

David Benton

TACKLING THE OBESITY CRISIS

Beyond
Failed Approaches
to Lasting
Solutions

 Springer

Tackling the Obesity Crisis

David Benton

Tackling the Obesity Crisis

Beyond Failed Approaches
to Lasting Solutions

 Springer

David Benton
Faculty of Medicine, Health and Life Science
Swansea University
Swansea, UK

ISBN 978-3-031-48196-3 ISBN 978-3-031-48197-0 (eBook)
<https://doi.org/10.1007/978-3-031-48197-0>

© Springer Nature Switzerland AG 2024

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Paper in this product is recyclable.

Preface: Tackling The Obesity Crisis

Having for over fifty years studied the relationship between the body's biology, diet, and behaviour, I became increasingly aware there was a major problem that I had ignored. Obesity.

It was apparent that the incidence of obesity had increased steadily for over fifty years, while a multitude of initiatives had aimed to deal with the problem. In fact, workers at Cambridge University counted 689 initiatives in the United Kingdom over the last thirty years. However, given the progressive increase in obesity, and the government projection that it is expected to increase even further, a safe conclusion is that these initiatives failed.

Given the enormous consequences of obesity, and the failure to deal with it, there were obvious questions. Why had attempts to reduce obesity failed? Is it possible to distinguish those approaches that do, or do not, have a chance of making a difference?

It became clear that it is a problem influenced by many aspects of biology, nutrition, and psychology that are affected by aspects of society. The number of calories consumed is so many more than is needed that it is inconceivable that most interventions could do more than scratch the surface. It was rapidly apparent that there are no easy answers, and it was inevitable that most of the approaches taken to date were bound to fail.

Given the thousands of people who have studied the topic over many decades, it would have been delusional and arrogant to suggest I had the answer. Rather the aim was to stimulate debate. Can a consensus be established that the approaches taken to date are not going to have the desired effect? Do we need a new approach?

It may be asked, why is this a book written for a general rather than an academic audience? It was apparent that there are two groups that, in the past, have been reluctant to act. The food industry has a vested interest in maintaining a very profitable business model. Politicians have looked for a quick fix, when major and complex long-term changes are required. The view taken was that both these groups were unlikely to change their behaviour unless it was in their interest.

Thus, the book is aimed at the public, with the hope that obesity becomes a hot topic with extensive media exposure, to the extent that it cannot be ignored. It is scandalous that so many are condemned to an early death, following decades of ill-health: obesity must be given a high priority.

Swansea, UK

David Benton

Acknowledgement

Obesity is not the study of one scientific discipline but draws on a wide range of approaches that interact in complex and often unpredictable ways; so basic biology is modified by psychological, social, cultural, and economic factors. I am therefore indebted to the many colleagues, with whom I have worked over the decades, who have introduced me to yet another perspective on the topic. I must in addition offer an apology to friends and family, as the time taken when writing has inevitably resulted in them being neglected. Particular thanks are due to Tanja Weyandt, who as editor, continually offered encouragement and good advice, with the result that the book benefited greatly from her knowledge and experience.

Contents

1	Introduction	1
----------	---------------------------	----------

Part I Basic Information and Historical Approaches

2	The Obesity Epidemic	7
	How to Measure Obesity	8
	BMI and Health	10
	Extent of the Problem	11
	Health Policy	12
	References	14
3	The Problem Is Fat	17
	Government Dietary Recommendations	18
	The Fat Hypothesis	19
	Types of Fat	20
	Ancel Keys	21
	Minnesota Coronary Experiment [4]	21
	Response to the Low Fat Theory	22
	Unintended Consequences	24
	Implications for Health Policy	27
	References	27
4	Is Sugar the Problem?	29
	Is It Really Sugar?	31
	Energy Compensation	32

Long-Term Influences	35
An Australian Paradox	36
Norway	38
United States	38
Drawing Approaches Together	39
Implication for Health Policy	41
References	41
5 Is Fructose the Problem?	45
Sugars	46
Glucose	46
Fructose	46
High-Fructose Corn Syrup	48
Robert Lustig	49
The Sugar Showdown	50
The Lustig Theory	50
What Is the Evidence?	51
Data from NHANES	51
Where Does Fructose End Up?	53
Is Fructose Any More Than Additional Calories?	54
Fruit	55
Sugar or Glycaemic Load?	55
Glycaemic Index	56
Study the Amount of Fructose Consumed	57
Implications for Health Policy	58
References	58
6 A Sugar Conspiracy	61
Pressure Groups	63
Assessing the Evidence	64
The Scientific Approach	66
A Conspiracy?	67
Yudkin's Interaction with the Food Industry	68
Is Behaviour 50 Years Ago Relevant?	69
Implications for Health Policy	69
References	70
7 Think About Calories	71
Let's Move Initiative	72
Remove Calories	75

