An overview of the leading causes of disease and injury burden

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Introduction

The process of planning health services to reduce disease burden is influenced not only by the magnitude of the overall burden contributed by a particular condition, but also by the relative contribution of mortality and disability to the burden of that condition. Calculation of Disability Adjusted Life Years (DALY) proves to be a useful measure for this purpose.

As shown in Figure 1, disease ranking by DALYs provides a different rank to that based purely on mortality burden (YLL). Cancer (19% of total burden) and cardiovascular disease (17%) were the leading causes of burden, with the majority of this burden accounted for by mortality. Mental disorders (16%) and neurological and sense organ disorders (17%) were the next leading causes with the majority of the burden caused by disability. Injuries (11%), with a high proportion of burden attributed to mortality, was ranked below neurological and sense organ disorders.

The high ranking of mental, neurological and sense organ disorders, chronic respiratory and musculoskeletal conditions in terms of DALYs demonstrates the importance of including disability measures. While specific conditions such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease (COPD), dementia and stroke contribute highly to both mortality and disability measures, others such as asthma, Parkinson’s disease, osteoarthritis, depression, schizophrenia, social phobia and hearing loss contribute little to mortality measures but substantially to disability measures (Figure 1).

Age-specific burden

The burden of cancer, cardiovascular disease, neurological and sense organ disorders, musculoskeletal disease and diabetes was experienced mainly among the oldest age groups (Figures 2a, b, d, g and h).

The mental disorder and injury burden was highest among ages from 15 to 44 years. The high mortality from road traffic accidents and suicide accounts for the increased injury burden among 15 to 44 year-olds. The majority of the mortality burden for mental disorders was accounted for by substance use disorders (Figures 2c and e).

The burden contributed by chronic respiratory conditions peaks in childhood and in old age, reflecting the burden of asthma among children and COPD among the elderly (Figure 2f).

Gender differences

Male burden was higher than female burden for cardiovascular and chronic respiratory diseases at all ages, cancer after age 54 years and injury up to age 74 years. The male injury burden was double that of the female burden up to age 74 years due to the fatal motor vehicle accidents and suicide. The higher chronic respiratory disease burden due to COPD among males reflects the higher prevalence of smoking among males 20 to 30 years ago (Figures 2b, e and f).

The higher burden due to cancer at younger ages among females was accounted for by the burden contributed by breast and cervix cancer. The higher burden of injury, neurological and sense organ disorders and musculoskeletal disorders at the oldest ages among females reflects the higher prevalence of falls, dementia and osteoarthritis among females at older ages due to greater longevity (Figures 2a, d and g).

The disability due to complications of diabetes such as retinopathy, cataracts, glaucoma, neuropathy, nephropathy and leg amputations account for the majority of the diabetes burden. The burden was similar among males and females for diabetes (Figure 2h) as it was for mental disorders.

Specific disease burden

Lung, colorectal and prostate cancer accounted for nearly 50% of the male cancer burden (Figure 3a). Lung cancer was the second leading specific cause of disease burden for males. Among females, breast, lung and colorectal cancers accounted for over 50% of the female cancer burden. Of these, breast cancer was included in the leading five causes of disease burden for females. The greater burden contributed by lung and mouth cancers in the male population reflects their higher smoking prevalence 20 to 30 years ago compared to females (Figure 3a).
Figure 2: Age-specific rates of burden for major disease groups by gender

(a) Cancer

(b) Cardiovascular

(c) Mental Health

(d) Neurological and senses

(e) Injury

(f) Chronic respiratory

(g) Musculoskeletal

(h) Diabetes
Figure 3: Burden for specific causes by major disease groups and gender

(a) Cancer
- Lung
- Colorectal
- Prostate
- Breast
- Leukaemia
- Stomach
- Lymphoma
- Leukaemia
- Melanoma
- Pancreatic
- Brain
- Ovary
- Cervix
- Other

(b) Cardiovascular
- Ischaemic heart disease
- Stroke
- Hypertensive heart disease
- Inflammatory heart disease
- Acute myocardial infarction
- Non-rheumatic valvular disease
- Peripheral arterial disease
- Rheumatic heart disease
- Other

