

# Musculoskeletal Disorders: Addressing Disparities in Prevalence, Severity, and Treatment

Lisa C. Campbell

**Racial and ethnic disparities in musculoskeletal disorders have been consistently documented in research conducted both nationally and in North Carolina. These disparities represent a higher clinical need that must be met with increased access to safe and effective interventions across medical, pharmacological, and psychosocial/behavioral modalities.**

**M**usculoskeletal disorders (MSDs) is the collective term for a variety of conditions that can affect the muscles, bones, and joints. MSDs are extremely common, affecting an estimated 1 in every 2 adults in the United States, or approximately 126 million individuals [1]. The most common MSD is osteoarthritis (OA), affecting nearly 52 million adults aged 65 or older. Other common MSDs include musculoskeletal pain in the neck and back, and pain subsequent to physical trauma injuries that many Americans suffer at work, playing sports, or in the course of military service. A final common MSD is osteoporosis, or bone density loss, that leads to increased risk of fracture. This risk is particularly elevated among older women [1]. The estimated annual cost of these conditions in terms of medical care and lost wages is \$213 billion, and the prevalence trajectory points upward unless there is significant attention to development of evidence based treatment, access to effective interventions, and a robust prevention effort [1].

## Disparities in MSD Prevalence

As with many medical conditions, the burden of MSDs is greater among racial and ethnic minority groups. These racial and ethnic disparities in MSD prevalence have perhaps been best established among individuals with OA. Higher rates of radiographic OA have been documented among African Americans as compared to Caucasians and Mexican Americans [2]. These differences are most pronounced among women. According to a research summary by Jordan and colleagues, African American women have a higher prevalence of OA than Mexican American women, and are possibly 2-3 times more likely than Caucasian women to have OA [2]. Notably, population-based arthritis research conducted in North Carolina has documented greater prevalence rates of bilateral radiographic knee OA among both African American men and women compared to their Caucasian counterparts [3]. African American men

were also significantly more likely to have hip OA as compared to Caucasian men [2].

## Disparities in MSD Severity

In addition to racial and ethnic disparities in prevalence, disparities also exist in the severity of musculoskeletal conditions. The North Carolina-based Johnston County Osteoarthritis Project documented more severe radiographic knee OA among African American women and a greater likelihood of bilateral hip OA among African American men as compared to Caucasian men [2, 3].

In addition to radiographic findings and extent of disease, MSD severity can also be measured in terms of pain and disability. The debilitating effects of severe arthritis and other MSDs takes a toll, often driving affected individuals from the workforce and into an uncertain and often more beleaguered financial future. MSD-related pain and disability related to OA and rheumatoid arthritis (RA) has also been reported to be greater among racial and ethnic minority group members, to include African Americans, Latino Americans, and Asian Americans [3-7]. Health disparities in MSDs and other medical conditions may account for as much as 30% of the costs of direct medical care for MSDs [8]. These excess costs are further compounded by the indirect costs related to lost productivity among populations that carry a greater burden of MSDs.

Increasingly, the search for explanations for the persistence of observed disparities in MSD prevalence and severity include examination of biological, environmental, and social and behavioral factors, as well as their interaction [9]. While an increasing understanding of the multifactorial contributions to health disparities in MSDs and other medical conditions, including potential genetic contributions, reflects important progress, widespread movement toward reducing these disparities is not yet evident [10].

## Disparities in MSD Treatment Access

Despite consistent research findings indicating greater

Electronically published September 22, 2017.

Address correspondence to Lisa C. Campbell, 104 Rawl Building, East Carolina University, Greenville, NC 27858 (campbell@ecu.edu).

**N C Med J. 2017;78(5):315-317.** ©2017 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2017/78507

prevalence and severity of MSDs among racial and ethnic minority group members, patterns of treatment do not appear to correspond to the greater clinical need. In the context of OA, total joint replacement is much less likely among African Americans, Hispanics, and Asians [2, 11]. Understanding disparities in surgery and other resource-intensive forms of treatment requires an examination of differences in financial access to care (eg, socioeconomic status, medical insurance status). Such socioeconomic status (SES) and insurance status differences have long been characterized as contributors to health disparities observed between Caucasians and non-Caucasians [12]. However, these treatment differences also persist when economic inequities are less apparent, as evidenced by decreased likelihood of referral for specialty care of racial and ethnic minority patients in health management organizations (HMOs) [13] and reduced rates of total knee replacements among African American and Hispanic Medicare enrollees [14]. Even among racial and ethnic minority individuals who overcome financial access barriers to surgical interventions, disparities exist in the form of greater risk of post-surgical mortality following hip or knee replacement surgery [15]. Interestingly, post-surgical expectations among African Americans is significantly lower, controlling for educational (eg, health literacy) and social (eg, physician trust, social support) factors [16]. The degree to which these lower expectations reflect awareness of the higher post-surgical mortality risks is unclear, but the alignment of expectations and risks is notable in that it suggests that surgical intervention is not necessarily the optimal or desired solution among minority populations [15, 16].

