Final Report
Improving Pain Management in Nursing Homes

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Structured Abstract

Purpose: The purpose of this study was to develop and test a multifaceted educational and behavioral intervention to improve nursing home pain practices.

Scope: Pain is under-recognized, under-reported, and under-treated in nursing homes. Prevalence may be as high as 84%. Barriers to effective pain management include staff, physician, and resident knowledge and attitudes about pain in the elderly and its treatment, organizational policies, and regulatory concerns. Several clinical practice guidelines are available but are infrequently used to guide practice.

Methods: The study was conducted in 12 proprietary and not-for-profit Colorado nursing homes (NHs), located in both rural and urban settings and ranging in size from 60 to 180 beds. Six NHs received the intervention, and six served as controls. Staff members completed baseline and follow-up pain knowledge and attitude surveys. A 20% sample of residents in each NH was interviewed and/or observed for pain and had their chart abstracted for pain-related information on a quarterly basis. The intervention consisted of four didactic sessions; an internal pain team that functioned as change agents; creation of a pain vital sign; production of two instructional videos with pamphlets or workbooks; and a CME session for affiliated primary care physicians.

Results: The intervention was partially successful in improving nursing home pain practices. Applied nursing knowledge improved, but attitudes remained unchanged in treatment homes. Residents experienced less constant pain but reported the same pain intensity. Prescribing practices improved over time, as did documentation of pain assessments. Staff and administrative turnover and leadership style influenced intervention implementation.

Key Words: pain, nursing homes, translation study, elderly

Purpose

The purpose of the study was to develop, implement, and evaluate a multifaceted, culturally competent, educational and behavioral intervention to improve the quality of pain assessment and management in nursing homes. Development of the educational materials was based on principles of competency-based education and adult learning. Implementation strategies were based on Roger's Theory of the Diffusion of Innovation (1995). The specific aims were to:

1. Develop and implement a multimodal, culturally competent, educational and behavioral intervention to improve evidence-based pain assessment and pain management practices in nursing homes;
2. Improve actual pain assessment procedures and pain management strategies being used in nursing homes;
3. Improve nursing home staff, physician, and resident/family knowledge and attitudes toward pain assessment and pain management;
4. Evaluate the influence of organizational variables on achieving desired clinical and educational outcomes; and
5. Assess the cost-effectiveness of the multimodal intervention for disseminating pain assessment and pain management knowledge in nursing homes.

Scope

Background: Inadequate pain management has been documented across healthcare settings. Quality issues related to pain have been reported in several nursing home studies, with pain prevalence estimated to be between 40% and 83%. Kramer et al (1998) studied 14 facilities in 11 states and documented significant problems in pain management. Keay (1994) found inadequate pain management to be a recurring theme when analyzing end-of-life care in nursing homes. There is widespread agreement that pain can be ameliorated by appropriate use of pharmacologic agents and nonpharmacologic interventions, but untreated or under-treated pain is very prevalent in nursing homes. A study of Oregon nursing homes found that 39% of residents had inadequately treated pain (Wagner, Austin, & von Korff, 1996). Up to 40% of elderly nursing home residents with cancer experienced pain every day (Bernabei et al, 1998), and 26% of those in daily pain received no analgesia. Minority status, age over 85, and cognitive impairment were independent predictors of receiving no analgesia. A larger study of nonmalignant pain in nursing home residents recorded daily pain in 26%, of whom 25% received no analgesia (Won et al, 1999). Inadequate pain management in nursing homes is associated with depression and anxiety, social isolation, impaired mobility, insomnia and sleep disturbances, behavioral problems, nutritional deficits, delayed healing, and lower overall quality of life (Ferrell, Ferrell, & Osterwil, 1990; Parmelee, Katz, & Lawton, 1991). Multiple factors are associated with the under-reporting, under-assessment, and under-treatment of pain in nursing homes. Residents fear addiction to opioids and other side effects of pain medication; do not want to be a burden or bother to the staff; display stoicism and claim they can handle the pain; believe it is normal for someone their age to hurt; or are concerned about the number of medications already being taken. Nurses and physicians have inadequate knowledge about pain and its management in the elderly; hold certain attitudes and beliefs about the most appropriate ways to manage pain in elderly and demented patients; fear

complications and side effects; and are concerned about possible exposure to regulatory authorities because of prescribing patterns. At the organizational level, optimal assessment and management practices may be inhibited by low staffing levels and a preponderance of unskilled workers in the staffing mix; high turnover rates; lack of continuity in assignments; and communication barriers.

