CNAS' RATINGS OF NURSING HOME RESIDENTS' PAIN: THE ROLE OF EMPATHY

by

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ABSTRACT

Long-term care residents with and without cognitive impairment may experience undertreatment of persistent pain (Fain et al., 2017). Certified nursing assistants (CNAs) are important sources of information about resident pain as provide the majority of residents' hands-on care. Therefore, assessing the accuracy of CNAs' pain assessments and potential influencing factors may provide insight regarding the undertreatment of pain. Informed by prior research, this study examined resident pain catastrophizing and cognitive status as predictors of CNAs' pain assessment accuracy. CNA empathy was examined as a moderating variable. Analyses confirmed a relationship between pain catastrophizing and CNA pain rating accuracy. Hypotheses predicting a relationship between resident cognitive status and CNA pain rating accuracy and moderating effects of empathy were disconfirmed. Challenges of conducting research in long-term care are discussed.

LIST OF ABBREVIATIONS AND SYMBOLS

α	Cronbach's alpha: a coefficient of internal consistency
b	Unstandardized regression coefficients
β	Beta: standardized regression coefficients
CI	Confidence Interval: proportion of intervals containing true value of the parameter
df	Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data
>	Greater than
LLCI	Lower Limit Confidence Interval
M	Mean: sum of a set of measurements divided by number of measurements in the set
N	Total sample size
n	Subset of total sample size
p	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
R^2	Squared multiple correlation coefficient, fraction of the variability of the response that is fitted by the model
SD	Standard deviation: amount of variation or dispersion of a set of data values
SE	Standard error: estimated error of the unstandardized regression coefficients
T	Computed value of t test
ULCI	Upper Limit Confidence Interval

$<$ Less than

$\leq$ Less Than or Equal To

$=$ Equal to

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INTRODUCTION

An estimated 23.4 million adults in the United States suffer from chronic pain (Nahin, 2015). Among those 65 and older, prevalence rates range from 60 to 75% (Molton & Terrill, 2014). Similar rates have been reported in the nursing home population (Takai, Yamamoto-Mitani, Okamoto, Koyama, & Honda, 2010). Despite the estimated 231 to 300 billion dollars spent annually on pain care in the US (Gaskin & Richard, 2012), pain continues to go undertreated for community-dwelling older adults (Gibson & Lussier, 2012) and those residing in nursing homes (Ferrell, Ferrell, & Osterweil, 1990; Ferrell, Ferrell, & Rivera, 1995; Monroe et al., 2014). Unmanaged pain can have a negative impact on older adult's quality of life, including limiting physical activity, decreasing involvement in social activities, sleep disturbance, and increased risk for depression (Molton & Terrill, 2014). Racial and ethnic minorities, lower socioeconomic status, women (Green et al., 2006) and cognitively impaired individuals (Reynolds et al., 2004; Fain et al., 2017) are all at increased risk for undertreatment.

Defined as "an unpleasant sensory and emotional experience that is associated with actual or potential tissue damage or described in such terms" (Merskey, 1986), pain can be detected through both verbal and nonverbal cues (Blomqvist & Hallberg, 1999). However, the subjective nature of pain creates a challenge for third parties attempting to accurately assess pain presence and severity. A recent meta-analysis of literature investigating pain rating accuracy concluded that both informal caregivers and healthcare providers, including nurses, underestimate the pain of care recipients (Ruben, Blanch-Hartigan, & Shipherd, 2018). Further,

the authors found that older adults (compared to children and adults) are significantly more likely to have their pain underestimated by caregivers and healthcare providers. The underestimation of older adults' pain by nurses has been documented in the nursing home setting (Weiner, Peterson, Ladd, McConnell, & Keefe, 1999). These findings highlight the vulnerability of older adults to undertreatment of pain in long-term care. Because of this susceptibility, it is important to identify factors that may influence the inadequate recognition and treatment of older adults' pain in the nursing home.

Empathy and Pain

Empathy is a key component of effective communication between nurses and their care recipients (Kunyk & Olson, 2001). In a qualitative study, CNAs reported utilizing empathy when assessing the pain severity of nursing home residents (Dobbs, Baker, Carrion, Vongxaiburana, & Hyer, 2014). Empathy has been conceptualized in multiple ways, including as a trait, a state, as a means of communication, as caring, and as a relationship (Kunyk & Olson, 2001). In healthcare research, empathy has been measured as both a cognitive and affective trait (Kim, Kaplowitz, & Johnston, 2004). Affective empathy refers to the ability to identify with another's emotions (Hooker, Verosky, Germine, Knight, & D'Esposito, 2010). Comparatively, empathy as a cognitive construct focuses on understanding by taking an individual's point of view (Hojat, Louis, Maio, & Gonnella, 2013). The current study will utilize measures of both empathy constructs.

High trait empathy is associated with greater estimates of others' pain. Medical students reporting high levels of empathy rated the pain of hypothetical patients as having more validity and severity than less empathic students (Chibnall, Tait, & Jovel, 2014). The same relationship emerged when undergraduates were asked to estimate the pain severity

experienced by individuals undergoing a cold pressor task through visual cues (Green, Tripp, Sullivan, & Davidson, 2009). Compared to raters low in empathy, raters high in empathy provided a greater overestimation of pain severity in those with low pain and smaller underestimation of pain for individuals reporting high levels of pain. Further, pain behaviors did not mediate the relationship between empathy and pain ratings. These findings suggest that individuals high in empathy may not be more accurate at inferring the pain of others, but rather tend to rate the pain of others higher than those low in empathy no matter the level of pain experienced. It is, therefore, possible that empathy may reduce the general tendency for CNAs to underestimate nursing home residents' pain. While empathy may lead CNAs to overestimate the pain of residents experiencing low levels of pain, it may also allow CNAs to more accurately estimate the pain of residents experiencing greater levels of pain.