Disparities are also evident in less invasive treatments for MSDs, specifically medication. Prescribing patterns for racial-ethnic minority patients have been documented to differ from Caucasian patients in a variety of care settings. Much of this research has centered on prescription of opioids, which gained increased acceptability in the treatment of MSDs through the 2000s, predating the current opioid epidemic. A study by Dominick and colleagues [17] found that opioids were prescribed less frequently, with fewer days' supply, and at lower dosages for African Americans with OA as compared to Caucasian patients.

In research on clinical decision making, elucidating motivations behind prescribing patterns that result in racial or ethnic differences in access to medications, and the role of patient preferences in these clinical decisions, has been difficult to achieve. However, in the current clinical environment opioid prescribing for both acute and chronic conditions is facing increased scrutiny, and answering lingering questions about prescribing patterns for current medications will likely be delayed further as we await solutions that may materialize in the form of safer and more efficacious analgesic formulations [18].

In light of the known risks associated with surgical and pharmacological interventions for MSDs, attention is

increasingly being focused on interventions that address social and behavioral factors that are considered modifiable with less reliance on medical intervention. These interventions address lifestyle factors such as weight management and pain management, utilizing cognitive-behavioral pain coping skills [19-21]. A notable finding from research conducted in North Carolina is that combining weight management and behavioral pain management produces long-term improvements in OA-related pain and disability that are greater than those achieved with either weight management or pain coping alone [20].

While there is evidence that lifestyle and pain coping interventions can provide an efficacious alternative or supplement to medical interventions, access issues remain. To date, patients with OA, RA, or other MSDs must often participate in clinical research studies at academic medical centers to gain access to these less invasive therapies. Cost and time associated with traveling to study sites and finding time to participate in weekly intervention sessions that can span several weeks or months represent significant barriers to accessing this form of treatment. An ongoing North Carolina-based study that offers a partial solution for this dilemma involves delivering a comprehensive intervention with pain coping and weight management elements via telephone [21]. This project is also distinctive for its health disparities focus; all participants are African Americans with OA. Telephone and, increasingly, internet-based interventions that focus on accessibility to disparity populations are only feasible to the extent that the telecommunications and digital disparities do not represent an additional barrier [23].

Maximizing access to care will likely require a multi-pronged approach that addresses both primary and secondary access barriers. Primary access issues encompass financial and logistical barriers, including medical insurance and transportation [10]. Primary access can be improved by making behavioral interventions available in community-based primary care settings or in home-based settings, rather than limiting them to academic medical centers. This approach to expanding access could be particularly important in low-resource settings that care for a disproportionate share of both minority and low-income patients from all racial and ethnic backgrounds. Examples of effective, community-based non-pharmacological interventions that focus on symptoms that are especially relevant for individuals with MSDs (ie, pain, disability) are slowly increasing in number [21, 23]. Expanding the availability of these interventions in low-resource primary care settings requires consideration of what can feel like competing organizational demands (eg, limited staffing and resources) as well as shared goals (eg, improving patient outcomes). An argument can be made that competing organizational demands can be lessened by designing interventions that are scaled for primary care settings from their inception, rather than requiring significant translation that could lead to degradations in efficacy [24].

A final consideration concerns greater attention to secondary access, which emphasizes reducing the barriers that remain when the primary financial and logistical barriers have been reduced or eliminated [10]. This could include making an intervention culturally acceptable, patient-centered, or even cognitively accessible. Cognitive accessibility is a particularly notable barrier in cognitive-behavioral and educational pain interventions for patients with MSDs and other chronic pain conditions. Many interventions assume or require a level of primary literacy that puts these interventions beyond the reach of individuals with lower educational attainment. Low literacy individuals are disproportionately poor and members of racial and ethnic minority groups. Community-based, literacy-adapted pain management interventions such as that of Thorn and colleagues [23] demonstrate what may be possible on a larger scale as we move nonpharmacological interventions for management of MSDs within closer reach of racial and ethnic minority individuals who may benefit from them the most [25].

## Conclusion

Racial and ethnic disparities in MSD prevalence, treatment, and outcomes will persist without concerted and comprehensive efforts to address the biological, environmental, socioeconomic, and behavioral factors that drive them. *NCMJ*

Lisa C. Campbell, PhD associate professor, Department of Psychology, East Carolina University, Greenville, North Carolina.

## Acknowledgments

Potential conflicts of interest. L.C.C. has no relevant conflicts of interest.

