In Clinical Practice

David Haslam · Aseem Malhotra
Matthew S. Capehorn *Editors*

Bariatric Surgery in Clinical Practice

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Bariatric Surgery in Clinical Practice

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ISSN 2199-6652 ISSN 2199-6660 (electronic)
In Clinical Practice
ISBN 978-3-030-83398-5 ISBN 978-3-030-83399-2 (eBook)
https://doi.org/10.1007/978-3-030-83399-2

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

Eulogy to Prof David Haslam

My good friend and co-editor of this book sadly passed away before it reached publication, and it should be correct that a moment is taken to recognise the wealth of input he has had into the field of obesity and weight management during what was an illustrious career.

Like me, David was fundamentally a general practitioner and worked in primary care as a Partner at his NHS Practice in Hertfordshire for 30 years until retiring a couple of years ago. However, we shared the same frustrations that our day jobs would cause us to chase our tails and see patients with the consequences of obesity, rather than treating the cause itself. His dedicated personal development saw him soon become a GP with specialist interest in obesity and cardiometabolic disease, and he ultimately worked as a Bariatric Physician in Obesity Management at Luton & Dunstable Hospital.

David began his interest in obesity medicine before we even met and soon became an established expert in the field. I first met him when he was in the respected role of a Clinical Director of the National Obesity Forum (NOF), an organisation for which he would subsequently become a Chairman. He was always very keen to promote the recognition of obesity as a serious medical problem and help to provide education and training on obesity management for the healthcare profession. During his time with the NOF, he would help to co-author or contribute to many clinical guidelines on the management of obesity or commonly associated co-morbidities such as type 2 diabetes.

It was David's passion to help set up a network of like-minded specialists to provide management support and an information resource, and he was integral in developing the NOF regional obesity groups (inviting me to be a Chair of the Yorkshire and Humber region), as well as subsequently becoming a founding board member of the Experts for Severe and Complex Obesity (ESCO) networking group. His encouragement of academic excellence led him to be one of the original academic advisory board members for the College of Contemporary Health.

However, David was also a keen and shrewd lobbyist and would welcome every chance to attend parliamentary meetings in Whitehall with the aim of highlighting the health inequalities of obesity and raising the profile of obesity via political, medical and lay media channels. His high profile led him to sit upon the Department of Health Obesity Strategy Group.

His other achievements were numerous, including: a Visiting Professor at Robert Gordon University, Aberdeen and Chester University; and an obesity specialist at 76 Harley Street, London; as well as working for charity organisations such as a Director of PCOS UK (Polycystic Ovary Syndrome UK); a member of the Counterweight Board; and a Visiting Lecturer at Beds & Herts Postgraduate Medical School. He was a prolific author and has widely published in journals and papers, and would speak internationally on obesity and related diseases, and his books included the often cited "Fat, Gluttony and Sloth; Obesity in Literature, Art and Medicine" and "The Obesity Epidemic and it's Management" both published in 2010.

On a more personal level, David was more than just a friend and became more like a mentor. I know that I would not be as involved in the field of weight management as much today had it not been for his support and guidance over the years. Furthermore, our many discussions over what we would have in the ideal obesity MDT (multidisciplinary team) will have influenced my development of the Rotherham Institute for Obesity (RIO) whether consciously or subconsciously, and I was honoured when David agreed to perform the official opening ceremony in November 2009, an event recorded forever with his name on the shiny brass plaque—he will be sadly missed.

RIP

11.05.62 to 23.08.21

Matthew S. Capehorn

A Personal Tribute to David Haslam, Physician and Friend

David's dedication to advancing better recognition and treatment for obesity meant our paths were destined to cross. While I played my part in persuading the World Health Organization, the European Union and medical and health professional organisations around the world that the obesity pandemic (long before Covid-19 came to haunt us) was a real global threat, David surrendered much of his precious spare time to beat the obesity drum in the UK.

For many years, he took on the leading role in the National Obesity Forum as its clinical director and then chair, and didn't shy away from the controversies that sometimes ensued in those honorary roles. His commitment was to keep the campaign momentum whatever vicissitudes he encountered.

We became good friends as well as colleagues, finding we shared a degree of healthy cynicism whilst also sharing a good laugh. Whenever we met, David was always able, with his wry sense of humour and undeterred optimism, to look on the bright side even when situations in the world of public health and obesity prevention policy seemed immeasurably worse. Occasionally we travelled together to critical meetings in Luxembourg, Strasbourg and Brussels, where I greatly valued his support. David was always a wonderfully entertaining travelling companion with many diverse interests beyond public health.

As visiting lecturers to what was then the only master's course in obesity at the University of Chester, we usually had time to put the world to rights over dinner when he would often rather talk about his other passions. He was a notable cricketer—sometime batsman, bowler and trustee of Knebworth Park Cricket Club—and having been an accomplished violinist, he retained a passion for music of all varieties.

Although a dedicated GP partner in his Hertfordshire practice for 30 years, David also became a well-known specialist in obesity medicine at the Centre for Obesity Research at Luton & Dunstable Hospital. He was a visiting professor at the Robert Gordon University, Aberdeen as well as at Chester and was a Fellow of the Royal College of Physicians of Edinburgh. His deep interest in the history of medicine led

him to write a fascinating book with his mother Dr Fiona Haslam.[1] He was also a co-author of the book, *Fast Facts: Obesity* with Prof Gary Wittert.[2]

He asked me to help him inaugurate the Wadd Society, a world-wide body for those interested in the history of obesity, which we unveiled in a joint article in The Lancet discussing the prehistoric evidence for obesity prior to recent medical history.[3] Along with the American doyen of the obesity research world, Prof George Bray, we launched the Wadd Society at a packed meeting at the International Congress on Obesity in Sweden in 2010.

After years leading the organisation, David stepped down from the National Obesity Forum, but his commitment to improving obesity care and prevention remained undaunted. Latterly, failing eyesight led to his early retirement from medical practice in 2019. David bore the burden of his illness with characteristic stoicism, and died peacefully in hospital on 23 August 2021, aged 59. He is survived by his wife Susan and children Madeleine, Edward and Isabel, and mother Fiona.

Neville Rigby

[1] David Haslam and Fiona Haslam, *Fat, Gluttony and Sloth: Obesity in Literature, Art and Medicine.* Liverpool University Press, 2009

[2] David Haslam and Gary Wittert, *Fast Facts: Obesity,* Karger Medical and Scientific Publishers, 2014

[3] Haslam D, Rigby N, *The art of medicine—A long look at obesity* www.thelancet.com Vol 376 July 10, 2010

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About the Editors[4]

David Haslam was a GP with a special interest in obesity and cardiometabolic disease, a Physician in Obesity Medicine at the Centre for Obesity Research at Luton & Dunstable Hospital; Visiting Professor at the Robert Gordon University Aberdeen, and a Visiting Professor at Chester University. He contributed to formulating the guidelines for adult obesity management in primary care and produced the first Primary Care guidelines for the management of childhood obesity with the Royal College of Paediatrics and Child Health.

Aseem Malhotra, NHS consultant cardiologist is based at the ROC Private Clinic, London. Dr Malhotra graduated with a degree in medicine from the University of Edinburgh in 2001. Diagnosing, preventing, and managing heart disease, his areas of expertise include evidence-based medicine, collaborative shared decision-making with patients, obesity, coronary artery disease, preventive cardiology and angina.

Matthew S. Capehorn founded and is a Clinical Manager and GPwSI at the Rotherham Institute for Obesity (RIO). RIO is a part of the award-winning NHS Rotherham Weight Management Strategy that won the 2009 NHS Health and Social Care Award for best commissioned service. Doctor Capehorn has been active on several local, regional and national advisory boards and regularly speaks at meetings to healthcare professionals, encouraging weight management services.

[4] Editor "David Haslam" deceased at the time of publication.

Part I

Background to Obesity as a Disease

1 Obesity in Context; What Is the Need for Assessment and Management of Obesity and Related Conditions

Stephan Rössner

it is absolutely essential that a new generation of enthusiastic health care personnel can look at obesity prevention and treatment as a professional challenge

"The most common nutritional disease in the US was treated by the health profession with scorn, contempt and indifference." The quote about obesity is now quite old and appeared in a review decades ago before PubMed. But unfortunately the quote still reflects a prevailing attitude toward those unfortunate to develop weight problems. There is a vast scientific literature demonstrating that subjects with obesity are not respectfully treated neither in society nor in the health care system, where personal prejudice rather than professionalism affects our attitudes. The old term "jolly fat" has never been relevant. Obese subjects rate their quality of life as poorly as subjects with depression, wheel chair confinement, or fighting a metastatic cancer.

Over the last decades numerous research groups from all over the world have over and over described the deleterious effect of the upcoming obesity epidemic with all its consequences for the individual, health planners, and society at whole. But regrettably the rising prevalence data, which in many countries started to be well documented more than 30 years ago, have not yet lead to the allocation of any major support for research in understanding the reasons for the epidemic, any analysis at health authority levels of the consequences, or sufficient resources set aside to develop coherent treatment strategies.

In some countries the incidence rise is possibly leveling off, whereas in others it still continues to increase. Although Type 2 diabetes is always mentioned as the

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_1

most obvious and easily measured consequence of obesity, there is a long list of other adverse effects of overweight and obesity—but also solid data showing that as little as 5–10% maintained weight loss confers important health benefits for many of those associated comorbidities.

The lack of interest to engage in the "battle against the bulge" is seen at all levels from government strategies to everyday clinical practice. To some extent this is understandable—although still unacceptable. We do have national well established programs for drug addicts, sex- and alcohol abusers and there are even programs being developed for compulsory gambling—but not enough for obesity treatment. The responsibility for action is always tossed on to somebody else's table. The diabetologists, seeing the consequences of obesity on Type 2, wonder why our primary health care system has not been more active in managing the underlying obesity. And the general practitioners on their hand argue that society at large has the responsibility by working for more preventive action. And—in the last instance—the patient him- or herself is blamed for lack of willpower. This is sad, since most experts in the field today agree that obesity is not a matter of impaired willpower but the unfortunate clash between stone-age genes and the modern, the so-called toxic environment, resulting in a positive energy balance and hence body weight increase. In modern society nobody wants to be fat.

Furthermore, the food industry at large has rightly received severe criticism for cynical promotion of unhealthy products. And whereas a hamburger or a pizza slice now and then can be a delightful meal, the development of such products into a narrow range of high fat nutriciously poor meals in the long run will have adverse effects. Standard sodas and soft drinks are 10% sugar solutions and many teenagers today get up to 25% of their energy intake from sugary products, which in the long run will have adverse effects on energy balance and tooth decay.

If the health aspects have not alarmed the decision makers, one can but hope that politicians, who are sensitive to financial issues, may eventually react to the economical implications. However, to document that money could be saved by antiobesity strategies, both preventive and curative, instead of being needed for the costly treatment of all the ensuing comorbidities, is complicated and in itself very costly. The general attitude among decision makers is that this is somebody else's responsibility.

At present bariatric surgery—after some initial resistance—has been accepted as a reasonably effective treatment tool for severe obesity. But after all, those operated upon constitute a minor fraction of all those obese patients, whose life will be shortened and made miserable by the consequences of their weight problems. Antiobesity drugs have been coming and going, and at present there is no really effective such compound in sight. Some combinations of old compounds with synergistic effects have been brought to the market and although technically "effective" do not bring any obvious solution to the problem. The tolerance of side effects for these drugs is extremely low, a fact which killed both sibutramine (cardio-vascular complications) and rimonabant (depression). It is not unlikely that at the time of their existence clinicians could easily have been trained to identify side effect risk patients and

withdrawn them from that treatment, since for many other patients these drugs were indeed of great benefit.

Obesity is clearly one of the main emerging health threats to our societies, both the developed but also the developing parts of the globe. Awareness has undoubtedly increased, and there is no need any longer to explain what BMI means—even to a lay audience. But from there to the creation of a coherent strategy to identify the problem, initiate whatever is feasible toward preventive action and the development treatment strategies, there is still a very long way to go. That is why it is absolutely essential that a new generation of enthusiastic health care personnel can look at obesity prevention and treatment as a professional challenge. After all—there are a number of good examples, showing that with standard but persistent support clinically meaningful weight loss may be achieved and maintained. The US National Weight Control Registry is such a promising example. Although these participants were highly selected and their success remarkable it is well established that even moderate and maintained weight losses have quite significant beneficial effects on somatic and—which might sound surprising—even psychological outcome.

We cannot wait for the magical solution to come about but have to work with what is at hand today. And—in the end of the day—although seeing no definite solution to the problem we can clearly make a difference. Those who benefit will of course firstly be the subjects with weight problems, but as said even modest successes will relieve the health care system from the need to care for all ensuing consequences and in the long run also have positive financial implications.

Winning the Battle But Losing the War on Obesity?

2

Neville Rigby

Obesity is a myth—you can be fit and fat—there's nothing wrong with sugar, nor with dietary fat nor indeed being fat. In fact there's no epidemic of obesity—it is all the invention of the pharmaceutical industry seeking to create new markets for their pills.

This was the tenor of the vicious and virulent attacks on the medical and scientific community that flowed freely from the variously uninformed, ignorant, malicious and even sometimes corrupted antagonists, who fired off in all directions to undermine efforts to alert the world to one of the biggest global non-communicable disease (NCD) challenges of our time.

Even now, we hear feeble echoes of the spurious critiques that abounded when the World Health Organization (WHO) not only published the first-ever report on the global obesity epidemic but dared to propose measures to address the epidemic—global strategies for diet, physical activity and the prevention of NCDs.[1] Few can doubt now that those of us (hundreds in the early days but now thousands of eminent medical experts and research scientists) involved in campaigning for full recognition and action on obesity, overweight and food policy challenges were faced with the Sisyphean task of rolling the stone up a mountain of political and corporate inertia only to have to the start again to overcome outright and obstructive antagonism, which remains to this day.

Achieving professional, political and popular momentum did not happen overnight. Indeed it is sobering to recall that concerted efforts behind the pressure for

[1] WHO TRS 894 Obesity: Preventing and Managing the Global Epidemic, 2000. http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_2

global recognition of the obesity epidemic only really began in earnest a quarter of a century ago. Still, a constant effort is needed today to maintain the momentum. It was in the mid-1990s that one man, Professor Phillip James, embarked on an extraordinary effort to galvanize leading medical specialists and scientific researchers to analyze the state of knowledge of obesity pathology, assess from limited data the extent of the epidemic globally and offer recommendations for preventive action. The International Obesity TaskForce, which he created and led, was later to be subsumed with the International Association for the Study Obesity, now known as the World Obesity Federation. The task force had its humble origins at the Rowett Research Institute in Aberdeen where Prof. James was director.[2] With the support of a small secretariat housed in a converted farmworker's cottage, he succeeded in drawing on the expertise of hundreds of international academics and practitioners to draft the major dossier, which led to WHO's first expert report on the global epidemic of obesity.

It was a transforming moment when WHO crystallized years of essentially voluntary medical and scientists contributions in the shape of a technical report. The first printed edition lay in unopened boxes in a basement corridor when I liberated copies and began distributing them among health ministers gathered for the World Health Assembly in 1999. An unorthodox procedure for Geneva, but bureaucratic inertia and protocol had to be set aside, and very quickly, WHO staff yielded to the pressure to issue the interim report on the spot to the members of Committee A. It was clear that many health ministers, from countries rich and poor, already knew that obesity was one of their primary concerns. Commonwealth Health ministers were the first to insist immediately that they should receive a full presentation of the implications of the report for their countries, followed later by an intergovernmental obesity policy workshop for the Caribbean.

As the interest in obesity mounted, headlines began appearing all over the world, and the food and beverage industries became alarmed. WHO had already moved on to reconsidering and updating a report on diet, physical activity and the prevention of NCDs, which had been buried after it came out in 1990 with strong recommendations to tackle high-calorie diets and an early warning about the problems of obesity for which "a preventive policy seems the only long term solution."[3]

The global masters of the food chain knew exactly what that meant and were determined to try to block the impetus towards a significant international agreement on food and nutrition strategies, which they feared would follow along the lines of the tobacco deal WHO was close to sealing with the authority of a UN treaty agreement. By the time WHO's technical editors lay down their blue pens on the final proofs for its successor, the WHO 916 report, the sugar industry had already declared war, mobilizing a broad cross-section of junk food and sugary drink corporates to

[2] The Global Challenge of Obesity and the International Obesity Task Force, 1998, revised 2002. http://www.iuns.org/resources/the-global-challenge-of-obesity-and-the-international-obesity-task-force/

[3] Diet, nutrition, and the prevention of chronic diseases—Report of a WHO Study Group (WHO Technical Report Series 797), 1990. http://www.who.int/nutrition/publications/obesity/WHO_TRS_797/en/

join the fight and demand that the report be shelved. To her credit, the then WHO Director-General Gro Harlem Brundtland, the former prime minister of Norway and a doctor, refused to be intimidated and chose to launch the report significantly in Rome alongside its UN sister agency, the Food and Agriculture Organization.[4]

Suddenly what should have been a formal launch of a consensus-based scientific report became a gloves-off war of attrition, with the sugar industry buying enough influence to persuade the US government to threaten to pull its funding from WHO (an early warning sign of what was to come in the Trump era).[5] Only a well-crafted letter from Prof Kaare Norum, the Norwegian chair of the WHO's expert reference group on diet, addressed personally to the then US health secretary, Tommy Thompson, succeeded in defusing temporarily the explosive political melodrama that had been whipped up.[6] The price of acquiescence to a WHO global strategy on diet was literally the physical erasure of all references to the "controversial" 916 report—an action that would have been familiar to George Orwell's 1984 protagonist Winston Smith who spent every day rewriting history according to which way the political wind was blowing.[7]

If this seems to be dwelling too much on the past, it is worth realizing the significance of this pivotal moment. In the face of millions of dollars spent on lobbying by the junk food giants and sugar trade, and the very real fear that Washington could cut its funding, WHO had resisted and paved the way for a strong global strategy alerting everyone to the serious public health disaster unfolding. A grudging recognition of the World Health Assembly's seal on the strategy was extracted from food industry organizations on both sides of the Atlantic but counted for little. They needed to adapt their approach, to appear more collaborative to embrace to smother.

The WHO Director General retired only to be recruited to an advisory panel by PepsiCo, a move which was kept quiet and sparked outrage, particularly among her close colleagues in Norway. The former WHO executive director for NCDs, Dr. Derek Yach, who had spearheaded the global diet strategy initiative as well as the tobacco treaty, was unceremoniously sidelined in Geneva after a shift in leadership and later joined PepsiCo himself. Amalia Waxman, who had shepherded the WHO global strategy process for 3 years, eventually took a prominent corporate role with Nestlé, as later did Janet Voute, chief executive of the World Heart Federation at the time when NGOs joined forces to combat the junk foods lobbying offensive.

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[4] Diet, nutrition and the prevention of chronic disease Report of a joint WHO/FAO expert consultation (WHO Technical Report Series 916), 2003. http://www.who.int/nutrition/publications/obesity/WHO_TRS_916/en/

[5] Sugar industry threatens to scupper WHO—*The Guardian,* Monday 21 April 2003. https://www.theguardian.com/society/2003/apr/21/usnews.food

[6] BMJ. 2004 Jan 31; 328(7434): 245. United States wins more time to lobby against WHO diet plan https://www.ncbi.nlm.nih.gov/pmc/articles/PMC324479/

[7] WHO Global Strategy on Diet, Physical Activity and Health, 2004. http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_web.pdf

None of those who shifted their allegiance could claim not to see the major political advantage they handed their corporate masters by switching horses. Irrespective of any personal motives and aspirations to transform the junk food sector from within, enabling the industry to buy in some of the key people involved in the global strategy not only put a brake on WHO and the combined NGO efforts to accelerate the implementation of the much-needed strategy, but also gave the industries the semblance of a fig-leaf to claim they were on the side of the angels.

What happened in the ensuing decade? Many governments have paid lip service to the need for a better strategy on diet and health. Some like Mexico have taken some advanced steps in the face of huge resistance and slapped a tax on sugar. But the industry's clarion call to respect free choice and "personal responsibility" has taken root. The food industry behaves rather like the arms industry, which refuses any culpability for the deaths and injuries its munitions cause—it must be the fault of those who got in the way of the bombs and bullets. Equally, the blame is placed upon those individuals unable to resist the pervasive marketing of junk food rather than the deliberate corporate strategy of concentrating high densities of franchises in poorer areas where there is the greatest vulnerability to obesity. It is the "responsibility" of the mother with a child in tow who is forced to run the gauntlet of the confectionery aisle in order to reach the supermarket check-out. It is the "weakness" of those who are too weak to resist the ubiquitous "cultural" pressures exerted in subtlest forms even using the newly refined techniques of "neuromarketing" in what we might more aptly now term the "overconsumer society."

The battle over sugar did not go away but was kept under wraps as part of a clever corporate strategy to buy time to retain market share and come up with an alternative. Hence the scientists, who had been happy to do the sugar industry's bidding on occasion or at least promote research interpretations in their favor, were surprisingly silenced (if not dumbfounded) when it came to a final recommendation from an expert group in Geneva, which was formed after it had been established that a previous report on carbohydrates, produced jointly by WHO and the FAO, had received clandestine funding from the sugar industry and other commercial interests with promises of influence and a favorable outcome. Some of the academic experts who had been hoodwinked were incensed.[8] A new report was commissioned, and its final recommendation to limit added sugars to less than 5% of dietary calorie intake was welcomed (partly because it was also fudged retaining a standing 10% limit that was in the original 1990 WHO report on diet and health).[9] It permitted the arrival in the UK of an even longer delayed report from the government's Scientific Advisory Group on Nutrition (SACN), which surprisingly echoed the 5% recommendation despite Prof Ian Macdonald, the chair of the SACN carbohydrates

[8] BBC UN probes sugar industry claims, 2004. http://news.bbc.co.uk/1/hi/health/3726510.stm

[9] WHO Guideline: sugars intake for adults and children, 2015. http://apps.who.int/iris/bitstream/handle/10665/149782/9789241549028_eng.pdf?sequence=1

working group, having disclosed close links to Coca-Cola, Mars and a wider industry advisory group.[10]

Unsurprisingly within a few months, Coca-Cola revealed its hand—it had been working on reducing sugar in all its products since 2012 and was ready to rebrand as a "no sugar" drink to ride on the wave of a convenient marketing impulse from new global recommendations.[11] Yes, this is the same Coca Cola that, along with Pepsi and McDonalds, fought against the 2012 New York "soda ban" that was in fact merely an attempt to introduce a legal injunction against serving an oversized bucket of sugary soda pop by restricting servings to no more than one pint or just half a litre at a time. Coca-Cola and the rest of the industry proudly defeated the New York regulations within 2 years—thus insisting that customers should be able to guzzle a full quart or one litre drink in one continuous gulp.[12]

Despite their best efforts, Action on Sugar, a UK group that campaigns to persuade the food industry to curb their sugar excesses, is still pushing for more meaningful responses from grudging corporations. Its most recent move presses the government to adopt a plan to reduce sugar content in all products by 50% and reduce energy density in other unhealthy food and beverages, actions that the industries are still resisting.[13]

While the UK government has made great play of its limited sugar levy, which in reality is nothing more than a minor tax on soft drinks with high levels of sugar, it is another example of policy action "too little, too late," given that the industry strategy has already switched its product range and emphasis, In Mexico, the imposition of a real sugar tax has had a demonstrable impact and has led to intriguing activities apparently involving Israeli spy equipment government departments and the soft drink sector.[14] In Europe altogether, 19 countries have introduced some form of tax or levy, according to Euromonitor.

In the same way that the tobacco companies shifted their focus to the developing world when regulations impacted smoking, particularly in western markets, the global junk food giants have switched their attention to some extent and are relying on exploiting Asia, particularly China, to provide future market growth. Already the major megacities of China are viewed as saturated markets, and the emerging

[10] SACN report Carbohydrates and Health, 2015. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/445503/SACN_Carbohydrates_and_Health.pdf

[11] Coca Cola launches no sugar drinks, 2016. https://www.coca-cola.co.uk/stories/coca-cola-zero-sugar-new-and-improved-sugar-free-coca-cola-launches-this-summer

[12] New York's Ban on Big Sodas Is Rejected by Final Court—June, 2014. https://www.nytimes.com/2014/06/27/nyregion/city-loses-final-appeal-on-limiting-sales-of-large-sodas.html

[13] An evidence-based plan to prevent obesity, type 2 diabetes, raised blood pressure, cardiovascular disease and cancer in the UK 'A benchmark for Theresa May's updated plan for action', May 2018. http://www.actiononsugar.org/media/action-on-salt/Healthy-food-and-drink-strategy-FINAL.pdf

[14] Colchero MA, Rivera-Dommarco J, Popkin BM, Ng SW. In Mexico, Evidence Of Sustained Consumer Response Two Years After Implementing A Sugar-Sweetened Beverage Tax. Health Aff (Millwood). 2017 Mar 1;36(3):564–571.

industrial strategy, mirroring past practices in the West, is to extend market presence into smaller towns and poorer areas.[15]

The commercial strategy disregards any sense of corporate responsibility towards population health. In Asia, where WHO has already determined health risks rise at much lower BMI measures than the international cut-off points of BMI 25 and 30, ruthless pursuit of increased consumption can only have inevitable consequences, not only of rising obesity, but the swifter onset of sequelae such as type 2 diabetes.

In the late 1990s, when WHO was persuaded to publish the first-ever technical report on obesity, the data on prevalence and indeed knowledge of obesity itself were sparse. Things have changed only to the extent that more projections based on surveys that allow better analysis of trends have given us a clearer picture of the parameters of the future obesity epidemic. WHO avers that worldwide obesity rates have trebled since 1975, with 1.9 billion adults overweight and of over 650 million obese. This assertion probably underestimates considerably the impact of overweight and obesity among Asian populations where WHO's own expert panel suggested BMI 23 was a more realistic cut-off point, where co-morbidities begin to occur. Furthermore, WHO still needs to gather more reliable and coherent data on the true extent of childhood obesity worldwide.

The etiology of obesity is no longer simply reliant on the truism that it is due to consuming more calories than are utilized, resulting in the excess intake being stored as fat. Hundreds of genes have been implicated since researchers, led by Jeffrey Friedman found the first hormone, leptin, to be implicated in the disease. The comparatively recent field of epigenetics has emerged as a complicating factor to confound those who are tempted to latch on to simplistic explanations. Behavioral studies have revealed the complex interaction of space, location, and food availability in affecting people's eating patterns, and those undertaking more sociological approaches have often objected to the phenomenon of "fat shaming"—typified in the worst kind of television shows pandering to the prejudices and bigotry of those who are often veering towards BMI 30 themselves.

What is also emerging is a better understanding of the metabolic processes and the fallacy that total calorie intake counts more than the nature of particular dietary constituents themselves. It is becoming clear that sugars are far more implicated than previously assumed and far more complicated in their influence on metabolism, extending beyond type 2 diabetes to potential pathways leading to Alzheimer's and dementia.

Some past studies of carbohydrates that sought in some ways to exonerate sugar were often funded by the industry—some adverse studies remained unpublished and while others were suspiciously delayed. WHO was embarrassed to have to arrange a new expert assessment of its carbohydrate recommendations when it was revealed that its collaborating UN agency, the Food and Agriculture Organization (FAO), had received clandestine funding from the sugar industry, which had nominated its favored participants for an "independent" expert report. The eventual

[15] US fast-food chains chase growth in small-town China—*Financial Times*, October 2017. https://www.ft.com/content/ca7b25be-9ed0-11e7-9a86-4d5a475ba4c5

revision cut the recommendations added sugar intake to no more than 5% of energy intake.

Industrial lobbying and corporate efforts to thwart public health measures continue scarcely unabated alongside desperate public relations efforts to convey a pretense of corporate cooperation and support. The reality was confirmed when the then WHO Director-General, Dr. Margaret Chan, gave a frank assessment of the commercial forces weighed against public health strategies:

> Efforts to prevent non-communicable diseases go against the business interests of powerful economic operators. Today, getting people to lead healthy lifestyles and adopt healthy behaviors faces opposition from forces that are not so friendly. Efforts to prevent noncommunicable diseases go against the business interests of powerful economic operators. In my view, this is one of the biggest challenges facing health promotion.
>
> It is not just Big Tobacco anymore. Public health must also contend with Big Food, Big Soda, and Big Alcohol. All of these industries fear regulation, and protect themselves by using the same tactics. They include front groups, lobbies, promises of self-regulation, lawsuits, and industry-funded research that confuses the evidence and keeps the public in doubt. Tactics also include gifts, grants, and contributions to worthy causes that cast these industries as respectable corporate citizens in the eyes of politicians and the public. They include arguments that place the responsibility for harm to health on individuals, and portray government actions as interference in personal liberties and free choice.
>
> This is formidable opposition. Market power readily translates into political power. Few governments prioritize health over big business. As we learned from experience with the tobacco industry, a powerful corporation can sell the public just about anything. Let me remind you. Not one single country has managed to turn around its obesity epidemic in all age groups. This is not a failure of individual will-power. This is a failure of political will to take on big business[16].

In the new era of the Trump-led USA and the UK, at the time of writing, poised to quit the European Union to seek new free trade arrangements, Dr. Chan's assessment has been reinforced by the evidence of renewed efforts to block public health initiatives.

In Mexico, it transpired that an Israeli computer spy system made by the NSO Group, normally only available to governments, was used to target key public figures in the field of nutrition and obesity because of their support for a national tax on sugary drinks. Their phones were hacked at a critical time when detailed taxation proposals were being drawn up. The New York Times suggested the discovery of malicious software raises questions about whether such tools were being used to advance the soda industry's commercial interests in Mexico.

> The tax in Mexico—Coca-Cola's biggest consumer market by per capita consumption—posed an exceptional threat. After the tax passed in 2014, Coca-Cola pledged $8.2 billion

[16] *WHO Director-General's address at the 8th Global Conference on Health, Helsinki, Finland 2013*. https://www.who.int/directorgeneral/speeches/detail/who-director-general-addresses-health-promotion-conference

worth of investments in Mexico through 2020. And soda giants have lobbied against the tax through various industry groups[17]

The NY Times concluded.

Whether the corporate lobbyists can be persuaded to relent from their zeal to promote vested interests in selling ever more volumes of junk food and sugary drinks is questionable. Their influence was noted in the renegotiation of the North American Free Trade Agreement (NAFTA), which revealed the junk food industry's efforts to undermine moves to have clearer food labeling.

The Institute for Agriculture and Trade Policy noted efforts to promote a US proposal restricting or prohibiting mandatory warning symbols on foods and beverages high in fat, salt, calories or sugar, a move against disclosing food additives, and the junk food industry is pushing for new provisions to prevent governments from limiting advertising aimed at children.[18] NAFTA has been replaced by the USA, Mexico, Canada Agreement (USMCA),[19] which incorporates similar regulatory impact assessment measures to those used in the USA to hinder public health initiatives, and used by the USA in an attempt to curtail the World Health Organization's global strategy on diet, physical activity and health in negotiations in 2004. How this might inhibit moves in Mexico or elsewhere on labeling junk food and sugary drinks remains to be seen.

Conclusion The extent of progress in transforming the landscape of obesity-related health has been limited, if not minimal. The opposing forces of the junk food and soft drinks sector remain in place worldwide with cynical plans to expand their markets and increase consumption, in total disregard of the known health implications. While there is a consensus on the reality of the global obesity epidemic and the need to address its threat, the field of obesity research, medical, and other approaches to treatment, and public health policy remain challenged to do far more and do it better.

There needs to be a greater respect for the importance of research, which should not be manipulated to the benefit of industrial paymasters; Governments and independent authorities need to rise above the attempts of industry lobbyists to water down measures to counteract the rise in obesity, and support the task of encouraging research, improving prevention and treatment, creating and enhancing existing environments so that they are no longer conducive to promoting obesity. There are still mountains to climb and even more to move.

[17] Spyware's Odd Targets: Backers of Mexico's Soda Tax. *New York Times*, 2017. https://www.nytimes.com/2017/02/11/technology/hack-mexico-soda-tax-advocates.html

[18] Junk Food, Junk Provisions NAFTA 2.0, Junk Food Labeling and Public Health Institute for Agriculture & Trade Policy, 2018. https://www.iatp.org/sites/default/files/2018-05/2018_05_NAFTA_FoodLabeling_ST_2.pdf

[19] United States, Mexico, Canada Agreement 2018 https://ustr.gov/about-us/policy-offices/press-office/fact-sheets/2018/october/united-states%E2%80%93mexico%E2%80%93canada-trade-fa-2

Obesity in Practice: The Opportunities

3

David Haslam

In vastness, whatever be its nature, there dwells sublimity. Why, therefore, may not the mountains of fat, the human olympi and caucasi excite our attention?

William Wadd, Comments on Corpulency, 1829

A study of over 2.8 million patient records was presented at the European Congress on Obesity in April 2019 and demonstrated a raise in risk of premature death of 50% in morbidly obese people, alongside a 12-fold increased risk of diabetes, a 22-fold increase in sleep apnoea, plus increases in blood pressure, cholesterol, heart disease and many other conditions.

William Wadd was the first medical writer to devote an entire book to obesity,[1] a condition which in his day was a rare commodity, which suggested that the afflicted individual had sufficient wealth to eat and drink heartily, and enough social status to avoid common infectious diseases of the day, such as cholera and TB; a perfect qualification for a contemporary doctor or lawyer. The importance of obesity lies not, as Wadd suggested, in the vast human spectacle but in the medical conditions and ultimately premature death that ensued. There is no possible doubt that some of Wadd's more high-profile patients suffered from the clinical ramifications of obesity; those whose weight exerted more influence on their lives than a bulging receipts book, but those who suffered chronically, painfully, and ultimately fatally from the effects of their obesity. Wadd's writing is full of anecodotes about the Irish tallows

[1] Cursory Remarks on Corpulency 1810.

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_3

chandler who made her best candles from the fat of Englishmen and the two morbidly obese noblemen whose daily exercise was to walk all the way around each other twice. No mention of treatment or management. Corpulence or obesity has existed since pre-history, arguably first being recorded 250,000 years ago, but has rarely been described, by patients or their carers as "sublime." The sequelae of excess weight include diabetes, cardiovascular disease, Obstructive Sleep Apnoea, various cancers, amongst many other knock-on effects targeting every organ and tissue of the body. It leads to infertility, higher rates of accidents, every single complication of pregnancy, including maternal and child death, and makes anaesthesia and surgery more of a risk, meaning that not only is there a devastating clinical cost, but a significant financial and economic burden. Obese people are not just a strain on the scales, but also the budget; they are expensive in terms of cost and as users of healthcare services. Recent evidence has continued to show that weight loss by any method can be accompanied by the remission of diabetes, and OSA, reduction in cholesterol, and hypertension, reduced drug costs, and renewed ability to undergo surgery from which they were previously disqualified.

Wadd's most pre-eminent patient was George IVth, who died at the decent age 67 from obesity, despite "no man clinging to life with greater eagerness…or more unwilling to hear from those about him any hint or suspicion of his apparent decay." At least 24 stone, his coffin had to be reinforced with wood and metal to prevent collapse and "rogue decay." In the period before his death, as his health rapidly deteriorated. His favourite breakfast comprised two pigeons, three beefsteaks, three parts of a bottle of white wine, a glass of dry champagne, two glasses of port and a glass of brandy. It supposedly took three hours to lace the King into his girdle and whale bone corset of morning due to all the "bulging and excresiances." Once girdled, his waist measured 55 inches; however, this feat of engineering was such that the tightness of the girdle almost caused George to faint during his own coronation and contemporaries are recorded as saying that his natural stomach hung between his knees. His personal physician Sir William Knighton described him as a "great sausage stuffed into the covering." Despite his great weight, he appeared "most difficult and melancholy…for the man was wasting away frightfully day by day;" an indication of possible type 2 diabetes. Lying in bed would almost cause him to asphyxiate, and so in his last few months, he was able only to sleep on a day bed, propped in an upright position; a convincing profile of Obstructive Sleep Apnoea and congestive cardiac failure. Small tasks were an ordeal as George's swollen limbs were often so painful with excess fluid from his dropsy that he could not get dressed. He suffered gout, arteriosclerosis, LVH, and considerable epicardial fat deposits. Another physician, Sir Henry Halford, was said to be "utterly and entirely destitute," and clearly Wadd was not much help.

Wadd's human interest stories concerning fat people touch upon the clinical ramifications of the obese state, but only as an aside to their "vastness." Now we consider excess weight as a marker for metabolic, psychiatric conditions and more which can only be addressed if the obesity itself is identified and properly managed. Wadd was no ordinary medic, but the Surgeon Extraordinary to the King, thereby counting himself amongst his Highnesses' closest medical attendants. It is interesting, therefore, that whilst Wadd waxed lyrical about the sublimity of vastness, and

compared obese humans to the Great Pyramids and Caucasii, that his Patient, George IV, was succumbing to increasing weight, ultimately to die the year after the publication of Wadd's latest edition, from a variety of illnesses, all of which could have improved with appropriate weight loss. It is, of course, distinctly possible that his Royal benefactor may not have been the most gracious recipient of well-meaning weight loss advice, but more likely is that recognition of co-morbid of serious co-morbid chronic diseases alongside obesity was poor, and that Wadd cared more about the aesthetics and amusing anecdotes which cram the book.