A Bitter-Sweet Outcome 78
 Implication for Health Policy 79
 References 79

Part II Changes in Society

8 Society Is to Blame 83
 Urban Design 84
 Poverty 85
 Changes Over Time 87
 Extent of the Problem 89
 Portion Size 89
 More to Portion Size Than Calories 92
 Fast Food 94
 Changes Over Time 97
 Society Shares the Blame 99
 Implications for Health Policy 99
 References 100

9 The Food Industry 103
 Historical Background 104
 Convenience Foods 106
 No More Slaving Over a Hot Stove 107
 Consequences of Industrialization 108
 Colours 109
 Preservatives 109
 Antioxidants 110
 Emulsifiers/Stabilisers 110
 Processing Aids 111
 Flavourings 111
 Vanilla 111
 Costs and Benefits 113
 The Industrial Approach to Food 114
 Sight 114
 Sound 115
 Smell 116
 Texture 117
 Public Health v the Food Industry 118

Implications for Health Policy.119
References120

10 Attitudes Towards Food.123
Is It Marketing Rather Than the Message?124
Marketing Approaches125
The Climate in Which We Live.125
 If It Is Natural, Is It Healthy? 126
 The Importance of Being Natural 128
 A Good Natural Meal 129
Negative Attitudes to Food130
 Additives 130
What Can We Learn from Marketeers?132
So How Is Food Perceived?132
Implications for Health Policy.133
References134

11 Ultra-processed Foods.135
What Is Ultra-processed Food?136
 Group 1: Unprocessed or Minimally Processed Foods 137
 Group 2: Processed Culinary Ingredients 137
 Group 3: Processed Foods 137
 Group 4: Ultra-processed Food and Drink Products 137
Are Ultra-processed Foods a Problem?138
Ultra-processing and Obesity139
Is It Ultra-processing That Is Important?140
 Energy Density 140
Where Does This Leave Ultra-processed Foods?141
The Way Forward142
Implications for Health Policy.143
References143

Part III Biological Influences

12 Genetics147
Twin Studies148
How Does Genetics Effect Obesity? Check Calulation Below150
Implications for Health Policy.151
References151

13	Fighting Your Biology	153
	Controlling Calories in the Diet	154
	Longer-Term Weight Control.	155
	Set Point Theory	156
	The 3500-Calorie Rule	157
	Response to Dieting	158
	Minnesota Starvation Study	159
	Adaptations to Weight Loss	159
	Metabolic Adaptation	161
	Non-Exercise Adaptive Thermogenesis (NEAT)	161
	Hunger and Hormones	162
	What Can Be Done	164
	Implications for Health Policy.	164
	References.	164
14	Food Addiction	167
	It Depends on What You Mean by Addiction	168
	Manual of Mental Disorders	168
	Symptoms or Cause	169
	Behavioural Addictions	170
	A Real Addiction.	170
	Brain Imaging.	174
	Evolution	175
	Is Sugar Addictive	176
	Tolerance	176
	Withdrawal	177
	Cravings.	177
	Sweet-Tooth Hypothesis	177
	Emotional or Comfort Eating	178
	Psychological Rather Than Biological Responses	178
	Addiction and the Obesity Epidemic.	180
	Implications for Health Policy.	180
	References.	180
15	Bacteria and Obesity	183
	Controlling Energy	184
	Germ-Free Mice	185
	Effect of Diet	185
	Differences in Response	186
	Gut Transit Time.	187

Microbiota and Obesity	187
Other Factors That Influence the Microbiota	188
Caesarean Section.	188
Breastfeeding.	189
Antibiotics.	190
Antibiotics and Weight Gain in Animals	191
Do Not Worry	192
Food and Antibiotic Residues	193
The Importance of Diet.	193
Implications for Health Policy.	194
References.	195
16 Obesity in Childhood	199
Diabetes	202
Pre-natal Influences of Obesity	203
A Bridge Too Far	204
Smoking	205
Mothers Gain in Weight	206
Postnatal Influences	207
Sleep	208
Adiposity Rebound	208
The Role of Your Mother's Mother	210
Has Children's Life Expectancy Declined?	211
Implications for Health Policy.	212
References.	212
 Part IV Attempts to Reduce Obesity	
17 Can Government Influence What We Eat?	217
How Do You Know If You Have a Healthy Diet?	218
Limit Food Advertising.	221
Grazing and Snacking.	223
Activity	223
Sleep	223
What Happens in the Real World?	224
Does Banning Advertising Make a Difference?	226
Advertising Ban in Quebec	227
Calories on the Menu	228
Nutrition Labelling.	229