The Role of Pain Catastrophizing

Pain catastrophizing on the part of the resident may influence a CNA's interpretation of her resident's pain. Recognized as one of the key predictors of pain experience, pain catastrophizing has been conceptualized as a negative cognitive response to experienced or anticipated pain (Sullivan et al., 2001). More specifically, pain catastrophizing involves overestimating the threat of a pain experience, feeling helpless during a pain experience, and the inability to regulate thoughts about pain before, during, or after a painful experience (Quartana, Campbell, & Edwards, 2009). Several negative outcomes have been associated with catastrophizing, including greater pain intensity, disability, psychological distress, pain behaviors, and less involvement in daily activities (Keefe et al., 2000; Severeijns, Vlaeyen, van den Hout, & Weber, 2001; Sullivan, Tripp, & Santor, 2000).

Researchers have demonstrated a positive correlation between pain catastrophizing and self-reports of pain from both participants in acute pain tasks (Spanos, Radtke-Bodorik, Ferguson, & Jones, 1979) and chronic pain patients (Sullivan & D'Eon, 1990). Further, this relationship appears stable over time. Pain catastrophizers provided significantly higher self-reported pain ratings than noncatastrophizers at both one week (Sullivan & Neish, 1999) and six months (Keefe, Brown, Wallston, & Caldwell, 1989) after a painful experience, supporting the conceptualization of pain catastrophizing as a stable trait.

Findings on the relationship between pain catastrophizing and caregivers' pain ratings are inconclusive. One study demonstrated that pain catastrophizing by the care recipient was associated with more severe pain evaluations from the informal caregiver (Keefe et al 2003). Similarly, undergraduate participants rated the pain of catastrophizers undergoing a cold-pressor task higher than noncatastrophizers (Sullivan, Martel, Tripp, Savard, & Crombez, 2006). However, higher pain catastrophizing scores were not associated with greater pain rating accuracy by observers. Researchers identified a trend, though nonsignificant, that higher pain catastrophizing scores were associated with lower accuracy of observer pain ratings (Sullivan, Martel, Tripp, Savard, & Crombez, 2006). This finding suggests that although pain catastrophizing may elicit higher pain ratings from observers, they may still underestimate or even discount the severity of high pain catastrophizers' pain. Indeed, pain catastrophizing may elicit negative responses from caregivers (Cano, 2004). Boothby, Thorn, Overduin, and Ward (2004) found that pain catastrophizing by chronic pain patients was associated with punishing responses from their partners. Additionally, in long-term care settings, CNAs question if some residents are truly in pain or are if they seek pills or attention (Dobbs et al., 2014).

Though the impact of pain catastrophizing on the interpretation of pain by informal and family caregivers has been investigated, its impact on pain ratings provided by CNAs has not been studied. Pain catastrophizing may be perceived differently by professional caregivers as compared to a spouse or family member. As the findings of Dobbs and colleagues (2014) suggest, CNAs may doubt the pain reports of their residents. The current study aims to address this gap in the literature.

Cognitive Impairment and the Treatment of Pain

Cognitive impairment is a major obstacle to adequate pain treatment for older adults. Undertreatment of pain in cognitively impaired older adults can contribute to increased fear, withdrawal, combativeness, agitation, functional impairment, and sleep disturbance (Monroe et al., 2014; Scherder et al., 2005). Although obtaining reliable, accurate self-report ratings of pain with mild to moderately cognitively impaired nursing home residents is possible (Ferrell et al., 1995; Parmelee, Smith, & Katz, 1993), assessment of pain in individuals with dementia is more difficult due to a decline in the ability to communicate (Lichtner et al., 2014). Multiple studies have concluded that greater cognitive impairment is associated with lower reports of pain in resident charts (Proctor & Hirdes, 2001) and slight underreporting of pain from residents themselves (Parmelee et al., 1993). Cognitive decline is also associated with undertreatment of pain (Horgas & Tsai, 1998; Torvik, Kaasa, Kirkevold, & Rustøen, 2009). One study found that nursing home residents with dementia received less pain medication despite having diagnoses of pain similar to those of residents without diagnoses of dementia (Monroe et al., 2014). Therefore, it is expected that CNAs will report lower and less accurate levels of pain for cognitively impaired residents compared to those without cognitive impairment.

Empathy may influence the relationship between cognitive status and pain rating accuracy. As noted in the empathy literature mentioned previously, highly empathic individuals may overestimate across all individuals despite their pain behavior (Green et al., 2009). Following this pattern, CNAs high in empathy are expected to provide higher estimates of pain for residents with cognitive impairment compared to CNAs low in empathy.

Proposed Study

Older adults' pain is underestimated (Ruben et al., 2018) and inadequately treated (Gibson & Lussier, 2012). This is a common experience for older adults in long-term care (Weiner et al., 1999), especially those diagnosed with cognitive impairment (Reynolds et al., 2004). Unmanaged pain has damaging effects on older adults' quality of life (Molton & Terrill, 2014). Therefore, the proposed study aims to identify factors influencing the accuracy of pain treatment for older adults residing in nursing homes. I suggest that CNAs high in trait empathy will show a general tendency to overestimate residents' pain while CNAs low in trait empathy will be more likely to underestimate pain. Hypotheses are based on past research findings (Chibnall, Tait, & Jovel, 2014; Green et al., 2009) suggesting that individuals high in trait empathy possess a general tendency to overestimate the pain of others rather than an ability to more accurately infer the pain states of others. Additionally, the current study aims to address a gap in the literature by investigating the effect of resident pain catastrophizing and resident cognitive status on CNA ratings of resident pain, and the influence of CNA empathy on this relationship.

