



Integrated Care Pathways for Bone Health: Singapore

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The burden of osteoporosis: a chronic disease perspective

Singapore's total population stood at 5.45 million as of 2021, with 17.6% of the population aged 65 and over.¹ However, that portion is expected to reach approximately 25% of the population by 2030 and almost 50% by 2050.² As life expectancy rises, the burden of poor bone health rises in unison. Rates of osteoporotic fractures have been increasing globally and are expected to continue rising. Much of the growth rate can be attributed to the increasing share of the population over age 60 worldwide.

Poor bone health encompasses a range of diseases, but it is most often quantified as the aggregate burden of osteoporosis and osteoporosis-related fractures. Osteoporosis is characterised by low bone mineral density or the deterioration of bone tissue, and it is the most widespread bone disease worldwide.³ Osteopenia, or reduced bone mass, is considered an early stage of osteoporosis, and many individuals with osteopenia are at great risk for developing osteoporosis.²

Osteoporotic fractures (or osteoporosis-related fractures) result from injuries that would not typically break a normal, healthy bone.³ This

paper utilises the terms *osteoporosis-related fractures* and *osteoporotic fractures* as opposed to *fragility fractures* to avoid the stigma that often accompanies the term *fragility*.

Osteoporotic fractures are one of the largest contributors to the burden of chronic conditions. Health systems around the world must prepare for this surge by prioritising bone health to preserve mobility and wellbeing. Globally, the disability adjusted life year (DALY) figure for musculoskeletal disease has grown by 45% since 1990, while the mean growth for other diseases has been 33%.⁴ This has serious implications for the future of Singapore's healthcare system, as well as the future of bone health in Singapore.

Studies in Singapore project that the total number of osteoporotic fractures will increase from 15,267 in 2017 to 24,104 in 2035, which represents a 57.9% increase in less than 20 years.⁵ Given the imminent and substantial increase, it is vital that bone health be supported as a part of healthy ageing in the lifestyles of Singaporeans.

Demographic burden of osteoporosis

Over 200 million people are affected by osteoporosis across the world.⁶ Hip fractures are one of the most common results of poor bone health and one of the most serious complications of osteoporosis.⁷ Singapore has the highest reported incidence of hip fractures in Asia.⁸

One in three Singaporean women over 50 years old has osteoporosis.⁸

The International Osteoporosis Foundation Asian Audit showed that one in three Singaporean women over 50 years old has osteoporosis.⁸ Among females more than 60 years of age, half and one-quarter of the population were at intermediate and high risk of developing osteoporosis, respectively. Globally, one in five men over age 50 will experience a fracture caused by osteoporosis, and outcomes for men from osteoporotic fractures, particularly hip fractures, are often worse.⁹ Unsurprisingly, it has been estimated that the cost of managing hip fractures in Singapore will reach US\$145m in 2050.⁸

Societal burden of osteoporosis

The societal burden of osteoporosis includes direct medical costs and the monetary and nonmonetary costs of poor health.¹⁰ Up to 56% of individuals with a hip fracture become dependent on an informal caregiver, causing a significant financial burden for both families and employers.¹¹ Osteoporosis has also been associated with various adverse health outcomes such as disability, psychological deterioration and mortality.¹⁰ Subsequent to a sentinel fracture, an individual is at twice the risk of experiencing further fractures.¹² Individuals who have experienced a hip fracture are at an increased

risk of mortality both in the short and long term compared to people who have not had a hip fracture.¹³

Some of this burden can be alleviated with early identification, improved access to treatment and better support programs for those living with osteoporosis. Multisectoral partnerships such as the Bone Alliance of Singapore have helped facilitate closer interactions between local community partners to ameliorate the burden,^{14,15} but there are gaps to be filled, as discussed in the next section.

