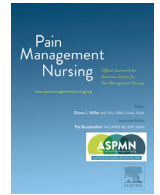




ELSEVIER

Contents lists available at ScienceDirect

Pain Management Nursing

journal homepage: www.painmanagementnursing.org

Original Article

A Descriptive Study of Treatment of Pain in Acute Care for Patients Living With Dementia

Barbara Resnick, Ph.D., CRNP^{*,1}, Marie Boltz, Ph.D.[†], Elizabeth Galik, Ph.D. ^{*},
Jeanette Ellis, M.A. ^{*}, Ashley Kuzmik, Ph.D.[†], Brittany Drazich, Ph.D. ^{*},
Rachel McPherson, PhD^{*}, Emma Kim, B.S.N. ^{*}

^{*} University of Maryland School of Nursing, Baltimore, Maryland

[†] Penn State University, University Park, Pennsylvania

ARTICLE INFO

Article history:

Received 20 August 2022

Received in revised form 9 December 2022

Accepted 30 December 2022

Available online xxx

ABSTRACT

Background: During the hospital stay pain is very common among patients living with dementia.

Methods: Descriptive data was obtained from chart review and included age, gender, race, comorbidities and admitting diagnosis.

Aims: The purpose of this study was to describe pain among patients living with dementia, the use of pharmacologic and nonpharmacologic treatment, and to compare treatments among those with and without pain.

Design: This was a descriptive study using baseline data from the first 233 participants from the study "Testing the Implementation of Function Focused Care for Acute Care Using the Evidence Integration Triangle (FFC-AC-EIT)".

Participants/Subjects: The mean age of participants was 83 (SD=5) and the majority was female (65%) and White (67%) with evidence of dementia (based on a mean Saint Louis University Mental Status Test = 7.23, SD=5.85).

Results: Overall 98 (42%) participants had pain and 135 (58%) no pain. Only 14 (6%) participants received no nonpharmacologic or pharmacologic interventions for pain and five of these individuals had pain. The most frequently used pharmacologic intervention among all participants was acetaminophen (n = 121, 52%), then tramadol (n = 19, 8%). Comfort measures and general nonpharmacologic approaches were the most frequently used non-pharmacologic approaches, then physical activity and therapeutic communication. From admission to discharge, there was a trend towards a decrease in pain. There was more use of opioids, physical activity, and therapeutic communication in the no pain group versus the pain group.

Conclusions: The majority of hospitalized medical patients living with dementia were treated for pain, but an ongoing focus is needed to assure optimal pain management for all patients.

© 2023 American Society for Pain Management Nursing. Published by Elsevier Inc. All rights reserved.

Hospitalization for medical reasons is common for older adults living with dementia, and these individuals are even more likely to be hospitalized than their peers without dementia (Shepherd et al., 2019). During the hospital stay pain has been noted in approximately 30% to 50% of these individuals (Boltz et al., 2021; Feast et al., 2018) and 12% to 14% receive no treatment for pain either pharmacologic or nonpharmacologic (Boltz et al., 2021; Montoro-Lorite et al., 2020; Sampson et al., 2015). Untreated pain in individuals living with dementia can lengthen the hospital stay

as it exacerbates psychological and behavioral symptoms associated with dementia, increases the risk of delirium, and exacerbates functional decline (Boltz et al., 2021; Mart et al., 2021).

Challenges to Identification and Management of Pain

Older adults living with dementia, particularly those with moderate to severe dementia, are not always able to verbally report the sensation of pain (Agit et al., 2018). Therefore, it has been recommended that observation measures be used to evaluate pain in these individuals (Chow et al., 2016; Lichtner et al., 2014). The most commonly used observation measure is the Pain Assessment in Advanced Dementia (PAINAD) (Natavio et al., 2020;

¹ Address correspondence to Barbara Resnick, PHD, CRNP, 3907 Cloverhill road, Baltimore, MD 21218

E-mail address: barbresnick@gmail.com (B. Resnick).

<https://doi.org/10.1016/j.pmn.2022.12.010>

1524-9042/© 2023 American Society for Pain Management Nursing. Published by Elsevier Inc. All rights reserved.