Nanny State230
 Implications for Health Policy.....232
 References.....232

18 Sin Taxes235
 Does Taxing Food Decrease Obesity?235
 Sugar Tax236
 Mexico238
 The United Kingdom Experience239
 Does a Sugar Tax Work?241
 Fact Checking.....241
 Reaction of the Customer242
 Timescale243
 Is It Sugar or the Whole Diet?.....243
 Sugary Drinks and Lifestyle.....244
 Implications for Health Policy.....245
 References.....246

19 Ban Advertising?249
 Children’s Vulnerability.....251
 Ethics253
 A Changing World 254
 How Can We Deal with Advertisements?255
 Do These Bans Work?.....256
 The American Approach257
 Self-Regulation259
 Final Comments261
 Implications for Health Policy.....262
 References.....262

20 Dieting and Other Ways to Control Weight.....265
 The History of Trying to Control Weight266
 The Vinegar Diet.....266
 Fletcherism267
 The Tapeworm Diet267
 The Cigarette Diet269
 Changing What You Eat272
 The Ketogenic Diet.....272
 Zero Carb or Carnivore Diet.....272
 Paleo or Caveman Diet273

Mediterranean Diet.273
Does It Matter Which Diet You Follow?273
What to Do274
Implications for Health Policy.274
References.275

Part V The Future of Public Health Policy Concerning Obesity

21 Government Obesity Policy279
An Australian Framework279
Canadian Obesity Policy281
Treating Those with Obesity282
United Kingdom Obesity Policy284
United States Obesity Policy285
Overview286
References288

22 Why Public Health Policy Failed291
Eat Less Move More292
 Can You Count Calories? 293
 More to Life than Calories 294
Failure to Acknowledge the Size of the Problem295
Too Simple a View of Nutrition296
 Healthy American Style Diet 296
 Healthy Vegetarian Diet 297
 Mediterranean Diet 297
 Standard American or Western Pattern Diet. 297
Failure to Address the Complexity of the Problem.299
 A Short-Term Perspective 302
 Government Structure. 302
 Individual or State 302
 Sickness Rather Than Wellness 303
How Successful Are Attempts to Control Obesity?303
References304

23 The Elephant in the Room307
Making Dietary Decisions.308
Self-Efficacy310
Is There a Solution311

Who Is to Blame 312
References 313

24 What Can We Do? 315
The Way Forward 316
We Need a New Approach 319
Insights from Previous Chapters 319
 The Greatest Influence. 320
 Prevention Is Better Than Cure 320
 Exploit Good Will 324
 Nutrition Education 325
 Do We Need a Trojan Horse? 327
Go and See Your Doctor 328
Self-Help. 330
Responding to Obesity 332
References 332

25 Cutting Calories 335
The Task 336
 The Food Industry 336
 The Consumer 339
 Energy Density. 339
We Need an Integrated Approach 342
References 343

26 Prospect 345
What Does the Future Hold? 345
The Food Industry 346
Fat Chance 347
Is There Hope 348
References 349

About the Author



David Benton PhD, DSc, is Professor of Psychology at Swansea University, UK. His interest in the influence of diet on brain functioning and cognition has resulted in over 200 research articles and an H Index to 57 (Scopus).

The acceptance of over 200 invitations to speak on six continents, and the widespread interest from multi-national food and ingredient companies, illustrates his impact. His work is quoted by the governments in the USA and UK when making public health recommendations. Invitations have been accepted to give evidence to the House of Commons and House of Lords in the UK.

The theme of the proposed book is that obesity cannot be understood without the perspectives of nutrition, physiology, biochemistry, psychology as well as societal viewpoint. His research reflects this range and has included papers on portion size, genetics, food addiction, sugar addition and non-nutritive sweeteners. A paper on calorie intake and the control of weight has been downloaded 35,000 times.



