1 I'm Too Fat

Hot Potato

I have met few adults who are happy with their own bodies, at least in Western societies. But even in non-Western societies, many people are unhappy with their bodies. The exact nature of this unhappiness varies, but what overwhelmingly dominates is the thought, whether objectively true or not, that they carry too much weight, and following that, the thought that they really should lose weight. I have met very few people who actively want to put on weight, and they have almost all been of athletic disposition, and the weight gain sought is usually (but not always) in terms of muscle. Some people are entirely 'fat-phobic' and not persuaded that some types of body fat might actually be good, healthy even. Many people don't know that there are different types of fat deposit, and that some deposits of fatness carry limited or no negative health consequences – around the buttocks, hips and thighs, for example. Body fatness is a 'hot potato' issue for many people; I like hot potatoes.

But what is excess or pathological body fatness? How would you define it, beyond 'I know it when I see it'? And what are the different types of body fat? And does the fat I eat become the fat on my body? This book is for all the people who worry about their weight and/or their body fatness, which is to say, most people. Body fatness, good fat, bad fat, what I call ugly fat, the imperfect science of how fatness relates to illness, how obesity is measured, and how and why people judge people who carry extra weight – all of these things are considered.

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The different types of body fat evolved along with the rest of our bodies. For our ancestors, consuming energy-dense foods and conserving dietary energy through gaining weight and as body fat could have provided a reproductive advantage then, if no longer in the present day. Such potentially evolved tendencies and mechanisms towards positive energy balance and weight gain are complex, and complexity is my lens for viewing obesity, through approaches as diverse as evolutionary theory, physiology, neurobiology, sociology and anthropology.

How did I get interested in obesity as a subject of research? I am an anthropologist, not a public health specialist, nor a medic. I am interested in people and communities, less so in risk groups, and even less so in disease and disability, except in as far as they impact on personal and social lives. Obesity is far more complex than being a disease related to body fatness, as some have framed it. It is something that can socially divide people, bringing out the worst in some, with stigmatization and shaming of people carrying excess body fatness. If it is a disease (which many experts and health agencies think it is), it is as much a social disease (in terms of fat phobia and stigmatization) as a medical one. I became interested in body fatness and obesity because my anthropological fieldwork in Papua New Guinea (PNG) into traditional subsistence and nutritional ecology (that is, how people's nutritional needs are attained in the environment in which they live) took me there. I first went to the Purari Delta region of the country in the late 1970s, when undernutrition and infection were the big health-related issues. I felt I had understood and defined the problem quite well by the time I left some two years later, well enough to help define policies and interventions, to make a difference. When I went back to this rural area 14 years later, my pleasure in seeing the great reduction in undernutrition was cancelled out by seeing many people with overnutrition and obesity, which had previously been non-existent. I couldn't fathom how this could have happened in less than a generation. In the mid-1990s I switched focus to obesity, not because of the emergent public health problem associated with it, but because of this swift and dramatic shift in nutritional health in a group of people I had worked with in remote PNG. It didn't fit the dominant narrative of the time, which was of obesity as a problem predominating in the Global North. I am always attracted by an anomaly.

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Subsequent fieldwork in the Cook Islands, and analysis of inequality and obesity data from socialist and post-socialist Poland, both got me thinking and researching the different ways in which obesity seemed to manifest itself in different populations. By the mid-2000s, over a hundred factors associated with obesity had been identified by researchers across the field of study, and it was time for a new approach, harnessing interaction and layering, which led me, via obesity policy think-tank work, to complexity, and setting up the Unit for BioCultural Variation and Obesity (UBVO) in 2007 at the University of Oxford. The work of this group has since informed obesity policy at the World Health Organization (WHO), and the governments of the United Kingdom (UK), Denmark, and Sweden.

This book is very much guided by the framings used by UBVO, using ecological, anthropological, social and political approaches to body fatness and obesity, and placing them within a biocultural context. In biocultural anthropology, the relationships between human biology and culture are paramount. With a biocultural approach to obesity, it is the anthropology of body fatness that is in the spotlight – its social, cultural, evolutionary, environmental aspects, rather than its medical and public health framings, although biocultural approaches do inform medicine and public health.