Consequently, the state of obesity in our patients and their families must not be glossed over as an irrelevant spectacle but dealt with actively and professionally to prevent, ease, or resolve the catalogue of co-morbidities that are likely to cause disease, infirmity, and death synergistically.

Some medical conditions are obvious as soon as the patient enters the consulting room, before they even get the chance to sit down—the antalgic gait, or the nicotine-stained fingers, COPD, psoriasis, the hair loss of cancer treatment. The obese patient is no different; the obese state is instantly recognisable before BMI, body fat analysis or bioimpedance analysis are even considered. A person who initially looks as though they have a weight problem has a weight problem and should be managed as such. Unlike the breathless patient who is there to report the difficulties associated with their dyspnoea and limited exercise tolerance, the obese individual may not raise the topic of their weight, which is why it falls on the healthcare professional to do so. Tiredness in an obese individual should not be tackled by saying "lose weight," but OSA should be considered; failure to lose weight shouldn't be put down lack of personal fortitude, but carbohydrate intolerance, insulin resistance, and possibly PCOS; abnormal LFTs to NAFLD, which can progress to, NASH, or cirrhosis or worse, and headaches, possible intracranial hypertension. Access to obese patients is simple. Even though they may not state excess weight as their primary reason for presentation, they will turn up for flu or travel jabs, pill checks, pregnancy, sprained ankles, verrucas, sick notes, etc., and a quick word in their ear, as the very first stage of a continuing weight loss programme need only take one minute, as long as follow-up is assured. It is a commonly believed myth that raising the topic is difficult. GPs and nurses have had to tell mothers that their baby is stillborn or has Down syndrome or cot death; wives that their husband has driven their car up a tree or has cancer. Bringing up the subject of excess weight is simple in comparison: "that's the rash in your groin sorted out; how about your general health? Are we looking after you properly?" A quick blood pressure, BMI, blood screen, with a promise of a follow-up appointment with one of the team, plus a reminder that weight loss would prevent the return of their rash can inveigle someone onto a weight loss programme. The diagnosis of obesity made by simply looking at patients as they enter the room can unveil a multitude of problems conditions for which, in many cases, weight loss is the main treatment, or at least an important component. Not only does the potential resolution of those conditions lead to a better quality of life for the patients, but it is also lucrative for the practitioner and the NHS (which is cheaper, CPAP or weight loss? Liver biopsy, diabetic complications, knee replacements or weight loss?) The patient, HCP, CCG, NHS, the public, and even the fat-phobic tax payer should embrace weight loss as a mode of treatment.

The patient, HCP, and tax payer may all want the elimination of obesity for different reasons—QALY, enhanced practice income, or discrimination, but with reduction of obesity and its co-morbidities, everybody wins. It is no coincidence that the press recently reported that the failure of an increase in life expectancy coincides with the burgeoning of the obesity epidemic, which can only be tackled by multidisciplinary, medical, political, school, medical educational and government input, which are all sadly impotent.

Obesity can, arguably, be traced back to Hominids of 250,000 years ago, primitive figurative likenesses of obese individuals carved from existing rocks strongly imply that the obese state already existed. The recent discoveries of the so-called prehistoric "Venus" statuettes, throughout Europe and beyond prove the existence of the obese state in pre-history. Without exception, every ancient culture has records of obesity in written records, images, or medical volumes. Examples include the ancient Egyptians (although their hieroglyphics demonstrate a degree of denial), Hindus, Japanese, Polynesians, Persians, etc. Indeed treatments for obesity, particularly among ancient Greek physicians were considerably more advanced than our contemporary management in many ways.

In 1988 the great physician Gerald Reaven defined the metabolic syndrome, which had been recognised in vague terms for centuries, but Reaven made it clear that hypertension, dyslipidaemia, dysglycaemia, and other conditions such as hypercoagulability were linked, and exactly why they are so closely connected. The basic thesis was that obesity—the one condition which is a "must-have" to join the "metabolic syndrome club" was the essential element. Obesity and insulin resistance go hand in hand, and the impaired hypoglycaemic response to normal insulin release leads to increased insulin secretion by pancreatic B-cells, causing a vicious circle of spiralling insulin release. Consequently, weight gain occurs due to anabolic properties of insulin, and in Reaven's words, "the organs of the body are innocent bystanders of the hypoglycaemic state," hence the occurrence of the metabolic syndrome, and for various tangential reasons, the other inflammatory sequelae of hyperinsulinaemia. Thus obesity, in particular overconsumption of refined carbohydrates, which stresses B-cell function, in the context of the metabolic syndrome, is one of the foremost factors in cardiovascular disease, as displayed in major studies such as Interheart.

Treating obesity and its consequences in the medical profession can seem unfair, as if healthcare professionals are being expected to manage the epidemic—which affects more than one-in four of our patients—one person at a time. The government, Public Health England, NHS England and the Department of Health have no idea what to do, commissioning groups are closing down tier 3 services at an alarming rate, intensifying the postcode lottery; highly effective pharmaceutical agents are being withdrawn from use, or are failing to gain NICE funding, meanwhile patients are eating inappropriate foods, egged on by flawed dietetic advice including the Eatwell Guide, as well as their own personal choices, available from every corner shop, fast food outlet or takeaway, whilst doing nothing to compensate for excess energy intake by engaging in physical activity.

It certainly is a gloomy scenario, but there is a flip side to the coin. Every obese person has access to Primary care; the minority because of their weight, many because of the consequences of excess weight—whether or not the individual realises it, such as hypertension, diabetes or sleep apnoea—or for a condition with no link to weight, such as sore throat, injury, flu jab, disability assessment, pill check, pregnancy, etc. There is no more science needed for Primary care to manage obesity; nutritional programmes, commercial, activity regimes, drugs, and surgery are all available; the problems are with awareness of the co-morbidities that accompany weight and the financial and political will and resources within government, manufacturing, and retail industries to assist, rather than hinder.

Obesity is to an extent due to flawed personal choice by an individual, but there are many more elements that affect weight, and the difficulty in maintaining loss of weight—factors such as genetics, epigenetics, gut flora, environmental disruptors, medicinal drugs such as insulin, sulphonylureas, and antipsychotics. Furthermore, by the time a person has reached a sufficient weight to be classified as overweight or obese, they develop a "set point" governed by a powerful series of physiological and metabolic drivers, which make weight loss maintenance by any other method than long term pharmaceutical therapy, or bariatric surgery, extremely onerous.

Therefore there are a number of challenges; the first could not be more simple: identification.

"Make every contact count;" the typical mantra of any newly appointed health minister, written by a fresh-faced school-leaver turned scriptwriter, but for once worth attention: access to obese individuals is not problematic, but the excess weight is often ignored under a tidal wave of other, more immediately pressing conditions, often themselves the consequences of obesity.

Obesity Paradox

It is becoming clear that not all obese individuals should be treated for weight loss. A simple example would be an obese woman with breast cancer who will naturally succumb to cachexia. But it is now increasing evidence of a counterintuitive so-called obesity paradox in other conditions. For example obesity is a well-known risk factor for CVD, but there is evidence the once a cv event has occurred, obese individuals have a better prognosis—in other words a risk factor suddenly becomes a protective factor. Similarly, in stroke and renal disease, the paradox exists. However, this poses a lot of questions about the mechanism of the paradox and what the appropriate treatment is, for instance once an MI has occurred in an obese individual, does the retention of the obese state continue to protect, or does weight loss then improve it? I.e. is the paradox a gift for life or merely a trump card to play at the time of the cardiac event.

Each patient must be treated on their own merits based on biometrics, clinical, social, and psychological profile, but ignoring obesity should not be an option.

Denis Burkitt, who first described Burkitt's lymphoma, in a paraphrase1 of the ideas in a poem "The Ambulance Down in the Valley" (1895) by Joseph Malin[2] is

[2] The Ambulance Down in the Valley Joseph Malins (1895)

'Twas a dangerous cliff, as they freely confessed,

Though to walk near its crest was so pleasant;
But over its terrible edge there had slipped
A duke and full many a peasant.
So the people said something would have to be done,
But their projects did not at all tally;
Some said, "Put a fence'round the edge of the cliff,"
Some, "An ambulance down in the valley."
But the cry for the ambulance carried the day,
For it spread through the neighboring city;
A fence may be useful or not, it is true,
But each heart became full of pity
For those who slipped over the dangerous cliff;
And the dwellers in highway and alley
Gave pounds and gave pence, not to put up a fence,
But an ambulance down in the valley.
"For the cliff is all right, if you're careful," they said,
"And, if folks even slip and are dropping,
It isn't the slipping that hurts them so much
As the shock down below when they're stopping."
So day after day, as these mishaps occurred,
Quick forth would those rescuers sally
To pick up the victims who fell off the cliff,
With their ambulance down in the valley.
Then an old sage remarked: "It's a marvel to me
That people give far more attention
To repairing results than to stopping the cause,
When they'd much better aim at prevention.
Let us stop at its source all this mischief," cried he,
"Come, neighbors and friends, let us rally;
If the cliff we will fence, we might almost dispense
With the ambulance down in the valley."
"Oh he's a fanatic," the others rejoined,
"Dispense with the ambulance? Never!
He'd dispense with all charities, too, if he could;
No! No! We'll support them forever.

famously quoted as saying, “If people are falling over the edge of a cliff and sustaining injuries, the problem could be dealt with by stationing ambulances at the bottom or erecting a fence at the top. Unfortunately, we put far too much effort into the provision of ambulances and far too little into the simple approach of erecting fences.” This was his ironic comment about prevention of disease rather than waiting to treat fulminant conditions after they occur, prevention of obesity being a prime example. Although education on nutrition, exercise, beneficial eating and healthy lifestyle is well within the remit of GPs, nurses, midwives, health visitors, carers, etc., it arguably relies too much on politicians, schools, town planners and the retail industry for HCPs to expect to make much of a dent in the obesity statistics. Therefore prevention of obesity, although crucially important, is beyond the scope of this book.

Aren’t we picking up folks just as fast as they fall?
And shall this man dictate to us? Shall he?
Why should people of sense stop to put up a fence,
While the ambulance works in the valley?”
But the sensible few, who are practical too,
Will not bear with such nonsense much longer;
They believe that prevention is better than cure,
And their party will soon be the stronger.
Encourage them then, with your purse, voice, and pen,
And while other philanthropists dally,
They will scorn all pretense, and put up a stout fence
On the cliff that hangs over the valley.
Better guide well the young than reclaim them when old,
For the voice of true wisdom is calling.
“To rescue the fallen is good, but’tis best
To prevent other people from falling.”
Better close up the source of temptation and crime
Than deliver from dungeon or galley;
Better put a strong fence’round the top of the cliff
Than an ambulance down in the valley.

Obesity Is a Disease

4

William P. Martin and Carel W. le Roux

Clinicians understand the risks of being obese and encourage patients to lose weight to prevent the complications of obesity. Thus far, it has been very difficult to treat obesity as the aetiology has been misunderstood. Logically, if clinicians can convince themselves that obesity is a disease that requires treatment, then progress can be made. Most human diseases are characterised by a set of reproducible symptoms and signs which affect a particular group of people and follow a predictable clinical trajectory (Jones et al. 2012). Our understanding of the disease is enhanced when its aetiology and complications are well defined. Obesity can now be defined as a disease characterised by the pathognomonic symptoms of excessive hunger and/or reduced satiation after a meal and the pathognomonic sign of increased adiposity, resulting in a state of dysregulated energy homeostasis that substantially increases mortality (Fontaine et al. 2003). Subcortical brain regions, especially the hypothalamus, integrate a diverse array of hormonal and nerve signals from the viscera and brain to govern human feeding behaviours (Saper and Lowell 2014). Evidence has been mounting that will help clinicians understand that by approaching obesity as a disease of the subcortical brain regions, more effective and compassionate treatments can be provided to our patients.

For clinicians, the most striking clinical example is when a child who is of normal weight and living in an optimal environment as regards food intake develops a

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_4

craniopharyngioma. These benign cystic epithelial tumours of the sellar or suprasellar region frequently affect the hypothalamus, thus offering an opportunity to gain clinical insights into the role the hypothalamus plays in obesity. Prevalence of hypothalamic dysfunction in children with craniopharyngiomas increases from approximately 35% at diagnosis to 65–80% after treatment (Muller 2016). In a review of 24 cases of paediatric craniopharyngiomas, body-mass index (BMI) increased by 6.8 kg/m^2 and 13 children deteriorated from being normal weight to become obese (BMI >95th percentile for age) at 5 years from diagnosis (Rosenfeld et al. 2014). Risk factors for obesity in children with craniopharyngiomas include preoperative hypothalamic dysfunction, intra-hypothalamic location of the tumour, hypothalamic radiation therapy, and hypothalamic injury at the time of surgery (Rosenfeld et al. 2014). The prevalence of postoperative severe obesity is approximately halved in children who undergo hypothalamus-sparing surgery compared with children who undergo extensive resections involving the hypothalamus (Elowe-Gruau et al. 2013). Weight gain in children with craniopharyngiomas occurs despite replacement of pituitary hormone deficiencies and is greater than for other causes of pituitary dysfunction (Geffner et al. 2004). Obesity in children with craniopharyngiomas occurs even when their caloric intake is similar to controls matched for BMI (Harz et al. 2003). Pathological eating behaviours in survivors of childhood-onset craniopharyngioma with varying degrees of obesity are similar or even less compared with BMI-matched controls (Hoffmann et al. 2015). Rather, craniopharyngioma-associated obesity is characterised by reduced basal metabolic rate, reduced physical activity, and impaired feedback signalling from leptin, ghrelin, and insulin (Holmer et al. 2010).

Another clinical dogma is that patients with obesity only need to eat less and exercise more. As a consequence of this conventional paradigm, we suggest to patients that more motivation and self-control will by itself suffice to achieve control of body weight. While inputs from forebrain areas dealing with reward, motivation, and decision-making probably influence hypothalamic neuronal circuits to play an ancillary role in the control of appetite and body weight, neuroendocrine regulation coordinated by the hypothalamus, and not a lack of self-discipline, is the principal determinant of energy homeostasis (Saper and Lowell 2014).

Indeed, if motivation was critical then conditions that impair cortical brain function resulting in a loss of motivation, such as Alzheimer's disease and traumatic brain injury, should be accompanied by profound changes in body weight. Contrary to this dogma, weight loss and not gain predicts progression of mild cognitive impairment to dementia and has been identified as a risk factor for the onset of dementia in observational studies (Sergi et al. 2013); however, absolute changes in body weight of more than 4% over 3 years are rare (Cova et al. 2016). Furthermore, mean BMI was not significantly different to baseline values at median 3-year follow-up of 107 adults with traumatic brain injury (Crenn et al. 2014).

Clinical therapeutics are enhanced if underlying disease mechanisms are understood or if even as clinicians, we know which organ we are treating. Brain lesioning experiments involving rodents demonstrated that ventromedial (VMH) and lateral (LH) hypothalamic injury resulted in dramatic hyperphagia or hypophagia,

respectively (Hetherington 1944; Hetherington and Ranson 1942; Teitelbaum and Epstein 1962; Baillie and Morrison 1963). These experiments were the foundation of understanding eating behaviours: inhibitory and excitatory signals from the VMH and LH were partly responsible for satiety and hunger, respectively (Stellar 1954). The VMH receives afferent input from the viscera, such as insulin from the pancreas, leptin from adipose cells, ghrelin from the stomach, and peptide YY from the small intestine. VMH injury disrupts communication between the viscera and central nervous system regarding energy stores and energy intake (Saper and Lowell 2014). Independent of hyperphagia, VMH injury has been shown to cause severe obesity by altering autonomic function to result in impaired fat metabolism, hyperinsulinaemia, and markedly increased gastric acid secretion and gastric emptying (King 2006).

Other subcortical brain centres such as the arcuate nucleus, paraventricular nucleus, and medial amygdala are increasingly recognised to interact with the VMH to modify food intake and body weight (King 2006). As the complex pathways involving several brain regions which underpin hypothalamic obesity continue to be unravelled, the concept of discrete feeding centres outlined above is being modified. Nevertheless, the importance of the VMH and LH in integrating afferent signals as part of a broader network governing hunger and satiety remains undisputed and helps us to understand that if our treatments do not make patients less hungry and/or more satisfied after smaller meals, then our chances of achieving durable weight loss will be limited.

The aetiology of obesity is heterogeneous and poorly understood, but recent advances in molecular biological techniques have facilitated an improved understanding of its pathophysiology and heritability. Obesity is rarely inherited in a Mendelian pattern: syndromic (e.g. Prader-Willi syndrome) and non-syndromic (e.g. leptin and leptin receptor mutations) monogenic obesity may result from mutations in single genes encoding proteins involved in hypothalamic pathways regulating energy homeostasis (Mutch and Clement 2006). Monogenic obesity is characterised by a severe phenotype with the onset of obesity in early life irrespective of environmental stimuli. Conversely, there is a global pandemic of polygenic obesity in which single nucleotide polymorphisms and epigenetic alterations in DNA methylation of multiple genes predisposing to adipose tissue expansion are exacerbated by an environment that favours energy consumption over energy expenditure (Pigeyre et al. 2016). Family history of obesity is a strong risk factor for childhood obesity (Birbilis et al. 2013), and obesity prevalence varies according to ethnicity (Pigeyre et al. 2016), suggesting that obesity is a heritable disorder. Both genetic and environmental factors account for the familial aggregation of obesity phenotypes (Chaput et al. 2014), although twin studies have illustrated that genetic factors are the dominant force and account for approximately 77% of the variance in BMI and waist circumference (Wardle et al. 2008).

Obesity complications are well defined, and their rising prevalence presents one of the foremost challenges to healthcare delivery in the twenty-first century. Importantly, many complications including hypertension (Schiavon et al. 2017), type 2 diabetes mellitus (Schauer et al. 2017), obstructive sleep apnoea (Ashrafian

et al. 2015), idiopathic intracranial hypertension (Manfield et al. 2017), polycystic ovarian syndrome (Nicholson et al. 2010), and non-alcoholic fatty liver disease (Bower et al. 2015) can be reversed with intentional weight loss. Indeed, large observational studies have demonstrated that sustained weight loss achieved with bariatric surgery reduces mortality by 29–40% (Sjostrom et al. 2007; Adams et al. 2007).

In conclusion, obesity is a subcortical brain disease characterised by the pathognomonic symptoms of excessive hunger and/or reduced satiation after a meal. Distinct subtypes of obesity are recognised, although the rising incidence of polygenic obesity resulting from incompletely elucidated gene-environment interactions is of greatest public health concern. Obesity complications are well documented; their reversal with sustained intentional weight loss is a reason for optimism and motivation to seek treatments targeting pathophysiological mechanisms of obesity. Although lifestyle modification to achieve net energy deficit represents an important facet of obesity management, it is imperative to remember that hypothalamic dysfunction underpins this dysregulated state of energy metabolism and that solely appealing to patients' cerebral cortices through motivational strategies will ultimately prove futile for many. Most patients will regain all the weight that they have lost if the treatment strategy does not make them less hungry and/or more satisfied with smaller meals (Dombrowski et al. 2014). Instead, we must expand our understanding of the pathophysiology of obesity and target our treatments to correct the subcortical brain disturbances which perpetuate aberrant feeding behaviours. Until our clinical tools improve, we can serve our patients better by recognising obesity as a disease and treating it with the same strategies and compassion we apply to all other chronic and disabling diseases.

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Obesity and Periodontal Disease

5

Rajesh Chauhan and David Haslam

Introduction

What goes in your mouth, particularly sugar and starchy food, can cause periodontal disease, obesity, and diabetes. Conversely, a healthy diet and good dental hygiene can help reverse obesity, even improve glycaemic control, and benefit micro- and macro-vascular risk in diabetes. The dental healthcare professional therefore, in tandem with General Practice and community pharmacy can play a key role in managing the obesity epidemic. Almost everybody visits their dentist, therefore access to obese individuals is not problematic, and education, both by leaflets/poster campaigns, and by one-to-one counselling if carried out sufficiently widely, could be a significant factor in controlling obesity and reducing the health burden of metabolic disease. This approach has been proven to succeed, notably in Chicago, although healthcare systems are dramatically different worldwide. Remarkably, if an obese diabetic individual takes good care of their feet, their feet will benefit. If the same person takes good care of their teeth and gums, their feet will benefit, alongside their glycaemic control and general health.

The existence of the complex bi-directional association between dental and metabolic health/illness has been christened the 'oral-systemic link'.

The dental practitioner should be a key member of the diabetes multidisciplinary team, and is uniquely placed to identify at-risk patients of co-morbidities, including

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_5

those with poor glycaemic control including 'pre-diabetes' patients. Healthcare professionals in dental and primary care should work and communicate more closely whilst screening individuals with periodontal disease at risk of progressing to chronic conditions, and for individuals with diabetes and/or obesity to be offered dental examination in the same way diabetic patients are routinely offered retinal, renal screening, and foot care.

Periodontal disease (PD)—affecting the tissues supporting the teeth (Löe 1993; Mealey and Ocampo 2007; Mealey 2006) can therefore be considered alongside the traditionally accepted complications of diabetes, that typically include macrovascular or microvascular disease. Epidemiological studies suggest that over two-thirds of the world's population have some form of chronic periodontal disease (Dahiya et al. 2012).

PD is an infectious oral condition affecting the supporting structures of the teeth, emanating from interaction between pathogenic bacteria, and the host immune response. Dental bacteria are essential, but normally in insufficient quantities, for disease initiation (Graves 2008); a persistent host inflammatory response is necessary for the soft and mineralized periodontal tissues to be eroded (Graves 2008; Liu et al. 2010).

PD includes gingivitis and periodontitis. Gingivitis is defined by inflammation of the gum, associated with teeth that retain normal attachment and bone, but have reduced periodontal support. Commonly associated with plaque build-up, it can lead to periodontitis if untreated. Periodontitis is a more advanced condition, whereby colonisation by specific micro-organisms results in progressive destruction of the periodontal ligament and alveolar bone, with pocket formation or recession around diseased teeth, or both (Löe 1993).

Diabetes

Diabetes is a significant risk factor for PD, with individuals exhibiting an increased prevalence, and severity of periodontal destruction compared with healthy adults (Mealey 2006; Lakschevitz et al. 2011); individuals with diabetes are three-times as likely to suffer from PD (Preshaw et al. 2012).

Conversely periodontitis heightens the risk of poor glycaemic control, adversely affecting diabetes outcomes (Borgnakke et al. 2013)—the bidirectional oral-systemic link.

T2D and obesity are closely associated, the latter contributing to insulin resistance by elevating circulating free fatty acids thereby inhibiting glucose uptake, glycogen synthesis, and glycolysis (Tunes et al. 2010). Visceral adipose tissue produces a variety of inflammatory adipokines which contribute to a hyperinflammatory state, modifying the host response to microbial challenge, in turn stimulating pathogenic processes associated with metabolic and cardiovascular disease (Oppermann et al. 2012). Diabetic individuals are more susceptible to infectious disease, in the case of periodontitis by a 2- to 5-fold risk (UK Prospective Diabetes

Study (UKPDS) Group 1998). Therefore, a complex, bi-directional relationship exists, with each being a risk factor for further systemic complications.

Immune Response

Activation of the host's innate immune system produces a cytokine-induced response, resulting in low-grade inflammation and increased concentrations of various acute-phase markers and proinflammatory cytokines (Tunes et al. 2010). Increased levels of tumour necrosis factor (TNF)-alpha (α), interleukin (IL)-1 beta (β), IL-6, and IL-8 have been found in gingival fluid, underlying an important role in the inflammatory process (Dahiya et al. 2012; Tunes et al. 2010). TNF-α is key in the pathogenesis of periodontitis, and increased concentrations can cause insulin resistance by feedback from the reservoir of TNF-α from the gingival fluid back into the bloodstream (Mealey and Ocampo 2007). Thus, chronic periodontal infections can affect insulin resistance and glycaemia in a similar way to obesity; locally produced cytokines move into the systemic circulation, enhancing the immune response and exacerbating an elevated inflammatory state (Tunes et al. 2010; Mealey and Rose 2008), worsening diabetes.

Role of the Dental Professional

Dental practitioners are uniquely placed for the role of education, prevention of obesity, and improving glycaemic control in diabetes, as they see patients in all stages of health on a daily basis, whereas doctors are often more likely to see patients when they are unwell or in need of medical attention. Dental practitioners are, therefore, are well-aligned to provide counselling on the oral complications of overweight, obesity and diabetes; offer weight prevention and management advice and education; implement screening programmes (e.g. using weight-to-height ratio or waist circumference measurements to determine visceral adiposity and/or HbA1c as an indicator of glycaemic control), and importantly, to refer overweight and obese patients to primary care practitioners.

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Part II

Commercial Weight Management Services

The Role of Commercial Weight Loss Programmes

6

Kelly L. Johnston

Whilst obesity in its simplest sense is the result of an individual's continued positive energy balance over a prolonged period of time, in truth, its aetiology is complex and multifactorial; with genetic, behavioural, socioeconomic, and environmental origins (American Medical Association 2014) and for which a 'lack of willpower' is not considered to be a credible cause. It is a largely preventable disease, one which currently has no accepted cure (Mauro et al. 2008), and as a disease process, has been likened by The World Health Organization, to hypertension or hypercholesterolaemia in that short-term treatments do not change the underlying biology that drives or maintains them (Bray and Kim 2017). Given that obesity is now widely recognised as a 'chronic, relapsing and progressive disease' (Bray and Kim 2017), it is generally accepted that life-long interventions are required for its successful management and with this, the expectation that continuous and comprehensive efforts should help bring this epidemic under control both from the perspective of prevention and treatment.

Yet despite recent advances in both pharmacological and surgical interventions for the treatment of obesity, sustained lifestyle changes including dietary changes and increased physical activity and feelings of wellbeing remain the cornerstone of obesity treatment. A widely available and easily accessible means by which overweight and obese individuals can access information and support in implementing the lifestyle changes necessary to both lose and subsequently manage their weight is via the use of commercial weight loss programmes. However, despite the huge increase in recent years in both the accessibility and heterogeneity of these

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_6

programmes; increased delivery via digital channels and personalised nutrition plans, respectively, and irrespective of their particular approach, there is a general, broad-brush undercurrent of scepticism and disbelief with regard to the efficacy of commercial weight loss programmes as a whole.

'Dieting doesn't work' is an oft-repeated phrase and especially when commercial weight loss plans are spoken of and these statements are almost always derived from anecdote or personal opinion rather than scientific evidence. Indeed, Casazza et al. (2013) discuss the beliefs about obesity that persist in the absence of supporting scientific evidence and express concerns that the promulgation of said myths and/or presumptions may lead to poorly informed policy decisions, inaccurate clinical and public health recommendations, and may in fact divert attention away from useful, evidence-based information.

So what actually is the current state of play with regard to the potential usefulness of commercial weight loss plans as part of the toolkit to help address the obesity epidemic?

Upon closer inspection of the available literature what we observed is that there are marked limitations in both the quantity and quality of information available to scientists and health care practitioners and that the efficacy of most commercially available weight loss programmes has simply not been rigorously evaluated (Wee 2015).

Recently, however there has been a marked increase in both systematic reviews and interventions, including large-scale randomised controlled trials (RCTs), with the primary objective to investigate the efficacy of commercial weight loss plans.

What is evident from a recent review of 45 studies (39 of which were RCTs), by Gudzune and colleagues (2015) is something that researchers in the field of behavioural weight management field have known for decades; structure and intensity of contact are highly correlated with programme success.

Weight loss programmes, no matter their dietary advice or nutritional make-up, are usually based on providing support to motivate people to stick to their chosen plan over the longer term and research shows that additional support made up of regular contact via meetings, self-help manuals, support groups, online guidance, etc., can help individuals achieve their weight loss and goals over the longer term.

Indeed, NICE's Weight management: lifestyle services for overweight or obese adults (Public Health Guidelines (PH53) 2014) have many recommendations with regard to structure and delivery of lifestyle weight management programmes including but not limited to the fact that they should be multi-component, address dietary intake, physical activity levels, and behaviour change, focus on life-long lifestyle change and the prevention of future weight gain, last for at least 3 months, and that sessions are offered at least weekly or fortnightly.

In terms of the evidence base with regard to behavioural weight management programmes, a recent systematic review (Hartmann-Boyce et al. 2014) of effectiveness trials comparing multi-component behavioural weight management programmes with controls, but rather importantly those that took place in everyday contexts, suggests that commercial interventions delivered in the community are effective for achieving weight loss, and that there is in fact no evidence that

interventions delivered within primary care settings by generalist primary care teams trained in weight management achieve meaningful weight loss. Additionally, there is clear data (Jolly et al. 2011) showing that commercial weight loss programmes by comparison were more effective and cheaper than primary care based services led by specially trained staff, which were deemed to be ineffective, thus highlighting the clear potential for said programmes to be commissioned as part of a weight management pathway.

The findings from these data have clearly been adopted and as it stands, in England, there is a clear and well-defined pathway designed to provide appropriate levels of weight management intervention to those who need it (NHS 2014). Tier 2 consists of evidence-based weight management services that are offered in primary Care with individualised community-based interventions[1] and commercial weight loss plans are increasingly a well-evidenced and fundamental part of this. Tier 3 weight management services are recommended for patients for whom specialist intervention may be needed as conventional treatment has been unsuccessful or who have complex needs which cannot be adequately managed by tier 2 services (Office of National Statistics 2016) and is particularly important as whilst it stops short of expensive surgical intervention, it represents a more intensive approach to weight management for obese people who have found other approaches to be ineffective. Interventions provided at tier 3 include, but are not limited to, behaviour change strategies, physical activity promotion, dietary advice and support including psychotherapy, pharmacotherapy, and low calorie and very low calorie diets (formula diets) (NHS England Specialised Commissioning 2017); the latter two of which are widely accepted to be most effectively delivered by commercial weight loss providers.

However, despite the 2013 NHS Commissioning Board guidelines for complex and specialised obesity surgery which clearly states that 'the treatment of obesity should be multi-component. All weight management programmes should include non-surgical assessment of patients, treatments and lifestyle changes such as improved diet, increased physical activity and behavioural interventions. There should be access to more intensive treatments such as low and very low calorie diets, pharmacological treatments, psychological support and specialist weight management programmes' (NHS Commissioning Board 2013) and despite there being clear and mounting evidence of their efficacy, the role of commercial weight loss programmes as a joint service provider, within tier 3, is largely non-existent. Findings from the DiRECT study (Lean et al. 2018) the intervention of which employed total diet replacement (825–853 kcal/day formula diet for 3–5 months), stepped food reintroduction (2–8 weeks), and structured support for long-term weight loss maintenance showed that at 12 months, almost half of the participants achieved remission to a non-diabetic state and off antidiabetic drugs and that remission of type 2 diabetes, a major obesity-related co-morbidity, is a practical target for primary care. Additionally the DROPLET study (Astbury et al. 2018)

[1] https://www.england.nhs.uk/wp-content/uploads/2016/05/devolved-services-ccg-guid-obesity.pdf

designed to determine the clinical effectiveness, feasibility, and acceptability of referral to a low-energy total diet replacement programme compared with usual weight management interventions in primary care concluded that this total diet replacement programme, alongside behavioural support, is significantly more effective for weight loss than programmes usually offered in primary care to treat obesity. Additionally, both DROPLET and DiRECT demonstrated high levels of patient acceptability. Given that we are now aware that 'slow-and steady' wins the race is a myth (Purcell et al. 2014) in as much as you are not more likely to successfully maintain your weight loss if you lose weight more slowly in the first place, and that in fact, rapid weight loss can have greater benefits in terms of more quickly reducing the presence of obesity-related co-morbidities (i.e. fatty liver, hyperglycaemia), now is the time for wider availability of commercial weight loss programmes, which have clearly demonstrated a cost-effective, effective approach to obesity treatment.

Whilst the prevention of obesity should clearly be a public health priority, currently it is the lack of effective, widely accepted and readily available treatments for the millions of already obese people, which ultimately represents a serious challenge both to healthcare systems and the wider economy over the longer term.

The crux of weight control is that individual invariably responds differently to different structured approaches. So what role, in the longer term do we envisage for commercial weight loss programmes in a wider and effort to prevent and reduce the prevalence of obesity? Arguably, as with any treatment plan, consideration of individualised care and patient-preferences is hugely important. In other words, the weight loss plan that is 'the best' is that one that you can stick to. Therefore, choosing the right option whilst taking into account many different factors including: amount of weight to lose, general health and fitness of each individual, and the cost-effectiveness of the proposed solution is pivotal in achieving longer-term success, however that is subjectively measured.

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The Role of Formula Very Low and Low Energy Diets in Obesity and Type 2 Diabetes Management

7

Adrian Brown

Introduction

Obesity and Type 2 diabetes (T2D) are two of the biggest challenges facing healthcare globally. Obesity is now estimated to effect 603.7 million adults worldwide, representing an overall prevalence of 12% (Afshin et al. 2017), whilst diabetes is estimated to currently effect approximately 463 million individuals worldwide (International Diabetes Federation 2019). Within the UK, there is a similar story, currently 3.9 million people have a diagnosis of diabetes, with approximately 90% of these having T2D and 80–85% living with overweight or obesity (UK Diabetes 2019). This rise in prevalence in obesity and T2D has placed a significant pressure both directly on healthcare services and indirectly on wider society including productivity losses due to illness and disability (Dee et al. 2014). Current estimates suggest the global impact of obesity to be roughly $2.0 trillion or 2.8% of global gross domestic product (GDP) (Dobbs et al. 2014), with diabetes estimated to be US$1.31 trillion or 1.8% of global GDP (Bommer et al. 2017). Therefore, the combination of these two diseases is of substantial concern for both global and UK healthcare systems both now and in the future.

It is clear from the unprecedented global rise in obesity and T2D that more traditional management strategies and interventions have struggled to effectively manage their continual rise, therefore other more effective treatment options are now required.

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_7

Very Low Energy and Low Energy Diets in Obesity Management

The dietary management of obesity is both challenging and complex and there are a multitude of dietary options available to the obesity clinician. Within these options are formula diets, which include very low energy diets (VLED) and low energy diets (LED). VLED provide 800 kcal/day or less, whilst LED provide between 800 and 1200 kcal per day. Formula diets are designed to either replace an individual's total daily energy intake, defined as total diet replacements (TDR), or to be included with conventional meals, in which case they are defined as partial diet replacements. Each individual product provides approximately 200 kcal, provides 30–33% of the daily requirement for vitamin and minerals, and is usually in the form of a liquid shake, bar, or soup. These products are designed to induce rapid weight loss whilst maintaining lean body mass. One particular benefit is that they remove the daily decision-making process regarding food choices, whilst helping the patient to look closer at their eating behaviours (Brown et al. 2015; Brown and Leeds 2019; Leeds 2014).

Data from clinical trials has now shown that both VLED and LED are effective at producing clinical significant weight loss (Astbury et al. 2018; Brown et al. 2020; Johansson et al. 2014; Lean et al. 2017; Parretti et al. 2016; Tsai and Wadden 2006). During the initial TDR phase, which typically lasts between 8 and 16 weeks, weight losses of 10–16 kg or 10–15% have been reported using both VLED and LED (Brown et al. 2015; Brown and Leeds 2019; Leeds 2014). Weekly weight losses vary between 1 and 3 kg per week (Leeds 2014; Lean 2011; Saris 2001), although it is important to understand that there may be variability between individuals (Lean et al. 2013). Although in theory it is believed that those on a VLED lose more weight than on a LED, when directly compared with each other there was no significant difference in weight losses at either 8 or 16 weeks (Christensen et al. 2011). At present there is no consensus on the ideal length of time for the TDR phase, however the National Institute for Health and Care Excellence (NICE) suggests a maximum TDR phase of 12-weeks, either continuously or intermittently (NICE 2014). Within a clinical care setting, evidence from a pilot study of the Counterweight Plus programme suggests that using an LED in combination with a structured weight management service is an effective way for delivery within a primary care setting, with an average weight loss of 12.4 ± 11.4 kg at 12 months (Lean et al. 2013). More recently data from the same group involving 288 patients showed at 12 months subjects achieved a mean weight loss of 10.5 kg with 22.1% achieving ≥15 kg weight loss (Mccombie et al. 2018), suggesting that using formula diets can be highly effective in a clinical setting.

The global demand for weight loss programmes exceeds the current capacity for healthcare services to deliver it; therefore, primary care and/or community collaborations represent potential solutions (Brown et al. 2015; Brown and Leeds 2019; Leeds 2014). The Doctor referral of overweight people to low energy total diet replacement treatment (DROPLET) pragmatic RCT (Astbury et al. 2018) showed that GP referral to a commercial low energy diet provider can give clinically significant outcomes at 12 months. The participants in the TDR programme lost more

weight (10.7 kg vs 4.5 kg) and were associated with greater improvements in glycated haemoglobin (HbA1c), fasting blood glucose, and blood triglyceride levels and insulin sensitivity compared to usual care.

