

Adult obesity and overweight

9

Rachel Scantlebury and Alison Moody

Summary

- This chapter presents measured height, weight, and waist circumference in participants aged 16 and over in 2014. The main focus is on overweight and obesity, including central (abdominal) obesity. The chapter also presents associations between obesity and hypertension, mental health and longstanding illness.
- BMI thresholds for diabetes risk which are specific to different ethnic groups are also shown, combining data from 2012-2014.
- Mean BMI for both men and women was 27.2 kg/m², in the overweight range.
- Similar proportions of men and women were obese (24% of men and 27% of women) but men were more likely to be overweight than women (41% of men and 31% of women). These figures have stayed broadly similar in recent years.
- In 2014, 2% of men and 4% of women were morbidly obese (BMI 40kg/m² or higher).
- The prevalence of obesity for men and women increased with age, and then decreased in the oldest age groups. Obesity ranged from 9% of men aged 16-24 to a peak of 35% of men aged 55-64, and the equivalent range for women was from 13% aged 16-24 to 35% aged 64-75. The proportion who were overweight also increased with age.
- For women, but not men, obesity varied with socio-economic indicators, with those in the lowest income households or the most deprived areas most likely to be obese. 31% of women in the lowest income households and 33% of women in the most deprived areas were obese, compared with 20% of women in the highest income households and 22% of women in the least deprived areas.
- More women than men had a high or very high waist circumference, indicating central obesity (66% of women and 54% of men). The difference was particularly marked for the prevalence of a very high waist circumference (45% of women and 32% of men). The proportion with a high or very high waist circumference generally increased with age.
- Waist circumference showed a similar relationship with socio-economic indicators as obesity did: those in lower income households or living in more deprived areas were the most likely to have a very high waist circumference. This was most marked for women (51% of women in the lowest income households and 33% of women in the highest income households; 53% of women in the most deprived areas and 39% of women in the least deprived areas).
- Obesity and central obesity were both associated with other health conditions, increasing the risk of hypertension, longstanding illness and mental ill health. For example, obese adults had about twice the prevalence of hypertension compared with adults who were neither obese nor overweight (42% of obese men and 37% of obese women, compared with 22% of men and 18% of women of normal weight).
- Combining obesity and waist circumference, in line with NICE (National Institute of

Health and Care Excellence) recommendations, showed that 34% of men and 43% of women were at high or very high risk of obesity-related chronic disease.

- Diabetes risk was calculated by applying alternative BMI thresholds for minority ethnic groups to reflect the differential risk of diabetes between these groups. Black and Asian men and women were at greatest risk of diabetes, despite Asian men having the lowest mean BMI. 83% of Black men and 77% of Asian men were at either increased or high risk of developing diabetes, compared with 68% of all men. Similarly, 87% of Black women and 68% of Asian women were at increased or high risk, compared with 59% of all women.

9.1 Introduction

9.1.1 Contents of the chapter

The main focus of this chapter is overweight and obesity for adults aged 16 and over, as measured by body mass index (BMI), and central (abdominal) obesity, indicated by a very high waist circumference. Height and weight measurements were taken during the interviewer visit and were used to calculate BMI;¹ waist measurements were taken during the nurse visit. BMI and central obesity categories are also combined to give an overall category for risk of developing obesity-related diseases including cardiovascular disease and diabetes. Trends in overweight and obesity prevalence since 1993 are also presented.

This chapter examines associations between overweight, obesity and central obesity with other health conditions, namely hypertension, longstanding illness, and mental health. This complements previous reports which contained a focus on diabetes (2013),² and general health (2012).³ In addition, for the first time in the HSE series, this chapter presents BMI data by ethnic group using additional BMI thresholds as recommended by the World Health Organization. These reflect the risk of obesity-related diabetes that occurs at lower BMI thresholds in some ethnic groups.

9.1.2 Overweight and obesity as health issues

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.⁴ Being overweight or obese is associated with an increased risk of a number of common diseases and causes of death, including diabetes, cardiovascular disease and some cancers.^{5,6} Obesity is estimated to be the fourth largest risk factor contributing to deaths in England (after hypertension, smoking, and high cholesterol) according to the NHS Atlas of Risk.⁷ For individuals classified as obese, the risk of poor health increases sharply with increasing BMI.⁸

Trend data from the Health Survey for England (HSE) has shown obesity rising from 13% of men and 16% of women in 1993 to 24% of men and women in 2006, since when the rise has slowed. Central obesity, defined as a very high waist circumference (see section 9.2.2 below), has also risen markedly, from 20% of men and 26% of women in 1993 to 34% and 44% respectively in 2013.⁹

HSE results also show that morbid obesity (the most severe category of obesity) has more than doubled since 1993, and reached 2% of men and 4% of women in 2013, with no sign of a reduction in the rate of increase after 2006.⁹ This reflects similar trends in hospital admissions with a primary diagnosis of obesity, which increased from just over 1,000 in 2000/2001 to a peak of nearly 12,000 in 2011/12, reducing in the last two years to around 9,300 per year in 2013/14. In 2013/14, female admissions accounted for more than double the number of male admissions.¹⁰ It is possible that part of this rise may be due to diagnostic/definitional changes or changes in management that result in a higher likelihood of admission.¹¹ Those admitted with a primary diagnosis of obesity are likely to be extreme cases, the 'tip of the iceberg'; at a population level, the majority of harm is done to those with less extreme obesity, of whom there are many more. Admissions with a primary or secondary diagnosis of obesity (i.e. attending hospital for another problem, for which obesity was relevant) have also risen more than ten-fold in the same period, from 29,000 in 2000/2001 to over 360,000 in 2013/2014.¹² These admissions have increased year-on-year, with no apparent slowing of the rise.