Table 1
Descriptive Findings for the Sample

Variable	Mean	SD	N	%
Age (y)	83.50	8.01		
Saint Louis University	7.23	5.85		
Mental Status Test				
Comorbidities	2.15	1.42		
Admission pain score	1.24	1.87		
Discharge pain score	1.10	1.79		
Length of stay	5.25	3.59		
Sex				
Male			81	35%
Female			152	65%
Race				
Black			78	33%
White			155	67%
Admission diagnosis				
Gastrointestinal			12	5%
Infection			64	28%
Respiratory			13	5%
Kidney			14	5%
Change in cognition			64	12%
Cardiac			25	11%
Anemia/bleed			8	3%
Musculoskeletal			23	10%
Electrolyte changes			8	3%
Neurologic			19	8%
Diabetes			5	2%
Other			13	5%

SD = standard deviation.

Resnick et al., 2021). Alternative measures of pain using approaches such as psychophysics, brain imaging, neurophysiologic recordings, facial responses to pain, electroencephalography (EEG) recordings, actigraphy, or use of biomarkers have not been well established and are particularly challenging for individuals living with dementia (Galik et al., under review; Kunz & Lautenbacher, 2017). These assessments overlap with evidence of behavioral symptoms and are impaired by physical factors such as facial wrinkles (Achterberg et al., 2021).

In addition to cognitive issues and measurement challenges, from the perspective of the patient living with dementia reports of pain are influenced by: (1) inconsistency of the pain experience with pain being more intense some days and during certain activities (e.g., only with walking); (2) socially desirable responses and/or fear of being judged if one reports pain; (3) acceptance of the pain as a normal part of aging; (4) fear of pharmacologic interventions; and (5) lack of belief in nonpharmacologic approaches (Ngu et al., 2015; Schofield & Abdulla, 2018; Veal et al., 2018). From the perspective of primary care providers, hospitalists, nurses, and other caregivers, additional reasons that contribute to inaccurate assessment, diagnosis, and management of pain when working with individuals living with dementia include: (1) beliefs that pain is a normal part of aging; (2) fear of pharmacologic interventions; (3) lack of belief in the value of nonpharmacologic approaches; (4) lack of prior experience and knowledge for how to evaluate and treat pain in older adults; (5) poor communication between providers (physician, nurse practitioner, physician assistant) and other staff (all levels of nursing, rehabilitation therapists, activity staff, social workers, pharmacists); and (6) insufficient time to address pain (Graham et al., 2022; Mart et al., 2021; Minaya-Freire et al., 2020; Ngu et al., 2015; Schofield & Abdulla, 2018; Veal et al., 2018).

Treatment Options

There are, fortunately, effective ways in which to manage pain using pharmacologic and nonpharmacologic approaches. Nonpharmacologic approaches should be considered as first line inter-

ventions for pain management and should be continued if pharmacotherapy is added (Levenson & Resnick, 2021). Effective non-pharmacologic interventions include physical activity, distraction, heat/cold, occupational or physical therapy, massage, positioning, cognitive behavioral therapy, acupuncture, aromatherapy, music and other relaxation techniques (Geneen et al., 2017; Veehof et al., 2011; Williams et al., 2020). Pharmacologic management of pain should be: (1) based on the individuals' underlying comorbidities and other medications; (2) given in the least invasive and most comfortable route available (e.g., oral, topical); (3) given on a scheduled or as needed basis depending on the resident's level of pain and need for treatment; and (4) focused on the cause of the underlying pain and type of pain the individual is experiencing (e.g., neuropathic, nociceptive pain). Agents fall into three groups: non-opioid analgesics (e.g., acetaminophen, lidocaine, non-steroidal anti-inflammatory drugs); adjuvant medications (e.g., antidepressants, anti-convulsants); and opioid analgesics (e.g., morphine, hydrocodone) (Levenson & Resnick, 2021).

Given the many challenges to pain assessment, diagnosis and management among hospitalized older adults living with dementia, research is needed to better understand current evidence of pain among these individuals, current use of pharmacologic and nonpharmacologic treatment, and effectiveness of those treatments during the hospital stay. To that end, the purpose of this study was to describe pain among patients living with dementia on admission and discharge, the use of pharmacologic and nonpharmacologic treatment of pain, and to compare treatments used among those with and without pain.

Methods

Design

This was a descriptive study using baseline data from the first 233 participants in our study testing the implementation of Function Focused Care for Acute Care Using the Evidence Integration Triangle (FFC-AC-EIT; ClinicalTrials.gov Identifier: NCT04235374). A description of the FFC-AC-EIT intervention is provided in Appendix A. Participants were from seven hospitals in two East Coast states that were randomized to treatment or control. The study was approved by the University of Maryland, Baltimore Institutional Review Board.