1

Introduction

Would you like to live in a society where there is an increased risk of heart disease, some cancers, and suffering from dementia? In the same society for the first time in human history, there are suggestions that the life expectancy of children is less than their parents. In this society, the government has been aware of the basic problem for over 50 years, and although it has repeatedly introduced public health policies, they have failed. The population has been condemned to a reduced life expectancy; in their final years incapacitated by a range of diseases.

If you live in an industrialised country, then you are already in such a society. The above are the consequences of obesity. If you live in the developing world, then this is an increasingly common problem, with the expectation that it will only be time before it gets worse.

An unavoidable conclusion is that government policies have not worked. The incidence of obesity has progressively increased over the last 50 years. In 1960, 13.4% of Americans were obese, a figure that had risen by 2018 to 42.8%. Although during this period there have been many attempts to reduce obesity, the incidence continued to rise. Statistical projections anticipate that by 2030 nearly 50% of Americans will be obese.

It is a widespread problem. The World Health Organization found in 2016 that worldwide 39% of those over 18 years were overweight. Worldwide between 1975 and 2016, the incidence of obesity nearly tripled, with the fear that it is only a matter of time before the rest of the world catches up with the United States. A particularly concerning trend has been an increase in the incidence of childhood obesity, to the extent that something that was rare, childhood diabetes, is increasingly observed.

Why then do we need another book on obesity when there are already many that look at the science, and even more that offer false hope by advocating the latest fad diet as a supposed answer? We know that obesity is a problem so what is new? The answer is very little, and this is the problem. We need new ways of dealing with obesity, as the present approaches have failed dramatically.

In industrialized countries, governments have regularly introduced yet another strategy to deal with obesity. However, the frequency that a new strategy has been introduced illustrates that previous attempts have not worked. It is particularly concerning that the new approaches often differ very little from those that were previously unsuccessful. Thus it is unsurprising that the incidence of obesity has continued to rise.

There has been a failure to acknowledge the extent and nature of the problem. We are eating hundreds of calories more than we need to fuel our basic biology. Yet the nature and scale of interventions have failed to remove sufficient calories to make a difference. In addition, it is commonly acknowledged that obesity is influenced by a multitude of factors; literally, we know of over a hundred. Yet government strategies have concentrated on one, or at the most a few of these variables. Again, as there has been a failure to fully acknowledge the nature of the problem, success is unlikely, arguably impossible.

These problems are made more difficult by an evolutionary driven tendency to replace any weight that is lost, and to retain any weight that is gained: basic tendencies that are useful if you are living in the stone age. However, they are unhelpful when food is highly calorific, requires an increasingly smaller portion of income, and is readily available.

This book reviews previous and current attempts to reduce obesity, although there are no obvious ways it can be controlled. Therefore if obesity is to be reduced new approaches must be developed. A major problem is that many of the factors that encourage eating are so embedded in our culture that they cannot be easily changed, or change may not be possible. Although it is much easier to find problems than solutions, possible ways forward are discussed. An unavoidable conclusion will be that obesity is a difficult problem without easy answers.

The book is organized into five sections:

- Initially historical approaches that have been taken to reduce obesity are discussed. What happened around 1980 when the incidence of obesity began to rise dramatically: was it due to fat, sugar, or increased calorie con-

sumption? It has been suggested that it was attempts to reduce heart disease that caused the obesity epidemic.

- The second section looks at society today and the associated food environment. The changes in methods of food production and attitudes towards food are examined. Changes such as increased portion sizes, fast-food and poverty are considered. Although highly-processed foods get a bad press, they may be the only solution to the obesity problem.
- Thirdly biological factors are examined: the influence of genetics, the possibility of addiction, the influence of gut bacteria, and the long-term impact of infant feeding. A picture emerges that evolution has developed a body that attempts to retain body fat, and to replace any that is lost. When we attempt to control weight are we fighting our basic biology?
- The fourth section looks at commonly used attempts to control body weight, including a sugar tax and limiting the advertising to children, although there is little evidence they work. Finally it is asked why dieting fails. Dieting results in the release of hormones that increase appetite and reduces the bodies need for energy. These changes last for years, so after dieting you need to eat fewer calories than before dieting.
- The final section attempts to draw together findings from the previous sections. What exactly has government policy been doing, and why has it failed? Lastly, approaches with a chance of reducing weight gain are considered: but do not expect easy answers.