To address the issue of obesity, a number of government policies and initiatives are in place, aimed at individuals, the NHS, local authorities and food manufacturers and retailers. The *Change4Life* public information campaign aims to improve diet and activity levels of parents and children.¹³ The Public Health Responsibility Deal involves voluntary participation from food manufacturers and retailers in a number of areas including calorie reduction and improving food labelling systems.¹⁴ The *Living Well for Longer* policy document aims to encourage local authorities and clinical commissioning groups (CCGs) to

follow the lead of Public Health England in acting on obesity.¹⁵ In particular, local authorities are being encouraged to use their powers to curb fast-food outlets¹⁶ and to promote exercise and active travel.¹⁷

9.2 Methods and definitions

9.2.1 Methods

Full details of the protocols for carrying out all the measurements are contained in Volume 2 of this report, *Methods and documentation*, Appendix B;¹⁸ they are summarised briefly here. Height and weight were measured during the interviewer visit, while waist and hip circumferences were measured during the nurse visit.¹⁹ The interviewer also asked participants about self-reported weight and height and their own perception of their weight and weight management. The questions can be found in the Individual Questionnaire in Volume 2 of this report, *Methods and Documentation*, Appendix A. These data are not presented in this chapter but self-reported results from HSE 2012 have been reported previously.³

Height

Height was measured using a portable stadiometer with a sliding head plate, a base plate and connecting rods marked with a measuring scale. Participants were asked to remove their shoes. One measurement was taken, with the participant stretching to the maximum height and the head positioned in the Frankfort plane.²⁰ The reading was recorded to the nearest millimetre. Participants who were unable to stand or were unsteady on their feet were not measured.

Weight

New Class III Seca scales were introduced for HSE 2011, and have been used since then. These meet a higher specification than previous (Class IV) scales, and measure up to a maximum of 200kg, compared with the maximum of 130kg in the earlier models.

For the weight measurement, participants were asked to remove their shoes and any bulky clothing or heavy items in pockets etc. A single measurement was recorded to the nearest 100g. Participants who were pregnant, unable to stand, or unsteady on their feet were not weighed. Participants who weighed more than 200kg were asked for their estimated weight because the scales are inaccurate above this level. The estimated weight from the one individual affected, where the interviewer estimated that they were over 200kg, although when asked, their estimated weight was below 200kg, was included in the analyses.

In the analysis of height and weight, data were excluded for those who were considered by the interviewer to have unreliable measurements, for example those who were too stooped or wearing excessive clothing.

Waist circumference

BMI does not distinguish between mass due to body fat and mass due to muscular physique. It also does not take account of the distribution of fat. It has therefore been suggested that waist circumference, waist to hip ratio (WHR) or waist to height ratio may be useful supplements to BMI to identify central (abdominal) obesity, which increases the health risk from being overweight.^{21,22} More recently waist circumference has been identified as the most useful of these three measures of central obesity in determining health risk.^{23,24}

The waist was defined as the midpoint between the lower rib and the upper margin of the iliac crest (hip bone). The measurement was taken twice, using the same tape (waist and hip measurements were alternated), and was recorded to the nearest millimetre. Where the two waist measurements differed by more than 3cm, a third measurement was taken. The mean of the two valid measurements (the two out of the three measurements that were the closest to each other, if there were three measurements) was used in the analysis.

Participants were excluded from waist measurements if they reported that they were pregnant, had a colostomy or ileostomy, or were unable to stand. All those with measurements considered unreliable by the nurse, for example due to excessive clothing or movement, were also excluded from the analysis.

Response to measurements

Response rates to measurements are shown in Table 9.1. 89% of men and 88% of women provided valid height and weight measurements. Among those who received a nurse visit, waist measurements were obtained from 97% of men and 96% of women. Response rates for all three objective measures, but particularly for height, were lower among those aged 85 and over.

Table 9.1

Age-standardisation

Age-standardised data are presented in this chapter for most analyses. Age-standardisation allows comparisons between groups after adjusting for the effects of any differences in their age distributions.

For regions, both observed and age-standardised data are provided. Those wishing to ascertain the actual levels of overweight and obesity in each region should use the observed data, while those making comparisons between regions should use the age-standardised data. The comments on region in this chapter are based on age-standardised results.

9.2.2 Definitions

Body mass index (BMI)

In order to define overweight or obesity, a measurement is required that allows for differences in weight due to height. A widely accepted measure of weight for height is the body mass index (BMI), defined as weight in kilograms divided by the height in metres squared (kg/m^2).²⁵ This has been used as a measure of obesity in the HSE series. Adult participants were classified into the following BMI groups according to the World Health Organization (WHO) BMI classification (Table 9A).²⁶

Table 9A	
BMI (kg/m^2)	Description
Less than 18.5	Underweight
18.5 to less than 25	Normal
25 to less than 30	Overweight
30 or more	Obese
40 or more	Morbidly obese

BMI categories of overweight and obese have frequently been combined to show the proportion who are either overweight or obese. As in previous years' reports, a subset of the obese category has also been defined, namely those with morbid obesity (BMI 40kg/m^2 or more), who are at highest risk of morbidity and mortality.²⁷

Combined assessment of health risk from BMI and waist circumference

In November 2014, NICE published guidance on the identification, assessment and management of overweight and obesity in children, young people and adults, which partially updated its 2006 guidance. The guidance included a recommendation for health professionals to 'think about using waist circumference, in addition to BMI, in people with a BMI less than 35kg/m^2 '. The recommendation is to base the assessment of health risks associated with being overweight or obese on BMI and waist circumference, as in Table 9B below.²¹ This is because some people, despite having a BMI of less than 35kg/m^2 , may have a higher risk of disease due to having a more 'central' fat distribution as identified by a high or very high waist circumference.^{22,28,29} For those with a BMI of 35kg/m^2 or more, waist circumference has little added predictive power of disease risk, and these individuals are also unlikely to have a low waist circumference.²²

Table 9B			
BMI classification	Waist circumference		
	Low	High	Very high
Normal weight (18.5 to less than 25kg/m ²)	No increased risk	No increased risk	Increased risk
Overweight (25 to less than 30kg/m ²)	No increased risk	Increased risk	High risk
Obesity I (30 to less than 35kg/m ²)	Increased risk	High risk	Very high risk
Obesity II (35 to less than 40kg/m ²)	Very high risk	Very high risk	Very high risk
Obesity III (40kg/m ² or more)	Very high risk	Very high risk	Very high risk

Source: NICE guidelines^{21,22}

The combined measures shown in Table 9.10 are based on adults with valid measurements for all three of height, weight and waist circumference. The data may therefore vary slightly from those presented in Table 9.2 for mean BMI and BMI categories, which are based on the larger number of adult participants with valid height and weight measurements.

In reports before 2013, waist circumference was categorised as 'raised', indicative of central obesity, and 'not raised'. The 'raised' category used the same thresholds as 'very high' in Table 9B. Given the high prevalence of central obesity, this chapter presents the prevalence of normal and high waist circumference as two separate categories, rather than combining them as 'not raised'. The 'low' category is referred to as 'desirable' throughout the chapter, to avoid any suggestion that this is lower than recommended or associated with being underweight.