Sample and Settings

To participate in the study the hospitals had to: (1) have at least one unit dedicated to general medical patients; (2) identify two registered nurses to be champions (one for day and one for evening shifts); (3) allow the staff to access email and websites via a phone, tablet, or computer; and (4) not have a geriatric focused unit. Patients admitted to these hospitals were eligible to participate if they: (1) were aged 65 years or older; (2) were admitted with a medical diagnosis except for COVID-19; and (3) had evidence of dementia based on: a score of 19 or greater on the Saint Louis University Mental Status (SLUMS) score for individuals with less than high school education and a score of 20 or greater for individuals with at least high school education (Morley & Tumosa, 2002); a score of greater than 2 on the AD8 Dementia Screening Interview (Galvin et al., 2005); a score of 0.5 to 2.0 on the Clinical Dementia Rating Scale (CDR) (O'Bryant et al., 2008); and a score of 9 or greater on the Functional Activities Questionnaire (FAQ) (Pfeffer et al., 1982). Patients were excluded from participation if they: (1) were receiving hospice services; (2) were already on the unit for greater than 48 hours; (3) did not have a contact for follow up; (4) were expected to have surgery;

or (5) had evidence of an acute psychiatric condition or a neurologic disorder that affects cognition, other than dementia. All potential participants completed an evaluation to sign consent (Resnick et al., 2007) to determine if they could self-consent. If the patient did not correctly answer all questions on the evaluation to sign consent, verbal or written assent was obtained and the legally authorized representative was contacted to complete the evaluation to sign consent and if passed to complete the consent process.

Four hospitals were randomized to treatment and three to control. A total of 3,928 patients were screened and 1,321 (about a third) were not communicative, not eligible based on initial chart review, or were discharged before being evaluated. A total of 445 (17% of approached) consented to participate but only 233 were enrolled as the additional 212 consented individuals did not meet the second level of eligibility which included cognitive screening for mild to moderate dementia. The 2,162 patients that were approached but were not consented or enrolled was largely due to refusal to participate, unavailability, testing positive for COVID-19, or not having a legally authorized representative we could reach.

Procedure

Following consent and enrollment, research evaluators obtained all of the baseline data within 48 hours of admission based on interviewing, direct observation of the patient, and chart review. All data were obtained by evaluators who were blinded to the intervention, had expertise in assessing individuals living with cognitive impairment, and were trained in completion of the PAINAD. Patients were interviewed to complete the SLUMs to describe cognitive status. Direct observation was done to evaluate pain in patients. The evaluators were asked to observe participants during daytime activities such as transferring or ambulating within 48 hours of admission and 48 hours of discharge. Chart reviews using electronic health records for the entire hospitalization period were used to complete the checklist of nonpharmacologic interventions to describe pain management and to obtain pharmacologic treatment. To comprehensively obtain nonpharmacologic interventions input from staff providing care to the patient on the day of testing and evaluator observations were also included in the completion of the checklist (Supplemental Table 1).

Measures

Descriptive data were obtained from chart review and included age, sex, race, comorbidities, and admitting diagnosis. The SLUMS exam was completed to describe cognitive status of the participant. Scores on this measure range from 0 to 30 and address aspects of memory such as orientation, problem solving, and recall (Morley & Tumosa, 2002). Pain was evaluated using the PAINAD scale (Warden et al., 2003). The PAINAD scale includes five behaviors that are noted to occur among individuals living with dementia who are experiencing pain including evaluations of breathing patterns, negative vocalizations, facial expressions, body language, and consolability. Items are scored from 0 to 2 for each behavior and a total score of 1 to 3 is considered mild pain, 4 to 6 moderate pain, and 7 to 10 severe pain. Prior use of this measure provided support for inter-rater reliability ($\kappa = .74$) and concurrent validity ($p < .001$) (Mosele et al., 2012).

