



Aspen Regional Health

**Pain and Aggression in Cognitively Impaired Institutionalized Individuals**

*Literature Review Final Report*

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September 25, 2006

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## **EXECUTIVE SUMMARY**

### **PAIN AND AGGRESSION IN COGNITIVELY IMPAIRED INSTITUTIONALIZED INDIVIDUALS**

Systematic Review of the Literature

Camille Poulin B.Sc.P.T.

Sept 25, 2006

#### **CONTEXT & PURPOSE:**

Westlock Continuing Care Center's interdisciplinary care team identified aggressive behaviors of cognitively impaired individuals as a quality of life and care issue for many residents, families and caregivers of their facility. Despite thorough investigation and treatment, care teams were unable to ameliorate or explain the aggressive behavior for a number of residents. Nursing theory supports that these residents may behave in an aggressive manner as a response to pain as has been described in the needs-driven, dementia-compromised behavior model(7).

The purpose of the systematic review of the literature was to determine if the presence of pain increased the incidence of aggression among cognitively impaired individuals.

#### **QUESTION:**

Among cognitively impaired institutionalized individuals does the presence of pain increase the incidence of aggression?

#### **SYSTEMATIC REVIEW OF THE LITERATURE:**

The literature review was conducted between November 15, 2005 and March 6, 2006. A total of 21 articles were obtained by searching CINAHL, Ovid, PubMed, Cochrane, Pedro, and EBSCO bibliographic databases, Theses Canada, Clinical Practice Guidelines databases, Grey Literature using Google, and a variety of Continuing Care related websites. After comprehensive analysis, a total of 5 articles were deemed appropriate for use in forming clinical and management recommendations for our care teams.

#### **FINDINGS:**

The evidence supports the existence of a relationship between pain and aggression in late stage dementia. Late stage dementia symptoms of both pain and aggression respond favorably to analgesics (6, 15). When multidisciplinary care teams address residents' pain, they also decrease aggressive behaviors. The implications: residents can be made more comfortable and less distressed by using analgesics.

## **RECOMMENDATIONS:**

Based on the systematic review of the literature the following care recommendations were developed:

1. Continue providing comprehensive multidisciplinary assessment and treatment for Continuing Care residents. In addition, regularly administer pain assessments designed for cognitively impaired individuals. Improved recognition of pain will allow prompt treatment and result in fewer episodes of aggressive behavior.
2. Consider pharmacological treatment with analgesics for cognitively impaired residents exhibiting aggressive behavior. Importantly, comprehensive resident assessment as in recommendation 1 will not only enable appropriate treatment of resident concerns but also prevent widespread, indiscriminant use of analgesics for pain and aggression. The review of the literature notes that clinical pharmacological studies are not finalized; multidisciplinary care teams will need to evaluate the potential use of analgesic medication on an individual client basis.
3. Institute analgesic pharmacological measures as in recommendation 2 prior to psychotropic medication trial as dictated by the multidisciplinary assessment. The appropriate assessment and treatment of pain may reduce the need for psychotropic medications which often carry significant side effects for elderly residents.
4. Implement outcome measures designed to assess cognitively impaired residents' pain and aggressive behaviors. Outcome measures used to evaluate treatment options for pain and aggression will inform the adaptation of individual resident care plans.

Administrative considerations:

1. Monitor that continued comprehensive multidisciplinary assessments occur to prevent indiscriminant use of analgesics.
2. Evaluate outcomes related to use of analgesics. Monitor case studies, system wide outcome indicators, and local site implementation successes/barriers.

The following comprehensive report details the foundations of the project, the project history and process (to ensure reproducibility and unbiased approach), and the project results placed in context of Aspen Regional Health Authority's Continuing Care Center environments.



## **Pain and Aggression in Cognitively Impaired Institutionalized Individuals**

### *Literature Review Final Report*

Camille Poulin B.Sc.P.T., Aspen Regional Health Authority, Westlock

#### **Question:**

Among cognitively impaired institutionalized individuals does the presence of pain increase the incidence of aggression?

#### **Context:**

Aggression in cognitively impaired institutionalized individuals is currently a pervasive local, national and international problem. Residents of Aspen RHA Continuing Care Centers display typical late stage dementia symptoms and behaviors including agitation and aggression (1). Family members and Aspen RHA caregivers working with residents in Continuing Care facilities encounter agitated or aggressive resident behaviors on a regular basis; though aggressive incidents are not widely tracked in Aspen RHA, one 75-bed facility noted 118 incidents of aggression using a Behavior Log over a ten month period from October 2004 – July 2005.

From a national perspective, the estimated number of Canadians with Alzheimer's disease is 300,000 to 400,000(2); estimates put new cases of dementia at 60,150 per year (3). Provincially, in the year 2000, 24,040 Albertans 65 years of age and older were estimated to have a diagnosis of Alzheimer's disease or dementia (McDowell 2001 cited in (4)).

In addition, International research studies note the prevalence of dementia in nursing homes ranges from 40 – 78% with over 40% of residents being affected by aggression; other researchers note the prevalence of aggressive behavior to be 74 – 96% for nursing home residents(5). International researchers note the prevalence of pain in nursing homes to be high at 45 – 84% (6).

## Background

Terms or phrases such as ‘resistive to care’, ‘agitated’, or ‘aggressive’ are often used in describing the behavior of late stage dementia residents. The terms ‘agitation’ and ‘resistance to care’ do not carry the same stigma for residents, care teams, and families as does the term ‘aggression’. For the purposes of this review, the term aggression was chosen as it is the most disturbing of the physical behaviors displayed by our residents. Oh (5) notes that researchers have not yet reached consensus on a definition of aggressive behavior. Aggressive behavior has been described as “a hostile action directed toward other persons or objects or toward oneself.” (Ryden1988 cited in (5)). A normally gentle person that is diagnosed with dementia may suddenly be observed striking out at caregivers or family members. Caregivers may regularly experience resident attempts to kick, hit, scratch, or bite them; aggression accurately describes these unfortunate late stage dementia symptoms.

Multidisciplinary team members working with residents who have late stage dementia encounter residents who cannot reliably communicate their needs or reasons for their current behavioral state. Continuing Care residents benefit from detailed multidisciplinary assessments of their physical, emotional, social, cognitive, physiological, and disease states. For residents with aggressive behaviors, this detailed assessment allows care teams to accurately document and analyze the late stage dementia presentation and its care-related implications. Multidisciplinary assessments typically include some or all of the following findings:

- Residents demonstrate unprovoked aggressive behaviors during daily care routines especially during peri-care
- Residents suffer from co-morbidities such as, but not limited to, Arthritic conditions, Peripheral Vascular Disease, Diabetes, Heart disease, Chronic Obstructive Pulmonary Disease, and Stroke
- Residents exhibit limited ability to provide subjective or historical medical data to team members, vocalize and direct caregivers in treatment or care situations, and respond to verbal cues that ask for movement or relaxation
- Residents exhibit resistance to movement that may be triggered by fatigue, an altered level of consciousness, the type of care activity taking place (especially peri-care), or the time of day; alternately, resistance to movement may have no apparent trigger
- Assisting residents to dress or wash often requires the assistance of two caregivers and approximately double the time to accomplish the task; in addition, applying very slow, careful passive motion against the resistance is physically taxing for both residents and caregivers. Regular Physiotherapy passive range of motion and stretching does not change the resistance to movement
- Residents exhibit occasional, unpredictable ‘calling out’ or yelling behavior
- Psychotropic medications have variable success in mediating the abovementioned resident behaviors and often leave residents ‘snowed’

- Staff report injuries or near misses associated with aggressive residents' behaviors

Following assessment and analysis, multidisciplinary care teams offer residents treatment interventions aimed at the appropriately diagnosed physical, emotional, social, cognitive, physiological, and disease state problems. In addition, environmental or situational triggers for residents' aggressive behavior are evaluated and modified as able. Despite thorough investigation and treatment, care teams are unable to ameliorate or explain the aggressive behavior for a number of remaining residents. Nursing theory supports that these residents may behave in an aggressive manner as a response to pain as has been described in the needs-driven, dementia-compromised behavior model(7).

