Sarcopenia in perimenopause: The untold story of muscle loss and pain

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ABSTRACT

Introduction: Perimenopause; the transition phase leading up to menopause is a critical window in a woman's life marked by fluctuating oestrogen levels and hormonal shifts that accelerate a cascade of physical, metabolic and emotional changes. Among these, musculoskeletal (MSK) symptoms such as joint pain, muscle weakness, and reduced physical function are highly prevalent, affecting over 70% of women with 25% experiencing functional disability. Central to this is sarcopenia: the progressive loss of skeletal muscle mass, strength and function. Evidence shows that oestrogen decline triggers early sarcopenic changes. Despite this, muscle health is rarely addressed in midlife women and sarcopenia is seldom diagnosed at this stage. This missed opportunity delays early interventions that could significantly improve long-term quality of life. **Materials and Methods:** A comprehensive literature search was conducted across Scopus, ScienceDirect, and Web of Science databases, focusing on studies from 2000 to 2025. Search strings targeted the association between sarcopenia or muscle loss and musculoskeletal pain among perimenopausal or midlife women. Keywords used included: "sarcopenia", "muscle loss", "muscle weakness", "musculoskeletal pain", "joint pain", "back pain", "perimenopause", "midlife women", and "menopausal transition". Animal studies and postmenopausal-specific research were excluded. Boolean operators and database-specific syntax were applied to refine results. This narrative review aimed to synthesize current evidence, highlight research gaps and identify opportunities for early intervention. **Results:** Oestrogen decline during perimenopause reduces muscle protein synthesis, increases intramuscular fat infiltration, and elevates pro-inflammatory cytokines, accelerating early muscle deterioration. MSK symptoms often manifesting as joint stiffness, back pain or fatigue is frequently misattributed to aging or other conditions, resulting in underdiagnosis of early sarcopenia. This neglect impacts women's functional capacity, work performance, mental well-being, and quality of life. With regards to Malaysian population, literature remains sparse with most local studies focused on postmenopausal groups. Hence, there is an urgent need to establish a longitudinal cohort study tracking women from age 40 which represent Malaysia's multiethnic population. Current gaps include the limited integration of muscle strength and pain measures; most studies evaluate strength alone, overlooking musculoskeletal pain that substantially impacts function and mobility in perimenopausal women. Biomarkers data across menopausal stages also remain limited, restricting insight into the biological mechanisms of sarcopenia during the transition. In addition, there is a lack of perimenopause-specific interventions, such as nutritional and resistance training trials. Furthermore, awareness and screening protocols among healthcare providers remain insufficient. Our review highlights the importance of bridging these gaps through culturally relevant research, interventional studies and preventive health strategies tailored to midlife Malaysian women. **Conclusion:** Perimenopause represents a critical yet under-recognized period for detecting and addressing sarcopenia. Promoting muscle health in this window is essential for reducing long-term disability and dependency. Early screening, culturally adapted interventions, and raising awareness among women and healthcare providers are needed to shift the paradigm towards healthy ageing for Malaysian women.

Keywords: Perimenopause, sarcopenia, musculoskeletal pain, muscle weakness, ageing