In the past there has been concern raised regarding the weight regain following ceasing the initial TDR phase and the reintroduction of food; with reports of up to 62% of weight loss being regained following a VLED and 41% with a LED (Tsai and Wadden 2006; Saris 2001). More recently though, evidence suggests that long-term weight maintenance is achievable, particularly with the inclusion of behaviour change, intermittent use of formula products, and following a higher protein and low glycaemic index maintenance diet (Johansson et al. 2014; Christensen et al. 2017; Larsen et al. 2010; Mulholland et al. 2012). Of interest is data from the Look Action for Health in Diabetes (AHEAD) trial suggesting that the degree of weight loss (≥10%) achieved within the first year is predictive of weight loss maintenance up to 4 years later (Wadden et al. 2011). Furthermore, the idea that slow and steady weight loss is better than rapid weight reduction has now been challenged (Coutinho et al. 2018; Purcell et al. 2014). In a study comparing those that lost ≥12.5% either using a VLED over 12 weeks, or an energy-reduced diet (400–500 kcal/day deficit) over 36 weeks found that the rate of weight loss did not affect the amount or rate of weight regained over 144 weeks (Purcell et al. 2014).

A series of systematic reviews have suggested the benefit of VLED and LED, particularly with the addition of behaviour change, in improvements of cardiovascular surrogate markers including blood pressure, waist circumference, and lipid profile (Parretti et al. 2016; Mulholland et al. 2012; Rehackova et al. 2017). From other clinical trials, formula diets have also been shown to be effective at achieving clinically significant weight loss and symptom improvements in a variety of obesity related co-morbidities including osteoarthritis (Christensen et al. 2011, 2017), obstructive sleep apnoea (Johansson et al. 2011; Tuomilehto et al. 2009), fertility (van Dam et al. 2004), and to reduce liver volume prior to bariatric surgery (Fris 2004).

The use of VLED and LED needs to be carefully considered and it is advised to have corresponding medical supervision of those with obesity related co-morbidities and T2D who may require medicine adjustments and to avoid complications. During the initial stages of rapid weight loss with formula diets, individuals may experience side effects, such as constipation, weakness, headache, and dizziness (Brown & Leeds, 2018). Acute gout occurred in none of 1500 women and in 6 of 700 men in the PREVIEW TDR weight loss phase, and gallstone events are rarely seen during TDR weight loss phase and more common during weight maintenance (Brown et al. 2020; Saris 2001; Christensen et al. 2018; Wadden et al. 1983). Side effects with formula diets are generally mild and easily managed in the majority of patients.

Finally, in certain patients groups the use of formula diets is currently contraindicated to increased medical risks, these include children <18 years of age, older adults (>75 years), psychiatric disorders, pregnancy or lactating women, unstable cardiac or cerebrovascular disease, and acute or chronic renal failure (Brown et al. 2015).

Low Energy and Low Energy Diet in Type 2 Diabetes Remission

The current international dietary guidelines for diabetes dietary management vary significantly between countries, with large variation in the macronutrient content of the diets recommended (Ajala et al. 2013). This may place the clinician, and the patient, at odds as to which one to choose to help achieve their goals for weight loss and glycaemic control.

Intensive dietary and lifestyle interventions remain the cornerstone of treatment within patients with obesity and T2D (Brown et al. 2017). When intensive lifestyle interventions (ILI) are compared with standardised diabetes education in those with T2D, as seen in the Look AHEAD trial, ILI had greater weight loss, glycaemic improvement, and also T2D remission. In a post hoc analysis of the Look AHEAD trial (Gregg et al. 2012), remission at 1 year was shown to be 11.5% in the ILI and 2% in the control, although this declined year on year, at 4 years, 7% in the ILI remained in T2D remission compared to none in the control group. Other dietary methods that used a low-carbohydrate Mediterranean diet compared to low-fat diet reported T2D remission of 14.7% at 1 year, although similar to the Look AHEAD trial reduced over time to 5.0% at 6 years follow-up (Esposito et al. 2014).

Evidence has suggested that there is a need for approximately 15 kg weight loss to induce T2D remission in those with recently diagnosed T2D (Lean et al. 2017; Lean 2011; Dixon et al. 2008). However, a systematic review looking at standard weight loss interventions in T2D patients showed that even in clinical trials, weight losses range from 2.4 kg to a maximum of 8.5 kg (Franz et al. 2015), far less than that reported after bariatric surgery, and far less than that suggested for T2D remission.

Bariatric surgery remains the most effective treatment for both obesity and T2D (Colquitt et al. 2014; Cummings and Rubino 2018) but despite this only a fraction of those eligible worldwide have surgery each year (Welbourn et al. 2016). Typically, weight losses of between 20 and 35% are seen within 2 years following surgery (Miras and Le roux 2013) with T2D remission rates being reported to occur in approximately 30–95% of patients (Buchwald et al. 2009; Rubino et al. 2017), with these figures varying with type of operation and deteriorating over time (Schauer et al. 2017; Yu et al. 2015). The exact mechanisms by which bariatric surgery causes these improvements to T2D outcomes are not fully understood, although are thought to include alterations in gut hormones, bile acid changes, altered microbiome, and changes in food preferences (Miras and Le roux 2013; Batterham and Cummings 2016). More recently though there have been suggestions that the acute energy restriction that happens immediately following bariatric surgery plays a key role in the early improvements in both Roux-en-Y gastric bypass and Biliopancreatic Diversion (Jackness et al. 2013; Lips et al. 2014; Steven et al. 2016b). Therefore, due to the current limited accessibility to bariatric surgery, associated complications and the ineffectiveness of current clinical practice, other treatment options are required to fill this therapeutic void to help achieve clinically relevant weight loss. VLED and LED are now thought to be able to fill this gap (Brown et al. 2015; Lean et al. 2017).

The use of formula diets in T2D is not a new concept and has been reported in the literature since the 1990s, with two randomised trials showing that the use of a VLED significantly reduced both glycaemic control and body weight (Wing et al. 1994, 1991). With those losing the most weight having the greatest improvement in HbA1c (Wing et al. 1994).

The mechanism by which VLED and LED cause T2D remission has now been extensively researched in a series of proof of concept studies, which have ignited interest in their use within clinical practice (Lim et al. 2011; Steven et al. 2015, 2016a; Steven and Taylor 2015). The initial study involved 11 patients with obesity with recently diagnosed T2D (<4 years) and showed that using a VLED for 8 weeks normalised first-phase insulin response and hepatic insulin sensitivity compared to weight-matched control (Lim et al. 2011). This improvement corresponded with a reduction in pancreatic and liver triacylglycerol, respectively, therefore suggesting the role of the twin cycle theory within the development of T2D (Taylor and Barnes 2018). In two further studies, which extended the intervention to 6 months, it was demonstrated that these results could be maintained but this appeared only in some individuals. Those that responded and achieved normalised blood glucose (<7 mmol/L) had a lower body mass, higher plasma insulin, lower HbA1c/fasting glucose, were younger, had lower diabetes duration, were on fewer medications and importantly, had lower pancreatic fat (Steven et al. 2016a). Now more recent data has shown that the ability to restore first-phase insulin response and reduce very-low density lipoprotein-1 (VLDL-1) triglyceride release from the liver are key mechanisms that lead to T2D remission (Al-mrabeh et al. 2020; Taylor et al. 2018).

These studies were extended to a full clinical trial within primary care, the Diabetes in Remission Clinical Trial (DiRECT). This trial was designed to assess if using an LED for 8–20 weeks followed by a long-term programme of weight loss maintenance would result in T2D remission in those diagnosed with T2D in the previous 6 years (Lean et al. 2017). In this randomised trial, 306 participants with obesity were randomised to either best practice NHS care plus an intensive structured weight management programme, or best practice NHS care alone. The study had two primary outcomes, firstly, T2D remission, defined as an HbA1c <6.5% (48 mmol/mol) and off all diabetes medication for at least 2 months from baseline to 12 months, and/secondly, 15 kg weight loss.

At 12 months, in an intention to treat analysis, T2D remission was achieved in 46% of the LED group, compared to 4% in the control group. Mean weight loss was 10 kg in the LED group and 1 kg in the control, whilst 24% achieved ≥15 kg weight loss compared to none in the control group. The recently published 2-year data have shown these benefits are sustainable for both weight loss (7.6%) and T2D remission (36%) (Lean et al. 2019). Similar to previous studies, the degree of weight loss was related to the degree of remission with those achieving ≥15 kg weight loss achieving 86% remission at 12 months and 73% at 24 months (odd ratio 1.25 [per kg weight loss]) (Lean et al. 2019). Extending these previous observations, recent data from the Middle East has shown that greater T2D remission (61%) and even normoglycaemia (HbA1c < 5.7%; 33%) can be achieved using an intensive LED programme by selecting participants who were both younger and had shorter diabetes

duration (Taheri et al. 2020). These data demonstrate that remission is an achievable goal within a primary care setting in both in a European population in the UK and a non-European population in people of Middle Eastern and North African origin.

DiRECT (Lean et al. 2017), the Diabetes Intervention Accentuating Diet and Enhancing Metabolism trial (Taheri et al. 2020) and other previous work using VLED have indeed moved us towards potentially having another treatment for T2D management and remission. However, there are still questions that need to be answered before there is wide acceptance for their use in clinical practice.

With over three million people in the UK having T2D, the need for the next steps to be focussed on potential responders is imperative; therefore, focusing on those who are more likely to respond is key to aid cost-effective transfer of such programmes to clinical practice. The mechanistic papers from DiRECT showed that remission is related to maintaining weight loss, durable recovery of beta-cell function, a return of first-phase insulin response, and a reduction in very low density lipoprotein-1 (VLDL-1) triglycerides release from the liver (Al-mrabeh et al. 2020; Taylor et al. 2018). However, these variables are not currently available in routine practice so identifying potential responders may in the future depend on use of surrogate markers.

Until recently the data from remission trials excluded those with advanced T2D treated on insulin and was limited to only those with T2D duration of within the previous 6 years. This has now been resolved with the publication of a recent study using a TDR programme in patients with T2D treated with insulin (Brown et al. 2020). At 12 months 39.4% of participants in those following a LED TDR programme stopped insulin and reduced their insulin requirements by 47.3 units compared with 5.6% and 33.3 units in the control group, respectively. In addition, the TDR programme lost significantly greater weight (9.8 kg vs 5.6 kg) and HbA1c fell significantly at 12 months. This demonstrated that TDR intervention can be effectively and safely used to manage patients with T2D and obesity on insulin therapy.

At present the number of contacts with support staff within all clinical trials to date is higher than currently achievable within many clinical services. This intensity of contact is one of the reasons for the effectiveness of weight maintenance in these trials, as evidence has shown that an increased number of contacts helps with maintenance of weight loss (Wadden et al. 2011). Therefore, contact frequency should be a key consideration when transferring such programmes to clinical practice.

Finally as yet the long-term effects of using TDR programmes on diabetes remission are not fully known as data is currently limited to 2 years, while their impact on on reduction on diabetes complications is currently not known (UK Diabetes 2018). Further studies will no doubt address these limitations.

Summary

From the current evidence the use of VLED and LED should now be considered by clinicians as a treatment option for obesity, some obesity related co-morbidities, and T2D remission in those with T2D diagnosed in the previous 6 years.

It is important to understand that any dietary intervention method is not a standalone treatment and requires a multicomponent and multidisciplinary approach

including physical activity, behaviour change, and medical supervision, VLED and LED are no different (NICE 2014). Therefore, before considering formula diets, medical, dietetic, and ideally psychological assessment should be completed. It is important, as with any lifestyle intervention that realistic goals are set before commencing to avoid any potential disappointment or the feeling of failure by the patient. An important observation is that there are both responders and non-responders, so it is important that patients understand that not all will achieve remission. The factors have been partially alluded to, but more research is required so a more focussed approach can be used within clinical practice. Furthermore it is key that those patients that do achieve remission should continue to be monitored, at least annually, for complications (UK Diabetes 2018).

At present there remains significant heterogeneity in the literature in regard to methodology time of TDR, food reintroduction, weight maintenance, and whether a VLED or LED is used, meaning it remains challenging to recommend best practice guidelines. Although typically the initial TDR phase lasts around 12 weeks with a gradual reintroduction of food lasting between 4 and 12 weeks followed by a weight maintainance phase in the long-term. 'Rescue packages' which involve temporary use of the TDR phase or intermittent use of the formula products have been shown to aid weight maintenance and should be considered (Lean et al. 2017; Christensen et al. 2017).

One key factor is that as clinicians we need to listen to our patients and their preferences regarding the dietary changes, they are willing to do and most importantly stick to, as this has been suggested to be the most important factor (Johansson et al. 2014). Therefore, the ultimate decision for the use of a formula diet should rest with the patients and it is the role of the dietitian and healthcare team to assist them to achieve their goals.

Conflicts of Interest AB has received funding for investigator-initiated research through an educational grant and travel grants from Cambridge Weight Plan Ltd and is on the medical advisory board and share holder of Reset Health Clinics Ltd.

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Part III

Primary Care Role in Obesity Management

Role of the Nurse in Managing Obesity

8

Debbie Cook

There are enormous financial, social, and economic costs to the current obesity epidemic, and the personal costs of this serious and escalating physiological threat should not be underestimated (Rodgers et al. 2012). Current projections indicate that there will be an increase in obesity, so nurses are more and more likely to come across patients who have a less than ideal body-mass Index. Obesity prevalence is known to vary across populations but is more prevalent at highest levels of deprivation (POST 2015). Nurses are required to help their patients manage increasingly complex conditions. As the global burden of obesity increases, nurses in all roles are coming into contact with more patients who have not only obesity, but the many co-morbidities associated with this common condition. Nurses must act as advocates for their patients, giving considered, contemporary advice regarding health and disease. Pharmacological management of the common co-morbidities of obesity, such as type two diabetes, can contribute to weight gain which further drives the disease process, and nurses need to remain vigilant and informed, carefully steering their patients towards self-empowerment. This chapter will explore how nurses can help their patients to achieve a meaningful and sustainable weight loss which will encourage the better management of their increasingly complex lives.

It is now well documented that mental health status, social circumstances, and family support systems can all contribute to both weight gain and fluctuating blood sugar levels (Greener 2015). Health care professionals need to understand the myriad factors which drive our health behaviours, and nurses are uniquely placed to do so in their everyday interactions with people. The McKinsey report (McKinsey Global Institute 2014) identified that obesity is one of the top three social burdens created by man; a plethora of interventions is needed across many systems, including integrated health and social care policies, to begin to ameliorate this toxic

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_8

condition. Part of the role of the nurse, especially general practice nurses (GPN), is to signpost patients towards interventions that will help them to circumnavigate some of the barriers to good health that have evolved in modern society.

People who already have a genetic disposition to obesity and or Type II diabetes, bingeing on high-fat, high sugar items on a regular basis, with a history of lack of activity are then in danger of developing metabolic disease (Clancy and Newell 2011). The current obesity epidemic is further potentiated by the constant availability of cheap, hyper palatable food, which is chosen over healthier often more expensive alternatives. Unfavourable changes to the built environment further lead to an obesogenic environment. This highlights an underlying, inherited susceptibility to obesity and fat distribution in certain individuals and can lead to the development of other long term conditions and co-morbidities.

Frequently, the diet of an obese individual can be of poor nutritional value, comprising high levels of fat, salt, and/or sugar, which is often lacking in minerals, protein, vitamins, and fibre. These nutritional deficiencies further contribute to weight gain, depression, eating disorders, and other co-morbidities (Al-Momani et al. 2015).

Screening

Patients with either simple overweight or obesity should be screened for any other covert disease; The NHS vascular screening programme (2016) has been principally set up to identify people at risk of disease from the age of 18 to 74 years, and offers a comprehensive health check to show which patients are at risk of disease such as hypertension, dyslipidaemia, stroke, and diabetes. If nurses opportunistically screen patients by checking blood pressures, waist measurements, and weight as well as organising bloods for glucose, Hba1c and lipid profiles, patients of normal weight, overweight, obesity, with vascular disease can be identified quicker.

Obesity can be seen from the above to be a public health issue, with very personal and meaningful connotations. Helping their patients to accept that they have a problem with their current and future health is within the gift of nurses, as they consult with patients for a myriad of reasons including dressings, cervical cytology, immunisations, and chronic disease monitoring, as well as medical and surgical management of their condition in the hospital setting. Signposting patients towards a healthier lifestyle involves careful communication and explaining that there are many options available to patients to help them to lose weight.

Nurses are not dietitians and have limited time with patients in their clinics or on the wards. Yet reductions in body weight can be achieved using different diets and part of the role of the nurse encompasses matching patients with the correct diet. Information is now readily available on NHS choices regarding sensible, healthy eating plans using a low carbohydrate, low calorie, or reduced fat approach. Very low calorie diets have also been shown to induce weight loss of up to 18 kg, and weight reductions of this magnitude can cause a drop in insulin resistance, reduction of blood pressure, and symptomatic improvement in both sleep apnoea and arthritic

conditions (Haslam et al. 2010). For those able to pay, commercial weight loss programmes are also readily available such as Slimming world, Weight watchers (Truby et al. 2006).

Yet achieving sustainable weight loss is difficult for most people. Nash (2015) also suggests that the assumption that education alone will lead to weight loss, the traditional medical and dietary advice model which treats weight loss like a logical, rational process is outmoded and flawed. Continuous, aggregated discussions about unachievable dietary changes may not be beneficial to most people so alternatives need to be suggested such as the national diabetes prevention programme (NDDP) (NHS England 2018), or access to a programme such as the 'expert patients programme' (Tidy 2015), may help patients much more. There is also a growing recognition that dietary programmes without a cognitive and behavioural component are relatively ineffective (Cook 2017). Nurse prescribers may also be able to prescribe orlistat, a mildly effective pancreatic lipase inhibitor (Torgerson et al. 2004), or Liraglutide which has been re-positioned at a higher dose into the weight loss arena due to the appetite suppression and delayed gastric emptying effects (Mehta et al. 2016). Holistic care however, means that patients may benefit from multi-modalities and although drugs may amplify adherence to behaviour change strategies, nurses need to appreciate that improving their physical functioning is peerlessly complex for some individuals and advice must be tailored to their individual needs.

One aspect of this is that nurses should continue to empower individuals to incorporate exercise into their daily lives. Exercise training has been shown to reverse insulin resistance, improve glucose profiles, and decrease hepatic glucose output (Solomon et al. 2010). Regular physical activity can extend life, and specifically reduce the risk of breast cancer by 20–30%, heart disease by 20–35%, and the risk of hip fracture by 36–68%. Yet in the health survey for England (2007), although one in four people said they would be more active if directed to do so by a health care professional, in another survey by McMillan cancer support, 72% of GPs stated that they did not speak to their patients about the benefits of physical activity (Johnson 2016). This role then passes to nurses and they should utilise the many touch points they have with patients to highlight the benefits of a more active life.

Evolution has equipped mankind to withstand a major threat to species survival; starvation. Yet over the last 40 years, the chronic consumption of calorie dense food and a limited opportunity for exercise have created a perfect storm of conditions which render our next biggest threat to survival more pressing than starvation; that of a seemingly relentless progression of global obesity. Over 50% of the population of Europe is now obese and diabesity, the frequent coupling of obesity and type two diabetes represents one of the worst health threats (Barber 2016). Unhealthy lifestyles contribute to chronic diseases and long-term conditions. Nurses role in society focuses on maintaining and enhancing the health of people in their care. Before nurses can help, advise, and encourage their patients, they need to examine their own health behaviours. If health care providers are stressed, inactive, and too busy to take on healthy behaviours, then they are unlikely to become good role models for their patients (Peate 2012). The diverse ethnic origins of people in the UK also cannot be underestimated; nurses need to understand the socio-economic and

cultural impact of peoples understanding, and appreciate their needs in terms of role models, education, and information giving (Chowdhury and King 2007).

Surgery

Part of the role of the nurse is also to demystify some of the very complex advice that patients receive from the various health care professionals they come across. Prejudice abounds and overcoming the stigma associated with obesity is vital before patients can move onto their weight loss journey. Bariatric surgery is now well known to ameliorate the symptoms and consequences of obesity and type two diabetes, yet less surgery is now being carried out despite NICE endorsement. There is a perception among both patients and professionals that having Bariatric surgery is somehow 'cheating', using NHS dwindling resources to prop up the deleterious metabolism of people who have made a series of poor life choices (Batterham and Zakeri 2017). There is not the same judgement with people who fracture a limb whilst skiing or face the need for lung volume reduction surgery for COPD after a 50-pack year history of smoking. Stigma and judgement have no place and need to be stamped out as it is at best unhelpful and at worst associated with very negative outcomes.

Long-Term Conditions; Diabetes

The intertwined aetiology of type two diabetes and obesity causes further problems. The first tool to reach for when treating a person newly diagnosed with T2 DM is often pharmacological, usually metformin. This drug is at best weight neutral, ideally restoring glycaemic levels to near normal, and in doing so stop the glycosuria that had been causing weight loss. Better Hba1c can then ensue, but at the expense of weight gain. Certain drugs are known to cause obesity, such as sulphonylureas which cause compensatory overeating and insulin. In the mental health arena, drugs such as clozapine, mirtazapine, and some anti-epileptic drugs can also cause disturbing weight gain (Van Gaal and Sheen 2015; Ketter and Haupt 2016).

Obesity and Cancer

A successful campaign from Cancer UK recently spelt out a major, modifiable risk factor for cancer: obesity (with several letters missing). Highlighting that obesity causes cancer is important- many nurses and their patients are unaware of this (Cancer UK 2017). There is a pivotal moment when patients will be far more receptive to Health care messages. If more were aware that obesity is implicated in the development of pancreatic, ovarian, prostate, and breast cancer, it could give them the motivation to continue with their weight loss programme. Historically, it has always been clinically easier to administer a pill, or other therapy, rather than urging

patients to deprive themselves of common and socially accepted habits that seemingly satisfy their needs.

Nurses role in the potential of primary cancer prevention is enormous and ranges from simple improvement of lifestyle choices such as smoking cessation advice, to the promotion of weight control and increasing physical exercise to reduce the incidence of many hormonally driven cancers. Empowering patients to lead healthier lives and reduce their risks of devastating diseases such as type two diabetes, cardiovascular disease, as well as ameliorating the effects of arthritis and poor mobility, is a vital and pivotal role for all nurses. The effect of weight loss on a whole host of diseases should never be forgotten and nurses are uniquely placed to influence patients' attitudes to their health at every encounter along their life journey.

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August 2018

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9 The Role of Community Pharmacy and Pharmacotherapy in Obesity Management

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Introduction

Obesity, a physiological state affecting around 30% of the UK population (Foresight 2004), is an independent risk factor for many long-term conditions with significant financial consequences for Health Services and national economies. The estimated costs of obesity in the UK, for example are believed to be at least £500 million a year in treatment costs to the NHS, and possibly, in excess of £200 million to the wider economy. These healthcare costs are predicted to escalate over the coming years as the number of obese people in the population increases.

The Foresight Report, focused on 2050, estimates if nothing is done, by that time, most adults will be obese, and healthcare costs will bankrupt our society (Foresight 2004). Derek Wanless, in his reports to the UK government (Wanless 2002) on how the National Health Service will be funded in the future, also identified the considerable burden from disease resulting directly from obesity.

White Papers such as *Choosing Health (2004)* (Department-of-Health 2004) and *Our Health, Our Care, Our Say (2006)* (Department-of-Health 2006) commit to help people make healthier choices. The Government is driving local initiatives to support and facilitate behavioural change as the most effective means of improving public health. Community pharmacy is already supporting these initiatives within a national strategy outlined in "*Choosing Health through pharmacy; a programme for pharmaceutical public health 2005-2015*" (Department of Health 2005), outlining the role for community pharmacy.

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
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The Role of the Pharmacist

The pharmacist and the pharmacy team can be utilised in a number of ways to help patients lose weight. Passive health promotion initiatives; posters, window displays and leaflets are possibly effective, but there is little evidence. The information provided can come in the form of both healthy food messages—to eat five portions of food and vegetables a day- and exercise recommendations—adults should engage in a minimum of 30 minutes of at least moderate-intensity physical activity on 5 or more days of the week.

A proactive active approach to weight management might involve innovative use of weighing scales, the calculation of BMI and waist-to-hip ratio calculation where clients are actively targeted. There is a developing body of evidence for the efficacy of this approach.

Overweight patients in the pharmacy to collect diabetes medicines, for example are targeted using Motivational Interviewing (MI) skills: utilising the individual's own obvious or covert desire to improve or prolong optimal health for family, social, financial, etc. reasons, allowing them to reach their own conclusions on the benefit of weight loss. The pharmacist, or one of the pharmacy team, proactively and opportunistically raises the issue of weight and assesses willingness to engage in further discussion. This "Brief Advice" may only take a few moments (if the individual expresses unwillingness to discuss this issue), or it might take up to 3 minutes.

Where someone responds positively, a "Brief Intervention" is targeted at supporting behavioural change and may involve enrolment into an obesity programme where there is sufficient motivation. Central to MI is the initiation of "change talk" where the client is asked to articulate the advantages of change and the disadvantages of failing to change.

A commissioned pharmacy-based weight management service has been provided in a number of UK regions. The service is offered to patients over the age of 18 years, with a BMI of $\geq$30 kg/m^2 and $\leq$ 28 kg/m^2, with at least ONE diagnosed or established risk factor. These risk factors include:

- Hypertension
- Type II diabetes
- Hyperlipidaemia
- Increased waist circumference—greater than 102 cm (40 in.) for males and more than 88 cm (35 in.) for women, but bearing in mind ethnic differences in, for instance South Asians, who have a greater health risk at any given BMI

Pharmacies Are Accredited on Completion of a Certified Training Programme

The one-to-one service uses a Pro-forma template to record data on each enrolled patient, to include BMI, waist circumference, blood glucose, total cholesterol, and blood pressure.

A patient food diary is discussed with the client to identify areas of excess calorie intake and activity and exercise options considered. As a minimum, government guidelines on nutrition and exercise are given within advice and will be supported by written leaflets. A target weight is then set for the patient; this will correspond to a 5–10% reduction in weight over a minimum period of 6 months. A reduction in calorie intake equivalent to 600 kcal daily is agreed along with an exercise programme. Each patient enrolled will be followed up, perhaps initially every 2 weeks for 1 month, then monthly up to 6 months and then bi-monthly to 12 months. At each subsequent meeting, the nutrition and exercise information is reinforced, measurements repeated, and progress monitored.

Although commissioned pharmacy-based schemes for obesity management are scarce, the services that have been provided, such as the Coventry weight management programme and Healthy Hearts in the West (N. Ireland), have been shown to be effective (Meera et al. 2008). The benefits of these services and the position of community pharmacy as a healthcare hub and a source of "social capital" in a new contractual framework mean that it is increasingly likely for there to more of these services nationally in the future.

Pharmacotherapy

The large American Look Ahead (Pi-Sunyer 2014) study of patients with type 2 DM showed improved biomarkers of glucose and lipid control, less sleep apnoea, lower liver fat, fewer instances of depression, ameliorated insulin sensitivity, less urinary incontinence, kidney disease, and a reduced requirement for glucose-lowering agents.

Physical mobility, improved quality of life, and lower costs occurred after intensive lifestyle intervention for obese diabetic individuals. This is reflected by weight loss data by any evidence based bona fide method of weight loss, including pharmacotherapy.

Pharmacotherapy approaches to controlling weight, in real-world conditions, have been largely unsuccessful with fewer medicines available with a specific indication of weight loss. Indeed medicines should not be used in isolation of lifestyle support and where clinical trials show promise of 5%–10% weight loss, this is often not achieved when the medicines are prescribed more widely. Orlistat (Xenical®) remains the only molecule available in the UK with a sole indication of weight loss. Sympathomimetic Agonists and CB1 receptor agonists have been tried but side effects limit their use. Sibutramine (Reductil®) and rimonabant (Acomplia®) are no longer licenced due to unacceptable side effects. Lorcaserin and Tesofensine are yet to achieve a marketing authorisation.

A more nuanced approach to weight loss medicines is now focused on the management of Type 2 Diabetes. Metformin has always been used in this way as it is an effective anorexic agent while managing blood glucose. More recently, the Glucagon-Like Peptide 1 (GLP1) agents; Exenatide (Byetta), Liraglutide (Victoza), Albiglutide (Eperzan), Dulaglutide (Trulicity), and Lixisenatide (Lyxumia) have become available. They are injectable drugs indicated in the

manage of Type 2 Diabetes but are also effective weight loss agents. This group of drugs strongly inhibit feeding desire and therefore bring about weight loss of 4.7 kg over 6 months.

Another group of drugs, the Sodium-Glucose Transporter 2 inhibitors (SGLT2), block glucose reuptake in the kidneys and where they are effective in reducing HbA1c are also effective weight loss agents. This group includes Canagliflozin (Invokana), Dapagliflozin (Forxiga), and Empagliflozin (Jardiance).

Orlistat

Orlistat is a lipase inhibitor that acts locally in the gut to reduce the absorption of dietary fat. The drug covalently binds to the lipase enzymes, resulting in 30% of dietary fat passing through the gastrointestinal tract unabsorbed. NICE advises that it can be used in patients aged between 18 and 75 years with a BMI of at least 30 kg m^2 or with a BMI of 28 kg m^2 in the presence of associated risk factors, such as type 2 diabetes, hypertension, or hyperlipidaemia. Orlistat can only be prescribed to a patient who has achieved a weight loss of at least 2.5 kg over a period of four consecutive weeks before the start of treatment through diet and exercise alone (Meera et al. 2008; National Institute for Health and Clinical Excellence (NICE) 2006, 2008).

Alli is a lower strength formulation of orlistat, available over the counter. Most over-the-counter treatments have not been scientifically evaluated. According to one manufacturing boss "why would we bother with trials, when we can sell them freely as 'medical devices' rather than 'drugs'?" Substances including capsaicin and crushed crustacean carapaces have very limited positive data, but there is little or no data to support the specific formulations available OTC. They should be avoided unless decent evidence emerges.

Sibutramine is a satiety enhancer (as opposed to an appetite suppressant, it allows fullness to descend sooner on a diner, avoiding over-indulgence) and an effective weight loss drug until it was withdrawn from most of the World (with the exception of some South American countries including Brazil). Following the SCOUT study (Scheen 2010), which showed an increase of non-fatal stroke of 16%. Many commentators consider the study to be deeply flawed, as it required high CVD risk, including elderly individuals, not previously allowed to take the drug under its licence, to stay on treatment for five years, even if ineffective, and in direct contradiction of prescribing rules. This point of view was backed by a subsequent pot-hoc study (Caterson et al. 2012), which reported a reduction in mortality, had the agent been used according to regulations. Rimonabant (Cochrane Systematic Review 2006), an endocannabinoid receptor antagonist, was also an effective weight loss agent also withdrawn due to concerns around mental health, although many clinicians believe it could safely have been reserved for specialist prescribers in the same way as, for instance Roaccutane for severe acne. America and other countries have access to a number of drugs to reduce weight, which the

UK and European regulators have stalled. These include Contrave, Qsymia, Tesofensine, and Lorcaserin, which work on various different appetite and metabolic pathways. Contrave, also known as Mysimba, is a combination of naltrexone and bupropion, which acts upon the POM-C nucleus, which has an important role in appetite regulation. A recent systematic analysis concluded, "Naltrexone-bupropion significantly reduces body weight by a small amount but significantly increases the risk of adverse events. A rigorous process of postmarketing surveillance is required" (Onakpoya et al. 2020). The main adverse effects and dropout cause with naltrexone/bupropion was nausea. A bupropion safety concern is the risk of seizures, which contraindicates its use in patients with a previous history of seizures (Halpern and Mancini 2017). Qsymia: Phentermine/topiramate is the most potent weight loss agent already studied in RCTs to date, with a median weight loss of 9.8 kg in the maximum dose (around half of the patients losing more than 10% of their initial weight). The main side effects with phentermine/topiramate are cognitive symptoms, paraesthesias, insomnia, and dysgeusia. There are concerns about teratogenicity due to topiramate and possible psychiatric effects; however, importantly, long-term studies, which include phentermine, however, did not show the risk of addiction (Halpern and Mancini 2017).

Phentermine/topiramate cardiovascular safety deserves deeper studies, but generally, a decrease in blood pressure due to weight loss with a small increase in heart rate was observed in RCTs. Phentermine, viewed as a pariah following the ban on fenfluramine and other amphetamine-related compounds, can now be reconsidered in light of these long-term safety studies, is still widely used in the US and Europe, but not the UK, despite its track record showing no evidence of heart valve problems or addiction, and proven benefits. Lorcaserin is another candidate as a weight loss agent, not yet available in the UK. In a major study (Bohula et al. 2018), at 1 year, weight loss of at least 5% had occurred in 1986 of 5135 patients (38.7%) in the lorcaserin group In a high-risk population of overweight or obese patients, lorcaserin facilitated sustained weight loss without a higher rate of major cardiovascular events than that with placebo. Tesofensine, a monoamine reuptake inhibitor, is under development for the potential treatment of obesity. In vitro, it potently blocked dopamine, norepinephrine, and serotonin reuptake (Bello and Zahner 2009), in some aspects, similar to sibutramine but is nowhere seeing the light of day in the UK. Many other compounds are under development. In the field of diabetes, the more recent glucose-lowering agents have been shown to have significant benefits in weight reduction and, more importantly, in reducing cardiovascular risk factors. GLP-1 inhibitors such as semaglutide are known to induce significant weight loss in addition to cardiometabolic benefits; SGLT-2 inhibitors similarly DPP-4 inhibitors to a lesser degree, whereas sulphonylureas and insulin regimes cause damaging weight gain. In the past, some of the most toxic chemicals known to man have been used in the management of obesity, including mercury, arsenic, strychnine, dinitrophenol, and amphetamines, but modern drugs are entirely separate entities: well-tolerated and effective in the appropriate circumstances alongside diet and physical activity regimes.

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10 Physical Activity and Exercise: Challenging Misconceptions and Considerations for People with Obesity

David R. Broom, Matthew Haines, and Matthew S. Capehorn

Aims

This chapter aims to inform healthcare professionals about the importance of physical activity for people with obesity and to challenge misconceptions that are largely due to the misrepresentation of exercise in mainstream media.

By engaging with this chapter, you will be able to:

- Define physical activity and exercise.
- Learn that misrepresentation of the benefits of exercise in the media has become a public health problem.
- Have an awareness of the effects of exercise on appetite and energy intake and the role of gut peptide hormones.
- Provide a rationale as to why physical activity and exercise should be included as part of a weight loss programme, including the prevention of weight regain.

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_10

- Advise your clients on the most appropriate types of activity as well as important considerations for tier 3 weight management programmes.

Introduction

Physical activity is defined as: 'any bodily movement produced by skeletal muscles that results in energy expenditure' (Caspersen et al. 1985). It is a broad term that describes bodily movement, posture and balance, all requiring energy. It includes different types of sports, physical education and dance activities, as well as indoor and outdoor play and work-related activity. It also includes outdoor and adventurous activities, active travel (e.g. walking, cycling, rollerblading, and scooting) and routine, habitual activities such as using stairs, doing housework and gardening. In this chapter, exercise is distinctive from physical activity, and the two terms will not be used synonymously. Exercise was defined by Caspersen et al. (1985) as: 'a subset of physical activity that is planned, structured, and repetitive and has as a final or an intermediate objective, the improvement and maintenance of physical fitness'. See Winter and Fowler (2009) for a more recent definition.

Despite the irrefutable benefits of achieving the UK Chief Medical Officers physical activity guidelines (Chief Medical Officers 2011), including the prevention and treatment of non-communicable diseases for people with obesity (Lancet Physical Activity Series, 2016), misrepresentation of physical activity and exercise in mainstream media has become a public health problem. Frequently, sensationalist headlines such as 'How exercise can make you pile on the pounds' (*Daily Mail*, 22 June 2015) and 'Why exercising for weight loss just doesn't work' (*The Telegraph*, 7 August 2017) misrepresent or misconstrue research findings. Regrettably, this cultivates confusion and even forestalls the objectives of public health.

Performing a search on Google™ typing: 'Will exercise make me fat?' returns approximately 11,800,000 hits in 0.55 seconds. Whilst many of them will be irrelevant, the sheer volume is worrying. Alarmingly, academic journals have also published sensationalist headlines with an editorial in the *British Journal of Sports Medicine* stating: 'It is time to bust the myth of physical inactivity and obesity: you cannot outrun a bad diet' (Malhotra, Noakes and Phinney, 2015). This promoted similarly lurid headlines in the media.

This poor representation of physical activity and exercise is damaging and could contribute to uncertainty regarding the role of energy expenditure in weight management. When healthcare professionals fail to promote physical activity and exercise in the populations that need it, the impact of this misinformation can be very damaging. Indeed, Sallis (2009) described physical inactivity as the greatest public health problem of our time.

This chapter will address physical activity, exercise, and weight management issues for people with obesity. First, it is important to challenge misconceptions that may have arisen from misinformed healthcare professionals by mainstream media.

Challenging Misconceptions

There is a misconception amongst healthcare professionals and people with obesity that exercise will make you hungrier. On the contrary, research has shown that high-intensity aerobic exercise can suppress hunger during and for a short period (up to 2 hours) after exercise (Broom et al. 2017). Similar findings have been found for resistance training (Broom et al. 2009). The control of appetite is complex, and although an oversimplification, this is in part due to the suppression of the hunger hormone known as acylated ghrelin during high-intensity aerobic exercise (King et al. 2017).

