

## Burden of hip fracture on disability



In *The Lancet Public Health*, Nikos Papadimitriou and colleagues<sup>1</sup> describe the public health impact of hip fractures on disability adjusted life-years (DALYs) using data from six large cohort studies from Europe and the USA. The results showed that DALYs for hip fracture were 27 per 1000 individuals, representing an average loss of 2.7% of healthy life expectancy. Notably, the effect of hip fractures on DALYs was 2.29 times greater than years of life lost due to premature mortality, especially at younger ages (60–69 years) and in women.

The results of this study are timely in view of the crisis in the treatment of osteoporosis<sup>2</sup> and the observation that the downward trend in hip fracture might be plateauing.<sup>3</sup> There is universal agreement that patients with hip fracture should receive treatment, yet estimates suggest that few patients are. A study<sup>4</sup> based on an administrative database showed that use of osteoporosis medication within 1 year after a hip fracture fell from 41% in 2002, to 20.5% in 2011.<sup>4</sup> A more recent analysis showed that overall treatment rates after hip fracture with bisphosphonates—the first-line treatment for osteoporosis—were even lower at 15% in 2004, and falling to 3% in 2013.<sup>5</sup>

Fear of disability and loss of independence are highly prevalent in older adults. The present study highlights the effect of hip fractures on disability. Thus, efforts to address the crisis in the treatment of osteoporosis need to emphasise the disability associated with hip fractures and the need to prevent the first hip fracture. Identification of individuals at high risk of hip fracture, such as those with a vertebral fracture, is needed. Fear of the disability associated with hip fracture might persuade high-risk women to seek treatment.

Papadimitriou and colleagues also calculated the population attributable fraction for major risk factors contributing to the loss of life-years free of disability. Smoking accounted for 7.5% (95% CI 5.2–9.7) of the total DALYs, followed by no vigorous activity (5.5%, 2.1–8.5) and diabetes (2.8%, 2.1–4.0). Report of current smoking was much more common (12–31%) in these cohorts who were primarily recruited in the 1990's, compared with the 2013 prevalence of smoking among individuals aged 65 or older (8.4%).<sup>6</sup> Thus, the contribution of smoking to the DALYs associated with hip fracture would probably be lower in the present day.

On the other hand, the effect of diabetes will grow. In these older cohorts, the prevalence of diabetes ranged from 3.6% to 11.5%. However, the prevalence of diabetes has steadily increased over the past three decades. Currently, the prevalence of diabetes among individuals aged 65 years or older is estimated at 25.9%. In 2010, 285 million people worldwide had diabetes, and this is projected to increase by 54% to 439 million in 2030.<sup>7</sup> Diabetes can be prevented by simple healthy lifestyle habits, such as diet, weight loss, and physical activity. Increasing efforts to prevent diabetes could reduce the disability associated with hip fractures.

Higher body-mass index (BMI) was associated with lower DALYs attributable to hip fractures, especially in women. Indeed, by comparison with women with a BMI of 21.5–25 kg/m<sup>2</sup>, the population attributable fraction for disability after a hip fracture was 14% lower in women with a BMI of 30–35 kg/m<sup>2</sup> and 24.5% lower in those with a BMI of  $\geq 35$  kg/m<sup>2</sup> or more. This finding is likely to reflect a lower incidence of hip fracture among obese individuals than in individuals with a healthy BMI. However, the relation between obesity and fractures is complex. Obese individuals have higher bone mineral density than non-obese individuals, but when bone mineral density is held constant, obese individuals have a higher rate of fracture.<sup>8</sup> Additionally, a meta-analysis<sup>9</sup> of almost 400 000 women showed an increased risk of osteoporotic fracture among those with severe obesity (BMI  $\geq 35$  kg/m<sup>2</sup>) after adjustment for bone mineral density.

Obesity is a global pandemic that is increasing worldwide. In the USA, more than a third of men and women aged 60 years or older are obese, and 78% and 59%, respectively, are overweight.<sup>10</sup> If these trends continue, an estimated 38% of the world's adult population will be overweight and 20% will be obese by 2030.<sup>11</sup> Obesity is associated with various important comorbidities, including diabetes. Obesity is also associated with greater disability and a reduction in the length of time spent disability free. Thus, the lower DALYs after hip fracture associated with high BMI could be spurious.

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