The easy narrative attached to obesity, which is that if you eat too much and don't get enough exercise you will put on body fat, isn't helpful for understanding different patterns of obesity increase across the world, Global North and Global South. Across decades of research into obesity, in Australia, India, Denmark, Sweden, Poland, the United States (US) and the UK, I have tripped over many misunderstandings. My hope is that this book will help you walk through the minefield of misunderstanding with more confidence. I can't guarantee that you won't stumble – there are probably still many unexploded misunderstandings about obesity – but hopefully this book can help guide you through.

Body Fat – What Is the Good of It?

In nature, body fatness is usually a good thing. As a species, humans have greater capability of accumulating body fat than non-human primates. Placing this in evolutionary context reveals the adaptive value of body fatness.

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The rapid brain evolution that came with the emergence of our *Homo erectus* ancestor almost 2 million years ago was probably associated with increased body fatness as well as diet quality – the greater availability of dietary animal fat and cholesterol is likely to have allowed encephalization, or increased brain size relative to the size of the body. Higher levels of body fatness and lower muscle mass relative to other primate species have allowed human infants to accommodate brain growth by having adequate stored energy for brain metabolism. Since energy stores are vital to survivorship and reproduction, the ability to conserve energy as adipose tissue would have conferred selective advantage in the food-constrained environments that early *Homo sapiens* would have been periodically exposed to. Fatness was crucial to the reproduction of ancestral humans and continues to be so in contemporary society. In females it is linked to fertility, and ovarian function is sensitive to energy balance and energy flux. At any body mass index (BMI), females have a greater proportion of their body weight as fat than males. Furthermore, they have a greater proportion of their fat in the lower body than do males, fat which is mobilized during pregnancy and lactation.

These very successful adaptations – in energy metabolism, in fat storage – have become burdens in the present day, as global food security issues were conquered in the 50 years or so since the 1960s, at least in relation to production of dietary energy. This was a period when the world's then-dominant nutritional problem, that of undernutrition, could have been fixed, but instead, a steady decline in people suffering undernutrition was to some extent matched by rising obesity. There are many places in the present day where an individual might even experience both undernutrition (especially in early childhood) and overnutrition (in adult life). More about this in Chapter 2. This rise in obesity is undoubtedly due to a wide range of associated and interrelated factors, with the inundation of the global food market with cheap calories (a triumph of industrial agriculture if you will) having underwritten it.

What Is Obesity and How Is It Measured?

Obesity (as defined by contemporary measures of the body mass index, or BMI) was retrospectively identified by economic historian John Komlos, of the University of Munich, as an emergent population phenomenon among North

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American men in the nineteenth century. Obesity then rose across the twentieth century, accelerating with the rise of global capitalism and neoliberalism from the 1980s onwards. It became a matter of economic concern in the US and the UK in the 1990s, when its direct health costs became clear. Economics, medicine and public health have framed obesity as particular types of problem to be controlled or managed in some way. However, it is not a problem for everyone. Nor is it the same problem for everyone concerned about obesity. So, for whom is obesity a problem, and why?

This was a question we posed in the very first seminar series of UBVO. Researchers interested in obesity as an object of research have different ways of thinking about it, which is only natural given that researchers will engage with a problem with their best theory, not someone else's – they can only do what they have trained to do. What is interesting is how differently different disciplines frame obesity and excess body fatness. For political scientists, obesity is a problem of governance, while for epidemiologists it is one of accelerating mortality and morbidity. For some economists, it is an unintended consequence of some types of economic system; for food systems analysts, a problem of incomplete specification. There were many approaches taken by researchers presenting at this first UBVO seminar series, confirming obesity to be a subject that requires interdisciplinary approaches. For people with obesity, there are other considerations, like stigma, blame and occupational glass ceilings. For many young adults with obesity who do not suffer the chronic disease consequences of it, it may not be seen as a problem at all. What appears to be commonly accepted is an evolutionary basis to body fatness, which is where I turn next, followed by a discussion of how excess body weight is defined.

You can go far in understanding obesity without defining it, and its definition has in recent decades been linked to understanding it as a disease state (or not), associated with mortality (or not). In 2014, the WHO defined obesity as 'abnormal or excessive fat accumulation that may impair health'. What exactly 'abnormal' or 'excessive' levels of body fatness are in relation to health continue to be debated among obesity researchers. There are some clear answers to these questions, but only at the extremes of body weight and fatness. This is good enough for medics to act – with obesity surgery at the high extreme of body fatness, and treatment for anorexia nervosa at the

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low – but for public health, mild or moderate obesity is coloured in shades of grey. At what point should any professional body or institution intervene? There is no clear and unambiguous answer. For the social scientist, how medics deal with severe obesity is a subject of study in its own right, as is how public health authorities define and act on less extreme forms of body fatness. The study of bodily norms and how they are socially enforced, and understandings of what constitutes health for any individual or group, are subjects of investigation for anthropologists. With many different stakeholders and approaches, it is easy to see what a fraught matter obesity has become.