Another misconception amongst healthcare professionals and people with obesity is that exercise will make you eat more at the next meal. Likewise, this is also not necessarily true as King et al. (2010a, b) found that brisk walking for 60 minutes did not increase hunger and that there were no differences in absolute energy intake at a morning (1.5–2 hours post-walk) and afternoon meal (5–5.5 hours post-walk). In fact, the relative energy intake (energy intake—(walking energy expenditure—resting energy expenditure)) was reduced, meaning that walking resulted in an acute negative energy deficit. Similar findings have been demonstrated following swimming (King et al. 2011). This appetite and energy intake responses have also been established in people with obesity, highlighting the ability of exercise to induce a short-term energy deficit without any compensatory effects on appetite regardless of weight status (Douglas et al. 2017).

Although research shows that acute exercise may not stimulate an automatic increase in energy intake to restore energy balance, this is not reflective of the regular activity or exercise training. When exercise is performed over 7–14 days, partial compensation in energy intake equivalent to approximately 30% of the exercise energy expenditure has been shown (Whybrow et al. 2008). When exercise has been performed over longer periods (>2 weeks), studies report no change in hunger or energy intake (Donnelly et al. 2014). Evidence is also emerging that active people have a greater ability to compensate for high-energy dense foods through reductions in energy intake in comparison with inactive controls (Beaulieu et al. 2016). Active people, therefore, have an increased satiety response when consuming food.

A further misconception is that exercise is less effective for weight loss in women than men. While, on average, women have lower fat-free mass (FFM), they lose the same body mass as men if undertaking a programme of regular aerobic exercise (Caudwell et al. 2014). Women will expend less energy for a given duration and intensity of exercise, compared with men, but a recent review supports the continued promotion of exercise as a strategy for inducing short-term energy deficits irrespective of adiposity and sex, as well as the ability of exercise to positively influence energy balance over the longer term (Dorling et al. 2018).

Many health professionals believe that fat is converted to energy or heat, which is not possible, violating the law of conversation of mass. Other misconceptions are that metabolites of fat are excreted in the faeces or converted to muscle. Losing weight requires the unlocking of carbon stored in fat cells, which requires respiration. Therefore, the lungs are the primary excretory organ for fat (Meerman and Brown 2014).

How Effective Is Physical Activity and Exercise for Weight Loss?

Weight loss as a result of physical activity or exercise is often less than what would be expected since predictive equations do not consider changes such as reductions in resting metabolic rate (RMR) or increases in FFM. Also, the widely accepted idea that 1 kg of body mass is equivalent to 7700 kcal, which consists of 70% fat and 30% FFM was determined from short-term, low-calorie diets, which are not directly applicable to changes in body composition that occur as a result of exercise since the percentage of fat would decrease with a subsequent increase in FFM.

Exercise can be portrayed as being ineffective for weight loss because researchers typically report the mean (average) response. For example King et al. (2010a, b) reported a mean fat mass loss of 3.7 kg following a 12 week supervised aerobic exercise programme. Yet, individual responses ranged from a large loss of 9.5 kg to one participant who gained 2.6 kg. This was despite individuals performing the same objectively verified exercise energy expenditure. Compensatory increases in hunger and food intake are highly variable and are commonly considered as reasons why exercise alone produces modest weight loss. A weight loss of 5% has been shown to be clinically meaningful (National Institute for Health and Care Excellence 2014), which has substantial health benefits (Magkos et al. 2016).

The effects of aerobic exercise training (as distinct from physical activity as part of daily living) without dietary restriction on weight loss has been extensively reviewed as part of a prestigious Cochrane Review (Shaw et al. 2006). Modest reductions (1.5–3.0 kg) are typically reported over 3–18 months. Weight loss is greater in well controlled, supervised conditions such as in a laboratory when the exercise energy expenditure is greater than 2000 kcal per week or when exercise is combined with dietary restriction. Research has shown that if the energy deficit created by exercise or diet is the same, then the weight loss is the same (Ross et al. 2000). However, we acknowledge that whether it is easier to walk a mile or refrain from eating a chocolate bar is not clear. Losing weight using food restriction alone is unlikely to yield the desired results. Humans have a complex system to control food intake and following weight loss, our appetite tends to promote overeating and weight regain (Sumithran et al. 2011). Based on current evidence and the authors' combined experiences, it is our belief that physical activity and exercise combined with a calorie-controlled diet is the best strategy for weight loss in people with obesity.

Why Is It Important to Include Physical Activity as Part of Weight Management?

Most individuals who lose weight regain it in less than a year. Physical activity and exercise have consistently been reported as being essential for the prevention of weight regain. This was evident in the study by Jakicic et al. (2008), who recruited women with overweight and obesity to a 24-month behavioural weight loss intervention that recommended reducing energy intake to 1200–1500 kcal per day and to

increase physical activity to achieve energy expenditures of 1000 or 2000 kcal per week using either moderate- or vigorous-intensity, giving rise to 4 different groups. Weight loss did not differ between the randomised groups at 6 months (approximately 8–10% weight loss) or 24 months (approximately 5% weight loss). However, further analysis showed that individuals maintaining ≥10% weight loss at 24 months reported the highest physical activity, which was 1835 kcal or 275 minutes per week.

Whilst weight loss is the predominant marker of successful weight management interventions, the inclusion of physical activity and exercise leads to other independent beneficial changes. These include maintaining skeletal muscle mass, reductions in blood pressure, an improved blood lipid profile, and improved insulin sensitivity. Also, regardless of body mass, people with higher aerobic fitness are at lower risk of all cause-mortality than those with lower fitness (Blair et al. 1995). Recent evidence highlights that low fitness is associated with abdominal adiposity and low-grade inflammation independent of BMI (Wedell-Neergaard et al. 2018). As such, it is important to promote activities to increase fitness, which is frequently overlooked.

A further consideration is that exercise has a role in consolidating surgically achieved weight loss. Exercise after bariatric surgery leads to further weight loss compared to those who undergo surgery but do not exercise (Egberts et al. 2012). Physical activity may also be important in parrying surgically induced sarcopenia, which has a negative influence on energy balance. Skeletal muscle deficiency relative to adipose tissue is an important consideration for function and health. Insulin resistance may be proportional to fat mass, but inversely proportional to the mass and metabolic activity of skeletal muscle.

Food cravings of high calorie, energy-dense foods are associated with weight gain, and brisk walking has been shown to reduce the urge for sugary snacks (Ledochowski et al. 2015).

Which Types of Physical Activity and Exercise Are Most Beneficial?

Kavouras et al. (2007) reported that individuals participating in physical activity commensurate with public health recommendations (at least 30 minutes, moderate-intensity physical activity per day on 5 days a week) had a significantly lower BMI (25.9 kg/m^2) when compared to the BMI (26.7 kg/m^2) of inactive individuals. Thus, based on these findings, it appears that 30–60 minutes of physical activity per day on at least 5 days per week (150–300 minutes per week) is sufficient to maintain or significantly reduce body weight.

Regardless of the physical activity or exercise type, the goal is to maximise total energy expenditure. Long slow distance (or steady state) exercise could be one approach to achieving this, and such aerobic activity typically expends more energy than resistance training. However, resistance training is more effective at stimulating muscle growth (hypertrophy) and can lead to a sustained increase in basal metabolic rate. An alternative option is high-intensity interval training (HIIT), using

alternating low- and high-intensities. Although further research is required, the effects on subcutaneous and abdominal fat loss are promising (Boutcher 2011), and approaches using reduced-exertion HIIT have recently shown to be tolerable and acceptable in people with overweight and obesity (Haines et al. unpublished findings; Ruffino et al. 2016).

Undertaking Activities of Daily Living (ADL's), increasing light-intensity physical activity, and reducing sedentary time are also important. Bailey et al. (2016) found that breaking up prolonged sitting with light-intensity walking for as little as 2 minutes every 20 minutes does not alter appetite and gut hormone responses to a meal over a 5 hour period. Increased energy expenditure from the activity breaks therefore promoted an energy deficit that was not compensated for.

Exercise scientists continue to research the effects of physical activity and exercise on body mass because an optimal dose has not been identified. When working with a client with obesity, a person-centred approach is the priority, and the choice of activity depends on a whole host of factors, including previous experience, enjoyment, and confidence. There are many important considerations that practitioners must consider when recommending physical activity and exercise, not least that the best type of exercise for losing weight is the one that people will actually do! Most of us cannot sustain a behaviour from which we derive no pleasure.

Important Considerations for Physical Activity and Exercise Programming in Weight Management Interventions

The following are examples of key considerations when trying to increase physical activity and exercise in people with obesity:

- Assess readiness to be more active and use a variety of behaviour change techniques.
- Identify barriers and any anxiety or body image issues and support your client to overcome them.
- Identify any previous negative experiences and raise confidence as demanded.
- If possible, minimise sensations of displeasure—adherence is a pre-requisite for success, and people usually avoid activities they find overly aversive.
- Understand that intermittent activity may be more manageable for those with a very high BMI.
- Undertake appropriate fitness testing and assessment of functional performance at baseline to inform goal setting. Repeat regularly to monitor changes and make suitable adaptions to the programme.
- Identify and work with the client's own goals, not what you think they should be.
- Start simple, progress gradually and safely but do not stereotype into gentler activities to avoid stigma.

- Clients may have low physical work capacity due to excess weight as well as poor joint mobility and balance.
- Consider how having comorbidities such as joint pain, hypertension, or type 2 diabetes can influence the physical activity programme.
- Use non-weight bearing activities if impact is an issue and have an injury prevention strategy.
- Consider if the exercise equipment available is fit for purpose due to body size and shape. Modify the equipment or avoid fixed resistance machines if needed.
- Have a good understanding of the client's medications and side effects that may lead to flatulence and/or faecal urgency. Openly discuss these in preparation for any events.
- Total energy expenditure is key, and how the client achieves this is largely up to them. Asking the question: 'Tell me about the physical activities or sports you currently or used to enjoy?' will encourage discussion.
- Support clients to understand their responses to physical activity and exercise—what is 'normal' for them?
- To manage expectations, make it clear that everyone is different, and responses will vary.
- Inform your client it is likely that other health outcomes will be improving even in the event of no weight loss.

Concluding Summary

It is important to challenge misconceptions about physical activity and exercise, which does not necessarily make you hungrier or eat more at the next meal. The importance of an active lifestyle in the maintenance of weight loss should not be overlooked and can lead to clinically significant weight loss. Exercise-induced reductions in body mass will vary between individuals due to numerous behavioural and physiological factors, so recognising that differences exist will help to manage your client's expectations to promote a better understanding of weight loss.

We have evolved as an exercise-dependent species, and our metabolic machinery works best at relatively high levels of physical activity. As such, increasing total energy expenditure should be a primary focus, but people with obesity should focus on both energy expenditure and energy intake as part of a weight loss programme. Solutions to obesity, both prevention and treatment, must include physical activity, but also consider what is personally, socially, and culturally acceptable. Cognitive effort is required to achieve this in the modern environment.

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Teaching Kitchens for Nutrition Education and to Improve Health Outcomes

11

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Teaching and community kitchens are emerging as a novel way to help translate nutrition science into practice both within health professional (Birkhead et al. 2015; La Puma 2016; Bhansali 2019) and public-facing education (Reicks et al. 2018).

Teaching Kitchens/Kitchen-Based Teaching

Kitchen-based teaching reflects a growing expert consensus that there is a need to shift focus from nutrient to food-based guidelines (Willett et al. 2019; Mozaffarian et al. 2018). Food is a complex matrix of many different nutrients working in synergy to influence our health. Moreover, the food we choose is a product of our mood, culture, environment and both financial and physical capabilities. It is crucial

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_11

to understand the role these wider determinants play in our food choices. Elevating the conversation around food will require collaboration across key stakeholders, but the kitchen can provide a unique venue for public and multi-professional learning and innovation.

At the time of publishing, we are not aware of this model being used with Bariatric surgical patients, but the authors do see potential in using this methodology to address food quality and support the social and psychological aspects of eating after surgery. Teaching kitchens may play a role in improving dietary patterns and avoiding micronutrient deficiencies in those having bariatric surgery as part of the rehabilitation and support required. In doing so, it can support weight maintenance by focussing on practical and relatable food preparation. Although currently, we have a limited evidence base to draw on, we describe examples of hands-on cooking uses here.

Community Kitchens

Community kitchens provide facilities where people can cook, learn new skills, and eat together.

An evaluation of 795 people completing an 8 week Ministry of Food course in the UK (Hutchinson 2016) concluded significant effects on dietary behaviour and confidence in cooking skills. Six months following their time in the community kitchen, the average portions of fruit and vegetable consumed doubled, whilst the number of snacks consumed decreased. Participants reported increased confidence in food preparation, budgeting, and purchasing skills, as well as greater nutritional awareness. Participants also discussed the social benefits, enjoying the opportunity to learn and share experiences in a group, which offers support and connection.

The Brighton and Hove Food Partnership community kitchen is another case example. It is chiefly funded via the People's Postcode Lottery and receives further support through crowdfunding and Jamie Oliver's Foundation Ministry of Food (Brighton and Hove Food Partnership Community Kitchen 2020). It offers courses for many, which pre COVID-19 pandemic included those with dementia, learning disabilities and mental health problems, and during COVID-19 the kitchen helped to prepare low-cost meals for people in receipt of means-tested benefits or on a low income and delivered courses online. This is a practical, skills-based model designed to specifically target groups that may be nutritionally more vulnerable and perhaps harder to reach in clinical settings.

Mobile Teaching Kitchens

Mobile teaching kitchens are an innovative solution to the nutrition challenges facing resource-poor and vast geographical areas. One such initiative, developed by the NNEdPro Global Centre for Nutrition and Health, brought nutrition education to slum dwellings in Kolkata, with the goal of improving nutrition and health

outcomes alongside promoting education, empowerment, and entrepreneurship. Local mothers were trained to cook budget friendly, healthy meals using available and seasonal ingredients. But vitally, they were also trained to pass on their skills relating to nutrition and health to other residents in their locality and indeed to the wider general public in Kolkata to facilitate knowledge transfer (Buckner et al. 2021).

Early results show potential reductions in micronutrient deficiencies and improved knowledge and practices around core dietary factors particularly including protein sources and feeding their children (Buckner et al. 2021). After successful implementation in urban Kolkata and rural Punjab, India, the Mobile Teaching Kitchen intervention will soon be trialled elsewhere in similar communities in different continents and countries. The most innovative aspect of this model is the See One, Do One, Teach One approach, which facilitates a vocational training transmission chain from trainers to trainees who in turn become trainers, thereby snowballing knowledge and skills. This training model uses a culinary method to circumvent literacy barriers and to promote high-nutritional value dietary changes, alongside addressing other social determinants of health including inequality through entrepreneurship, education and wider health.

Culinary Medicine

Culinary Medicine is a kitchen-based approach to nutrition education originating in the USA that has now been successfully integrated into a large percentage of US medical schools. Participants learn about food and its preparation through hands-on cooking, while considering how to translate these skills to help patients to meet their own health goals (La Puma 2016). In a comparison of hands-on cooking and traditional nutrition education of 625 students, attendees of the hands-on cooking programme saw significant improvements in their competence and attitudes pertaining to nutrition. Interestingly, an improvement in fruit and vegetable intake was also seen (Birkhead et al. 2015). Emerging, are examples where healthcare students pass on their knowledge to the public by themselves teaching hands-on cooking sessions (Chae et al. 2017). One such programme resulted in small but significant improvements in blood pressure and total cholesterol for participants with type 2 diabetes (Monlezun et al. 2015).

Culinary Medicine UK was the first to pioneer a similar but UK centric approach in 2018 and now regularly delivers sessions to health professionals and medical students in the UK. The ethos is one of collaboration where chefs, dietitians, and doctors work together to consider how, within their unique job roles, they can support patients to make healthier food choices appropriate to their medical conditions, including when to refer to Registered Dietitians for specialist dietary interventions. Initial data reveals increases in perceived confidence and commitment to include nutrition in consultations, with attendees keen to attend more sessions and to recommend sessions to other students (Bhansali 2019).

During the interactive session, participants prepare recipes with support from professional chefs and Registered Dietitians. Clinical case studies are discussed to

help participants consider the application of their learning to their own practice. The programme has been designed to incorporate medical student and faculty views and requirements. Formal evaluations are currently being planned in collaboration with nutrition research professionals via the UK Nutrition Implementation Coalition, a strategic alliance between NNEdPro Global Centre for Nutrition and Health, ERimNN (The Education and Research in Medical Nutrition Network), Nutritank and Culinary Medicine UK (NNEdPro Global Centre for Nutrition and Health, 2020).

Nutrition Education for Health Professionals in the UK

People with obesity and treated with bariatric surgery meet many different professions within the multidisciplinary team. A wider understanding of nutrition issues resulting from the physical difficulties in eating, micronutrient requirements, as well as the environmental, individual, and psychological barriers to nutrition is crucial to meet complex nutrition needs. Upskilling health care professionals to have a better food and cooking knowledge base would enhance their ability to support people undergoing bariatric surgery and in the post-operative rehabilitation phase. Teaching kitchens can help to discuss nutrition in the context of food and meal prep rather than macro and micronutrients to enable more relatable conversations with patients. Furthermore, this hands-on approach considers potential barriers in putting well-meaning "advice" into practice to build greater empathy and understanding on the importance of individual and patient-centred care, tailored to current eating habits and patient challenges.

Although widely recognised that nutrition plays an important role in health (Afshin et al. 2019), there is growing evidence to suggest that health professionals are not confident to discuss food and nutrition with patients. For example The UK General Medical Council has identified key nutrition-related learning outcomes for medical undergraduates (General Medical Council (GMC) 2015). However, a 2020 review of the opinions of medical students and doctors concluded that although most feel nutrition is an important consideration, only a quarter was confident in their knowledge, and 74% discussed nutrition with patients less than once a month, citing lack of knowledge, time, and confidence as the biggest barriers. Most did not feel they had received adequate nutrition education as part of their training, with a majority reporting less than 2 hours of nutrition teaching (Macaninch et al. 2020). The lack of nutrition in medical education is reflected globally (Crowley et al. 2019) as well as in nursing and other allied health professions (Sacks 2017).

Summary

Although in its infancy in medical education, the use of teaching kitchens is more established in other settings, and education via hands-on cooking has many applications with promising early results. In order to scale, further evaluation and research is recommended to build the evidence base and to refine methods for maximum

benefits. This has the potential to address the gaps in nutrition education for professionals, the public and marginalised communities.

Hands-on cooking enables a broader consideration of nutrition in the prevention and management of the disease. There is an opportunity to address the needs of those who are overweight or underweight but equally an opportunity to improve diet quality to improve health outcomes, including micronutrient deficiencies broadly. Furthermore, teaching kitchens offer a safe learning environment to discuss different dietary patterns and the complex determinants of dietary needs, preferences, and any overarching external influences. This aims to build greater empathy and flexibility to motivate appropriate dietary change incorporating medical needs, patient choice and ability or readiness to change.

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Part IV

Specialist Obesity Services Outside Primary Care

Setting Up a Tier 3 Service and Barriers to It

12

Matthew S. Capehorn

Regrettably, it is not the case that anyone with interest in obesity can just set up and start running an NHS-funded obesity service. Services need to be commissioned, and although there is guidance on who should take responsibility for the commissioning of each tier of intervention (Department of Health 2014), together with guidance on what should be included in these services (NHS Commissioning Board 2012), there is a great deal of scope for local variability. However, some of the barriers and challenges to setting up and running an effective weight management service are common to all services however they are commissioned.

Over recent years there have been a number of changes at a national and policy level regarding the commissioning of weight management services (Department of Health 2014; NHS Commissioning Board 2012), and at the present time, the Department of Health recommends that tier 3 specialist weight management clinics with a multi-disciplinary team approach to helping individuals with severe and complex obesity is to be the responsibility of Clinical Commissioning Groups (or CCGs) (Department of Health 2014). It will be at the level of this commissioning where the initial challenges are faced when trying to assess whether it is even possible to run a tier 3 service effectively.

Challenges Raised at the Commissioning Stage

Funding

This is always going to be one of the major barriers that determine whether it is feasible to run an effective service. The anecdotal impression held by clinicians is that commissioners are under pressure to save money, not spend it, and although they may understand and appreciate the financial arguments for treating obesity, and

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_12

that in the long term, it will be cost-effective and cheaper than treating the consequences (Zakeri and Batterham 2017; Brown et al. 2017), they may not have money to invest or sufficient money for service providers to offer the gold standard service that they may want to.

Duration of Tender

Irrespective of whether sufficient funding is provided to allow an adequate Tier 3 service to be set up, it is often frustrating when commissioners provide tenders of up to 3 years, which for most providers will be when their service is starting to become established within the local community and performing at its best. It is often frustrating when there is no guarantee that funding will be recurrent, or even if it is how long that will be for. Staff morale and job security can become an issue with only one year, or less, extensions to existing contracts. With a chronic long-term condition like obesity, it is essential that we argue for longer tenders in the region of 10 years or more.

Key Performance Indicators

Will your income be in part dependant on Key Performance Indicators (KPIs), and if so, are they realistic and achievable? Most commissioners would love us to see every patient with obesity in the local community and to have 100% success rate in helping them to lose weight or reach a healthy BMI. However, this is where the clinical evidence needs to be used to argue for realistic outcomes. Data published by existing services show that it is reasonable to expect a 50% drop out in a long-term intervention for severe and complex obesity, and even those who complete treatment a success rate at hitting modest (yet still clinically significant) weight loss targets of 5% from baseline may be in the region of 60% (Jennings et al. 2014). It is important that any KPIs that expect more unrealistic targets need to be established as aspirational but perhaps not be allowed to influence income.

Challenges Setting Up the Service

Clinician Time

It is likely to be very time-consuming for any clinician involved in wanting to set up and manage a specialist weight management service, especially if wanting to continue with a "day job" as a primary or secondary care physician. It is worth considering having a dedicated session a week to manage the service and a further number of clinical sessions for any face-to-face patient clinics.

Suitable Premises

Is the weight management service going to be run from dedicated stand-alone premises or within an existing building that is used for other purposes, e.g. a GP practice? Will there be sufficient room for staff and facilities and for potential expansion? If it is a dedicated site, then the cost of these premises needs to be factored into whether the service can be operated with any profit.

Staff Recruitment and Training

Finding ready trained and/or skilled staff can be difficult when setting up a dedicated specialist multi-disciplinary team. Some of the key specialists, such as dietitians, exercise therapists or psychologists/therapists may already have qualifications and be responsible for their own ongoing professional development. However, there may not be many trained obesity specialist nurses, and it may be the case that the nursing team is hired without experience but with a plan to up skill them by attending appropriate courses. However, it may be difficult to find adequate courses that focus on the practical aspects of managing obesity, and they are all likely to come with additional cost that needs to be factored in. With regards to staffing and costs, it is important to structure the roles and responsibilities sensibly. It would be ideal to have a dozen highly skilled dietitians in your service, but perhaps a waste of their skills if they were delivering calorie-counting advice and Eat Well Guide nutritional information that could be delivered by one of your nurses. More highly skilled staff may be better off with more niche roles, such as in the case of dietitians, seeing those patients with malabsorption syndrome, coeliac disease, vegan diets, South Asian diets, type 1 diabetes etc., that is outside the knowledge and skill set of nurses. Similar principles apply to the psychology/therapist team. A psychologist is possibly best at identifying eating disorders, but delivering the therapy for making behaviour change can be done by therapists, and if the nurses are skilled at screening for and identifying emotional eating, an alternative, more cost-effective care pathway can be developed.

Clinical Protocol and Services

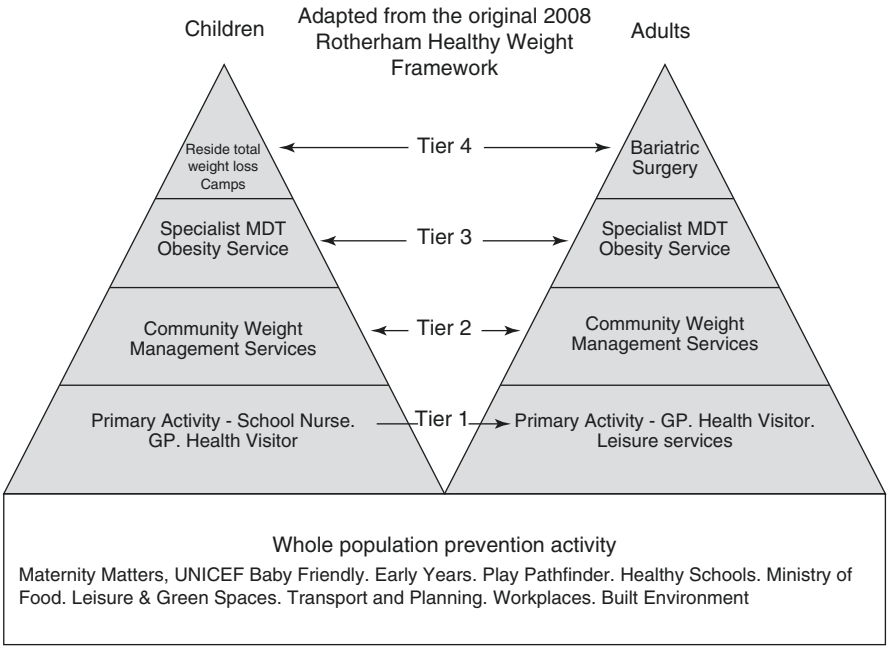
Fortunately, there is now an increasing amount of articles where existing services have shared their care pathways and service design that it may not require you to "re-invent the wheel" by developing your own, however, you need to ensure that it is adapted to your local needs. Furthermore, it is important to establish what additional services you may wish to offer in order to provide the best service possible, rather than just the minimum service, and a good example of this might be offering on-site screening for Obstructive Sleep Apnoea with overnight oximetry. Regarding exercise therapy, it is very difficult to encourage the patient to engage with more physical activity from a consulting room while sitting behind a desk. Will your service provide links with local leisure services, or will it have on-site gym

facilities which can be the consulting room for your exercise therapist. The Rotherham Institute for Obesity (RIO) showed that within as little as six face-to-face sessions with an exercise therapist in their on-site gym, to educate and motivate the patient in what types of physical activity they should and could be doing, they demonstrated that 79% of patients were still engaged in physical activity at 9 months, reversing the trend shown in official figures from the Fitness Industry Association that suggests up to 90% of people who join a gym stop going within the first 6 months (Walker et al. 2012).

Challenges Running the Service

Integrating with Other Services

It is essential that the tier 3 service is not a stand-alone service. It needs to be part of a tiered framework of other weight management services, and to work together with the tier 2 community weight management services and also the tier 4 bariatric services. This can be difficult when the responsibility for commissioning tier 2 is done by Local Authority, when tiers 3 and 4 are the responsibility of the CCG (Department of Health 2014). However, it also needs to link in with secondary care, both in terms of accepting referrals from them and, when appropriate, referring back. Rotherham won the overall NHS Health and Social Care award in 2009 for excellence in commissioning for its fully integrated 4-tiered framework of both child and adult weight management services (see below):



Advertising

It is likely that one of the commissioners' KPIs will relate to a minimum throughput of patients. For this reason, it is important that other services, potential referrers, and patients are aware of your existence and referral criteria. How will this be done? Will, your commissioners, have set aside a separate budget to advertise their newly commissioned service, or will it be expected of you? This can become very expensive in terms of time and cost, whether it is by going around local GP surgeries, schools, leisure services, pharmacists etc., or sending out advertising materials that may never get read or adverts in local newspapers.

Academic Links

This may not be considered as essential by some, but for others, it can be very fulfilling to link with academic institutions with a view to getting your data published and in the public domain. However, it is important to establish appropriate patient consent and clarification as to who owns the data (you as service provider or the commissioner) from the outset.

Challenges Evaluating the Service

Collecting Data

The likelihood is that you will be collecting a huge amount of patient data. Much of this may be specifically for the purpose of demonstrating you have met your KPI targets. However, you may be collecting clinical information that has a great deal of value to the evidence base. Careful thought needs to go into what information you collect (e.g. measurements, blood values, patient perception and other questionnaires etc.) and how you keep this in a format that can easily be analysed. It needs to be remembered that this can be a time-consuming process for whatever staff are doing it, and it may be more cost-effective to allow for dedicated admin staff for this purpose. Regarding the evidence base, what is lacking is good quality long-term follow-up data, and this can be very difficult and time-consuming for any service provider to commit to. Adequate resources will need to be ring-fenced if this is a chosen aim or KPI. Analysis of the data may require statistical skills. Will, your commissioner, be taking this responsibility, or will they only manage the core data set for the KPIs, in which case it may be even more helpful to link with academic institutions.

Understanding "Failures"

No patient attending a weight management service should be considered a "failure" as they are likely to have taken away valuable lessons even if they have not managed

to meet weight loss targets. However, it is important to remember that as a tier 3 service, you will be seeing complex patients with severe obesity and quite often psychological-emotional eating issues. These are often patients who have tried nearly everything else and been unable to lose weight, and more often keep putting additional weight on, so even stabilising weight gain can be considered a success. It may also be the case that they are losing weight in conjunction with increased physical activity and the increased muscle development limits their apparent weight loss on the scales, even those they have significantly improved their health and cardiometabolic risks.

Conclusion

Tier 3 services have recently been evaluated and deemed to be cost-effective interventions. Therefore we should be able to argue the health-economic case for commissioners to set up services. The process of setting up a service can be very rewarding but needs careful consideration of all of the potential challenges and barriers involved. Primary care does not have the financial or academic infrastructure to subsidise the significant administrative burden of collecting a large range of data and organising long-term follow-up to assess the true efficacy of these services. The development of collaborative partnerships is essential.

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Commissioning of Weight Management Services

13

Matthew S. Capehorn

For many years we have had messages from Public Health England, Sir Simon Stevens (Head of NHS England), successive Government representatives, and obesity experts, who have all been telling us of the need to prioritise obesity in the face of a public health epidemic. Numerous changes have been made over the years, to the commissioning of weight management services, to address this however, there is now evidence that instead of tier 3 provisions becoming more widespread and comprehensive, it remains variable and show signs of decreasing, with some areas facing the threat of decommissioning established weight management services.

Global obesity has tripled in the last 40 years, and the World Health Organisation estimates that there were over 650 million obese people worldwide in 2016.[1] In England, the most recent data available shows a rise in the prevalence of obesity from 15% in 1993 to 26% in 2016.[2] Obesity is recognised as a major risk factor for a wide range of non-communicable diseases, including hypertension, cardiovascular disease, type 2 diabetes mellitus, musculoskeletal disorders and certain types of cancer (see footnote 1). Effective treatment of obesity represents a wide-reaching preventive strategy for a multitude of long-term health conditions.

In England, Weight Management Services follow a four-tier structure as shown below in Table 13.1.

Patients should have a care pathway that allows seamless movement both up and down the tiers depending on their clinical need. In Tier 3, the Multi-Disciplinary Team (MDT) provides more intensive individualised care to patients with severe and complex obesity and should involve a team of specialists. The MDT is typically led by a clinician and comprises a physician (consultant or GP with Special Interest in Obesity); specialist nurse; specialist dietitian; psychologist or therapist;

[1] World Health Organisation. Obesity and Overweight—fact sheet no. 311.2017.

[2] NHS England. Statistics on Obesity, Physical Activity and Diet—England, April 2018.

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_13

Table 13.1 Structure of Weight Management Services in England

Tier 1—Primary Care advice and identification of those at risk, together with population-level public health interventions (via local authorities)
Tier 2—Community-based weight management interventions (commissioned by the local authority) normally in a group setting and education based
Tier 3—Specialist Multi-Disciplinary Team approach to provide individualised interventions for those with severe and complex obesity (commissioned by Clinical Commissioning Groups from 2014)
Tier 4—Specialised Complex Obesity Services including bariatric surgery (commissioned by Clinical Commissioning Groups from 2017)

physiotherapist or physical activity specialist.[3] Interventions provided at tier 3 include, but are not limited to, behaviour change strategies, physical activity promotion, dietary advice and support, including low calorie and very low-calorie diets, psychotherapy, and pharmacotherapy.[4] NICE recommends referral to tier 3 services for patients for whom specialist intervention may be needed (including the more intensive tier 4 level such as bariatric surgery) as conventional treatment has been unsuccessful or who have complex needs which cannot be adequately managed by tier 2 services.[5]

Prior to 2014, tier 3 services were the responsibility of local authorities and CCGs (and Primary Care Trusts before them) depending upon local commissioning preferences, while tier 4 was commissioned by NHS England Specialised Commissioning (see footnote 5). The 2013 NHS Commissioning Board guidelines for the commissioning of obesity surgery in severe and complex obesity tried to standardise access to tier 4 bariatric surgery, introducing a host of criteria intended to improve access to medical management prior to referral to surgeons, but also better clinical and psychological triage of those patients moving through the care pathway (see footnote 3). However, this identified a postcode lottery of availability and variation in tier 3 services across the country. A multi-stake-holder working party was set up by the Department of Health (DH) to address this issue and to look at more joined-up working. In 2014, this working party identified CCGs were identified as the preferred commissioners for Tier 3 services.[6]

[3] NHS Commissioning Board. Clinical Commissioning Policy: Complex and Specialised Obesity Surgery. 2012; Ref: NHSCB/A05/P/a.

[4] NHS England Specialised Commissioning. Commissioning Guidance to support devolution to CCGs of adult obesity services in 2016/17.

[5] National Institute for Health and Clinical Excellence. Obesity: Identification, assessment and management—clinical guideline (CG189).

[6] Report of the working group into: Joined up clinical pathways for obesity. Department of Health, April 2014.

Mapping of Commissioned Services

Attempts by Public Health England to map tier 3 services in 2015 were met with a poor response, and a contemporary survey of mainly endocrinology and diabetes consultants by the Royal College of Physicians revealed that only 60% stated that there was a tier 3 service commissioned in their area, although the response rate was poor (21%) and did not reflect all activity nationwide.[7]

In 2016, a further attempt was undertaken to map weight management services, primarily focussing on tier 3 services (Scott et al. 2018). Freedom of Information (FOI) requests were sent to all registered CCGs in England, Health Boards in Scotland and Wales, and Health and Social Care Trusts in Northern Ireland in September 2016, requesting information about their Tier 3 Obesity Service provision. Of the 208 English CCGs contacted, 201 (96.6%) provided responses, allowing for the most comprehensive mapping exercise to date. Eleven of these replied that commissioning tier 3 obesity services was the responsibility of NHS England, which is a particularly interesting finding given that tier 3 services have never been part of NHS England's remit. After further clarification, the final overall response rate to the FOI questions was 95.2% (198/208 CCGs). At the time of the request, 135/198 (68.2%) CCGs reported commissioning a tier 3 service (although no detail was given about the facilities offered and therefore how comprehensive these services were) (see footnote 8).

In April 2017, the responsibility of commissioning tier 4 services also moved to Clinical Commissioning Groups (CCGs). It was hoped that by having the responsibility for commissioning both tier 3 and tier 4 held jointly, it might encourage further investment in tier 3 to help ensure only appropriate clinical patients moved on to the more expensive tier 4 (surgical) services (see footnote 6). There is currently, however, no evidence that this has been achieved.

In 2017, a further comprehensive survey was undertaken using similar methodology and FOI requests.[8] This looked again at the provision of tier 3 services, as well as other weight management services, commissioned by CCGs and the Local Government Authorities (LGAs) between July and November of 2017. The responder rate was again high, with 88% response from CCGs and 91% from LGAs. At this time, only 98 (57%) CCGs reported having a commissioned tier 3 service, and only 124 (73%) reported that they had now taken over responsibility for commissioning tier 4, which includes bariatric surgery (see footnote 9). This means that since the responsibility for commissioning tier 4 bariatric surgery transferred to CCGs from NHS England, access to bariatric surgery has decreased, and the postcode lottery of access to this has been re-introduced.

[7] Public Health England. National mapping of weight management services—Provision of tier 2 and tier 3 services in England, 2015.

[8] Getting The Measure of Obesity Services in England; weight management service provision in England: 2017. a report by Novo Nordisk, Feb 2018.

Implications for the Future

In 2015, despite the limitations of the methodology and mapping results, it suggested that 60% of CCG areas had access to tier 3 services, and with recommendations made by the DH working party, there was hope that further investment would be incentivised to increase this coverage. The FOI data collected in 2016 did indeed show, with the most comprehensive mapping exercise to date, that 68.2% of CCG areas had access to tier 3 services, although, at that time, there was concern that some services were being decommissioned. Unfortunately, when a similar FOI mapping exercise was performed in 2017, it demonstrated that both CCGs and LAs have been decommissioning weight management services, and only 57% of CCG areas had access to tier 3 specialist weight management services.

Call to Action

This data was presented, together with other testimony, at the All-Party Parliamentary Group (APPG) meeting on Obesity held in Westminster in November 2017. As a result of this meeting, the APPG began a parliamentary inquiry into weight management services, with around 1500 evidence submissions from healthcare professionals and patients, and one of the conclusions from the group was that the NHS was failing people with obesity and called for a national obesity strategy for adults and children to tackle the "obesity epidemic".[9]

In England, there is a clear, well-defined pathway designed to provide appropriate levels of weight management intervention to those who need it. This pathway, however, is being inconsistently implemented and is certainly not being considered as a priority. Funding will always be the major barrier to commissioning services, whether it is to set them up or to continue established and successful services, along with public perception, stigma and discrimination. For the LGA, the ring-fenced public health budget has now gone, and they were quoted in the national newspapers in 2016 stating that without obesity being a mandated service, they would always have to consider reducing funding in this area if savings needed to be found. It is likely that CCG commissioners will feel the same, and until obesity does become a mandated service, with ring-fenced central Government funding, it will be difficult to ensure that obesity is prioritised.