## **Purpose**

The purpose of our systematic review of the literature is to determine if the presence of pain increases the incidence of aggression among cognitively impaired individuals. Specifically, our question is:

Among cognitively impaired institutionalized individuals does the presence of pain increase the incidence of aggression?

## **Literature Identification and Selection:**

### *Search strategy:*

CINAHL, Ovid, PubMed, Cochrane, Pedro, and EBSCO databases were searched between November 15, 2005 and March 6, 2006. These databases represented good sources of filtered and/or bibliographically indexed clinical evidence that were most likely to contain articles related to the research question. Pedro was chosen for its rehabilitation focus. Grey literature (Theses Canada, Google) and clinical practice guidelines (Google, NICE, National Guideline Clearinghouse) were also searched as there was potential for unpublished studies or clinical practice guidelines to provide appropriate evidence related to the research question.

### *MeSH terms*

MeSH terms were searched related to terms appearing in the research question. For 'aggression', the MeSH terms aggression, violence, and dangerous behavior were found to be most relevant. For 'cognitively impaired', MeSH terms most relevant were dementia and Alzheimer Disease. For 'pain', pain or pain threshold were used. For 'institutionalized', nursing home or institutionalization were used. *Table 1* details other possible terms identified. Only the key MeSH terms were used in the literature search.

*Table 1 MeSH terms identified:*

Key MeSH terms	<ul style="list-style-type: none"> <li>• Group 1: Pain or Pain threshold,</li> <li>• Group 2: Alzheimer Disease or Dementia</li> <li>• Group 3: Aggression or Violence or Dangerous Behavior</li> <li>• Group 4: Institutionalization or Nursing Home</li> </ul>
Additional MeSH terms	Cognition disorders; Cognitive disorders; Psychomotor disorders; Delirium; Amnesic; Dementia, vascular; Dementia, multi-infarct; Behavior; Agonistic Behavior; Impulsive Behavior; Psychomotor Agitation; Wounds and injuries; Patient acceptance of health care
Additional non-MeSH terms	Staff injury Resistance to care

Search terms were divided into four groups as described above in Key MeSH terms section.

CINAHL, Ovid, PubMed, Cochrane, Pedro, and EBSCO Databases were searched combining terms in each group with OR and combining groups 1, 2, 3, and 4 with AND. When databases would not perform OR/AND functions concurrently as described, the search was broken up into smaller sections and performed as group 1 and 2, 1 and 3, 2 and 3. If greater than 100 results were found, group 4 was added with AND to limit the results to pertinent articles. 289 articles were retrieved. After viewing titles, 16 abstracts were obtained.

When searching Theses Canada, terms could not be searched combined in groups. 5 searches were completed using AND in combinations of four terms: one term from each group; all terms except 'pain threshold' and 'dangerous behavior' were combined. 'Pain threshold' and 'dangerous behavior' were excluded as no results were obtained in the first 5 searches with the more common terms 'pain', 'violence' and 'aggression'. No results were obtained.

Grey Literature was searched twice using Google. The first search was unsuccessful, finding only 33 articles, as time limited thorough combinations of search terms. Grey Literature was re-searched using Google as follows: Combinations of groups 1 and 2, 1 and 3, 1 and 4, 2 and 3, 2 and 4, and 3 and 4 were searched. The first 30 internet addresses were viewed for each combination. Pertinent websites were then searched using the same combinations within the website - groups 1 and 2, 1 and 3, 1 and 4, 2 and 3, 2 and 4, and 3 and 4. 936 information resources were available from eight websites using this search strategy. One sub-search in a website revealed 648 information resources; the first 30 of these 648 resources were viewed and all dealt with the topic of placing family members into institutionalized care; therefore, the following 618 were not viewed. A total of 318/936 information resources were viewed; five were kept after viewing the titles. Three of the five resources were clinical practice guidelines.

The World Health Organization Health Evidence Network was searched specifically as the reviewer had prior knowledge of the site's documents/resources. After 3 searches, it was apparent that all resources were policy based and not directed toward clinical questions. No results were obtained.

Clinical Practice Guidelines search strategies were varied as clinical practice guidelines contained more specific, clinically based terms such as 'elderly', 'clinical practice guidelines', and 'long term care', as well as some of the initially identified MeSH terms: 'pain', 'dementia', and 'aggression'. Some websites/databases catalogued Clinical Practice Guidelines by topic; these websites/databases would allow viewing of clinical practice guidelines by topic but would not allow searching by terms. Where possible, search terms were used but were limited to 'pain AND dementia' and 'pain AND aggression'. Alberta Long Term Care Association, Alberta Gerontological Nurses Association, and Alberta Caregiver's Association, were also searched for clinical practice guidelines. No clinical practice guidelines were found using the above search strategies.

A total of 16 articles were obtained using the bibliographic databases as described above. A total of 5 articles were obtained in a search of the grey literature. These 21 article abstracts were reviewed using the following inclusion/exclusion criteria. Search results were recorded in Appendix A.

*Inclusion and Exclusion Criteria:*

In order to select articles relevant to Aspen RHA's local context, the following inclusion and exclusion criteria were formulated:

*Inclusion Criteria*

1. Studies must be in English
2. Studies must involve human subjects
3. Studies must have been completed between 2000 – 2005.
4. Studies must include at least one term from each of the 4 columns below in title or abstract

Column 1	Column 2	Column 3	Column 4
Pain Pain threshold	Nursing home Institutionalization	Dementia (including vascular and multi-infarct) Alzheimer disease Cognitive Disorders Delirium Amnestic Psychomotor disorders	Aggression Violence Dangerous behavior Agitation Impulsive behavior Resistance to care Patient acceptance of health care Injuries Agonistic behavior

**Exclusion Criteria**

1. Articles focusing on diseases such as Huntington’s Chorea that regularly have aggression as one of their presenting clinical factors.
2. Articles focusing on psychiatric diagnoses that regularly have aggression or agitation as one of their presenting clinical factors
3. Community based samples

The literature search focused on recent articles from 2000 – 2005 to provide a current state of evidence. After application of the inclusion and exclusion criteria, eight articles were chosen for review (*Table 2 – Inclusion/Exclusion of Articles*). Exclusion criteria were only applied to articles that met ALL inclusion criteria.

**Table 2 – Inclusion/Exclusion of Articles**  
**Inclusion Criteria**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
English	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
human subjects	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2000 – 2005	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Column 1	√	x	√	√	√	x	√	√	√	x	√	√	√	√	x	√	√	√	x	x	√
Column 2	√	√	√	√	√	x	√	√	√	x	√	√	x	x	x	x	√	√	√	√	x
Column 3	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Column 4	√	√	x	√	√	x	x	√	√	x	√	√	√	√	√	√	√	x	√	√	x

**Exclusion Criteria**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Articles focusing on diseases such as Huntington’s Chorea that regularly have aggression as one of their presenting clinical factors.	x			x	x			x	x		x	x						x			
2. Articles focusing on psychiatric diagnoses that regularly have aggression or agitation as one of their presenting clinical factors	x			x	x			x			x	x						x			
3. Community based samples	x			x	x			x			x	x						x			
4. Articles focusing only on pain assessment	x			x	x			x			x	x						x			
5. Articles focusing only on pain treatment.	x			x	x			x			x	x						x			
6. Editorial comments.	x			x	x			x			x	x						x			
7. Poster presentations.	x			x	x			x			x	x						x			

After the first reading, two articles were excluded(8, 9). The two secondarily excluded articles did not contain abstracts or a clear statement of research design though their titles included the terms 'clinical practice guideline'. Despite containing all the relevant inclusion criteria in the body of the excluded articles, they were found to be protocols based on an unsystematic selection of articles.

