

The Problem of Obesity

Key Points:

1. Obesity is the commonest health problem in our community
2. Obesity causes many diseases and markedly increases the risk of dying prematurely
3. Obesity also reduces quality of life by limiting physical activity and encouraging social isolation.
4. The costs of obesity through increased health costs and reduced effectiveness in the community are very high.
5. The body mass index or BMI is the best simple method for measuring how obese someone is.

Obesity is shaping to be one of the greatest health challenges of the 21st century. No disease is more common and causes more unnecessary illness or early death than obesity. Furthermore, there is no other single problem that so reduces the quality of life or increases the demand for healthcare services.

The problem is world wide. In the USA, more than two of every three adults are overweight and about one in three is obese. That means that approximately 60 million people have the disease of obesity in the USA alone. More than one in five Australian adults, an estimated 2.6 million of a population of 20 million, are obese. For both countries, the incidence of obesity has doubled since the 1980. Alarmingly, obesity starts in childhood and already 7% of our teenagers are obese.

Around the world, all countries have a growing problem. There are now an estimated 300 million people around the world who are suffering from obesity and its consequences. In both developed and developing nations, a similar pattern is occurring. In Russia, 54% of adults are overweight. In Brazil, the figure is 36%, and in Malaysia, 27%. Even China has a developing problem. A recent survey of adults in urban Shanghai reported that 29.5% were overweight and 4.3% were obese.

After millions of years evolving a genetic structure to survive the life of the hunter/ gatherer, our health and our lives are now threatened by a lifestyle characterized by ready access to copious amounts of attractive food and very little need for physical activity. Foods high in fat, carbohydrates, and, in particular, simple sugars, are booming. The US Department of Agriculture reports that the US per capita intake of sugar was 152.4 lbs in 2000. That is equal to nearly half a pound of sugar per person each day. Most will claim they are not eating that much sugar. We would all be surprised to see that sugar is now a part of so many foods that we don't even realise we are eating sugar. It has infiltrated our diet to a frightening extent. One hundred years ago, the sugar intake per person was only 0.5 lb. Is it any wonder that we have a problem?

And we don't even need to get out of the chair to order the food to be delivered or to change the channels on the television. Activity has become optional. The combination of increased intake of energy and reduced energy expenditure inevitably leads to progressive weight increase

DEFINING AND MEASURING OBESITY

We define **obesity** as **"a disease in which fat has accumulated to the extent that health is impaired"**.

Notice three key components of the definition:

"Obesity is a disease" - It is only recently that major health authorities such as the World Health Organization and the US Federal Department of Health have acknowledge it as a disease. This change is most important as the disease of obesity can now begin to claim attention and an allocation of resources as do all other diseases.

"in which fat has accumulated" - fat is the key element of obesity. Primarily we are interested in how much fat there is in the body. We are not focused on weight per se. However, as we do not have a simple office method for directly measuring the fat content of the body, we have to use surrogate measures. We could use weight alone but this would be terribly misleading. The tall person is always likely to be heavier than the shorter person. Therefore, as a minimum, we have to take into account the height as well. Currently, our best way to do that is by using the Body Mass Index or the BMI. We will come back to discuss how we calculate the BMI and look at its

strengths and weaknesses in a moment

“to the extent that health is impaired” . We are dealing with a disease that causes disease. The disease of obesity may be expressed in various ways. It may be as type 2 diabetes or any of the dozens of known diseases that are caused by or made worse by obesity. It may be expressed as a physical or psychosocial limitation on the quality of your life. You can no longer do the things that normally it is expected you can do. You may have severe lowering of self-esteem or self-confidence leading to isolation, depression or unemployment. Or it may be expressed as a risk to your future health. You may feel fine currently, but you are aware that you are at high risk of disease in the future and that your life expectancy is being reduced by your obesity.

We will return to look at the disease of obesity in more detail but, firstly, let's be clear about how we measure this disease.

The Body Mass Index - The BMI

The BMI is a measure that combines the weight and the height according to the following formula:-

$$\text{BMI} = \text{Weight (in kg)} \text{ divided by } \text{Height}^2 \text{ (in metres).}$$

or

$$\text{BMI} = \text{Weight (pounds)} \text{ divided by } \text{Height}^2 \text{ (in inches)} \times 705$$

We use BMI as our primary measure of obesity. We want a measure that is simple to make and acceptably accurate. Direct measure of the amount of fat in the body is not simple and measuring weight alone is not accurate enough. Across the world, the BMI is accepted as the best primary measure, as, in most situations, it provides an accurate reflection of the amount of fat present. As weight increases, it is mainly as fat. There may be some increase in muscle mass as well but it is usually small in proportion. As you lose weight, the loss of fat is predominant but you may also lose some muscle mass.