Hopefully individuals will gain some insight into why it is so hard to control body weight, and with it some understanding of how weight can be controlled. Although for most people there are ways to control weight, it involves permanently changing what is eaten, and continually monitoring the consequences. Popular books may allege that there are easy ways to control weight, but these are misleading as there are no simple solutions. However, although weight control is difficult, it is possible, and hopefully a fuller understanding of the food environment, and the way we interact with it, will prove helpful.

Enjoy!

Part I

Basic Information and Historical Approaches

The second chapter sets the scene by introducing basic terms and outlining the extent and significance of the obesity problem. Then historical attempts to reduce obesity are considered: reducing fat consumption in Chap. 3, sugar in Chap. 4, and fructose in Chap. 5. In the sixth chapter, the suggestion there was a sugar conspiracy is discussed, the view that the sugar industry intentionally blamed fat, to diverted attention away from sugar. The final chapter of this section looks at attempts to generally reduce calorie intake and in particular the initiative of Michelle Obama that removed 6.4 trillion calories from the American diet.



2

The Obesity Epidemic

Summary The scene is set by introducing basic terms and outlining the importance of developing methods to control body weight. How body weight is measured is discussed, and body mass index (BMI) is defined and related to being overweight or obese. The influence of obesity on health is considered and the worldwide incidence reported: the World Health Organization found in 129 out of 190 countries that average body weight was above the healthy range.

In Wales, United Kingdom, builders demolished the outside brick wall of the bedroom of a 19-year-old young woman [1]. It was an 8 hour operation involving firemen, doctors, paramedics and in addition scaffolders and builders. The aim was to extricate a young woman from her house. Aged 10 she had weighed 168 pounds (76 kg) and by 15 years she was 462 pounds (209 kg). She had travelled to the USA to attend a weight-loss camp and lost 210 pounds (95 kg) which she regained after returning home. At 19 years she now weighed 840 pounds (381 kg).

Having fallen ill she could not get out of bed, get down the stairs or out the door. A window and part of a wall were removed, and she was winched out of the building to be taken to the hospital. This is an example of somebody in a society where obesity was endemic, and although an extreme example, she was part of the majority who have a weight problem. Seventy-four percent of Americans, and 63% of those in the United Kingdom, are either overweight or obese.

Throughout the world the incidence of obesity is increasing, irrespective of whether you live in a high-, middle- or low-income country. In 2016 the World Health Organization found in most countries that being overweight or obese killed more people than being underweight. In total 39% of the adult population were overweight, a figure that had nearly tripled over 40 years [2]. The curse of obesity is a universal problem.

Why did the obesity epidemic develop? Why have attempts to deal with obesity failed so dramatically? Is the problem too difficult to solve or can novel approaches be found? These are questions to be addressed.

The message of this book can be summarized by the aphorism of the American journalist H.L. Mencken: ‘For every complex problem there is an answer that is clear, simple, and wrong’. If today Mencken looked at obesity he could remark, ‘I told you so’. The study of obesity has been plagued by those who propose that obesity was largely caused by one factor, for example, fat or sugar. For others, an attempt to deal with the problem has involved a limited range of interventions; maybe a sugar tax, removing a few calories from food products or banning the advertising of food to children. Whereas all students of obesity agree that it is a complex problem, our attempts to address the issue have failed to acknowledge the complexity of the task.

How to Measure Obesity

There will be few who have not heard of BMI (body mass index), the measure of body fat that will be used throughout the book. What is the healthy range? How does obesity relate to BMI?

At the beginning of the twentieth century it became clear that a high body weight was associated with early death, so there was a need for it to be easily measured. In 1972 a study compared a range of measures and concluded that body mass index (BMI) was superior to others [3]. Body weight was divided by your height squared.

$$\text{Body Mass Index} = \frac{\text{Weight in kilograms}}{\text{Height} \times \text{Height in metres}}$$

Initially, BMI was not intended to be used by doctors; rather it was an indication of the average level of body fat in a population. It was suggested that it should not be used with an individual as other factors affect the score. Athletes can have a high muscle-to-fat ratio, and as muscle is heavier than fat, they have a misleadingly high BMI. Those in South-East Asia complain that their BMI is unfairly raised. They have short legs.

Box 2.1 Waist size and disease

	Males	Females
Low risk	Less than 94 cm (37 inches)	Less than 80 cm (31.5 inches)
High risk	94 to 102 cm (37 to 40 inches)	80 to 88 cm (31.5 to 34.5 inches)
Very high risk	More than 102 cm (40 inches)	More than 88 cm (34.6 inches)

Abdominal or central obesity reflects excessive fat around the stomach and abdomen, and importantly, this adds information not given by BMI. Box 2.1 gives the waist sizes that correspond to a low, high and very high risk for high blood pressure, type two diabetes, heart attack and stroke. BMI does not consider where fat is found in the body, something that gives important information and is indicated by the size of the waist.