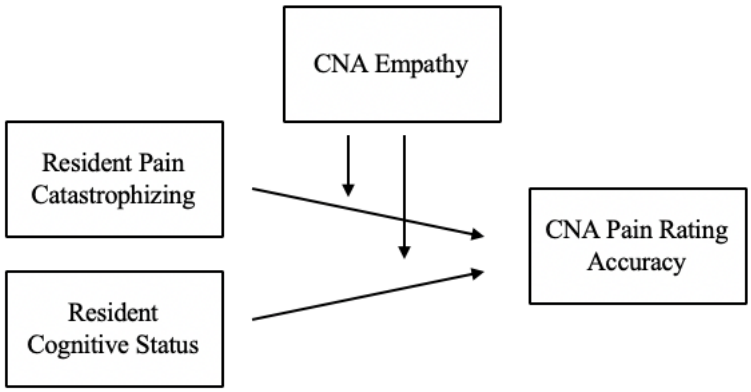

Figure 1. Hypothesized Model

Hypotheses:

1) CNA empathy will moderate the relationship between resident pain catastrophizing and CNA pain rating accuracy. Due to a general tendency for individuals high in trait empathy to overestimate pain, it is predicted that high trait empathy will exacerbate a positive relationship between resident pain catastrophizing and CNA pain rating accuracy. CNAs low in empathy will show the inverse relationship, displaying underestimation of residents' pain..
2) CNA empathy will moderate a hypothesized negative relationship between resident cognitive status and CNA pain rating accuracy. Due to general overestimation of pain, highly empathic CNAs will provide more accurate or overestimate ratings of cognitively impaired residents' pain compared to CNAs low in empathy. CNAs low in empathy will provide less accurate or underestimate ratings of cognitively impaired residents' pain.

METHODOLOGY

Data Collection

The current study was conducted at one nursing home in the Tuscaloosa, Alabama area. A letter of support was acquired from the facility administrator and approved by the University of Alabama IRB.

Participants

Participating CNAs were recruited through two methods: 1) identification as the paid, formal caregiver for a resident who was randomly selected for the study, or 2) team member presentation of the participation opportunity at each nursing unit within the facility. Two methods were utilized for resident recruitment: 1) random selection by team members and 2) identification from participating CNAs. Random selection occurred by the selection of every 4th chart on an alphabetically sorted list of residents. For the CNA identification process, CNAs interested in participation provided research team members the names of the residents they know best. Chart reviews were completed for all residents before approaching them for participation. When approached, residents were asked to repeat back elements of the assent form. Those unable to do so were excluded and considered cognitively unable to participate.

For this study, we captured the dynamics of the staff/resident relationship, which requires completed data collection from all three sources utilized: Nursing Home Minimum Data Set (MDS), staff interview, and resident interview. Therefore, participants missing any of these elements were excluded from the current analyses. Reasons for collection not being conducted include resident refusal of participation following MDS data collection, resident

death after MDS data collection and before attempted approach for participation, CNA refusal of participation, and the CNA leaving the facility.

Eighteen CNAs participated in the project. The age range for this group was 26-56 years, with a mean age of 44.00 (SD = 8.16). All CNA participants identified as female and African American.

Thirty-five long-term care residents participated in the project. The age range for this group of participants was 60-89, with a mean age of 83.29 (SD = 9.78). The resident sample consisted of 9 males and 26 females. Twenty-eight participants were White. Seven were African American.

Refer to Table 1 for resident and CNA descriptive statistics.

Data Collection Procedure

Data was collected from residents' medical records, residents, and staff. The research team first reviewed records of the randomly selected and staff-identified residents to collect information on sex, age, length of nursing home residence, and cognitive status. These data were drawn from the most recent MDS assessment available for each participant.

After completing the chart review, a research assistant approached each sampled resident for a one-time interview to assess self-reported presence of pain using the 6-item Philadelphia Geriatric Center Pain Intensity Scale (Parmelee, 1994) and pain catastrophizing using the 6-item Pain Catastrophizing Scale (Rosenstiel & Keefe, 1983).

Following completion of the resident interview, the resident's primary CNA was approached for participation. CNAs were identified by leadership staff working on each unit. CNAs recruited by research staff prior to the resident interview had already completed the Interpersonal Reactivity Index Empathic Concern and Perspective Taking Scales (IRI; Davis,

1980) and provided basic demographic information. Therefore, they were asked to rate the resident's pain using the 6-item Philadelphia Geriatric Center Pain Intensity Scale. CNAs who had not yet been recruited were asked to complete all measures: PGC Center Pain Intensity Scale, IRI empathy scales, and demographics questionnaire.

Measures

Empathy was measured with the Interpersonal Reactivity Index, a multidimensional measure of empathy (IRI; Davis, 1980). The IRI 7-item empathic concern scale and 7-item perspective-taking scale were utilized. The empathic concern scale is considered to be a measure of affective empathy, focusing on the degree to which an individual feels warmth, compassion, and concern for another person. Cognitive empathy is measured by the perspective-taking scale, measuring the ability to take the viewpoint of another. Responses options include 0 “does not describe me well” to 4 “describes me very well.” For both scales, empathy scores were summed for a total of 28 possible points. The IRI has been established as a valid and reliable measure.

The empathic concern scale has good internal consistency ($\alpha = .72$) and test-retest reliability ranges from 0.70 to 0.72 (Davis, 1980). The perspective-taking scale has good internal consistency ($\alpha = .78$) and test-retest reliability ranging from 0.61 to 0.62 (Davis, 1980). Alpha coefficients were computed to analyze the internal consistency of the empathy scales for this population. The 7-item empathic concern scale yielded a Cronbach’s alpha of $\alpha = .33$, suggesting poor reliability. Analysis of individual items revealed the removal of one item (Item 14) would lead to an increased Cronbach’s alpha value of $\alpha = .60$. While still suggestive of poor reliability, item 14 was removed for the analysis due to the improvement of the alpha value for this scale.

Cronbach's alpha for the 7-item perspective-taking scale was α =.31, suggesting poor reliability. Item analyses revealed the removal of reverse coded items (items 3 & 15) would improve the reliability of this scale. While only producing modest improvements, the items were removed, yielding a 5-item scale with a Cronbach's alpha value of α = .44.