We have now established what we consider are normal and abnormal levels of BMI. The following values are for Western populations:

<u>Label</u>	<u>BMI</u>
Normal	18.5 - 25.
Overweight	25 - 30.

Obese	above 30.
Severely obese	above 35,
Morbidly obese	above 40
Super obese	above 50

Any level of obesity is bad for you. At a BMI of 30 you are at a higher risk of disease and have a reduced life expectancy. For most, the quality of life is reduced. At progressively higher levels of BMI the likelihood of disease increases, the risk to life is greater and the quality of life is less. Of course there is much variation between individuals. Some can have quite a high BMI and not recognise any problem. Others can be mildly obese and yet suffer significantly.

If the concept of the body mass index is confusing to you, the following table shows you the BMI you are for different weights and heights, firstly in pounds weight and inches of height and then in kg of weight and cm of height:

Body Mass Index Chart (based on lb and in)

	Height (in)								
	60	62	64	66	68	70	72	74	76
<u>120 lb</u>	23	22	21	19	18	17	16	15	15
<u>130</u>	25	24	22	21	20	19	18	17	16
<u>140</u>	27	26	24	23	21	20	19	18	17
<u>150</u>	29	27	26	24	23	22	20	19	18
<u>160</u>	31	29	28	26	24	23	22	21	20
<u>170</u>	33	31	29	27	26	24	23	22	21
<u>180</u>	35	33	31	29	27	26	24	23	22
<u>190</u>	37	35	33	31	29	27	26	24	23
<u>200</u>	39	37	34	32	30	29	27	26	24
<u>210</u>	41	38	36	34	32	30	29	27	26
<u>220</u>	43	40	38	36	34	32	30	28	27
<u>230</u>	45	42	40	37	35	33	31	30	28
<u>240</u>	47	44	41	39	37	35	33	31	29
<u>250</u>	49	46	43	40	38	36	34	32	30
<u>260</u>	51	48	45	42	40	38	36	34	32
<u>270</u>	53	49	46	44	41	39	37	35	33
<u>280</u>	55	51	48	45	43	40	38	36	34
<u>290</u>	57	53	50	47	44	42	39	37	35
<u>300</u>	59	55	52	49	46	43	41	39	37
<u>320</u>	63	59	55	52	48	46	43	41	40

340	66	62	58	55	52	49	46	44	41
360	70	66	62	58	55	52	49	46	44
380	74	70	65	61	58	55	52	49	46
400	78	73	69	65	61	57	54	51	49

Body Mass Index Chart (in kg and cm)

	152	158	163	168	173	178	183	188	193
<u>54 kg</u>	23	22	21	19	18	17	16	15	15
<u>59</u>	25	24	22	21	20	19	18	17	16
<u>64</u>	27	26	24	23	21	20	19	18	17
<u>68</u>	29	27	26	24	23	22	20	19	18
<u>73</u>	31	29	28	26	24	23	22	21	20
<u>77</u>	33	31	29	27	26	24	23	22	21
<u>82</u>	35	33	31	29	27	26	24	23	22
<u>86</u>	37	35	33	31	29	27	26	24	23
<u>91</u>	39	37	34	32	30	29	27	26	24
<u>95</u>	41	38	36	34	32	30	29	27	26
<u>100</u>	43	40	38	36	34	32	30	28	27
<u>104</u>	45	42	40	37	35	33	31	30	28
<u>109</u>	47	44	41	39	37	35	33	31	29
<u>113</u>	49	46	43	40	38	36	34	32	30
<u>118</u>	51	48	45	42	40	38	36	34	32
<u>123</u>	53	49	46	44	41	39	37	35	33
<u>127</u>	55	51	48	45	43	40	38	36	34
<u>132</u>	57	53	50	47	44	42	39	37	35
<u>136</u>	59	55	52	49	46	43	41	39	37
<u>145</u>	63	59	55	52	48	46	43	41	40
<u>154</u>	66	62	58	55	52	49	46	44	41
<u>163</u>	70	66	62	58	55	52	49	46	44
<u>172</u>	74	70	65	61	58	55	52	49	46
<u>181</u>	78	73	69	65	61	57	54	51	49

It is important to know that BMI is not perfect. Measuring it is a surrogate for measuring the amount of fat. Its great advantage is that it is simple to measure and it is generally accurate enough. However it can be misleading. Here are at four examples which demonstrate that BMI is not perfect.