The six remaining articles were analyzed; included in this analysis was a review of all six articles' related references. From these 'snowball' references, eleven references were identified as potentially relevant. Upon review of the abstracts, three articles were identified as relevant despite two of them not meeting the inclusion criteria for being published after 2000. Only two of the three were able to be retrieved; the third (10)was unattainable despite efforts to contact the Senior Vice-President, Group Publisher for the journal supplement. The remaining two articles were analyzed (11, 12).

A total of eight articles were selected for use in this review of the literature (*Table 3 – Article Summary*).

*Table 3 Article Summary*

Article	Search source	Study design
1. Buffum MD, Miaskowski C, Sands L and Brod M. A pilot study of the relationship between discomfort and agitation in patients with dementia. <i>Geriatr Nurs</i> 2001;22(2):80-5. (13)	Obtained in initial search	Descriptive study
2. Chibnall JT, Tait RC, Harman B and Luebbert RA. Effect of acetaminophen on behavior, well-being, and psychotropic medication use in nursing home residents with moderate-to-severe dementia. <i>J Am Geriatr Soc</i> 2005;53(11):1921-9. (14)	Obtained in initial search	Randomized, Double Blind Placebo Controlled Crossover Pharmacological study
3. Cohen-Mansfield J, Billig N, Lipson S, Rosenthal AS and Pawlson LG. Medical correlates of agitation in nursing home residents. <i>Gerontology</i> 1990;36(3):150-8. (11)	Obtained as a 'snowball' reference	Population based study
4. Douglas MK, DNSc RN FAAN, Principal Investigator Department of Veterans Affairs. Pain Management and Behavioral Outcomes in Patients With Dementia. 2001;Trials register number: NCT00012857. (15)	Obtained in initial search	Randomized, Double Blind Placebo Controlled Crossover Pharmacological study
5. Dunn JC, ThiruChelvam B and Beck CHM. Interdisciplinary care. Bathing: pleasure or pain? <i>J Gerontol Nurs</i> 2002;28(11):6-13. (16)	Obtained in initial search	Crossover Observational study
6. Feldt KS, Warne MA and Ryden MB. Examining pain in aggressive cognitively impaired older adults. <i>J Gerontol Nurs</i> 1998;24(11):14-22. (12)	Obtained as a 'snowball' reference	Descriptive study
7. Grossberg, GT et al. Pain and Behavioral Disturbances in the Cognitively Impaired Older Adult: Assessment and Treatment Issues. Meeting Reporter, Supplement to <i>Annals of Long-Term Care</i> 2000. (10)	<b>Unable to obtain</b>	N/A
8. Manfredi PL, Breuer B, Wallenstein S, Stegmann M, Bottomley G and Libow L. Opioid treatment for agitation in patients with advanced dementia. <i>Int J Geriatr Psychiatry</i> 2003;18(8):700-5. (6)	Obtained in initial search	Pharmacological study with an Observational Crossover design using a Purposive sample
9. Oh H, Eom M and Kwon Y. A study on aggressive behavior among nursing home residents with cognitive impairment. <i>Daehan Ganho Haghoeji</i> 2004;34(8):1451-9. (5)	Obtained in initial search	Descriptive study

## Data Extraction and Summary

Data was extracted from each article using the template in Appendix B. Handwritten notes established the information base used for critical appraisal of each article. Study designs are noted in *Table 3 - Article Summary*; there was 1 population based study, 3 descriptive studies, 2 pharmacological studies with randomized, double blind placebo controlled crossover design, 1 crossover observational study, and 1 pharmacological study with observational crossover design.

For each article, the Findings, Internal Validity and External Relevance were evaluated. Studies were critically appraised by examining for thoroughness of reporting, reliability and validity of measuring tools as used in the clinical research settings, independence of measuring tools used in the clinical research settings, study flaws/stated limitations in methodology, and limitations of the studies related to the population being studied. Articles were rated as weak, moderate, good or a combination of these terms as noted in *Table 4 - Reviewer summary of data*. Detailed results of the critical appraisal can be found in Appendix C.

*Table 4 - Reviewer summary of data*

Date	Relationships Exist Between:		Date	Drug studies:	
1990 Cohen- Mansfield (11)	Cognitive Impairment, Agitation, and Aggression <b>Regression analysis</b>	IV: Moderate ER: Moderate			
1998 Feldt (12)	Painful Conditions and Aggression specifically arthritis and physically aggressive behaviors <b>T-tests</b>	IV: Mod → Good ER: Good			
2001 Buffum (13)	Discomfort and Severity of dementia Discomfort and Aggression <b>Regression analysis</b>	IV: Moderate ER: Moderate			
2001 Douglas (15)	Agitated Behaviors and Severity of Dementia Agitated Behaviors and Pain <b>Regression analysis implied</b> (sparse data details – unpublished study)	IV: Moderate ER: Moderate	2001 Douglas (15)	Agitation decreases with acetaminophen <b>Regression analysis implied</b> (sparse data details – unpublished study)	IV: Moderate ER: Moderate
			2003 Manfredi (6)	Decrease in agitation may be a direct opioid effect on patient's behavior, an analgesic action that decreases the agitated behaviors by making patients more comfortable or a combination of these 2 effects. <b>Regression analysis</b>	IV: Good ER: Good
2004 Oh (5)	Aggression, Pain, Length of Nursing Home Stay and Cognitive Impairment <b>T- tests</b>	IV: Mod → Weak ER: Mod → Weak			
			2005 Chibnall (14)	Agitation and medication use outcomes indicate that those with less agitation do not respond to acetaminophen. <b>Regression analysis</b>	IV: Moderate ER: Moderate → Weak

IV: internal validity ER: external relevance

Studies were evaluated in chronological order to determine if researchers were aware of and sensitive to real-time research developments in the subject being studied. In addition, studies were divided into two groups: those looking at the relationships between pain and aggression and pharmacological studies. Douglas

(15) examined the relationship between pain and aggression using a pharmacological intervention; this study was included in both groups.

One article (16) was rejected after critical appraisal as it discussed a particular care option related to discomfort in bathing and was not applicable to the original question. Two additional articles utilizing t-tests instead of regression analysis were excluded (5, 12) as regression analysis provides stronger evidence of relationships between variables such as pain and aggression than the use of t-tests alone.

The five remaining articles were used in the **Analysis and Findings** section (6, 11, 13-15). Internal validity was rated as Moderate for four out of five studies and Good for one study. External relevance was rated as Moderate to Weak for one study, Moderate for three studies and Good for one study.

### **Analysis and Findings**

There is moderate strength of evidence to suggest that relationships exist between variables as follows:

- cognitive impairment, agitation, and aggression(11)
- discomfort and severity of dementia(13)
- discomfort and aggression(13)
- agitated behaviors and severity of dementia (15)
- agitated behaviors and pain (15)

There is moderate strength of evidence to suggest that acetaminophen decreases agitation for residents over 55 years of age with greater than 1 episode of agitation per day having a Global Deterioration Scale of 5.3 or greater(15).

There is good strength of evidence to suggest that opioids decrease agitation for residents over 85 years of age with greater than 1 episode of agitation per day having a MMSE score less than  $7.3 \pm 7.8$  (6).

There is moderate strength of evidence to suggest that residents with less than 1 episode of agitation per week 65 years of age or older having a Functional Assessment Stage of 5 or 6 experience no change in agitation after acetaminophen is administered(14).

