Published in final edited form as:

J Adv Nurs. 2009 April ; 65(4): 828–835. doi:10.1111/j.1365-2648.2008.04940.x.

Use of recommended osteoarthritis pain treatment by older adults

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Abstract

Aim—This paper reports on a study conducted to describe what traditional and nontraditional treatments older adults with osteoarthritis use for pain management, their reported pain relief, and factors associated with use of recommended initial gold standard treatment (acetaminophen/paracetamol or non-steroidal anti-inflammatory drugs, and exercise and/or physical therapy) as designated by conventional western medicine.

Background—Osteoarthritis is characterized by joint pain, stiffness and limited range of motion and has been designated an international health burden by the World Health Organization. Demographic and cultural factors have been shown to affect both traditional and non-traditional osteoarthritis treatment decisions.

Method—A descriptive correlational design was used, with secondary analysis of data collected between July 2006 and July 2007 in two randomized controlled studies using the Brief Pain Inventory Short Form and testing older adults' pain communication.

Results—The frequency of use of gold standard treatment was 28.0% ($n = 128$). Both traditional and non-traditional treatments were used by 46.4% ($n = 212$) of the participants. Logistic regression revealed that those with higher education (odds ratio 1.56, CI 1.24–1.96, $P = 0.001$), and non-White race, regardless of educational level (odds ratio 2.02, CI 1.20–3.40, $P = 0.008$), were more likely to use gold standard treatment.

Conclusion—Factors influencing older adults' use of gold standard treatment for their osteoarthritis pain need to be identified so that greater numbers of older adults can be supported to use recommended treatment to obtain greater pain relief.

Keywords

gold standard; nursing; older adults; osteoarthritis; pain; secondary analysis; treatment

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Author contributions

DM and DDM were responsible for the study conception and design, data analysis, drafting the manuscript and they also made critical revisions to the paper for important intellectual content. DDM performed the data collection, provided statistical expertise, obtained funding, provided administrative, technical or material support and supervised the study.

Conflict of interest

No conflict of interest has been declared by the authors.

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Introduction

Osteoarthritis is characterized by joint pain, stiffness and limited range of motion and has been declared an international health burden by the World Health Organization (WHO) (WHO Scientific Group, 2003). Osteoarthritis is an increasing problem because of the increased number of active aging adults, and increased obesity (Ottawa Osteoarthritis Panel (OOP) 2005, Lawson *et al.* 2004). A recent United States prevalence study by disease experts estimated the osteoarthritis prevalence to be 27 million, with the highest incidence among older adults (Lawrence *et al.* 2008), comparable to the prevalence found in Europe of 30% in those aged 75 and above (Arden & Nevitt 2006). The most common joint sites reported were the hands and knees of women over the age of 50, estimated as high as 26.2% (Lawrence *et al.* 2008). Osteoarthritis is likely to burden healthcare systems in the years to come (OOP 2005, Lawrence *et al.* 2008).

Osteoarthritis presents as slowly developing chronic joint pain (American College of Rheumatology Subcommittee on Osteoarthritis Guidelines (ACRSOG) 2000, American Academy of Orthopaedic Surgeons (AAOS) 2003, OOP 2005). Joint stiffness and gelling occur after periods of inactivity (AAOS 2003, OOP 2005). Physical assessment of a joint with arthritis may reveal pain on palpation, bony changes, crepitus with motion, effusion, and movement limitations (AAOS 2003). Radiographic evidence of osteoarthritis includes narrowing of cartilage spaces, marginal osteophytes, and subchondral sclerosis (OOP 2005).

The goals of osteoarthritis management are decreased pain, increased function and quality of life, and minimized treatment effects (AAOS 2003). Current guidelines recommend baseline treatment of osteoarthritis with both pharmacological and non-pharmacological methods, consisting of pain management using acetaminophen (USA)/paracetamol (UK) at a maximum dose 2–4 grams per day, or non-steroidal anti-inflammatory drugs (NSAID), at a maximum dose 2.4–2.6 grams per day for ibuprofen, combined with physical therapy and/or exercise, and use of assistive devices such as walking frames as needed (Lawson *et al.* 2004, OOP 2005, Zhang *et al.* 2008). Referral to a rheumatologist, pain specialist, and/or additional treatments is indicated when treatment goals are not achieved (ACRSOG 2000, AAOS 2003).

Background

Pain intensity is an important factor in treatment decisions and may lead to the use of both traditional and nontraditional treatments (Lawson *et al.* 2004, Zochling *et al.* 2004, Feinglass *et al.* 2007, Sleath *et al.* 2008). However, Canadian researchers (Sale *et al.* 2006), using phenomenological analysis, found that despite reports of pain older adults with osteoarthritis ($n = 18$) did not take their pain medications as they did other prescribed medications.

