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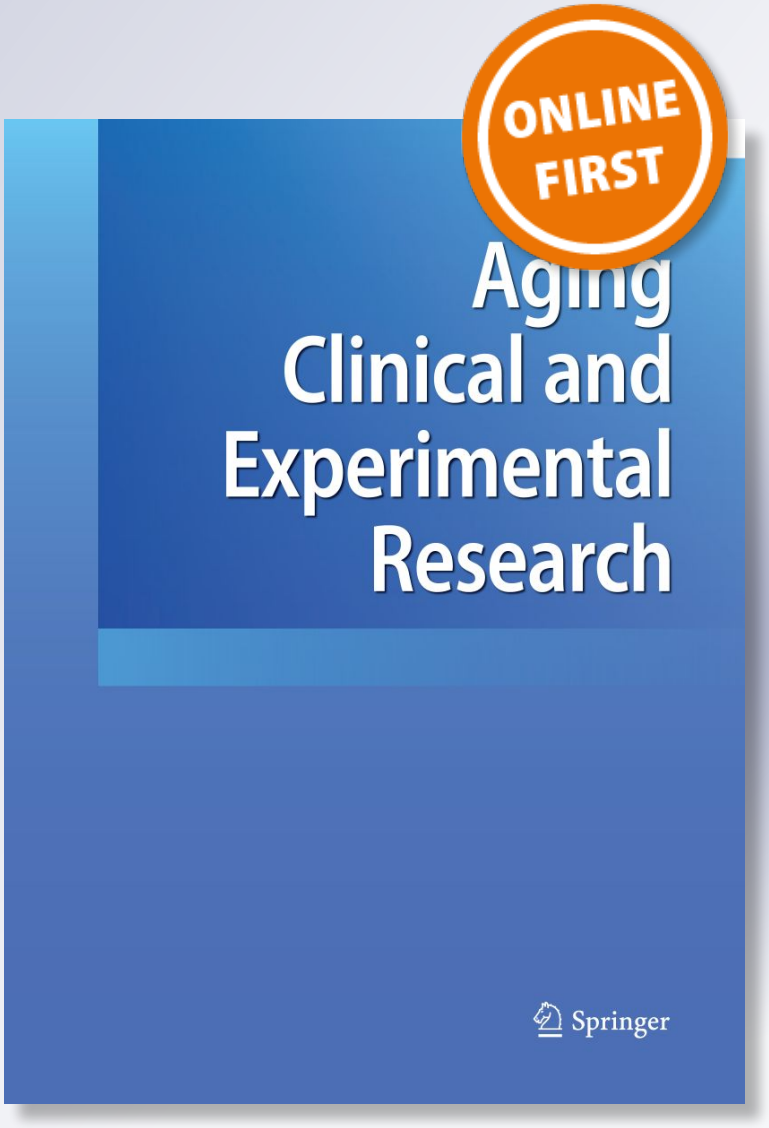

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REVIEW

Quality of life assessment in musculo-skeletal health

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Abstract Musculoskeletal disorders affect morbidity, quality of life and mortality, and represent an increasing economic and societal burden in the context of population aging and increased life expectancy. Improvement of quality of life should be one of the priorities of any interventions to prevent and treat musculoskeletal disorders in the ageing population. Two main approaches, namely generic and disease-specific instruments, can be applied to measure health-related quality of life. Among the generic tools available in scientific literature, the short form 36 questionnaire (SF-36) and the Euroqol five item questionnaire (EQ-5D) are two of the most popular questionnaires used to quantify the health related quality of life in people with musculoskeletal disorders. However, because generic tools may not always be able to detect subtle effects of a specific condition on quality of life, a specific tool is highly valuable. Specific tools improve the ability to clinically characterize quality of life in subjects with a specific musculoskeletal disorder, as well as the capacity to assess changes over time in the QoL of these subjects. The recent development of specific tools should help to validate preventive and therapeutic interventions in this field.

Keywords Quality of life · Musculo-skeletal health · Sarcopenia · Osteoporosis · Osteoarthritis · Frailty

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Introduction

With population aging and increased life expectancy, people are now living longer and are becoming increasingly susceptible to non-communicable diseases, in particular musculoskeletal disorders [1]. Musculoskeletal diseases increase with age and represent the fouth leading contributors to disease burden in older people after cardiovascular diseases, malignant neoplasms and chronic respiratory diseases [2]. Their burden also increases with age and will further increase with ageing of the global population [3]. The burden attributable to musculoskeletal disorders is estimated having increased by 46% from 1990 to 2010 [4]. The increase of socio-demographic status also contributes to higher disability-adjusted life-years (DALYs) associated with musculoskeletal diseases [5].