Context: Educational strategies alone, such as those embodied in Clinical Practice Guidelines (CPGs), have not been effective in achieving sustained changes in practice behavior. Even though pain measures for both short-stay and long-stay residents were included in Medicare's Nursing Home Compare report card, and state Quality Improvement Organizations (QIOs) have reported significant improvement on these pain measures in their state nursing homes, evidence suggests that the numbers might reflect a decline in assessment and documentation of pain rather than improved pain practices. For example, nursing homes with hospice services report higher levels of pain on the report card, even though hospice clinicians are well known for providing superior pain management at the end of life. Improved management of pain has become the focus of several national initiatives. Besides being included on the Nursing Home Compare report card, The Joint Commission has issued standards for pain management that cross all healthcare settings. The Veterans Administration healthcare system has also launched a national initiative, identifying pain as the 5th vital sign, requiring periodic assessment and appropriate management. Several professional associations have developed and distributed evidence-based clinical practice guidelines related to pain, including the American Geriatrics Society (AGS); the American Medical Director's Association (AMDA); the American Pain Society (APS); and the Agency for Healthcare Research and Quality (AHRQ). Even though the knowledge base for effective assessment and treatment of pain exists, few nursing homes utilize this knowledge or existing resources to guide their pain practices. It was our belief that a multimodal intervention for improving nursing home pain practices needed to be developed and targeted at multiple stakeholders: nursing home residents and family members, all levels of nursing staff, other clinicians, and affiliated primary care physicians.

Setting: Colorado is a mountain state that contains both urban and rural settings. The rural areas are diverse, consisting of both ranch and farm land in the East and mountain communities to the West. The population is concentrated along the Front Range, with urban areas extending from Pueblo in the South to Fort Collins in the North. To capture the diversity of settings, the research team selected nursing homes for the study sample that were located in the urban Denver and Pueblo/Colorado Springs areas and the rural areas of the Eastern Plains (Sterling and Fort Morgan/Brush) and Southwest (Canon City and Salida). The dominant ethnic minority group in Colorado is Hispanic/Latino, with population concentrations rising to 25% in some locations. Most nursing homes in the state are for-profit and belong to chains; fewer are independent and not-for-profit (primarily with a religious affiliation). The few hospital-based nursing homes were excluded from the sample, as were publicly owned facilities.

Participants: Twelve Colorado nursing homes participated in the study: six urban, and six rural. An equal number of urban and rural homes served as intervention and control sites. Nursing home size ranged from 60 to 180 beds, with very small and very large homes also excluded from the study. All nursing homes accepted both Medicare and Medicaid payment. The intervention focused on all nursing home staff as well as on nursing home residents and affiliated primary care physicians. The university-based research team partnered with several state Area Health Education Centers (AHECs), who assisted with identifying study sites, forming relationships with individuals from those sites, and hiring local data collectors.

Methods

Study Design: This was a translational research study that developed and implemented an educational and behavioral intervention using a controlled comparison-group design. The treatment homes were selected after the baseline data collection period on the basis of demonstrated administrative commitment to the project, geographic distribution (only one home in a specific location), and urban/rural balance. The study was divided into three time periods: pre-intervention baseline, intervention, and post-intervention (sustainability). During the baseline period, the intervention content and procedures were finalized, and data were collected from staff members, residents, their medical records, and the organization on a quarterly basis over 9 months. During the intervention period, didactic and behavioral strategies for improving pain practices were implemented, while resident data collection continued on a quarterly basis for another 9 months. In the 9-month post-intervention period, quarterly resident data collection were completed, and staff data collection was repeated. At the completion of the study, a shortened version of the intervention was provided to the control-group nursing homes.

Analysis: Nested factorial analysis of variance (ANOVAs) and generalized linear models (GLMs) with generalized estimating equations (GEEs) were used in this analysis to account for the fact that respondents were not truly independent of each other. More specifically, staff members and residents were clustered within the individual nursing homes that were either receiving the intervention or serving as controls. Independent variables included group (experimental/control) and change over time (baseline, post-intervention).

Data Sources/Collection: Staff knowledge and attitude – written surveys

The team modified and expanded two existing surveys of pain knowledge and attitudes, University of Wisconsin and City of Hope (City of Hope, 2002), to align them with the geriatric pain management guidelines. The resulting survey included 36 true/false knowledge items, 21 five-point Likert scale attitude items, two short case studies requiring pain assessment and treatment decision, and 14 possible barriers to effective pain management (four levels, ranging from very important to not important at all in my nursing home). Items on the knowledge questionnaire included pain myths and misconceptions, pain assessment practices, pharmacologic and nonpharmacologic management, and concepts of addiction/tolerance/dependency. Pain and geriatrics experts reviewed the items for content validity. A version appropriate for certified nursing assistants was developed that used simpler language and excluded the medication

management items. A Spanish version of the CNA questionnaire was also developed by a certified translator, back-translated by a bilingual team member, and verified by a native Spanish speaker on the research team. Overall internal consistency (KR-20) reliabilities of the knowledge test of licensed and unlicensed staff surveys were .61 and .71, respectively, which are levels that are adequate for newly developed research measures. The attitude questions were developed by a subgroup of the team who first identified key themes to be covered. These included religious traditions and beliefs about pain and suffering, beliefs about gender and cultural differences in expressing pain, and beliefs about why residents might report pain and how staff might respond to complaints about pain. The final attitude survey consisted of four scales, with overall internal consistency reliability of .70. The barrier items were grouped into resident and family, physician, staff, and organizational categories. The internal consistency reliability for these subscales ranged from .71 (organizational barriers) to .87 (staff barriers). Reliability for the overall 14-item barrier scale was .93. Surveys were voluntary and anonymous. They were distributed and collected during scheduled staff meetings, and signed consent forms were collected separately.