Pain catastrophizing was measured utilizing the six-item Pain Catastrophizing Scale from the Coping Strategies Questionnaire (CSQ) developed by Rosenstiel & Keefe (1983). The scale addresses negative thoughts and attitudes about pain. The original scale utilized a seven-point frequency rating scale ranging from 0 (never) to 6 (always). For ease of administration with an older adult population, the current study used a five-point frequency rating scale ranging from 0 (never) to 4 (always). This response scale has been utilized successfully in past research. Scores were summed out of a possible 28 points. The scale includes items such as, "it is terrible and I feel it is never going to get any better" and "I feel I can't stand it anymore." The Pain Catastrophizing Scale has both good internal consistency (α = 0.78; Rosenstiel & Keefe, 1983) and test-retest reliability over 6-months (*r* = 0.81; Keefe et al., 1989). The scale yielded excellent internal consistency for the current sample (α = .91).

Pain intensity was measured utilizing the 6-item Philadelphia Geriatric Center–Pain Intensity Scale (Parmelee, 1994). Five items ask respondents about severity of pain on a scale of 1 (never) to 5 (extremely), such as "In general, how much have you been bothered by pain over the past few weeks? and "How much has the pain interfered with your day-to-day activities?" One item asks for a numerical response: "How many days a week does the pain get really bad?" For scoring, this was converted into a five-point response scale. One item, "How much are you bothered by pain right now?" was removed for analyses as resident and CNA interviews were not completed simultaneously. Scores were averaged out of a possible

25 points. For residents, the analysis of internal consistency yielded a value of α =.90, suggesting excellent reliability. The scale yielded good reliability for the CNA sample (α = .86).

Cognitive status was evaluated utilizing the Brief Interview for Mental Status (BIMS) created for the Nursing Home Minimum Data Set (MDS), a brief, performance-based cognitive assessment (Saliba, Jones, et al., 2012). Nursing home staff complete an MDS assessment at admission, quarterly, and after a significant change in the resident's status. The BIMS assesses word repetition, temporal orientation, and word recall. A total BIMS score ranges from 0-15 (13-15 = cognitively intact, 8-12 = moderate cognitive impairment, 0-7 = severe impairment). The BIMS has good sensitivity = 0.83 and specificity = 0.91 for identifying cognitive impairment and is a highly accurate measure (AUC = 0.93; Saliba, Buchanan, et al., 2012). The scale yielded excellent internal consistency for this sample (α =. .84).

Covariates

To examine the influence of demographic factors on the primary variables of interest, the following factors was included as covariates in the model: resident race, resident gender, resident length of stay, CNA age, CNA years of experience, CNA level of education, length of time the CNA has provided care for the resident, and length of time between MDS completion and the time of data was collected for the current study. CNA race and gender were not included in the analyses as all CNAs identified as African American and female.

Data Analysis Plan

Power Analysis. Before data collection, a power analysis was conducted using the G*Power computer program (Faul, Erdfelder, Lang, & Buchner, 2007) to determine a sample size is sufficient to detect a medium effect (f^2= 0.15) with a multiple regression analysis and alpha at .05. The Power analysis, including all nine covariates, indicated that a sample size of 55 CNAs would provide adequate power (> 0.80) for analysis. However, only 18 CNAs were recruited for the study. Therefore, the following analyses are underpowered and must be interpreted with caution.

Statistical Analyses. Data analyses were conducted utilizing SAS and SPSS 24. Preliminary analyses included reporting descriptive statistics, identifying and managing missing data, and scale construction. Then, the proposed moderation models in which empathy serves as a moderator between resident pain catastrophizing and CNA pain rating accuracy, and resident cognitive status and CNA pain rating accuracy, were analyzed.

Missing data. In preparation for the main data analysis, any participant with more than 20% missing data on a measure was excluded from analyses including that measure. One resident was excluded from analyses utilizing the pain catastrophizing scale.

Descriptive Statistics. Sample size, minimum and maximum scale values, mean, and standard deviations were reported for demographic and primary variables.

Statistical Assumptions. Statistical assumptions of normal distribution were examined. If the data deviated significantly from a normal distribution, alternate scaling (including data transformations) was considered. Data were inspected for linearity and multicollinearity. If the data seriously violate the assumption of linearity, or should there be serious multicollinearity, alternate analyses were considered.

Correlations. Zero-order correlations were calculated to examine the relationships among participants' levels of catastrophizing, CNA's level of empathy, the accuracy of CNA pain ratings, and residents' cognitive status. Nine covariates were hypothesized: resident race, resident gender, resident length of stay, CNA age, CNA race, CNA years of experience, CNA level of education, amount of time CNA has cared for resident, and length of time between MDS completion and when data was collected for the current study. Potential covariates were included in the model if they were significantly related to the moderator or outcome variable.

Main Data Analysis

Multilevel modeling was originally chosen to test main and moderating effects in the model as it accounts for the dependency between level 1 and level 2 data (Nezlek, 2012). The dependency, in this case, was the expected influence of CNA trait empathy on each pain severity assessment she conducted. Because of the small sample size and complex structure, a multilevel modeling expert was consulted for the analysis.

Using SAS statistics software, a random-intercept model was utilized to estimate the random-effect of CNA, or how much of the outcome variability was attributable to differences between CNAs. This model took into account that between-resident versus between-CNA effects cannot be separated for single CNA-resident pairs by removing the random effect for those CNAs. The analysis produced a negative estimate for the variance of the random intercept (-2.64) suggesting a possible lack of level 1 and level 2 data dependency. Two other estimations were utilized to explore the dependency of the data, a random-intercept model and a compound symmetry estimation utilizing only clustered data. Both models produced a negative estimate of the variance of the random intercept (-2.22), further suggesting a lack of data dependency.

Due to these initial results, a likelihood ratio chi-square difference test was utilized to determine if a nested or nonnested model best fit the data. This analysis was nonsignificant, suggesting the inclusion of a random effect for CNA did not significantly improve model fit. Therefore, OLS regression was utilized for the current analysis.

