Chapter outline

Behaviour is linked to health. This has been shown over decades of painstaking research that has examined individual lifestyles and behaviour and identified relationships between these and the development of illness. For example, it has been estimated that up to three-quarters of cancer deaths are attributable to a person's behaviour. This chapter provides an overview of the evidence pertaining to an array of behaviour shown to increase an individual's risk of disease, such as unhealthy diet, smoking, excessive alcohol consumption, illicit drug use and unprotected sexual intercourse. Evidence regarding the negative health consequences of each type of behaviour is reviewed, and the prevalence of each behaviour considered. Both the health-risk behaviour described here and the health-enhancing behaviour described in Chapter 4 ☛ provide the impetus for many educational and public health initiatives worldwide.

What is health behaviour?

Kasl and Cobb (1966a: 246) defined health behaviour as 'any activity undertaken by a person believing themselves to be healthy for the purposes of preventing disease or detecting it at an asymptomatic stage'. This definition was influenced by a medical perspective in that it assumes that healthy people engage in particular behaviour, such as exercise or seeking medical attention, purely to prevent their chance of disease onset. Harris and Guten (1979), in contrast, defined health behaviour as 'behaviour performed by an individual, regardless of his/her perceived health status, with the purpose of protecting, promoting or maintaining his/her health'. According to this definition, health behaviour could include the behaviour of 'unhealthy' people. For example, an individual who has heart disease may change their diet to help to limit its progression, just as a healthy person may change their diet in order to reduce their future risk of heart disease.

However, these two definitions make a crucial assumption, i.e. that the behaviour is motivated by the goal of health. Many people engage in a variety of apparently health-related behaviour, such as exercise, motivated by reasons other than disease prevention. For example, a person may exercise to lose weight and improve their appearance or as a means of making social contacts, or simply for pleasure (see also Chapter 5 ☛)! Nevertheless, whether intentional or not, engaging in health behaviour may prevent disease and may also prevent the progression of disease once it is established. Further elaboration of definitions of health behaviour was provided by Matarazzo (1984), who distinguished between what he termed '**behavioural pathogens**' and '**behavioural immunogens**', which in this text we call health-risk behaviours and health-protective behaviours respectively.

In spite of definitional differences, health behaviour research generally adopts the view that health behaviour is that which is associated with an individual's health status, regardless of current health or motivations.

The World Health Organization (2009) define 'health risk' as 'a factor that raises the probability of adverse

behavioural pathogen
: a behavioural practice thought to be damaging to health, e.g. smoking.

behavioural immunogen
: a behavioural practice considered to be health-protective, e.g. exercise.

health outcomes' (p. 6). As we will see in this chapter in the context of health risk, many of these risks are behavioural, although others are environmental, such as pollution or poverty, and so we address these where possible (see also Chapter 2 ☛).

It is worth bearing in mind history and generational change in perspectives on behaviour – what is considered health-risk behaviour has changed over the past century as medical understanding has developed: for example, we know now that smoking and excessive exposure to the sun carry significant risks for development of some cancers, whereas our ancestors did not. To further muddy the waters, there is also evidence of health benefits of some behaviours considered generally as 'risky'. Perhaps the best example is sun or ultraviolet radiation (UVR) exposure, including the use of indoor tanning machines, which is receiving growing attention in relation to skin cancer risk, a diagnosis with a significantly increased incidence in the past 50 years, particularly in younger females (Cancer Research UK, Lazovich and Forster 2005; Ferlay et al. 2013). In contrast, in the early twentieth century, sun exposure was considered useful in the treatment of skin tuberculosis, and today sunlight therapy may be offered in the treatment of skin disorders. Furthermore, there is evidence of beneficial effects of vitamin D levels (which are raised with sunlight exposure) to reduced risk of several diseases including osteoporosis, autoimmune disease, cardiovascular disease (and lower rates of several forms of cancer including of the breast, colon, prostate, ovary, lungs and pancreas (Holick 2004; Ingraham et al. 2008). Vitamin D from a typical diet is thought unlikely to be sufficient on its own to achieve these benefits: thus in this case a little bit of sunshine is beneficial. Later in this chapter we also raise the issue of beneficial effects of moderate alcohol consumption.

In order to test the nature and extent of associations between behaviour and health, longitudinal studies are necessary. One early and highly cited is the Alameda County study (Belloc and Breslow 1972), a large epidemiological study which collected data in 1965, 1973, 1985, 1988, 1994 and finally in 1999. This study followed 6,928 adults (aged over 20), all of whom were healthy at the beginning of the study, for over 30 years and compared the baseline behaviours of those people who developed disease and those who remained healthy. Key behavioural factors associated with health and longevity were identified, with a range of behaviours, later named the 'Alameda seven', found to reduce subsequent development of disease and mortality. These were:

1. sleeping 7–8 hours a night;
2. not smoking;
3. consuming no more than 1–2 alcoholic drinks per day;
4. getting regular exercise;
5. not eating between meals;
6. eating breakfast;
7. being no more than 10 per cent overweight.

