



## Commentary

## Moving Forward with Physical Activity: Self-Management of Chronic Pain among Women

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Chronic pain among women in the United States and Canada is a public health issue, affecting as many as 34% of women (Johannes, Le, Zhou, Johnston, & Dworkin, 2010; Schopflocher, Taenzer, & Jovey, 2011). Women of all ages are 2% to 10% more likely to live with chronic pain than men (Schopflocher et al., 2011) with higher prevalence rates among vulnerable subgroups (e.g., racial minorities, veterans, lower socioeconomic status, lower education; older adults; Blyth, 2010). In addition, women are predominantly impacted by overlapping chronic pain conditions (e.g., chronic migraine, irritable bowel syndrome) and sex-specific conditions (e.g., endometriosis; Chronic Pain Research Alliance, 2015).

Pain is labelled as being chronic when it is not cancer related and persists beyond an expected time of healing, with the duration of 3 to 6 months or longer being commonly used for classification (Fishman, Ballantyne, & Rathmell, 2010). Even when injuries heal or diseases are controlled, pain may continue, or arise in the absence of identifiable tissue pathology owing to numerous alterations in central and/or peripheral neurophysiological mechanisms (Fishman et al., 2010). Furthermore, chronic pain is not a homogeneous entity, and distinct pain mechanisms may contribute to divergent responses to treatments even within narrowly defined disease classifications (e.g., osteoarthritis).

### Impacts of Chronic Pain

Chronic pain creates devastating impacts on individuals, health care systems, and societies (Agborsangaya, Lau, Lahtinen,

Cooke, & Johnson, 2013; Goldberg & McGee, 2011; Institute of Medicine, 2011; Lalonde et al., 2014; Rice, Smith, & Blyth, 2016; National Institutes of Health Interagency Pain Research Coordinating Committee, 2017). Among individuals, health-related quality of life is negatively impacted through worsened physical (e.g., reduced physical function and activities of daily living), mental (e.g., higher rates of depression and anxiety), and social health (e.g., fewer social support systems; increased stigma and discrimination; Agborsangaya et al., 2013; Duenas, Ojeda, Salazar, Mico, & Failde, 2016; Fine, 2011; Gerrits et al., 2014; Rice et al., 2016). Health care and societal impacts arise from direct and indirect costs from chronic pain. Total costs in the United States are an estimated \$560 to \$635 billion, including \$261 to \$300 billion in lost productivity costs; in Canada, total costs are an estimated \$42 billion (Institute of Medicine, 2011; Nahin, 2012; Phillips & Schopflocher, 2008).

### Physical Activity as a Nonpharmacologic Chronic Pain Management Approach

Given the individual and public health burden of chronic pain, the International Association for the Study of Chronic Pain (2010) (Montreal Declaration) has declared access to pain management a fundamental human right. Pain management involves the actions of the individual living with chronic pain, their significant others, and their interactions/relationships with health care professionals to minimize symptoms and optimize function (Clark, 2003). In addition to the declaration, national calls in the United States and Canada continue to recognize the need for research to further our understanding of effective pain management approaches and related outcomes, particularly among disadvantaged and more afflicted groups, including women (Lynch, 2011; National Institutes of Health Interagency Pain Research Coordinating Committee, 2017).

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Although pharmacological approaches, including opioids, are the most commonly prescribed management approach (Volkow & McLellan, 2016), concerns exist about their limited effectiveness and risks for dependency and addiction (Dowell, Haegerich, & Chou, 2016; Institute of Medicine, 2011). Thus, national health and pain agencies in the United States and Canada recommend the use of evidence-based nonpharmacologic management strategies, including physical activity, which is the focus of the present article, to help individuals better self-manage their pain (e.g., from the Centers for Disease Control and Prevention [Dowell et al., 2016] and the Canada National Pain Centre [Busse, 2017]).

Even though activity is a key self-management strategy, no specific evidence-based recommendations exist for the frequency, intensity, time, or type of physical activity that best manage pain. There are no sex- or gender-specific recommendations to guide the minimization of chronic pain during physical activity. However, evidence shows that a wide variety of physical activity participation paradigms reduce the negative health consequences of chronic pain and improve overall health (Ambrose & Golightly, 2015; U.S. Interagency Pain Research Coordinating Committee, 2016). Low to moderate intensity aerobic physical activity (50%–60% of maximum heart rate) results in reduced pain, disability, and depression, and more vigorous intensity activity (60%–80% of maximum heart rate) improves physical functioning, fitness levels, and overall health (Ambrose & Golightly, 2015; Geneen et al., 2017; Naugle, Fillingim, & Riley, 2012). Isometric and dynamic resistance/strength training exercises are safe and effective for improving strength and fitness and reducing symptoms across a variety of chronic pain conditions in adults (Ambrose, & Golightly, 2015). Mind-body therapies, including yoga, Tai Chi, and Qigong, are generally well-tolerated and effective in reducing pain, fatigue, depression, and anxiety, and improving balance, mobility, and strength (Cramer, Klose, Brinkhaus, Michalsen, & Dobos, 2017; Hall, Maher Latimer & Ferreira, 2009; Sutar, Yadav, & Desai, 2016; Wieland et al., 2017).