The types of traditional and non-traditional treatments that are used by community-dwelling adults to treat their osteoarthritis pain need to be identified so that more effective pain outcomes can be achieved. Lawson *et al.* (2004), in a Canadian study, found that 74% ($N = 244$) of people reported taking self-prescribed osteoarthritis pain treatments, with 60% using over the counter medications, and 45% using herbal products. Fifty-two percent of the respondents reported taking a combination of prescribed and non-prescribed treatments. Researchers in the US found that 63% ($N = 557$) of patients surveyed used both traditional and non-traditional treatments (Sleath *et al.* 2008). Nontraditional treatments were considered as anything other than over the counter medications and prescription medications. Herman *et al.* (2004) reported two commonly used treatments, glucosamine chondroitin (43%) and mind–body meditation and relaxation (20%). However, glucosamine chondroitin has recently been shown ineffective in treatment for mild to moderate osteoarthritis pain (Towheed *et al.* 2005, Clegg *et al.* 2006). Adults clearly use a combination of treatment modalities to decrease their osteoarthritis pain,

some of which have been shown to be ineffective for this. However, the extent of use of recommended acetaminophen/ paracetamol or NSAIDs and exercise or physical therapy remains unclear.

It is important to identify demographic factors affecting use of osteoarthritis pain treatments to tailor support for use of those that are most effective. White people are twice as likely to report using a traditional treatment, according to Sleath *et al.* 2008); however, Dente *et al.* (2006) found similar rates of non-traditional treatment usage by Hispanic ($n = 218$) and White non-Hispanic adults ($n = 204$), but that Hispanics were more likely to use oral herbs and magnets or copper jewellery. White non-Hispanics have been shown to be more likely to use nutritional supplements (Dente *et al.* 2006), while Black people were more likely to report usage of relaxation, massage, nutrition and dietary techniques than Whites (Feinglass *et al.* 2007). Women with education beyond high school are more likely to use non-traditional treatments (Herman *et al.* 2004, Zochling *et al.* 2004, Sleath *et al.* 2008), as are married adults (Sleath *et al.* 2008) and those aged less than 55 years (Herman *et al.* 2004). However, the demographic factors associated with evidenced-based osteoarthritis pain treatment have not been clearly identified.

Increased sleep difficulty has been related to using one or more traditional treatments (Sleath *et al.* 2008). Zochling *et al.* (2004), in an Australian study with 341 adults, found that pain intensity was also related to this. Similarly, increased disease severity and poor overall health status was also related to use of non-traditional pain treatments in a study by Feinglass *et al.* (2007). Again, it remains unclear how any of these factors relate to increased use of the first-line pain treatments for osteoarthritis pain.

The majority of osteoarthritis researchers have explored either traditional or non-traditional aspects of the treatment plan, and few have studied the combination of both traditional and non-traditional treatments and what particular patient factors are associated with use of evidence-based recommended treatment (National Institutes of Health (NIH) 2002, Sleath *et al.* 2008).

The study

Aim

The aim of the study was to describe what traditional and non-traditional treatments older adults with osteoarthritis use to manage their pain, their reported levels of pain relief, and factors associated with use of recommended gold standard treatment (the combination of acetaminophen/paracetamol or NSAIDs, combined with physical therapy or exercise).

Design

The study design was descriptive and correlational, a secondary analysis of data from two randomized, controlled studies testing pain communication in older adults with osteoarthritis pain (McDonald *et al.*, 2008, McDonald *et al.* in press). The specific inclusion and exclusion criterion and methods of the two original studies have been described in detail in the referenced manuscripts. Briefly, the purpose of the first was to test the use of the Brief Pain Inventory Short Form (BPI-SF) as an intervention to increase older adults' ability to communicate pain information (BPI intervention study, $N = 106$) (McDonald *et al.* 2008). In the second study we tested how practitioners' phrasing of their pain question affected the pain information provided by older adults (pain phrasing study, $N = 312$) (McDonald *et al.* in press).

Participants

The purposive sample consisted of 457 English-speaking, community-dwelling, urban and suburban adults, aged 60 years and older, with self-reported osteoarthritis pain. Participants in the original studies were recruited from independent living senior congregate housing sites and senior centres in the North-eastern USA. For the current study, 30 participants were required for each variable studied with a regression model (Green & Salkind 2003). We tested 10 variables, making a sample size of $N = 457$, which is well above the minimum required size of $N = 300$.