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The Staff, Roles, and Facilities in Tier 3

14

Dale Carter and Matthew S. Capehorn

Introduction

Obesity is a modifiable risk factor for many serious comorbidities (World Health Organisation 2000) and it has recently been suggested that it is associated with causing or worsening over 200 different medical conditions (Yuen et al. 2016). Any intervention that is demonstrated to manage obesity will help prevent a wide variety of these different long-term conditions. It has recently been demonstrated that a weight management intervention, and in particular a tier 3 multidisciplinary team approach, is cost-effective (Zakeri and Batterham 2017; Brown et al. 2017; Avenell et al. 2018). Numerous examples of tier 3 services already exist, and their success has been documented (Jennings et al. 2014). One of the earliest examples of a comprehensive tier 3 service was the Rotherham Institute for Obesity (RIO), which formed the tier 3 specialist service in both the child and adult care pathways in the award-winning NHS Rotherham Healthy Weight Framework, developed in 2008, which won the overall NHS Health and Social Care award for excellence in commissioning in 2009 (see Fig. 14.1). From 2009 to 2017, RIO was commissioned to provide adult tier 3 services to anyone living in Rotherham, or registered to a Rotherham GP, that met the agreed referral criteria, and as well as providing intensive medical weight management it was conditional that any patient being considered for tier 4 bariatric surgery was assessed by RIO prior to referral in accordance with the NHS commissioning board guidelines (NHS Commissioning Board 2012).

In Rotherham it was intended that those patients requiring the Tier 3 intervention would be those who had received Tier 2 interventions but considered unsuccessful in their level of weight loss. Patients could also be referred directly to RIO via local

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In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_14

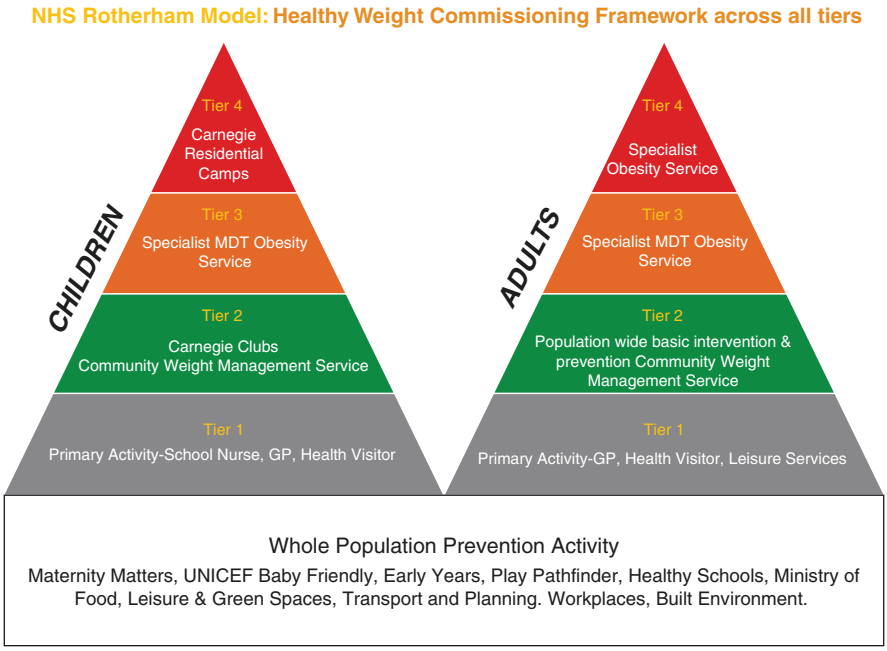

Fig. 14.1 The award-winning Rotherham Healthy Weight Framework

general practitioners, or any other allied healthcare professional, including secondary care, local pharmacists, leisure services, health visitors, school nurses, etc., if they met more specific criteria that deemed them to be particularly at risk of the cardio-metabolic consequences of obesity, such as diabetes, or need any of the more specialist intervention offered by RIO. Care pathways were developed to allow referrals for patients who may have accessed, yet been unsuccessful in, other accredited weight management programmes that may be offered locally by pharmacists or in the private sector.

The Multidisciplinary Team Approach to Weight Management

The Rotherham Institute for Obesity (RIO) has a multidisciplinary team approach to managing weight problems by providing a mix of different specialists in a single centre that can deliver different weight management approaches, based on NHS approved and evidence based interventions. This included dedicated Obesity Specialist Nurses (OSNs), Healthcare Assistants (HCAs), Dietetics input for complex dietary needs, "Rotherham Cook & Eat" skills education, Health Trainers, Talking Therapies including psychological input, Exercise Therapists who worked from an on-site gym, and a General Practitioner with a Specialist Interest in Obesity (GPwSI) for any medication issues or referrals for onward care. There are facilities to allow for group work for exercise, talking therapies, and nutritional advice. RIO

also provided the triage and assessment for all patients being considered for bariatric surgery in adults or, in the case of children, attendance at residential weight management camps that are funded by NHS Rotherham. A summary of the staff and resources offered are given in Table 14.1.

The Initial Consultation

When patient referrals were initially received they were triaged to assess which, if not all, of the services offered by RIO were required, and appointments made as appropriate. In any weight management clinic, all patients should be initially

Table 14.1 Staff and resources at the Rotherham Institute for Obesity

Job description	Role
Health trainers	Brief interventions and motivational interviewing Goal setting and life-coaching
Healthcare assistant	Weighing and measuring Follow-up care VLCD monitoring OSA screening
Obesity specialist nurse	Initial triage. Basic nutrition and advice VLCD initiation OSA screening
Dietitian	Complex dietary needs including VLCD support Pre-/post-op bariatric surgery
"Cook & eat"	Basic nutrition and advice Cooking skills (on-site kitchen facilities)
Exercise therapists	Personal exercise programme (on-site gym) Education and motivation Liaison with other local physical activity events/sites
Talking therapists	Life-coaching Cognitive Behavioural Therapy (CBT) Neurolinguistic Programming (NLP) Emotional Freedom Techniques (EFT)
GPwSI	Pharmacotherapy Pre-bariatric surgery and pre-residential Camp assessments OSA referrals
Admin supervisor	Liaison with patients, referrers, and other service providers Allocation of appointments
Clinical manager	Managing service and Clinical Governance
Education room/library	Resource room. Group work
Bariatric surgery centre	Potential for Bariatric Intragastric Balloons (BIB) and endobarriers Potential for overnight sleep studies
Other specialists	For example, obstetric pre-conception care
RIO market stall	Advice at the point of sale of fruit and veg Promotion of Healthy Weight Framework services

assessed and a full history and examination performed including parameters such as weight, height, body mass index (BMI), waist circumference, fat composition using bio-impedance scales, and blood pressure. If no recent blood tests have been performed, these are taken in order to exclude previously undiagnosed metabolic conditions, such as diabetes and pre-diabetic states, underactive thyroid, or other associated risk factors. Therefore, standard blood tests in nearly all patients include FBG/HbA1c, TFTs, LFTs, and lipid profile.

The Obesity Specialist Nurse (OSN) then has a vital role in delivering much of the vital basic information that is required for successful weight loss and prevention of weight regain. This will include:

- Basic nutrition and balanced healthy eating (e.g. using the "Eat Well" model)
- The difference between "healthy" eating and eating for weight loss
- An assessment of *energy requirements* (using the Harris Benedict or Schofield equations)
- The *hypocaloric diet*, aiming for *500 kcal deficit* each day to achieve a minimum steady weight loss even in patients where more rapid weight loss may be indicated
- The effect of the "*day off the diet*" (which can cancel out a week's worth of dieting)
- *Portion controls* (choose regular sized meals/snacks and never "go large")
- *Substituting snacks* for less calorific alternatives (e.g. an apple instead of a chocolate bar)
- *Substitute sugary drinks* for "diet" drinks or water
- Treat each *alcoholic drink* as a chocolate bar
- Awareness of high calorie low-fat foods
- Basic *behaviour therapy* techniques to avoid eating when not really hungry
- The effect of *regular* physical activity on energy requirements
- *Referral, when appropriate*, to other members of the MDT for more intensive input

Common Myths and Mistakes

Calorie counting can suit some patients, but instead it can often be more successful to look for ways in which they can save 500 kcals from their daily diet. This may be simple reduction in portion control, or a change of snacks to alternatives or substitution of particular foods in their meals. In some patients this can be easy, for example, those who tend to "go large" at a quick service restaurant. Often, patients find that a simple change from sugary drinks to "diet" drinks, or water, is all that is required to save those required calories. Many patients do not realise that alcohol has calories! Each alcoholic drink should be considered as the same as a chocolate bar.

Another common mistake that can be made is to get confused between "healthy" eating, and eating for weight loss. Unfortunately, many patients do not realise that they can put on weight by eating too much of any healthy foods. Furthermore,

patients can often get caught out at the supermarket by choosing to buy "low fat" options, when in fact these may have more calories than an alternative. Patients sometimes purchase the "premium" ranges of food at the supermarket thinking this may convey a healthier diet, when in fact these products often have a higher fat, sugar, and/or salt content.

All patients received further basic dietary and nutritional advice as well as lifestyle and exercise education throughout the length of time they are in the service. This may include basic cooking skills in order to complement nutritional advice given (provided in on-site kitchen facilities). There are opportunities to discuss other aspects of their lives, and any emotional relationship they may have with food (comfort eating, habit eating, etc.) with Health Trainers, Talking Therapists proficient in techniques such as Cognitive Behavioural Therapy (CBT), Neuro Linguistic Programming (NLP), Emotional Freedom Techniques (EFT), and Hypnotherapy, or access to a Psychologist.

Appointments could be made with an Exercise Therapist, who could help to tailor a specific exercise programme suitable for the individual (provided in on-site gym facilities), and patients were then encouraged to engage with free and subsidised local leisure facilities that have been arranged through partnerships with RIO. Many patients often believe that the reason why they cannot lose weight is because they feel they are unable to participate in physical activity. One role of the on-site exercise therapist is to educate and motivate the patient on appropriate physical activity they can do, even given any physical disabilities. On occasion it is explained to patients about the limitations of isolated physical activity on weight loss itself, with it being quite an inefficient technique for losing weight unless done on a sufficiently regular basis. However the cardiovascular benefits of physical activity are stressed in terms of overall benefit to health and reducing mortality.

Individualised Care and Group Work

Consultations are performed on a one-to-one basis in dedicated consulting rooms, although group work is available. Group sessions are a cost-effective way of presenting generic information to groups of patents when messages do not need to be individualised. This might include nutritional advice, or basic talking therapy advice. It can often be useful for group work in relation to patients being considered for bariatric surgery. Further facilities within the Institute include a dedicated meeting room which may be developed to allow educational meetings for patients or healthcare professionals. This room often provides a resource library with computer terminals, books and journals, and other educational tools.

Patients going through the RIO service were considered a success if they meet certain criteria depending on the individual. For example, for most patients this may be considered to be 3–5% weight loss at 3 months, maintained at 6 months, or minimum 5% weight loss at 6 months. For other patients it may be more, however, in the case of certain children, weight maintenance alone may be considered a successful goal.

Pharmacotherapy, Surgery, and Other Services

Patients that were to be considered for pharmacotherapy were assessed by the GPwSI for a review of their co-existing medical conditions and medications. This was an opportunity to review current medications that may be associated with weight gain (and/or hypoglycaemia in the case of patients with diabetes), and recommendations made to change them to newer, more weight-friendly, alternatives.

RIO served an important role in the pre-op and post-op care for patients requiring referral for bariatric surgery. Prior to the publication of the 2013 NHS Commissioning Board guidelines on who should be referred for consideration of bariatric surgery, and what services patients should receive in the 12–24 months prior to referral, RIO was one of the few specialist centres that already managed patients in this way. Local service evaluation showed that RIO had demonstrated a reduction in inappropriate referrals to bariatric surgical centres, and an overall cessation of the year on year increase in referrals for surgery, due to the success that the MDT approach has had on weight loss in patients with severe and complex obesity that would have otherwise required surgery.

From 2009 to 2014, RIO also served an important role in the triage of children with severe and complex obesity who were being considered for the attendance at the tier 4 residential weight management camps. Suitable patients had an assessment for underlying medical conditions, psychological issues, or any outstanding social or learning problems. As in the case of adult triage for tier 4 surgery, this process increased the likelihood of more appropriate referrals to this more intensive and expensive resource. Furthermore, whilst any children are attending the residential camps, RIO provided support and educational advice to the families of these children, to reinforce knowledge and reduce the likelihood that the child returns to an obesogenic environment.

Even though it was not part of the commissioned service and not reimbursed, RIO offered additional services for the benefit of the patient. The main example of this was screening for obstructive sleep apnoea (OSA) which included overnight oximetry in all patients that were symptomatic, had a high neck circumference, or who were patients with both diabetes and obesity. Prior to having the NHS service decommissioned in 2017, facilities were built on-site for an endoscopy suite and recovery room that could have potentially allowed the trial of endoscopic procedures such as gastric balloons and endobarriers, etc. in a primary care setting. Novel partnerships and collaboration made by RIO over the years included working with pharmacists with a particular interest in weight management, and with a local grocer who had a “RIO market stall” advertising local services at the point of sale of food.

A fully comprehensive and integrated care pathway existed in both directions through the tiers of the overall obesity framework. Results from the service were regularly audited and the overall Rotherham obesity strategy was subject to a regular monitoring process by the commissioners.

Conclusion

It is important that we appreciate that obesity is a chronic relapsing condition. Patients with obesity unable to achieve significant weight loss by themselves should be offered a range of help within a specialist multidisciplinary team service. These services should not be offered as a "cure", but rather a way of helping to manage this long-term condition.

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The Role of the Psychologist in Weight Management and Bariatric Surgery

15

Denise Ratcliffe and Michelle Wilson

There are a number of clinical practice guidelines which recommend the inclusion of specialist psychologists in weight management and bariatric surgery services (e.g. NICE Guidelines for Obesity 2014; BOMMS 2017). In acknowledgement of the complex biopsychosocial factors involved in obesity, these guidelines emphasise the importance of a multidisciplinary approach, which includes specialist psychology input. In weight management and bariatric surgery settings, psychological input is provided alongside other interventions (for example, dietetic or surgical interventions) in order to provide a holistic intervention to optimise outcomes and addresses vulnerability factors which could jeopardise long-term maintenance.

It is important to note that the role of the psychologist goes beyond providing talking therapy and includes consultation, supervision, liaison with other services, research and service development. In essence, the psychologist provides intervention across all levels of the service, from individual therapeutic input to MDT working to identifying and implementing service improvement initiatives. In this chapter, we will outline some of the key psychological issues experienced by individuals attending obesity services and then review the main roles and functions of the psychologist working in these settings.

Rationale for the Inclusion of Psychology in Weight Management and Bariatric Surgery Services

Helping individuals make, and maintain, changes to their behaviour in order to facilitate weight management or prepare and adjust to the changes integral to bariatric surgery is an important aspect of the psychologist's role. However, facilitating

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_15

behaviour change is not the only focus for psychological intervention. This is because it is important to provide psychological input for other psychological issues which may drive an individual's behaviour (see below). It is well documented that the prevalence of psychological distress and difficulties is significantly higher in individuals who are obese, compared to the general population (Kalarchian et al. 2007; Mitchell et al. 2012). These include psychological difficulties that are directly related to weight, for example, binge eating disorder as well as those that are not (e.g. personality disorder).

There are a number of psychological issues that can have a considerable impact on an individual's weight management, but which fall between the remit of general Mental Health services and Eating Disorder services. These include issues related to weight-related stigma and social anxiety, emotional eating and trauma that have affected an individual's eating behaviour or relationship to their weight/body. Issues associated with weight-related shame are prevalent and may potentially affect an individual accessing or engaging with treatment in other services. Addressing these issues can support behavioural changes that help reduce the individual's weight. However, it is important to be mindful that there are multiple ways of measuring change that might not always correspond with significant changes on the scales, e.g. quality of life, improving relationships with others in the persons system, improving engagement with health services overall. Psychologists are able to support interventions that address this wide range of outcomes and which may need to be addressed in the first instance before weight change can occur.

For the reasons outlined above, there is a need for a specialist psychologist to be embedded within the service where these psychological issues are likely to arise, particularly as they may be a barrier to engagement or change. In addition to requiring experience in working with people with mental health issues, the psychologist requires specialist knowledge of obesity, non-surgical weight loss methods, and bariatric surgery in order to provide meaningful and appropriate interventions (West-Smith and Sogg 2010).

Psychological Difficulties

The type of psychological issues commonly addressed by psychologists in weight management and bariatric surgery settings includes the following:

- Disordered or problematic eating patterns, e.g. binge eating, emotional eating, night eating, irregular eating (e.g. skipping meals during the day and just eating an evening meal)
- Impact of mood issues on eating
- Social anxiety/weight stigma
- Impact of trauma and early childhood experiences on eating
- Body image issues
- Emotional regulation/distress tolerance

- Managing dynamics within families/systems that might impact an individual's ability to engage in weight loss (e.g. family beliefs around food and eating; managing comments/discussions with others about weight and eating)

Psychological Assessment

The psychological assessment in specialist weight management and bariatric surgery settings has multiple functions—it is a tool for identifying an individual's current difficulties; identifying unmet needs; making recommendations to the wider MDT; and identifying appropriate sources of help. Psychological factors that could impede or impact upon the weight management process are identified and it is an opportunity to develop a collaborative plan to negotiate these with patients. As part of this, it is additionally a mechanism to identify which therapeutic approach might be most helpful for the patient. The assessment process also considers whether this is the appropriate or optimum time for individuals to be considering weight management. Making this an active decision helps to reduce the chance that patients engage in "another failed attempt" at weight loss, which might undermine any motivation or ability to engage with weight management at a later date. Furthermore, the assessment information gathered can be used to make recommendations to other MDT members on how their interventions can be tailored/delivered to best meet the patient's needs.

Individuals may be fearful or apprehensive about seeing a psychologist, this is often due to lack of knowledge about the role of psychologists in weight management and the perception that psychologists only work with individuals who have mental health problems. It is therefore important that the psychologist and the rest of the team demystify the role of psychology and reassure patients that the intention is to work collaboratively to help them achieve their goals.

One of the most important outcomes of the assessment is the development of the psychological formulation. This involves the co-production of a working model, which summarises and makes links between the psychological, behavioural and emotional factors that have contributed to, and maintain the individual's current difficulties. A psychological formulation usually focuses on the interactions between different issues and responses—for example, eating may have become a coping mechanism for managing anxiety but as weight increases, this leads to anxiety and avoidance, which serves to maintain the problematic eating behaviour. This process of developing a psychological formulation is an intervention in its own right. Often when clients start to develop a meaningful understanding of the links between their past experiences (including the historical origin and psychological function of their eating behaviour), and their current triggers and psychological and behavioural reactions to these, they can start to decentre from the process. This can support them to make meaningful changes and achieve the goals they have set for their weight management.

Direct Input with Patients

The type of psychological approach obviously needs to be based on the individual formulation as well as the goals and focus of therapy. These are the most commonly used therapeutic approaches in weight management:

- Cognitive Behaviour Therapy (CBT)
- Acceptance and Commitment Therapy (ACT)
- Mindfulness approaches
- Compassion Focused Therapy (CFT)

ACT and mindfulness approaches can be helpful in managing distress tolerance and reducing experiential avoidance (i.e. trying to "get rid" of internal experiences such as thoughts and emotions). This can be helpful in reducing emotional eating episodes. CFT can be particularly useful for individuals presenting with high degrees of self-criticism and shame—this may relate to their eating patterns, (eating) behaviours or to previous life experiences which may have affected their eating patterns and behaviours in the here and now.

Therapy options are discussed with patients and an explanation given as to the suggested therapy approach. As stated above, this is based on the psychological formulation developed through the assessment and goals of the patient.

Different Modes of Delivery

Psychological input can be delivered in different ways, depending on the complexity of the patient and the focus of the work. For some presentations, individual input is more appropriate. Group work can be a very useful tool (particularly as it has the added advantage of built-in peer support) and these can be purely psychological or group programmes that involve other members of the MDT.

A stepped care model can be a cost-effective and pragmatic way of increasing access to psychological input. This may mean using self-help resources or guided self-help; delivery of more standardised and less complex interventions by junior members of staff (e.g. assistant psychologists); and qualified psychologists providing interventions for those with more complex presentations with high levels of comorbidity. This means that interventions are provided at different levels depending on the needs of the patient.

Psychoeducation About Obesity and Weight Stigma

The psychologist can play an important role in providing psychoeducation (to both individuals with obesity and other health professionals) about the causes and mechanisms driving obesity to challenge the view that individuals have "failed" because they have been unable to lose/maintain weight loss. This can help to tackle self-blame and internalised stigma. Individuals have often followed multiple diets and been actively engaged in trying to lose weight for decades. They are often stuck in

a "dieting mindset" which involves all-or-nothing approaches to dieting rather than trying to identify a long-term sustainable eating plan. Furthermore, this means that it can be difficult for individuals to be realistic about the challenges of maintaining weight loss and the fact that specific skills are required. Addressing this and the stigma associated with obesity can support patients to take a longer-term view and approach to their weight management.

Liaison with Other Services

Individuals with complex obesity are often receiving input from multiple services—this may be physical health, mental health or both. Joined up working between services in order to meet the individual's goals and hopes can greatly improve a patient's engagement and response to treatment. Psychology plays a key role in this by obtaining, sharing and integrating information, which can improve the delivery of weight management interventions. As an example, gaining information from mental health services on how best to support and engage the individual within the context of their mental health needs.

In addition, through assessment, weight management psychologists can develop an understanding of the individual's relationship with other health care services and how this may impact engagement with the weight management team itself. Sharing this understanding can facilitate the patient's engagement with the service through allowing the team to understand how best to engage them but also through helping raise their own awareness so that they can build better relationships with the team.

Furthermore, individuals may well present with complex social care needs. Psychologists are well placed to communicate these needs and the impact they have on the patient's engagement with healthcare treatment as well as indicating how addressing these needs may facilitate their ability to navigate treatment effectively.

Alongside to the above, psychologists are well placed to work with other services to improve their understanding of obesity and its treatment—actively challenging obesity stigma and highlighting the importance of actively considering an individual's physical health alongside their mental health within mental health services. Furthermore, patients may often have unmet mental health needs which do not relate directly to their weight management but may impede attempts to address it. These can be overlooked, as the focus remains on weight loss. Psychologists can support onward referrals to appropriate services to meet these needs, which often allows patients to engage with weight management interventions and self-care more effectively.

MDT Working

MDT working is essential to effective delivery of weight management programmes, with all professional groups adding valuable perspectives to the treatment delivered. Not all patients who access weight management services will require direct

psychology input; however, psychologically informed support can facilitate their engagement in treatment and ensure it is tailored to meet their specific needs. As discussed above, psychological formulation is an understanding of the patient's specified needs and how best to approach the work needed to support them. Through case discussion in MDT meetings, psychologists can offer advice and suggestions to other professionals on how to approach a particular piece of work with a patient based on this psychological formulation.

In addition, psychologists often provide clinical supervision to other MDT members to discuss casework as well as common themes and challenges to the work they specifically deliver. This supervision provides a psychological perspective of these issues and can support other professionals to more routinely consider psychological and social aspects of a patient's presentation, and develop skills in how to negotiate these issues within their work. This supports patient-centred care, informed by their specific needs, and allows all patients who access weight management services to receive psychologically informed treatment, even if they do not meet with the psychologist directly.

Specific Issues in Tier 3 Specialist Weight Management Services

Weight assessment and management clinics (referred to in the UK as Tier 3 services) provide input and links between lower level population/lifestyle intervention services (Tier 1 or 2) and specialist bariatric surgery services (Tier 4). They offer an MDT approach for individuals with complex obesity presentations where multiprofessional assessment and treatment is required to support them to make changes (BOMMS 2017). Many patients are keen to make changes to their weight non-surgically and often feel trapped in a cycle of yo-yo dieting and hopeless about making sustainable and manageable changes to their weight. In addition, they often have unrealistic expectations set for them about how much weight loss is necessary to achieve in order to improve their health and well-being. Tier 3 services offer an alternative approach, which tries to understand individual barriers to weight loss alongside adjusting patient expectations for weight loss and how to approach this. Patients report greatly valuing the opportunity to consider these factors, most notably the emotional aspects of weight management, as well as identifying ways to manage the internal and external triggers to eating behaviours (Public Health England 2017).

Psychology plays a key role in this by helping the team and individual patient understand factors that may be contributing to their difficulties, and how these affect change. In addition, much work is required to support patients with weight loss maintenance—helping patients shift their approach from a diet-focused one to that of sustainable and manageable changes with associated behaviours, such as changes to eating and activity. Furthermore, psychology can support patients to consider how to adjust to a change in their identity, which can occur alongside weight loss—successful negotiation of this can foster longer-term maintenance of changes made whilst under the care of the Tier 3 service. This is key given that obesity is a long-term health condition that requires ongoing management and maintenance.

Specific Issues in Bariatric Surgery

Previously, the psychological assessment was viewed as a tool to identify suitable and unsuitable individuals prior to bariatric surgery but this is now considered to be an outdated and non-evidence based approach (Sogg and Friedman 2015). The role and function of the psychological assessment in bariatric surgery has evolved to identify readiness for surgery and potential vulnerabilities that may impact on an individual's weight loss and psychosocial outcome following surgery and to develop recommendations and interventions based around these. Pre-operative interventions are provided in order to prepare individuals and to mitigate risk factors, e.g. emotional eating. It is important that post-operative psychological input is available as there are a number of significant complications including increased rates of alcohol dependency (King et al. 2017) and suicide (Neovius et al. 2018). Aside from these high-risk scenarios, all individuals undergo significant changes in weight, eating, body image, relationships, confidence following bariatric surgery and it is inevitable that these require psychological adjustment and present challenges which need to be negotiated. A subgroup of individuals after bariatric surgery develop restrictive eating disorders (Conceição et al. 2013) or have a relapse of binge eating and this is associated with suboptimal weight loss (White et al. 2010). The massive weight loss that often occurs following surgery can lead to issues with body image, particularly when excess skin is a problem (Kitzinger et al. 2012).

Service Evaluation and Development

Research is continually improving our understanding of obesity and as such, treatments need to be adjusted and refined to offer the most effective support for patients. The training that psychologists have in research and service development puts them in a good position to support teams to evaluate their treatment, the outcomes of it and support innovative new approaches. Service user involvement is key as part of this and should be incorporated as part of these developments. Having psychology embedded in weight management services can support teams to take a critical approach to the treatment they offer by continually evaluating it and adjusting it in line with service user needs and research developments as they occur.

Summary

This chapter summarises the multifaceted role that psychology has within weight management and bariatric services. Contrary to popular understanding, psychology is able to offer not only directly therapy interventions with clients, but also takes on a range of indirect work through other members of the team to help support service delivery and treatment offered (e.g. supervision and consultation).

The expertise that psychologists have in mental health as well as their specialist knowledge of obesity, non-surgical weight loss methods and bariatric surgery allows

psychologists to work effectively with the high levels of complexity that arise within obesity services. Overall, having psychology embedded in these services can greatly facilitate engagement and outcomes for clients who access these services and should be considered when planning and setting up such teams.

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Dietary Impact on the Prevention and Management of Obesity

16

Trudi Deakin

"You don't drown by falling in water. You drown by staying there"—Anonymous

The nation is getting fatter and currently two-thirds of the UK population are overweight and 26.9% are obese (OECD 2017). The prevalence is set to almost double, with one in every two or three adults projected to be being obese by 2030 (Wang et al. 2011). The common thought is that this is due to the nation eating more and exercising less. The energy balance theory suggests that if people consume more calories than they burn, they will gain weight and if they eat fewer calories than they expend, they will lose weight. However, there are several problems with this theory:

1. It does not consider the difference between food calorimetry in a lab (determining the number of calories per gram of food) and food metabolism in the body (how calories are processed and either used as energy or stored).
2. Telling people to simply *eat less* is not the answer to sustainable weight loss. Reducing calorie intake (eating less) can slow ones basal metabolic rate, i.e. reduce the amount of calories the body burns, because the body thinks it is being deprived and goes into dietary starvation mode.
3. Advising people to *move more* as a sole strategy for weight loss is not the answer. Increasing physical activity can stimulate hunger hormones such as ghrelin, which will increase appetite (Cameron et al. 2016), and rarely compensates for excess calories consumed from food and drinks—you can't outrun a bad diet! (Malhotra et al. 2015)

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_16

These flaws are why traditional diets, which often lead to weight loss in the short term, are ineffective in the longer-term. The weight regain frequency overshoots the initial weight resulting in the person being heavier after the diet than they were beforehand. The person often blames themselves for the failure and when they redeem the motivation to lose weight, they frequently do exactly the same but believe that they will just try harder. On each occasion that they attempt to lose weight with a reduced calorie, low fat high carbohydrate diet, they may further reduce their basal metabolic rate and this could result in their energy expenditure dropping to match the new energy intake and the reduced energy expenditure can be as much as 500 calories per day (Fothergill et al. 2016).

Some people find it helpful to monitor their calorie intake. On average, women require 2000 calories each day and men require 2500 calories. However, one limitation with calorie counting is the lack of recognition that weight gain is regulated by hormones and not calories. Hormones regulate fat storage (lipogenesis), fat usage (lipolysis), hunger, and satiety (Taubes 2013; Kersten 2001; Choi et al. 2010). It is much more important to consider the quality of foods consumed than count calories.

The food we eat contains several nutrients. Some nutrients provide energy (calories) and these are called macronutrients. The three main macronutrients are *carbohydrate, protein, and fat*. Micronutrients supply the body with nutrients but no calories. The two classes of micronutrients are *vitamins and minerals*. Our health is largely determined by the amount of nutrients the body absorbs. Too many or too few of certain nutrients can cause harm. Some nutrients are essential to life, meaning that the body cannot synthesise them and therefore they must be consumed. There are some essential fatty acids (from fat), amino acids (from protein), and many vitamins and minerals that are vital. Traditional wisdom believes that carbohydrate is essential, but this is not true because if we do not eat carbohydrate, we can make it in the body from either protein or fat. Humans can survive without an exogenous (dietary) supply of carbohydrate as 0.56 g of glucose can be derived from every 1 g of protein ingested and 0.1 g of glucose can be derived from every 1 g of fat ingested, a process called gluconeogenesis. Thus, the lower limit of dietary carbohydrate essential for life is zero, provided that adequate amounts of protein and fat are consumed (Institute of Medicine of the National Academies 2005).

One of the main hormones involved in internal fat regulation is insulin. There is emerging evidence that elevated insulin levels result in energy being trapped in fat cells (adipocytes), decreasing energy availability. Thus, if fewer calories are being consumed, the body has no option but to go into dietary starvation mode, stimulating hunger and conserving energy, i.e. slowing down the basal metabolic rate (Ludwig and Ebbeling 2018).

This chapter presents an alternative strategy to the low calorie, low fat diet for sustainable weight loss. It aims to address one of the underlying problems of fat storage and obesity: high insulin levels and insulin resistance. The amount and type of macronutrients consumed as well as eating frequency will impact insulin levels. Carbohydrate is the nutrient that elicits the greatest rise in insulin levels, this nutrient

should be restricted to tolerance levels, i.e. to a level whereby an individual is able to achieve their weight loss and health goals. Although protein generates the greatest satiety value, some proteins do directly rise insulin levels and therefore protein should be consumed in moderation. Fat has minimum impact on insulin levels and this nutrient should become the preferred energy source. However, fat calories can be supplied from either the diet or the adipose tissue. If weight loss is too rapid, this suggests that insufficient fat is being supplied from the diet and too much from the stored body fat. If weight loss plateaus, this would suggest that too much fat is being consumed and fat stores are being maintained.

Food Groups

The five main food groups that contribute to our daily intake are: fruit and vegetables; carbohydrates; milk and dairy; protein; fats.

- *Fruit and vegetables* provide a variety of vitamins and minerals and fibre. Many of the vitamins are antioxidants that help to halt cell damage that leads to heart disease, stroke, and some cancers. Minerals are required for many essential functions in the body.
- *Carbohydrates* are a source of energy. Starchy foods supply the body with glucose whereas sugary foods supply both glucose and fructose. Natural unprocessed carbohydrate can also contribute fibre, calcium, iron, and B vitamins. However, processed and refined carbs are nutrient poor.
- *Protein foods* are essential for growth and repair of the body and increase feelings of fullness, following consumption.
- *Milk and dairy foods* provide us with calcium which is essential for healthy bones.
- *Fats* are nutrient dense, providing us with many essential nutrients, and they are also a great energy source. Fat often adds taste to food and creates satiety (the feeling of fullness).

Carbohydrate to Tolerance

All of the food groups can potentially contribute to your daily intake of carbohydrate, in the form of starch and/or sugars.

- Fruits contain natural fruit sugars and vegetables contain small amounts of starch.
- Carbohydrates such as bread, potatoes, rice, and cereals are sources of starchy carbohydrate. Sugary carbohydrates are obtained from drinking sugar-sweetened beverages, fruit juice, and sweet foods such as sugar, candy, biscuits, cake, and desserts.
- Protein foods, such as meat, fish, and eggs do not contain any carbohydrate unless they are processed in some way, for example, added breadcrumbs or batter. Protein such as pulses, e.g. beans and lentils contain starchy carbohydrate.

- Milk and dairy foods contain natural milk sugars called lactose (excluding hard cheese which is virtually carbohydrate free).
- Fats in their natural form, e.g. butter, lard, oil, fat on meat, cream, or cocoa solids are virtually carbohydrate free but as soon as fat is processed by adding flour and sugar to make biscuits or cake; sugar and milk to cocoa to make chocolate; or potato to make chips and crisps it becomes quite carbohydrate dense.

A small slice of bread contains around 15 g of carbohydrate. It is easy to compare the quantity of carbohydrates in other foods to that in a slice of bread. For example, three teaspoons of sugar, a small [130 g] apple or 300 ml of milk provide the same quantity of carbohydrate as a small slice of bread. Figure 16.1 illustrates some carbohydrate foods that may be consumed throughout day.

STARCH is made up from lots of units of glucose. The glucose is released into the blood at different rates depending on other nutrients present within the food.

GLUCOSE is a simple unit which is absorbed very quickly in the gut, causing a rapid peak in blood glucose levels.

SUCROSE, generally known as SUGAR, is made from glucose and fructose. It is used in drinks, confectionery, and baked goods.

FRUCTOSE, often called FRUIT SUGAR, is also found in fruit as well as being one of the building blocks of sucrose.

LACTOSE, another type of sugar which is found in milk and milk products, is often referred to as MILK SUGAR. It is made up of glucose and galactose. Some people may struggle to digest this type of sugar.

The building blocks of carbohydrates are as follows and are illustrated in Fig. 16.2 below.

When starchy food digests it is broken down into glucose which is released and absorbed into the blood stream causing a rise in blood glucose levels. Therefore, the more carbohydrate (starch or sugar) consumed, the greater the impact on glycaemia. Only 3–7 g of glucose is contained in the entire blood circulation at any one time in individuals with normal glucose tolerance and therefore the glucose needs to be cleared from the blood rapidly after a carbohydrate containing meal or snack. When blood glucose levels rise, insulin is released from the pancreas into the blood where it enables glucose to enter body cells where it can be converted into energy.

Fructose and galactose have a slightly different metabolic pathway. They are initially transported to the liver, converted into glucose and stored as glycogen. Between meals or overnight when blood glucose levels start to dip, the glycogen is broken down into glucose and is released into the blood to restore glucose levels to normal. The liver can release between 6 and 25 g of glucose per hour (Webster et al. 2016). When glycogen stores become full, any excess carbohydrate is then converted into fat, a process called de novo lipogenesis. The scientific name for fat is triglyceride. Therefore eating carbohydrate to excess results in the production of triglyceride that is either stored in the adipose tissue, in and around the organs such as the pancreas and liver, or in the blood, increasing blood triglyceride levels (Volk et al. 2014; Volek et al. 2012; Sevastianova et al. 2012).