First, the critical cutoff of BMI for obesity is different for some ethnic groups. For the people who originated from European countries, the so-called

Western world, a BMI of 30 is considered the dividing line between being overweight and obese. But, from careful study of the amount of fat in the body at different weights, we now know that the Chinese, Indian and Malay population should be regarded as obese at BMI levels of 27 - 28 rather than 30 for the Western population because at any given weight they will have a higher proportion of fat. As a more detailed picture of the ethnic differences continues to develop we may find other groups who should have different cutoffs also.

Second, the athlete who builds up muscle through heavy training can put on weight without additional fat. BMI measures in such a person will not reflect the fat content of the body. There are many examples of bodybuilders or footballers who have a high BMI but very little body fat. They do not have obesity as they do not have an abnormal accumulation of fat. As long as we understand that BMI is not a direct but a surrogate measure for fat, we should not get confused by this exception.

Third, the BMI does not tell us anything about the distribution of fat and yet we recognise that those with "central" obesity, the big belly, have a higher risk of a range of obesity related disorders like heart disease and diabetes compared to those with 'peripheral" obesity, big bum and legs. The "apple" shape is worse than the "pear" shape. Again, simple observation and measurement enable us to avoid confusion on this.

Finally, the accumulation of excess fat in children and adolescent is not adequately reflected by measuring height and weight alone. We must include age and then look at growth and weight charts to see if the child is outside the expected range.

While we should recognise these potential pitfalls, BMI remains our best general measure. It is used throughout the world, it is easy to measure and to understand and is now established as the appropriate starting point for describing obesity.

Other Measures of Fatness

Although the BMI is the most commonly used and most simple method for estimating the amount of fat in the body as a proportion of total body weight we can do this more accurately with some relatively sophisticated tests such as DEXA and underwater weighing.

DEXA is now a common test and potentially very useful in measuring fatness and following the fat loss as the weight decreases. DEXA stand for Dual

Energy X-ray Absorptiometry. Up to now it has been used mainly for measuring the density of bones to check for possible thinning of the bones or osteoporosis. The DEXA machine looks a bit like a CT scanner but uses much lower energy and therefore less potential harm. It is too complex to use on a day to day basis but does tell us exactly how much fat is in the body and can be used intermittently to monitor progress.

Underwater weighing is an accurate way to measure the fat content of the body. It provides a simple measure of weight per unit volume and takes us back to ancient Greece and to Archimedes lying in his bath. He is said to have shouted "Eureka" when he realised how, through displacement of water, he could discover if the King's golden crown contained some base metals. We can now discover in this same way how much of you is fat. However, although it is accurate and therefore valuable in research studies, it is not really acceptable for most people and not suitable for frequent measures.

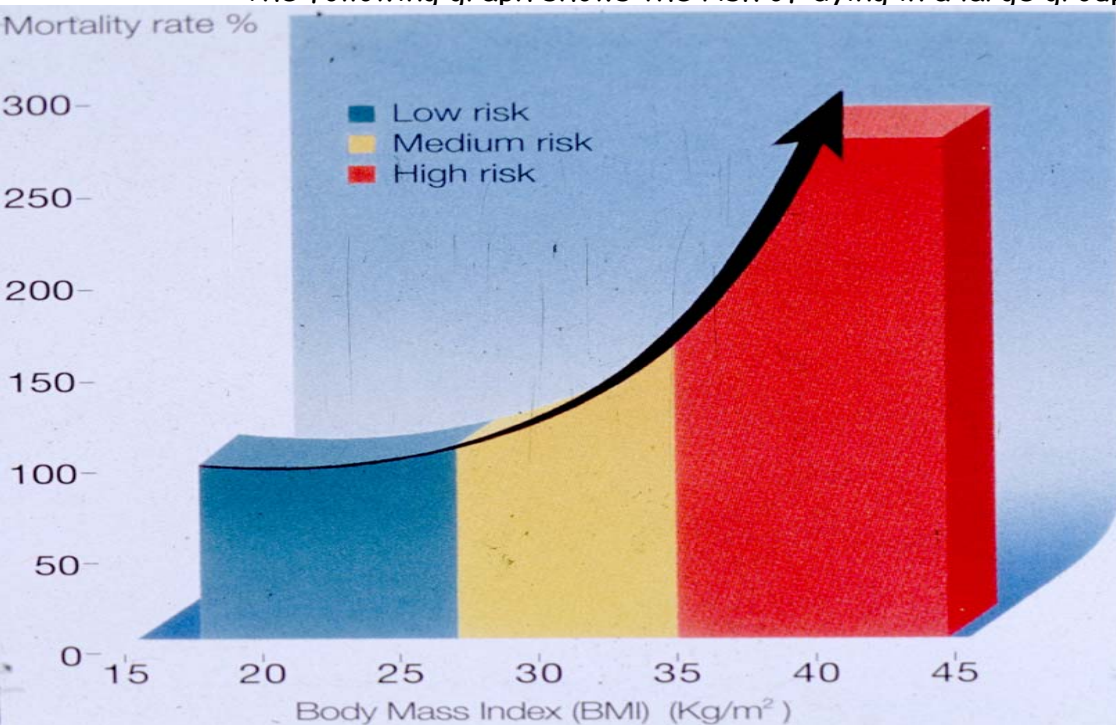
Bioimpedance, otherwise called BIA, is well known, commonly used and therefore deserves comment. You can readily buy scales which provide measures of bioimpedance and these scales give a readout of total body fat. You will see them advertised by commercial weight loss groups and Doctor's offices frequently have them. More complex devices are also available. The concept is that a small electrical current is passed across the body and the resistance to the flow of that current is measured. Fat impedes the flow of the current more than the other body tissues and, from the measurement of this impedance, the instrument uses a formula to calculate how much is fat. Unfortunately the technique is not an accurate measure of fatness. Because of the way the electronics in the devices do their calculations, we are able to get just as accurate a measure of the amount of fat by using the BMI alone. Don't be fooled by the fact that it prints numbers or sounds highly scientific. It is not.