Ethnic-specific diabetes risk category

A WHO review in 2004 concluded that increased risk of chronic diseases occurred at lower BMI levels in Asians than White Europeans.³⁰ The majority of the evidence was related to diabetes, with increased risk at lower BMI cut-off points for Asian adults (including South Asian and Chinese adults). NICE guidance published in 2013 concluded that people from Black, Asian and other minority ethnic groups are at an equivalent risk of diabetes, other health conditions or mortality at lower BMI levels than the White European population.³¹ The WHO recommends using lower BMI thresholds to indicate increased risk of type 2 diabetes and to trigger public health action in adult Asian populations, as shown in Table 9C. NICE has made similar recommendations but also extended these lower thresholds for action points to include Black as well as Asian adults. These ethnic-specific BMI thresholds are used in the classification of diabetes risk in Table 9.11. The WHO also recommends that

Table 9C		
Description	WHO recommendation for White European populations, also applied to Mixed and Other adults	WHO recommendation for Asian populations, also applied by NICE to Black adults
Underweight	Less than 18.5kg/m ²	Less than 18.5kg/m ²
Increasing but acceptable risk	18.5 to less than 25g/m ²	18.5 to less than 23kg/m ²
Increased risk	25 to less than 30kg/m ² (equivalent to overweight)	23 to less than 27.5kg/m ²
High risk	30kg/m ² or higher (equivalent to obese)	27.5kg/m ² or higher

countries should publish prevalence of BMI categories at the following thresholds, to allow for flexibility of use and international comparisons: 18.5, 23, 25, 27.5, 30, 32.5, 35, 37.5, and 40kg/m². These are therefore also shown in Table 9.11.³² Data from 2012 to 2014 were combined to produce estimates of the number of people from each ethnic group at acceptable, increased or high risk of diabetes.

Hypertension

During the nurse visit, blood pressure was measured three times, following the standard protocol (see Volume 2, *Methods and documentation*, Appendix B). The mean of the second and third readings was used to determine the presence of hypertension, in conjunction with whether or not the participant was currently taking medication to control blood pressure (Table 9D).

Table 9D

Hypertension category	Description ^a
Normotensive untreated	SBP below 140mmHg and DBP below 90mmHg, not currently taking medicines specifically prescribed to treat high blood pressure
Hypertensive controlled	SBP below 140mmHg and DBP below 90mmHg, currently taking medicines specifically prescribed to treat their high blood pressure
Hypertensive uncontrolled	SBP at least 140mmHg and/or DBP at least 90mmHg, currently taking medicines specifically prescribed to treat their high blood pressure
Hypertensive untreated	SBP at least 140mmHg and/or DBP at least 90mmHg, not currently taking medicines specifically prescribed to treat their high blood pressure

^aSBP: systolic blood pressure; DBP: diastolic blood pressure

Longstanding illness

Longstanding illness is defined as any physical or mental health conditions or illnesses lasting or expected to last 12 months or more. A limiting longstanding illness is one that reduces an individual's ability to carry out day-to-day activities.

Mental health

The 12-item General Health Questionnaire (GHQ-12) is a widely used and validated measure of mental health. It was originally intended for use in general practice settings as a screening instrument for general, non-psychotic psychiatric morbidity. The questionnaire uses a Likert scale, and scoring is applied to give a maximum score of 12. A score of 4 or more is referred to as a 'high GHQ-12 score', indicating probable psychological disturbance or mental ill health.³³

9.3 Height and weight

Mean height was 175.6cm for men and 161.8cm for women. For both sexes, height was lower in older age groups from around the age of 65. Mean weight was 84.0kg for men and 71.1kg for women. For both sexes there was an increase in weight up to middle age, and then a decrease in older age. The initial increase was larger for men (13.5kg difference between ages 16-24 and 55-64) than for women (9.5kg between the same age groups).

Table 9.2

9.4 Prevalence of obesity, overweight and high waist circumference

9.4.1 Mean BMI, obesity and overweight, by age and sex

Mean BMI was the same for men and women, at 27.2 kg/m². Mean BMI was lowest among younger adults, increasing through middle age, and reducing slightly among older adults 65 and over. Only those in the youngest age group had a mean BMI within the desirable range; all groups aged 25 and over had a mean BMI within the overweight range.

Similar proportions of men and women were obese (24% of men and 27% of women) but men were more likely to be overweight than women (41% of men and 31% of women).

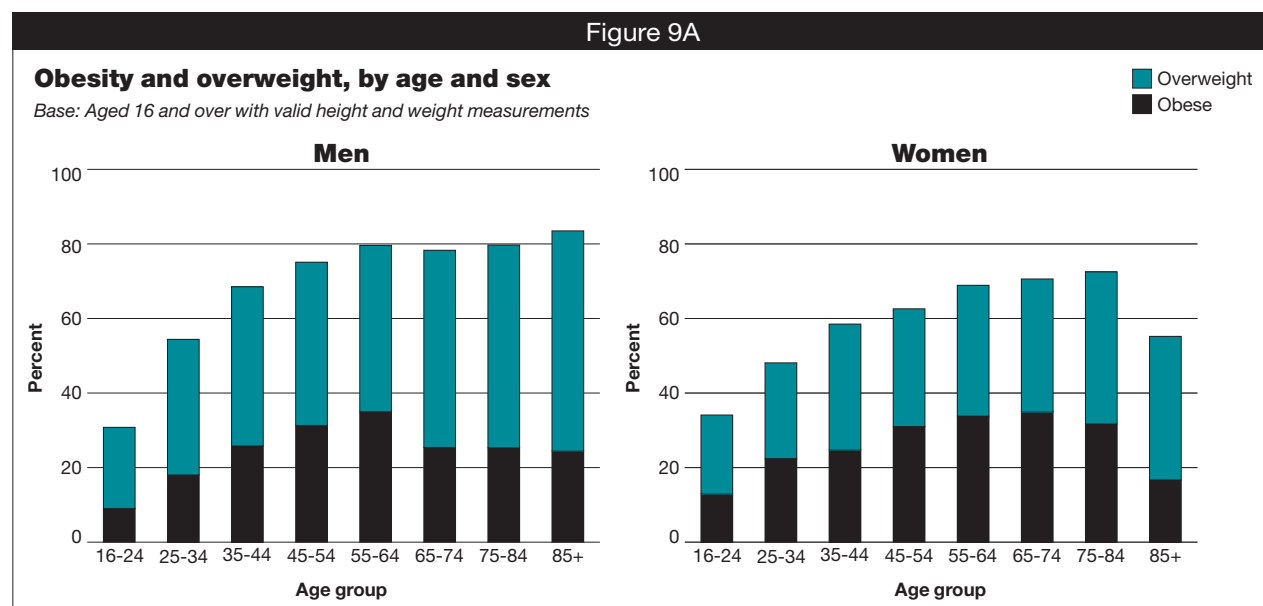
Like mean BMI, the prevalence of obesity increased with age, and then decreased in the oldest age groups, as shown in Figure 9A. The proportion who were overweight also increased with age.

