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Research Article

Does Pain Mediate or Moderate the Effect of Cognitive Impairment on Aggression in Nursing Home Residents with Dementia?

Hyochol Ahn, PhD, ARNP, ANP-BC, * Ann Horgas, PhD, RN, FAAN, FGSA

Department of Adult and Elderly Nursing, College of Nursing, University of Florida, Gainesville, USA

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SUMMARY

Purpose: The purpose of this study was to investigate if pain mediates or moderates the relationship between cognitive impairment and aggressive behaviors in nursing home residents with dementia based on the Need-driven Dementia-compromised Behavior model.

Methods: This was a secondary analysis of the Minimum Data Set assessment data on long-term care from the state of Florida during calendar year 2009. The data used in this study was the first comprehensive assessment data from residents with dementia ($N = 56,577$) in Medicare-certified or Medicaid-certified nursing homes. Path analysis using a series of hierarchical regression analyses and two-way analysis of variance was used to evaluate the mediating and moderating effect of pain on the relationship between the level of cognitive impairment and aggression.

Results: Results indicated that pain did not mediate the relationship between cognition and aggressive behaviors, but there was evidence of a significant moderating effect of pain only for residents with severe cognitive impairment. Only among the residents with severe cognitive impairment, those with pain had significantly more frequent aggressive behaviors than those without pain.

Conclusion: A change in the frequency of aggressive behaviors in severely cognitively impaired residents should signal the possibility that the person is experiencing pain. Accurate but simple pain assessment in this population including these behavioral changes should be developed further, and pain should be well controlled to reduce these problematic behaviors.

Introduction

Aggressive behaviors are common among nursing home (NH) residents with dementia (Ahn & Horgas, 2013; Kunik et al., 2010). Aggression is defined as an overt act, involving the delivery of noxious stimuli to (but not necessarily aimed at) another organism, object or self, which is clearly not accidental, and includes verbally or physically abusive and threatening behaviors (Nösman, Bucht, Eriksson, & Sandman, 1993; Patel & Hope, 1992; Ryden, 1988). Aggression occurs in about 40%–80% of NH residents with cognitive impairments (Brodaty et al., 2001; Chen, Borson, & Scanlan, 2000; Kunik et al., 2007; Schreiner, 2001). These behaviors are associated with injuries, hospitalization, or decreased health-related qualify of life among older adults with dementia, and stress and burnout among caregiving staff (Norton, Allen, Snow, Hardin, & Burgio, 2010).

These aggressive behaviors are hard to deal with, therefore physical restraints or psychoactive medications are commonly used in order to control these behaviors. The use of physical restraints in NHs has declined since the implementation of the Omnibus Budget Reconciliation Act of 1987 (OBRA '87) which established regulatory guidelines for the use of chemical and physical restraints (Guttman, Altman, & Karlan, 1999). However, restraints are still often used to manage aggressive behaviors in older adults with dementia (Evans & Cotter, 2008). Pharmacological interventions using psychoactive medications are also commonly used for NH residents with dementia to control aggressive behaviors, but these medications are associated with decreased health-related quality of life, and increased risk for sedation, extrapyramidal symptoms, and falls (Cohen-Mansfield & Jensen, 2008).

Recent studies suggest that pain may contribute to aggressive behaviors in older adults with dementia. Dementia impairs cognitive and communicative abilities (Ko & Shin, 2013). Thus, older adults with severe dementia may express pain through aggressive behaviors because they cannot properly verbalize their pain experience (Scherder et al., 2009; Shega et al., 2007; Snow et al.,

* Correspondence to: Hyochol Ahn, PhD, ARNP, ANP-BC, Department of Adult and Elderly Nursing, College of Nursing, University of Florida, PO Box 100197-HSC, 101 S. Newell Drive, Gainesville, Florida 32610-0197, USA.
E-mail address: hcahn@ufl.edu

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2009). Ahn and Horgas (2013) reported pain is significantly related to aggressive behaviors among NH residents in Florida. Cipher and Clifford (2004) also reported that pain affected aggressive behaviors among 234 residents living in long-term care facilities in Texas.

Aggressive behaviors can be interpreted as meaningful bodily expressions that describe something about the person's needs or wishes that require addressing, such as pain (Algase et al., 1996). The use of physical or chemical restraints as a behavior management mechanism for older adults with dementia violates the respect for autonomy (Touhy, 2004). The better approach to managing aggressive behaviors is to control their possible cause rather than using restraints to control NH residents and thus reduce these behaviors.

The Need-driven Dementia-compromised Behavior (NDB) model (Algase, Yao, Beel-Bates, & Song, 2007) provides the theoretical basis for this study (Figure 1). The NDB model posits that there are two main constructs that predict NDBs: background factors and proximal factors. Background factors include those characteristics that place older adults with dementia at risk for behavioral symptoms. Proximal factors represent the conditions under which behavioral symptoms occur. For this study, the level of cognitive impairment represents a background factor, and pain represents a proximal factor. The NDB model (Algase et al., 2007) does not clearly specify the nature of the relationships among background, proximal, and outcome variables, but instead states that proximal factors may mediate or moderate the relationship between background and outcome variables. Aggressive behaviors are one type of NDB, and are the focus of this paper. Thus, we seek to explore and clarify these relationships using the association among cognitive impairment level (background factor), pain (proximal factor), and aggressive behaviors (outcome variable) as the exemplar.