Data Sources/Collection: Resident pain interviews and observation

A 20% random sample of residents was interviewed quarterly for nine quarters. Exclusion criteria were temporary absence from the facility; expectation of death within 48 hours; and original admission to the facility for a psychiatric illness. Data collectors selected every fifth resident from a randomly ordered list of the nursing home census. If the resident was not available or declined to participate, the roommate was approached. Selected residents were asked to sign a consent form after receiving an explanation of the study. If the selected resident was unable to understand questions and consent, the legal guardian was contacted by telephone and asked to provide consent. Approximately 10% of the residents approached declined to participate in the study. One legal guardian provided consent then withdrew the consent when the written document was received. The One-Minute Pain Questionnaire was modified for use with nursing home residents and additionally modified after pilot testing. If able to communicate, residents were asked to respond to a series of questions related to pain and its treatment. All residents in the sample (cognitively impaired and cognitively intact) were observed for signs of pain using Feldt's Checklist of Nonverbal Pain Indicators (2000). The items on the pain questionnaire were whether the resident had pain (or equivalent word used by the resident) now or since the same time the day before. If additional probing did not elicit presence of pain, the interview was stopped. If the resident reported pain, the research assistant asked additional questions about the location, intensity, and duration of pain. Residents were also asked about use of pain medication (whether given, requested, had to wait, never received when requested, or never requested even though in pain). Finally, the resident was asked about satisfaction with his/her pain management, and how much s/he was bothered by the pain. After the pain interview, residents were observed for indicators of pain. This required observing the resident at rest and upon movement.

Data Sources/Collection: Resident chart abstraction

All participants' medical records were reviewed for specific documentation related to pain assessment, reassessment, pharmacologic management, and nonpharmacologic

management. The Medication Administration Record (MAR) was reviewed, and selected medications (pain medication, adjuvants, stool softeners, laxatives) were recorded for the previous 72-hour period. A medication appropriateness scale was designed and tested with the purpose of screening the overall suitability of prescribing practices for pain in the nursing home setting. Two members of the research team with expertise in pharmacology and geriatric medicine led development of the scale. Five key principles were applied: 1) scale items should be derived from evidence-based guidelines; 2) the resident's description of pain or observed pain indicators if nonverbal should be considered the gold standard against which medication management is measured; 3) resident's assessment of quality of pain relief should be included; 4) prevention and management of constipation is intrinsic to appropriate use of opioids; and 5) there are medications and adjuvants whose use should be avoided in frail elders. The scale has five domains: concordance between pain syndrome and type or class of medication; concordance between dose interval prescribed and half-life of medication; concordance between severity of pain and WHO level of nonopioid/opioid and class of medication; constipation prevention; and avoidance of geriatric high-risk medications. The scale was designed to have a variable denominator so that an item only counts if it is relevant to an individual subject. The draft scale was tested on four subjects from whom we had study data. It next was sent out to an expert panel for review and comment. The final revisions were made, and the PMAS was applied to the study subjects as one of the outcome measures. Finally, pain and pain-related variables (activity level, mobility, behaviors) were also abstracted from the most recent Minimum Data Set (MDS).

Data Sources/Collection: Staff focus groups and interviews

In the pre-intervention period, focus groups of nursing home staff members were conducted to gather qualitative data about staff perceptions of pain and its management in the elderly. The specific areas of exploration were pain assessment practices used in the nursing home; pain treatment approaches used by nursing home staff; and ideas for improving pain-related knowledge in the nursing home. Twenty focus groups were conducted: six with mixed staff, eight with licensed staff only, and six with CNAs only. Separate sessions were held for licensed and unlicensed staff when possible due to potential reluctance by CNAs to express their views in the presence of supervising nurses. An experienced focus group facilitator followed a structured script, and the project PI observed and took notes. The facilitator explained the study, the focus group process, and elements of the informed consent. Sessions were audiotaped and lasted 1.5 hours. Snacks were provided, and participants received a $10 payment at the end of the session. Transcripts of the focus group sessions were analyzed using Atlas/Ti software. Transcriptions were read by two team members and scrutinized for segments of discourse related to the topics of pain assessment and pain management practices. Identified segments were coded using an inductively developed list of code words. The coding dictionary, composed of the definition for each code word, was adapted throughout the course of qualitative data analysis to reflect the domain of meaning and relational patterns among and across codes (Lofland & Lofland, 1984; Spradley, 1979). To estimate the reliability between the two coders, in identifying segments of discourse to be coded and applying identical codes to that text, a process of inter-rater reliability was devised (Brink, 1989; Kurasaki, 2000). Reliability checks of the transcripts resulted in endorsement by the secondary coder of 88% of the original codes.

For the 12% that were contested, the majority of requested changes involved addition of another code to complement the code already applied to the data.

