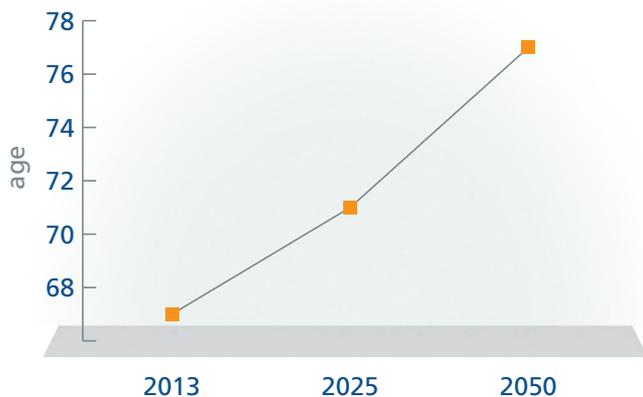


PAKISTAN

COUNTRY OVERVIEW

The population of Pakistan was 193.2 million in 2013 with an average life expectancy of 67 years (Figure 1). This number is expected to increase by approximately 51% between 2013 and 2050, rising to 228.3 million in 2025 and 290.8 million in 2050 (Figure 2). With an increasingly ageing population, the numbers are projected to rise much more rapidly in the over fifties age group. In just over a decade, by 2025, those aged over 50 years will increase by 50% (from 24.8 million to 37.3 million) and increase again by 134% to 87.2 million by 2050. As shown in Figure 1, in 2050, 30% of the population will be over the age of 50 years and living to an average age of 77 years (compared with today where 13% are aged over 50 years and living to 67 years)¹. This is a steep growth curve occurring – in just a few decades – in the population most vulnerable to osteoporosis and this presents Pakistan with a tremendous challenge as well as an opportunity to care for its elderly.

FIGURE 1 Life expectancy in Pakistan



State of osteoporosis/osteopenia

Osteoporosis-related bone fractures are a significant public health problem in Pakistan. The prevalence of osteoporosis in Pakistan is high, as observed in several



CURRENT

Population **193.2 million**
Aged over 50 years **13%**
Life expectancy **67 years**
Hip fracture incidence per year **no data**
Cost per hip fracture **1,200–2,400 USD**
Number of DXA per million population **< 0.1**
Fracture liaison services **not implemented**

PROJECTED 2050

Population **290.8 million** ↑
Aged over 50 years **30%** ↑
Life expectancy **77 years** ↑

FIGURE 2 Population projection for Pakistan



studies measuring bone mineral density (BMD) using ultrasound. One study of 140 postmenopausal women found that 42% had osteopenia (T-score between -1 and -2.4) and 29% had osteoporosis (T-score below -2.5)⁵. Another study of 334 women over the age of 20 years found that 43.4% had osteopenia (BMD 0.46 g/cm²) and 12.9% were osteoporotic (BMD 0.33 g/cm²)².

Additionally, studies have reported a high prevalence of osteopenia in young women. A study in Karachi found low BMD levels (T score < - 1.0 and > - 2.5) in 64% of women aged less than 30 years, in 55% of women aged between 31–45 years, and in 73.9% of women aged over 45³. Left untreated, these young women with poor bone health in 2013 may well become part of the osteoporotic burden in the years to come.

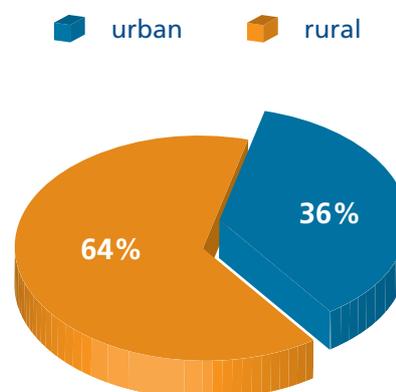
Lifestyle

As mentioned above, cases of osteopenia have been observed in younger and premenopausal Pakistani women, who are likely to be at greater risk of developing osteoporosis in later life⁴. There are various factors that may contribute to this, including poor nutrition, and low vitamin D and exercise levels.