Men and women who performed 6 out of 7 of the above behaviours, in the final analysis, lived 7 and 11 years longer respectively than those performing <6, although in later re-analyses not snacking or not eating breakfast was not related to mortality. Overall, however, the Alameda findings contributed significantly to growing awareness of the associations between personal lifestyle behaviour and disease. The many publications (see Housman and Dorman 2005 for a chronological review of the survey and its findings) also concluded that the benefits of performing these activities were multiplicative and cumulative: in other words, not smoking as well as being active, conferred more than twice the benefit of only performing one of these behaviours, and furthermore the longer 'immunogens' (health-protective behaviours) were engaged in, the greater the benefits to our health and longevity (Breslow and Enstrom 1980).

Epidemiologists can clearly demonstrate that behaviour is predictive of mortality and that associations exist between specific behaviour and the onset of major illnesses such as heart disease or cancer. If, however, we are to prevent people from engaging in risk behaviour (the goal of health promotion – see Chapters 6 and 7 ☛), we also need to understand the psychological and social factors that contribute to the uptake and maintenance of risk behaviour or the avoidance of health-enhancing or preventive behaviour. Such studies are conducted by health and social psychologists rather than epidemiologists, and are referred to in this and the subsequent chapter, although addressed more fully in Chapter 5 ☛.

Health-risk behaviour

The message of the Director-General of the World Health Organization (WHO), in the opening to the *World*

Health Report (WHO 2002a: 3) was stark, but clear. It stated:

> *in many ways, the world is a safer place today. Safer from what were once deadly or incurable diseases. Safer from daily hazards of waterborne and food-related illnesses. Safer from dangerous consumer goods, from accidents at home, at work, or in hospitals. But in many other ways the world is becoming more dangerous. Too many of us are living dangerously – whether we are aware of that or not.*

This report by the WHO followed massive worldwide research into health risks in developed, developing and underdeveloped countries. Although specific health risks may vary across the world (for example, under-consumption of food in many African nations versus over-consumption in most Western countries), there are many commonalities such as the risk conferred by smoking tobacco. The WHO (WHO 2009) describes how (based on 2004 data) eight risk factors (alcohol use, tobacco use, high blood pressure, high body mass index, high cholesterol, high blood glucose, low fruit and vegetable intake, and physical inactivity) account for 61 per cent of cardiovascular deaths. In combination these same factors account for over three-quarters of ischaemic heart disease, which is the leading cause of death worldwide. More broadly defined, cardiovascular diseases (which includes heart disease, heart attacks, strokes) accounts for 36 per cent of all deaths in the EU Member States in 2010 (OECD 2012).

Table 3.1 list the 'top ten' risk factors for death globally according to income group (low, middle, high), which together account for more than a third of all deaths worldwide.

For reasons of length, we cannot address all risk factors in this chapter, even though the statistics attached to some are horrendous and thought-provoking: over two million childhood deaths occur *every year* in low-income countries as a result of being underweight, whereas in moderate- to high-income countries, including North America and Europe almost 2 million people die each year (based on 2004 figures) as a result of an obesity-related disease. Behaviour associated with high levels of **mortality** in developed countries are discussed in more detail here, as they have attracted the greatest attention from health psychologists to date:

- *heart disease*: smoking tobacco, high-cholesterol diet, lack of exercise;
- *cancer*: smoking tobacco, alcohol, diet, sexual behaviour;
- *stroke*: smoking tobacco, high-cholesterol diet, alcohol;
- *pneumonia, influenza*: smoking tobacco, lack of vaccination;
- *HIV/AIDS*: unsafe/unprotected sexual intercourse.

mortality

death. Generally presented as mortality statistics, i.e. the number of deaths in a given population and/or in a given year ascribed to a given condition (e.g. number of cancer deaths among women in 2000).

Table 3.1 Ranking of selected risk factors: 10 leading risk factor causes of death by income group, 2004

Overall	Low income* ranking	Middle income ranking	High income ranking
1. high blood pressure (12.8%);	2nd	1st	2nd
2. tobacco consumption (8.7%)	7th	2nd	1st
3. high blood glucose (5.8%);	5th	6th	5th
4. physical inactivity (5.5%)	8th	4th	4th
5. overweight and obesity (4.8%)	n/a†	3rd	3rd
6. high cholesterol (4.5%)	10th	7th	6th
7. unsafe sex (4.0%)	3rd	n/a‡	n/a§
8. alcohol consumption (3.8%);	n/a†	5th	9th
9. childhood underweight (3.8%)	1st	n/a‡	n/a§
10. indoor smoke from solid fuels (3.3%)	6th	9th	n/a§

* Countries grouped by **gross national income per capita** –- low income USD 825m or less; high income USD 10,066m or more
† Low income countries have unsafe water, sanitation and hygiene ranked 4th, and suboptimal breastfeeding ranked 9th
‡ Middle income countries have low fruit and vegetable intake in 8th and urban outdoor air pollution in 10th
§ High income countries have low fruit and vegetable intake in 7th, urban outdoor air pollution in 8th and occupational risk in 10th

Source: WHO (2009).