

Pain Management in Nursing Homes

What Do Quality Measure Scores Tell Us?

ABSTRACT

Pain management for older adults residing in nursing homes continues to present multifaceted challenges to health care practitioners and researchers. This study, which focuses on improvement in pain assessment and management, is a secondary analysis of data from a larger study, which used an intervention simultaneously directed at all levels of staff with change in quality measure (QM)/quality indicator (QI) scores to determine improvement in resident outcomes. We anticipated that focused improvement efforts in resident care regarding pain management would be reflected by correspondingly lower QM/QI scores over time. Findings of increased QM/QI scores may be positive in that they may point to increased attention by staff regarding pain management for residents.

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Nursing homes have been the focus of study for quality improvement activities for the past 2 decades. Quality measures (QM) and quality indicators (QI) continue to show multiple areas for improvement if quality of life for our nation's older adults is to meet societal expectations. One area of continued concern is pain assessment and management. Evidence is available from the American Geriatrics Society (2002), American Medical Directors Association (2003), Agency for Healthcare Research and Quality (Herr, Bjoro, Steffensmeier, & Rakel, 2006), and The Joint Commission (2009) to make pain management practice improvements. Researchers have studied health care providers' knowledge of pain management, implementation and use of pain management protocols, and prescribing practices relating to pain analgesia. Barriers to improvement efforts have multiple origins, resulting in a continuing need for the study of pain assessment and management practices in nursing homes.

BACKGROUND

Pain is a subjective experience, often overlooked and undertreated in older adults residing in nursing homes. Pain has many negative effects including insomnia, depression, anxiety, change in or loss of appetite, change in activity status, and overall decreased quality of life (Jones, 2006). Estimates for residents in nursing homes with daily pain range from 40% to 85% (Sengstaken & King, 1993; Stein & Ferrell, 1996; Won et al., 1999), with as many as 25% of these older adults receiving no intervention for pain relief (Won et al., 2004). Researchers have approached understanding and improving pain assessment and management practices in nursing homes through studies in multiple sites across several states (Jones et al., 2004; Weissman, Griffie, Muchka, & Matson, 2000).

Qualitative Research

Attitudes toward pain management have been one area receiving

researchers' attention. Tarzian and Hoffmann (2004) surveyed long-term care Directors of Nursing, finding that most believed pain was suboptimally managed in their facilities. Identified barriers included nurses' and physicians' inadequate knowledge about pain management, physicians' attitudes regarding fear of overdose or addiction, and difficulty choosing the correct analgesic agent. Similar findings were reported by Kaasalainen et al. (2007); their grounded theory analysis resulted in a model highlighting critical decision points for physicians and nurses regarding pain management. Themes relating to pain assessment (lack of recognition of pain and uncertainty regarding accuracy of assessment) and treatment (reluctance to use opioid agents and issues relating to physician trust of nurses) emerged.

Wiener and Rudy's (2002) study included certified nursing assistants (CNAs) and residents and found time available for pain assessment was a perceived barrier by CNAs, while residents were concerned about addiction and dependence. Residents also believed chronic pain would not change, even with intervention. de Rond et al. (2000) determined most nurses harbor prejudice, as well as lack of knowledge, about pain management.

Intervention Research: Education

Several researchers have used intervention strategies to improve pain management in nursing homes, with variable results. Use of educational strategies to improve pain management programs in nursing homes has been a common component of intervention studies (Buhr & White, 2006; Hanson, Reynolds, Henderson, & Pickard, 2005; Jones et al., 2004; Weissman et al., 2000). One of the earliest studies was conducted in 87 Wisconsin nursing homes using an educational plan that included 20 contact hours over a period of 12 months (Weissman et al., 2000). Multiple instructional methods were

used with educational resource packets designed for and distributed to all levels of nursing and facility staff. These education efforts were combined with methods to effect change in institutional culture and practice of pain management. Descriptive statistics showed an improvement from 14% to 74% of more than 50% use on 14 measures used to determine progress in pain management. Buhr and White (2006) reported similar results with educational interventions. Their study also targeted all levels of nursing and facility staff who demonstrated higher scores on posttests following education on pain assessment and management.

A study conducted in six Colorado nursing homes used an educational and behavioral intervention designed to improve nursing home pain management practices (Jones et al., 2004). While staff knowledge in the area of pain management improved, attitudes regarding pain management in older adults changed little. The behavioral component included development of an internal pain team. Success of this team was less than expected due to staff turnover, lack of authority necessary to make changes in policies and procedures, and less than optimal support by key administrative personnel.