Nutritionally, as is common around the world, the modern trends towards consumption of fast food and carbonated beverages, both of which are energy dense but nutrient poor, is present in Pakistan, with calcium consumption being particularly low⁴. One study found that the mean calcium intake in Pakistan was 346 mg/d, which is less than 50% of the daily intake recommended by the World Health Organization (WHO)⁵.

With regard to vitamin D, numerous studies found widespread deficiency. A study in Karachi observed that 82.8% of premenopausal women were vitamin D deficient (<20 ng/mL)⁶. In another study, 90.1% of the younger women were vitamin D deficient (<50 nmol/L)⁷. Increasingly, Vitamin D deficiency appears more common in younger than older women suggesting that peak bone mass may not be achieved, predisposing to osteoporosis later in life⁷. Although Pakistan is sunny, conservative dress and air pollution in the urban areas may be factors that limit sun exposure and therefore vitamin D absorption (*Figure 3*)^{6,8,9}. Finally, Pakistan does not have a mandatory vitamin D fortification policy in place limiting the opportunity to boost levels through diet⁴.

FIGURE 3 Urban versus rural population in Pakistan⁹



Exercise levels have been shown to be low in Pakistan and sedentary living is high which could be due to greater hours spent indoors with computers and watching television⁴. The elderly in Pakistan also lead a mainly sedentary lifestyle. The lack of exercise and physical activity may play a significant role in low bone mass, immobility disorders, loss of muscle mass and falls, all of which contribute to osteoporosis and related fractures¹⁰.

Level of awareness

An article in the *Indian Journal of Endocrinology and Metabolism*, described some health challenges in Pakistan, including inadequate knowledge of the prevalence and causes of many common diseases, including osteoporosis. This is evident from the lack of guidelines and standards as well as the low number of physicians specializing in osteoporosis prevention, diagnosis and treatment. Additionally, fracture data are not widely available which inhibits the understanding of the magnitude of the disease¹¹.

The low awareness levels are not unique to the medical community. Some social studies have found that knowledge of osteoporosis in younger women is usually very poor compared to older females¹². This is a concern since the younger women in Pakistan already display risk factors for poor bone health and vitamin D deficiency.

FRACTURE RATES

Hip fracture

Fracture data are lacking in Pakistan and accurate numbers are not available.

Other fragility fractures

Data not provided.

Vertebral fractures

Data not provided.

COST OF FRACTURE

The Pakistan Society for the Rehabilitation of the Disabled (PSRD), a leading provider of orthopaedic, medical and surgical health care and rehabilitation, estimates that 50–75% of hip fracture cases are treated surgically in the urban areas, and the average waiting time for surgery is 2–3 days once the patient has entered the tertiary health care system, which may be altered depending on the age and health of the patient. Costs for hip fracture treatment are approximately 1,200 USD if a dynamic hip screw (DHS) surgery is done and 2,400 USD if a total hip replacement is done (*Table 1*). These figures are estimated to be less favourable in the rural

areas since there is reduced access to health facilities and less awareness of osteoporosis outside of the cities.

TABLE 1 Costs of hip fracture

HOSPITAL COSTS PER HIP FRACTURE (USD)	AVERAGE HOSPITAL BED DAYS	SURGICALLY TREATED
\$1200–2400	4–6	50–75%

FRACTURE REGISTRIES

Pakistan does not currently have fracture registries.

FRACTURE LIAISON SERVICES

Fracture liaison services are generally not available; however the PSRD is aware of certain consultants who,



on an individual basis, may be coordinating fracture care for their patients.

SPECIALISTS RESPONSIBLE FOR OSTEOPOROSIS

Osteoporosis in Pakistan is primarily managed by primary care physicians (GPs, family doctors) and orthopaedic surgeons. Other physicians who are responsible for osteoporosis patients are: rheumatologists, gynaecologists and rehabilitation medicine physicians. However, these physicians are not specifically trained in osteoporosis since it is not a recognized component of medical training in Pakistan.