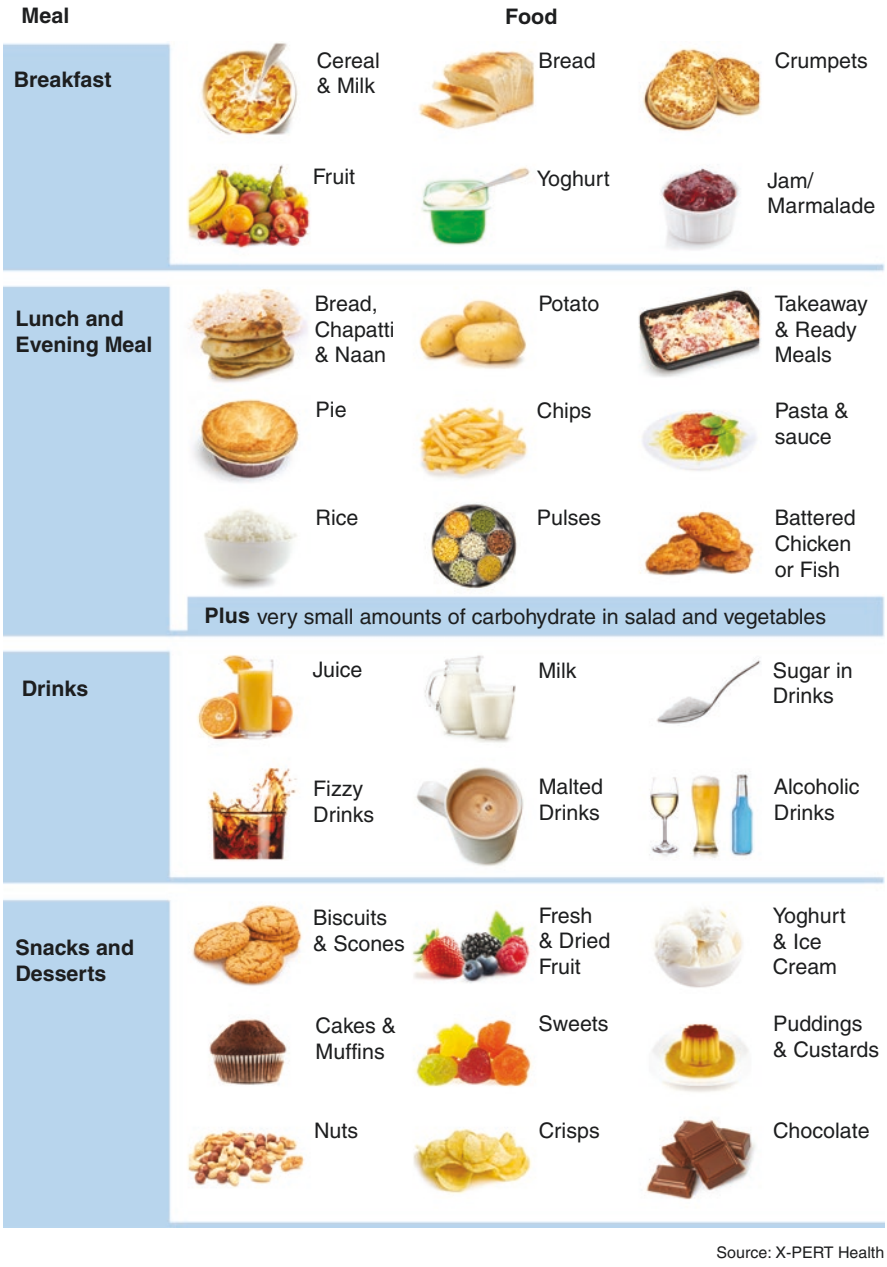

Fig. 16.1 Sources of carbohydrate

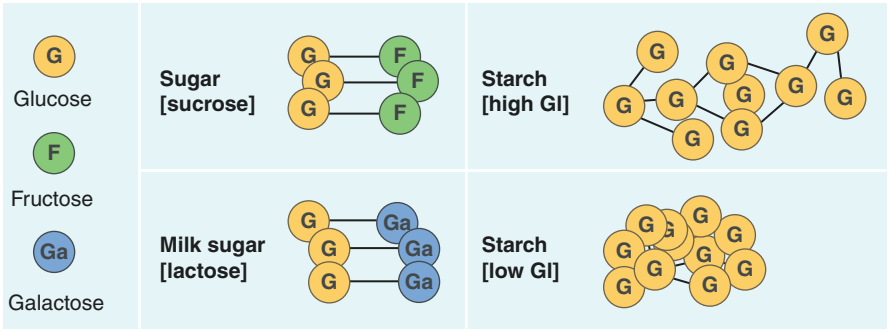

Fig. 16.2 Building blocks of carbohydrate

Glycaemic Index

Different carbohydrate foods have varying effects on blood glucose and can be ranked using the glycaemic index (GI). As stated above, a small slice of bread, three teaspoons of sugar, a 130 g apple and 300 ml milk all contain the same amount of carbohydrate—15 g. However, the speed in which they release the glucose and raise blood glucose levels and thus, insulin levels, is very different. Bread has the quickest impact because the modern milling process grinds the grain to a very fine consistency so that the glucose can be rapidly released in the digestive track and adsorbed into the blood, causing a greater peak in insulin levels. Some breads such as granary and wholegrain release glucose slightly slower because they have not been processed to the same extent. As a general rule of thumb, the more processed the food, the quicker it digests and releases its glucose. Lucozade™, glucose tablets, old potatoes, processed and refined cereals such as Cornflakes™ and Rice Krispies™ and rice are also quick-releasing carbs.

Sugar is classed as a medium-releasing carbohydrate as well as most sugar containing foods such as jam and fizzy drinks. This is because sugar or sucrose (to give its correct name) contains equal amounts of glucose and fructose. Fructose is stored in the liver either as glycogen or triglyceride so only 50% of the sucrose molecule directly impacts on blood glucose and insulin. This does not imply that sugar is healthier as the amount of sugar consumed has the greatest impact. There is emerging evidence that fructose can be detrimental to health by stimulating insulin resistance and non-alcoholic liver disease by stimulating hepatic de novo lipogenesis (accumulation of fat within the liver) (Jensen et al. 2018). Other medium-releasing foods include Weetabix™, shredded wheat, new potatoes, sweet potatoes, and basmati rice.

If carbohydrate food breaks down slowly, there will be a slower rise in blood glucose levels, which will allow the body to handle the glucose load better, without stimulating the same surge in insulin. Examples of slow-releasing carbohydrates include: many vegetables; milk and yoghurts; nuts, seeds, and pulses; steel-cut porridge and some mueslis.

There are many factors that can account for the GI of different foods and these are summarised below:

Physical form: Generally, the more processed a food, the higher its GI. For example, instant oatmeal has a GI of 79, whereas steel-cut rolled oats has a GI of 55.

Food combinations: When carbohydrate foods are eaten as part of a meal, the GI of the meal changes based on the average of all the GI values factored together.

Cooking time: Longer cooking times may increase the glycaemic impact of a food by breaking down the starch or carbohydrate and allowing it to pass through the body more quickly when consumed. Pasta cooked al dente (for 5–10 min) has a slightly lower GI than pasta cooked longer.

Acidity: The more acidic a food is (e.g., pickled food or those containing vinegar or lemon juice), the lower the GI. For example, sourdough bread, which uses a lactobacillus or lactic acid culture as part of the leavening process, has a lower GI than white bread.

Physical entrapment: The fibrous coat around beans, seeds, and plant cell walls in whole grains acts as a physical barrier, slowing access of digestive enzymes to break down the carbohydrate. Thus, many whole grains and legumes have a lower GI.

Protein/fat: Adding protein or fat, which have minimal effects on glycaemic excursions, to a high-GI food will decrease the GI of that food. For example, adding cheese to a slice of bread would decrease the GI.

Soluble fibre: In general, the higher the food is in viscous or soluble fibre, the lower its GI will be. By increasing the viscosity of the intestinal contents, the interaction between the starch and the digestive enzymes is slowed, resulting in slower and lower glycaemic excursions. Beans are a great example of a food high in soluble fibre.

Replacing some high-GI foods with low GI foods has been shown to lead to health improvement (Thomas 2009; Schulze et al. 2004). Despite the quantity of carbohydrate remaining as the primary focus, it is also useful to consider the type of carbohydrate. Glycaemic load can be calculated by multiplying the glycaemic index of a food by the grams of carbohydrates consumed. The International Tables of Glycaemic Index and Glycaemic Load lists information for more than 2400 food items and are acknowledged as the go-to source for the most scientific information (Atkinson et al. 2008).

The Level of Carbohydrate Restriction

The UK Reference Intake for carbohydrate is 260 g per day. This quantity of carbohydrate may be above the tolerance range for some people, eliciting hyperinsulinaemia (high insulin levels) and weight gain. A Mediterranean dietary approach contains up to 200 g per day of wholesome slow-releasing carbs. A low carbohydrate diet contains less than 130 g, whereas a very low carbohydrate, ketogenic diet, contains fewer than 50 g per day (Feinman et al. 2015). If an individual consumes carbohydrate above their personal threshold, this may lead to hyperinsulinaemia,

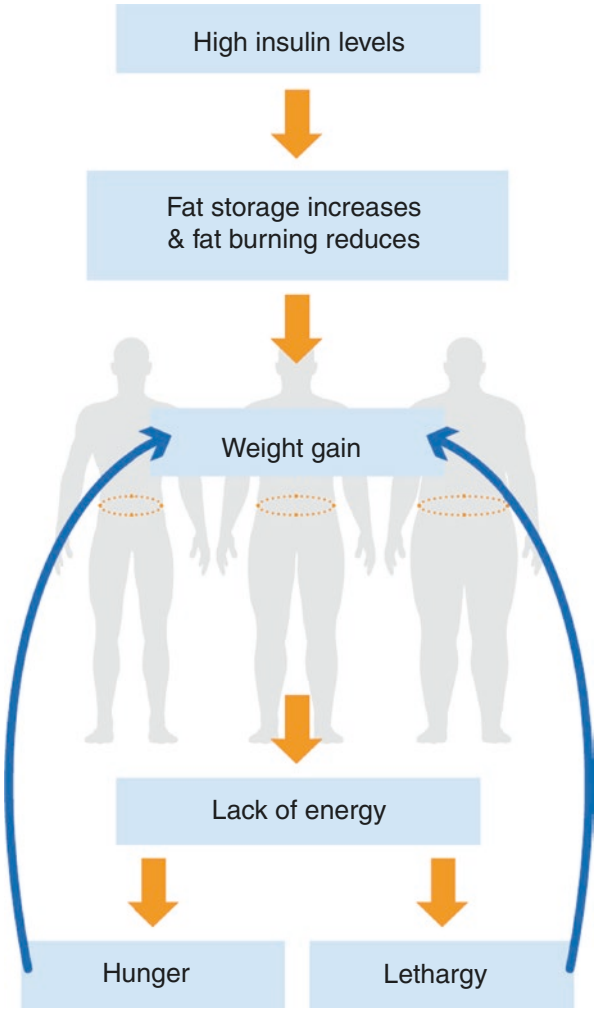

Fig. 16.3 The consequence of hyperinsulinaemia

hunger, and sedentary behaviour (see Fig. 16.3) ultimately increasing the risk of developing obesity, non-alcoholic liver disease, and Type 2 diabetes (Sevastianova et al. 2012; Chiu et al. 2014; Georgoulis et al. 2014).

High insulin levels, and the resulting lipogenesis, cause the cells to resist the action of insulin. This is defined as insulin resistance (Henry et al. 1993) (see Fig. 16.4). This exacerbates the problem resulting in a vicious cycle of hyperinsulinaemia, insulin resistance, and an inability to utilise stored energy resulting in per person experiencing hunger, lethargy, and potentially further weight gain.

Insulin levels are not routinely measured in the UK and therefore the only way to ascertain whether high insulin levels and insulin resistance are present is by monitoring the metabolic syndrome indicators (Alberti et al. 2005). If three or more

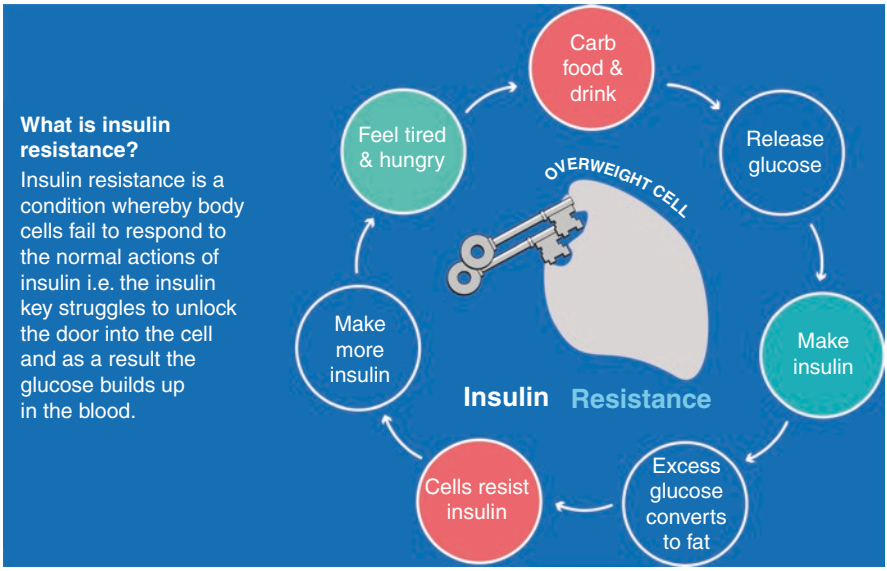

Fig. 16.4 Aetiology of insulin resistance

of the five indicators are outside the international cut points, it suggests that that individual is experiencing hyperinsulinaemia and insulin resistance (see Fig. 16.5). Considering the amount and type of carbohydrate consumed can improve these indicators.

Protein in Moderation

Protein should be a central part of a complete diet for adults. While physical growth occurs only for a brief period of life, the need to repair and remodel muscle and bone continues throughout life. Maintaining the health of muscle and bone is an essential part of the ageing process and critical to maintain mobility, health, and the active tissues of our body. Protein requirements increase during periods of reduced food intake such as weight loss or during periods of recovery after illness or during ageing. Protein needs for adults relate to body weight. Dietary protein need is often presented as a percentage of energy intake. The Reference Nutrient Intake (RNI) is set at 0.75 g of protein per kilogram bodyweight per day in adults (SACN 2011). Protein requirements are frequency promoted as being 15–20% of energy intake but protein needs are actually constant across all energy intakes. So at low energy intakes, protein needs to be a higher percentage of total calories and at high energy intakes protein can be reduced as a percentage of total calories.

Protein is an important part of good nutrition at every meal. Vitamins and minerals can fulfil nutrient needs on a once-per-day basis but for protein the body has no ability to store a daily supply. To maintain healthy muscles and bones for adults, at

Fig. 16.5 Definition and cut points for the metabolic syndrome

Metabolic Syndrome

The metabolic syndrome is deined as having three or more of the risk factors below. The international cut points are:

Increased waist size: Greater than 94 cm in Caucasian men and greater than 80 cm in Caucasian women, or greater than 90 cm in South Asian men and greater than 80 cm South Asian women

Raised triglycerides: Greater than 1.7 mmol/l (or on medication to reduce triglycerides)

Reduced HDL-cholesterol: Less than 1.03 mmol/l in men; less than 1.29 mmol/l in women (this is different to the standard HDL-C cut points, see page 160)

Raised blood pressure: Systolic greater than 130 mmHg; Diastolic greater than 85 mmHg (or on medication to reduce blood pressure)

Raised fasting glucose: Fasting plasma glucose greater than 5.6 mmol/l

Source: X-PERT Health

least 30 g of protein should be consumed at more than one meal (Layman 2009). Breaking a fast (overnight or after intermittent fasting) is an important meal for dietary protein because the body is in a catabolic state. Protein is also critical for regulation of appetite and daily food intake (Weigle et al. 2005).

However, consuming protein to excess can be detrimental for two reasons:

1. Some proteins can directly stimulate insulin.
2. Surplus protein cannot be stored and some may be converted to glucose, further stimulating insulin.

Fat to Satiety

Fat is an indispensable building material for every single cell. It also serves as the primary energy reserve in humans and animals. The storage and transportation form of fat is called triglyceride. Each triglyceride molecule is composed of one glycerol and three fatty acid molecules. Free fatty acids are also components of cell membranes, precursors for many biologically active molecules, and direct substrates for energy production.

There are three different types of fat. The terms saturated, monounsaturated, and polyunsaturated fats refer to the number of double bonds between carbon atoms (see Fig. 16.6).

There are 36 types of saturated fatty acids (SFA) differing in chain length from 3 to 38 carbons, 8 types of monounsaturated fatty acids (MUFA), 16 to 24 carbons

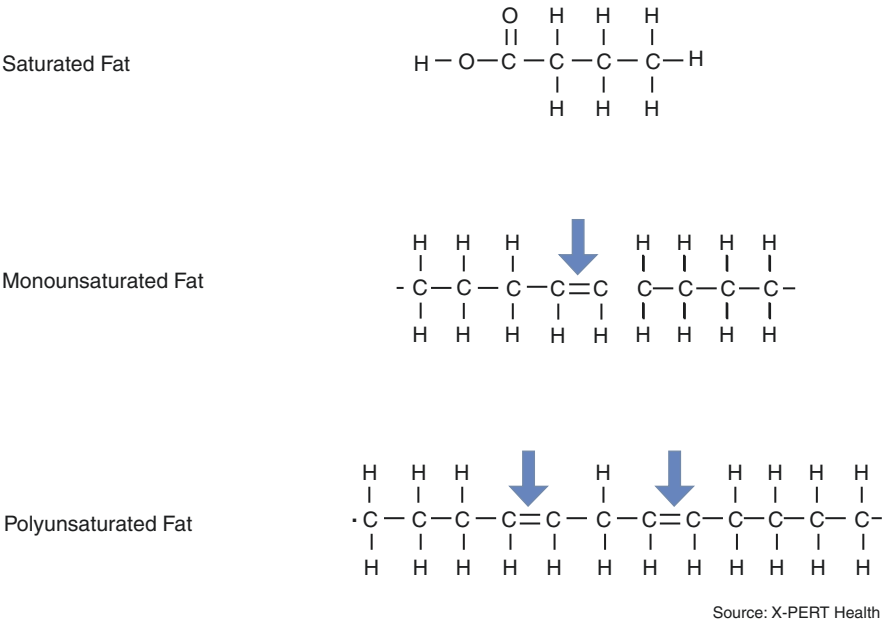

Fig. 16.6 Three classes of fatty acids

with one double bond, and 10 types of polyunsaturated fatty acids (PUFA), 18 to 22 carbons with two to six double bonds. Saturated fats, which are mostly from animal sources, have single bonds between the carbons and all the carbons are bonded to the maximum number of hydrogens possible. The chains in these fatty acids are straight and can pack closely together making these fats solid at room temperature. Oils, mostly from plant sources, have some double bonds between some of the carbons causing bends or "kinks" in the shape of the molecules and are called unsaturated fats. Because of the kinks, unsaturated fats cannot pack as closely together making them liquid at room temperature. These bonds can easily be oxidised and this can make the oil rancid. To control this, food manufacturers sometimes use hydrogenated vegetable oils. Hydrogenation is a chemical process that adds hydrogen atoms to the available double bonds in the vegetable oil converting "cis" double bonds to "trans" double bonds, producing *trans* fatty acids (Willett and Ascherio 1994).

All fats have equal calories (9 calories per gram) but they work differently in the body. No food contains 100% of one type of fatty acid or triglyceride but we tend to categorise foods as having either greater proportions of either saturated, polyunsaturated, or monounsaturated. Contrary to popular belief, pork fat (lard) has more unsaturated fat than saturated fat and beef fat (dripping) has equal amount of saturated and unsaturated fat. Olive oil, although classified as a monounsaturated oil, contains 14% saturated fat (see Fig. 16.7).

The number of carbon atoms in fatty acid chains is also important. Most of the fatty acids in living organisms have an even number of carbons. Fatty acids with less than six carbons in their chains may collectively be called short-chain fatty acids.

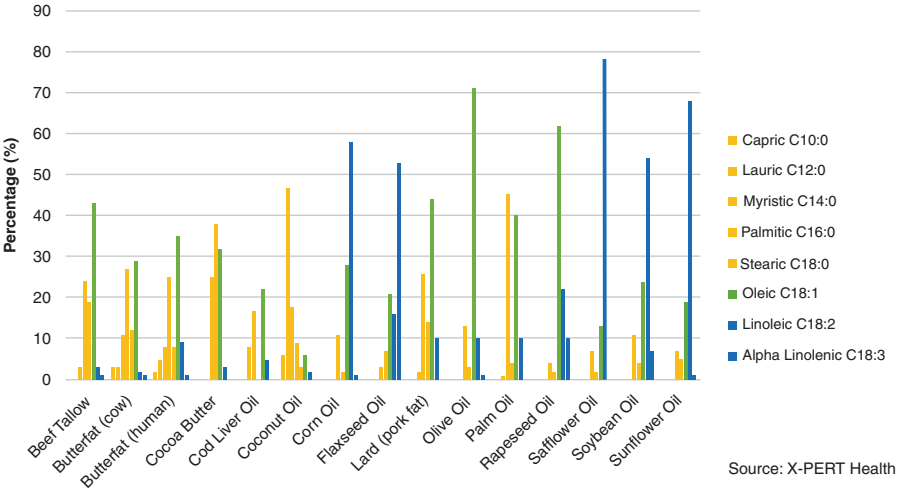

Fig. 16.7 MUFA (green), SFA (yellow), and PUFA (blue) composition of fats and oils

Those with 6 to 12 carbons are medium-chain fatty acids, those with 14 to 22 carbons are long-chain fatty acids, and those with over 22 carbons are the very-long-chain fatty acids. Short- and medium-chain fatty acids are rapidly oxidised as fuel rather than stored as fat, whereas long-chain fatty acids are more likely to be stored in adipose tissue.

The foods which are the main sources of saturated fat are butter, ghee, cream, cheese, and chocolate. Foods high in omega-6 polyunsaturated fat are oils like sunflower, safflower, sesame, corn, soya, linseed, or grapeseed and spreads labelled "high in polyunsaturates". Foods high in omega-3 polyunsaturated fat is oily fish such as salmon, mackerel, and sardines; nuts and seeds such as walnuts, Brazil nuts, pine nuts, sunflower, and sesame seeds. The foods that are the main sources of monounsaturated fat are olive and rapeseed oil. However, it is better to purchase extra virgin or cold-pressed varieties as the standard versions have been highly processed with the use of heat and solvents that can destroy the beneficial properties of the oil. This also applies to spreads made out of these oils. Monounsaturated fat is also found in peanut or groundnut oils, butter and lard, and in nuts such as peanuts, almonds, cashews, Brazil nuts. Monounsaturated fat is more stable in the body than polyunsaturated fat, which is more prone to oxidation. Oxidation causes free radicals that can lead to cell damage increasing the risk of heart disease and cancer.

Dietary fat (triglycerides) cannot be absorbed by human cells directly. They must be broken down first through a series of processes that require enzymes called lipases. Dietary fat is mainly transported in a protein transporter called a chylomicron.

There is no evidence for the beneficial effects of reduced or modified fat diets in the prevention of heart disease (Harcombe et al. 2016). Recommending higher intakes of omega-6 polyunsaturated fatty acids in replacement of saturated fats is not associated with risk reduction. Recent research indicates that saturated fat, particularly in dairy products and coconut oil, can improve health (Khaw et al. 2018; Forouhi et al. 2014; Gao et al. 2013). The evidence of omega-6 polyunsaturated fatty acids (PUFAs) promoting inflammation and augmenting many diseases continues to grow, whereas omega-3 PUFAs seem to counter these adverse effects (Ramsden et al. 2010). The replacement of saturated fats in the diet, with carbohydrates, may have resulted in increased obesity and its associated health complications (Dehghan et al. 2017; Grasgruber et al. 2016). The adverse health effects that have been associated with saturated fats in the past are most likely due to other factors and there is a need for a re-evaluation of existing dietary recommendations that focus on minimising dietary saturated fats.

When carbohydrate intake is restricted and moderate protein consumed, fat either supplied from the diet or utilised from body fat stores becomes the primary fuel for energy. Individuals who aim to maintain their body weight will need to

increase dietary fat (if following a low carb, high fat dietary approach). Individuals who wish to lose weight, will fuel from their stored fat. It is recommended that dietary fat is obtained from foods that have been minimally processed such as extra virgin olive oil or cold-pressed rapeseed, coconut oil, avocado, eggs, butter, lard, dripping, and tallow.

Eating Frequency

We have changed from a nation consuming three meals per day with no snacks to grazing throughout the day. Increased frequency of eating and the consumption of a large amount of quick-releasing carbohydrate can cause repeated surges in blood glucose and insulin. Moreover insulin levels should be able to return to a fasting state between meals.

A longer overnight fast and reduced frequency of eating has been shown to be beneficial to health Reducing eating frequency to three or fewer meals per day will help to reduce insulin levels and insulin resistance (Hankey et al. 2015; Davis et al. 2016; Kahleova et al. 2017) (see Fig. 16.8).

Eating the same amount over a shorter period of time (6 hours compared to 12) has also been shown to be beneficial for insulin regulation and sensitivity (Sutton et al. 2018).

Summary

Adopting a low calorie, low fat diet may still lead to consuming carbohydrate above ones' personal threshold level. The resulting high insulin levels promote lipogenesis (fat storage) and prevent lipolysis (fat usage). This can be described as starvation in the mist of plenty where there is excess energy stored as fat within the body but it cannot be utilised as an energy source. As calories consumed are also being restricted, there is insufficient energy to fuel the body. The body then compensates and goes into dietary starvation mode and slows down the basal metabolic rate to conserve energy. Thus, although a low calorie diet may be successful in the short term, the weight loss will eventually plateau and weight regain is a frequent consequence. The "eat less, move more" message is less likely to lead to sustainable weight loss. Recognition that obesity is a hormonal condition and considering the type of food consumed and frequency of eating will treat the underlying cause of obesity, namely hyperinsulinaemia and insulin resistance. Eating carbs to tolerance and consuming moderate protein will enable the body to fuel on fat (dietary and stored) leading to sustainable fat loss, preserved metabolic rate, and improved health status.

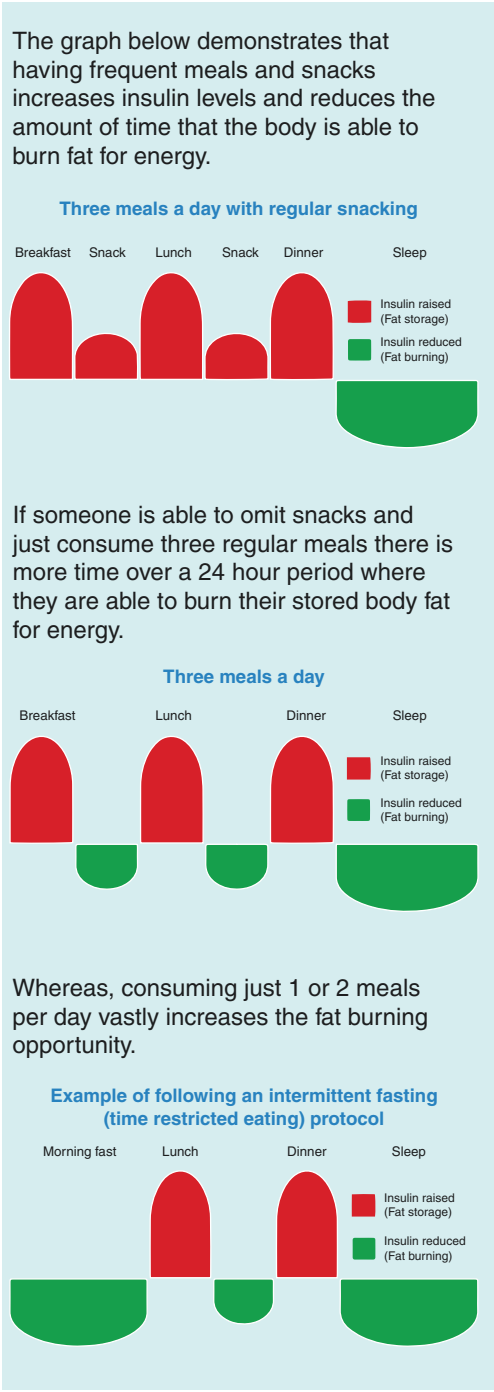

Fig. 16.8 Frequency of eating on insulin levels

Source: X-PERT Health

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Obesity Services Luton and Dunstable Hospital: Overview

17

Sue Walsh

The Luton & Dunstable Hospital has a Specialist Centre for Obesity Services and Research. Our multidisciplinary team (MDT) provides weight management programmes (Tier 3) and bariatric surgery (Tier 4) to patients throughout the East of England to include Bedfordshire, Hertfordshire, Buckinghamshire, Essex, Norfolk, Suffolk, and Northamptonshire.

The multidisciplinary team includes Consultant Surgeons, Consultant Physicians, Dietitians, Endocrinologists, Psychologists, and Specialists Nurses and offers nutritional guidance, dietary counselling, in-depth medical assessment, psychological assessment, and regular specialist support.

Patients do need to fulfil specific criteria to access the service which is determined by local individual clinical commissioning groups. However the majority of CCGs use the following access criteria:

BMI greater than 40

OR

BMI greater than 35 and have one of the following comorbidities:

- Type 2 Diabetes
- Hypertension
- Cardiovascular Disease
- Obstructive Sleep Apnoea
- Osteoarthritis

Eligible patients seeking medical intervention are offered a 12-month programme within the Tier 3 service, and patients seeking a surgical intervention must complete a minimum of 12–24 months within a Tier 3 service prior to progressing to assessment for bariatric surgery within the Tier 4 service. Depending on the area

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_17

patients reside, it may be necessary to obtain prior funding approval from local CCGs in order to access Tier 3 and Tier 4 services.

On successful completion of a Tier 3 programme (either at the Luton & Dunstable Hospital or through another recognised provider) patients can then progress to Tier 4 (once prior approval is obtained from the CCG if required) for consideration of bariatric surgery. Patients will undergo a thorough assessment to determine their suitability for surgery and we currently offer patients the following surgical options:

Roux-en-Y & Loop Gastric Bypass

- Can result in 70% of excess weight loss (on average)

Sleeve Gastrectomy

- Can result in 60% of excess weight loss (on average)

Laparoscopic Gastric Banding

- Can result in 40% of excess weight loss (on average)

Duodenal Switch (as part of a two-stage procedure only for appropriate patients)

- Can result in 80% of excess weight loss (on average)

We offer a fully comprehensive aftercare service whereby patients are reviewed at set intervals post-surgery for a period of 2 years following which they are then referred back to their local Tier 3 service for ongoing advice and support. In addition we provide 24-hour access to our emergency bariatric team.

Part V

The Importance of the Surgical Pathway

Obesity Management: Criteria for Commissioning

18

Bindu Jophy

Introduction

The Luton and Dunstable University hospital has a specialist Centre for Obesity Treatment and Research, which is a centre of excellence. We provide medical and surgical programmes to patients throughout the East of England. It is one of the largest and most comprehensive bariatric services in the country since 2001.

Obesity is a major public health problem worldwide and the UK has one of the fastest growing rates of Obesity in Europe. It is associated with serious chronic diseases such as Type 2 Diabetes, hypertension, hyperlipidaemia which are major risk factors for cardio vascular diseases. Obesity is also associated with cancer, disability, liver disease, poor mental and psychological health, reduced quality of life and premature death. Obesity and weight management pose a huge risk to the NHS both financially and for the well-being of our patients.

The Health Survey for England measures a representative sample of adults aged 16 and over to provide estimates of obesity levels in the country. In the 2016 survey, it found that 26.2% of adults in England are obese and a further 35.2% are overweight, making a total of 61.4% who are either overweight or obese. From obese adults, just over a tenth is morbidly obese (2.9% of all adults). Men are more likely than women to be overweight or obese (65.7% of men, 57.1% of women).

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_18

The most widely used measure of obesity is the Body Mass Index (BMI), defined as weight divided by the square of height (kg/m^2). A person is classified as obese if their BMI is 30 or higher. A BMI of 40 or more is often known as "morbid obesity". The full range of classifications is as follows:

Classification BMI

Underweight: <18.5
Normal weight: 18.5–24.9
Overweight: 25.0–29.9
Obese: Class I 30.0–34.9
Obese: Class II 35.0–39.9
Obese: Class III 40.0+

A patient is defined as having "potentially life-threatening obesity" by the NHS if their BMI is 40 or above. Alternatively, if a patient has co-morbidities such as Type 2 diabetes with high blood pressure, they are seen as having "potentially life-threatening obesity" with a BMI of 35 or above.

Bariatric surgery is the most effective weight loss therapy to treat patients with potentially life-threatening obesity. It has proven to be effective, safe, and cost effective. Studies have shown that it has a marked therapeutic effect on patients with Type 2 diabetes and reduction in co-morbidities and mortality. (patients whose co-morbidity enters remission post-operatively should remain on their appropriate disease register to continue to benefit from, e.g., retinal screening in diabetes). Nice CG 189 recommends obesity surgery is to aid weight reduction for adults with morbid/severe obesity and should be considered when there is recent and comprehensive evidence that an individual patient has fully engaged in a structured, specialist weight loss programme; and that all appropriate noninvasive measures have been tried continuously and for a sufficient period; but have failed to achieve and maintain a clinically significant weight loss for the patient's clinical needs. The current standard obesity operations are gastric banding, gastric bypass, sleeve gastrectomy, duodenal switch and revisional surgery. These are predominantly undertaken laparoscopically.

The National Bariatric Surgery Register (NBSR) report 2013/2016 revealed that the procedure can help severely obese patients to reduce weight by as much as 25–35% in one year. The report includes figures on 20,534 primary and 2098 revisions/planned second stage procedures with an average length of hospital stay for all operations at 2.6 days. However it is recognised that the data collected from Enhanced Recovery Programme (2017) at Luton and Dunstable hospital holds the average length of hospital stay for all operations at 1 day.

Criteria for Commissioning

With effect from April 1, 2016, NHS England transferred the responsibility of commissioning adult severe and complex obesity surgery services to Clinical Commissioning Groups (CCGs). All individuals are required to have attended and complied with local Tier 3 services before they can be considered for Tier 4 services which consist of hospital-based specialist care, including bariatric surgery, obesity medical MDTs, specialist weight management programmes, post-surgical and annual follow up. It is important to note that Tier 4 includes not only bariatric surgery but also bariatric medicine. The latter will offer more specialist and intensive input than tier 3. According to the new guidance, following the completion of Tier 3 services locally or at Luton and Dunstable Hospital, patients can be referred to Tier 4 service who will assess against each CCG criteria and apply for funding where appropriate. However, there is a current lack of consistency for commissioning criteria and referral process among CCG's. This has created confusion for surgeons and hospitals about whether patients have gone through the correct pathways of care, and can therefore access surgery.

Eligibility Criteria

Surgery should only be considered as a treatment option for people with morbidly obese. According to NICE CG 189, obesity surgery will be offered to adults with a BMI of 40 kg/m^2 or more, or between 35 kg/m^2 and 40 kg/m^2 or greater in the presence of other significant diseases; these are guidelines but CCG's are responsible for setting their criteria over and above guidelines.

There must be formalised MDT led processes for the screening of co-morbidities and the detection of other significant diseases. These should include disease condition, risk factor identification, diagnosis, severity/complexity assessment, risk stratification scoring and appropriate specialist referral for specialist medical management such as sleep studies, ECHO, etc. Such medical evaluation and optimisation is mandatory prior to entering a surgical pathway. On the first Tier 4 appointment at Luton and Dunstable Hospital, patients will meet specialist nurse and the bariatric physician and together, the patient will discuss the treatment options available for them. Patient will then be assessed by a specialist obesity MDT (Multidisciplinary) team. The MDT team includes Dietitians, Clinical Nurse Specialists, Psychologists, Specialist Anaesthetists and Bariatric Surgeons. Together with the patient the MDT will decide the next steps in their treatment plan based on their individual needs and clinical circumstances.

Before referring to Tier 4 services patients should have completed local specialist weight management programme for the duration of 12–24 months. For patients with BMI > 50 kg/m^2 attending a specialist obesity service, this period can include the stabilisation and assessment period prior to obesity surgery (previous requirement was a minimum of 6 months).

There are different models of MDTs. Important features are the multidisciplinary, structured and organised approach, lead professional leadership, assessment of evidence that all suitable non-invasive options have been explored, trialled with individual patient focus and targets. In addition to offering a programme of care, the service will select and refer appropriate patients for consideration for obesity surgery. MDT assessment processes and referral for complex case management and surgical referral must be formalised. Records must be kept and the service audited.

Irrespective of prior funding approval, the final decision on whether an operation is indicated should be made by the specialist hospital obesity MDT. For all obesity surgery candidates, an individual risk benefit evaluation will be completed by the Obesity Surgery MDT, this will be informed by their own clinical assessment and information provided by primary care and by Tier 3 services. There should be close liaison (and perhaps even overlap of personnel) between medical Tier 3 services and Obesity Surgery MDT. It is responsible for the pre-assessment, operative and perioperative management, post-operative and elements of longer term follow up, where it occurs within the specialist service will be funded by the Clinical Commissioning Groups (CCGs).

During the Tier 4 pathway the Obesity Surgery team will recognise the following:

- Obesity surgery is in accordance with relevant guidelines
- There are no specific clinical or psychological contra-indications to this type of surgery
- The patient has engaged for an optimal period with non-surgical Tier 3 Services.
- The anaesthetic and other peri-operative risks have been appropriately minimised.
- The patient has engaged in appropriate support or education groups/schemes to understand the benefits and risks of the intended surgical procedure

The surgical provider will have robust arrangements for surgical follow up and for receiving, assessing patients with post-operative complications and their emergency management by obesity surgeons. This includes access to a fully staffed emergency theatre on a 24 hour basis; consequently patients presenting to primary care with potential complications of bariatric surgery should be referred back to the specialist centre in an emergency, rather than a local DGH who may not be adequately equipped or trained. There will also be a contact point for advice on queries.