The question 'Is obesity a disease?' has never been fully answered. Many agencies, governmental and other, view it as such, with the WHO and the US National Institutes of Health having done so from the 1990s. Jantina de Vries, then of the University of Oxford, argued in 2007 against classifying it as a disease. From an evolutionary perspective, she asserted that if some bodily conditions either confer evolutionary or biological advantage or are common to a species, they should not be regarded as diseases; only if bodily conditions are rare and fall out of the range of morphological normality should they be considered thus. Body fatness is typical of the human species, and on this basis, obesity cannot be considered to be a disease. From a societal perspective, she argued that obesity can be framed as disease because it represents bodily deviation from norms and social desirability. George Bray, then of the Pennington Biomedical Research Center at Louisiana State University, argued in the early 2000s that obesity is a chronic relapsing neurological disease, requiring lifelong treatment or management. Lifelong intervention means lifelong employment for those involved in its treatment, as well as the growth of an industry built around anti-obesity interventions, which in the US in 2022 alone was worth nearly 150 billion dollars.

Whether disease or not, there is a judgement call on how excess body fatness should be measured – there are lots of ways of doing it – and it matters, at least for the obesity treatment and management industry. If you don't have a consensus on defining obesity, you can't really intervene.

So how is it measured? The simplest measure out there is body weight – you just stand on the scale and judge for yourself according to what you think you should weigh. You might want to relate that to norms of body weight, or

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weight for height, or weight over height squared (the BMI). I personally ignore the BMI when considering my own body weight. For the record, my BMI tips into the overweight category but only just. I don't agonize over it, but monitor my weight, trying to neither lose nor gain it. I know how much attention and discipline is needed to lose weight, and I want to avoid the stress of constant vigilance over what I eat. If you want to measure excess body fatness or obesity by BMI, for medical or public health intervention for example, then norms become more important. Weight alone doesn't take into account differences in height between people; if you are taller, you are likely to be heavier, just because you are carrying a bigger skeleton – a bigger frame on which to pack both muscle and fat. One measure of obesity that makes allowance for this is weight for height. This doesn't entirely neutralize differences in weight due to differences in height, however. The BMI – weight (in kilograms) divided by the square of height (in metres) – does a better job in neutralizing the effects of height on weight, but does so in a far from perfect way.

The BMI was formalized for international use by the WHO in 2000, with several aims: to make the assessment and monitoring of obesity worldwide as simple as possible; to allow public health authorities to make meaningful comparisons within and between populations; to identify individuals and groups at increased risk of disease and death; to help identify priorities for intervention at individual and community levels; and to give a basis for evaluating interventions. For epidemiological investigation, this formalization rendered meaningless population estimates of obesity based on measures other than BMI, or that used different norms or cut-offs for obesity. In epidemiology, the BMI is used as a proxy for body energy stores, and at the upper end of a population distribution it shows strong but imperfect associations with a number of chronic diseases and disorders, both in morbidity and mortality. Other measures such as waist circumference, waist to hip ratio, and waist to height ratio compete very well with it, so it is worth considering why the BMI continues to be a standard measure of obesity.

The BMI works just about well enough for epidemiological and public health work. It has been used for far longer than any other anthropometric measure and was the first to be appropriated for the assessment of obesity rates in populations. It is collected systematically across the world – no other measure is, to anywhere near the same extent. One reason for this is that

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heights and weights are relatively easy to measure. Just over a decade ago, the WHO considered switching to one of a small number of measures that incorporate waist circumference, but decided against it. This is because changing the standard measure of global obesity surveillance would have thrown the international governance of obesity into disarray, at a time when obesity was rising fast (it continues to rise). Obesity measurement and reporting allows the tracking of obesity across time and in different countries, giving background data for anti-obesity interventions. In most countries, obesity is reported in terms of the proportion of adults with a BMI greater than 30 kg/m^2, although lower cut-offs are deemed appropriate for people of Asian ancestry, whose disease and death risk is higher at any BMI point than for people of European ancestry. For people of Pacific Islander ancestry, higher cut-offs are deemed appropriate, because such populations carry lower disease and death risk at any BMI point.