In the post-intervention period, it was decided to interview key informants rather than to conduct focus groups, due to the difficulty of recruiting sufficient numbers of staff to participate in focus groups. Ten individuals filling specific job titles were asked to participate in the interviews. The job titles were Director of Nursing (DON), Administrator, Medical Director, Staff Development Coordinator, MDS/Quality Coordinator, Social Worker, Therapists, RN, LPN, and CNA. Each subject received a $5 honorarium after the interview. The specific topics covered during the interview were pain practices and attitudes about pain and its management after the intervention and quantitative data collection period; linkage between any reported changes in knowledge, attitudes, and practices and receipt of the intervention; whether particular alternative translation strategies might be more acceptable, feasible, and successful in changing nursing home pain practices; and what barriers continue to jeopardize optimal pain management practices in nursing homes. Two research team members conducted all the interviews. Each participant was informed of their rights as a human subject and signed a consent form. The interviews were audiotaped for later transcription. The interviews were analyzed using the Atlas/Ti software, and the same techniques for analyzing qualitative data as had applied to the focus groups were used.

Intervention: Specific components of the intervention to improve pain practices included the following:

- Comprehensive pain resource binder – contained CPGs, standards, assessment tools, patient educational materials, drug equianalgesic charts, CD-ROMs of pain resources, and commercially available videotapes
- Staff videotape with three vignettes scripted and produced by research team; accompanying staff workbooks and structured discussion questions
- Resident video scripted and produced by research team; accompanying pamphlets in English and Spanish
- Four didactic sessions – 20- to 30-minute educational offerings covering key topics (Pain Problem, Pain Assessment; Pharmacologic Management; Communication Issues and Strategies; and Integrative Case Studies)
- Physician Continuing Medical Education Session – a 45-minute educational session using interactive discussion of challenging cases; also provided written material, such as drug equianalgesic charts and laminated cards and clinical practice guidelines
- Internal Pain Team (IPT) – consisting of three nursing home employees: a CNA nominated by his/her peers; a medication LPN; and one other employee selected by the nursing home leadership. The IPT met with members of the research team every 6 weeks for a total of five meetings. The IPT posted pain factoids and feedback reports and developed the pain vital sign procedures for their nursing home.
- Pain Rounds and Consultations – During each of the five meetings with the IPT, the pain specialist on the research team conducted pain rounds, role-modeled pain assessment procedures, reviewed medication management, and made suggestions

regarding management. The pain specialist also helped coach staff on how to communicate pain information effectively to the primary care physician and helped create a pain fax form to be used by the nursing home for communication with the physician offices.

Measures: Primary uptake measures for the study were collected from both staff members and residents.
- Staff Measures: knowledge score; attitude score; barriers score; applied knowledge score; documentation of assessment and reassessment; nonpharmacologic interventions; Medication Quantification Score (MQS); and Medication Appropriateness Score (PMAS)
- Resident Measures: pain report; pain intensity and duration; pain medication request; satisfaction with pain management

Limitations of Study: Despite repeated attempts, one treatment home never successfully implemented the intervention due to sustained chaos within the facility. This facility's data were omitted from the analysis. During the course of the study, Medicare implemented the Nursing Home Compare report card. Colorado was one of the pilot states and chose pain as its first measure. This heightened focus on pain within the environment is reflected in the results, as several control group nursing homes volunteered to participate in the report card rollout. The Joint Commission also issued its pain standards as we were conducting the study. Staff turnover was so great in the nursing homes that very few staff attended all the training sessions, and very few took both pre- and post-knowledge surveys. The analysis of results consequently needed to drop the repeaters from the analysis and treat the two surveys as two independent samples, resulting in a decrease in power to detect differences.

Results

Principal Findings: Pain is a common problem in nursing home residents but often is not assessed, reported, or effectively managed. Staff members may verbalize certain beliefs about pain in the elderly (pain is what the resident says it is) but then go on to judge resident report of pain and its intensity in light of observed cues, behaviors, and "knowing" the resident. Our study suggests that improving pain assessment practices may be easier to achieve than improvements in pain management practices, especially in prescribing and administering pain medications. Physicians remain reluctant to abandon favored pain medications, such as Darvocet, and to order pain medication for chronic pain on an around-the-clock basis. However, the problem of altered prescribing practices is compounded by the hesitancy of nurses to administered stronger drugs even when ordered and by the reluctance or refusal of residents to report pain and/or take medication for that pain. Our study also revealed structural barriers to implementing quality improvement initiatives in the nursing home setting. Minimal staffing levels, dominance of unlicensed personnel, high turnover rates among staff and administrators, intermittent physician presence, a low-technology environment, and regulatory culture all combine to present significant challenges to improving care. Even more influential is the stability and quality of nursing home leadership, especially the director of nursing (DON). This individual sets the tone and expectations for the rest of the staff. If the DON

demonstrates commitment to the initiative, is involved with the activities, expects the staff to participate, and facilitates that participation, the project has a much greater likelihood of being successful.

Outcomes: Staff

Overall, 678 staff members completed surveys (300 at baseline and 378 post-intervention). Those participants with repeated data (n=43) were omitted from reported analyses, as were staff in non-nursing titles (n=50). The final sample size for analysis was 432 surveys: 176 at baseline and 256 post-intervention. Respondents predominantly worked days and were predominantly female, White, and middle aged. The largest single job category was CNA, and the largest ethnic minority group was Hispanic/Latino at slightly less than 20%. Respondent tenure in the nursing homes averaged 5-6 years – suggesting that some employees remain in their jobs or move to different jobs within the same facility, while a different core group experiences repeated turnover in the same positions.

