

Review article

Osteoporosis knowledge assessment and osteoporosis education recommendations in the health professions

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Received 15 February 2016; revised 29 February 2016; accepted 11 March 2016

Available online 4 May 2016

Abstract

A previous systematic review on osteoporosis knowledge published showed that only several studies investigated osteoporosis knowledge in health professionals, and it found that their knowledge was not as adequate and sufficient as it should be. Since then, studies published on osteoporosis knowledge among health professionals have also assessed and found that they still do not have adequate and sufficient osteoporosis knowledge. To increase and improve osteoporosis knowledge among health professionals, recommendations in osteoporosis education in the health professions, including the application of the cognitive load theory, online learning, problem-based learning, practical learning, simulation-based learning, interactive learning, and feedback are covered in order to ensure health professionals can have adequate and sufficient osteoporosis knowledge to best prevent and treat individuals with the disease.

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Keywords: Osteoporosis; Knowledge; Education; Health professions

1. Introduction

Osteoporosis is a severe and debilitating bone disease that affects hundreds of millions of individuals worldwide [1]. The disease is medically diagnosed as having reduced bone mineral density that is 2.5 standard deviations below the adult peak mean [2], which decreases bone strength and increases the risk of skeletal fractures, particularly fractures to the hip, spine and wrist, and osteoporosis and osteoporotic fractures significantly reduce the quality of life [3] and increase mortality [4] of those affected.

For the prevention and treatment of osteoporosis, it is vital that health practitioners have adequate osteoporosis knowledge to ensure that they have the ability and skills to effectively treat individuals with this disease. A decade ago, a published systematic review authored by Werner [5] noted the impressive increase in the amount of research studies

investigating osteoporosis knowledge in the then-previous decade, and while many studies in the review investigated osteoporosis knowledge in populations considered to be most at risk for the disease, only several studies were conducted assessing the osteoporosis knowledge of health professionals, as Werner [5] noted that “very little attention has been paid to the knowledge of health care professionals involved in the prevention and treatment of osteoporosis”. As osteoporosis prevention and treatment requires a multidisciplinary approach from numerous types of health professionals, literature on osteoporosis knowledge found to have investigated health professionals included physicians, nurses, and dietitians, with findings showing that all could have higher levels of osteoporosis knowledge, whether it was general osteoporosis knowledge and/or knowledge of specific osteoporosis topics [5]. Since Werner's [5] review, additional research studies have been conducted in the past decade investigating osteoporosis knowledge of health professionals, which has been studied in both professionals and students in various health fields.

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Peer review under responsibility of The Korean Society of Osteoporosis.

2. Osteoporosis knowledge assessment in the health professions

2.1. Osteoporosis knowledge in medicine

In the field of medicine, female medical school entrants have modest osteoporosis knowledge with gaps in knowledge of risk factors, preventive behaviors and severity of the disease [6], and medical students know the definition of osteoporosis, but lack knowledge of its complications and preventive measures, as researchers concluded that medical students need more education on risk factors and preventive measures for osteoporosis [7]. Practicing physicians may only have adequate general knowledge of risk factors and preventive strategies of osteoporosis, but limited knowledge in the best and proper treatment strategies for the disease [8].

2.2. Osteoporosis knowledge in nursing

In the field of nursing, nursing students of various grade levels have been shown to have low osteoporosis knowledge, with researchers recommending interventions to increase osteoporosis knowledge [9,10]. Even in senior nursing students, osteoporosis knowledge is inadequate [11–13], with limited knowledge of aspects including risk factors, detection, treatment, and preventive measures. Although osteoporosis education can lead to higher levels of osteoporosis knowledge in nursing students [14], and even though there is some osteoporosis education in the nursing curriculum [15], there is a need for even more osteoporosis education, as osteoporosis knowledge has still been found to be inadequate in senior nursing students, as well as in practitioners in nursing, to treat individuals with the disease. Practitioners in nursing have also been found to have low to only moderate osteoporosis knowledge [16–23], causing recommendations made for increased osteoporosis education in nursing curriculums and continuing education [16,17], as nurses have a desire for more osteoporosis education [22], and have felt their lack of osteoporosis knowledge was a barrier towards giving adequate care [23].

2.3. Osteoporosis knowledge in other health fields and in community health

For other health fields besides medicine and nursing, students studying pharmacy, physical therapy, and dietetics have some osteoporosis knowledge, but levels were still insufficient in terms of general osteoporosis knowledge, particularly knowledge of osteoporosis risk factors and knowledge of exercise and nutrition in relation to osteoporosis and bone health, showing a need for increased osteoporosis education in their respective curricula to better prepare them to work with individuals with osteoporosis in practice after they graduate [13]. Various health professionals working in orthopedics and rehabilitation, such as dietitians, physical therapists and physical therapy assistants, occupational therapists occupational therapy assistants, pharmacists, technologists, among

other professionals, generally have low to only moderate osteoporosis knowledge [19], even when working in an orthopedic setting. As physical activity is a key health behavior used for the prevention and treatment of osteoporosis, exercise physiologists also have low to only moderate osteoporosis knowledge, particularly in the areas of disease prevalence, prevention, and nutrition [24]. And as for health professionals who work in community health settings, medical workers in community health service centers were found to have low osteoporosis knowledge [25], and even guardians and caregivers of individuals with osteoporosis have been found to have limited osteoporosis knowledge [26].

2.4. Osteoporosis knowledge conclusion

Consistent to a previous assessment on osteoporosis knowledge of health professionals [5], similar findings from numerous studies thereafter have found that osteoporosis knowledge is still inadequate and insufficient in health professionals. Evidence is firm and conclusive that health professionals who work with and treat individuals with osteoporosis still lack adequate and complete osteoporosis knowledge, regardless of the health field of practice.

Osteoporosis education must start in the curricula for students of these health professions, with continuing education throughout their professional careers. For those who are already health professionals, there is some evidence of moderately effective continuing education for increasing osteoporosis knowledge, at least for physicians. Internet-based lectures on osteoporosis were found to increase osteoporosis knowledge, although patient care was not altered [27]. And although attendance at workshops on osteoporosis medical practices have been associated with higher rates of practice for elderly women and for women and men considered at high risk for the disease, osteoporosis treatment remained suboptimal, particularly for men [28]. Thus, development and designs for better methods and modalities for osteoporosis education is needed for health professionals. As evidence is conclusive that health professionals lack adequate and complete osteoporosis knowledge, focus should be placed on advances in osteoporosis education to increase and improve their osteoporosis knowledge in order to provide individuals with osteoporosis the best treatment and care possible.

3. Osteoporosis education recommendations in the health professions

3.1. Cognitive and learning science theory

To improve osteoporosis knowledge, osteoporosis education should be based on and model off a cognitive and learning science theory developed in order to predict effective learning. One such cognitive and learning science theory, the Cognitive Load Theory (CLT) [29–31], intended to design instruction based on a model human cognitive architecture, is applicable in health profession education due its approach of increasing use of authentic and real-life tasks in learning [32]. In its

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