Irrespective of these concerns, BMI has been embraced by the medical profession as a quick, cheap and easy indication of body weight. There are more accurate measures, such as using skin callipers to measure the depth of fat in different areas of the body. The Greek philosopher Archimedes developed the principle of displacement that can be used to estimate the amount of body fat. Fat has a lower density than muscle and bone, so your change in weight when underwater is measured. By considering the change in weight when submerged, you can estimate the amount of body fat. A DEXA scan (dual-energy X-ray absorptiometry) uses low-dose X-rays to measure bone density, but it is also the gold standard for measuring body fat. The negative is that it needs specialist equipment unavailable to a general practitioner.

Particularly as the book deals with populations, BMI will be the measure reported. It is not surprising that BMI has become the accepted way to determine whether you have healthy body weight, It is quick and convenient. You would be surprised if when visiting a doctor you were asked to strip off and submerge yourself in a tank of water.

Figure 2.1 lists the way BMI is classified: underweight under 18.5; normal healthy range 18.5 to 24.9; overweight 25 to 29.9; obese over 30; over 35 severely or extremely obese. If you want to establish your own BMI, there are available websites that will perform the calculation [4, 5].

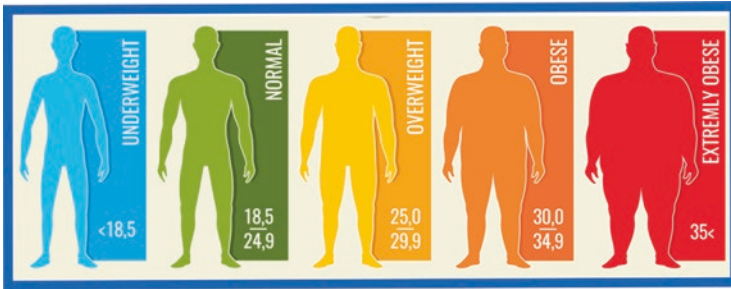


Fig. 2.1 Classification of body mass index (BMI). Source: Shutterstock

BMI and Health

When, worldwide BMI was examined in ten and half million people, BMIs under 20 and over 25 were both associated with a higher death rate. The more you were outside the desirable BMI range, the greater the chance of having died [6], although this adverse effect of BMI was greater in those aged 35–49 years rather than 70–89 years.

Obesity is particularly associated with the development of type 2 diabetes, such that about 80% of diabetics are overweight. It is also associated with high blood pressure that damages blood vessels and increases the risk of heart attack, stroke and kidney disease. Sleep apnoea is another problem: during sleep breathing stops for short periods. It is unsurprising that osteoarthritis occurs as there is extra pressure on the joints. The risk of several types of cancer is also greater, amongst others, endometrial, stomach, liver, kidney, pancreatic, colorectal, breast and ovarian cancer [7].

As well as a risk factor for disease, there may be emotional and social problems, including depression, that can be made worse by negative attitudes and discrimination. Although less attention has been played to the association between obesity and dementia, ‘there is a strong association between obesity and impaired cognitive functioning’ [8]. Obesity is related to the extent to which the cortex of the brain is damaged.

It follows that obesity places a great strain on the provision of healthcare. It is estimated that between 2020 and 2050, due to obesity, the USA will spend \$645 per person a year on health services. This amounts to 14% of total healthcare expenditure, whereas Germany will spend 11%, Canada 11%, Australia 9% and the United Kingdom 8% [9].

There are many factors that make controlling weight difficult. The price of cutting down calories is to feel tired and hungry, both of which encourage eating. If you cut out sugar and fat, food does not taste as good, and you

choose another option high in calories. If we restrict food intake, hormones are released that increase appetite. A consequence of loss of weight is that the metabolic rate is reduced, so the basic functioning of the body now consumes less energy and requires less food. We live in a society that encourages obesity and many have sedentary jobs and go by car. We eat fast foods outside the home, and there are readily available cheap, tasty and highly calorific foods.

Even if you decide to tailor the calories to your bodily needs, there is a major reason the counting calorie approach will not work. Very few know how many calories a day they need, understand the portion sizes they should be eating, or know how many calories there are in a food item. In addition, it is a basic characteristic familiar to all nutritionists, that human beings consistently underreport the amount they eat.