THE PROBLEMS THAT OBESITY CAUSES

1. REDUCED LIFE EXPECTANCY

The first problem of obesity to focus on is the one that many obese people think about the least - you are less likely to live a long life if you are too fat. The life insurance companies have known this for a long time. They know that, for life insurance purposes, the fatter you are the worse the risk you are to them.

The following graph shows the risk of dying in a large group of American men risk of dying is risk increases



If your BMI is greater than 35 you are in the high risk group and, by the time you reach a BMI of 40, the risk is nearly three times that of people who have normal weight. The risk rises very steeply as your weight goes above a BMI of 40.

The Center for Disease Control in Atlanta, Georgia estimated that, depending on how you calculate the numbers, there were between 112,000 and 380,000 excess deaths from obesity related disease in the US during the year 2000. Whichever figure is correct or something in between, it is a horrific statistic, far worse than road deaths (43,000) or terrorism (0). Even the young are paying a price for their obesity. A teenager, entering adulthood with a BMI greater than 40, would have life expectancy reduced by up to 13 years for a male and 8 years for a female. The risk of early death from obesity is similar to the risk from smoking.

2. MEDICAL DISEASES

A pathogen is something that causes disease. Obesity is the consummate pathogen. It causes or makes worse a broad range of diseases including type 2 diabetes, coronary heart disease and stroke, hypertension, sleep apnoea, depression, a range of cancers including breast, gynecological and gastrointestinal malignancies, abnormal levels of fats in the blood, polycystic ovary syndrome, inflammation of the liver and osteoarthritis of the lower spine and joints which bear your weight such as the hips, knees and feet. Also obese people are more at risk of accidents at work, at home or on the road and are more likely to suffer sudden unexplained death.

There is a long list of illnesses that are either caused by obesity or are made worse by obesity. The ones that are listed in the table are the common and most important of them.

Table:

- **Diabetes**
- **Hypertension**
- **Dyslipidemia**
- **Ischemic heart disease**
- **Cardiomyopathy**
- **Pulmonary hypertension**
- **Asthma**
- **Hypoventilation syndromes**
- **Obstructive sleep apnea**
- **Gallstones**
- **NASH (Non-alcoholic steatohepatitis)**
- **Urinary incontinence**
- **Gastroesophageal reflux**
- **Arthritis - weight bearing**
- **Low back pain**
- **Infertility**
- **Polycystic ovarian syndrome**
- **Obstetric complications**
- **DVT & Thromboembolism**
- **Depression**
- **Immobility**
- **Breast / Gastrointestinal / Prostate / & endometrial cancer**
- **Venous / Stasis ulcers**

- **Intertrigo**
- **Accident Prone**

We will discuss a number of these diseases in the next chapter when we will also look at the improvements in health which occur with weight loss. For now we will move on to look at some of the physical, social and economic problems that occur with obesity.

3. PHYSICAL LIMITATIONS

Morbidly obese people often cannot do the things that others can do. Sporting activities are generally out, which excludes them from many family pastimes.