Figure 9A, Table 9.2

9.4.2. Waist circumference, by age and sex

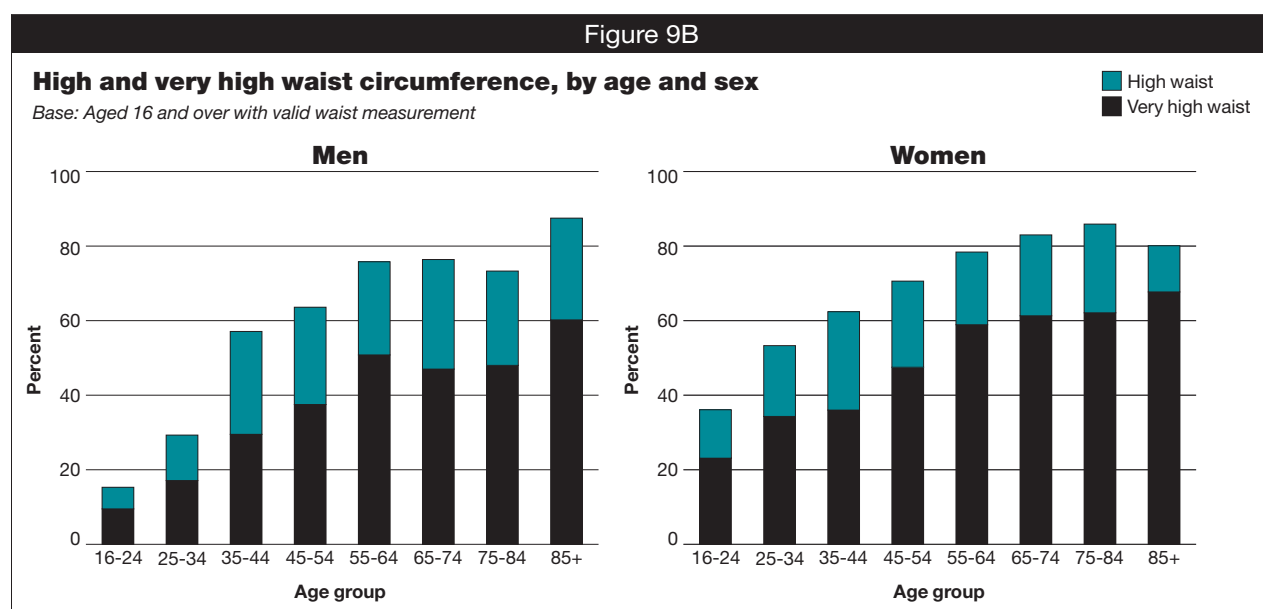
A desirable waist circumference is lower for women than for men, and accordingly, mean waist circumference was higher among men (96.3cm) than women (87.7cm). Mean waist circumference increased with age, with a slightly steeper increase among men.

More women than men had a high or very high waist circumference (66% of women and



54% of men). As with other measures of obesity, the proportion with high or very high waist circumference generally increased with age (Figure 9B).

Figure 9B, Table 9.6



9.4.3 Prevalence of obesity, overweight and high waist circumference by region

Obesity prevalence as measured by BMI varied by region, with different patterns of regional variation for men and women (Figure 9C). Central obesity (high or very high waist circumference) did not vary significantly by region.

Figure 9C, Tables 9.3, 9.7

9.4.4 Prevalence of obesity, overweight and high waist circumference by income and deprivation

Obesity and overweight

The HSE uses the measure of equivalised household income, which takes into account the number of adults and dependent children in the household as well as overall household income.³⁴ Households are divided into quintiles (fifths) based on this measure. Among women, there were clear relationships between BMI and household income: mean BMI increased as income decreased, obesity was associated with lower income, and the proportion who were either overweight or obese also increased as income decreased, as shown in Figure 9D. These relationships between income and BMI were not seen among men.