RESULTS

Preliminary Analyses

Descriptive Statistics. A total of 18 CNAs and 35 residents were examined. The number of resident interviews completed per CNA ranged from 1 to 5 interviews, with 1 interview occurring most frequently (*n*=9). Basic descriptive statistics for primary variables can be found in Table 2.

Covariates. Nine covariates were initially hypothesized: resident race, resident gender, resident length of stay, CNA age, CNA race, CNA years of experience, CNA level of education, length of time the CNA has provided care for the resident, and the length of time between MDS completion and data collection for the current study. CNA race and was not included in the analyses as all CNAs identified as African American.

Zero-order correlations were utilized to examine the statistical significance of relationships among covariates. A significant positive relationship emerged between resident pain rating and resident pain catastrophizing ($r = .72$, $p < .01$). Additionally, there was a significant positive relationship between resident pain rating and CNA pain rating ($r = .44$, $p < .01$). No covariates were significantly related to CNA pain rating accuracy A significant positive relationship emerged for CNA pain rating and resident cognitive status ($r = .37$, $p < .05$). One significant relationship emerged for CNA empathy. Analyses revealed a significant negative correlation between the number of months a CNA has cared for her resident and CNAs' scores on the IRI empathic subscale ($r= -.37$, $p < .05$). Significant relationship that emerged among

primary variables will be addressed in the results section. Table 3 presents correlations among covariates and primary variables.

Main Data Analysis

Regression analyses were first conducted to establish relationships between the independent and dependent variables in the model. Resident pain catastrophizing significantly predicted CNA pain rating accuracy, R^2= .205, *b* = -.425, SE = .148, p < .05. Resident cognitive status did not have a significant effect on CNA pain rating accuracy, R^2=.004, b = .106, SE =.306, p > .05.

Pain Catastrophizing and CNA Pain Rating Accuracy. A moderation model (model 1) was utilized in PROCESS to test the hypothesis that CNA empathy would moderate the pain catastrophizing-pain rating accuracy relationship. The model was significant (R^2 =.272, F (4,29) = 2.709, p < .05) suggesting a significant relationship between resident pain catastrophizing and CNA pain rating accuracy. CNA empathic concern (*b* = .019, SE=.069, p > .05) did not moderate this relationship. In a parallel model, CNA perspective taking (*b* = -.012, SE=.039, p > .05) did not moderate the relationship. See Table 4 for results.

Cognitive Status and Pain Rating Accuracy. PROCESS was utilized to test the hypothesis that CNA empathy would moderate the hypothesized relationship between resident cognitive status and pain rating accuracy relationship. The model was not significant, R^2 =.058, F(4,30) = .465, p >.05. CNA empathic concern did not moderate the relationship, *b* = .206, SE = .227, p > .05. In a separate model, CNA perspective taking did not moderate the relationship, *b* = -.041, SE=.096, p > .05. See Table 5 for results.

DISCUSSION

The current study aimed to determine the associations among cognitive status, care recipient pain catastrophizing, caregiver empathy, and the accuracy of caregiver pain ratings in a long-term care setting. The goals of this study were to determine if 1) resident cognitive status or pain catastrophizing impacts caregivers' ratings of residents' pain, and 2) caregivers' trait empathy impacts the accuracy with which they estimate care recipients' pain.

Analyses revealed a significant negative correlation between the number of months a CNA has cared for her resident and CNA's empathic concern. As empathy is conceptualized as a trait in the current study, it is possible empathy influences how many months a CNA is willing to care for a specific resident or remain at a specific unit or facility. Additionally, a significant positive correlation between resident pain rating and CNA pain rating emerged, suggesting CNAs provided ratings of their residents' pain that were similar to residents' self-report. Regarding cognitive status, a significant positive correlation emerged for CNA pain rating and resident cognitive status. This finding suggests CNAs provided higher pain ratings for residents who were more cognitively intact compared to residents with cognitive impairment.

The primary analyses revealed a significant negative relationship between residents' pain catastrophizing and CNAs' pain rating accuracy was established, suggesting CNAs may discount the pain reports of residents who pain catastrophize. Empathy did not moderate this relationship. Additionally, a relationship between resident cognitive status

and CNA pain rating accuracy was not established. While these relationships may in fact not exist, it is important to recognize factors that may have impacted the ability to detect such effects in this study.

Strengths and Limitations

To my knowledge, this is the first quantitative study modeling the associations among cognitive status, care recipient pain catastrophizing, caregiver empathy, and the accuracy of caregiver pain ratings in a long-term care setting. Previous research on the relationships among empathy, pain catastrophizing and the perception of others' pain has been limited to laboratory research with undergraduate students utilizing cold-pressor tasks (Green, Tripp, Sullivan, & Davidson, 2009) and the assessment of hypothetical patients (Chibnall, Tait, & Jovel, 2014).

Examining these constructs is important for determining why individuals residing in nursing homes are at risk for undertreatment of pain (Monroe et al., 2014). Additionally, this project highlighted barriers to research in long-term care that must be addressed for researchers to contribute to quality improvement efforts in long-term care settings.

Sample Size. Our power analysis before conducting this study indicated that a sample of 55 CNAs would provide adequate power (> 0.80) for analysis. Our sample final data set consisted of 18 CNAs. Because underpowered studies often produce imprecise estimates of effects and have an increased risk of Type-I errors, our results must be interpreted with caution (Hacker, 2008)

Sample Profile. Because this study examines empathy, a trait exemplifying the ability to identify others' emotions and point of view, this trait may have impacted participants' willingness to participate in a research study. CNAs who agreed to participate may possess greater levels of empathy than those who refused, as participating CNAs may have been more

attuned to the value of the study expressed by researchers. Alternatively, CNAs who refused participation may have been attuned to their residents' needs when approached for participation and, therefore, refused participation in order to provide care. Either scenario would reduce the range of scores and, therefore, the ability to detect an effect of empathy.