Data collection

Data collection took place between July 2006 and July 2007 using the BPI-SF.

Brief pain inventory short form—Data from the BPI-SF was the primary source of data. The BPI-SF consists of 15 questions that measure pain location, intensity, pain treatment, treatment effectiveness, and functional interference from pain (Daut *et al.* 1983). Completing the BPI-SF requires participants to select from 0 to 10, with 0 being no pain and 10 being pain as bad as one can imagine, to describe their pain ‘right now’, and to describe their worst, least and average pain in the past 24 hours. Participants also rate the percent of relief obtained in the past 24 hours. Pain interference with activities is measured with seven items using a 0 to 10 scale, with 0 being no interference and 10 being the worst interference. Cronbach’s alpha for the overall BPI-SF has been reported as 0.77–0.87 (McDonald *et al.* 2005). Validity of the BPI-SF has been evidenced by a correlation of $r = 0.61$, $P < 0.001$ with the Short Form McGill Pain Questionnaire (Zalon 1999). For the BPI study, internal consistency for the pain intensity and pain interference scales was $\alpha = 0.84$ and $\alpha = 0.90$, respectively. For the pain phrasing study, internal consistency for the overall BPI-SF was $\alpha = 0.87$.

Demographic information was recorded using a form developed for the two studies. The information included age, sex, race, ethnicity, marital status, highest education completed, under the care of an arthritis specialist and under the care of a pain specialist.

Data sets from the two original studies were combined for the current study so that demographic data and data from the BPI-SF could be analyzed across both studies. The BPI-SF data was self-administered in the BPI study, and obtained via interview in the pain phrasing study. Demographic information was reported via interview in both original studies.

The dichotomous variable of gold standard treatment (acetaminophen/paracetamol or NSAIDs, combined with physical therapy or exercise) was computed so that use of the gold standard was scored as a 1 and non-use of gold standard scored as a 0. Traditional treatments were those determined to be based on the conventional medical model as practiced in the USA, as well as those recommended as guideline treatments (NIH 2002). Variables included as traditional treatments were prescription medications, over the counter medications, physical therapy and/or exercise, positioning and rest and assistive devices. Non-traditional treatments were those not yet supported by Western-based consensus or considered to be folk remedies, and included massage, massage with topical products, application of hot or cold, acupuncture, transcutaneous electric nerve stimulator (TENS), glucosamine chondroitin, oral herbal preparations, meditation, music, prayer and general miscellaneous treatments, such as placing a bar of soap in bed while sleeping (NIH 2002). The term ‘non-traditional’ was used in this study because it was unclear whether the treatments were considered complementary (used together with traditional treatment) or alternative (used in place of traditional medicine) (NIH 2002).

Ethical considerations

The current and original studies were approved by the appropriate institutional review board. All data were kept confidential and secured. In the original studies, written consent was obtained from each participant. All participants were financially compensated for their time and given an arthritis pain management pamphlet. Those with reported pain at 4 or greater on the 0–10 pain intensity scale were encouraged to consult healthcare practitioner to lower their pain intensity.

Data analysis

Secondary analysis of data was performed, including frequencies, means and standard deviations. Logistic regression was used to determine variables associated with use of gold standard treatment. Gold standard treatment was used as the dependent variable, with demographic factors (age, sex, race, ethnicity, education, living with another person) entered in the first block, use of an arthritis or pain specialist in the second block, and pain outcomes (relief, mean pain intensity and mean pain interference) added in the third block. Crosstabulation analyses with chi square statistics and *t*-tests were conducted to describe further the relationship of statistically significant variables and gold standard treatment.

Results

Description of participants

Frequencies summarizing the sample demographic characteristics are shown in Table 1. The mean age was 75.7 years ($SD = 8.41$). Older adults reported a mean pain intensity and pain interference of $M = 4.5$ ($SD = 1.95$) and $M = 4.0$ ($SD = 2.54$), respectively. The mean percentage of reported pain relief was 62.9% ($SD = 31.06$), indicating that the majority of the pain was relieved, but that approximately 37% remained. Nineteen percent ($n = 87$) of participants reported 100% pain relief.

Treatment factors

Frequencies for traditional pain treatments used by older adults to treat their osteoarthritis pain are given in Table 2. and for non-traditional pain treatments in Table 3. A total of 89.1% of participants used traditional treatments and 51.0% used non-traditional treatments. A combination of both traditional and non-traditional treatments was used by 46.4% ($n = 212$). The frequency of reported gold standard treatment was 28.0% ($n = 128$).