The BMI measure does a lot of work for public health obesity, but does it do as much for you and me as individuals? Well, it depends. While BMI cut-offs for obesity classification are seen as meaningful for epidemiological and public health work, health and well-being can be perceived quite differently by people who have been classified as having obesity. For example, Helen Doll, and her colleagues at the University of Oxford, have shown that the self-reported health status of adults in the UK is low among people categorized as having severe obesity, with BMI greater than 40 (Figure 1.1), but lowest among people with any category of obesity also experiencing chronic disease (Figure 1.2). Thus, obesity may not be a problem for people with non-severe obesity if they do not also experience chronic illness.

Two criticisms of BMI are that it's not just the amount of fat that you carry that's important, but where you carry it, and that it can only give an imperfect measure of overall body fatness at the individual level. Fat on the thighs and bum protects against chronic disease, while fat in the abdomen harms. Among physically fit people, high BMI can reflect muscularity more than fatness. Natalie King, of the University of Leeds, and her colleagues did a study of body composition of players in the four teams taking part in the semi-finals of the 2003 Rugby Union World Cup. Nine out of ten of them had a BMI that would categorize them as either overweight or obese by the WHO criteria, when in fact they were extremely muscular, and the BMI picked that up.

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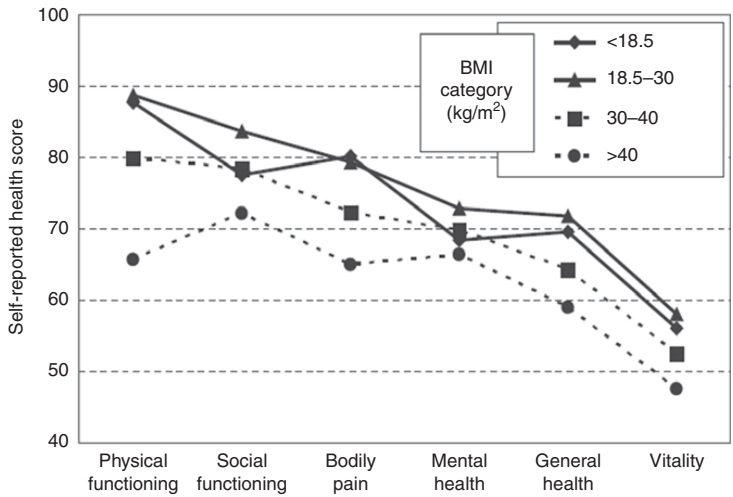

Figure 1.1 Distribution of self-reported health scores by body mass index (BMI) category, after adjusting for age, gender and frequency of health service utilization, in the UK.

Jimmy Bell, of Imperial College London, has perfected techniques for whole body imaging of human body fat distribution. He found that there are people with high BMI who, because of their fat distribution, do not carry a health risk equivalent to their upper-range BMI. As a result, he came up with the acronym TOFI – thin on the outside, fat on the inside. A person he might identify as TOFI would have a BMI in the normal range but carry fat in their abdomen, carrying a health risk as a consequence. Between 10 and 30 per cent of people classified as having obesity by the BMI classification have metabolically healthy obesity (MHO). There is no standardized definition of MHO, but all start with obesity as defined by BMI $\geq$ 30 kg/m^2, in combination with one or more of the following markers that are associated with health rather than chronic disease: low fasted serum triglycerides; elevated HDL cholesterol serum concentrations; systolic and diastolic blood pressures in the normative range; low fasting blood glucose; an absence of drug treatment for dyslipidaemia, diabetes or hypertension; and no cardiovascular disease manifestations.