These findings are significant to clients suffering from cognitive impairment, their families and their caregivers. The evidence supports the existence of a relationship between pain and aggression in late stage dementia. While studies demonstrate difficulty in defining or measuring the nature of this relationship the fact remains that late stage dementia symptoms of both pain and aggression respond favorably to analgesics (6, 15). The implications: residents can be made more comfortable and less distressed by using analgesics. Confirming the relationship between pain and aggression is significant as multidisciplinary care

teams have access to treatment interventions that can be aimed at decreasing pain. This literature review provides a preliminary look at the use of analgesics for pain and aggression symptoms in this population. However, application of the research findings is not limited to the use of analgesics; heat, cold, exercise, manual therapy, and electrical stimulation can also be used as multidisciplinary interventions for treating pain (17).

A general principle of pain treatment in clients with cognitive impairment emerges from this review of the literature; when multidisciplinary care teams address residents' pain, they also decrease aggressive behaviors. The resulting behavioral change corresponds to an increase in residents' quality of life, their families' peace of mind and their caregivers' safety.

## **Relevance**

### *Local Application of Findings*

This literature review supports the existence of a relationship between pain and aggressive behavior in cognitively impaired institutionalized individuals. *Table 5 - Study Sample Characteristics*, details characteristics of the final five study populations used to facilitate comparison with local Aspen RHA residents. Characteristics of the study populations are sufficiently similar to Aspen RHA Continuing Care resident characteristics to allow local application of research findings:

1. Aspen RHA Continuing Care residents exhibit a range of cognitive impairment; all studies described subjects with cognitive impairment (18-21).
2. Residents in Aspen RHA Continuing Care facilities exhibit late stage dementia symptoms and behaviors including aggression; 3 studies involved samples having a range of frequency of aggressive episodes from greater than one per day to less than one per week.
3. All studies were conducted in nursing home settings similar to Aspen Continuing Care facilities though most were situated in urban or suburban locations. Aspen RHA rural locations do not likely change care situations or cultures substantially.
4. Westlock Continuing Care Center's mean resident age is 84.9 years. This is within the standard deviation for the participants' mean age in each of the studies.
5. Study participants were predominantly female; 395 female subjects to 135 male subjects (2.9 female participants to 1 male participant). Westlock's gender distribution is similar: the Westlock CCC currently provides nursing care to 71 female and 29 male residents (2.4 female residents to 1 male resident).

Aspen RHA Continuing Care teams can apply the results of this review to the care of their residents with confidence.

Table 5 Study Characteristics

Study	Setting & Participants	Inclusion criteria	Exclusion criteria	Mean age	Group composition
Cohen-Mansfield 1990(11)	Large suburban nursing home  N: 316 female 92 male	Not stated	Age below 70 or over 99. Comatose states. Short-term admission status. Recent admission. Hospitalization.	85	Varying degree of physical disabilities and <b>all levels of cognitive decline.</b>
Buffum 2001 (13)	Urban, university affiliated 120 bed extended care facility.  N: 1 female 32 male	60 years of age or older. Diagnosis of dementia. At least one diagnosed painful condition. At least one reported agitated behavior seen once per day.	Not stated	78.5 ± 7.2	MMSE mean: 14 ± 9.6 <sup>‡</sup> Global Deterioration Scale mean: 4.8 ± 1.9 (very mild to severe dementia (21))
Douglas 2001 (15)	Participating centers: Jewish Home for the Aged in San Francisco; Golden Gate Healthcare Center in San Francisco; Palo Alto VA Health Care System; Nursing Home care Unit at Livermore.  N: 34 female 5 male	Greater than 55 years of age. Severe dementia. Documented painful condition not requiring opiates or a current medication regimen. Unable to report pain consistently or reliably. Be present and accept treatment. Greater than 1 episode of agitation per day.	Patients with schizophrenia or severe Parkinson's.	87.5 ± 7.9	MMSE mean 5.3 ± 5 <sup>‡</sup> . Global Deterioration Scale 5.7 ± 0.4 (moderate to severe dementia (21)).
Manfredi 2003 (6)	Nursing home with 1427 long-term beds and 202 sub-acute care beds.  N: Recruited subjects: 47. Subjects completing the study: 25 (22 female, 3 male)	MMSE < 21. Cohen-Mansfield Agitation Inventory score ≥ 40. At least one agitated behavior displayed more than once daily.	Many medical and physiological parameters related to opioid administration. Able to complain of pain. Patients with an obviously painful condition.	84.6 ± 7.0*	MMSE: 7.3 ± 7.8* <sup>‡</sup>

\*Numbers reported for 25 subjects who completed the study

‡ An MMSE score of 23 or less by an individual with more than 8 years of education may be considered evidence of cognitive impairment (18)

Table 5 Study Characteristics continued

Study	Setting & Participants	Inclusion criteria	Exclusion criteria	Mean age	Group composition
Chbinall 2005 (14)	250- and 143-bed nursing home facilities in the St. Louis, Missouri, metropolitan area.  N: 22 female 3 male	Moderate-to-severe dementia (Functional Assessment Staging 5 or 6). 65 years of age or older. Minimum time in nursing home of 3 months. Minimum of 2 months since dementia diagnosis.	Current prescription for routine acetaminophen or opioid analgesic. Psychosis or other severe mental disorder. Advanced, severe or unstable medical disease/disorder that could interfere with participation. Known allergy or adverse reaction to acetaminophen. Liver compromise, injury or disease or history of alcoholism. Renal compromise, injury or disease. Anemia. Current treatment with Warfarin or Phenobarbital. Other neurodegenerative disease/disorder including Parkinson's disease. Bed-ridden or comatose state. Current enrollment in another experimental protocol.	85.9 ± 7.4.	10 of 25 were fully ambulatory, 6 required assistance and 9 were non-ambulatory.  FAST stage 5 or 6: moderate to severe dementia (20).

## *Recommendations for Aspen RHA*

Based on the systematic review of the literature the following care recommendations were developed:

5. Continue providing comprehensive multidisciplinary assessment and treatment of residents' physical, emotional, social, cognitive, physiological, and disease state problems as well as environmental or situational triggers for residents' aggressive behaviors. In addition, regularly administer pain assessments designed for cognitively impaired individuals. Improved recognition of pain will allow prompt treatment and result in fewer episodes of aggressive behavior.
6. Following comprehensive assessment and treatment outlined in recommendation 1, consider pharmacological treatment with analgesics for cognitively impaired residents exhibiting aggressive behavior. Importantly, comprehensive resident assessment will not only enable appropriate treatment of resident concerns but also prevent widespread, indiscriminant use of analgesics for pain and aggression. Significant resident illness or injury could result if the use of analgesics masked a serious medical problem. The review of the literature notes that clinical pharmacological studies are not finalized; multidisciplinary care teams will need to evaluate the potential use of analgesic medication on an individual client basis.
7. Institute analgesic pharmacological measures as in recommendation 2 prior to psychotropic medication trial as dictated by the multidisciplinary assessment. The reviewer's experience in several Continuing Care settings in Alberta and Saskatchewan health regions is that psychotropic medications are utilized prior to appropriate pain assessment and treatment. While some residents' aggressive behaviors will ultimately require treatment with psychotropic medications, the appropriate assessment and treatment of pain may reduce the need for these drugs which often carry significant side effects for elderly residents.
8. Implement outcome measures designed to assess cognitively impaired residents' pain and aggressive behaviors. Outcome measures administered prior to and during any treatment intervention designed to decrease either pain or aggressive behaviors will allow individual resident care plans to be adapted. Interventions with either no effect or a negative outcome will be promptly discontinued while interventions with positive outcomes will be continued.

#### Administrative considerations:

3. Monitor that continued comprehensive multidisciplinary assessments occur to prevent indiscriminant use of analgesics.
4. Evaluate outcomes related to use of analgesics. Monitor case studies as well as system wide outcome indicators including incidence of aggressive behaviors and staff injuries related to aggression. Is there any difference in the outcomes across the region or between sites? Were there any unidentified barriers that prevented local application of the research findings?