Results from the logistic regression explained 7.1%–10.1% of variability in use of gold standard treatment. Table 4 contains the logistic regression results. Statistically significant factors that increased the odds of gold standard treatment use were higher levels of completed education and non-White race. Higher educated older adults were 1.6 times more likely to use gold standard treatment than less educated older adults, and non-White older adults were twice as likely to use gold standard treatment as White older adults. A total of 42.4% of those with a bachelor's degree or higher used gold standard treatment compared with 23.4% of those with less than high school education ($\chi^2 = 7.87$, d.f. = 1, $P = 0.005$, $n = 211$). A total of 3.71% of non-White older adults used the gold standard osteoarthritis pain treatment compared with 25.1% of White older adults ($\chi^2 = 6.15$, d.f. = 1, $P = 0.013$, $n = 455$, regardless of educational level. Furthermore, non-White older adults reported statistically significantly greater pain relief from their treatments than White older adults, $M = 74.3\%$ ($SD = 24.80$), and $M = 58.7\%$ ($SD = 32.05$), respectively, $t(434) = 5.33$, $P = 0.001$; at the same time, they reported similar overall pain intensity, $M = 4.7$ ($SD = 2.01$) and $M = 4.5$ ($SD = 1.93$), respectively for non-Whites and Whites, $t(453) = 1.24$, $P = 0.22$. Finally, Non-Whites were statistically significantly more likely to report being under the care of an arthritis specialist 79.3% compared with 65.4% ($\chi^2 = 7.82$,

d.f. = 1, $P = 0.005$, $n = 454$), or a pain specialist, 72.4% compared with 57.4% ($\chi^2 = 8.21$, d.f. = 1, $P = 0.004$, $n = 454$); however, being under the care of either an arthritis or pain specialist was not predictive of using gold standard pain treatment.

Discussion

Study limitations

The major limitation of the current study was that the original studies did not focus on treatment use, and the treatment selection may not have been completed as thoroughly as if it were the original research question. The responses may have also been skewed to traditional pain treatments, because of the fact that people may not consider non-traditional treatments when discussing their pain treatments (Lazar & O'Conner 1997, Rao *et al.* 1999, Sleath *et al.* 2008).

In the current study we did not explore how treatment was initiated as a recommended treatment from a healthcare provider or learned from another source, or whether the home treatment plan differed from the prescribed treatment plan. Participants also were not asked to describe treatment-specific responses. The BPI-SF does not include information about side effects and timing of treatments (McDonald *et al.* 2007), which it would be helpful to assess when evaluating treatment effectiveness.

Consensus on the definitions of non-traditional, alternative and complementary methods would make future research more robust. Movement, if characterized as tai chi, may be considered non-traditional in Western medicine, but if characterized as 'exercise' may be considered as part of gold standard treatment. Also, commonly used treatments such as massage, thermal treatments and certain herbal medications, need to be studied further in combination with gold standard treatment. Future studies should include more detailed information about treatment source, how and why treatments are used, and the degree of pain relief derived from the combination of traditional and non-traditional treatments.

Factors associated with arthritis pain treatment

Previous studies have shown that osteoarthritis pain treatment selection may be based on demographic and cultural factors (Feinglass *et al.* 2007, Sleath *et al.* 2008), but none have examined factors associated with use of gold standard treatment. Findings from this study indicate that non-White race and higher level of education are associated with using gold standard treatment. Lower educational level may be related to economic inhibitors to treatment, but we did not have data on economic or health insurance information, which are likely to affect treatment decisions. However, the relatively low cost of using acetaminophen/paracetamol or NSAIDs and exercise may reduce the probability that lower socioeconomic status inhibits use of gold standard treatment.

Non-White people were significantly more likely to report being under the care of an arthritis or pain specialist. Most documented racial disparities relative to osteoarthritis treatment show that Blacks and Hispanics are more likely to have poorer outcomes (Dominick & Baker 2004). The non-White participants in our study reported higher levels of pain relief. Burns *et al.* (2007), in a secondary data analysis of a randomized single blind study ($N = 518$), found that older Black people with arthritis reported less disability than White people, despite clinical data supportive of increased severity of condition.

Less than one third of our participants reported using gold standard treatment, despite the large percentage who reported being under the care of an arthritis specialist. It is unclear whether the arthritis or pain practitioners reported were actual specialists. The low frequency of gold standard treatment use may be indicative of the lack of treatment adherence in an older adult

population that is likely to be burdened by co-morbidities and multiple treatments, or may reflect a perceived lack of treatment efficacy. Perceived lack of treatment efficacy might occur because of inadequate trial of the treatment plan. Low use of the gold standard treatment may also reflect lack of guideline use by practitioners. Further research is needed to examine the factors driving gold standard treatment use and pain relief outcomes in community-dwelling older adults.