Additionally, pain experience and catastrophizing may have influenced residents' willingness to participate in the current study. Residents with greater pain severity and catastrophizing may have placed greater importance on their symptoms and therefore, may have been less likely to participate. Alternatively, those residents may have been more likely to participate due to the opportunity participation provided to discuss their experience. Either situation would reduce the range of scores and ability to detect the effect of pain catastrophizing.

It is also important to recognize the limited sample of individuals with cognitive impairment. This study attempted to include individuals with cognitive impairment, as exclusion of this group is common in geriatric research (Taylor, DeMers, Vig, & Borson, 2012). The inclusion of these individuals was specifically important for this study due to the high rates of untreated pain among individuals with dementia in long-term care settings (Huesbo et al., 2008). However, ethical and legal issues related to including cognitively impaired older adults limit researchers' ability to recruit this population (Monroe, Herr, Mion, & Cowan, 2012). In addition to these issues, our specific method of recruitment for this study may have contributed to our small sample of cognitively impaired older adults. CNAs were asked to identify residents to be interviewed. It is possible CNAs identified residents without cognitive impairment for participation as they may have been concerned

cognitively impaired residents would provide inaccurate reports or become distressed by the interview.

Interpersonal Reactivity Index (IRI). Developers of the IRI reported satisfactory factor structure, internal consistency, and test-retest reliability across independent samples (Davis, 1980). These properties have been confirmed in measures adapted for use in other cultures (De Corte et al., 2007; Fernández, Dufey, & Kramp, 2011; Gilet et al., 2013), though alternative factor structures have emerged for some (Siu & Shek, 2005; Cliffordson, 2002). One group of researchers confirmed the two-factor structure of the Perspective Taking and Empathic Concern subscales in the context of research with dyads (Péloquin, & Lafontaine, 2010). Surprisingly, the empathic and perspective taking subscales both produced poor reliabilities for the current study ($\alpha = .33$ and $\alpha = .31$, respectively).

Through item-by-item analysis, it was realized that the removal of reverse-coded measures would improve scale reliabilities. Many studies have shown that scales including both positively and negatively worded statements are less reliable than those including only one type (Schriesheim and Hill, 1981; Johnson, Bristow, and Schneider 2004). I believe these statements did not serve their intended purpose of reducing the chances that individuals will engage in response styles such as acquiescing and nay-saying (Nunnally, 1978; Paulhus, 1991). Rather, I believe the inclusion may have led to biased responding, an effect that can occur at many points of the response process (Podsakoff et al., 2003). While it is possible various biases occurred during our item administration, I believe two were likely to occur due to this combination: comprehension and response reporting biases.

Comprehension Bias. CNAs may have not understood items due to the data collection process. Research assistants often had to follow CNAs as they completed their job tasks to

administer the measures. In other words, CNAs were often multitasking and unable to provide their full attention when responding to items. This is a possible reason for the poor subscale reliability scores we obtained for the IRI, especially for reverse coded items as the CNAs may not have recognized some items were negatively worded.

Response Reporting Bias. The self-report nature of the study may also have impacted the results of the current study. Biases in reporting, especially social desirability bias, may have come into play when CNAs reported empathy. Some CNAs may have provided responses endorsing empathy as one would expect from individuals employed in a helping profession. The face-to-face administration of the empathy scale may have exacerbated this effect.

Timing of Interviews. It is also important to acknowledge the timing of administration. Research assistants attempted to administer CNA and residents measures in succession, but often the CNA and residents were not available at the same time. The research team attempted to avoid delays between interviews by checking if residents were in their rooms before interviewing staff and by obtaining the staff work schedule to when CNAs would be available; However, residents often left their rooms to attend activities and the CNA work schedule was often incorrect. Due to this and limited availability of research assistants, a significant number of days (up to 1 week) between CNA and residents interviews was unavoidable.

Barriers to Research

The barriers to recruitment and data collection experienced by the researchers conducting the present study echo those identified by other researchers in LTC settings (Lam et al., 2018). The greatest difficulty was the recruitment and retention of LTC facilities. Similar to the experience of other researchers, refusal came from both the administrator and

corporate levels (Zapka et al., 2014; Davies et al., 2014). Administration turnover was also a barrier, as in one case it led to facility attrition. Challenges due to ownership changes and staff turnover are not uncommon in LTC research (Garcia, Kelley, & Dyck, 2013; Tilden et al., 2013; Jenkins et al., 2016).

We did not face as many challenges regarding residents consenting to participate as have been discussed by others (Lam et al., 2018). This is likely due to the design of our study, as participation entails one 15-minute interview rather than the extensive participation that may be required in randomized trials. Recruitment barriers during this study stemmed from resident health. Many residents could not consent and participate due to the severity of cognitive impairment. Other residents were never approached for the in-person interview due to high mortality rates. Along with residents' ability to participate, RAs sometimes had difficulty locating residents as some were often at activities elsewhere in the facility.

CNA participation was a major challenge faced by our research team. In this area, time- constraint was the most problematic. As noted by numerous researchers, many staff members refused to participate due to time constraint (Zapka et al., 2014, Garcia, Kelley, & Dyck, 2013). CNAs had residents needing care and did not have time in their schedules to complete interviews. Additionally, many CNAs left the facility or moved to a different workstation within the facility during the time between recruitment and interviews.

Future Directions and Recommendations

Results suggesting a negative relationship exists between resident pain catastrophizing and the accuracy of CNAs' pain assessments of their residents' pain lend support for past findings with family caregivers (Cano, 2004; Boothby, Thorn, Overduin,

and Ward 2004). Empathy did not moderate the relationship. This was surprising given past findings have supported this relationship (Green, Tripp, Sullivan, & Davidson, 2009; Chibnall, Tait, & Jovel, 2014). However, research methodology may have significantly impacted our results. This line of research should continue to be explored as accurate pain assessment and management is an important contributor to the quality of life of long-term care residents with pain. Other CNA factors, such as the amount of training on pain assessment, may be worth investigating.