Musculoskeletal aging is a very large phenotype including four main conditions, osteoporosis, osteoarthritis,

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sarcopenia and frailty, which are associated with adverse outcomes such as falls, fractures, functional decline or increased mortality [6–10]. All of them highly affect disability and independence levels, quality of life and demands on health systems [11–13]. For instance, at the age of 50, the lifetime risk of any osteoporotic fracture lies within 50% in women and 20% in men, and further increases with advancing age [14, 15]. Osteoporosis is a major risk of fractures, but sarcopenia itself also increases the risk of fracture [16, 17], possibly via an increase of the risk of falls [18]. A vicious circle of musculoskeletal aging arises, leading to chronic pain, loss of mobility and slowness with their multiple clinical and societal consequences [19].

Burden of musculo-skeletal disorders

Patients with musculoskeletal disorders experience loss of mobility, of independence, higher rates of institutionalisation and higher mortality rates. As a consequence, all musculoskeletal disorders significantly impairs patients' health-related quality of life (HRQoL) [20–23], and generate at the societal level high direct and indirect healthcare costs. Among injuries resulting from low trauma falls, hip and vertebral fractures lead to the greatest activities of daily living limitations immediately after the fall [24]. Only 40–70% of hip fracture survivors recover their pre-fracture level of mobility, ability and independence to perform activities of daily living, and a substantial proportion requires assistance for various tasks in the 2 years after fracture, although they were independent before fracture [25]. Fractures also generate high hospital and healthcare costs which can remain above pre-fracture levels 5 years following the index fracture [26, 27]. In Switzerland during 2000, the overall incidences of hospitalization due to fractures were 969 and 768 per 100,000 in women and men, respectively, showing that osteoporosis continued to be a heavy burden on the healthcare systems [28, 29]. There is a high risk of transfer to a long-term care facility following osteoporotic fractures, reaching 10–30% of patients in the year following hospital discharge after hip fracture [25, 30]. This risk is about 3 times greater after hospitalization for a hip fracture or other fall-related injuries than for a non-fall-related reason [31].

Sarcopenia also significantly impacts self-reported quality of life and physical activity level [32, 33]. In women from the prospective Study of Osteoporotic Fractures, it was shown that slowness was associated with greater health care utilization, including greater number of hospitalizations, rate of hospitalization days and likelihood of a short-term skilled nursing facility stay than women without slowness [34]. Musculoskeletal disorders and their consequences are also associated with increased mortality risk. This has been shown for after low-trauma fractures [35–37], in patients with painful osteoarthritis [38] or with sarcopenia or deficits in mobility, even after adjustment for confounding factors [39, 40]. This burden is deemed to increase, driven by population aging, and largely exceeds service capacity, leading to a substantial treatment gap, in particular in the context of osteoporosis in which fractures are, however, preventable [29, 41].

Assessment of quality of life in musculoskeletal disorders

HRQoL is considered to be a subjective assessment of the impact of disease and treatment across physical, psychological, social and somatic domains of functioning and well-being [42]. This is also one of the most important concept in all medical illnesses that involves all relevant factors to health status directly and indirectly. HRQoL is also an important measure of a patient's perception of his/her illness. Measurement of HRQoL has become increasingly important in research and clinic over the past three decades. Randomised controlled trials as well as observational studies increasingly include QoL measures, usually as a secondary endpoint. Moreover, many medical interventions are now designed to improve quality of life rather than prolong the life. Additionally, there are studies utilizing measures of QoL as predictors, for example of physical decline or death [43, 44]. Inclusion of QoL measures into studies is no longer restricted to highly developed western countries, but now includes countries from all over the world [45, 46].

Research published clinical practice guidelines recommending providers to routinely evaluate patients' HRQoL and use their assessment to modify and guide patient care [47]. Two main approaches, namely generic and disease-specific instruments, can be applied to measure HRQoL [48].

Generic tools to assess quality of life in musculoskeletal health

Generic HRQoL instruments are designed to be applicable across a wide range of populations and interventions. Indeed, these simple and effective instruments [49] are designed to focus on domains of quality of life that can be expected to be affected by health-care interventions. They are, therefore, widely used in observational studies and clinical studies since they allow comparison between, for example, different populations suffering from a same disease or comparison of the quality of life impact of the disease based on the state of the disease.

Among the generic tools available in scientific literature, the short form 36 questionnaire (SF-36) and the

Euroqol five item questionnaire (EQ-5D) are two of the most popular questionnaires used to quantify the health related quality of life in people with musculoskeletal disorders. The SF-36 questionnaire [50] is composed of 36 items measuring eight health-related quality of health domains (physical functioning, role limitation due to physical problems, bodily pain, general health, vitality, social functioning, role limitation due to emotional problem, and mental health). The EQ-5D questionnaire is also a generic tool [51], which records the level of self-reported problems according to five dimensions (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression).