Intervention Research: Quality Improvement

Quality improvement efforts of various designs have been used in several recent research studies. Following the Donabedian model, efforts were made to improve key structural elements for pain management in 37 nursing homes in Wisconsin (Stevenson, Dahl, Berry, Beck, & Griffie, 2006). Significant improvement ($p < 0.05$) was seen in the use of pain assessment tools, standards mandating when pain requires intervention, involvement of families in pain management programs through education and care planning, and a formalized plan to monitor appropriateness and effectiveness of pain management.

Keeney et al. (2008) used a similar two-phased approach with 49 homes in Kentucky. Elements of structure, process, and outcome were addressed with improvement noted in all areas. One year following study completion, telephone interviews with four homes indicated sustainability of change, with each of these homes continuing a well-functioning pain management program.

Education in pain management along with the quality improvement methodology of Plan-Do-Check-Act (PDCA) was used in nine North Carolina nursing homes (Horner, Hanson, Wood, Silver, & Reynolds, 2005). Results showed significant improvement in the area of pain assessment ($p < 0.001$). Significant improvement was also seen in use of nonpharmacological pain management ($p = 0.010$); however, no difference was seen in pain treatment of

colological interventions ($p < 0.001$). Prescription of pain medication, change in pain medication, prescription of pain medication on a regularly scheduled basis, and reduction in prevalence of pain did not show significant change.

Qualitative research has provided rich information regarding attitudes about and barriers to adequate pain management. Quantitative research, with interventions designed to build on this information, has yielded mixed results. All quantitative studies used multifaceted interventions, but no study used a combination of interventions simultaneously directed toward all levels of staff. No study was found that used federal QM/QI indicator scores as the unit of measure from which to determine significance of research results.

The purpose of this article is to report on a study focused on pain man-

An attention control group used an educational intervention.

Objectives

The overall aim of the parent study was to test an experimental intervention focused on building organizational capacity to create and sustain improvement in quality of care and subsequently improve resident outcomes in nursing homes. The objective of this secondary analysis was to ascertain whether, through this intervention, resident care improved in the area of pain management. Hypotheses included:

- The experimental intervention group will show greater improvement in pain management QM/QI scores than the education control group.
- Individual education control group facilities will show no significant change in pain management QM/QI scores.
- Individual experimental group facilities choosing pain management as an area of focused intervention will show significant improvement in pain management QM/QI scores over time.

Increased QM/QI scores may be a positive finding in that they may point to increased attention by staff regarding pain management for residents.

those residents with daily moderate or excruciating pain. Researchers in South Carolina also used the PDCA model in a small intervention study involving 40 residents in two nursing homes (Leone, Standoli, & Hirth, 2009). Descriptive statistics revealed improvement in use of pain assessment tools and treatment.

In Rhode Island, a quasi-experimental pretest-posttest design was used to improve pain management processes of care and outcomes in nursing homes (Baier et al., 2004). Use of a multifaceted intervention including education, training, audit and feedback of pain management, coaching, and inter-nursing home collaboration yielded mixed results. Significant improvement was noted in use of pain assessment and intensity scales ($p < 0.001$) and nonpharma-

gement improvement. This study is a secondary analysis of data from a larger study funded by the National Institute of Nursing Research (grant 5ROINR009040-05, M.J. Rantz, PI), which used an intervention simultaneously directed at all levels of staff with change in QM/QI indicator scores as the measure to determine improvement in resident outcomes.

METHOD

Design

This study used data from a larger parent interventional study designed to test the effect of a bundled intervention on improving quality of care for residents in nursing homes. A randomized, two-group, repeated measures design was used, accompanied by an exploratory observation and interview qualitative process.

Sample and Participants

The sample for the parent study was drawn from a population of nursing homes in Missouri with QM/QI scores above the 40th percentile on at least three of four selected QM for two consecutive 6-month periods of Minimum Data Set (MDS) data. Selected measures included bowel and bladder incontinence, weight loss, pressure ulcers, and decline in activities of daily living. A power analysis revealed that a minimum of 26 facilities were needed in both the intervention and control groups in the parent study. Owners of qualified facilities were first randomly assigned to group 1 (Intervention) or 2 (Control) to avoid assigning facilities from the same owner to both groups. Facilities were then randomly selected for invitation for study participation.