Figure 9C

Prevalence of obesity (age-standardised), by region and sex

Base: Aged 16 and over with valid height and weight measurements

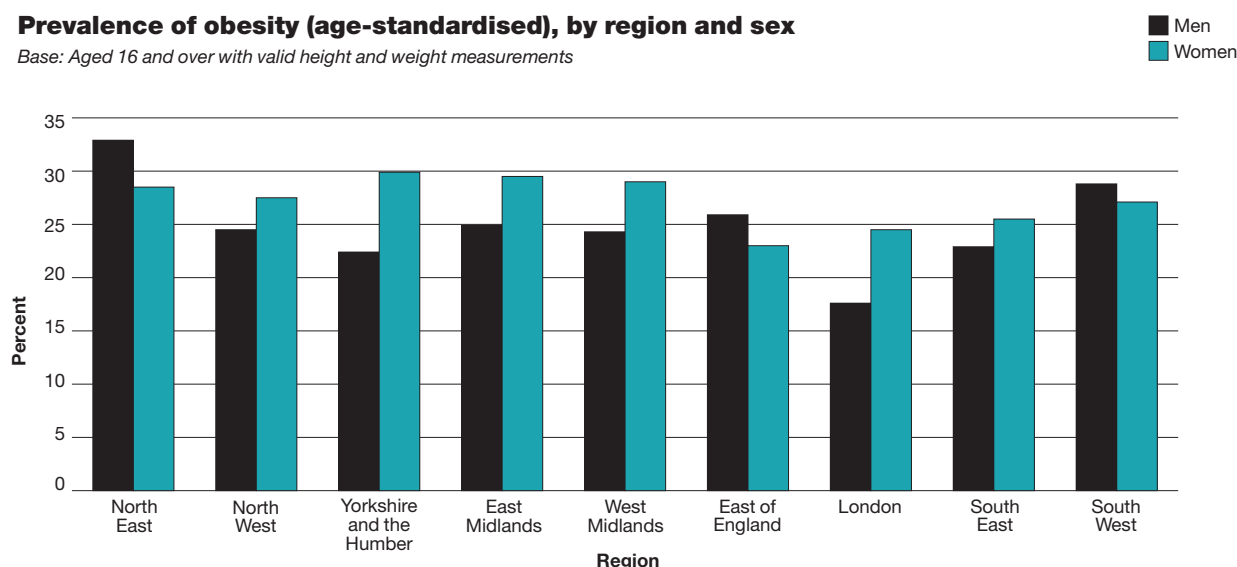
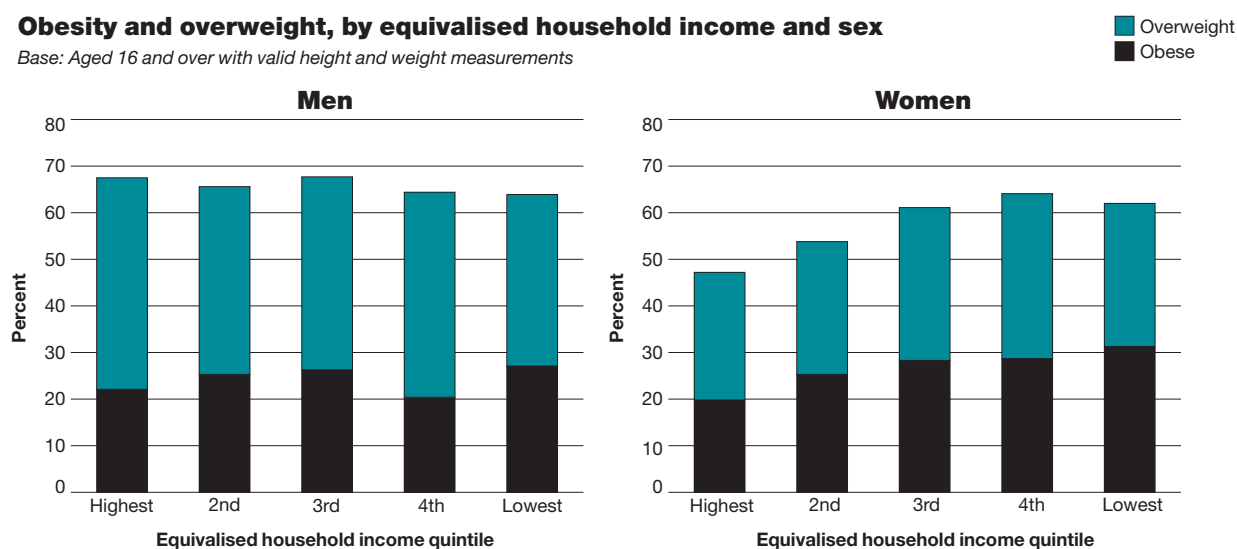


Figure 9D

Obesity and overweight, by equivalised household income and sex

Base: Aged 16 and over with valid height and weight measurements



There were similar associations between BMI and area deprivation, as measured by the Index of Multiple Deprivation (IMD).³⁵ Among women, mean BMI rose in each successive quintile of deprivation, as did levels of obesity (Figure 9E). There were no such patterns for men.

Figures 9D, 9E, Tables 9.4, 9.5

High waist circumference

The associations between waist circumference and income and area deprivation followed a similar pattern to those for obesity. As income decreased, mean waist circumference increased, particularly for women. The proportion with a very high waist circumference also increased with decreasing income, again most notably among women. Both men and women living in more deprived areas had higher mean waist circumference although the increase was steeper for women. Similarly, as Figure 9F shows, the proportion of people with very high waist circumference increased with deprivation, again particularly for women.

Figure 9F, Tables 9.8, 9.9

Figure 9E

Obesity and overweight, by Index of Multiple Deprivation and sex

Base: Aged 16 and over with valid height and weight measurements

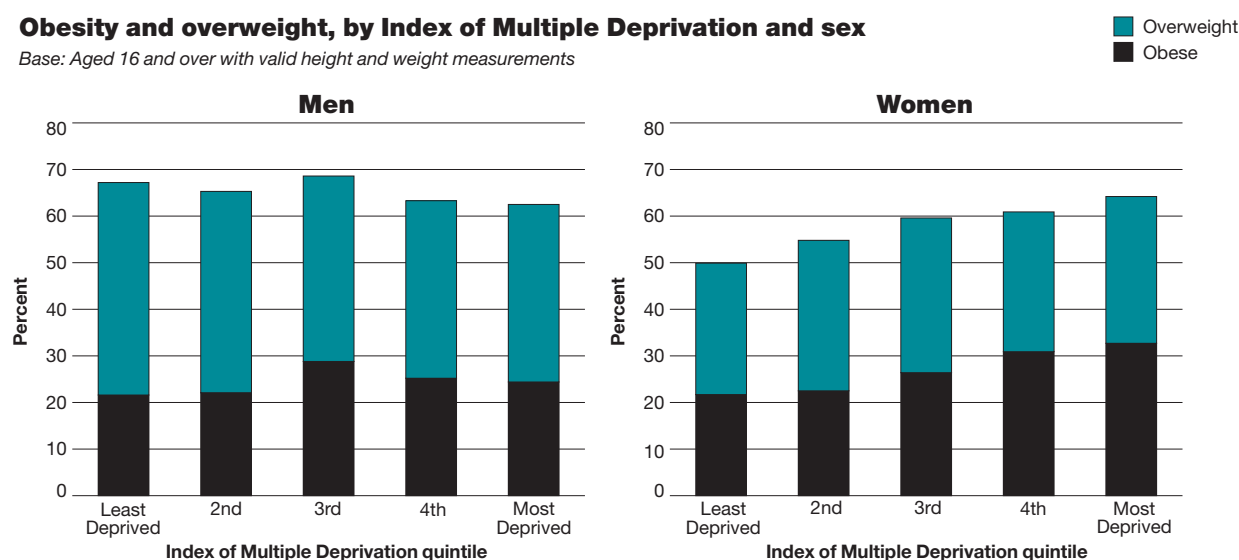
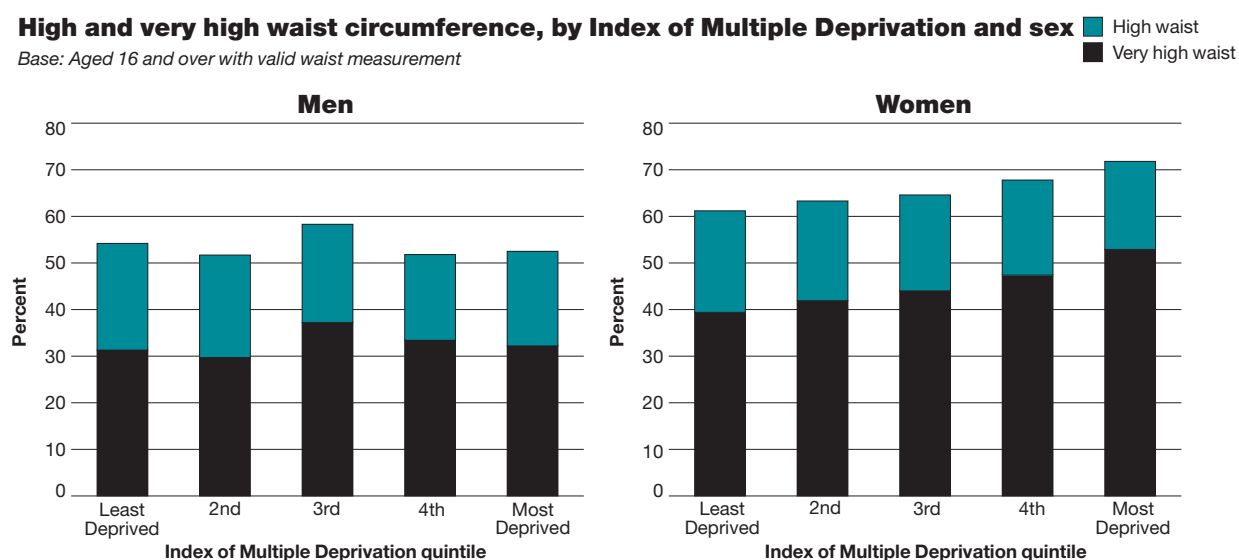