Knowledge: As described in Jones et al (2004a), mean treatment home knowledge scores increased from 69% to 71%, whereas mean control nursing home knowledge scores essentially did not change (68% to 67%). ANOVA revealed that there was not a significant overall improvement in staff knowledge in the treatment homes after the intervention was implemented. There were significant differences (p<.001) in knowledge across job titles, with RNs scoring higher than LPNs and LPNs scoring higher than CNAs. For the Case Study A assessment question, treatment home RNs showed improvement across rounds, although this did not reach statistical significance, as the majority had already rated pain correctly. Treatment home LPNs showed significant improvement (p=.028) across rounds, as did the treatment home CNAs (p=.045). For the Case Study B assessment question, treatment home RNs did not change significantly (most rating pain correctly initially), but treatment home LPNs again showed significant improvement (p=.013). GLM/GEE analytic strategies with pain assessment coded as correct or incorrect showed significant job title and treatment group differences. Initial analyses for Case Study management questions showed essentially no improvement patterns over time for either case. Analysis with GLM/GEE of aggressiveness of management showed that, for case A, treatment group staff members generally were 2.5 times more likely to have chosen the most aggressive management strategy than were control group staff members.

Attitudes: The intervention did not have much effect on staff attitudes between baseline and post-intervention periods. ANOVA showed that there were no significant differences in overall attitudes between treatment and control nursing homes after the intervention period, but there were job category differences (p<.001). The attitudes of CNAs were significantly more negative than those held by LPNs and RNs.

Barriers: There was a marked decline in perceived barriers to effective pain management practices between the two data collection periods (p<.001) reported by staff in both treatment and control homes. This was most likely due to the contextual and

environmental changes taking place during that time period (Nursing Home Compare, Joint Commission Pain Standards).

Qualitative Analysis: As described in Clark, Jones, and Pennington (2004), the coding of the focus group transcripts resulted in identification of 119 codes; the 40 related to pain assessment have been examined in depth. Four themes pertaining to pain assessment were identified: a) uncertainty in pain assessment; b) relation-centered cues to residents' pain; c) behavioral and visual cues to residents' pain; and d) the complications of resident characteristics and attitudes in the accurate assessment of pain. Staff members were particularly concerned with their ability to accurately assess and classify pain in their residents and, thus, relied on behavioral cues to assist them to do this. Staff relied more on knowing the resident than on standardized pain assessment protocols and pain intensity tools. They also discounted the use of physiological measures in helping assess the presence of pain. Staff often attributed under-treatment of pain to resident attitudes and beliefs (stoicism, fear of addiction) and physician reluctance to order pain medications. Poor CNA-nurse communication and lack of continuity in staff assignments were also identified as potential barriers to effective pain practices within the nursing home. After the intervention and sustainability time periods, semi-structured interviews were conducted with 103 staff members from the treatment and control nursing homes (nine administrators; 38 RNs; 26 LPNs; 22 CNAs; two therapists; three social workers; three activities directors). These results are reported in Clark et al (under review). Taping difficulties led to the loss of nine interviews. Staff members identified changes in their knowledge and attitudes about pain and their pain assessment and management practices. Progressive solutions and suggestions for changing practice included establishing an internal pain team of change agents and incorporating nursing assistants into the care planning process. Respondents also reported that residents continued to under-report pain and that staff remained concerned about addiction and over-medication. Respondents from the treatment homes reported improved attitudes and sensitivity toward pain reports on the part of the staff nurses in those facilities. However, the reluctance to administer as-needed pain medications and to aggressively assess residents for possible pain persisted. Treatment home respondents also reported using a greater variety of pain medications, reduced use of Darvocet, greater use of nonverbal pain indicators, and application of nonpharmacologic interventions (e.g., hot packs and positioning). Respondents from both treatment and control homes reported continued refusal by physicians to alter their pain management practices.

Outcomes: Residents
        As described in Jones et al (2004b), the primary outcomes measured for pain practices were percentage of residents reporting pain, reporting moderate or severe pain, with a non-MDS pain assessment, and with a pain reassessment. Data were collected from 2,033 residents in the 12 study facilities. Resident characteristics in the treatment homes were 72.4% female; 55.7% urban; 12.4% non-White; and 96.4% able to report pain; the mean age was 81.5 years. Resident characteristics in the control homes were 66.5% female; 54.5% urban; 15.1% non-White; and 96.3% able to report pain; the mean age was 79.5 years. Resident data from one treatment home (n=134) were omitted from analysis because the facility failed to complete the intervention, despite repeated starts and restarts. Chi-square and logistic regression (with GEE) analyses were used to

examine differences related to group (intervention/control) and study phase (baseline/ implementation/sustainability). There was no significant reduction in percent of residents in treatment homes reporting pain over the three phases of the study (57%, 61%, 60%, respectively). There was a significant (p<.001) decrease over the three phases of the study in the percentage of residents reporting constant pain in the treatment homes (53%, 37%, 35%, respectively). Overall, residents in the implementation phase were 35% less likely to report constant pain than were residents in the baseline phase (p=.008); residents in the sustainability phase were 42% less likely to report constant pain than were residents in the baseline phase (p=.0006). There was no significant reduction over the three phases of the study in percentage of residents in treatment homes reporting moderate/severe pain now (30%, 23%, 26%, respectively) or in the last 24 hours (46%, 44%, 46%, respectively).