For research in long-term care to be conducted successfully, the barriers to long-term care research must be addressed. Barriers to conducting CNA interviews for this study were time constraints and staff turnover. While designing research to minimize disruptions of CNAs' schedules and offering compensation can encourage participation (Lam et al., 2018), efforts at the administration level are necessary. Prior researchers have found face-to-face contact with nursing home leadership to be the most effective strategy for gaining access to nursing homes, recommending researchers become familiar with the nursing home environment and develop relationships with local nursing home personnel (Garcia, Kelley, and Dyck, 2013). Also, educating administration about research can help foster interest and decrease any perceptions of threat produced by the introduction of research into a facility (Garcia, Kelley, & Dyck, 2013; Tilden et al., 2013). If long-term care leadership recognizes the value of research, they are more likely to take a more active role in the research process and create time in CNAs' schedules for participation.

Finally, it is important to address these barriers at the macro-level. Administrators face challenges in meeting both resident and organizational needs under strict regulations (Holecek et al., 2010; Tellis-Nayak, 2007). This may be especially challenging for

administrators of for-profit nursing homes, where financial gains may be prioritized over resident well-being and high-quality care within the organization (Kitchener, O'Meara, Brody, Lee, & Harrington, 2008; Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000). Unsurprisingly, turnover rates of nursing home administrators have been estimated at 40% per year (Angelelli, Gifford, Shah, & Mor, 2001; Castle, 2001; Castle, Engberg, & Anderson, 2007; Singh & Schwab, 1998). These findings provide a possible explanation as to why incorporating research into long-term care facilities may not be a priority for, or a decision in the hands of administrators.

Efforts may be best targeted at providing resources to corporations that allow them to prioritize the implementation of quality improvement research into their practice. Future research should focus on identifying characteristics of long-term care facilities who do and do not implement research into their practice. By understanding these relationships, we may be able to better integrate research into the long-term care system, and, therefore, improve the resident, staff, and administrator experience.

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APPENDIX A

Table 1

Sample Descriptive Statistics

Variable	N	%
CNAs (N=18)		
Education		
< High School	0	0
High School/GED	10	55.6
Technical/Vocational Training	3	16.7
1 to 4 years college	5	27.8
College/graduate degree	0	0
Income		
< 10,000	1	5.6
10,000-20,000	1	5.6
20,000-30,000	8	44.4
30,000-40,000	7	38.9
Declined to answer	1	5.6
Race		
White	0	0
African American	18	100
Asian/Pacific Islander	0	0
Hispanic	0	0
American Indian/Alaskan Native	0	0
Sex		
Female	18	100
Male	0	0
Age		
21-30	1	5.6
31-40	7	38.9
41-50	5	27.7
51-60	4	22.2
Declined to answer	1	5.6
Divorced/Separated	4	22.2
Number of Jobs Currently Held		
1	15	83.3
> 1	3	16.7

Table 1 *(continued)*

Variable	N	%
Time Worked in any LTC Facilities		
<1 year	0	0
1-2 years	0	0
3-5 years	4	11.4
6-9 years	1	2.9
10+ years	30	85.7
Marital Status		
Never Married	7	38.9
Married	6	33.3
Living with Partner	1	5.6
Divorced/Separated	4	22.2
Time Work in Current Facility		
<1 year	6	17.1
1-2 years	5	14.3
3-5 years	3	8.6
6-9 years	13	37.1
10+ years	8	22.9
Residents (N=35)		
Gender		
Male	9	25.7
Female	26	74.3
Race		
White	28	80.0
African American	7	20.0
Age		
60-69	8	22.9
70-79	7	20.0
80-88	7	20.0
89+	13	37.1
Length of Stay		
<1 year	0	0
1- 1.5 years	12	34.2
1.5 – 2 years	23	65.8

Table 2

Descriptive Statistics of Primary Variables

	N	Min	Max	Mean	SD
CNAs					
PGC Pain (of resident)	35	4.00	20.14	10.81	5.63
Pain Rating Accuracy[a]	35	-17.00	11.43	-1.99	6.25
IRI Empathy	18	2.43	4.00	3.50	0.49
IRI Perspective Taking	18	1.86	3.57	2.95	0.54
Residents					
PGC Pain	35	4.00	25.00	12.89	6.22
Pain Catastrophizing	34	0.00	20.00	6.44	6.72
MDS BIMS Score	35	3.00	15.00	12.91	3.55

[a] Pain Rating Accuracy computed by subtracting resident pain rating from CNA rating of resident pain

Table 3 *Correlations Among Covariates and Primary Variables*

Variables	1	2	3	4	5	6	7	8
1. CNA Age	-							
2. CNA Pain Accuracy	-.085	-						
3. Months Caring for Resident	.224	.071	-					
4. IRI Empathic Scale	-0.442	0.005	-.369*	-				
5. IRI Perspective Scale	031	0.354	-.095	.025	-			
6. Resident Length of Stay	-.260	-.007	-.218	.237	-.078	-		
7. Days between MDS and Resident Interview	-.039	.208	.260	.055	.099	.223	-	
8. Resident Cognitive Status	-.136	.060	.035	-.047	-.189	-.034	.061	-
9. Resident Pain Catastrophizing	-.210	-.453**	-.103	.135	-.065	.033	.074	.123
10. Resident Race	-.100	.172	.223	-.147	.229	.005	.037	-.09
11. Resident Gender	-0.040	.140	.015	.095	-.082	.033	.123	.172
12. CNA Years of Experience	.126	-.132	.121	.094	-.235	-.236	.186	.072
13. CNA Level of Education	.188	.043	.110	-.218	-.090	-.195	.013	.096
14. Resident Pain Rating	.023	-.606**	-.100	.012	-.214	-.056	-.215	.283
15. CNA Pain Rating	-.151	.442**	-.052	.083	.141	-.082	-.017	.367*