Perceptions and rationalizations held by older adults might interfere with understanding and treating their osteoarthritis pain (Sale *et al.* 2006). They are likely to be non-adherent to their prescribed treatment if they hold low expectations of pain relief; therefore practitioners need to assess patients' pain relief expectations when evaluating osteoarthritis pain treatment and response.

What is already known about this topic

- Osteoarthritis, the most common rheumatic condition, is increasing in incidence because of the growing number of active older adults, and increasing obesity.
- Osteoarthritis pain and disability is recommended to be initially managed with acetaminophen/paracetamol or non-steroidal anti-inflammatory drugs, combined with physical therapy or exercise.
- Demographic and cultural factors have been shown to affect both traditional and non-traditional osteoarthritis treatment decisions.

What this paper adds

- Relatively few older adults use the recommended gold standard treatment for their osteoarthritis pain management.
- Higher education and non-White race are associated with use of recommended gold standard treatment.

Implications for practice and/or policy

- Practitioners should discuss with their older adult patients the efficacy of acetaminophen/paracetamol or non-steroidal anti-inflammatory drugs, combined with physical therapy or exercise in reducing osteoarthritis pain.
- White and/or less educated older adults might require additional teaching and follow up to insure effective treatment outcomes.

Conclusion

Healthcare practitioners need to recognize the factors that influence treatment adherence when assessing and treating osteoarthritis pain to encourage greater adherence to efficacious treatment regimens. Understanding what factors drive a person's treatment decisions or treatment adherence is important for both enhancing communication with patients, and understanding what treatments, traditional and non-traditional, reduce pain intensity and interference, potentially leading to a better quality of life. Increased use of this evidence-based treatment for osteoarthritis pain might lead to greater pain relief for larger numbers of older adults.

Acknowledgements

The project was supported by combined funding from Grant Number 5 R21NR009848-02 from the National Institute of Nursing Research, and the University of Connecticut School of Nursing Toner Funds. The contents are solely the responsibility of the authors and do not necessarily represent the official views of NIH.

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Table 1Demographics ($N = 457$)

Variables	<i>n</i>	%
Female	333	73.0
Non-Hispanic	416	92.7
Race		
White	339	74.5
Black	86	18.9
American Indian/Alaskan	5	1.1
Asian	1	0.2
Native Hawaiian	1	0.2
Multi-racial	23	5.1
Marital Status		
Lives alone	352	77.4
Lives with someone	103	22.6
Education		
Less than high school	145	32.0
High school	198	43.7
Technical or associate degree	44	9.8
Bachelor's degree or higher	66	14.5
Use of arthritis specialist care	313	68.9
Use of pain specialist care	278	61.2

Table 2Frequencies of traditional osteoarthritis pain treatment use ($N = 457$)

Variables	<i>n</i>	%
Medications		
Acetaminophen	196	42.9
NSAIDs	164	35.9
Opioids	54	11.8
Prednisone	9	2.0
Cortisone injection	31	6.8
Topical anaesthetic	15	3.3
Joint Protection		
Physical therapy/exercise	187	40.9
Positioning/rest	67	14.7
Assistive devices	33	7.2
Miscellaneous oral medications	7	1.5

NSAIDs, non-steroidal anti-inflammatories.

Table 3Frequencies of non-traditional osteoarthritis pain treatment use ($N = 457$)

Variables	<i>n</i>	%
Manipulative/energy, physical modalities		
Thermal	105	23.0
Massage only	32	7.0
Massage + topical	96	21.0
Acupuncture	1	0.2
TENS	1	0.2
Biological or herbal oral medications		
Chondroprotective agents	14	3.1
Other	5	1.1
Mind-body, cognitive restructuring		
Meditation/music	3	0.7
Prayer	1	0.2
Miscellaneous	81	17.7

TENS, transcutaneous electrical nerve stimulation.

Table 4Results of logistic regression predicting use of gold standard treatment ($n = 428$)

Variables	Exp(B)	95-0% CI	P-value
Age	1.02	1.00–1.05	0.111
Sex	1.13	0.67–1.91	0.637
Ethnic	1.17	0.49–2.83	0.723
Race	2.02	1.20–3.40	0.008
Education	1.56	1.24–1.96	0.001
Arthritis practitioner	1.04	0.47–2.33	0.918
Pain practitioner	1.07	0.52–2.21	0.855
Pain intensity	0.88	0.76–1.02	0.091
Pain interference	1.15	1.02–1.29	0.019
Pain relief	1.01	1.00–1.02	0.066