Recruitment

Prior to initiation of the parent study, letters of support were obtained from the Director of the Missouri Department of Health and Senior Services, Missouri nursing home associations, quality improvement organizations, and ombudsmen programs. Once study funding was secured, a press release was distributed to cooperating agencies and organizations for use in newsletters and on websites. A letter explaining the study and encouraging acceptance of a request to participate if randomly selected was also mailed to all qualified facility administrators. A computer program was used to generate a random calling sequence list for the project coordinator or research nurse. Thirty-eight homes were recruited for the experimental group. Nine of these homes dropped out (most before the intervention was underway), leaving a total of 29 homes completing the study. Thirty-three homes were recruited for the control group. Four of the homes dropped out, leaving a total of 29 homes completing the study.

Intervention Components

The experimental intervention of the parent study was designed to build systems of good care practices and leadership practices that foster organizational culture shown to enhance staff performance and improve resident outcomes. Three levels of nursing home operations staff were targeted: owners, nursing and administrative facility staff, and direct care staff. Facilities in the intervention group were assigned, by geographical location, to one of two research nurses. Each research nurse was trained by the primary investigator (M.J.R.) and project manager (M.F.) and given a manual detailing: (a) the baseline educational program about quality improvement and implementing change, (b) how to use quality improvement teams, (c) how to develop systems that support the consistent delivery of the basics of care, and (d) quality improvement tools.

The first step in the parent study intervention was accomplished by the research nurses conducting meetings with owners and administrative staff of each facility to explain the intervention and implementation activities in which they and direct care staff would engage during the next 24 months. The research nurses then scheduled meetings with direct care staff, at times that administrative staff could attend, to ask direct care staff to participate in team and group processes for decisions about resident care, facility quality improvement activities, and to adopt systems of care that help consistently accomplish the basics of care. The research nurses worked with each facility to develop or enhance a quality improvement team on a basic resident care issue of the facility's choosing. If requested to do so, the research nurses reviewed facility QM/QI scores with leadership and team staff to assist in discernment of a topic of focus.

Once the team members and focus area for improvement were determined, the research nurse helped the team through coaching and positive reinforcement of team efforts, provision of evidence-based practice information and quality improvement measurement tools, and assistance with monitoring of care and quality improvement processes during monthly onsite visits and follow-up telephone and/or e-mail contact at routine intervals between visits. As a part of each monthly visit, the research nurse also talked with representatives of administrative and nursing leadership to discuss team progress and reinforce project goals. Facilities had the option of choosing to start a new quality improvement project and team at any time during the 24-month intervention. The research nurse tailored the specific information provided to each facility on the basis of staff needs, but all included evidence-based practice information about the care problem selected by the team, how to work as a quality improvement team, and

quality improvement methods to apply to the care problem.

The research nurses made monthly observations and measurements of care delivery systems and provided feedback about those observations and QM/QI measures. All nursing homes in the study submitted federal QM/QI reports quarterly to the research team. These reports contain 12 clinical domains consisting of 31 measures, including pain. The secondary analysis reported in this article used the pain scores from all intervention and control homes in the parent study. A subset of 5 homes that focused on improving pain management was studied in-depth using both qualitative and quantitative data from the parent study.

Analysis

Facility QM/QI pain scores, derived from MDS data, obtained at baseline (Time 1) and at month 24 (Time 2) of the study for all participating facilities (29 intervention, 29 control) were used for statistical analysis. Weighted mean proportions were used for analysis as they provide a more accurate picture of the total number of residents reported to have pain. Logistic regression was used to compare groups. The analysis was modified to account for overdispersion of the binomial data. The baseline proportion was used as a covariate when comparing homes at the end of the study (Time 2). If that covariate did not have a coefficient that differed significantly from 0, it was not included in the final model. Possible dependence, based on repeated measures for the same home, was also accounted for in the analysis. The analysis was conducted using the GENMOD procedure in SAS version 9.

Qualitative content analysis (Sandelowski, 2000) was used to review field notes and processes of care (POC) reports of the subset of facilities in the intervention group choosing to focus efforts in the area of pain management. Field notes from all onsite and telephone call contacts were

TABLE 1**FACILITY CHARACTERISTICS**

Study Group	Number of Beds	For Profit	Not for Profit	Government Entity
Intervention (<i>n</i> = 29)	52 to 246	20	5	4
Control (<i>n</i> = 29)	36 to 282	20	6	3

reviewed. POC survey and interview reports from initial, 12-month, and 24-month visits were reviewed. Content analysis findings were then discussed with the project manager and primary investigator.

RESULTS

Facility Characteristics

Analysis of demographic data revealed that facilities in the intervention and control groups were similar (Table 1). Homes in the intervention group ranged in size from 52 to 246 beds. Twenty homes were designated as for profit, 5 homes were not for profit, and 4 were designated as entities of local government. Ten corporate chains were represented in this group. Homes in the control group ranged in size from 36 to 282 beds. Twenty were designated as for profit, 6 homes were not for profit, and 3 were designated as entities of local government. Seven corporate chains were represented in the control group. Geographical characterization in regard to urban or rural was similar between the two groups.