Although the eat less/move more approach can in the short term result in weight loss, in the longer term it is difficult to maintain. In addition to take this approach is to imply that body weight is only about diet and exercise, while ignoring psychological factors, your evolution determined biology, and the obesity-inducing world in which we live.

Extent of the Problem

Throughout the world, over the last 50 years the waistline has expanded. The incidence of obesity has tripled. Table 2.1 lists the average BMI of a representative sample of countries. The data from 190 countries were collected by the World Health Organization, and in 128 the average BMI was greater than 25, the top of the healthy range.[10] Table 2.1 illustrates that obesity is a widespread phenomenon, and although the USA has a bigger problem than most, other nations are following in their footsteps. It is clearly a worldwide problem, with examples quoted from South America, the Caribbean, Europe, the Middle East, Africa and Australia. The right-hand side of Table 2.1 lists some of the countries with an average BMI below 25, but even here the tendency is for under-nutrition to increasingly turn into over-nutrition.

The British Government used statistical modelling to predict the future[11] and concluded that by 2025 43% of men and 32% of women will be obese. By 2050 it was anticipated that 60% of men and 50% of women will be obese. The trends were similar in the rest of Europe with the trend in the USA being 6–10 years ahead of Europe. A similar exercise in the USA predicted that by 2030, 49.2% of Americans will be obese [12].

Table 2.1 Average BMI in a range of countries

Country	Males	Females
Kuwait	29.5	30.8
USA	28.5	28.6
New Zealand	28.0	27.8
Ireland	27.9	27.1
Australia	27.6	26.8
Canada	27.6	26.8
United Kingdom	27.5	27.1
Germany	27.0	25.6
Brazil	25.9	26.0
Jamaica	25.5	29.2
South Africa	25.4	29.1
Singapore	24.3	23.2
China	24.2	23.6
Japan	23.6	21.7
Thailand	23.6	24.6
Philippines	22.9	23.4
Nigeria	22.8	24.0
Kenya	21.9	24.0
India	21.8	22.1

Source: World Health Organization. Data are the average BMI [10]

Health Policy

The World Health Organization Global Strategy on Diet, Physical Activity and Health was adopted by the World Health Assembly in 2004[13]. A ‘fact’ offered by the World Health Organization was that:

Overweight and obesity are largely preventable

They suggested we should decrease the eating of fat and sugars and engage in regular exercise. Supportive environments were to be developed to make healthy eating and regular activity an easy choice. The food industry was to provide healthy foods, and the marketing of foods high in fat and sugar was to be banned, particularly if aimed at children.

Is it really the case we know how to prevent obesity? If so, why, all over the planet, has the rate of obesity reached such high levels? If the knowledge exists, why has it not been implemented? Instead, although it is universally recognized that obesity is a major problem, and there have been many attempts to make a difference, the current rates of obesity indicate failure.

There is an old joke, more profound than funny, that summarizes the position with obesity. An old farmer was leaning on a gate when two visitors came

along the road. They had gone for a walk, and as they were lost, they asked the way. They explained where they had left their car only to learn: 'Aah, if I was going there, I would not start from here'. There are similar problems with obesity. We know why obesity has soared: there are too many calories and too little exercise in a society that encourages obesity. Although we know how we came to be where we are, we do not know how to get to where we want to be.

The World Health Organization claims to offer a strategy to solve the problem [13]. However, a strategy is a plan to achieve a particular goal. Rather than offering a strategy, they provided a series of goals such as eating fewer calories: these do not amount to a strategy but instead a 'wish list'. Certainly, if we eat fewer calories than we expend, then we would not put on weight, but there is one important question: how is this to be achieved? Essentially, they are advocating the eat less/move more approach that we will learn has failed [14–17]. They do not, however, suggest how these aims are to be achieved; rather the problem is off-loaded to governments who are expected to find a solution. It will surprise few that they have failed to develop successful strategies.

It is suggested that we should eat less sugar and fat, yet we will learn that this strategy has not reduced obesity. By concentrating only on removing calories from food items, you ignore that humans do not passively accept such changes, but compensate by altering the rest of the diet, and our biology alters to encourage the regaining of lost weight. You might hope that the food industry will change its products but why would they do this? Removing sugar and fat makes food less palatable, ensuring the customer will choose the better-tasting alternative, forcing you out of business. Eating outside the home, particularly fast food, is a risk factor for obesity, yet it would be politically unthinkable to close these outlets.