Opioids and other analgesics both scheduled and as needed, were obtained from the electronic health record. Nonpharmacologic interventions were obtained using the checklist provided in Supplemental Table 1. Examples of nonpharmacologic approaches included using general approaches such as ice or heat, music, aro-

Table 2

Number of Nonpharmacologic and the Pharmacologic Approaches Used to Manage Pain (N = 233)^a

Number of Nonpharmacologic Interventions Implemented	n (%)
0	14 (6%)
1.00	41(18%)
2.00	64 (28%)
3.00	67(29%)
4.00	30 (13%)
5.00	15 (6%)
6.00	2 (1%)
Pharmacologic Interventions	
Ibuprofen	3 (1%)
Celecoxib	2 (1%)
Hydromorphone	2 (1%)
Oxycodone hydrochloride/Acetaminophen	3 (1%)
Topical lidocaine	21 (9%)
Hydrocodone	3 (1%)
Methadone	2 (1%)
Morphine	11 (5%)
Oxycodone	10 (4%)
Acetaminophen	121 (52%)
Acetaminophen and codeine	1 (.5%)
Anbesol	2 (1%)
Baclofen	2 (1%)
Tramadol	19 (8%)
Cyclobenzaprine	2 (1%)
Diclofenac gel	4 (2%)
Chloraseptic spray	1 (.5%)

^a Nonpharmacologic approaches include the sum of at least one intervention from each group: general nonpharmacologic interventions; distraction; physical activity; socialization; therapeutic communication; comfort measures; use of pharmacologic interventions.

matherapy, or hypnosis, distraction, physical activity, socialization, therapeutic communication, or comfort measures.

Data Analysis

Descriptive statistics were used to describe the percentage of patients living with dementia admitted to the hospital with pain, the interventions implemented during their acute care stay, and pain at discharge. A multivariate analysis of covariance was conducted to test whether or not those with pain were more likely to be exposed to treatments for pain versus those who were not experiencing pain on admission. The Pillai-Bartlett trace was used to determine multivariate significance (Adeleke et al., 2015). Lastly, we completed a repeated measures analysis to evaluate for differences in pain over time. In all analyses age, sex, race, comorbidities, length of stay, and treatment status were controlled for. A $p \leq .05$ was used as the level of significance for all analyses.

Results

As shown in Table 1, the mean age of the 233 participants was 83 (standard deviation [SD] = 5) and the majority was female (65%) and White (67%). As per eligibility requirements, all participants had moderate to severe dementia (SLUMS; mean = 7.23, SD = 5.85). The participants had a mean of 2 (SD=1) comorbidities. The admission diagnoses varied such that the majority was admitted for an infection, a change in cognition, exacerbation of cardiac disease, and/or musculoskeletal conditions. Overall, 98 (42%) participants were observed to have some pain. The number of treatment approaches (nonpharmacologic and pharmacologic) used to manage pain among all participants is noted in Table 2. The pharmacologic interventions in descending order of frequency of use included: acetaminophen (n = 121, 52% of sample), tramadol (n = 19, 8%), topical lidocaine (n = 21, 9%), mor-

Table 3
Pharmacologic and Nonpharmacologic Approaches Used by Pain Group (yes/no experiencing pain, N = 233)

Approach Used	Patients With Pain N (%)	Patients Without Pain N (%)
Use of distraction		
Yes	0 (0)	1 (1)
No	98 (100)	134 (99)
Use of physical activity		
Yes	35 (35)	63 (47)
No	63 (64)	72 (53)
Use of socialization		
Yes	0 (0)	2 (2)
No	98 (100)	133 (98)
Use of therapeutic communication		
Yes	23 (23)	50 (37)
No	75 (77)	85 (63)
Use of comfort measures		
Yes	47 (48)	57 (42)
No	51 (52)	78 (58)
Use of general nonpharmacological approaches		
Yes	43 (43)	62 (46)
No	56 (57)	72 (54)
Non opioid pain medication		
Yes	56 (57)	72 (53)
No	42 (43)	63 (47)
Opioid pain medication		
Yes	15 (15)	33 (24)
No	83 (85)	102 (76)

Table 4
Multivariate Results^a

Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Use of a non-opioid pain medication	.03	1	.03	.150	.69
Use of a narcotic pain medication	.72	1	.72	4.411	.03
Use of distraction	.01	1	.01	.42	.51
Use of physical activity	.88	1	.88	3.64	.05
Use of socialization	.01	1	.01	1.23	.26
Use of therapeutic Communication	1.12	1	1.12	5.26	.02
Use of comfort measures	.08	1	.08	.33	.56
Use of general pain Interventions	.33	1	.33	1.38	.24

^a Age, sex, race, comorbidities, length of stay, and treatment allocation were all controlled for. There were, however, no significant correlations between these variables and pain assessments on admission or discharge.
Sig. = Significance

phine (n = 11, 5%), and oxycodone (n = 10, 4%). Other drugs were given in only 1% to 3% of the sample. Only 14 (6%) of the participants received no nonpharmacologic or pharmacologic interventions. Among these 14 individuals, five individuals (5% of the 98 participants that were noted to have pain) were experiencing pain. Between admission to discharge there was a trend towards a decrease in pain with a mean PAINAD score on admission of 1.28 (SD = 1.98) to a discharge score of 1.08 (SD = 1.78), $F = 3.54$, $p = .06$.