#### Recommendations for further research include:

1. Determine if pain and aggression assessment tools can be sufficiently isolated from each other so as to be independent in their recognition of either pain or aggression.
2. Determine ideal analgesic dosages for this population and intervention.
3. Determine levels/frequencies/characteristics of aggression where analgesics have optimal effect.
4. Investigate other pharmacological measures that may be superior or alternative in treating pain and aggression symptoms in cognitively impaired individuals.

#### **Conclusion**

This literature review demonstrates a link between pain and aggression and, further, demonstrates that pharmacological measures can be offered as an intervention for residents suffering from moderate to severe dementia with greater than one incident of unmediated aggression per day. Regardless of the complex nature of interaction between pain and aggression, late stage dementia symptoms of pain and aggression respond favorably to analgesics(6, 15) used as part of comprehensive multidisciplinary team care. Decreased incidence of aggression stands to improve residents' quality of life and caregiver safety in Aspen RHA Continuing Care Centers.

## Dissemination

### *Early Dissemination Plan (June 2005 – December 2005)*

1. Develop research question in conjunction with local care team.
2. Present poster of research question and process to involved staff, clients, and families.
3. Collect input regarding research question and related areas – keep track of comments and categories of influence to aid search (i.e. search terms)

### *Middle Dissemination Plan (October 2005 – June 2006)*

4. Perform literature review
5. Give regular updates to stakeholders throughout the process by use of a bulletin board and month end reports to site management

### *Later Dissemination Plan (June 2006 – June 2007)*

6. Present draft results to stakeholders to ensure process of analyzing results is holistic
7. Complete poster and literature review paper
8. Present poster, literature review paper, and recommendations to Area 2 Community Services Supervisor and Manager and Site Supervisor, Westlock Continuing Care Center
9. Refine recommendations based on feedback from supervisors and managers
10. Develop multimedia presentation materials for the varied needs of the following groups:
  - a. Senior Management Team Aspen RHA including Regional Rehab Coordinator and Regional VP for Continuing Care
  - b. Continuing Care facilities throughout Aspen RHA
  - c. Regional Quality Council
  - d. Regional Accreditation Team in Continuing Care
  - e. Local caregiver support groups – invite family members of clients with dementia/CI from local health care programs (LTC, AC, DSS)
  - f. Alberta Association of Caregivers
  - g. Health Quality Council of Alberta
  - h. SEARCH V cohort
  - i. SEARCH conference and forum
  - j. Aspen RHA OH & S, Employee Wellness groups
  - k. Alzheimer Society of Alberta and Northwest Territories

and present to groups individually or in networks.

## Appendix A - Record of Searches

Record of searches for systematic review of the literature regarding following question:

### **Among cognitively impaired institutionalized individuals does the presence of pain increase the incidence of aggression?**

Camille Poulin B.Sc.P.T. Aspen Regional Health Authority

Search terms – 9 terms total

Group 1	Group 2	Group 3	Group 4
p=pain pt=pain threshold	AD=Alzheimer's Disease d=dementia	a=aggression db=dangerous behavior v=violence	nh=nursing home i=institutionalization

Date	Database	Search terms and conditions	Results
November 15, 2005	Cinahl through OVID	pain or pain threshold AND Alzheimer Disease or dementia AND aggression or violence or dangerous behavior; no limits applied; nursing home or institutionalization was added and no additional search results were found	1
November 15, 2005	PubMed	pain or pain threshold AND alzheimer or dementia All Fields, Limits: Middle Aged + Aged: 45+ years, Publication Date from 2000/01/01 to 2005/11/15, English, Review, Humans AND aggression; no additional references found with violence or dangerous behavior used as search terms instead of aggression; no further references found by adding institutionalization as a search term	1
November 15, 2005	EBSCO Biomedical Reference Collection: Comprehensive	alzheimer disease or dementia AND nursing home or institutionalization AND violence or aggression or dangerous behavior AND pain or pain threshold; limits were: references available, peer review journal, January 2000 – November 2005, also search for: related words and within full text of articles	1
November 16, 2005	EBSCO Nursing And Allied Health Collection: Comprehensive	pain or pain threshold AND nursing home or institutionalization AND aggression or violence or dangerous behavior AND dementia or alzheimer disease; limits used: peer reviewed journal, January 2000 – November 2005, search in full text and search related words	5

Date	Database	Search terms and conditions	Results
February 27, 2006	EBSCO Psychology and Behavioral Sciences Collection	<p>pain or pain threshold AND nursing home or institutionalization AND aggression or violence or dangerous behavior AND dementia or alzheimer disease – 2 found, none kept.</p> <p>pain or pain threshold AND Alzheimer's disease or dementia AND nursing home – 16 found, 1 kept</p>	1
November 20, 2005	EBSCO: Cinahl Plus with Full Text	( (MH "Pain") or (MH "Chronic Pain") ) And aggression; alternately, violence and dangerous behavior were substituted for aggression then all were successively combined with dementia or Alzheimer disease separately. No limits were applied.	1 article prior to 2000
February 25, 2006	PeDro	All search terms were searched individually combining Group 1 & 2, 1 & 3, 1 & 4, 2 & 3, 2 & 4, and 3 & 4 – i.e. each term searched separately as search engine would not accept OR to combine, for example, p & pt together. Simple search used. 35 hits but none relevant to topic.	0
February 25, 2006	Cochrane	All of Cochrane library searched. Limits: 2000 – 2006. Contents of each group put together with OR then searched combining Group 1 & 2, 1 & 3, 1 & 4, 2 & 3, 2 & 4, and 3 & 4. 28 hits but none relevant to topic	0
February 25, 2006	OVID	Databases used: EBM Reviews – ACP Journal Club, OVID Healthstar 1999 – 2006, OVID MEDLINE (R) 1966 – 2006, and OVID MEDLINE (R) In-Process & Other Non-Indexed Citations and OVID MEDLINE (R) 1966 – present. Limits: English, Humans, 2000 – 2006. Searching 2 groups at a time yielded > 360 hits so terms were combined in groups of 3: <ol style="list-style-type: none"> <li>1. Group 1, 2, &amp; 3: 18 hits – 2 kept but were duplicates</li> <li>2. Group 1, 3 &amp; 4: 2 hits – 1 kept</li> <li>3. Group 1, 2, &amp; 4: 84 hits – 5 kept but 1 duplicate so total = 4 kept</li> <li>4. Group 2, 3, &amp; 4: 95 hits – 2 kept but 1 duplicate so total = 1 kept</li> </ol>	6

Grey Literature

Date	Search description	Search terms	Results
February 25, 2006	Grey Literature – Theses Canada	<p>p &amp; d &amp; a &amp; nh = 62 hits                      p &amp; AD &amp; a &amp; nh = 60 hits                      p &amp; d &amp; a &amp; i = 39 hits                      p &amp; d &amp; v &amp; i = 49 hits                      p &amp; AD &amp; v &amp; i = 37 hits</p> <p>None relevant</p> <p>Not all search terms used. Most common terms that have yielded relevant results in other databases were used; searcher decided to stop as no relevant resources found after 5 searches.</p>	Results: 0