(c) Mental Health
- Substance use disorders
- Affective disorders
- Anxiety disorders
- Childhood conditions
- Borderline personality disorder
- Schizophrenia
- Mental retardation
- Eating disorders
- Other

(d) Neurological and sense organ disorders
- Hearing loss
- Dementia
- Parkinson’s disease
- Epilepsy
- Vision disorders
- Multiple sclerosis
- Other

(e) Injury
- Suicide
- Road traffic accidents
- Falls
- Poisoning
- Homicide and violence
- Drowning
- Other transport accidents
- Machinery accidents
- Fires/burns/scalds
- Other

(f) Chronic respiratory disease
- COPD
- Asthma
- Other

(g) Musculoskeletal
- Osteoarthritis
- Rheumatoid arthritis
- Slipped disc
- Chronic back pain
- Osteoporosis
- Occupational overuse syndrome
- Other

(h) Diabetes
- Type 2
- Type 1
Ischaemic heart disease and stroke account for more than 80% of the cardiovascular burden among both males and females. These conditions ranked within the five leading specific causes of total disease burden. While the burden contributed by ischaemic heart disease was greater among males than females, the contribution of stroke to total burden was greater for females than males (Figure 3d).

Substance use, mental disorders, affective and anxiety disorders accounted for around 80% of all burden attributed to mental disorders among both genders. Depression was the third leading specific cause among females and was ranked among the 10 leading specific causes among males. Additionally, alcohol and drug abuse and dependence were ranked in the leading 20 specific causes of burden among both genders as was generalised anxiety disorders among females (Figure 3c).

Although the amount of mental illness burden contributed by each gender was similar, there were gender differences in the amount contributed by particular disorders. Among males the burden contributed by substance-use disorders was twice that among females, with the burden contributed by borderline personality and childhood conditions also greater among males than females. The burden attributed to anxiety, affective and eating disorders was greater among females than males (Figure 3d).

The leading specific cause of neurological and sense disorder burden was dementia, which ranked first among females and second among males. Other leading causes were hearing and vision loss. Among females, the burden contributed by dementia was almost twice that among males and for vision loss, almost four times that among males due mostly to the greater longevity of females.

Suicide and road traffic accidents were the leading specific causes of injury burden among both genders. Both suicide and road traffic accidents were ranked within the leading 20 specific causes of overall burden, with suicide ranked third and road traffic accidents ranked sixth among males. The burden contributed by suicide and road traffic accidents among males was more than double that of females (Figure 3e).

COPD and asthma accounted for 85% of the chronic respiratory burden among both genders. However, among males COPD was the leading specific cause, whereas among females asthma contributed most to the burden. (Figure 3f). Both asthma and COPD were ranked in the leading 10 specific causes of overall burden among both genders.

Osteoarthritis accounts for 62% and 66% of the musculoskeletal burden for males and females, respectively. Among both genders, osteoarthritis ranks within the leading 20 specific causes of overall burden. The greater burden contributed by osteoarthritis among females compared to males is accounted for by the higher life expectancy among females. Females also had a higher contribution to musculoskeletal burden by rheumatoid arthritis and occupational overuse syndrome (Figure 3g).

Type 2 or adult-onset diabetes accounts for 90% of the diabetes burden (Figure 3h). Because the disease is linked to lifestyle and behavioural risk factors, such as obesity and physical inactivity, there is the potential for reducing its burden. The burden estimates do not include the burden attributable to diabetes from ischaemic heart disease, stroke and peripheral vascular disease. If included, the burden more than doubles for ages 55 years and older.

Key findings
- While cancer and cardiovascular disease contribute the largest disease burden in the Western Australian population, the impact of mental and neurological disorders which have a large disability component are highlighted by studies of this type.
- Males carry the largest disease burden due to cardiovascular disease, cancer, injury and substance abuse.
- Females bear the largest disease burden for conditions such as dementia, affective and anxiety disorders.
- Targeting 15-44 year olds seems appropriate for mental health and injury related programs.

Implications
- Policies may need to be gender appropriate to reflect differences in disease burden as reported here between males and females.

Method
For further details of the method used to estimate DALYs for Western Australia in 2000 refer to the supplementary technical report.4

References