Table 3 delineates the number and percentage of individuals exposed to each type of nonpharmacologic intervention or pharmacologic intervention (opioid or non-opioid) among those with or without pain. Use of non-opioid pain medication (57% for those with pain and 53% for those without pain), comfort measures (48% for those with pain and 42% for those without pain) and general nonpharmacologic approaches such as heat, ice, positioning (43% for those with pain and 46% for those without pain) were the most frequently used approaches. The next most frequently used approaches included the use of physical activity (35% for those with pain and 47% for those without pain), therapeutic communication (23% for those with pain and 37% for those without pain), and then use of opioids (15% for those with pain and 24% for those without pain). There was very little use of distraction or socialization (2% or less) and no use of many of the general approaches such as massage, meditation, relaxation, aromatherapy, hypnosis, or pet visits (Supplemental Table 1).

Multivariate results are provided in Table 4. There was a significantly greater percentage of use of opioids ($F = 4.41$, $p = .03$), use of physical activity ($F = 3.64$, $p = .05$), and use of therapeutic communication ($F = 5.26$, $p = .02$) in the no pain group versus the pain group. The overall model was significant with a Pillai's Trace of $F = 1.96$ ($p = .05$).

Discussion

The findings from this study suggest that pain is present in about 42% of the sample which is within the range of 36% to 70% reported by other studies (Boltz et al., 2021; Feast et al., 2018; Sampson et al., 2015). Similar to other studies (Boltz et al., 2021; Montoro-Lorite et al., 2020), the majority of the patients in the current study who experienced pain were treated with at least one nonpharmacologic or pharmacologic intervention. Although treated, 42% of the participants were still experiencing pain and there were 5 (5%) individuals with pain that were not being treated. Lack of treatment or adequate treatment is likely due to the previously reported reasons such as knowledge, experience and skills related to identification and management of pain in patients living with dementia (Graham et al., 2022; Harmon et al., 2019; Minaya-Freire et al., 2020), and poor centralization and communication between health care providers regarding pain in this population (Lichtner et al., 2014).

The rates of use of nonpharmacologic interventions noted in this sample were similar to those reported in a study by Montoro-Lorite et al. (2020), which focused on increasing use of nonpharmacologic interventions among acute care patients living with dementia (Montoro-Lorite et al., 2020). Similar to our current study, in the Montoro-Lorite study, 100% of the small sample of 22 participants from both the treatment and control groups were exposed to some type of nonpharmacologic intervention such as use of heat and cold, massage, positioning, exercise, and communication and consoling. The major difference was in the use of distraction, which was essentially not used in the current study, but was provided for in 100% of the intervention group in the Montoro-Lorite study. The lack of use of distraction or socialization in the current study may have been due to COVID-19 restrictions. Future research is needed to consider the value of each of these nonpharmacologic approaches to establish their effectiveness alone or combined with other pain management approaches.

While we noted a greater percentage of use of opioids, physical activity, and therapeutic communication in the non-pain group, it is impossible to confirm causation. The interventions used were not necessarily used alone and pain may have resolved over time during the hospital stay as treatment of the underlying problem was addressed (e.g., antibiotics for a cellulitis). Despite the high rate of use of some type of intervention for pain in this study, there was only a small decrease in the pain score by discharge which was nonsignificant ($p = .06$). This may in part be due to the low intensity of pain with scores on admission and discharge of the PAINAD ranging from 1.24 (SD = 1.42) to 1.10 (SD = 1.79) out of a total possible score from 0 to 10. Consequently, there was little room to improve or decrease the mean pain score. However, it is possible a more intensive focus on pain and pain management such as done in the Montoro-Lorite study may be needed to affect pain over time (Montoro-Lorite et al., 2020).