Statistical Findings

Initially, groups were compared at baseline (Time 1) for similarity of QM/QI pain scores. Intervention group facilities had baseline QM/QI pain values ranging from 1.3% to 22.4%, with a weighted mean value of 7.2% (Table 2). The control group facilities had baseline values ranging from 0% to 32.8%, with a weighted mean value of 7.8% (Table 2). No significance difference was noted in weighted mean QM/QI values for the intervention and control groups at Time 1 ($p = 0.697$). It must also be

TABLE 2**WEIGHTED MEAN VALUES**

Study Group	Time 1 (Baseline)	Time 2 (Month 24)
Intervention (<i>n</i> = 29)	7.2%	10.7%
Control (<i>n</i> = 29)	7.8%	7.1%
Intervention subset ^a (<i>n</i> = 5)	3.6%	8.7%

^a This subset focused specifically on improving pain management.

noted that total numbers of residents in these comparisons differed only slightly between Time 1 and Time 2 for both the intervention and control groups. In the intervention group, the total number of residents were 152 (Time 1) and 139 (Time 2). Control group total number of residents were 274 (Time 1) and 245 (Time 2).

With the groups similar at Time 1, to support our first hypothesis (i.e., the experimental group will show greater improvement in pain management scores than the control group), it was expected that the intervention group would have a significantly lower weighted mean value for the QM/QI pain at Time 2. However, as is shown in Table 2, the intervention group weighted mean value of 10.7% was higher than the control group weighted mean value of 7.1% at Time 2. Thus, the first hypothesis was not supported.

For our second hypothesis, we looked only at data from the control group to determine whether there was a significant difference in weighted mean values at Time 2 compared with Time 1. The weighted mean values are 7.8% and 7.1% ($p = 0.649$). Thus, our second hypothesis was

supported. No difference was seen in QM/QI pain scores in the education control group when comparing baseline and 24-month scores.

Our final hypothesis, regarding the subset of facilities in the intervention group choosing to focus efforts in the area of pain management, was not supported. In this group, weighted mean values actually increased from 3.6% at Time 1 to 8.7% at Time 2 (Table 2), rather than showing the expected decline.

Qualitative Findings

Qualitative findings revealed positive changes in pain management program components and outcomes. As facilities chose pain management as a focus area, the research nurses, working with facility team key personnel, identified a common initial intervention strategy of education regarding pain assessment and management. Standardized assessment tools, intervention strategies, and follow-up evaluation of individual intervention effectiveness were included. All subset facilities chose to include all levels of nursing staff and ancillary staff in their educational efforts. Each facility identified an assessment

KEYPOINTS

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- 1 Pain is a subjective experience, frequently overlooked and under-treated for many older nursing home residents.
- 2 When pain management programs are implemented, it is important to remember that quality measure (QM)/quality indicator (QI) scores often increase and then decrease as pain management programs are sustained. This phenomenon is commonly referred to as *ascertainment bias*.
- 3 Resident care, and corresponding QM/QI scores, can improve in nursing homes with designated pain management champions leading pain management teams.

tool and process, with one Director of Nursing sharing with the research nurse how amazed she was that her efforts to model use and documentation of the tool seemed to have such positive staff impact. Another key nursing staff member noted “how much quieter one of our noisy residents is now that we are appropriately treating her pain.” The research nurses conducting the 12- and 24-month POC reviews also noted improvement in the areas of documentation of pain management interventions and follow up for effectiveness, with one research nurse recording a conversation with a CNA who indicated “how much better resident care is now that we are all working together in this new pain management program.”

DISCUSSION

In this study, we anticipated that focusing improvement efforts in any area of resident care could have an effect in the pain quality indicator for the duration of the study since staff would be focusing on quality improvement methods and would be aware of all of their QM/QI scores. This was not found. In addition, we anticipated that if staff specifically focused on improving pain assessment and treatment that the pain QM/QI would improve (i.e., scores would decline, as it is a problem-

based score). That also was not found; in fact, when staff in the intervention facilities focused on improving pain management, the QM/QI scores actually worsened (i.e., scores increased) over time.