A major finding of the study was the noted monotonic relationship between pain intensity and number of nonverbal pain indicators observed at the same time (Jones et al, in press). As pain intensity increased, the number of observed pain indicators also increased. The relationship was stronger for reported current pain than for pain in the past 24 hours, as might be expected.

Outcomes: Documentation and Management

Documentation of pain assessments and re-assessments improved between baseline and post-intervention periods across all nursing homes. Both treatment (64%, 81%, 92%) and control (64%, 86%, 94%) homes showed significant improvement (p<.001) in non-MDS pain assessments over the course of the study. Overall, residents in the baseline phase were 64% as likely to have a non-MDS pain assessment as were residents in the implementation phase (p<.0001); residents in the baseline phase were 87% as likely to have a non-MDS pain assessment as were residents in the sustainability phase (p<.0001). Residents in the implementation phase were 62% more likely to have a non-MDS pain assessment as were residents in the sustainability phase (p<.0001). Both treatment (38%, 46%, 44%) and control (27%, 47%, 53%) homes showed significant improvement (p<.05) in pain reassessments over the three phases of the study.

The Pain Medication Appropriateness Score (PMAS) was derived from the information abstracted from the Medication Administration Record and was applied to the 2033 pain assessments. As described by Hutt et al (under review), the mean total score was 66%, with a range from -33% to 100%. Appropriate prescribing for mild episodic pain and constipation prevention for as-needed opioids was excellent (91.4% and 81.8% compliance, respectively). Prescribing for persistent, recurrent, and neuropathic pain was adequate for half or fewer residents who had that type of pain. Only a third of the residents had an excellent match between their pain severity and the medication prescribed, and only a quarter said they had complete pain relief. On the other hand, more than 75% of residents described their pain relief as adequate or complete. Thirty-nine percent of respondents were receiving at least one medication considered to be high risk in the elderly.

Outcomes: Disparities in Pain Assessment and Management

The results indicated that subtle biases in the assessment and management of pain might have been occurring in our nursing homes. Those in the Hispanic/Latino group were less likely to have pain noted in the Minimum Data Set (MDS) (54.4% of whites; 42.2% of Hispanics). However, there were no significant differences by race/ethnicity in percentage of residents reporting pain in our interviews. Multivariate logistic regression model predicting moderate or severe pain identified ethnicity and sex as significant predictors. The odds of reporting moderate or severe pain were 112% higher for men and 156% higher for Hispanics. In addition, the odds of reporting moderate or severe pain were 88% lower for those who had requested pain medication. Hispanic/Latino residents in pain were much more likely not to request pain medication because of the expected response by staff to that request (Jones et al, 2005).

Outcomes: Intervention Implementation

Attendance and turnover: Although each of the four didactic sessions was offered multiple times in each treatment home (starting at 6 am and stopping about 6 pm) on a day selected by the nursing home and delivered as many times as the nursing home requested throughout the day, attendance was problematic once the initial, mandatory session was completed. The fact that each session lasted only 20 to 30 minutes and included food, door prizes, and other incentives did not seem to make a difference. Attendance was worse if one or more staff members had called in sick that day or was unable to get to work because of weather conditions. Lack of coverage for staff so they could leave the unit also hindered attendance. The turnover of staff presented significant problems, with new employees showing up at each session. In some sessions, none of the attendees had been present at the preceding session. To partially accommodate these circumstances, the research team made videotapes of three of the didactic sessions, so the nursing home staff development coordinator could arrange for showing them to staff members whenever convenient. The fourth session, which involved the pain specialist and interactive discussion using the videotape of case vignettes produced by the research team, was repeated as requested by the nursing home.

Access to and Retention of Educational Material: The material and tools contained in the comprehensive pain resource binders were deemed "too valuable" to be left on nursing units, so the binder was often locked up in staff development or administrative offices. In addition, the vast amount of material was often overwhelming to the staff members, especially the CNAs. In response, the research team created mini-binders of pain material that could be placed on each nursing unit as well as in the therapy room and the break room. We also created a binder just for CNA use. Finally, the research team decided to create "pain factoids," single items of information extracted from the clinical practice guidelines. These individual facts (pain assessment, pain management, and communication) were placed on colorful paper, illustrated, and posted in visible locations throughout the nursing homes (medication room doors, bathroom walls, and staff break rooms).

Physician Involvement: There was poor attendance at most of the physician seminars despite offering CME credit, convenient times and locations, food, pain materials, and a discount on malpractice insurance. The use of local opinion leaders and personal invitations with oral and written reminders did not seem to help encourage

attendance. The sessions were organized by an MD and a nurse pharmacologist, using a case approach, and were rated useful by the physicians who did attend.