The most commonly used pharmacologic intervention in this study was acetaminophen which is recommended by most guidelines for older adults as the safest pharmacologic alternative (Girard et al., 2019; Levenson & Resnick 2022). We did not collect total daily dosages given but dosages in excess of 4,000 mg per day should be avoided (AAC, 2021). There is limited evidence to indicate that older adults are more likely than younger adults to develop acetaminophen-induced hepatotoxicity. However, for older individuals with decreased hepatic phase II metabolism there is an increased risk of hepatotoxicity (Bauerlein et al. 2021).

The sample size and specific use of different approaches in this study was too small to test for the effectiveness of each approach. There have been integrative and systematic reviews evaluating the effectiveness of specific nonpharmacologic interventions in older adults living with dementia in nursing homes (Shropshire et al., 2018), in the community (Saravanan et al., 2022) or for those with specific disease states such as osteoarthritis (Zhang et al., 2019). These reviews supported the value of use of nonpharmacologic interventions considered in this study. Consistent with what was noted in the current study, repeated physical activity (including simple stretching, walking, or specific exercise programs such as yoga), as well as positioning, were the most commonly utilized nonpharmacologic approaches and were believed to be effective approaches to management of pain among older adults (Montoro-Lorite et al., 2020; Saravanan et al., 2022; Shropshire et al., 2018; Zhang et al., 2019). Future research needs to continue to carefully control for other factors and consider the effect of specific non-pharmacologic interventions on pain. Conversely, it may be more useful to take a person-centered approach and offer a variety of non-pharmacologic interventions and match preferences or responses to the individual.

Limitations

This study was limited by a relatively small sample size from only seven hospitals in two states and due to the inclusion of observational data from medical records, verbal reports, and direct observation of use of nonpharmacologic interventions which may have resulted in inflated reports. Pain was only collected at two time points, admission and discharge, and there may have been some regression to the mean by discharge and an expected decrease in pain as the acute clinical issue was resolved. As this was a descriptive study it is impossible to assume causation and that the interventions implemented helped to manage the pain. Although data on interventions used were obtained the following additional data were not collected: (1) the specific dosages of as needed pain medications given and/or the frequency and length of time of use of the nonpharmacologic interventions; (2) the immediate effect of any specific intervention (e.g., evaluating if heat helped decrease pain at the time it was provided); (3) what activity was being done by the patient at the time of the pain assessment; or (4) the diagnosis of the pain or if a pain diagnosis was established and treated. Future research should consider obtaining this level of detail.

Conclusion

Despite the noted study limitations, this study provides useful descriptive information about pain and use of pain interventions among hospitalized older adults living with dementia. Although causation cannot be established, the findings suggest that the majority of patients living with dementia in this study were being treated for pain. Future research should consider exploring the details and effect of pain treatment and help assure that all hospitalized patients living with dementia are evaluated for pain and that appropriate interventions are used to best manage pain among these individuals.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.pmn.2022.12.010.

References

- Acetaminophen Awareness Coalition (AAC). (2021). What your patients need to know. Retrieved November, 2022 from <https://www.knowyourdose.org/what-your-patients-need-to-know/>.
- Achterberg, W., Erdal, A., Husebo, B., Kunz, M., & Lautenbacher, M. (2021). Are chronic pain patients with dementia being undermedicated? *Journal of Pain Research*, 14, 431–439.
- Adeleke, B. L., Yahya, W. B., & Usman, A. (2015). A comparison of some test statistics for multivariate analysis of variance model with non-normal responses. *Journal of Natural Sciences Research*, 5(15), 2224–3186.
- Agit, A., Balci, C., Yavuz, B., Cankurtaran, E., Kuyumcu, M., Halil, M., Ariogul, S., & Cankurtaran, M. (2018). An iceberg phenomenon in dementia: Pain. *Journal of Geriatric Psychiatry and Neurology*, 31(4), 186–193.
- Bauerlein, D. K., Williams, A. P., & John, P. R. (2021). Optimizing acetaminophen use in patients with risk factors for hepatotoxicity: reviewing dosing recommendations in adults. *Pain Medicine*, 22(7), 1469–1472.
- Boltz, M., Resnick, B., Kuzmik, A., Mogle, J., Jones, J. R., Arendacs, R., BeLue, R., Caccione, P., & Galvin, J. (2021). Pain incidence, treatment, and associated symptoms in hospitalized persons with dementia. *Pain Management Nursing*, 22(2), 158–163.
- Chow, S., Chow, R., Lam, M., Rowbottom, L., Hollenberg, D., Friesen, E., Nadalini, O., Lam, H., DeAngelis, C., & Herrmann, N. (2016). Pain assessment tools for older adults with dementia in long-term care facilities: A systematic review. *Review of Neurodegenerative Disease Management*, 6(6), 525–538.
- de Williams, A. C., Fisher, E., Hearn, L., & Eccleston, C. (2020). Psychological therapies for the management of chronic pain (excluding headache) in adults. *Cochrane Database and Systematic Review*, 8(8) CD007407.
- Feast, A., White, N., Lord, K., Kupeli, N., Vickerstaff, V., & Sampson, E. L. (2018). Pain and delirium in people with dementia in the acute general hospital setting. *Age and Ageing*, 47(6), 841–846.