Studies employing the SF-36 have been undertaken in patients presenting various musculoskeletal disorders such as chronic back disorders [52–54], arthritis [55–57], osteoarthritis [58], rheumatoid arthritis [59], spinal problems [60, 61], fibromyalgia [62, 63] but also sarcopenia [64–66]. The EQ-5D has also been used for disorders such as back disorders [67, 68], osteoarthritis of the knee [69], rheumatoid arthritis [70, 71], sarcopenia [64, 72] and several musculoskeletal diseases [73].

A study including 3664 participants assessed the prevalence of twelve common musculoskeletal disorders [74]. Results reported that subjects with musculoskeletal diseases ($n = 1776$) had a worst quality of life compared to those without any musculoskeletal conditions ($n = 1888$). Lower scores were found for all SF-36 dimensions. The worsted results were found for fibromyalgia, osteoporosis of the hip, osteoporosis and rheumatoid arthritis, one again across all domains of the SF-36 questionnaire. Subjects with a musculoskeletal disease were also reported more health problems on the EQ-5D dimensions than those without a musculoskeletal disease. Subjects suffering from a musculoskeletal diseases presented, therefore, more problems on mobility (29.9 versus 10.5%), self-care (6.6 versus 2.3%), usual activities (34.5 versus 12.4%), pain/discomfort (62.5 versus 31.2%) and, finally, anxiety/depression (23.3 versus 14.8%).

One of the major criticisms highlighted against the use of generic QoL questionnaire is that these instruments, designed to measure HRQoL over a broad spectrum of diseases, may not be sensitive enough to detect HRQoL specific to a particular illness of interest. Indeed, they are often based on a relatively narrow focus on the concept of health and, therefore, they address only a selective number of domains. Moreover, they carry the risk of being insensitive to changes over time or treatment. In some specific musculoskeletal condition, such as sarcopenia for example, it is acknowledged that generic tools should be supplemented with disease-specific instruments [75].

Specific tools to assess quality of life in musculoskeletal health

Because generic tools may not always be able to detect subtle effects of a specific condition on QoL, a specific tool is highly valuable to assess the impact of musculoskeletal conditions on QoL. A large number of disease-specific tools already exist in the field of musculoskeletal health. In the field of osteoporosis, for example, no less than six specific health-related quality of life tools are available [Qualeffo-41 [48, 76], questionnaire QoL in Osteoporosis (QUALIOST) [77], osteoporosis assessment questionnaire (OPAQ) [78], osteoporosis QoL questionnaire (OQLQ) [79], osteoporosis functional disability questionnaire (OFDQ) [80] and osteoporosis-targeted QoL questionnaire (OPTQoL) [81]]. Specific quality of life questionnaires are also available for other conditions, such as arthritis in general [e.g. WOMAC, rheumatoid arthritis quality of life (RAQoL) [82]] but also for some specific form of arthritis such as knee and hip arthrisits [osteoarthritis knee and hip quality of life questionnaire (OAKHQOL) [83]] or psoriatic arthritis (PsAQoL questionnaire [84]). Other specific QoL questionnaires have also been found for sarcopenia [sarcopenia & QoL questionnaire (SarQoL®) [85]] and fibromyalgia [fibromyalgia impact questionnaire and its revised version (FIQ) [86]].

Specific tools improve the ability to clinically characterize QoL in subjects with a specific musculoskeletal disorder, as well as the capacity to assess changes over time in the QoL of these subjects. Even if therapeutic interventions in the field of sarcopenia and frailty are still in their infancy [87, 88], these tools can be used to assess the relevance of these interventions and their effectiveness in terms of change in quality of life. The disadvantage of specific tools is that they do not offer the possibility to compare the quality of life of subjects with other types of population.

Conclusion:

Musculoskeletal disorders are major health conditions associated with ageing, which affect morbidity, quality of life and mortality, and contribute to increased healthcare costs for the society. In the context of population ageing, of improvement of life expectancy and of the consensual previsions of marked increase of the proportion of older people, they represent a great challenge to limit their current and future economic and societal burden. Improvement of QoL should be the priority of any interventions to prevent and treat osteoporosis, osteoarthritis and sarcopenia in the ageing population. The recent development of tools dedicated to the assessment of QoL related to musculoskeletal conditions should help to validate such interventions.

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Compliance with ethical standards

Conflict of interest Charlotte Beaudart, Olivier Bruyère and Jean-Yves Reginster are the shareholders of SarQoL® sprl. Others authors have no relevant competing interests to declare.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent For this type of study informed consent is not required.

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