Physical activity of any sort can be quite difficult due to shortness of breath or just plain tiredness, so that even housework or standard employment is a challenge.

Most cannot buy clothes easily and some have difficulty getting into and out of cars, into seats on the bus or the theatre.

Airplane travel can be a major embarrassment. You may need to ask for an extension for the seat belt. You may not be able to lower the table down.

You may see the person allocated the seat next to you go to the flight attendant and ask for another seat. Just the thought of these things happening put you off travel.

Flexibility is reduced. The toes get progressively out of reach or even out of sight, making cutting the toenails a shared responsibility. Personal hygiene becomes a problem if you cannot get the toilet paper or the towel to reach all the nooks and crannies.

4. SOCIAL ISOLATION

Many who are morbidly obese feel uncomfortable in public. Commonly they sense that people are looking at them and commenting on their weight and the difficulties it produces in dressing well and moving easily. They prefer to withdraw - to live within the family circle at home, rarely venturing into the public gaze.

This may help them cope with the embarrassment but equally it deprives them of the chance to work, the chance to join the family in outside activities and to join friends socially. It is not surprising therefore to find

that the morbidly obese have a low level of self esteem and a feeling of worthlessness and uselessness. It is common for obese people to suffer depression. They hate their appearance. They feel that they are unattractive to their partner and to others.

Obese people suffer social bias, prejudice and discrimination as a result of their appearance. Society stigmatizes the obesity. Obesity is probably the only area left where discrimination is still considered acceptable. Unfavourable remarks about someone because of their sex, race or disability are just not acceptable in our society today, and rightly so. Unfavourable remarks about someone's obesity is still okay. This attitude is implanted early. When children are shown the silhouette of an obese person they describe the person as ugly, smelly, dirty, lazy, stupid, dishonest, weak-willed, awkward, liar and cheat.

My patients are the best witnesses to these problems. The following are a list of anecdotes about events that have occurred to some of them because of their obesity:

Waiting in the queue at the supermarket with a trolley of shopping and a stranger will look into the trolley and point to items saying "someone your size shouldn't be eating that".

Walking down the street and a small child speaking in a really loud voice "Mummy, look at that big fat lady. She's the fattest lady I've ever seen". Others all turn to look at me.

Walking along the street and a car load of young men/louts yelling obscenities to me about my size.

In a nightclub, overhearing a man refer to me as a "beached whale".

Travelling in Asia and constantly harassed by locals about my size. There were some very cruel comments and frequent attempts to touch and squeeze parts of my body.

At an airport, a very loud and public scene when an official said I was so fat that I had to pay for two seats on the plane.

On an airplane trip I was very publicly moved to another seat as the flight attendant said I was "too heavy and they needed to balance up the weight on the plane".

Walking into a dress shop and being told rudely that "there is nothing to fit you here".

When shopping I am often totally ignored while other customers receive attention. (This difficulty in clothing shops recurs again and again. And when they have lost weight, they are greeted warmly and asked if they need any help.)

Checking that the chairs in a restaurant are strong enough to hold me. They pretend to be anxious that I may break the chair.

Getting into an elevator and a woman already inside saying to her child as she looked directly at me "I think we'll get out here and wait for the next elevator"

5. ECONOMIC CONSIDERATIONS

Obesity costs the community a great deal in view of the high healthcare needs of the obese. These costs are both direct costs of investigating and treating obese-related diseases and include doctor visits, tests and medicines and hospitalizations, and the indirect costs such as the wages lost because of illness or disability or the loss of future earnings because of premature death. In the United States, these costs have been estimated by the U.S. Department of Health and Human Services to be \$117 billion for the year 2000. This is made up for \$61 billion of direct costs and \$56 billion for indirect costs. Major contributors to this total cost are heart disease (\$9 billion), osteoarthritis (\$21 billion), high blood pressure (\$4 billion) gallbladder disease (\$3 billion) and cancers of the breast, uterus, and colon alone \$7 billion). The annual workdays lost was nearly 40 million. It is estimated that, in that year in the US, people made 63 million visits to their doctor because of obesity related problems.

Whatever way you look at these numbers we are spending a great deal on obesity. If these costs could be reduced by weight loss, it would pay for a lot of treatments.

Summary

Obesity is one heck of a problem. It is the worst cause of disease in the Western world. It leads to early death in more people than almost any other cause. What life you do have is severely reduced in quality because of the physical and social problems generated by the disease. And it costs us as a community a great deal of money because of the direct and indirect effects of the health problems. If losing weight solves even some of these problems and if we can find an acceptable and effective way to lose weight, we really should go for it.