- Galik, E., Resnick, B., Mocci, E., Renn, C., Song, Y., & Dorsey, S.A. (2023). Transcriptional profiling identified pain-specific changes in whole blood that are distinct from changes related to dementia in older adults. (Under review).
- Galvin, J. E., Roe, C. M., Powlishta, K. K., Coats, M. A., Muich, S. J., Grant, E., Miller, J. P., Storandt, M., & Morris, J. C. (2005). The AD8, a brief informant interview to detect dementia. *Neurology*, *65*(4), 559–564.
- Geneen, L. J., Moore, R. A., Clarke, C., Martin, D., Colvin, L. A., & Smith, B. H. (2017). Physical activity and exercise for chronic pain in adults: An overview of Cochrane Reviews. *Cochrane Database and Systematic Review*, *1*(1), Article CD011279.
- Girard, P., Sourdet, S., Cantet, C., de Souto Barreto, P., & Rolland, Y. (2019). Acetaminophen safety: Risk of mortality and cardiovascular events in nursing home residents, a prospective study. *Journal of the American Geriatrics Society*, *67*(6), 1240–1247.
- Graham, F., Fielding, E., & Beattie, E. (2022). The role of experiential knowledge in hospital nurses' management of pain-related agitation in people with dementia: An expert performance simulation study. *International Journal of Nursing Studies* Advance online publication. <https://doi.org/10.1016/j.ijnurstu.2021.104160>.
- Harmon, J., Summons, P., & Higgins, I. (2019). Experiences of the older hospitalised person on nursing pain care: An ethnographic insight. *Journal of Clinical Nursing*, *28*(23/24), 4447–4459.
- Levenson, S., & Resnick, B. (2021). The AMDA Pain CPG: A different kind of trustworthy clinical guideline. *Journal of the American Medical Directors Association*, *22*(12), 2405–2406.
- Lichtner, V., Dowding, D., Esterhuizen, P., Closs, S. J., Long, A. F., Corbett, A., & Briggs, M. (2014). Pain assessment for people with dementia: A systematic review of systematic reviews of pain assessment tools. *BMC Geriatrics*, *14*, 138.
- Mart, M. F., Roberson, S. W., Salas, B., Pandharipande, P. P., & Ely, E. W. (2021). Prevention and management of delirium in the intensive care unit. *Seminars in Respiratory & Critical Care Medicine*, *42*(1), 112–126.
- Minaya-Freire, A., Ramon-Aribau, A., Pou-Pujol, G., Fajula-Bonet, M., & Subirana-Casacuberta, M. (2020). Facilitators, barriers, and solutions in pain management for older adults with dementia. *Pain Management Nursing*, *21*(6), 495–501.
- Montoro-Lorite, M., Risco, E., Canalias-Reverter, M., Rodríguez-Murillo, J. A., García-Pascual, M., & Zabalegui, A. (2020). Integrated management of pain in advanced dementia. *Pain Management Nursing*, *21*(4), 331–338.
- Morley, J., & Tumosa, N. (2002). Saint Louis University Mental Status Examination (SLUMS). *Aging Successfully*, *12*(1), 4.
- Mosele, M., Inelmen, E. M., Toffanello, E. D., Girardi, A., Coin, A., Sergi, G., & Manzano, E. (2012). Psychometric properties of the pain assessment in advanced dementia scale compared to self assessment of pain in elderly patients. *Dementia and Geriatric Cognitive Disorders*, *34*(1), 38–43.
- Natavio, T., McQuillen, E., Dietrich, M. S., Wells, N., Rhoten, B. A., Vallerand, A. H., & Monroe, T. B. (2020). A comparison of the Pain Assessment Checklist for Seniors with Limited Ability to Communicate (PACSLAC) and Pain Assessment in Advanced Dementia Scale (PAINAD). *Pain Management Nursing*, *21*(6), 502–509.