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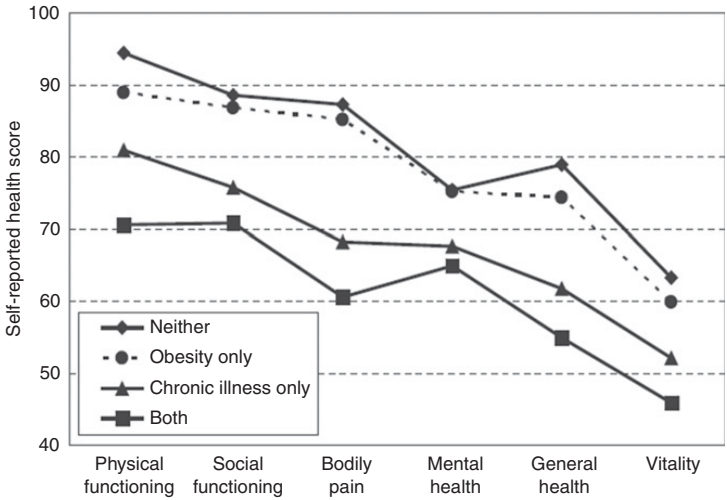

Figure 1.2 Distribution of self-reported health scores (the higher the healthier) according to obesity (defined by BMI) and chronic illness, after adjusting for age, gender and frequency of health service utilization, in the UK.

Clinical scientists remain cautious about calling MHO truly healthy until there is clear evidence across a number of years to that effect.

But there is clear evidence that the BMI does not distinguish between different types of body fat and their locations. This is an important consideration for thinking about obesity in relation to disease, which is what the next section examines.

Is Some Fat OK?

The BMI is not able to distinguish between potentially harmful fat in the liver and abdomen (around the viscera) and less harmful fat under the skin, in the buttocks or thighs. Fat accumulated in the abdomen and liver has been linked epidemiologically to cardiovascular disease, type 2 diabetes and death due to all causes, while fat beneath the skin, especially in the lower body, is neutral,

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or even protective against chronic disease. Visceral fat is more easily mobilized by physical activity than is subcutaneous fat, and a high BMI is of much less concern if you are physically active and carry a lot of muscle. The all-cause and cardiovascular (CVD) risk of death in people with obesity who are physically fit (on the basis of cardiorespiratory fitness) is no different to people in the normal range of BMI who are also fit (that is, the theoretically healthiest group). Where your fat is deposited matters, for health.

In the Italian language, good is good, and bad can be ugly, or not. Which is to say that ugly can also mean bad, depending on context – 'ugly' is thus a moral category as well as an aesthetic one. Taking this to body fatness, fat can be good, bad, or morally ugly.

We all carry fat on and in our bodies, and in general, this is a good thing. It is an evolved bodily characteristic and has many benefits. We carry it in the form of triglycerides in adipose tissue, and adipose tissue does many useful things to help keep us alive. For starters, adipose tissue is an insulator, protecting our bodies against the cold. Subcutaneous adipose tissue acts as a biological overcoat. Some animal species that haven't got much body fat have body fur. Across evolutionary time we have lost our ability to grow fur and gained the ability to develop body fatness – in fact, we are the fattest of all primate species. Humans do a lot both behaviourally and culturally (if we call technology a part of culture) to keep ourselves warm and to avoid having to call upon our body fat as an insulator – what with clothing, housing, central heating, heating in cars, bedding, and so on. We can survive a moderate amount of cold exposure, but shivering usually kicks in before we get too cold, to defend our core body temperature.

Adipose tissue is a good energy store, fat offering nine calories of energy per gram that can be used in metabolism, compared with four for each of carbohydrate and protein respectively. Being able to store energy as fat contributed to our evolutionary success as a species. Seasonality in temperature and periodic food shortage were major environmental pressures in human evolution, and being able to store energy as fat on the body was an important adaptation. It continues to be important for people living in seasonal environments in the rural Global South now. It is also important for women having babies, both past and in the present day, where body fat gained in pregnancy

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contributes energy for breast milk production, one of the most physiologically costly things for a woman.

Adipose tissue is also involved in innate and adaptive immunity, the day-to-day protection against disease we usually take for granted. It makes and stores a range of immune system proteins that identify disease-causing bacteria, viruses and fungi and help neutralize them before they can do any damage to our bodies. A number of proteins made and stored in the adipose tissue have dual purpose – to act immunologically, protecting against disease, but also in metabolism, most importantly mediating the work of insulin, the powerful body cell-building and bodily maintenance hormone. Adipose tissue also makes and secretes hormones that help to regulate appetite, energy balance and reproduction. According to Miguel Otero of Santiago University, Spain, and his colleagues, the hormone leptin, produced in adipose tissue, is a critical link between adipose tissue, the regulation of appetite by the brain, and energy balance, as well as being important in immunological memory, and in glucorticoid metabolism in mediating the immune response. Leptin is also involved in haematopoiesis (the production of all of the cellular components of blood and blood plasma), in angiogenesis (the formation of new blood vessels), in fetal development and in maturation of the reproductive system.