The aim of this study is to determine if pain mediates or moderates the relationship between cognition and aggressive behaviors in NH residents with dementia. We tested the following hypotheses:

- For mediating effect of pain on the relationship between cognitive impairment and aggression, we hypothesize that, among NH residents with dementia, the higher levels of cognitive impairment are negatively associated with pain severity, and this under-diagnosed pain contributes to more frequent aggressive behaviors.
- For moderating effect of pain on the relationship between cognitive impairment and aggression, we hypothesize that, among NH residents with dementia, the relationship between cognitive impairment and aggression varies depending on the presence of pain. Pain positively affects aggressive behaviors in only severely cognitively impaired residents with dementia. People with mild or moderate dementia are able to verbalize their pain level to the simple pain assessment interview so that they can get the pain treatment, without causing the increment in aggressive behaviors.

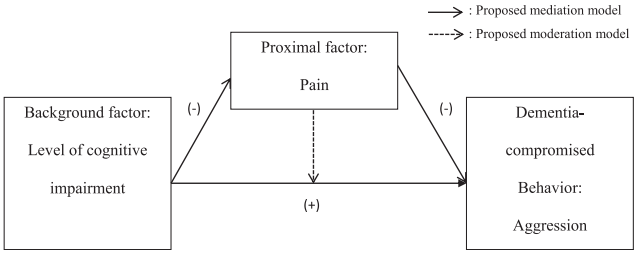

Figure 1. Theoretical framework: Need-driven Dementia-compromised Behavior model.

Methods

Study design

This was a secondary analysis of the Minimum Data Set (MDS) assessment data on long-term care from the state of Florida during calendar year 2009. The MDS assessment data is mandatory in all U.S. nursing homes certified to participate in Medicare and Medicaid, and contains standardized physical, psychological and psychosocial assessment data of their residents. Although it is largely used for clinical purposes in NH residents, the MDS has also been used for research for this population (Ahn & Horgas, 2013; Ahn, Stechmiller, & Horgas, 2013; Burfield, Wan, Sole, & Cooper, 2012; Carpenter, Hastie, Morris, Fries, & Ankri, 2006). An exploratory cross-sectional design was used for this study. Cross-sectional data, the first MDS comprehensive assessment data for each NH residents during the 12-month time frame, were used to explore the relationship between pain and aggressive behaviors.

Setting and sample

Participants in this study were residents with dementia in Medicare-certified or Medicaid-certified NHs in the state of Florida between January 1, 2009 and December 31, 2009 who have an MDS comprehensive assessment on file. Inclusion criteria were NH residents older than 65 years and a documented diagnosis of Alzheimer disease or other dementia. Exclusion criteria were comatose status because these residents cannot display aggressive behaviors.

Ethical consideration

Approval for the study was obtained from the University of Florida Health Science Center Institutional Review Board.

Measurement

Several subscales from the MDS were used for this study. The MDS-Pain Severity Scale (MDS-PSS) (Fries, Simon, Morris, Flodstrom, & Bookstein, 2001), combining both pain frequency and pain intensity, was used to assess pain severity. MDS-PSS (Fries et al.) is recorded on a 4-point scale, 0 (*no pain*), 1 (*mild pain*), 2 (*moderate pain*), and 3 (*excruciating pain*). NH residents' self report is reflected in the MDS pain items if residents can self report and staff completing MDS assessments have confidence with residents' self report. Otherwise, a staff member completes the MDS assessment document pain symptoms based on observation on pain behavioral indicators and/or the proxy reports from facility nursing staff or family caregivers who take care of the residents. The MDS-PSS is frequently used for measuring pain in the cognitively impaired older adults in NHs (Ahn & Horgas, 2013; Ahn et al., 2013; Burfield et al., 2012), and has been reported to have an inter-rater reliability coefficient of .73 and higher, and kappa coefficient of .70 with a visual analogue scale in a study involving 95 NH residents at 25 Medicare-certified skilled nursing facilities in Massachusetts (Fries et al.).

The MDS-Cognitive Performance Scale (MDS-CPS) (Morris et al., 1994) was used to measure the level of cognitive impairment. The MDS-CPS score is calculated using five MDS items: comatose, short-term memory, cognitive skills or daily decision making, making oneself understood, and self-performance in eating. The MDS-CPS ranges from 0 to 6, with higher scores indicating more severe cognitive impairment. The MDS-CPS has a kappa coefficient of .45–.75 with Mini-Mental State Examination, .41–.77 against Global Deterioration Scale, and .45 against Mattis Dementia Rating Scale in