While these findings were not anticipated, increased QM/QI scores may be a positive finding in that they may point to increased attention by staff regarding pain management for residents. This is supported in qualitative data from each facility in the intervention subset, which indicates a positive trend in frequency of pain assessment, use of standardized assessment tools, and improved documentation of follow-up assessments in the presence of active pain management. Cadogan, Schnelle, Yamamoto-Mitani, Cabrera, and Simmons (2004) reported similar findings in a study conducted in California: Homes with higher pain QM/QI scores were found to perform better in the areas of documentation of pain assessment, treatment, and follow up.

Accuracy of preintervention resident assessment data and resulting QM/QI scores is an important consideration. We know from previous studies that nurses and physicians typically do not possess adequate expertise in pain management (Tarzian & Hoffman, 2004) and that lack of edu-

cation and inadequate use of processes of care often leads to underreporting of required MDS data elements (Wu, Miller, Lapane, Roy, & Mor, 2005). QM scores, derived from MDS data, are reflective of rater knowledge and expertise and, as such, are subject to potential rating bias. Mor et al. (2003) studied interrater reliability of clinical elements of MDS data reflective of pain QM/QI measures and found an average kappa value of 0.50, indicating greater than average disparity of ratings in this area of MDS information. Underreporting, or ascertainment bias, of pain data prior to implementation of this intervention may also explain the increase, rather than the expected decrease, in scores seen following implementation of the intervention.

Ascertainment bias refers to systematic errors in reporting assessment and documentation of phenomena, such as clinical conditions, due to differences in assessment skills and/or adherence to assessment protocols (Carr, 2009; Roy & Mor, 2005). Ascertainment bias in the data used for QM/QI calculation biases provider performance comparisons from one data point to another. In a recent study by Wu, Mor, and Roy (2009), Missouri was noted to have the highest proportion of undercoding on seven of eight scales analyzed; pain was one of these. The possibility of a downward bias in QM/QI scores prior to this intervention is suggested by this finding.

Ascertainment bias can be minimized through staff education (Roy & Mor, 2005), consistency of staff collecting MDS data, implementation of basic care processes and systems, and follow-up evaluation of care delivery and resident outcomes. Systematic approaches to care must be incorporated into daily routines. Follow-up mechanisms that evaluate processes of care, care delivery, and resident outcomes are of paramount importance and must go beyond what is required by state and federal inspection processes. Nursing administration must not abandon efforts to implement changes in processes of care in the face of wors-

ening QM/QI scores, but must understand the impact of ascertainment bias on previous scores and use multiple measures to evaluate quality resident care in their organization.

It is important that members of the public at large also understand that measurement errors can and do occur in the form of ascertainment bias. QM scores are not the only information important to discern when looking for nursing home placement for loved ones. Nursing home administrators and staff can assist in educating the public in this regard.

Directors of Nursing have multiple opportunities to influence staff, resident, and family beliefs and approaches to pain management. Starting points are to:

- Access resources provided through state and federal agencies regarding best practice in pain management.
- Educate staff, residents, and families with resident stories regarding pain management outcomes and supplement these stories with basic facts about pain assessment, intervention, and outcomes.
- Create posters about pain myths and display them in prominent areas within the nursing home.
- Provide weekly recognition of CNAs and other staff who incorporate pain assessment and management into their daily routines.
- Ask staff to elect a Pain Champion on a rotating basis whose responsibilities include change-of-shift highlights regarding pain management interventions and outcomes occurring within the past 8 to 12 hours.

Directors of Nursing also must provide consistency in MDS assessment data collection and reporting, along with consistent interpretation of trends in QM scores. Through these beginning steps, Directors of Nursing can impact care delivery and recognize staff member contributions on a very complex resident care issue.

There are several limitations to this study. The small sample in the intervention subset limits generalization

of findings. Availability of case-mix information would have provided additional information for interpretation of change in QM/QI scores. While participant characteristics were similar to national nursing homes, the limitation of geographical location to one state must be considered.

CONCLUSION AND IMPLICATIONS FOR FUTURE RESEARCH

Multifaceted approaches to research in the area of pain management are needed. Bundled interventions that focus on education of the science of pain management, implementation of revised processes of care, and quality improvement monitoring strategies that trend progress and determine improvement are indicated. Research in the area of leadership, with interventions designed to strengthen team processes both within and across disciplines, will provide a foundation for all aspects of care management improvement processes. Facilities will benefit from research efforts that target all levels of staff within and across departments, assisting development of entire staff "felt responsibility" for all aspects of resident care.

The burden of pain can greatly diminish quality of life for older adults. Quality care is a complex issue that requires simultaneous targeted improvement efforts in multiple areas of nursing home operation. Change in processes of care and subsequent evaluation of resident outcomes, sustained over time, will enhance resident quality of life.

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