As highlighted in the U.S. Federal Pain Strategy (U.S. Interagency Pain Research Coordinating Committee, 2016), a more tailored research approach for disparate pain populations, including women, is needed to investigate outcomes and mediating mechanisms of pain management approaches, including physical activity. Despite this important recommendation, specific avenues for investigation are not outlined in the report. Thus, the this article provide a synopsis of key research themes and practical considerations that will aid in the advancement of knowledge on physical activity as a pain management strategy for women.

### Chronic Pain and Physical Activity: Research Themes

One thematic area to advance research involves a more thorough understanding of the neurophysiological mechanisms of pain among women and the effectiveness of physical activity to self-manage pain. What are the most feasible assessment approaches to identify the specific neurophysiological mechanisms contributing to chronic pain (including chronic overlapping types of pain disproportionately experienced by women)? What is the optimal dose of activity needed to address the mechanisms and achieve best long-term pain management? Factors to consider involve identifying the optimal frequency, intensity, time, and types of physical activity, including mind-body therapies that result in a) pain-reducing biological mechanisms, such as exercise-induced hypoalgesia (Naugle,

et al., 2012) and the anti-inflammatory effects of physical activity (Simpson, Kunz, Agha & Graff, 2015), and b) improvements in physical, mental, and social health (e.g., reduced pain-related fatigue, depression, and anxiety) among women with chronic pain. Are there gender and/or biological sex differences in the optimal dose of physical activity? Knowing the optimal dose based on specific pain-generating mechanisms as well as gender and/or sex holds the potential to result in more individualized, evidence-based care (McGregor, Templeton, Kleinman, & Jenkins, 2013).

The second theme involves an epidemiologic assessment of the rates of participation among women who use of physical activity as a chronic pain self-management approach. Information is needed on how many women are aware that physical activity is a pain management approach and how many women engage in or do not engage in activity to manage pain. If a majority are not physically active, then efforts must focus on educating women about the beneficial pain management impacts of physical activity. To date, only minimal non-epidemiological research has examined physical activity participation rates among women with pain. Dansie, Turk, Martin, Van Domelen, and Patel (2014) reported that women with chronic widespread pain averaged only 9 minutes of moderate to vigorous physical activity on weekdays and 12 minutes on the weekends. Even less is known about physical activity rates among vulnerable populations of women living with chronic pain, such as women of color, sexual orientation and gender-identity minorities, veterans, and Indigenous women, and the intersectionality associated with the cumulative effects of multiple levels of oppression (Kempner, 2017). Moving forward, research should embody principles captured in some current federal funding agencies and health-related scientific journals, both in the United States and Canada, that require gender and sex analyses be addressed in all submissions.

A third theme involves obtaining a greater and more specific understanding of factors that relate to, and mechanisms that can enhance, physical activity engagement in women. What personal barriers (e.g., pain-related fatigue, pain flare), social barriers (e.g., unsupportive significant others or health care professionals), and/or environmental barriers (e.g., unsafe neighborhoods, lack of local physical activity resources including gyms) hinder or stop participation in physical activity among all demographic groups of women with chronic pain? What are the key psychological mechanisms that help women to initiate and maintain their physical activity in the long term (e.g., self-regulatory efficacy beliefs, motivation)? Focusing on social factors, questions exist about the approaches health care providers (e.g., medical doctors, physical therapists) use to prescribe physical activity for women with chronic pain. Can a tailored, multimodal pain management approach be feasibly implemented for women to self-manage pain during physical activity, such as the 4 P's of pain treatment—physical (e.g., acupuncture, ice, heat), psychological (e.g., mindfulness), pharmacological (e.g., medication), and prevention (e.g., joint bracing; Dowell et al., 2016; Tupper, Swiggum, O'Rourke, & Sangster, 2014)? Does provider stigma, which involves negative judgements about a patient having chronic pain (De Ruddere & Craig, 2016; Williams, 2016) interfere with physical activity prescribing for all women and/or specific vulnerable subgroups? Very limited research has found that women with chronic pain overall, without consideration of vulnerable subgroups, are more likely to experience provider stigma in relation to pain diagnosis and treatment recommendations (LeResche, 2011). If stigma is consistently present among

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