Internal Pain Team (IPT): The original IPT consisted of a CNA, a LPN medication nurse, and one other employee of the nursing home's choice. This third member of the team ranged from social workers to restorative aides. Although the IPTs took their responsibilities seriously and tried to implement new practices in their settings, it quickly became apparent that lack of recognized authority within the nursing home and lack of control over resources and personnel prevented achieving the clinical practice and policy changes. After the first round of site visits, a decision was made to invite nursing leadership to join the IPT meetings. This allowed more informed discussions on how to implement the pain vital sign and its documentation within the facility. However, it also reduced the participation of some of the nursing assistants, who were often intimidated by the presence of nursing home supervisors and administrators.

Outcomes: Cost Analysis

The intervention, as explained above, was only partially successful in improving pain practices in the nursing homes. It was decided that the most appropriate analysis would be to conduct a cost analysis of the intervention, to determine how much it would cost the average nursing home to implement the intervention as designed by the research team. The analysis was conducted from the societal perspective. Several assumptions were made related to overhead costs and staffing levels. Nursing home staff levels were assumed to be constant. No additional personnel would be hired to implement the intervention. The staff development coordinator and internal pain team members would provide the intervention during the course of their regular responsibilities. Again, opportunity costs would be incurred as time was diverted from other possible assignments. Nursing homes would not incur significant increases in direct operating costs, such as telephone, supplies, or copying, due to the intervention. There also would be no additional capital costs, such as video recorders or fax machines, which are assumed to already be in use by the facility. The intervention is assumed to be physician-staffing neutral as well, not generating additional visits to the nursing home. There might be a small increase in physician time devoted to communication with the nursing home on pain-related issues in general and for specific residents. There would be no change in cost to families, as there would be no change in number of visits or telephone calls. It is also assumed that there would be no change in utilization of health services (hospitalization, emergency room visits) due to the pain intervention.

Each nursing home would purchase the standard package, which includes training session materials and outlines. Costs for training and materials reflect actual production costs. Training materials are composed of the following:

Resident videos – English and Spanish (two/nursing home)
Resident educational pamphlet (200/nursing home) – English and Spanish
Staff training video – set of four (three didactic sessions plus vignettes)
Staff training workbook (100/nursing home)
Staff pain poster (three/nursing home)
Resource binders (five/nursing home)
Pain fax sheet (11/nursing home)
WILDA pain assessment laminated card (200/nursing home)

Drug reference card (134/nursing home)
Container (one/nursing home)
TOTAL COSTS = $775

Staff training sessions would involve:
    Two 1-hour sessions/nursing home
    One 1-hour makeup session/nursing home
    Internal pain team meetings: n=3-5 staff for five 1-hour meetings
    Trainer time: one trainer per session
    Total trainer time = 8 hours direct training time + 30 minutes of documentation
time per session (4 hours/nursing home) = 12 hours X salary & benefit rate per hour of trainer

    Total Trainer Cost: Mean salary = $35/hour; 27% benefit rate
    TOTAL COSTS: $533

    TOTAL INTERVENTION PACKAGE COST: $1308

Medications:
    Cost of pain medications actually given at baseline:
        Total for all nursing homes = $780
        Mean cost per NH = $65
        Mean cost per resident = $3.35

    Cost of pain medications actually given post-intervention:
        Total for all nursing homes = $921
        Mean cost per NH = $77
        Mean cost per resident = $4.07

    Cost of pain medications actually given at sustainability time period:
        Total for all nursing homes = $848
        Mean cost per NH = $71
        Mean cost per resident = $4.06

Net change from time 0 to time 1 = $0.72 per resident (21% increase - $4.07-3.35)
Net change from time 1 to time 2 = -$0.01 per resident (0.2% decrease - $4.07-$4.06)

Total Cost of Intervention = $1398, assuming a 125-bed NH

Sensitivity Analysis
    Cost drivers are personnel and medications. The above calculations assumed no required increase in personnel to conduct the training program. If the nursing home added .25 FTE in order to provide the program, the program cost would increase by $13,888. If the nursing home needed to add .5 FTE, the program cost would increase by $27,775. If the cost of pain and adjuvant medications increased by 5%, the mean cost per resident for pain medication would increase from $4.07 to $4.27. The net change in cost for a 125-bed nursing home would be $25. If the cost of pain and adjuvant medications

increased by 10%, the mean cost per resident would increase from $4.07 to $4.48. The net change in cost for a 125-bed nursing home would be $51.25. Worst-case scenario analysis: Nursing home 1 had an increase in cost of pain medications per resident of $3.90, or 244%. If the cost of pain medication increased by 244% overall, then the mean cost per resident would increase from $4.07 to $9.93. The net change in cost for a 125-bed nursing home would be $732.50.

Our baseline assumption for 12 hours of training time is only valid in low-turnover environments. In locations where there is high turnover, it is likely that more required training time or an increase in internal pain team time spent working with new staff would result in significant costs to the facility. Even when the cost of pain medication increased dramatically (244%), pain medication costs were less than 3% of overall costs if staffing time increased. However, medication costs are 46% of overall costs if there are no increases in staffing. Hence, the cost of the intervention is most sensitive to changes in staffing.