Figure 9F

High and very high waist circumference, by Index of Multiple Deprivation and sex

Base: Aged 16 and over with valid waist measurement



9.5 Health risk category with obesity, overweight and waist circumference

Participants with both BMI and waist measurements were assigned a health risk category, taking these two measures into account as described in Section 9.2.2. More than half the participants (51% of men and 56% of women) were at increased, high or very high risk of chronic disease. Women were more likely than men to be in the high or very high risk categories (43% and 34% respectively). This includes 9% of women and 6% of men who were in the Obese II and Obese III categories, with BMI of 35kg/m² or more, and were therefore at very high risk. Figure 9G shows that the proportion of people in these risk categories generally increased with age.

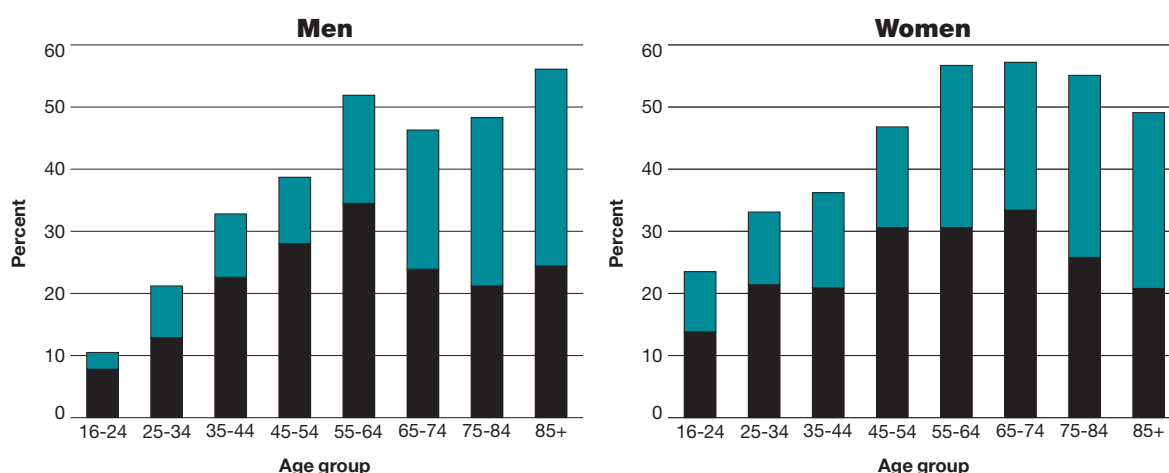
Almost all the men who were either underweight or with a normal BMI had a desirable waist circumference, and were therefore at no increased risk. However, among the men who were overweight (BMI 25 to less than 30kg/m², the most common weight category for men) a majority had either a high or very high waist circumference, putting them into the increased or high risk groups.

Figure 9G

Prevalence of high or very high health risk, by age and sex

Base: Aged 16 and over with valid height, weight and waist measurements

■ High risk
■ Very high risk



2% of women were at increased risk of chronic disease due to their very high waist circumference, despite having a BMI within the normal range. Almost all women in the Obese I group (BMI of 30 to less than 35kg/m²) had a very high waist circumference, putting them at very high risk of chronic disease. Overall 26% of women were in one of the Obese categories (I to III); this included 25% of all women whose waist circumference combined with their BMI put them at very high risk.

Figure 9G, Table 9.10

9.6 BMI and diabetes risk category by ethnic group

In this section, three years of HSE data have been combined to give robust base sizes for each group. The 'other' category has been omitted from the discussion due to its small size and the fact that it is likely to include a number of diverse groups.

Mean BMI varied by ethnic group, with men and women showing different patterns of variation. Among men, White men had the highest mean BMI (27.4 kg/m²) and Asian men had the lowest (26.0 kg/m²). Among women, Black women had the highest mean BMI (29.5 kg/m²) and White women had the lowest (25.6 kg/m²). For each ethnic group, mean BMI was in the overweight category.

In this section, the risk of diabetes was derived from BMI and ethnicity, as described in section 9.2.2. It differs from the calculation of chronic disease risk (including diabetes) in section 9.5 which combines BMI and waist circumference to derive risk categories for chronic disease for all ethnic groups. Results here are therefore not directly comparable with those in section 9.5. For participants not in Black or Asian groups, those who were overweight had increased risk of diabetes and those who were obese (any category) had a high risk of diabetes. For those in Black or Asian groups, these risks were present at BMI levels 2.5kg/m² lower than in other ethnic groups. The proportions with increased and high risk of diabetes reported here reflect ethnic-specific definitions.

The proportion of adults at increased or high risk of diabetes varied by ethnicity, as shown in Figure 9H. Black men and women were most at risk of diabetes, followed by Asian men and women. 83% of Black men and 77% of Asian men were at either increased or high risk of developing diabetes, compared with 68% of all men. Similarly, 87% of Black women, and 68% of Asian women were at increased or high risk, compared with 59% of all women. In Black, Asian and Mixed groups, women were more likely than men to be at **high risk**. In each ethnic group, men were more likely than women to be at **increased risk** of diabetes; 41-45% of men, compared with 27-32% of women.