Adipose tissue – where would we be without it? 'Dead' is the answer to that question. Some specialist forms of adipose tissue can produce heat when we are exposed to cold stress. This is brown adipose tissue, or BAT for short. Masayuki Saito, formerly of Hokkaido University, and colleagues found greater activation of BAT in winter compared with summer in human subjects, as well as BAT activity being inversely related to BMI, and to visceral fat content. They suggested that BAT, because of its energy-dissipating activity, must be protective against body fat accumulation, and therefore also obesity. Different people have different levels of BAT activity, and this was once thought to be why some people can eat plentifully and not put on weight while others can't. Eating induces heat production with diet-induced thermogenesis (DIT), the energy we use in digesting food, and this too is mediated by BAT. The activation of heat production in BAT by both cold exposure and eating operates through the stimulation of the sympathetic nervous system.

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The stimulatory effects of cold exposure on BAT are also mediated through transient receptor potential (TRP) channels, having something in common with the effects of capsaicin consumption – think of eating food spiced with chilli peppers. Most of the different types of TRP channels sense chemical compounds which are ultimately perceived variously as pain, touch or temperature. With food, they can be described as spiciness or pungency, for example, and the perception of a spicy food can vary with the physical temperature of a food. I don't know if it is just me, but when eating cold curry the day after its making, it seems much less spicy than when I ate it hot the evening before. Capsaicin, and some molecules very similar to it, mimic the effects of cold exposure to decrease body fatness through the activation and recruitment of BAT. Green tea may do something similar because of the catechins it contains, but this hasn't yet been fully researched.

We wouldn't be alive without body fat and the adipose tissue it is stored in, so it is a great shame that people often feel very negatively about their own bodily fat. Ugly fat, I call it, the ugliness lying in how it is perceived, and not so much in its healthiness or otherwise. Ugly fat, body fatness associated with aesthetics and perception, how people judge people who carry extra weight (including themselves), is what the popular debate concerning the BMI is mostly about, perhaps more so than about health. Perceptions of appropriate body size for health and beauty vary and change across societies and time (Chapters 5 and 6). Sociocultural factors, including participation in the global economy and exposure to Western ideas and ideals, influence them, there being a general and global trend towards increased valuation of thinness and increased awareness of the health risks of obesity. There are a number of communities and societies where obesity rates have risen in recent decades where previously people preferred or accepted larger body size as attractive, and where they now prefer thinner bodies. These include African Americans, Pacific Islanders, Native Americans and people in South Korea. Among Europeans, the desire for thinness used to be a privilege of wealthier classes since the late nineteenth century, and has become more widespread in the past half century or so. The higher cultural valuation of body fatness has become a thing of the past in most places.

The present-day linking of beauty to the lean and fit body has deep roots in the history of Western thought. The democratic dissemination of this ideal,

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alongside the new industry of self-improvement and the diet industry, really took off only around four decades ago. The athletic and youthfully packaged fit thin body is what now serves as a marker of social status and cultural capital for women; for men tallness and muscularity suffice. These ideals of beauty linked to fitness are set within neoliberal norms of self-marketing (Chapter 5), where seeing is believing, and where moral judgement of fat bodies is easy, because they are publicly visible, even when covered by clothing. The Italian word 'brutto' is not just visibly ugly but can be morally so. There's an echo of this in the English language – 'as ugly as sin'. Social perceptions, perceptions of others, have a strong influence on self-perception of body fatness. As a result of negative attitudes toward fatness, there is much stigmatization of people carrying excess body fatness, and body image disturbance is common, not just among people classified as having obesity. Individuals with weight within the normal range of its classification often have difficulty in accurately assessing their body size, and who view their own body fatness, even if healthy, as ugly. There is plentiful evidence of stress and stigmatization doing damage to health, independently of body fatness. Add body fatness to the mix, and it is so much worse.