Discussion: This study attempted to improve pain practices in nursing homes by using a multifaceted intervention containing both educational and behavioral components. Several challenges were faced in the course of intervention implementation. The lessons learned should be useful to others as they develop interventions to improve the quality of nursing home care. These can be categorized as follows (Jones et al, 2004b):

- Administrative commitment, involvement, and leadership ability are essential.
- Administrative and staff turnover interferes with sustained engagement in the quality improvement process.
- Limited organizational capacity prevents major investments in the quality improvement process.
- Both direct caregivers and clinical supervisors need to function as change agents.
- Educational content must be simplified and condensed into key aspects of care that improve resident outcomes; reading level needs to be at a sixth-grade level; Spanish or other translations might be required.
- Physician engagement is necessary; educational outreach (academic detailing) might be more successful in influencing physician prescribing practices.

Another challenge faced by the research team related to the requirement to obtain written consent from the staff members and the residents prior to data collection. More than a few residents were very willing to answer our questions about their pain experience but refused to sign the consent form. Many stated that they had been instructed by their family members not to sign anything if asked. Contacting and acquiring consent from legal guardians was also challenging and consumed a lot of time during the data collection period. Requiring signed consent forms from the staff members led to greater reluctance or refusal to participate. Depending on the messages being conveyed by nursing home leadership, written consent was often the excuse provided by staff members not to complete the survey. Some staff members were convinced that the surveys could be linked to them as individuals and believed that somehow their responses would get back to administration. These challenges were exacerbated by the addition of the requirement for HIPAA authorization, which was instituted during the conduct of the study.

Conclusions: Nursing home pain management is a complex problem. Staff and physician knowledge deficits, personal biases and beliefs, and communication gaps present serious barriers. Resident beliefs and behaviors also hinder effective management strategies. The nursing home setting itself makes programs for clinical improvement particularly challenging. The large percentage of unlicensed staff, high turnover rates and low staffing ratios, inadequate leadership competencies, low-technology environment, and regulatory culture and climate must all be addressed and overcome before quality improvements are possible.

Significance: The advent of the Medicare Nursing Home Compare public reporting initiative by the Centers for Medicare and Medicaid Services (CMS) served to focus attention on the quality of pain management in nursing homes, because two of the initial nine measures related to pain. There was evidence in our study that nursing homes might have perceived lower barriers to effective pain management due to the major initiatives occurring in the environment. It is important, however, that data be collected related to the management of pain, not just the assessment of pain by staff. The tools developed by the research team are available to assist individual nursing homes, state quality improvement organizations (QIOs), and others working with nursing homes to improve pain practices. Two specific areas require attention by policymakers. One is the need to improve the nursing home work environment, to make it more attractive to workers at all levels. The second is to develop leadership programs for nursing home administrators, directors of nursing, and staff development coordinators. A more stabilized nursing home environment would facilitate successful quality improvement initiatives and ultimately better quality of care and quality of life for the residents. It would also improve the quality of work life for the staff.

Implications: During the course of our study, it became very apparent that both physicians and nurses have inadequate and outdated knowledge regarding pharmacologic approaches to effective pain management in the elderly. Medical and nursing school curricula need to be upgraded in this area, particularly in the differences between acute and chronic pain management and the variations across the types of pain (somatic, visceral, and neuropathic) and appropriate medications. Specific information on drug titration in the elderly, equianalgesic dosing, and contraindicated drugs is needed. Gero-pharmacology courses are needed in formal educational programs as well as in continuing education courses.

There was also very little use of nonpharmacological treatments for pain. Even though the application of heat and cold has been shown to be effective for various types of pain, nursing home staff members are reluctant to use them. Some of this relates to whether a doctor's order is required or whether these interventions fall within the nurses' scope of practice. Because of fears of injuring residents' fragile skin, some nursing homes assign this intervention to specially trained restorative aides or to the therapists. Other interventions, however, are less controversial. The use of distraction, massage, and positioning could be implemented by any member of the staff as well as by family members. The creation of "care kits" with lotions and instructions on how to provide massages and other techniques for use by CNAs and family members might be helpful.

Communication is another area requiring more attention. Residents often will not communicate their pain to staff members, for a variety of reasons (Jones et al, 2005). Sometimes, language or cultural issues are present. Other times, the nursing home staff is perceived as too busy and there is reluctance to bother them with a request for pain medication. Unfortunately, residents may also feel that their reports of pain are ignored, are not believed, or will not get communicated to those who can act on it. Communication among staff members is another concern (Jones, in press). Often, CNAs are not included in report, rounds, or care planning conferences. Their reports of resident pain may be discounted by the nursing staff, with subsequent reluctance to continue reporting resident needs in this regard. Finally, communication between nursing home staff and physician offices is often problematic. Many times the physician is unreachable, and the nurses need to relay information and requests through office staff. Physicians may be reluctant to trust the information being conveyed and decide to wait until their next visit before changing orders. Physicians may also resent suggestions made by nursing home staff, even if based on evidence-based clinical practice guidelines and consultation with the pharmacist. Communication lapses also occur when the resident is transferred across settings, such as the hospital and the nursing home. It is not unusual for all medication orders, including pain medications, to be discontinued upon discharge, with delays in writing new orders at the nursing home. Unrelieved pain, and possible delirium due to withdrawal, may be the result.

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