Awareness and knowledge of osteoporosis

Awareness of osteoporosis among Singaporeans has not yet reached an ideal level. A recent study in 2021 found that 88% of participants had low osteoporosis awareness and prevention knowledge.¹⁶ This was also strikingly lower than the local study performed 20 years ago that showed 42.7% of participants had low osteoporosis awareness.¹⁶ Studies showed that reasons for declining bone mineral density (BMD) testing in Singapore were due to misconceptions that lifestyle management (regular exercise and calcium intake) is sufficient to prevent osteoporosis; poor awareness and knowledge of the disease; and the perceived high cost of BMD testing.¹⁷

Other studies have cited a lack of understanding of the screening process.¹⁷ A clinician calls the lack of awareness a barrier to care, stating, “the main reason patients refuse treatment for osteoporosis is that they feel they are too old, and it’s ‘not worth it’, but this is not true. Therefore, one of the biggest barriers to care is the perception of the patients and caregivers”. Similar concerns have been linked to poor adherence to osteoporosis treatment, such as time-consuming follow-up appointments, medication costs and side effects, and the perceived lack of importance of osteoporosis treatment.¹⁷ Education campaigns as well as awareness events

should be prioritized because they can increase both prevention and the treatment of poor bone health.

Fortunately, local programs are well on their way, such as the Bone Health Ambassador Programme, which is a collaborative program between the Health Promotion Board of Singapore and Osteoporosis Society Singapore.¹⁸ This program is designed to train 300 bone health ambassadors to educate Singaporeans on the importance of a healthy lifestyle and diet. They assist in public education sessions, particularly in the area of fall prevention. Other nonprofit organisations in Singapore such as WINGS have also started training Singaporean women in particular about the importance of bone health so that they can take this knowledge back to their families and communities.¹⁹

Osteoporosis awareness is an important factor for early diagnosis and prevention of fractures and the associated morbidity and mortality.¹⁷ Although educational training and sessions are being held, it is also important to incorporate programs and initiatives that focus not just on primary prevention but also secondary prevention within the community. This will increase the awareness and uptake of health services related to osteoporosis, and it will improve the quality of life for those at risk of osteoporosis and related fractures.

The current state of care

The current health system in Singapore is said to be “disease-centric”. Experts believe that this needs to change, stating, “we must move away

from [a disease-centric health system] and start thinking about ‘how do I look after someone as a whole?’” This is where integrated care can help streamline care for patients with poor bone health. Clinicians believe that “pathways of care should be intentionally created, otherwise patients tend to get lost in the ‘Bermuda triangle’ between the surgeons who are focused on surgery, the primary care doctors who have competing clinical priorities and limited knowledge, and the bone disease specialists who have limited availability—and to whom patients are often not referred.” Primary care doctors in particular can be instrumental in helping patients navigate care through the health system, ensure continuity of care and potentially provide earlier management of health conditions. Studies have shown that patients without a regular doctor are more likely to have more emergency visits and generally poorer health outcomes.^{20,21} Yet many Singaporeans tend to doctor-hop and thus lack a consistent primary care doctor.²² Without a consistent doctor, osteoporosis patients are more likely to end up in the aforementioned “Bermuda triangle”.

Despite the primary care challenges, Singapore is one of the few countries in the Asia Pacific region where osteoporosis is considered a national health priority.² It also has Asia’s oldest Fracture Liaison Service: Osteoporosis Patient Targeted and Integrated Management for Active Living (OPTIMAL).² OPTIMAL 2.0, launched in 2019, has been incorporated into the operational budget of public restructured hospitals and polyclinics in Singapore. This move aims to make secondary fracture prevention a part of these centres’ routine workflow.¹⁹ However, the efficiency and effectiveness of these services have not been evaluated. Additionally, while there is a structure in place for greater emphasis on osteoporosis care, a recent study suggests that nurses and physicians in acute hospitals may be unaware of the tools to manage bone health.²³ Primary care providers may also lack such knowledge, as well as community health workers, who are often overlooked.²⁴ It is

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vital that healthcare workers are informed about bone health to ensure osteoporosis is detected, treated and controlled appropriately.

Osteoporosis was included in the Chronic Disease Management Programme in 2015, whereby patients can use Medisave, the compulsory national health insurance in Singapore, to pay for outpatient clinic visits pertaining to their osteoporosis care. However, patients, their families and the community still incur significant costs associated with osteoporosis and its related fractures. Patients' greatest costs are associated with hospitalisation and informal care.²⁵ Although formal care may be covered by Singaporean national health insurance, the cost of informal caregiving once the patient returns to their local communities must also be considered.

