effectiveness in enhancing resident outcomes.[19–21]

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* Address correspondence to Mary Ersek, PhD, RN, University of Pennsylvania School of Nursing, 418 Curie Boulevard, Room 329, Philadelphia, PA 19104–6096.
E-mail address: ersekm@nursing.upenn.edu (M. Ersek).

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One promising approach is the embedding of guidelines into explicit protocols and algorithms to enhance decision-making. Previous clinical trials have shown that assessment and treatment algorithms are effective in improving practice and patient outcomes.[22–25] To be maximally effective, the algorithms need to be embedded in a systematic intervention that uses effective strategies aimed at changing clinical practice. These implementation strategies include collaborative patient management, clinician education, enhanced roles for nurses, engagement of influential opinion leaders, audit and feedback, and academic detailing.[26]

Methods

Study Purpose and Aims

The purpose of this cluster, randomized controlled trial was to enhance pain practices in NHs using pain assessment and management algorithms and intense diffusion strategies. The following study aims and hypothesis tests reported were to:

1. Evaluate the effectiveness of a pain management algorithm coupled with intense diffusion strategies (ALG) as compared with pain education (EDU) only, in decreasing surrogate- and self-reported pain among NH residents at the completion of the intervention and at 6-month follow-up.

Hypothesis: At postintervention and 6-month follow-up, residents in the ALG facilities will have a greater reduction in surrogate- and self-reported pain than residents in EDU facilities.

2. Compare adherence to recommended pain practices between ALG and EDU facilities.

Hypothesis: At postintervention and 6-month follow-up, ALG facilities will demonstrate greater improvement on adherence to recommended pain practices compared with EDU facilities.

Design

The study used a clustered, randomized controlled trial design comparing ALG and EDU groups. The randomization scheme minimized cross-contamination between ALG and EDU facilities, which can cause dilution of the treatment effects.[27] Additional information about the study design and methods is available in an earlier publication.[28]

All study procedures were reviewed and approved by the Swedish Medical Center Institutional Review Board (IRB) (FWA00000544). Every participating NH obtained a Federal-wide Assurance through the Office for Human Research Protections and signed written agreements to designate Swedish Medical Center as the IRB of record. Residents provided written consent or were consented by the designated health care proxy.

Description of Intervention and Control Conditions

Intervention

The ALG intervention consisted of intensive training and support for the use of recommended pain assessment and management practices using algorithms. The cornerstone of the intervention was the dissemination of pocket-sized handbooks containing 11 linked evidence-based decision trees for the following: general pain assessment; assessment and treatment of pain in nonverbal residents; appropriate prescribing and titration of acetaminophen, nonsteroidal anti-inflammatory drugs, opioids and adjuvant pain medications; and assessment and management of medication side effects (constipation, sedation, delirium). Licensed nursing staff each received a copy of the handbook and attended 4 classes (conducted at the facility) that covered every algorithm. Classes were videotaped for future viewing. Facilities also received 3-ring binders that contained additional resource materials to aid licensed nursing staff, administrators, primary care providers, and nursing assistants in addressing residents' pain issues.

To aid the adoption of the ALG and evidence-based pain practices, the ALG and the classes were embedded in strategies that were based on Rogers' Diffusion of Innovations Theory.[29] These strategies included feedback about performance, establishment of and clinical support for facility-based interdisciplinary pain teams and clinical champions, chart forms and policies to incorporate the ALG into regular practice, and 4 biweekly booster activities begun 8 weeks following the classes. Additional information about the intervention has been described elsewhere.[28]

Control

The control, or EDU condition, involved offering licensed nursing staff four 1-hour classes at each control facility. Classes covered basic principles of pain assessment and management for older adults. As with the ALG classes, videotapes of each session were made available to the facilities for future review by both current and newly hired nurses. Figure 1 outlines study activities for the ALG and EDU groups.

Sample

Twenty-seven NHs in the greater Puget Sound area participated. Facilities were diverse in terms of size, quality, and ownership.[28] Residents of participating NHs were eligible if they were age 65 years and older, identified as having moderate to severe pain, and expected to remain at the facility for at least 6 months. All residents meeting these criteria were eligible regardless of cognitive function.

Residents with pain were identified using 3 procedures. First, research staff asked unit managers (licensed nurses who oversaw resident care) to identify all residents they believed had moderate to severe pain at any time in the past week that was not adequately treated by current therapies. Second, we used the Minimum Data Set (MDS) to identify residents who had moderate to severe pain. Third, we reviewed the charts of all residents not identified as having pain using the first 2 methods for clinical notes about pain, analgesic use, or pain care plans. Residents identified in this manner were then interviewed, if possible, and screened for eligibility.

Randomization Procedures

Following collection of all baseline measures at a facility, the principal investigator (ME) contacted the statistician with the name or names of the facilities that were to be randomized along with the limited information that was necessary to monitor balance between ALG and EDU facilities. Facilities were randomized singly or in matched pairs, although the final 3 unmatched facilities were randomized simultaneously. For the first 18 facilities, pairs of facilities that were similar in size ($\leq$110 beds or $>$110 beds), ownership (for profit or not for profit), and quality (based on number of deficiencies or stars on the 5-star quality rating system) were matched and randomized (1 to treatment and 1 to control with equal chance of assignment). Six of the first 18 facilities were not paired and were randomized singly with an equal chance of assignment to either condition. The last 9 facilities were randomized with an adaptive randomization that set the probability of each possible assignment according to the resulting balance in the allocation of ALG versus EDU on key facility characteristics.