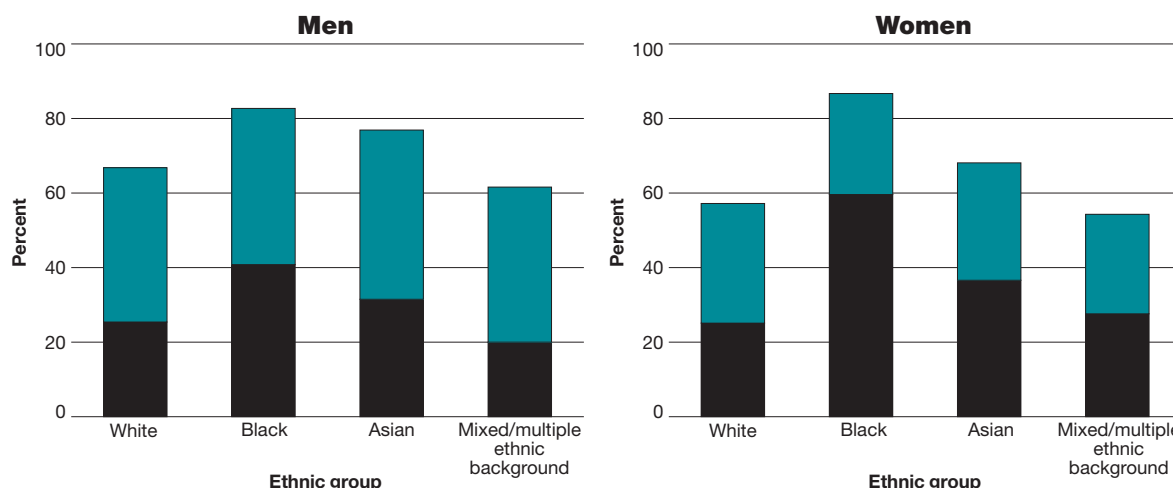
Figure 9H, Table 9.11

Figure 9H

Prevalence of increased or high risk of diabetes, by ethnicity and sex

Base: Aged 16 and over with valid height and waist measurements

■ Increased risk
■ High risk



9.7 Trends in obesity and overweight

Figure 9I shows trends in obesity and in overweight including obesity from 1993 to 2014, using three year moving averages to smooth out any unusually high or low values in individual years.

Rates of obesity and overweight were similar in 2014 to recent years. Obesity prevalence increased steeply between 1993 and around 2000, and there was a slower rate of increase after that. Prevalence of obesity has generally fluctuated between 24% and 26% from around 2006 to 2014.

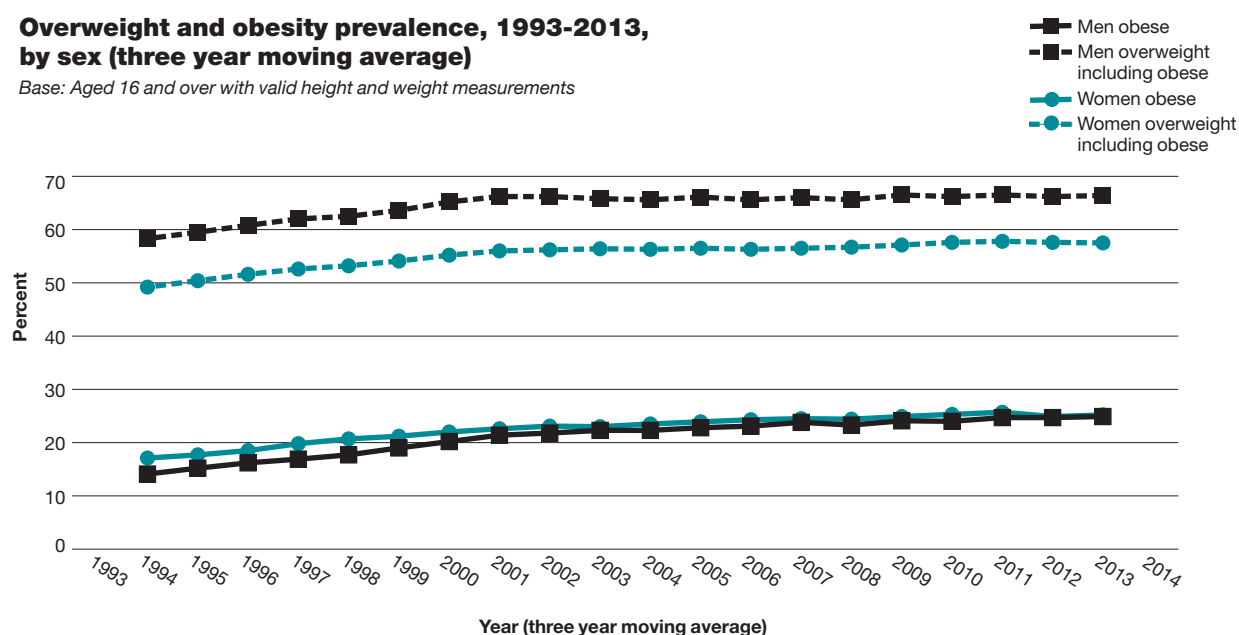
Morbid obesity has also increased between 1993 and 2014, with almost 2% of men and almost 4% of women morbidly obese in 2014, from fewer than 0.5% of men and just over 1% of women in 1993 (see HSE 2014 trend tables for details).³⁶

Figure 9I, Table 9.12

Figure 9I

Overweight and obesity prevalence, 1993-2013, by sex (three year moving average)

Base: Aged 16 and over with valid height and weight measurements



Note: Data from 2003 onwards are weighted for non-response. Some points combine weighted and unweighted estimates.