Grey Literature			
Date	Search description	Search terms	Results
February 25, 2006	Grey Literature - Google	grey literature pain aggression institutionalized elderly  >500 hits so only first 30 viewed	<p><a href="http://psychiatryonline.org/cgi/search">http://psychiatryonline.org/cgi/search</a> Then searched 2000 – 2006 in all APPI journals with search terms in the title: p &amp; a &amp; d &amp; nh 29 found – 0 kept</p> <ol style="list-style-type: none"> <li>1. p &amp; AD &amp; db &amp; i = 0 found</li> <li>2. p &amp; d &amp; db &amp; nh = 29 found – 0 kept</li> </ol> <p>- db was used this time as results were very similar to Theses Canada and searcher decided to try db instead of a in case more results were found. Results: 0</p> <p><a href="http://www.alz.org/Resources/rtrlbehav.asp#ass">http://www.alz.org/Resources/rtrlbehav.asp#ass</a> Browsing through the site the following were found:</p> <ol style="list-style-type: none"> <li>1. Mintzer, J.E. Journal of clinical Psychiatry 2001; vol 62 (Supplement 21) pp. 23 – 25; reference found on PubMed and it is related to drug trials, not pain so not kept</li> <li>2. Advances – Progress in Alzheimer Research and Care – Alzheimer’s Association vol. 19 No. 5 Spring 2000: mentioned Vancouver Health Sciences Centre initiative in assessing pain. Reference and website found – deals with pain assessment, not relationship between pain and dementia</li> </ol> <p>Results: 0</p> <p><a href="http://mqa.dhs.sate.tx.us">http://mqa.dhs.sate.tx.us</a> – Quality Matters Problem Oriented Best Practices; Feldt KS, Warne MA Examining pain in aggressive cognitively impaired older adults. Journal of Gerontological Nursing 1998 24(11) 14 – 22. Article prior to 2000 so not used. Results: 0</p>

Date	Search description	Search terms	Results
February 25, 2006	Grey Literature - Google	<p>grey literature pain aggression institutionalized dementia</p> <p>366 results so only first 30 viewed</p>	<p><a href="http://www.psychiatrist.com/pcc/pccpdf">http://www.psychiatrist.com/pcc/pccpdf</a> - Recognition and Management of Behavioral Disturbances in Dementia; Primary Care Companion J Clin Psychiatry 2001; 3: 93 – 109. Found on Pub Med and kept.</p> <p>Results: 1 <a href="http://www.athealth.com/Practitioner/particles/alzguidelines.html">http://www.athealth.com/Practitioner/particles/alzguidelines.html</a> - Guidelines for Alzheimer's Disease Management – not kept as pain not discussed</p> <p>Results: 0</p> <p><a href="http://cjns.metapress.com">http://cjns.metapress.com</a> – The Canadian Journal of Neurological Sciences. Vol 28 Supplement 1 May 2001 pp 96 – 107. Recommendations for the Management of Behavioral and Psychological Symptoms of Dementia – Nathan Hermann – not kept as pain not discussed</p> <p>Results: 0</p>
February 26, 2006	Grey Literature – World Health Organization – Health Evidence Network	<p>Searched: p &amp; d = 37 results – 0 kept p &amp; d &amp; a = 0 results p &amp; AD = 1 result but not kept</p> <p>Search abandoned as all resources were based at policy not clinical questions</p>	Results: 0

### Clinical Practice Guidelines

Date	Search description	Search terms	Results
February 25, 2006	Google – Grey Literature (a CPG was found in this GL search)	grey literature pain aggression institutionalized elderly	EBP Guideline: The primary care management of dementia – not kept as pain not discussed.
February 26, 2006	Google - CPG	clinical practice guidelines elderly institutionalized  >80 000 hits so only first 10 viewed	<a href="http://www.ltcpractice.com/content/node-6/clinicians/agi.htm">www.ltcpractice.com/content/node-6/clinicians/agi.htm</a> - Agitation in the demented nursing home resident Clinical Practice Guideline – kept; refers to another CPG regarding pain: Pain (Chronic or Acute) In The Nursing Home Clinical Practice Guideline  Results: 2
February 26, 2006	SEARCH desktop link with CPGs: 1. CMAJ: Geriatric medicine	In CMAJ categories were searched: Long term care: 21 CPGs, but none applicable Other geriatric medicine: 68 CPGs, but none applicable	0
February 26, 2006	SEARCH desktop link with CPGs: 2. NICE	No related categories found	0
February 26, 2006	SEARCH desktop link with CPGs: 3. National Guideline Clearinghouse	p & d = 0 results p & a = 13 results – 1 kept	McGonigal-Kenney ML, Schutte DL. Non-pharmacologic management of agitated behaviors in persons with Alzheimer disease and other chronic dementing conditions. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2004. 54 p. [132 references]  Results: 1

Clinical Practice Guidelines			
Date	Search description	Search terms	Results
February 26, 2006	Google	<p>Alberta Long Term Care Association - searcher looked here specifically as it is a known Alberta organization that could have clinical practice guidelines</p> <p>From this Google search for Alberta Long Term Care Association the following Alberta organizations were found:</p> <p>Alberta Gerontological Nurses Association</p> <p>Alberta Caregiver's Association</p> <p>None of the sites offered CPGs; however, they will be important in dissemination planning and the dissemination plan was updated.</p>	Results: 0

February 27, 2006: 1 duplicate found in RefWorks and deleted.

Grey Literature – Google Re-Search

Date	Search description	Search terms	Results
March 3, 2006		<p>pain, Alzheimer's, dementia:</p> <p>Would not accept 'pain threshold' or Alzheimer's Disease so only 'pain' and 'Alzheimer's' searched</p>	<p>152, 000, 000 results. First 30 viewed.</p> <p><a href="http://www.alz.org/">http://www.alz.org/</a>  p or pt AND AD or d = &gt;200 results added AND a or v or db AND nh or I = 64 results with 1 kept:</p> <p>1. The Utility of Pain Assessment for Analgesic Use in Persons with Dementia  Jiska Cohen-Mansfield, PhD  Research Institute on Aging of the Hebrew Home of Greater Washington  Rockville, Maryland  2003 Zenith Fellows Award  <b>(planned study) – not found when citation matcher used on PubMed</b>  <a href="http://www.pain.com/">http://www.pain.com/</a>  AD = 9 results – 0 kept  d = 30 results: 1 kept  <b>1. Journal:</b> J Am Geriatr Soc, 50(11):1847-1851, 2002. 30  References  <b>Reprint:</b> Providence Center on Aging, 3510 NE 122nd St, Suite 200, Portland, OR 97230 (K Brummel-Smith, MD)  <b>v = 3 results – 0 kept</b>  <b>db = 0 results</b>  <b>a = 3 results – 0 kept</b>  <b>i = 1 result – 0 kept</b>  <b>nh = 24 results – 0 kept</b>  <a href="http://www.alzheimer.ca/">http://www.alzheimer.ca/</a>  p = 63 results – 0 kept  pt = 65 results – 0 kept  a = 9 results – 0 kept  db = 14 results – 0 kept  v = 0 results  nh i = 648 results; first 30 viewed and all are about placing family members in a nursing home – 0 kept</p>

Grey Literature – Google re-searched continued

Date	Search description	Search terms	Results
March 6, 2006	Google search for Grey Literature	pain, aggression, violence, dangerous behavior	2,520,000; first 30 viewed – 0 results. Many comments on children and violence
March 6, 2006	Google search for Grey Literature	pain, nursing home, institutionalization	<p>136,000; first 30 viewed:  <a href="http://mirecc.stanford.edu/mirecc/Emrgncy%20Psych%20in%20NH.pdf">http://mirecc.stanford.edu/mirecc/Emrgncy%20Psych%20in%20NH.pdf</a>            ;pdf file with author but no references so host site checked:  <a href="http://mirecc.stanford.edu/mirecc/-VA%20VISN%2021%20Mental%20Illness%20Research%20Educational%20and%20Clinical%20Center%20(MIRECC)%20-%20A%20United%20States%20veteran's%20affairs%20organization">http://mirecc.stanford.edu/mirecc/-VA VISN 21 Mental Illness Research Educational and Clinical Center (MIRECC) – A United States veteran’s affairs organization.</a>            Further checking of website address brought me to  <a href="http://arcc.stanford.edu/">http://arcc.stanford.edu/</a> where I found Stanford/VA Alzheimer’s Research Center of California and searched the site as follows:            p or pt AND a or v or db = 0            p or pt AND AD or d = 1 result; 0 kept            p or pt AND nh or i = 0            AD or d AND nh or i = 4 results; 0 kept            AD or d AND a or v or db = 0            a or v or db AND nh or i = 0</p> <p>original pdf saved as background document or link to expert if search results inconclusive.</p>
March 6, 2006	Google search for Grey Literature	Alzheimer’s, dementia, aggression, violence, dangerous behavior	<p>65,300 results; first 30 viewed:  <a href="http://myuminfo.umanitoba.ca/Documents/720/behavior.pdf">http://myuminfo.umanitoba.ca/Documents/720/behavior.pdf</a>            - bibliography established by J.W. Crane Memorial Library: Current Perspectives in the literature on challenging behavior            - saved as pdf file  <a href="http://www.ascp.com/public/pubs/tcpsupp/1997/suppc/review3.html">http://www.ascp.com/public/pubs/tcpsupp/1997/suppc/review3.html</a>            - clinical review &lt;2000 – not kept</p>