The bad fat in our bodies includes deep subcutaneous adipose tissue (dSAT), visceral fat, and fat in the liver. dSAT was identified by Gillian Walker and her colleagues, at the Italian Institute of Auxology in Piancavallo, Italy, as a distinct form of abdominal adipose tissue which is involved in the development of obesity-associated chronic disease complications including metabolic syndrome (Chapter 3). Visceral fat accumulates around the intestine and is associated with fatty acid profiles in the blood that can lead to cardiovascular disease. Fat infiltrating the liver (hepatic steatosis) is strongly associated with the metabolic syndrome regardless of whether you carry excess fat in the rest of your body or not. If the liver is constantly exposed to free fatty acids (FFA), fat is deposited there, from a failure of being able to oxidize the excess for immediate use as bodily energy. There is a strong association between abdominal obesity, elevated FFA levels and fatty liver, visceral fat being the key driver of fatty liver development. Visceral fat and fatty liver are the key components of obesity-related disease. Having examined the different types of adipose tissue, I next turn to diseases associated with obesity.

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Disease Risks

In 2009, the WHO placed obesity among the leading global risks of death. Of the diseases associated with it, type 2 diabetes, cardiovascular diseases, a range of cancers, fatty liver disease, kidney disease and respiratory disease are the most common, both in prevalence of disease and in deaths from them. Death associated with obesity is higher in men than in women, mostly because men are more likely to develop cardiovascular diseases and cancers than are women. This in turn is largely because they are more likely to have practised health-risky behaviour across their lives than women, as well being less likely to seek healthcare or advice when ill. Testosterone also promotes cell growth and therefore the progressive of cancer, whereas oestrogen protects against cardiovascular disease and breast cancer. Obesity is also a major cause of chronic inflammation, especially in later life, this being a common pathway for chronic disease development. The inflammation associated with severe obesity was a major reason why people contracting COVID-19 in the early months of the pandemic were more likely to end up in intensive care than people in the normative range of BMI. I am put in mind of the British Prime Minister of the time, Boris Johnson, who had poo-pooed obesity as an important object for policy, only to change his mind after recovering from near-fatal COVID-19. In recovery, medics informed him that his then BMI of 36 kg/m^2 had almost certainly tipped him to the edge of death.

Even with mass vaccination against COVID-19, obesity continues to be a major factor in the development and severity of this infectious disease. Professor Sir Aziz Sheik of the University of Edinburgh and his colleagues have found that even with COVID-19 vaccination, people with obesity are at higher risk of developing severe infection than people with weight in the normative range, the extent of protection from vaccination dropping off faster for people with severe obesity. There are many other diseases and disorders associated with obesity that are less likely to cause death, but that are worrying and painful nonetheless. These include obstructive sleep apnoea, gallstones, glomerulosclerosis, joint problems, menstrual irregularities, osteoporosis and polycystic ovary syndrome.

Obesity has increased in children and adolescents, and this has increased the risk of chronic disease and death in adult life, partly because of an extended period of life carrying excess weight and consuming diets high in saturated fats

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and refined carbohydrates, both of which are associated with elevated chronic disease risk independently of obesity. Cardiovascular disease risk is also raised among those at the lower end of the BMI scale in childhood, but who develop excess weight in adulthood. More about this in Chapter 2.

What Can We Do?

There are so many factors associated with obesity that it might seem difficult to know where to start. We can focus on the interactive and complex nature of obesity, of which more in Chapter 9. As individuals, we can be more forgiving of ourselves and of others who might be carrying excess weight, knowing how our physiology has been shaped across evolutionary time to make it easy to put on weight, and so difficult to lose it. More about this in Chapters 3 and 7. We can think about how stigma and blame against people carrying excess weight has become entrenched in wealthy nations, and how we might respond to this within society and as individuals – this is discussed in Chapters 5 and 6.

I have mentioned energy balance a few times in this chapter, but have purposely avoided any suggestion that it is energy imbalance, that is, calories eaten exceeding calories expended by the body in different ways across a prolonged period (usually years), that causes obesity. There will be much more about this in Chapter 3, but there is every possibility that scientists, policymakers, medical practitioners have been barking up the wrong tree for almost half a century, and that focusing on energy imbalance might even have contributed to obesity. It is important to sort out whether calories in total are more important than the type of calories that come into our bodies, because this has profound implications for our food systems and what we individually choose or are able to eat on a daily basis.

We can acknowledge that our genetics contributes to obesity, but that apart from rare types of single-gene forms of obesity, we can't pin it down precisely. More about this in Chapter 2. We can blame the food corporations for selling us poor food and persuading us that it is good. More about this in Chapters 4 and 7. We can look at how we move around in our daily lives, and how the structures of urban places either help or hinder physical activity. More on this in Chapter 8.

Now read on.

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