Experts state that tackling bone health requires a "systems approach, in which a redesign of policies and regulations are needed". Fracture liaison services (FLS) are the most widely utilised and supported multidisciplinary care programmes for bone health. One local clinician expert said that FLS has been shown to be successful in one of Singapore's hospitals. This FLS was aimed to improve secondary prevention of osteoporosis with services such as counselling for patients about their treatment options and follow-up arrangements, as well as falls risk assessment, education and exercise programs. The expert noted that the approach increased the number of patients following up after their treatments and reduced hip fracture mortality and morbidity. Given the potential benefit shown, effective programs and initiatives that complement FLS in the hospital setting should be embedded in the local community to support a healthy lifestyle for the ageing community.

The future of bone health in Singapore

Academics, clinicians, stakeholders from the public and private sectors, and government agencies must collaborate to ensure better management of bone health in Singapore. Integrated pathways and preventive bone healthcare align with Singapore's Ministry of Health's Healthier Singapore strategy, which encourages stronger prevention, involvement of family physicians and an action plan for successful ageing for seniors.²⁶ To better establish and implement integrated care pathways for bone health, Singapore should focus on:

Increasing public awareness and knowledge of bone health. Increasing public awareness will reduce misconceptions regarding bone health. Such education will help improve knowledge and perception about bone health among Singaporeans, but it will also encourage the use of preventive and treatment services. Increasing awareness among healthcare professionals is equally important to ensure early, effective treatment, by enabling and activating relevant healthcare stakeholders early in the patient care journey. Moreover, local community organizations can partner with health programmes such as the Bone Health Ambassador to facilitate early screening.

Reinforcing secondary care by expanding FLS. All fractures should be investigated to determine whether they are associated with osteoporosis. Primary care doctors must support and work alongside bone health specialists to ensure high-quality care to those with and at risk of osteoporosis and to promote adherence to treatment plans. The success of FLS is an example of improved care that nongovernmental organisations can use to inspire further initiatives in the field of bone health.

Strengthening primary care. Primary care doctors can help patients with poor bone health to navigate services. Increasing these doctors' involvement will improve clinicians' workflow and the patient's

treatment journey in alignment with the Healthier Singapore framework. Improved clinical training, complemented by a streamlined and consolidated approach to primary care guidelines, can help clinicians to recognise the importance of bone health assessments. Emphasising patient communication and demonstrating efficient tools to assess fracture risk are vital.

Educating healthcare professionals. It is essential that multidisciplinary healthcare professional teams—encompassing primary, secondary and community care—create integrated pathways for bone health. Health professionals including pharmacists, physiotherapists and nurses must be included to meet an individual’s needs throughout life. These healthcare care professionals can be

trained as bone health ambassadors to identify individuals at highest risk of fractures early to provide early intervention and support.

Population ageing, often called the “Silver Tsunami”, is quickly approaching Singapore, and there is a great opportunity to act. Integrated care pathways for bone health can improve the comprehensiveness of care and services to allow Singaporeans to live long healthy lives. As one expert claims, “how we act on this issue of demographic change can be a gift to future Singaporeans.” Through the focus areas outlined above, more can therefore be done to move the needle towards better bone health and healthy ageing.

About this paper

In March 2022, Economist Impact published a global research program, sponsored by Amgen, entitled *Integrated care pathways for bone health: an overview of global policies*.²⁷ This briefing paper is a synthesis of subsequent discussions during a bone health event in Singapore, supplemented by desk research conducted independently by Economist Impact, focused on applying insights from the global study within the Singaporean context.

The research was conducted by the Economist Impact team. The research for this paper was managed by Amanda Stucke and led by Jocelyn Ho, with inputs and analysis from Nuriesya Saleha and Emily Tiemann. This briefing paper was written by Jocelyn Ho and Nuriesya Saleha, and was edited by Melissa Lux.

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