Google – Grey Literature Re-searched			
March 6, 2006	Google search for Grey Literature	Alzheimer's, dementia, nursing home, institutionalization	74, 600 results; first 30 viewed – 0 kept
March 6, 2006	Google search for Grey Literature	aggression, violence, dangerous behavior, nursing home, institutionalization	30,000 results; first 30 viewed – 0 kept

## Appendix B – Data Extraction

1. **Study information:** Authors, Title, Journal, Year of publication
2. **Design of study:** description; plus also pilot study versus completed study
3. **Paper's purpose or hypothesis.** If it is not stated, state purpose in reviewer's own words or describe purpose as a research question. Especially important: how is it related to the literature review question? This will be key to whether or not the study is used.
4. **Methodology:** Data about the process of the study may be more important to than statistical data. What lead the researchers to decide about collecting the data and then analyzing it with certain statistical procedures? If the thinking is flawed so will the research be flawed. These questions will help determine if the articles meet the purpose of the literature review and if they are of quality:
  - To determine quality:
    - Reviewer 're-creates' the study to see if it makes sense
    - Look at types of data collected – were there several sources that the analysis and conclusions were drawn from?
    - Equalize all research methods – not quantitative vs. qualitative. There is no hierarchy. Instead, are there several sources that point to the 'truth' in this study? E.g. chart review, focus groups, outcome measures, surveys scale, interviews, data from instruments, etc.
    - Look at the thoroughness of the data collected – when was it collected? Was that appropriate given what the reviewer knows about the clinical problem? Was it confirmed or re-tested in any way? Were the tools used to collect it reliable and valid?
5. **Comparison and Congruence:** Do #2, 3, and 4 give internal quality and external relevance/validity?
6. **Findings of research:** What were they?
7. **Implications:** Both what the article says and what the reviewer thinks are the implications are for the local care environment. Do the well done studies inform the local Aspen RHA clinical situation?
8. **Care related issues:** level of staffing, level of care required, personal care/hygiene considerations, type of facility, client and caregiver safety, theorized vs proven causes of aggression, care giver ability to assess pain, caregiver characteristics, effects of aggression of caregivers, family involvement, availability of drugs, local use of pharmacology
9. **Background:** Interesting facts that don't necessarily influence the question but form background or relevance infrastructure

### Appendix C – Final Results of Critical Appraisal

Study	Findings	Internal validity	External relevance
Cohen-Mansfield, Billig, Lipson, Rosenthal, Pawlson 1990	Notes relationships between cognitive impairment, agitation, and aggression but not able to definitively relate them.	For pain measurement and use of data: weak – no mention of reliability and validity of 7 point pain scale used – seems to be perception of nursing staff. Overall rating: <b>Moderate</b> : relationships between variables identified.	<b>Moderate.</b> Captures that a relationship between all the variables exists in a subject study population similar to that encountered in Aspen RHA work situations.
Population based observational study			
Purpose: Determine the relationship between agitation and medical diagnoses, psychiatric diagnoses and medication received by nursing home residents			

**ACCEPT**  
**Category:** Notes relationships exist between cognitive impairment, agitation, and aggression.  
**Regression analysis:** Yes

Study	Findings	Internal validity	External relevance
Feldt KS, Warne MA, Ryden MB 1998	Reports of resident pain by family members: 44.7%; nursing assistants (NAs): 65.8% (congruence: 47.3%). 35.3% of those identified by family received no pain medication; 56% of those identified by NA received no pain medication. Subjects with 2 or more pain related diagnoses had significantly higher aggression scores compared to those with 1 or no diagnoses. Subjects with arthritis had significantly higher PAB and VAB scores.	<b>Moderate → Good: Pain appears to contribute to aggressive behaviors.</b> Able to show that those with 2 or more painful conditions did have significantly more aggression and that those with arthritis in particular had significantly more aggressive behaviors than those with other diagnoses. Only took those with aggression into the study; would have been confirming if they had taken those with lower RAS1 scores and measured their behavior as well and determined if a lack of painful conditions showed lower aggressive behavior scores. No regression analysis performed to determine if other factors influenced OA and aggression. Data was used from a larger study on aggressive behaviors.	<b>Good:</b> Similar subject population to Aspen RHA work situations. Important information about frequency of pain treatment. <b>Residents with more painful conditions show significantly higher rates of aggression.</b>
Descriptive			
Purpose: Explore pain in cognitively impaired older adults and to determine the relationship between pain and aggressive behaviors			

**ACCEPT**  
**Category:** Notes relationships exist between painful conditions and aggression.  
**Regression analysis:** No

Study	Findings	Internal validity	External relevance
<p>Buffum MD, Miaskowski C, Sands L, Brod M 2001</p> <p>Pilot study Observational descriptive study</p> <p>Purpose: 1. Test pain screening tool to determine if dementia patients were reliable self reporters of pain. 2. Examine relationships among agitation, discomfort, and severity of dementia in those unable to report pain 3. Determine whether agitation specifically contributes to discomfort in patients with moderate to severe dementia</p>	<p>Pain Screening Tool: Cronbach's alpha: 0.91; 82% of patients unable to report pain or lack of it consistently. Significant bivariate positive correlations between <i>inability to report pain</i> and agitation, discomfort, cognitive ability, and severity of dementia; <i>agitation</i> and discomfort and severity of dementia; <i>discomfort</i> and severity of dementia; <i>cognitive ability</i> and severity of dementia. When regression analysis was performed for agitation and severity of dementia as they relate to discomfort, amount of variance in discomfort explained by severity of dementia: 18%; amount of variance in discomfort explained by agitation: 14%. This delineation may be an artifact as authors note discomfort and agitation measures have similar behaviors on their scales; the relationship may be simply because they are measuring the same thing. Severity of dementia and agitation may be as likely to be related as severity of dementia and discomfort.</p>	<p>Severity of dementia and discomfort relationship established. However, discomfort may = agitation in the measures used in this study so all relationships established must be confirmed by other studies.</p> <p><b>Moderate:</b> Tells us that discomfort may be related to agitated behaviors as well as to severity of dementia</p>	<p><b>Moderate:</b> Population studied is similar to Aspen RHA work situations.</p> <p><b>Relationships between pain, severity of dementia and aggression exist that can be explored.</b></p>
		<p><b>ACCEPT</b>  <b>Category:</b> Notes relationships exist between pain, severity of dementia and aggression.  <b>Regression analysis:</b> Yes</p>	