To a large extent we understand what caused the problem, but we need to move on from thinking about causes. Like the walkers who were lost, we must start the journey from where we are as trying to retrace our steps has proved unsuccessful. When planning the journey to a slim world, it is unrealistic to try to turn the clock back 50 years.

In Greek mythology, Pandora opened a box and released a range of physical and emotional curses into the world that proved impossible to again lock away. Just as there was no alternative but to learn to live with the evils released by Pandora, there is no alternative to accepting the world the way it is. The food industry is not going to revert to using historical methods of food production. There are so many ways in which industrialized societies encourage obesity that it is unrealistic to expect any but the most minor of changes. Human psychology and physiology are the way they are, and both encourage

putting on weight. We do not have a blank sheet of paper on which to redesign society.

We will learn that public health policy dealing with obesity has failed: a strong statement that will be justified. It is not intended to imply that research in this area has not produced a considerable insight into the origins of obesity. In fact, without this research the book could not have been written. What is implied is that these insights have not been translated into policies that have prevented a rapid increase in obesity. In the case of the USA, three-quarters of the entire population are overweight or obese. That statistic is mind-blowing. The vast majority of the population lack the ability to maintain a healthy body weight; they are out of control.

Without any doubt there is a growing problem that public health policy has failed to halt, never mind reverse, condemning many to an early death. We should not, however, be too hard on those developing public health policy. We know that obesity is influenced by hundreds of factors that interact in often unpredictable ways. We are dealing with the psychology and biology of individuals that often in subconscious ways, try to prevent a reduction in body weight. Can anything be done?

References

1. Wall of home knocked down to get morbitally obese teenager to hospital. Available at: <https://www.theguardian.com/uk/2012/may/25/wall-knocked-down-obese-teenager-wales>. Accessed 07 Sept 2023.
2. Fact sheet, Obesity and overweight, World Health Organization, 2021. Available at: <https://www.who.int/news-room/factsheets/detail/obesity-and-overweight>. Accessed 07 Sept 2023.
3. Keys A. Indices of relative weight and obesity. *J Chronic Dis*. 1972;25:329–43.
4. BMI Calculator. Available at: https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm. Accessed 07 Sept 2023.
5. BMI Calculator (Metric). Available at: <https://www.calculator.net/bmi-calculator.html>. Accessed 07 Sept 2023.
6. Di Angelantonio E, et al. Body-mass index and all-cause mortality: individual-participant-data meta-analysis of 239 prospective studies in four continents. *Lancet*. 2016;388:776–86.
7. National Diabetes Statistics Report. Available at: <https://www.cdc.gov/diabetes/data/statistics/statistics-report.html>. Accessed 07 Sept 2023.
8. Dye L, et al. The relationship between obesity and cognitive health and decline. *Proc Nutr Soc*. 2017;76:443–54.

9. The Heavy Burden of Obesity. Available at: https://read.oecd-ilibrary.org/social-issues-migration-health/the-heavy-burden-ofobesity_67450d67-en#page16. Accessed 07 Sept 2023.
10. Global status report on noncommunicable diseases. Available at: <http://www.who.int/nmh/publications/ncd-status-report-2014/en/>. Accessed 07 Sept 2023.
11. Reducing obesity: modelling future trends. Available at: <https://www.gov.uk/government/publications/reducing-obesitymodelling-future-trends>. Accessed 07 Sept 2023.
12. Zachary J, et al. Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity. *N Engl J Med*. 2019;381:2440–50.
13. Global Strategy on Diet, Physical Activity and Health. Available at: <https://www.who.int/publications/i/item/9241592222>. Accessed 07 Sept 2023.
14. Why eat less move more is a ridiculous approach. Available at: <https://getwildfit.com/weight-loss-approach/>. Accessed 07 Sept 2023.
15. Why the ‘move more and eat less’ is outdated. Available at: <https://www.bodyshot-performance.com/why-the-move-more-andeat-less-theory-is-outdated-for-weight-management/>. Accessed 07 Sept 2023.
16. Eat less and move more is bad advice. Available at: <https://www.staystrongsc.com/blog/2018/4/1/eat-less-and-move-mor>. Accessed 07 Sept 2023.
17. Is Eat less, move more theory wrong?. Available at: <https://forum.slowtwitch.com/forum/?post=4461749>. Accessed 07 Sept 2023.