- Ngu, S. S. C., Tan, M. P., Subramanian, P., Rahman, R. A., Kamaruzzaman, S., Chin, A. V., Tan, K. M., & Poi, P. J. H. (2015). Pain assessment using self-reported, nurse reported and observational pain assessment tools among older individuals with cognitive impairment. *Pain Management Nursing*, *16*(4), 595–601.
- O'Bryant, S. E., Waring, S. C., Cullum, C. M., Hall, J., Lacritz, L., Massman, P. J., Lupo, P., Reisch, J. S., & Doody, R. Texas Alzheimer's Research Consortium. (2008). Staging dementia using Clinical Dementia Rating Scale sum of boxes scores. *Archives of Neurology*, *65*(8), 1091–1095.
- Pfeffer, R. I., Kurosaki, T. T., Harrah, C. H., Chance, J. M., & Filos, S. (1982). Functional Activities Questionnaire (FAQ, PFAQ). APA Psychiatric Tests. Retrieved November, 2022, from <https://doi.org/10.1037/t04022-000>.
- Resnick, B., Gruber-Baldini, A., Aboff-Petzer, I., Galik, B., Russ, K., & Zimmerman, S. (2007). Reliability and validity of the evaluation to sign consent measure. *The Gerontologist*, *47*(1), 69–77.
- Resnick, B., Van Haitsma, K., Kolanowski, A., Galik, E., Boltz, M., Ellis, J., Behrens, L., Eshraghi, K., Renn, C. L., & Dorsey, S. G. (2021). Invariance of the PAINAD scale between the Black and White residents living with dementia. *Frontiers in Pain Research (Lausanne)*, *2*, Article 757654.
- Sampson, E. L., White, N., Lord, K., Leurent, B., Vickerstaff, V., Scott, S., & Jones, L. (2015). Pain, agitation, and behavioural problems in people with dementia admitted to general hospital wards: A longitudinal cohort study. *Pain*, *156*(4), 675–683.
- Saravanan, A., Reagan, L., Rivera, R., Challa, N., Lankipalle, N., Reddy Sareddy, V. R., & Starkweather, A. (2022). Social determinants and comorbidities in non-pharmacological interventions for chronic pain in community-dwelling older adults: A scoping review of randomized controlled trials. *Geriatric Nursing*, *45*, 205–214.
- Schofield, P., & Abdulla, A. (2018). Pain assessment in the older population: What the literature says. *Age and Ageing*, *47*(3), 324–327.
- Shepherd, H., Livingston, G., Chan, J., & Sommerlad, A. (2019). Hospitalisation rates and predictors in people with dementia: A systematic review and meta-analysis. *BMC Medicine*, *17*(1), 130.
- Shropshire, M., Stapleton, S. J., Dych, M. J., Kim, M., & Mallory, C. (2018). Nonpharmacological interventions for persistent, noncancer pain in elders residing in long-term care facilities: An integrative review of the literature. *Nursing Forum*, *53*(4), 538–548.
- Veal, F., Williams, M., Bereznicki, L., Cummings, E., Thompson, A., Peterson, G., & Winzenberg, T. (2018). Barriers to optimal pain management in aged care facilities: An Australian qualitative study. *Pain Management Nursing*, *19*(2), 177–185.
- Veehof, M. M., Oskam, M. J., Schreurs, K. M. G., & Bohlmeijer, E. T. (2011). Acceptance-based interventions for the treatment of chronic pain: A systematic review and meta-analysis. *Pain*, *152*(3), 533–542.
- Warden, V., Hurley, A. C., & Volicer, L. (2003). Development and psychometric evaluation of the pain assessment in advanced dementia (PAINAD) Scale. *Journal of the American Medical Directors Association*, *4*(1), 9–15.
- Zhang, Q., Young, L., & Li, F. (2019). Network meta analysis of various nonpharmacological interventions on pain relief in older adults with osteoarthritis. *American Journal of Physical Medicine & Rehabilitation*, *98*(6), 469–478.