GOVERNMENT POLICIES

Osteoporosis as a documented national health priority

Osteoporosis is not a national health priority in Pakistan at present and currently there are no clinical guidelines regarding this public health problem. There are many reasons for this. Traditionally in Pakistan, osteoporosis has primarily been considered a natural consequence of ageing, and in a country where the life expectancy at birth is only 67 years and only 6.4% of the population is aged over 60 years, it naturally has not figured high on the list of priorities¹³. Additionally, the country's financial resources are limited. The total expenditure on health in 2011 was 2.5% of gross domestic product (GDP) of which the government expenditure was only 27% of total expenditure¹³. This is not at all sufficient to meet the growing health needs of a large population of 193.2 million.

Additionally, the priority of international donor agencies in Pakistan is not on osteoporosis, but rather on other health issues such as HIV/AIDS, Polio, maternal and child health etc., in line with the Millennium Development Goals.

Some industry and non-governmental organizations do put effort into osteoporosis awareness and treatment. For example there is a public health programme organized by pharmaceutical companies on Maternal & Child Health (MCH) that often focuses on calcium and vitamin D. The PSRD routinely conducts bone density tests and also takes multiple steps regarding health education of high-risk patients. Seminars on osteoporosis are also major events at a local level. Dissemination of osteoporosis information leaflets among the public and osteoporosis awareness

campaigns such as that launched by PSRD in October 2012 (<http://www.psr.org.pk/default.aspx>) also help to educate the public on the growing menace of this disease.

Guidelines

According to PSRD, it is not known if osteoporosis guidelines currently exist in Pakistan, however, there is guidance on fracture risk assessment including prior fracture, age, BMD scores and the use of FRAX.

Audit and quality indicator systems

Pakistan does not presently have a quality indicator system in place for osteoporosis.

TREATMENT (REIMBURSEMENT OF MEDICATION)

Pakistan's health-care system comprises government run and private health facilities, and the overall governance for health care is at the local, provincial level. Functions were transferred to the provincial health departments in 2011 when the responsibilities of the Ministry of Health were delegated. Now, the provinces are responsible for developing their own strategies and interventions based on their local needs¹⁴.

For this reason, there are no national treatment reimbursement guidelines for osteoporosis care in Pakistan, and one must look to the local level for details. In principle, treatment is free in government hospitals but depends on the availability of services. Generally, treatment is mostly focused on post-fracture care and least focused on preventive care. First-line treatments usually include alendronate, risedronate, strontium ranelate, vitamin D and calcium supplements.

DIAGNOSTICS

Dual-energy X-ray absorptiometry (DXA) remains the 'gold standard' diagnostic tool for osteoporosis but high cost and low availability restrict its use in primary care in Pakistan, and equipment is usually available in cities only^{5,8}.

There are approximately 16 DXA (less than 0.1 per one million in population¹⁵) and 150 ultrasound machines (0.1 per 10 000 population). DXA costs around 40 USD per scan and the average waiting time for a scan is 2–3 days (*Table 2*). Ultrasound may also be used as a diagnostic tool, with wait times of 1–2 days and costing

TABLE 2 Access and cost of diagnostics in Pakistan

	DXA	ULTRASOUND
Waiting time (d)	2–3	1–2
Cost (USD)	\$40	\$15–20
Is it reimbursed?	depends on local governance	depends on local governance
Is reimbursement a barrier to access to treatment?	depends on local governance	depends on local governance

around 15–20 USD. Reimbursement depends on the local governance and health plan concerned.

RECOMMENDATIONS

Action plans for prevention, treatment, diagnosis and fracture care are needed in Pakistan, such as:

- Establishing a fracture registry which compiles high-risk patients and patients presenting with hip fractures and other fragility fractures will help to develop prevention and treatment parameters for osteoporosis.
- Expanding osteoporosis awareness to the rural communities through the existing *rural health project* will help to spread awareness of the disease to the more remote areas of Pakistan.
- Increasing overall efforts to raise awareness about osteoporosis so that effective steps can be taken to prevent the first and subsequent fractures will be imperative, especially with life expectancy gradually increasing from 61 years in 1990, to: 67 years in 2011; 70 years in 2025; and 77 years in 2050.
- Supporting patients with the goal of improving the quality of life of those living with the disease will help to ease the burden on the patient and family system.
- Encouraging the government to take the lead and develop programmes for osteoporosis that are similar to the existing *Family Planning* and the *Extended Program of Immunisation (EPI)* programmes.

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