## References

- United States Bone and Joint Initiative. The Burden of Musculoskeletal Diseases in the United States (BMUS), Third Edition. The Burden of Musculoskeletal Diseases in the United States website. <http://www.boneandjointburden.org>. Published 2014. Accessed June 15, 2017.
- Jordan JM, Lawrence R, Kington R, Fraser P, Karlson E, Lorig K, Liang MH. Ethnic health disparities in arthritis and musculoskeletal diseases. Report of a scientific conference. *Arthritis Rheum*. 2002;46(9):2280-2286.
- Jordan JM, Helmick CG, Renner JB, et al. Prevalence of knee symptoms and radiographic and symptomatic knee osteoarthritis in African Americans and Caucasians: The Johnston County Osteoarthritis Project. *J Rheumatol*. 2007;34(1):172-180.
- Bruce B, Fries J, Murtagh K. Health status disparities in ethnic minority patients with rheumatoid arthritis: a cross-sectional study. *J Rheumatol*. 2007;34(7):1475-1479.
- Wolfe F, Michaud K. Assessment of pain in rheumatoid arthritis: minimal clinically significant difference, predictors, and the effect of anti-tumor necrosis factor therapy. *J Rheumatol*. 2007;34(8):1674-1683.
- Yazici Y, Kautiainen H, Sokka T. Differences in clinical status measures in different ethnic/racial groups with early rheumatoid arthritis: implications for interpretation of clinical trial data. *J Rheumatol*. 2007;34(2):311-315.
- Ahn H, Weaver M, Lyon DE, et al. Differences in clinical pain and experimental pain sensitivity between Asian Americans and whites with knee osteoarthritis. *Clin J Pain*. 2017;33(2):174-180.
- LaVeist TA, Gaskin DJ, Richard P. The Economic Burden of Health Inequalities in the United States. Joint Center for Political and Economic Studies; 2009. [http://www.hhnmag.com/ext/resources/in-c-hhn/pdfs/resources/Burden\\_Of\\_Health\\_FINAL\\_0.pdf](http://www.hhnmag.com/ext/resources/in-c-hhn/pdfs/resources/Burden_Of_Health_FINAL_0.pdf). Accessed July 5, 2017.
- Pierce RO Jr. Ethnic and racial disparities in diagnosis, treatment, and follow-up care. *J Amer Acad Orthop Surg*. 2007;15:S8-S12.
- Campbell LC, Meghani S, Robinson K, Vallerand A, Schatman M, Sonty N. Challenges and opportunities in pain management disparities research: insights from clinical practice, advocacy, and policy. *J Pain*. 2012;13(7):611-619.
- Dunlop DD, Manheim LM, Song J, et al. Age and racial/ethnic disparities in arthritis-related hip and knee surgeries. *Med Care*. 2008;46(2):200-208.
- Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. Socioeconomic disparities in health in the United States: what the patterns tell us. *Am J Public Health*. 2010;100(Suppl 1):S186-196.
- Campbell LC, Warner TD. Accessibility of health care. In: Jackson Y, ed. *Encyclopedia of Multicultural Psychology*. Thousand Oaks, CA: Sage Publications; 2006.
- Cisternas MG, Murphy L, Croft JB, Helmick CG. Racial disparities in total knee replacement among Medicare enrollees—United States, 2000-2006. *Morbidity and Mortality Weekly Report*. 2009;58(06):133-138.
- Nwachukwu BU, Kenny AD, Losina E, Chibnik LB, Katz JN. Complications for racial and ethnic minority groups after total hip and knee replacement: a review of the literature. *J Bone Joint Surg Am*. 2010;92(2):338-345.
- Groeneveld PW, Kwok CK, Mor MK, et al. Racial differences in expectations of joint replacement surgery outcomes. *Arthritis Rheum*. 2008;59(5):730-737.
- Dominick KL, Bosworth HB, Dudley TK, Waters SJ, Campbell LC, Keefe FJ. Patterns of opioid analgesic prescription among patients with osteoarthritis. *J Pain Palliat Care Pharmacother*. 2004;18(1):31-46.
- Calif RM, Woodcock J, Ostroff S. A proactive response to prescription opioid abuse. *N Engl J Med*. 2016;374:1480-1485.
- Waters SJ, Campbell LC, Keefe FJ. Cognitive-behavioral treatment of rheumatoid arthritis. In: St. Clair W, et al., eds. *Textbook of Rheumatoid Arthritis*. Philadelphia, PA: Lippincott Williams and Wilkins; 2004.
- Somers TJ, Blumenthal JA, Guilak F, et al. Pain coping skills training and lifestyle behavioral weight management in patients with knee osteoarthritis: a randomized controlled study. *Pain*. 2012;153(6):1199-1209.
- Schrubbe LA, Ravys SG, Benas BC, et al. Pain coping skills training for African Americans with osteoarthritis (STAART): study protocol of a randomized controlled trial. *BMC Musculoskelet Disord*. 2016;17(1):359.
- Price Z. Race-based health disparities and the digital divide: implications for nursing practice. *J Natl Black Nurses Assoc*. 2015;26(2):79-83.
- Thorn BE, Day MA, Burns, J, et al. Randomized trial of group cognitive behavioral therapy compared with a pain education control for low-literacy rural people with chronic pain. *Pain*. 2011;152(12):2710-2720.
- Daniels LM, Dixon KE, Campbell LC. Building capacity for behavioral health services in a rural primary care clinic. *AIMS Public Health* 2014: Special Issue Addressing Understudied and Vulnerable Populations and Health Systems. 2014;1(2):60-75.
- Campbell LC. Addressing literacy as a barrier in delivery and evaluation of cognitive behavioral therapy for pain management. *Pain*. 2011;152:2679-2680.