Study	Findings	Internal validity	External relevance
Douglas M 2001 Unpublished	Strong, significant baseline correlation between discomfort and agitation AND between severity of dementia and agitation.	<b>Moderate:</b> Tells us that agitated behaviors may be related to pain as well as to severity of dementia	<b>Moderate:</b> Population studied is similar to Aspen RHA work situations.
Randomized Double Blind Placebo Control Crossover assignment Pharmacodynamics study	There were no difference in summed mean discomfort, agitation or confusion scores. When severity of dementia was controlled for, the change in agitation scores was significantly associated with change in discomfort scores. No tables or data in report - only final numbers and calculations.		<b>Relationships between pain, severity of dementia and aggression exist that can be explored.</b>
Purpose: Does systematic pain treatment reduce problematic behaviors in patient dementia? 1. Elucidate the relationships between pain, discomfort, and agitation 2. To determine the influence that pain management has on decreasing the outcomes of discomfort, agitation and confusion in nursing home residents.	Same measures used as in Buffum study – Discomfort Scale and Cohen-Mansfield Agitation Inventory;  This delineation may be an artifact as previous authors note discomfort and agitation measures have similar behaviors on their scales; the relationship may be simply because they are measuring the same thing. Where the Buffum study says discomfort and agitation are related with discomfort being the dependent variable, Douglas says discomfort and agitation are related with agitation being the dependent variable.		<b>Bottom line in this study is that acetaminophen decreases the behaviors regardless of the cause – important clinically.</b>

**ACCEPT**  
**Category:** Agitation may be affected by analgesic pharmacological measures - acetaminophen  
**Regression analysis:** Not clearly stated but process described in study sounds like regression analysis

Study	Findings	Internal validity	External relevance
Dunn JC, Thiru-Chelvam B, Beck CHM 2002	Sum of all agitated behaviors significantly smaller in Thermal Bath. Only 1 behavior showed significantly lower	<b>Moderate to weak:</b> Showed that bathing options may influence agitated behaviors though this relationship is based on a small sample using a combination of measuring instruments that capture only a small portion of behaviors that are possible. Weak link between previous research that shows discomfort causes agitation in bathing and a further weak link that most aggression occurs with physical contact.	<b>Weak/anecdotal:</b> If aggression occurs mostly in bathing situations for a particular resident, the Thermal Bath may be a care option to consider.
Crossover Observational. Random order given to interventions	frequency for the group: shivering. Only 1 of 15 residents reached $p < 0.01$ for decreasing frequency of all agitated behaviors.		
Purpose: Compare the level of agitation observed during conventional tub bath and Thermal Bath. <b>Working hypothesis:</b> Thermal Bath would produce less discomfort in elderly residents with dementia than the tub bath and that this would be manifest in a lower frequency of agitated behaviors during the Thermal Bath.	<div data-bbox="488 905 787 1312" style="border: 1px solid black; padding: 5px;"> <p><b>REJECT</b>  <b>Category:</b> Specific care option  <b>Regression analysis:</b> Not clearly stated but process described in study sounds like regression analysis</p> </div>	<p>IF physical contact precedes and causes discomfort, it may be a trigger for aggression for <b>some</b> but definitely not all residents.</p>	

Study	Findings	Internal validity	External relevance
<p>Manfredi P, Breuer B, Wallenstein S, Stegmann M, Bottomley G, Libow L 2003</p>	<p>Agitation level at end of opioid phase was statistically significantly lower than at end of placebo phase for &gt; 85 year old subjects. This difference remained after adjusting for sedation, cognitive impairment and PRN use of psychotropic medications. Also statistically significant for the 4 &gt;= 85 year old study dropouts. For &gt; 85 year old subjects physically non-aggressive and physically aggressive domains show statistically significant decreases with opioid use. There was no statistically significant difference between treatment phase/placebo phase for PRN psychotropic meds, sedation, constipation, nausea, and falls. There is no statistically significant difference in the mean # of scheduled psychotropic drugs for those &lt;85 compared to those &gt;85 years old.</p>	<p><b>Good:</b> Purposive sample allowed effects on agitation to be clearly measured especially since clients were their own controls.</p>	<p><b>Good:</b> Decrease in agitation may be a direct opioid effect on patient's behavior, an analgesic action that decreases the agitated behaviors by making patients more comfortable, or a combination of these 2 effects. Use of opioids would need to be carefully monitored for side effects.</p>
<p>Observational Crossover Purposive sample</p>			
<p>Purpose: Determine the effect of opioids on agitation in demented patients unable to report pain</p>		<div style="border: 1px solid black; padding: 5px;"> <p><b>ACCEPT</b> <b>Category:</b> Agitation may be affected by analgesic pharmacological measures - opioids <b>Regression analysis:</b> Yes</p> </div>	<p><b>Bottom line in this study is that opioids decreases the behaviors regardless of the cause – important clinically.</b></p>

Study	Findings	Internal validity	External relevance
Oh H, Eom M, Kwon Y 2004	62.9% of residents exhibited aggressive behavior as measured by RAS1 (129/205).	<b>Moderate → Weak:</b> Simple, accurate results though they only establish	<b>Moderate → Weak:</b> Shows there is a relationship of some sort between pain and aggression.
Cross-sectional descriptive	For RAS2: 76 behaviors in 3 days: PAB: 41 incidents VAB: 26 incidents SAB: 9 incidents	correlations which lead to more best guesses and theorizing.	
Purpose: For cognitively impaired nursing home residents and nursing staff determine: 1. Proportion and nature of aggressive behavior 2. Frequency and types of aggressive behavior 3. Difference between residents who demonstrate aggressive behavior and those who do not 4. Nursing staff responses to aggressive behavior by residents	Aggressive residents are older than non-aggressive, have more pain, longer NH stay, more cognitive impairment but no statistically significant difference in functional status. Shows correlations but <b>no regression analysis done.</b>  Confirms high incidence rate of aggression with next step to determine context behavior occurs in and what triggers the aggression.  Aggression affects caregivers – CP: would have been better as a qualitative study.		

**ACCEPT**  
**Category:** Relationships exist between aggression, pain, length of nursing home stay and cognitive impairment.  
**Regression analysis:** No

Study	Findings	Internal validity	External relevance
Chibnall J, Tait RC, Harmann B, Luebbert RA 2005	Statistically significant increase in time spent engaged with media, in passive social involvement, talking to themselves/imaginary others;	<b>Weak:</b> Dementia care mapping used as a measure which does not give a complete history of behavior (subjects could not be observed in bedroom or bathroom with this tool). Reviewer chose to reject all findings associated with analysis of these variables as they did not represent a complete picture of dementia behavior.	<b>Moderate → Weak:</b> Unable to make any recommendations regarding effect of analgesics on PRN psychotropic use. Low agitation levels and lack of change in agitation with acetaminophen shows that hypothesis may be correct – if agitated clients are expected to decrease agitation levels with acetaminophen, non-agitated residents should be expected to not decrease agitation with acetaminophen. Being that this study did not use agitation as an inclusion criterion supports the original hypothesis by showing the reverse lack of effect.
Randomized double blind, placebo controlled crossover trial	statistically significant decrease in time spent in rooms, off unit and in independent self care. No change in agitation, psychotropic medication use, emotional wellbeing.		
<p>Purpose:  1. Evaluate changes in behavior of NH residents with mod-severe dementia in response to analgesic medication  2. Evaluate effectiveness of analgesic medication on use of psychotropic medications  3. Identify behaviors of NH residents with mod-severe dementia that are most sensitive to analgesic treatment</p> <p><b>Hypothesis:</b> routine administration of an analgesic would increase social and physical activity, decrease agitation, increase emotional wellbeing and decrease # of doses of as-needed psychotropic medications in study participants.</p>	<div style="border: 1px solid black; padding: 5px;"> <p><b>ACCEPT Category:</b> Pharmacological study with limited applicability of some variables studied. Agitation and medication use outcomes support that those with less agitation do not respond to acetaminophen.</p> <p><b>Regression analysis:</b> Yes</p> </div>	<p><b>Moderate → Weak:</b> Methodology concerns:  1. Measured PRN psychotropic medication use when 19/25 had routine psychotropic medication orders – may not be clinically relevant  2. 10/25 participants taking concomitant analgesic drugs prior to and during study.</p> <p><b>Moderate:</b>  1. Low level of aggression in this study to start with which did not show any further decrease with acetaminophen even with covariate regression analysis.</p>	

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