Structured, systematic and team-based follow up should be organised by the surgical provider for 2 years after surgery. After two years, care is transferred back to Tier 3 or GP for annual monitoring. Lifelong specialist follow up is also advocated. Although follow up will usually be led by the Tier 4 services, it will be delivered on the basis of formal shared care arrangements with primary care and defined provider

and clinician responsibilities. Such an approach will monitor weight loss and co-morbidity outcomes, complications, adherence to iron, vitamin D/calcium and vitamin B12 supplementation, facilitate clinical suspicion of specific or combined micronutrient deficiencies leading to appropriate laboratory tests for confirmation. Psychological input, management of co-morbidities, dietary and lifestyle advice and liaison with general practice will also be other functions of the follow-up process.

Obesity surgery for the morbidly obese is an increasingly available intervention. However, surgical intervention is not the whole solution and appropriate clinical selection of fully informed and educated patients is important. It is also important to ensure that surgery is not offered prematurely in a patient's weight loss pathway. Obesity surgery is only one component of the multimodal lifetime treatment pathway. Medical and psychological assessment and optimisation are also important to achieve and retain the benefits of obesity surgery.

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Bariatric Surgery Dietitian Section

19

Thomas Chapman

Before considering tier four management of obesity, it must first be recognised as a condition that *needs* to be treated. There has been much debate over recent years as to whether obesity is a chronic disease and, if so what is its nature; biological, psychological, social, or a mixture of all these states. What is uncontroversial is that obesity is the biggest health issue of our time according to the Foresight report by Butland et al. in 2007 and 40% of the population can be expected to be obese by 2025 and 50% by 2050 with a predicted cost of 10 billion pounds to the NHS and 49.9 billion pounds to the wider economy. Dietitians specialising in treating individuals before and after bariatric surgery must accept the necessity to recognise obesity as a disease, not merely a lifestyle choice, and having done so to manage it appropriately to assist patients in making appropriate changes in their diet and lifestyle to induce optimum health gain.

Obesity is now recognised as a disease by a wide range of organisations, including the American medical association and the world health organisation. However, this remains controversial with many people who argue that such a view is counterproductive. The two main opposing cases put forward are (a) that obesity is caused by people's own choices and (b) that classifying obesity as a disease will mean that people will fail to take personal responsibility for losing weight and improving their health.

The first of these arguments fundamentally relies on the concept that obese individuals are morally deficient and totally responsible for becoming obese. It is often said that obese people are lazy and just need to eat less and exercise more and that it is unfair that society should pay for their bad choices. However, lifestyle is already recognised as a major cause of many other conditions, including heart disease, liver disease, diabetes, and even many cancers. There does not seem to be a valid

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_19

argument against classifying these conditions as serious, genuine illnesses or that we should not treat the sufferer despite their choices being substantially to blame.

The causes of obesity are complex, and we are beginning to recognise the critical interplay of environmental, genetic, and psychological factors which lead to some people becoming obese, while others remain a healthy weight. There are some known variables that contribute to individuals becoming obese. The correlation between obesity and psychiatric illness is well documented. These include binge eating disorder, depression (Annagur 2015) and personality disorders (Johnson et al. 2006; Chen et al. 2015; Carpinello et al. 2009; Sansome et al. 2008). There is growing evidence that gut hormones affect the brain, which may be a big driver of overeating and obesity (Jerlhag et al. 2006, Jerlhag et al. 2007; Dickson et al. 2012; Richards et al. 2015) (see Chap. 2). Genetic factors are likely to be a major cause of obesity, but given that the genetic mix in the population has not changed alongside the rise in obesity, it is likely that either epigenetic factors are more important or that genetic predisposition is not enough on its own to cause obesity. As well as these less obvious underlying causes, the overt obesogenic factors, societal and environmental changes that predispose the population to weight gain, must still be considered in the clinical context. In other words, if a patient displays a psychological, genetic, epigenetic, or neuro-endocrine cause, the advice to 'eat less and do more' is still valid, but only as a small element of overall management. We now have unprecedented access to high calorie-dense foods and labour-saving technology, which have evolved significantly, damagingly skewing the energy balance equation, which can now be seen as increasingly obsolete.

The argument that classifying obesity as a disease will stop people from taking responsibility for their own health is also fundamentally flawed. In the case of other conditions such as COPD, heart disease, and sleep apnoea, which have a significant lifestyle component, no concern exists that people will not try to improve their own health: instead, the goal is to work to empower and motivate individuals to manage their condition, alongside whatever pharmacology, technology, or surgery is available. Obesity is no different. Furthermore, the burden of obesity is also severe for many individuals and has a significant impact on their day-to-day lives. It seems likely that people would be more open to accessing treatment and trying to improve their health if obesity was classified as a disease rather than a lack of willpower, gluttony, or sloth.

As the causes of obesity are complex, it is unfair to classify obesity as a condition that the individual is alone responsible for. It is also unfair to say that we should not classify obesity as a disease or treat it if we are willing to classify and treat other diseases which we know to be affected by lifestyle choices. Having established this, we need to assess, diagnose, and treat obesity as the disease that it is as well as relying on government, schools, and industry to change society to prevent obesity in the future.

For clinicians aspiring to treat obesity, the next question is: what treatment options should be offered? As a dietitian, it may seem counter intuitive that we should give precedence to the option of bariatric surgery. Dietitians might normally

be associated with diet and lifestyle interventions as the mainstay of obesity treatment. A high-quality diet and lifestyle intervention can be very successful for some patients as demonstrated by the Look Ahead trial (West et al. 2006). Unfortunately, even with high-quality lifestyle interventions, many patients fail to achieve meaningful weight loss, weight regain is typical, and attrition rates tend to be high.

What is clear is that there need to be other therapies alongside diet and lifestyle intervention, designed to help those patients who are not successful with initial therapy or who need to lose more weight than is possible with this mode of treatment.

This includes pharmacotherapy; however, our options are very limited in the UK at present, only orlistat being available on the NHS. Despite being an effective therapy, orlistat is often poorly tolerated by patients who may struggle to make the necessary dietary changes to work with the drug. Other options are on the market, such as Saxenda or Mysimba, but they are not available for NHS patients who may not be able to fund a private prescription. Even with pharmacotherapy alongside a diet and lifestyle intervention, many patients will not be able to lose enough weight to have a significant impact on their disease. This is why the use of surgical intervention should be considered.

All of these options are useful and appropriate for treating obesity. It should not be assumed that if a patient is unsuccessful with one intervention that they would not be have a different result with another. As with many disease states at present, we cannot identify which patients would benefit from which intervention will be successful with which patient. This being the case, we should start with the least invasive, moving over time to the most invasive treatment. We should not put barriers to accessing a more invasive treatment such as surgery just because a patient has not been successful with the less invasive options.

At present bariatric surgery is the treatment option with the best evidence base for treating obesity. Individuals often lose 70% of their excess body weight. The physical changes after bariatric surgery make it easier for patients to adhere to the diet and lifestyle changes needed for long-term weight loss.

There are four main areas of dietetic practice associated with bariatric surgery: assessment of the patient before surgery, pre-surgical diet, post-surgical diet and long-term supplementation and biochemical and nutritional monitoring.

Assessment of the Individual Before Surgery. Patients should see a dietitian before surgery as part of the bariatric MDT. The dietitian should assess their nutritional status and aim to correct any deficiencies before surgery. Alongside other members of the MDT, the dietitian should also aim to assess the patients' ability to make appropriate lifestyle changes after surgery. If patients are not able to make such changes, they are unlikely to be successful. This can be assessed in many ways, but predictive factors may be they have made lifestyle changes in the past, even if these have not led to any significant weight loss. Are they able to identify what lifestyle changes they will need to make after surgery, remembering that patients are likely to find it easier to make these changes after they have had surgery.

Pre-Surgical Diet. Many obese individuals will have an enlarged liver, which is situated anterior to the stomach, presenting surgeons with a practical challenge as an enlarged liver can hamper access to the stomach by laparoscopic surgery. This

means that the liver must be shrunk by reducing its glycogen stores and therefore, the amount of water stored within. This is done by following either a strict low carbohydrate diet or a low-calorie liquid diet.

Post-Surgical Diet. After bariatric surgery, patients need to follow a food reintroduction plan to enable them to get back to normal textured foods. There is much debate about the best way to do this, but an example food reintroduction plan for a gastric bypass or sleeve gastrectomy would be as follows:

Day 1: Clear fluids
Week 1–2: Liquids only
Week 3–8: puree/soft mashed consistency
Week 8–10: normal textured foods

When the patient is re-established on normal textured foods, they need to follow a diet of three meals a day with one or two snacks eating off a 7-in. plate; if they have had a gastric bypass or sleeve gastrectomy, gastric band patients will typically have larger portions. They should aim to have approximately half of each meal be a protein food such as meat, fish, eggs, dairy, nuts, pulses, or vegetarian protein alternatives. As the patient is only able to eat small portions of food, it is important that they eat foods of high nutritional value. They will also need to follow an appropriate supplementation regimen as outlined in the bomss clinical guidelines (O'Kane et al. 2014).

Biochemical and nutritional monitoring should be done regularly following bariatric surgery. At the Luton and Dunstable hospital, patients are seen at 6 weeks, 3 months 6 months, 1 year, and then annually. A dietitian or other suitably trained professional should see the patient check concordance with an appropriate diet and the appropriate supplementation regimen. The nutritional guidelines (O'Kane et al. 2014) also state the appropriate biochemical monitoring post-surgery. It is important that a patient's biochemistry is monitored and any deficiencies are corrected.

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The Role of the Specialist Obesity Nurse Within the Bariatric Multidisciplinary Team

20

Jane Rix

On completion of a tier 3 weight management programme, patients considering surgical intervention for Obesity is referred to the MDT by a bariatric physician.

It is important to ascertain a patient's suitability and readiness to progress on for further review with a bariatric surgeon and anaesthetist in accordance with NICE guidelines.

As part of the assessment process, it is beneficial to refer back to the patients' weight on entry into tier 3, taking time to discuss the key factors which have contributed to their Obesity. A review of the influencing medical, social, psychological, and behavioural factors is taken, and a discussion is had regarding changes made. As a measure of successful change, a 5% weight loss target is used. It is important that this measure is not used in isolation as there are a number of factors that demonstrate engagement in change. An increase in physical activity, smoking cessation, alcohol reduction as well as a portion-controlled diet and regulation of dietary structure are also good indicators of positive change. Patient insight into previous barriers to change is also essential as the following surgery, and there may continue to be barriers and addressing how these will be dealt with if encountered again is important for long-term success.

There are a number of co-morbidities that may be improved with bariatric surgical intervention; however, assessing the management of these is paramount prior to progression to surgery. Compliance with managing diabetes and obstructive sleep apnoea through medication and CPAP therapy can be a good indicator as to an individual's likelihood to comply with the post-operative lifestyle required for long-term post-operative success. The specialist obesity nurse will discuss glycaemia control, and if Hba1c is above 70, further input from an Endocrinologist is required to optimise. Evidence of CPAP compliance is required prior to referral to surgeon and anaesthetist, indicating usage for 6 weeks prior to surgery, and this may be

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_20

obtained from the patient's respiratory physician. Finally, recent biochemistry results and Cardiac investigations such as ECG and Echo (in line with local anaesthetic protocol) are valuable to ensure delays are avoided on referral.

Following general assessment, it is helpful to ascertain a patient's general level of understanding regarding surgical interventions available. A discussion follows about the available options and patient education is given on each surgical option, including the mechanisms whereby each procedure works and its action on restriction, gut hormones, satiety and absorption.

It is important to discuss patient expectations from their pre-operative assessment to their hospital stay and discharge. Enhanced recovery programmes have been utilised over recent years to help manage patient expectation, which influences the length of hospital stay and recovery. Patients are educated on the importance of taking a lead in their own recovery from ensuring they maintain an adequate fluid balance to mobilising as early as possible to reduce post-operative complications such as DVT or PE.

When assessing patient's suitability for bariatric surgery, it is important that patients have realistic expectations of the likely benefits of surgery. A patient that has been wheelchair bound for a number of years due to osteo or rheumatoid arthritis resulting in chronic pain may think that surgery may result in them regaining mobility and becoming pain free but unfortunately, these expectations must be managed. Another example is a patient who has severe body image issues needs to fully understand that the potential for excess skin and the unlikelihood of NHS-funded removal may result in worsening body image issues.

Ultimately, the most important message which needs to be relayed is that any form of bariatric surgery is 'a tool' with which to work for long-term success with weight loss and resolution of associated health issues.

Finally, the importance of follow-up is discussed. Following bariatric surgery, regular monitoring of blood biochemistry is essential to detect and intervene in deficiencies that left untreated could lead to anaemia, osteoporosis, or malnutrition. A dietary assessment is taken, and patients are advised on adherence to their post-operative supplementation and optimising protein intake. Mental wellbeing is monitored at follow-up due to the potential for cross-addiction. Referral to clinical psychology services for further assessment and signposting can then be made. Continued education on a healthy diet and activity supports successful outcomes, and so it is important to ensure patients are aware of these factors when deciding if surgical intervention is the right route for them.

Following assessment by the wider Multidisciplinary team, a discussion is had on the patient's readiness to progress, taking all of these factors into consideration. It is important that a plan is then made with the patient to ensure they understand the benefits versus risks.

Psychological Aspects of Obesity Management

21

Leah Bousie, Emma Patten, and Rebecca Ramsden

The Relationship Between Mental Health and Obesity

Obesity is associated with both physical and mental health difficulties, with a bidirectional relationship being proposed between obesity and mental health (Gatineau and Dent 2011). A systematic review and meta-analysis examining the longitudinal relationship between depression and obesity (classified by the researchers as a body mass index ≥30) found that individuals classified as obese had a 55% increased risk of developing depression over time, and an individual who experienced depression had a 58% increased risk of developing obesity (Luppino et al. 2010). Systematic review and meta-analysis have also found moderate evidence indicating a weak but positive association between anxiety and obesity (Gariepy et al. 2010).

A variety of mediating factors have been proposed to explain obesity as a risk factor in the development of mental health difficulties, including the development of chronic medical conditions, medication, low self-esteem, diet cycling, stigma, as well as functional impairment (Gatineau and Dent 2011). Obesity is associated with increased risk of numerous chronic conditions, including diabetes (Abdullah et al. 2010; Wild and Byrne 2006), cardiovascular disease (Poirier et al. 2006) and stroke (Winter et al. 2008). Rates of depression are estimated to be 2–3 times higher in individuals with a chronic physical health condition (NICE 2009). Studies have found obesity to be predictive of future development of low self-esteem (Hesketh et al. 2004), and there is evidence to support the vulnerability model of low self-esteem contributing to the development of depression (Sowislo and Orth 2013). Low self-esteem has also been found to be a contributing factor to the development of anxiety (Sowislo and Orth 2013). Individuals who experience difficulties with

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
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obesity are highly stigmatised, and the negative stereotypes that are widespread in society can lead to individuals experiencing inequities and impact upon quality of life and emotional wellbeing (Puhl and Heuer 2010).

Mediating factors that have been proposed for mental health difficulties as a risk factor in the development of obesity include unhealthy lifestyles, use of maladaptive emotional regulation strategies such as emotionally driven eating, avoidance of activity, prescription of psychotropic medication and reduced support (Gatineau and Dent 2011; van Strien et al. 2016). Mental health difficulties have been found to be associated with low physical activity and poor diet (Scott and Happell 2011), and prescription of psychotropic medication has been found to be associated with significant increases in weight (McCloughen and Foster 2011). It has also been hypothesised that anxiety disorders are a risk factor in the development of obesity due to hypothalamic–pituitary–adrenal axis dysregulation contributing to appetite dysregulation and consequently weight gain (Gariepy et al. 2010).

Obesity and mental health difficulties may also have predisposing factors in common, for example experience of childhood abuse has been found to predict both obesity and mental health difficulties (Gustafson and Sarwer 2004; Rohde et al. 2008). The strength of the relationship between obesity and mental health is proposed to be moderated by a number of different factors, including gender and socioeconomic status (Gatineau and Dent 2011).

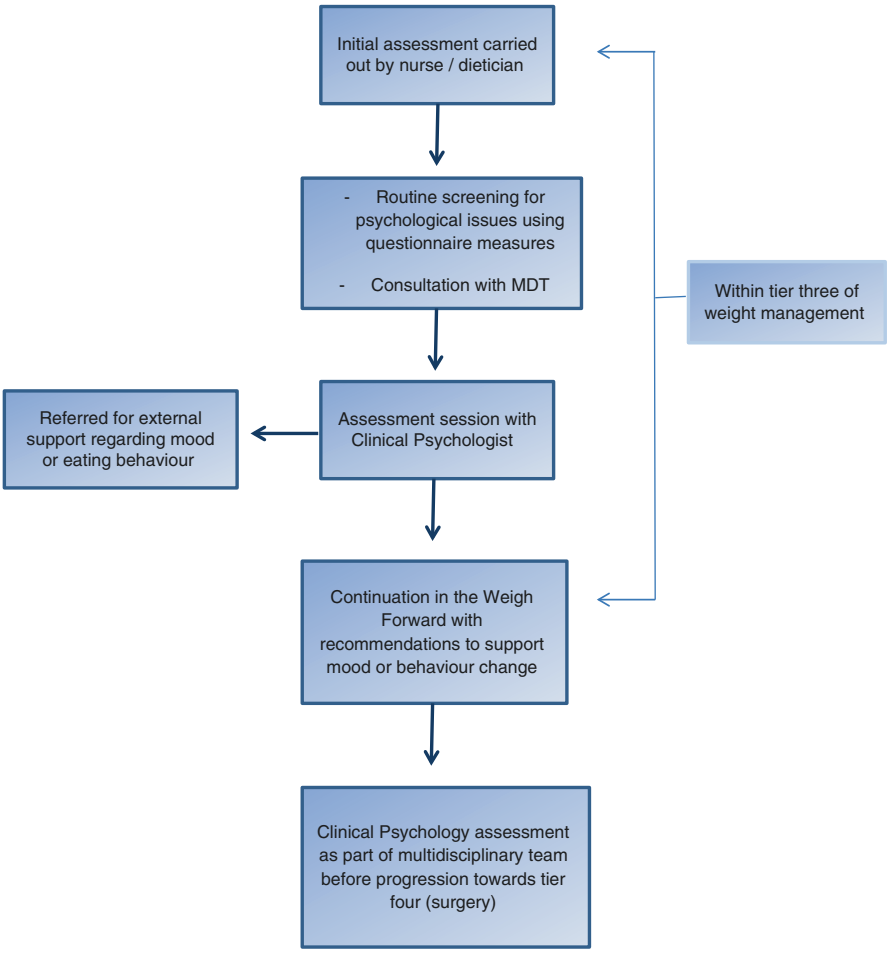
Despite the co-morbidity of obesity and common mental health disorders, and their similarity in symptoms such as inactivity, disturbed sleep, poor diet structure and poor dietary intake, they are predominantly treated as separate health problems which can compromise outcomes (Markowitz et al. 2008; Gatineau and Dent 2011). Providing psychological therapy as part of, or adjunct to, weight management interventions can significantly improve outcomes (Shaw et al. 2005). The co-treatment of obesity and mental health is therefore recommended to improve both the physical health and emotional wellbeing of individuals (Gatineau and Dent 2011).

Role of Psychology Within Tier Three Weight Management Services

NICE Clinical Guideline CG189 identifies a clear need for psychological input within a weight management programme. Cavill and Ells (2010) highlighted the importance of behaviour change in the management of obesity, and in their recent report, The British Psychological Society (2020), state how Clinical Psychologists can work collaboratively with patients who are struggling to lose weight or adhere to medication or those with concurrent mental health difficulties. The Psychological formulation can be used to help patients understand obesity related difficulties in a non-judgemental and de-stigmatising manner.

At Luton and Dunstable hospital's Weigh Forward programme, support is offered throughout tiers three and four. Clinical Psychologists specialising in obesity management work alongside the wider multidisciplinary team (MDT) consisting of dieticians, specialist nurses and medics and surgeons. At initial assessment, patients

are asked to complete the nine-item Patient Health Questionnaire (PHQ-9; Spitzer, 1999) and Generalised Anxiety Disorder (GAD-7; Spitzer et al. 2006) questionnaires in addition to answering questions around their physical and mental health histories. If significant psychological difficulties are identified, the patient may be offered an appointment with a Clinical Psychologist specialising in weight management. Patients are also regularly discussed in consultation with the wider MDT. See the diagram below for an outline of the psychology pathway within tier three.



Clinical psychologists working with patients in a tier three weight management setting aim to gain an understanding of individuals across the following areas:

- Stages of change, awareness, and insight
- Barriers to change
- Any risks present in relation to mental health and wellbeing

- Formulation of eating behaviour, including understanding triggers and perpetuating factors
- Identification of maladaptive coping strategies
- Identification of disordered eating behaviour, particularly binge eating disorder and bulimia nervosa

Whilst some tier three weight management services offer psychological therapy within the service; this is not universally the case. Boyden (2015) describes how psychological skills and behavioural change can be delivered by a variety of professionals both within and outside of weight management services. This is the case for the service at Luton and Dunstable hospital, where those patients requiring psychological therapy are commonly referred to services provided by Improving Access to Psychological Therapies (IAPT) or secondary care mental health teams.

Role of Psychology Within Tier Four Bariatric Services

Within Tier Four Bariatric Services, Clinical Psychologists work alongside the wider multidisciplinary team to help establish an individual's readiness for the bariatric surgery process and post-operative lifestyle. Psychological assessment is completed with the aim of establishing psychological or social issues that have the potential to interfere with key surgery requisites and/or which may need further monitoring or intervention prior to bariatric surgery being considered safe and appropriate. NHS England (2016) has estimated that about 80% of patients seen within weight assessment and management clinics are suitable for bariatric surgery from a medical perspective. However, as highlighted earlier, morbid obesity is a complex syndrome, and obesity surgery a highly specialist intervention associated with significant lifelong changes and demands. Comprehensive psychological assessment in the lead-up to surgery taking place can therefore enhance understanding of the bio-psycho-social aspects to an individual's presentation, supporting the best possible surgical outcome (Flores 2014).

Psychologists will consider multiple aspects of a candidate's life to support the assessment of an individual's readiness to undertake bariatric surgery (Flores 2014; BOMSS/Royal College of Surgeons 2017).

These include:

- The individual's relationship to food/eating in the aftermath of Tier Three weight management intervention, including any potential barriers to adherence with key post-operative dietary recommendations.
- Weight history, including the level of insight into causes for weight gain.
- Motivation for, and understanding of, the surgery itself, including essential lifestyle changes and consequences (e.g. post-operative vitamin supplementation, issues of excess skin), as well as expectations regarding its results.
- Mental health co-morbidities (current and historical) and issues of psychological risk (suicidal ideation/intent/acts, self-harm). If reported, then consideration is given as to the level of stability demonstrated by the individual concerned to date. Corroborative reports may then also be sought at times from GPs or mental health services/professionals to help establish greater understanding in this

regard. Assessment is also made of the individual's coping strategies and the potential for the surgical process and its demands, particularly with respect to food/eating behavior, to impact on these.

- Social support, including any potential for the wider social context, e.g. a lack of adequate social support, to impact a candidate's progress post-operatively.
- Issues of substance addiction/dependence. If reported as a historical issue, the level of stability demonstrated by the individual to date is once again considered. More generally, time may be spent considering with a candidate the potential for such issues to emerge post-operatively, particularly in the face of a significantly altered relationship with food/eating, i.e. the potential for 'cross-addiction' with alternative substances if food/eating has held a strong emotional coping function (McFadden 2010).
- Cognitive functioning, including assessment of the individual's ability to weigh up potential benefits and costs of surgery and assessment of any cognitive impairment that may compromise their ability to adhere to essential post-operative requisites.
- Notable history of trauma/abuse. The imposed sense of control that surgery can place on an individual's dietary intake may mirror the control placed on an individual during previous traumatic or abusive experiences, thus eliciting distress. In addition, weight may have previously acted as a protective barrier during or after previous traumatic or abusive experiences, therefore rapid weight loss in the context of bariatric surgery can activate a heightened sense of vulnerability.
- Active or historic issues with an eating disorder such as Bulimia Nervosa, or highly disordered eating behaviours, e.g. compensatory food behaviours such as self-induced vomiting or laxative misuse. The rapid weight loss in the context of bariatric surgery and heightened focus on dietary intake can elicit previous maladaptive cognitions and behaviours relating to weight, body image, and eating behaviour.
- Presence of more problematic levels of body image concern, impacting significantly on day-to-day functioning (e.g. leading an individual to refrain from accessing their local community). Consideration is also given to how the presence of excess skin may impact this.

A 'traffic light system' can then be used to help identify patients not currently suitable for surgery ('red' candidates), or those who may be suitable but considered a higher risk, requiring further psychological intervention or a need to demonstrate a more extended period of stability, before being considered ready for surgery ('amber' candidates).

Radcliffe (2013) identified key factors that may render a candidate unsuitable from a psychological perspective for surgery. These include:

- Severe unstable mental health difficulties, such as recurrent episodes of psychosis, or regular mood cycling associated with bipolar disorder
- On-going alcohol or drug dependency issues
- Severe or moderate intellectual disability, or a diagnosis of dementia or alternative severe cognitive impairment
- Active Bulimia Nervosa

- Non-compliance with treatment, e.g. not taking prescribed medication
- Severe Personality Disorder

Radcliffe (2013) proposes key factors that may render a candidate in need of additional monitoring/support include:

- A history of severe mental health issues that have been stable for a period of at least 12 months, with no psychiatric inpatient admissions or episodes of self-harm within this time.
- A history of issues with alcohol or drug dependency/addiction, stable for a period of at least 12 months.
- A history of an eating disorder, or poor understanding of eating behaviour.
- Active Binge Eating Disorder. Significantly, research evidence at present is divided as to the significance of binge eating behaviour in the context of bariatric surgery. Some researchers argue that bingeing has significant potential to go into remission after surgery, and therefore may not represent an outright contra-indicator (NHS England 2016). However, alternative researchers have argued clinically significant levels of binge eating to be associated with poorer surgical outcomes (NHS England 2016). Notably, within the authors' clinical experience, binge eating has been observed to correlate generally with higher levels of maladaptive emotional coping—a significant concern in the context of bariatric surgery and the demands this places on the individual in the long-term. As such, stability for a period of at least 12 months is deemed critical.
- Poor compliance with Tier Three weight management recommendations.
- Unrealistic expectations of surgery, e.g. unrealistic body image expectations, particularly with respect to issues of excess skin.
- History of Personality Disorder, where an individual has been able to demonstrate sustained change to more problematic behaviours, such as self-harm.

Once the assessment is completed, Psychology, in tandem with the wider multidisciplinary team, will then seek to establish a 'plan' with the candidate with respect to onward progression towards surgery; signposting to mental health services for evidence-based psychological intervention where appropriate.

Crucially, despite considerable efforts to comprehensively evaluate an individual's readiness as a candidate for bariatric surgery, at times, patients may experience a notable relapse in mental health difficulties/maladaptive eating behaviour, or even develop new-onset difficulties, in the wake of surgery taking place. In such cases, Psychology may then meet with these individuals once again to help determine a clearer understanding of the issues at hand, and ensure appropriate onward support/intervention may be accessed.

As Flores (2014) notes, 'in the matter of the importance of [Psychology's] role within Tier 4 Bariatric services… results [have] found…. there are no doubts about the value and validity of this process for surgery success' (p62). However, there remain numerous areas in which greater research understanding may enhance appropriate decision-making in the context of bariatric surgery. These include more comprehensive data on the potential impact of certain psycho-social factors for longer term surgical outcome (NHS England 2016). Innovative psychology-led research within Tier Three and Four weight management and bariatric services may

therefore be viewed as of increasing importance, to support best practice moving forward.

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The Role of the Nurse Post-Bariatric Surgery Within a Bariatric Centre

22

Debbie Musendeki

Introduction

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health. People are generally considered obese when their body mass index (BMI), a measurement obtained by dividing a person's weight by the square of the person's height, is over 30 kg/m^2, with the range 25–30 kg/m^2 defined as overweight. Obesity is most commonly caused by a combination of excessive food intake, lack of physical activity, and genetic susceptibility.

Obesity is now a global epidemic and has now placed itself top on all government agendas. According to, a third of the world's population is obese or overweight. Britain is considered to be the fattest nation in Europe with its people getting fatter by the day. Foresight 2007 rightly predicted Britain becoming a nation where the overweight is the norm. We are only too aware of the health implications that this epidemic brings, such as type 2 diabetes, cardiovascular events/diseases, certain types of cancers, mental health such as depression, low self-esteem, joint pains, only to mention a few. Obesity is mostly preventable through a combination of social changes and personal choices. Although changes to diet and exercising are considered obesity treatments, bariatric surgery is an essential option for the treatment of obesity and its associated co-morbidities. This section presents the role of a nurse post-bariatric surgery.

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_22

Surgical Obesity Treatment

Currently, there are three common bariatric procedures such as gastric banding, gastric bypass and sleeve gastrectomy, and in order to maximise successful outcomes for patients who undergo these various procedures, follow-ups are an integral part of the surgical obesity treatment. These follow-ups are done by the multidisciplinary team (MDT) such as surgeons, nurses, physicians, dietitians, and clinical psychologists as and when deemed necessary. It is crucial and necessary that patients are monitored following bariatric surgery to ensure patients meet their nutritional requirements, thereby reducing risks of developing nutritional deficiencies as a result of this surgical procedure. Picking up possible complications and deficiencies early enables appropriate treatment and necessary investigations to be delivered timely. Follow-up care and guidance maximises success in both maintaining reduction in co-morbidities and long-term weight loss. The frequency of monitoring is indeed based upon the type of surgery as well as the needs of individual patients. This, however, should be within the framework of National Health Service (NHS) England guidelines. The nurses' role postoperatively is to support patients in their weight loss journey and flag up any concerns to the rest of the MDT for appropriate care. Below are some of the issues that nurses monitor, evaluate, and routinely assess postoperatively.

Medical Review

There is evidence that a high percentage of patients who have undergone bariatric surgery report improved quality of life after surgery. Obese patients who have had bariatric surgery not only live longer but also live an improved quality of life. Examples of the improved quality of life are when patients report returning to work or simply travelling or taking a challenge that would have been unthinkable prior to surgery. It is therefore essential for the nurse to monitor and evaluate patient's co-morbidities post-bariatric surgery. The following are some of the co-morbidities that are commonly associated with obesity hence essential to monitor improvement post-bariatric surgery.

Diabetes

Roux-en-Y gastric bypass and sleeve gastrectomy are effective interventions for treating type 2 diabetes. Improvement in metabolic control is often evident within days to weeks following surgery. Therefore, almost invariably, there is a need to adjust anti-diabetic drug dosages in the postoperative period in order to prevent hypoglycemia. Treatment adjustment or attempted withdrawal of medications should be under the supervision of a physician specialising in diabetes management. Therefore the nurse would need to liaise with the physicians and patients own general practitioners (GPs) to ensure adjustments to medication are done accurately and

safely. During follow-up appointments, HBA1c would need to be monitored in the long term as well as monitoring CBG recordings.

Hypertension

Bariatric surgery is known to cause normalisation of hypertension in patients or medication reduction. In clinic with the nurse, it is paramount that blood pressure readings are done and an evaluation of the current medication. A common symptom that patients experience is postural hypertension, and this is always a tell-tale sign that warrants medication to be reviewed. It is important to note that the nurse highlights the changes to be done by the GP or Physician to ensure safe management.

Joint Pain

Studies have demonstrated that among patients with knee OA pain, bariatric procedures can predictably provide relief. Dramatic reductions in pain can occur as quickly as 3 months post-surgery, however, this is not always guaranteed as it depends on the level of damage prior to surgery. None the less it is important to monitor and evaluate the levels of pain and any improvement.

Obstructive Sleep Apnoea

It is known that the strongest risk factor for OSA is obesity, therefore, it is inevitable that weight loss would have a positive impact. The nurse would need to encourage the patient to ensure further reviews with the respiratory hospital; as patients lose weight, the mask would be ineffective, and the more weight that is lost, the less pressure a patient would require on their CPAP.

Infertility

Polycystic ovarian syndrome (PCOS) is the most common endocrine disorder in women which is strongly associated with obesity. However, Studies have shown that most obese women who effectively achieved weight loss following bariatric surgery had restored menstrual cycles, and many cases of reported pregnancies post-bariatric surgery. It is important to highlight intense dietary support for these women as well as changing their vitamins to recommended ones during pregnancy. The advice given to childbearing age women is to usually allow their bodies 12–18 months (This is the known stability period for weight loss) before trying to conceive. Through blood tests we can also ascertain that patients are not anaemic as this is a common case for PCOS patients. This allows us to promote compliance with iron supplements.

Compliance with Postoperative Supplements

According to BOMSS guidelines, patients who undergo bariatric surgery should be supplemented for life. These supplements include complete vitamins and minerals, iron, Calcium with Vitamin D as well Vitamin B12 injection once every 3 months. It is important to note here that various bariatric procedures require different supplementation. Never the less compliance is of great importance. Vitamins are normally derived from foods; however, after bariatric surgeries, food eaten is severely reduced; hence supplements are taken to complete minimum daily requirements of vitamins and minerals. The effectiveness of these vitamins is monitored via regular tests according to the protocol provided by BOMSS. The blood tests allow the team either to recommend extra vitamins or in some cases if Ferritin levels are high, iron supplements to be stopped for a while. Besides the nutritional deficiencies, some of the postoperative supplements help with healing as well as reducing acid reflux. Post-bariatric surgery, it is recommended that patients are prescribed PPIs, and these usually are taken up to 3 month period.

Compliance with Adequate Protein Intake: Dietary

After surgery, patients feel full after eating only small amounts of food. This is a result of the reduced stomach size. Reduced food intake usually results in inadequate nutrition; therefore, it is important to ensure that patients follow the outlined dietary guidelines. These usually start off with a form of liquid diet and building it up. It is important for the nurses to monitor that patients are eating a minimum of three regular meals and adequate snacks if needed. The diet should also contain adequate amounts of protein. Protein is an essential food substance found in vegetables, lentils, and pulses, nuts, meat, fish, poultry, dairy products and eggs. It is essential that patients postoperatively master eating habits of chewing thoroughly and swallowing slowly as well as taking adequate time with each meal. Lack of adequate protein has been associated with hair loss, breaking fingernails, fatigue, and some even loose teeth. A good education on protein is always necessary prior to surgery. The amount of protein patients should eat in a day can vary from 60 g to 100 g due to the nature of the surgery. Alongside eating well, patients are encouraged to hydrate themselves well by constantly taking sips of water.

Dietary monitoring is extremely important as we know that weight regain is possible post-bariatric surgery. It is good to educate patients on avoiding foods that are dense in calories and sugars. Nurses together with dietitians should educate patients on understanding satiety and hunger signals. With every visit postoperatively the aim is for patients to be in tune with their bodies and recognise bad eating habits that might start creeping in, such as grazing, comfort eating, etc. Once these signs are picked up, it is essential that the nurse then refers the patient to the appropriate MDT member.

Compliance with Physical Exercises

There is growing interest in the role of physical activity (PA) in promoting optimal weight loss after bariatric surgery. However, studies are still ongoing with regards to the extent of the outcome of PA post-bariatric surgery. In recent research, it suggests that patients become more physically active postoperatively following the weight loss. It is well documented that physical activities or physical exercises have tremendous health benefits and help sustain long-term weight loss. Some of the health benefits include improved mood levels, reduced cardiovascular events, increased self-esteem and sustained weight loss. We, therefore, encourage patients to engage in some form of physical activities if it is safe for them to do so. We also work alongside with GPs for gym prescriptions which enable patients to be assessed by a qualified personal trainer before embarking on any vigorous or rather intense exercises.

Reduce Postoperative Complications

This is a vital part of patient education. Patients are empowered to have personal responsibility for their own health. This simply means alerting health professionals of any sign of complications. Some of these complications could be major or minor never the less, they all need to be addressed to ascertain quality of life post-bariatric surgery. Examples of some of the complications could be leaks which can occur immediately or up to 2 weeks post-bariatric surgery. Other complications could be strictures, ulcers, bowel obstruction, infection by wound site, thromboembolism. With Thromboembolism, patients are required to comply with anti-coagulants given to them upon discharge. The risk of clots formation in the veins of the legs or lungs (pulmonary embolism) are high; therefore, patients would need to comply with mobility and report symptoms such as pain in the calf, palpitations and chest pains or difficulty in breathing. Patients are advised to either reduce smoking or to cut smoking out altogether. Another complication that is associated with analgesia postoperatively is gut bleeding which is triggered by NSAIDs. Patients are advised preoperatively to stop the use of NSAIDs and see their doctor for alternative analgesia. Postoperatively we continue to monitor that patient's pain is adequately managed.