Table 3 *(cont.)*

Variables	9	10	11	12	13	14	15
9. Resident Pain Catastrophizing	-						
10. Resident Race	-.177	-					
11. Resident Gender	.211	-.033	-				
12. CNA Years of Experience	.007	-.022	.170	-			
13. CNA Level of Education	.032	.016	.234	.108	-		
14. Resident Pain Rating	.721**	-.285	.022	-.070	.010	-	
15. CNA Pain Rating	.319	-.130	.187	-.198	.093	.444**	-

Note. *p < .05; **p<.01

Table 4

Direct and Indirect Associations of Pain Catastrophizing and Pain Rating Accuracy

	b	SE	t	LLCI	ULCI
Empathic Concern					
Constant	-2.681	7.791	-.344	-.18.615	13.253
Pain Catastrophizing	-.847	1.532	.553	3.981	2.287
Empathic Concern	.168	.353	.476	-.554	.890
Interaction	.019	.069	.277	-.123	.162
Months Caring for Resident	-.033	.040	-.841	-.114	.048
Perspective Taking					
Constant	-6.396	5.745	-1.113	-18.146	5.354
Pain Catastrophizing	-.182	.673	-.270	.558	1.195
Perspective Taking	.397	.303	1.313	-.222	1.017
Interaction	-.012	.039	-.301	-.092	.069
Months Caring for Resident	-.0291	.037	-.792	-.104	.046

Initial regression: $R^2 = .205$, F (1, 32) = 8.27, $p < .05$
Note. * $p < 0.05$; ** $p \leq 0.001$.

Table 5

Direct and Indirect Association of Cognitive Status and Pain Rating Accuracy

	b	SE	t	LLCI	ULCI
Empathic Concern					
Constant	4.978	9.380	.520	-14.278	24.037
Resident Cognitive Status	-4.356	4.944	-.881	-14.453	5.742
Empathic Concern	-.184	.427	-.431	-1.057	.689
Interaction	.206	.227	.906	-.258	.670
Months Caring for Resident	-.038	.041	-.920	-.124	.047
Perspective Taking					
Constant	-8.978	5.747	-1.562	-20.715	2.758
Resident Cognitive Status	-.560	1.672	-.335	-3.975	2.855
Perspective Taking	.548	.307	1.785	-.079	1.176
Interaction	.041	.096	.431	-.154	.237
Months Caring for Resident	-.03	.039	-.869	-.113	.046

Initial regression: $R^2 = .004$, F (1, 33) = .120, $p > .05$
Note. * $p < 0.05$; ** $p \leq 0.001$.

APPENDIX B

Philadelphia Geriatric Pain Scale

Scale: Not at all, A little, Moderately, Quite a Bit, Extremely

1. In general, how much has this resident been bothered by pain over the past few weeks?

2. How much is this resident bothered by pain right now?

3. How much is this resident bothered by the pain when it is at its worst?

4. How many days a week does this resident's pain get really bad?

5. How much is this resident bothered by the pain when it is at its least?

6. How much has the pain interfered with this resident's day-to-day activities?

Interpersonal Reactivity Index

Scale: 0 (Does not describe me well) to 4 (Describes me very well)

1. I daydream and fantasize, with some regularity, about things that might happen to me.

2. I often have tender, concerned feelings for people less fortunate than me.

3. I sometimes find it difficult to see things from the "other guy's" point of view.

4. Sometimes I don't feel very sorry for other people when they are having problems.

5. I really get involved with the feelings of the characters in a novel.

6. In emergency situations, I feel apprehensive and ill-at-ease.

7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.

8. I try to look at everybody's side of a disagreement before I make a decision.

9. When I see someone being taken advantage of, I feel kind of protective towards them.

10. I sometimes feel helpless when I am in the middle of a very emotional situation.

11. I sometimes try to understand my friends better by imagining how things look from their perspective.

12. Becoming extremely involved in a good book or movie is somewhat rare for me.

13. When I see someone get hurt, I tend to remain calm.

14. Other people's misfortunes do not usually disturb me a great deal.

15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.

16. After seeing a play or movie, I have felt as though I were one of the characters.

17. Being in a tense emotional situation scares me.

18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.

19. I am usually pretty effective in dealing with emergencies.

20. I am often quite touched by things that I see happen.

21. I believe that there are two sides to every question and try to look at them both.

22. I would describe myself as a pretty soft-hearted person.

23. When I watch a good movie, I can very easily put myself in the place of a leading character.

24. I tend to lose control during emergencies.

25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.

26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.

27. When I see someone who badly needs help in an emergency, I go to pieces.

28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.

Pain Catastrophizing Scale

Scale: Never, Rarely, Sometimes, Often, Always

1. It is terrible and I feel it is never going to get any better.

2. It is awful and I feel it overwhelms me.

3. I feel my life isn't worth living.

4. I worry all the time about whether it will end.

5. I feel I can't stand it anymore.

6. I feel like I can't go on.

APPENDIX C

THE UNIVERSITY OF ALABAMA | *Office of the Vice President for* Research & Economic Development
Office for Research Compliance

October 7, 2019

Patricia A. Parmelee, Ph.D.
Director, Alabama Research Institute on Aging
Professor, Department of Psychology
College of Arts & Sciences
The University of Alabama
Box 870315

Re: IRB Protocol # 17-018-ME-R2
"Pain, Sleep, and Depression in Elderly Nursing Home Residents"

Dr. Parmelee:

The University of Alabama Medical IRB recently met to consider your renewal application. You have also been granted the requested waiver of documentation of informed consent. The IRB voted to approve your protocol for a period of one year.

The approval for your application will lapse on October 2, 2020. If your research will continue beyond this date, please submit a continuing review to the IRB as required by University policy before the lapse. Please note, any modifications made in research design, methodology, or procedures must be submitted to and approved by the IRB before implementation. Please submit a final report form when the study is complete.

Please use reproductions of the IRB approved informed consent form to obtain consent from your participants.

Good luck with your research.

Sincerely,

J. Grier Stewart, MD, FACP
Medical IRB Chair

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