Dumping syndrome is another complication that usually occurs when patients eat foods excess in sugars and fats. The affected person will experience rapid heart rate, clammy, diarrhoea, stomach cramps, etc. To avoid these complications, a good dietary education is required. In some cases, patients experience reactive hypoglycemic episodes, which have similar symptoms but the difference is that with the later, patients tend to treat symptoms with more sugar. This requires more monitoring and a possible referral to a Physician for further management. Some complications require referral to a Clinical psychologist especially when we can see tale-tell signs of developing an eating disorder or body dysmorphia.

Conclusion

The role of the nurse post-bariatric surgery can be summarised as education, evaluation, and liaising with the MDT to ensure that patients have sustained weight loss and enjoy their weight loss journey.

Bariatric Surgery: Making the Right Decision

23

David Haslam and Yvonne Mckeown

- Why do I have to do the milk diet?
- What can I expect after the surgery?
- I want to have a baby. Can I still get pregnant after the surgery?
- Which type of surgery is best for me and who decides?
- Is surgery the right option for me?
- I live quite far away. Can I have my appointments nearer to home?
- Is the surgery permanent?

Bariatric procedures are changing operations, the aim of which is to help people to lose weight in order to improve their health and quality of life. The surgery is considered as a tool to reduce appetite, however, it does not necessarily mean patients will stop wanting foods that are high in calories and therefore, they must understand and take on the responsibility of having a healthy, well-structured and nutritious diet.

Deciding which procedure is best for some people is simple but, for others, not so easy. The aim of this chapter is to provide information so that the healthcare professional alongside the potential patient is able to make an informed decision about which procedure is most appropriate for them.

If all the right positive lifestyle changes are made, weight loss will be achieved with whichever procedure is chosen.

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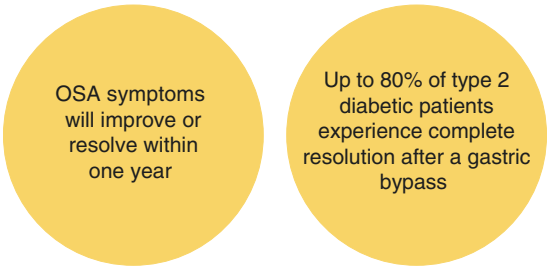
D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_23

Benefits of Bariatric Surgery

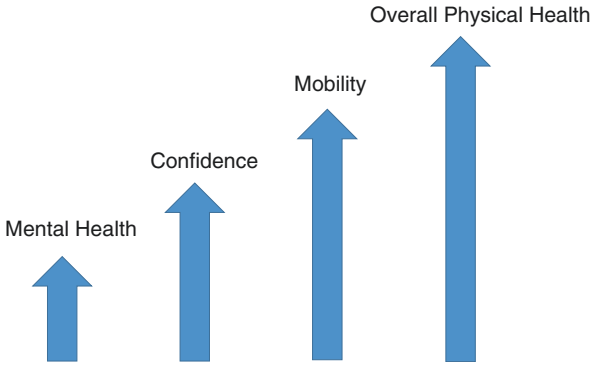
Improvement/Resolution of health conditions

- Type 2 diabetes
- High blood pressure
- Obstructive sleep apnoea (OSA)
- High cholesterol



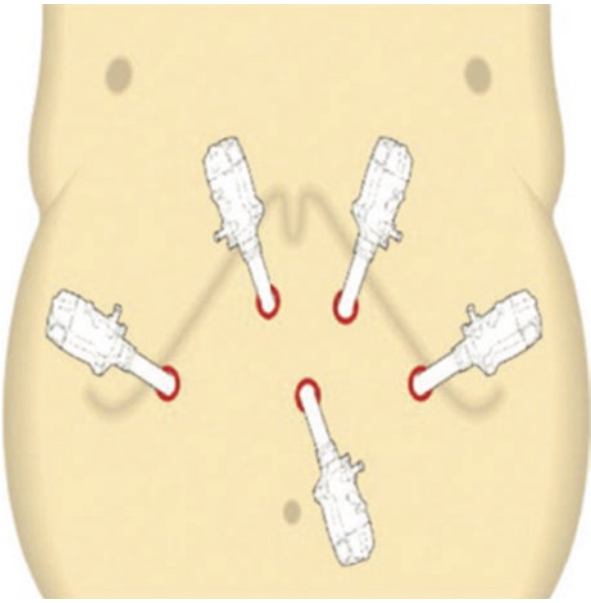
Other conditions, including osteoarthritis, skin conditions, and hormone-related problems such as PCOS and subfertility, are likely to benefit, alongside many others.

Patients will often see a marked improvement in their overall quality of life in areas such as:



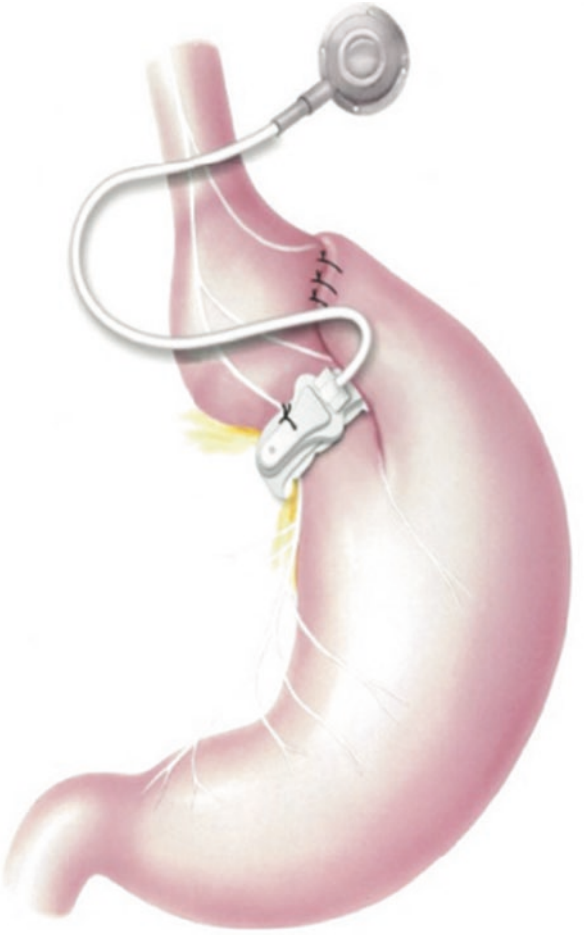
Types of Surgery

All commonly undertaken procedures are performed laparoscopically with a planned stay in a hospital of one night. After surgery, some pain and discomfort are experienced. Patients should mobilise as soon as possible to reduce the risk of post-operative thrombosis.



Gastric Band (LAGB)

This procedure is often the one that people have most often heard of, and request, although it should be considered carefully and discussed fully. It now accounts for only about 10% of bariatric procedures because it is deemed less effective than the other options.



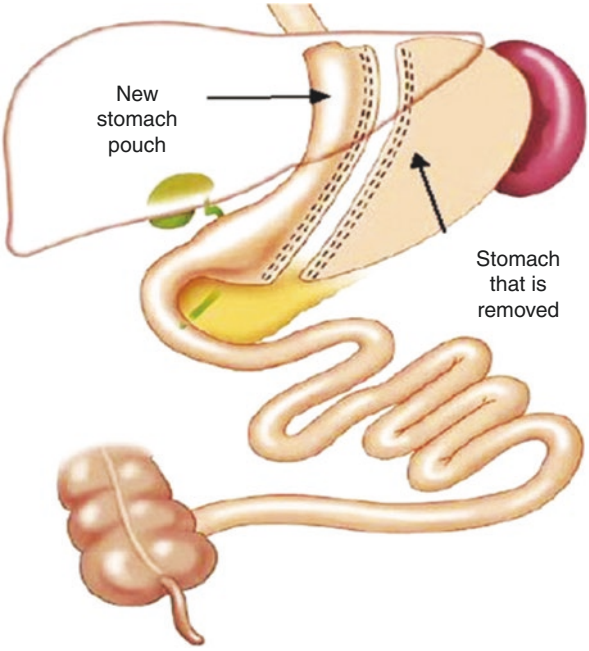
The LAGB is an adjustable silicone band that is placed around the top of the stomach just below the oesophagus. This serves to reduce the size of the stomach and the size of the meal as well as slowing the passage of food through the restriction. The band is connected to a port that lies just under the surface of the skin on the abdomen. Fluid can be both injected and withdrawn through this port when adjustment of restriction is required. Getting the restriction right can be a challenge, and also for the LAGB to be effective, significant lifestyle changes must be made on a permanent basis. Expected weight loss is approximately 30% of excess body weight at 2 years after surgery.

Points to Consider

- Getting the restriction 'just right' can be a challenge and may take many visits
- A healthy planned diet must be eaten, and there may be a number of foods that can no longer be tolerated
- Weight loss can be slow and/or targets not met
- There is no stapling, and none of the stomach is removed
- Mechanical problems with the band include leakage, deflation, slippage and erosion, all of which require surgical intervention to fix
- The LABG can cause heartburn, nausea and vomiting, especially immediately postoperatively
- These symptoms can worsen with overeating or eating too quickly, and therefore it is not recommended for people who struggle with comfort eating

Sleeve Gastrectomy

This procedure accounts for about 40% of all the bariatric procedures at the Luton and Dunstable Hospital. The stomach is divided by stapling, which results in a 'sleeve' shaped stomach.



The remaining stomach is about 30% of the size of the original stomach, and the other 70% is removed. This means portion sizes are significantly reduced.

Another feature of this procedure is that when certain parts of the stomach are removed, neurohormonal changes can occur, such as decreased concentrations of Ghrelin, the hunger-stimulating hormone. Ghrelin is mainly produced by the cells of the gastric fundus, which is removed by sleeve gastrectomy. Therefore some studies have shown that this can lessen appetite, further contributing to further weight loss.

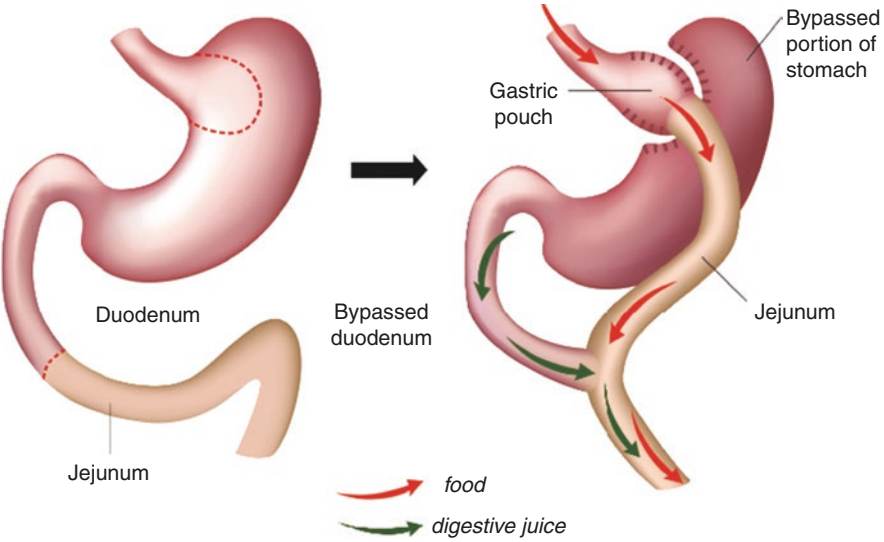
Points to Consider

- For people with diabetes, a significant improvement can often be achieved, but for some patients, the improvement is not as rapid nor as much as with those who have undergone a Gastric Bypass, and therefore it is likely that the team will encourage Gastric Bypasses in diabetic individuals.
- Similarly, in patients suffering from gastric reflux, a Sleeve Gastrectomy can worsen the symptoms, and therefore the Gastric Bypass may be more suitable.
- Reflux can occur even in patients who have never suffered with this preoperatively. Usually, this can be controlled with medication and a sensible diet; however, sometimes, the symptoms persist.
- Expected weight loss at 2 years after surgery is around 60% of excess body weight.
- As there are no changes made to the digestive tract, digestion and absorption of food remain the same. However, due to the fact that food volume will be significantly less than before, it is required that a multivitamin daily plus a calcium and vitamin D supplement is taken on a lifelong basis.
- Full attendance of all postoperative appointments must be attended for the requisite 7 years (2 years in tier four service and 5 years in local tier three service).

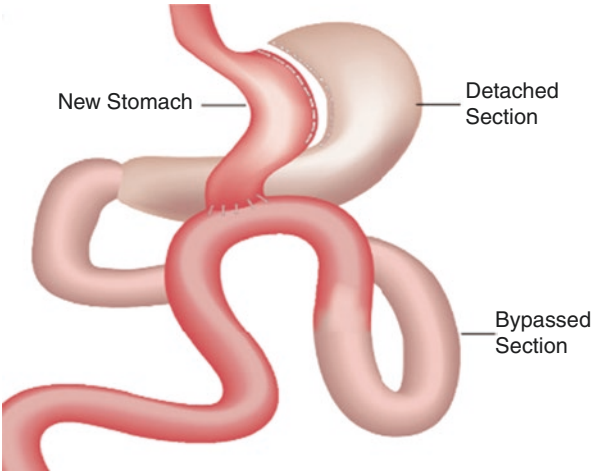
Gastric Bypass

There are two different types of Gastric Bypass: the Roux-en-y Gastric Bypass and the Loop Gastric Bypass. They are managed in the same way, and patients will need to discuss with their surgeon which one is more suitable for them.

Roux-en-Y Gastric Bypass



Gastric Loop Bypass



With both types of Gastric Bypass, a smaller stomach/pouch is made from the original stomach using staples. Then, a loop is formed in the intestine, which forms a new passage for the food to leave the stomach, which is shorter than before, which can subsequently cause some minor malabsorption. The volume of food that can be eaten is significantly less, and it also bypasses most of the stomach and some of the small intestine.

This 'malabsorption', together with the reduced volume of food, aids weight loss. For patients with type 2 diabetes, this procedure can instantly improve glucose control. There is a lot of debate about how this really works, but it is thought it is mainly due to the effect and function of the incretin system, specifically, alteration in the secretion, action, and effect of glucagon-like peptide-1 (GLP-1) secreted from T-cells in the lining of the gut different way that can improve sensitivity to the naturally occurring insulin.

Points to consider

- Expected weight loss is about 60–70% of excess weight loss at 2 years post-surgery.
- Multivitamins must be taken on a lifelong basis, including a vitamin B12 injection given by a practice nurse every 3 months. These are necessary as the amount of food eaten is much less and the absorption of the vitamins affected by the surgical changes.
- Not all diabetic patients experience complete resolution of symptoms, but, as previously stated, nearly everyone benefits from a marked improvement. Duration of the time that diabetes has been present and current control can affect the outcome.
- Dumping Syndrome can occur if foods with high sugar content are eaten. The frequency and severity of this vary significantly. Most people are able to manage this by avoiding overly sugary foods.

Risks

Short Term

As with any surgical procedure, there are risks, all of which are very rare. Blood clots are extremely rare but can happen. An anticoagulant is given in the abdomen the night before surgery and for 2 weeks after, and this, together with the compression stockings, greatly reduces risk. Patients should mobilise early and frequently following surgery when it is ok to do so. Infection occasionally occurs as the patient's body is more vulnerable, having undergone major surgery—treated by oral antibiotics. Bleeding is extremely rare but, if it occurs, requires another operation. Postoperation mortality is very unlikely but, as with any surgery, it is a risk (less than 0.2%).

Long-Term Risks and Side Effects
Poor weight loss/weight regain. Bariatric surgery is only a tool that aids weight loss, and therefore, if the recommended lifestyle and dietary advice are not followed, it is likely that the expected benefits will not be achieved.

Excess Skin
This is likely to occur following significant weight loss, and it is important that to explore how the patient feels about this. Exercise can help but is likely to only make a small impact. The aim of the surgery and subsequent weight loss is to improve health. Cosmetic outcomes are variable, and it is likely that excess skin will occur.

Post-Prandial Hypoglycaemia (Late Dumping Syndrome)
This term describes recurrent episodes of low blood sugar. In a small number of cases, patients, usually who have undergone gastric bypass, describe symptoms of this a year or two following their surgery. The symptoms are usually controlled with dietary measures, occasionally with medication, but in very serious cases, surgery would be required.

Reflux and Nausea
This can be an ongoing issue postoperatively for a very small number of patients, especially those who have undergone a Sleeve Gastrectomy. Medication and diet adjustments can often have a very positive effect on the symptoms.

Frequently Asked Questions

How much weight will a patient lose?
This varies—national statistics consider loss of ***excess weight***, rather than body weight, which can confuse. It is reported that up to 40% occurs with a LAGB, 60% with a Sleeve Gastrectomy, and 70% with a Gastric Bypass of a patient's excess weight. Weight loss is very rapid for the first 3–6 months and then slows down, and it is expected that a plateau will be reached at around 18 months after surgery.

What can a patient do about the excess skin after weight loss?
This is a tricky one. Funding is not available in most cases on the NHS and therefore, as previously stated, it is important to consider this before having the surgery.

How soon after having the surgery can a patient have a baby?
It is advised that patients wait a minimum of 12 months before attempting to conceive. This is in the best interest for both the mother and baby. It should also be noted that as weight is lost, fertility can increase and therefore, a patient is more likely to get pregnant. It is important that suitable contraception is used.

How long does a patient have to attend appointments at their specialist centre?
NHS guidelines state that follow-up should be for 7 years. Patients are required to attend for at least 2 years, and if they have a more suitable local service, they can be discharged there.

Will patients lose hair after the surgery?
Some patients will notice that their hair becomes thinner. This is the body's normal reaction to rapid weight loss. The effects can be minimised by ensuring that their diet contains plenty of protein on a daily basis and hair-health supplements can be taken, which may have some benefit. This problem should resolve within 12 months following surgery.

When can patients drive?
Patients must wait at least 5–10 days after surgery to drive as per DVLA guidelines. Thereafter they should only drive when they feel comfortable doing an emergency stop.

Can patients go on holiday after surgery?
Flying can increase the risk of blood clots and therefore is not recommended for at least 2 weeks following surgery. However, due to the specialist nature of the surgery, it is sensible to wait for at least 6 weeks.

Obesity Education

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John Feenie and Nigel Hinchliffe

Obesity now affects more than one in four adults and one in five children aged 11 or over in the UK, resulting in a range of associated health problems and placing a huge burden on the health system. Urgent action is therefore required to support weight management across the population and find effective treatments to address obesity and related health problems. However, the increase in the prevalence of obesity has not been matched with a corresponding emphasis on education and training for healthcare professionals (HCPs) to equip them to deal with the complex nature of the condition.

The 2010 report by the Royal College of Physicians, titled "The training of health professionals for the prevention and treatment of overweight and obesity" claimed that healthcare professionals had a poor understanding of obesity, including social and environmental determinants, the complexity of nutritional issues and physical activity, and barriers to changing health-related behaviours, and as a result would often ignore patients' excess weight or simply tell them to go on a diet to lose weight. The report linked this lack of understanding to the limited teaching provided in both undergraduate and postgraduate training programmes for HCPs and minimal focus on weight management in specialist medical training. The reason for this is that weight management has traditionally been seen as a lifestyle issue, not a medical problem, so HCPs have abdicated responsibility.

As well as making sure all HCPs have an understanding of the complex nature of obesity, there are two key areas of obesity care training that could make a significant difference to outcomes:

- Training for all HCPs in starting opportunistic conversations with patients about weight

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_24

- Training of at least one GP, and ideally one nurse, in every surgery as a practitioner with a special interest in obesity - obesity specialist Professor Tony Leeds has called for "an army of obesity GPs, nurses and dietitians" in primary care clinics.

While it is, of course, important that the education and training requirements for HCPs have been identified, the bigger challenge is to follow this up with courses and learning opportunities that will deliver this training. Although the UK General Medical Council (GMC) updated its Outcomes for Graduates in 2009 to include the recommendation that medical students should be competent to discuss obesity and behaviour change with patients, a 2013 survey of medical school educators revealed that this was not easily accomplished. They found inconsistencies in the implementation and interpretation of the GMC recommendations and identified a number of barriers to the inclusion and delivery of obesity management education (OME) within undergraduate medical programmes. These included: a lack of clarity about how to design and deliver OME; reluctance of educators to include OME in the curriculum; and perceived lack of student engagement in OME (Chisholm et al. 2013). It was proposed that the dissemination of evidence-based guidelines among medical educators would improve internal support for OME and that enhancing the relevance of OME to students would improve engagement. It was also suggested the GMC should introduce specific learning objectives and obesity management competencies for medical students. These competencies have not materialised from the GMC, but in the USA, the Obesity Medicine Education Collaborative (OMEC) published preliminary obesity medicine competencies in 2019 to be used by medical training programmes (Kushner et al. 2019). A survey of US medical schools was carried out to determine to what extent they meet the OMEC competencies, which revealed that only 10% of respondents believed their students were "very prepared" to manage patients with obesity, and one third reported that their medical school had no obesity education programme in place and no plans to develop one. So, despite the very high rates of obesity and the huge cost burden in the USA, medical schools are not yet prioritising obesity in their curricula (Butsch et al. 2020).

It appears that medical training on both sides of the Atlantic requires attention to ensure the next generation of doctors are competent at managing patients with obesity, but what about medics and other HCPs who are already practising? A large scale continuing professional development (CPD) programme is required in all disciplines to bring practitioners up to speed with best practice for obesity care. However, HCPs are generally overworked and have very limited time for CPD, so programmes need to be selective and effective, to train professionals in the knowledge and skills that are likely to have the most impact.

Sadly, since the Royal College of Physicians report highlighted the urgent need for training in obesity care, there have been no initiatives from the Department of Health to promote or fund such training. There is no requirement for health trusts or local authorities to train their staff in obesity care, so the level of obesity knowledge and expertise across the country is inconsistent at best. A 2015 report on UK HCPs estimated that fewer than 1% had received any specialised obesity training (Candesic 2015). One nationwide initiative that does encourage HCPs to start conversations

about weight with patients is Make Every Contact Count (MECC). MECC was launched in 2012 and aimed to empower HCPs to take every opportunity to raise the issue of health-related behaviours, such as smoking, diet, and physical activity, with their patients, to encourage them to make positive changes to improve their health. A MECC conversation simply aims to help people to think about changing their lifestyle by raising awareness of relevant issues, being encouraging and supportive of change, and signposting to further supporting agencies. There is evidence that, when applied by organisations on a large scale, it can make a difference to patient health at a local population level. MECC can be a positive step with regard to weight management as it can start conversations about lifestyle factors that affect patients' weight. However, the degree of training provided to support MECC is inconsistent (Lawrence et al. 2016), and does not deal specifically with weight or obesity, and therefore does not address some of the specific challenges of raising the issue of weight.

Indeed, a qualitative study published in the BMJ in 2015 (Blackburn et al. 2015) revealed that GPs and nurses were still reluctant to broach the topic of weight with patients due to: lack of knowledge and skills to deal with obesity; concerns about alienating patients; and the time constraints of a 10 minute consultation. The study concluded that addressing these concerns through training may lead to greater practitioner engagement and willingness to raise the topic. A good example of this was provided by the BWeL (Brief intervention for Weight Loss) trial, which showed that when the subject of weight is handled sensitively, and patients are offered a free weight management programme, they are often happy to talk about their weight and participate in the programme. The BWeL trial involved training GPs to opportunistically engage overweight and obese patients in a brief conversation about weight, with the aim of referring them to weight management services. The conversation could be as short as 30 seconds, but the results were impressive, leading to an increase in participation in weight management programmes, and an increase in the number of patients who successfully lost weight over the following 12 months (Aveyard et al. 2016).

So the evidence is out there that simple, targeted training programmes, supported by the availability of appropriate weight management services, can make a positive difference in the battle against obesity. This evidence has not been lost on the London Borough of Southwark in their attempts to tackle obesity in the Borough. Southwark has one of the highest rates of adult and childhood obesity in the country and has therefore launched a healthy weight strategy called Everybody's Business, which uses an evidence-based, life-course, whole-systems approach that includes both prevention and treatment services from maternity and early years through to older adults. Part of this strategy is the commissioning of obesity training programmes, not only for all healthcare professionals employed in the Borough but also for non-healthcare professionals who are public-facing. The courses are designed and delivered by the College of Contemporary Health, which specialises in online training courses in obesity care for HCPs. The courses provide training not only in the knowledge and understanding of obesity and the importance of sensitive communication and motivational skills but also explains how the Southwark Healthy

Weight Care and Referral Pathway works and which weight management services are available in the Borough.

The online nature of these courses means that they are accessible to all staff, no matter where or when they work, as long as they have internet access. Busy HCPs can study flexibly in their own time, or in work time if permitted, to complete the 5-hour course when it is most convenient for them—either intensively over a day or two, or extended over several weeks. E-learning is a rapidly growing educational medium that is suited to reaching large numbers of busy professionals for training and CPD and could therefore be key to delivering obesity care training to the army of HCPs confronted every day with the health consequences of excess weight.

While short courses of a few hours can educate HCPs with the basics of obesity knowledge and how to engage patients, more extensive training is required to train them to provide weight management advice in primary care. To achieve the RCP recommendation of a GP and nurse with a special interest in obesity in every general practice, training needs to be easily accessible for HCPs right across the country. Reading University offers a course for HCPs, to train them to be able to set up and deliver an effective weight management service in primary care. However, this is a 4-day attendance course delivered in Reading, so it is inaccessible for most HCPs. Online provision, on the other hand, is accessible to all HCPs. The RCGP offers an Introductory Certificate in Obesity, Malnutrition and Health, which could potentially be used to meet the obesity training need of large numbers of HCPs. It starts with six short online modules from SCOPE (Specialist Certification of Obesity Professional Education), but it also requires attendance at a communication skills training session. This is an improvement, as these attendance sessions can be delivered in different locations but still requires considerable time and organisation. On the other hand, courses that are delivered entirely online, and require no attendance, could potentially be used to meet the obesity training need of large numbers of HCPs. For example the College of Contemporary Health (CCH), in association with University of Central Lancashire Medical School, has developed postgraduate courses (PG Cert, PG Dip. and MSc) in Lifestyle Medicine (Obesity Care and Management). These courses provide HCPs with a deep understanding of obesity and the ability to improve and develop obesity care within their field of practice. For those practitioners looking for a less intensive learning experience and simply wish to update their knowledge, a range of accredited CPD short courses are available, including courses for nurses, personal trainers and HCPs working with children.

In an innovative, collaborative project, CCH has been working with London South Bank University, C3 Collaboration for Health and the Royal College of Nurses, as part of the Healthy Weight Initiative for Nurses (WIN), to address the issue of obesity in the nursing profession. The working environment of nurses provides barriers to adopting healthy behaviours, and therefore a high proportion of nurses have difficulty managing their weight (Kyle et al. 2017; Wills and Kelly 2017). This, of course, raises concerns about the health of our nurses, so it needs to be addressed, but it can also affect nurses' confidence in supporting patients with obesity and make patients less likely to follow their advice (Kelly et al. 2017). CCH

has developed a bespoke 10-h online course, Obesity Essentials for Nurses, to help nurses understand their own weight and thereby enhance skills transferrable to clinical practice to motivate patients towards weight loss. An initial pilot programme involving trainee nurses, as part of WIN, showed very promising results with regard to nurses' confidence in starting conversations about weight and giving up to date and personalised advice about obesity and weight management (C3 Health 2018).

The importance of reducing the prevalence of obesity in the general public, and in particular our nurses and other health professionals, has been highlighted by the recent coronavirus pandemic. Obesity is one of the major risk factors for Covid-19 severity and mortality, along with comorbidities of obesity such as type 2 diabetes and hypertension (Docherty et al. 2020). It is therefore important to re-double our efforts to tackle obesity, both to limit the impact of future pandemics and to reduce the incidence of type 2 diabetes, cardiovascular disease and other obesity-related health conditions. To achieve this, we must address the issue of obesity education for healthcare professionals, who come across patients with obesity on a daily basis but lack the knowledge and skills to provide the help and support these patients need. Obesity management should be prioritised in medical and nursing curricula, and training provided for existing HCPs to bring them up to date with best practices for obesity care. Targeted online training courses offer one way of providing this training and making it accessible and cost-effective for large numbers of practitioners.

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Gastric Band

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Michele Rouse

So it is 1991 and I have been accepted to have a gastric band; I have seen the psychologists and surgeons and am all set to go, my journey into a slimmer me starts here…

When I arrive at the hospital, I get told that if they are unable to do this surgery by keyhole, they will be opening me up, I did not realise this until that moment and not sure how I feel about it, but I have come this far so decide to take the chance.

I wake up from surgery, and although in a lot of pain, I have not been opened up, and it is such a relief to see the keyholes.

I am discharged, and the journey home is excruciating every time we hit a bump in the road, it is agony; once home, I start my special diet, no solids, just mush.

I go back to the hospital a couple of weeks later as I am unable to keep anything down, they tell me they need to put a syringe in my porthole (which is located on my breastbone) to release the band, so I can eat again.

I then start vomiting after everything I eat, even liquids, and as I am retching, the porthole becomes detached and is sticking out of my chest, back to the hospital I go, and they open me up and re-stitch the porthole back in its place, still vomiting it happens again, so back I go, after they re-stitch it I notice a couple of days later I have a huge bruising about the size of an orange, friends and family are concerned so I go to A and E and they cut through the scar and find a huge blood clot the size of a grapefruit, it has taken out and I am stitched up again.

Although able to keep liquids down and mushy food, I am retching and have to go back to the hospital; then they decide that they are going to take out the porthole, so they open me up and pull it out and just cut the tube, leaving the band in but not able to control it anymore.

It is such a relief to have it out, I actually keep it for old time's sake, this little thing had caused me a lot of pain and discomfort, I then went on for a few years

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_25

eating and then vomiting, so I go to my GP who sends me to the hospital to see a surgeon, it would seem that food was not going through the band, and I had developed a pouch over the top of the band, where food would go in and sit until I vomited it out, I was vomiting approx. 6–8 times a day.

So after seeing the surgeon again, it was decided to take out the band and do a gastric bypass. I was offered to have them done separately in two different operations but decided I had been through enough and things could not get any worse, so I had the band removed, and the gastric bypass performed therein ends my gastric band story.

So, it is 19 days until I change my life by having the stomach bypass, from this moment, I am not allowed to eat what I like, I have to shrink my liver in order for the operation to go ahead. I am going to be living off sugar-free jelly, semi-skimmed milk and yeast extract. This is so going to be worth it, though; I am going to be a size 14 in no time; I am currently a 26.

So been doing this 'diet' a few days its actually not as bad as I thought, I have realised I do not like sugar-free jelly and yeast extract, so I am currently just drinking four pints of semi-skimmed milk per day. Felt strange today, so I went to see my doctor, who advised I need salt in my diet, the first thing that came into my mind is… Walkers plain crisps. I went out and bought them they were so tasty.

So the morning of my bypass, here I am in the hospital waiting to go down to surgery; I might not wake up; I have been told the risks but… I am going to be thin in the end!!

Waking up in intensive care, ouch, everything hurts; I remember my nurse he patted my lips with water, and I thought this is it!!

Moved on to a ward and had lots of visitors; everyone relieved I have made it through the operation.

The next day I was wheeled down to the X-ray department for a Barium meal to make sure I did not have any leaks, I was made to drink the most vile liquid, and I was retching, and the pain was incredible, but luckily no leaks.

Two days later, I was out, relieved to be back home, still eating nothing but shakes, which made me wretch, which hurt like mad.

A week in I was allowed baby substance-like food, mushed up egg, cauliflower cheese, anything that could be blended, apart from chocolate but I did not want that because I was going to be thin!

Two weeks in, I was missing pasta, bread, and rice, all things I was told I would never be able to eat again as they had a tendency to swell. I did not mind though because I was convinced it was all going to be worth it.

Four weeks post, people had started noticing my weight loss, because I was eating tiny amounts, I felt like a size 14, although I had lost about a stone and a half—still a size down so feeling good.

Eight weeks post, I am missing foods so much; I had been addicted to food for so long I felt like I needed to gorge, but that would be the worst thing I could do, and after all, I was going to be thin.

So its 10 years since the op, and guess what… I am still overweight, not as overweight as I was. I am four stone lighter but have stayed at this weight for about the

last 8 years, if I never had the bypass maybe I would be bigger, it is not the easy option and it is not pain and risk free. If I had my time again, I think I would still do it, so I am not a size 14, still fat, but now accept myself for what I am. This op does not work for one in ten people, and it did not work for me.

Got a final thing to say, my Doctor supported me every step of the way, I appreciate I am very lucky to have had this surgery on the NHS.

My Journey

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Justine Clark

On a visit to see my GP about an unrelated matter, who has always known that I have always struggled with my weight, suggested being referred to the bariatric team at Luton and Dunstable Hospital. I have tried everything else, every diet, like the egg diet, Atkins diet, slim fast, Cambridge diet, weight watchers and slimming world. All had an initial success, but no matter how hard I tried, the fat would just come back. So I said yes.

I first went to Luton and Dunstable Hospital in the spring of 2014. I was very apprehensive, no idea what to expect, if I would be judged for being so overweight.

To be honest, I have never met a group of people who were so nice, caring, and supportive. My first appointment was great, we talked about me, my life, what went on in it, and of course, my diet. It was when I was given the milk diet to follow for the next 4 weeks.

The milk diet is not as bad as it sounds, but the first 4–5 days, I have never felt so hungry or tired. This passed, and I felt much better, and I began to lose weight. When I went back to the hospital, I had lost 21 lbs, never had I ever managed to lose that amount of weight before.

Over the next month, I lost a further 7 lbs, and in that time, I had to have one meal a day, but as soon as my food intake increased, so did my weight.

In May 2016, I was approved for a gastric bypass, I chose bypass as it gave the best results in weight loss, and I was only going to get one chance.

The following few days after surgery were bad; I felt awful, looked worse and ended up in A and E having a serious case of constipation dealt with, that was the lowest point, and I questioned what I had done to myself. From then on, everything got better. I did struggle to eat as I did not feel hungry. When I started to have food, I lived on tinned mandarins and small pots of low-fat custard. I still don't ever feel that hungry, but I know what I need to do to keep myself healthy.

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D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
In Clinical Practice, https://doi.org/10.1007/978-3-030-83399-2_26

I followed all the instructions and advice that I was given, and other than my one trip to A and E, I have been fine. I always kept my appointments and was honest about how everything was going. There are lots of foods that I cannot eat as they make me feel ill, so I always keep a note of all those, but I do have a very varied diet, mainly protein with some vegetables and salad, always drink plenty of water. High fat and sugar foods are the ones I avoid.

If anyone had told me how I would feel 2 years on from my operation, I wouldn't have believed my life would change as much as it has. I can fit in an aeroplane seat with no problems; I can get in and out of a car without any problems. I am still amazed that when I get up in the morning, nothing aches or hurts. I have joined a running club, and I do 'Park Run' every weekend. I really enjoy my exercise, which is something I thought I would never say. My life is so different now. I have even given up smoking, because I'm not worried about putting weight on.

The last 2 years have been amazing; I have learnt a lot, especially about myself. I would have no problem recommending this opportunity to anyone, everyone that I have met at Luton and Dunstable hospital has been amazing and never judgemental. Very special thanks to my Doctor, who has supported me all the way and without whom I may have never been given this opportunity.

I was a size 26/28 and weighed nearly 23 stone. I am now a size 14/16 and weigh just over 12 stone, which is crazy.

(Feeling fabulous at nearly 50)

Postscript

This chapter is being written during what appears to be the peak of the Covid-19 pandemic. There seems to be an emerging link between the virus and obesity, both in severity, duration of infection and ability to infect others. There could be a simple answer, such as the mechanical difficulty in natural breathing in bedbound patients and problems with invasive and non-invasive ventilation. Alternatively it may transpire that obese individuals are more likely to suffer from the metabolic syndrome, with the associated risks of cardiovascular disease, hypertension, dyslipidaemia, sleep apnoea and diabetes, all known pre-disposing factors for the virus. However evidence is emerging that more profound factors may be involved. Obesity has been reported to increase vulnerability to infection in general (Misumi et al. 2019). Obesity is a known independent risk factor for hospital admission and mortality in patients with H1N1 influenza virus, and obese rodents exhibited greater H1N1 mortality (Milner et al. 2015). Symptomatic obese adults have been shown to shed influenza A virus 42% longer than non-obese counterparts (Maier et al. 2018).

Reports from around the globe have identified obesity and severe obesity as risk factors for hospital admission and mechanical ventilation in H1N1, a related virus. In California between April and August 2009, 1088 patients with H1N1 influenza either were hospitalized or died. Of 268 patients ≥20 years old in whom BMI was calculated, 58% had obesity (BMI ≥ 30), and 67% of those had severe obesity (BMI ≥ 40). Sixty-six percent of those with obesity also had underlying diseases, such as chronic lung disease, including asthma, cardiac problems, or diabetes. Among hospitalised patients in New Mexico in 2009, 46% had obesity, and 56% of those requiring mechanical ventilation had severe obesity (Dietz and Santos-Burgoa 2020). This letter to 'Obesity' calls for 'increasing the sensitivity of clinicians caring for patients with obesity and COVID-19 to the need for aggressive treatment of such patients.' And also explores the increase in infections and sequelae in certain ethnic groups, which could be explained by the enhanced predisposition to obesity and its co-morbid risk factors in these groups, as could the severity of the virus in sarcopenic elderly individuals.

D. Haslam et al. (eds.), *Bariatric Surgery in Clinical Practice*,
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