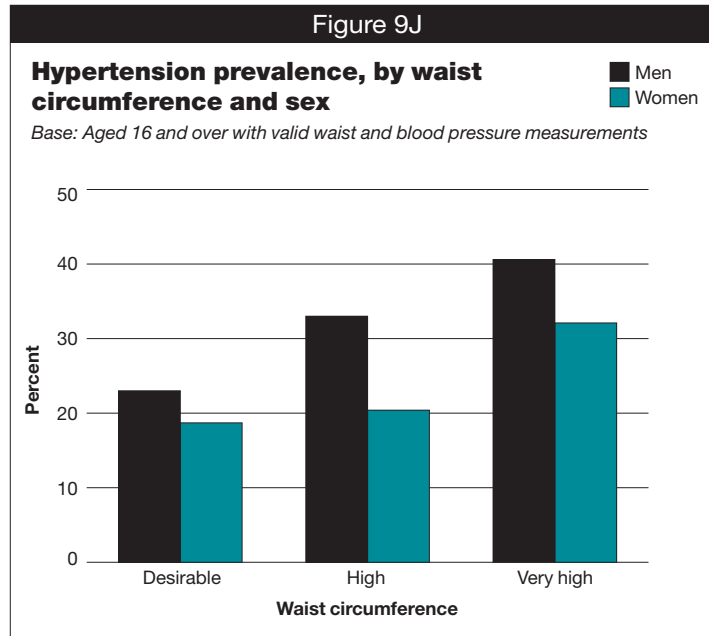
9.8 Health status by obesity, overweight and waist circumference

9.8.1 Hypertension

Hypertension prevalence increased with increasing BMI from 22% of men with normal BMI to 42% of obese men, and from 18% of women with normal BMI to 37% of obese women. This association with BMI was seen in all three categories of hypertension (controlled, uncontrolled and untreated, as defined in Section 9.2.2).

For both sexes, increasing waist circumference was also associated with increasing likelihood of having hypertension, as shown in Figure 9J.

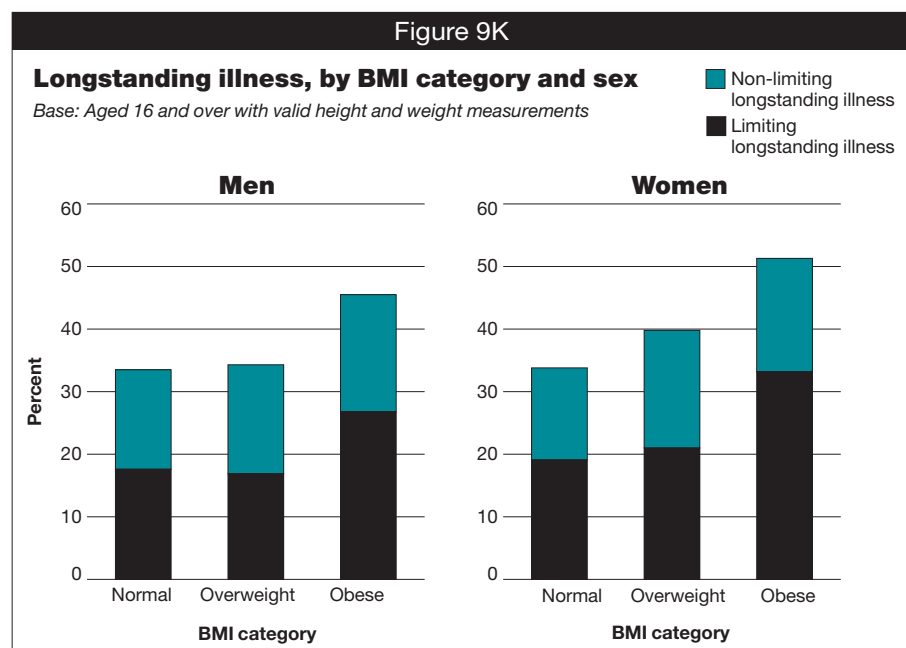
Figure 9J, Tables 9.13, 9.14



9.8.2 Longstanding illness

Men and women who were obese were more likely than those of normal BMI to have a limiting longstanding illness. Non-limiting longstanding illness was associated with obesity in men and overweight and obesity in women (Figure 9K). There was a similar pattern for men and women with a high or very high waist circumference.

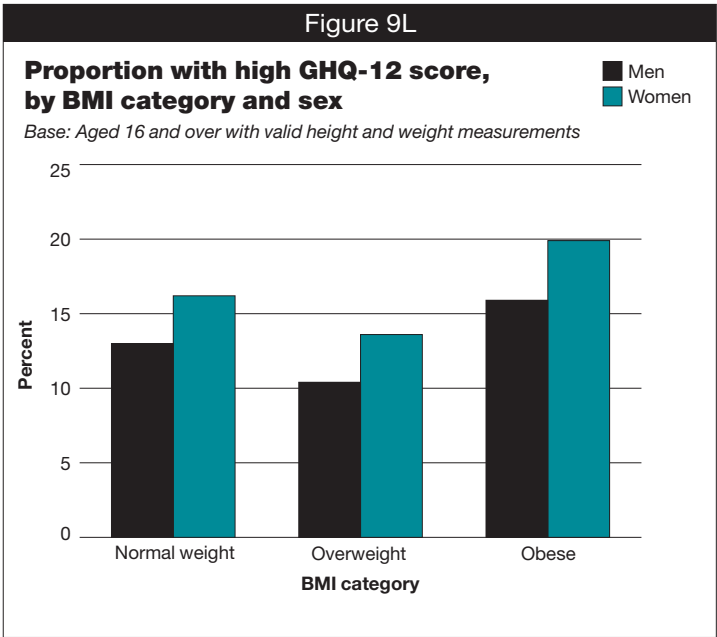
Figure 9K, Tables 9.15, 9.16



9.8.3 Mental health

Figure 9L shows the proportion of those with a ‘high’ GHQ-12 score of 4 or more. This high score, indicating probable psychological disturbance or mental ill health, was more common among those who were obese than among those who were overweight or normal weight. Mental ill health did not appear to show the same association with waist circumference.

Figure 9L, Tables 9.17, 9.18



9.9 Discussion

This chapter shows that, in 2014, most men and women were overweight or obese, with little change in either measure since around 2006. Across all ages, mean BMI for men and women was 27.2 kg/m². This represents an excess weight of 6.9kg for a man of average height and 5.6kg for a woman of average height.

Overweight and obesity and their associated risks of ill health are not equally distributed across all population groups in England, making this an issue of health inequalities. Particular groups most at risk of being overweight or obese include those on lower incomes or living in areas with greater deprivation, particularly women. There is also regional variation.

In addition, this chapter identifies groups at particular risk of chronic disease using BMI in combination with either waist circumference or ethnic group. NICE recommends that health professionals use BMI together with waist circumference to identify individuals likely to be at greater risk of developing chronic diseases including cardiovascular disease, diabetes and some cancers.²² Using this approach, 2% of women were at increased risk of chronic disease due to their very high waist circumference, despite having a BMI within the normal range.

NICE recommends that the level of intervention to be discussed with patients should be based on their BMI classification, waist circumference and the presence of co-morbidities, as shown in Table 9E.

As described in section 9.2.2, WHO and NICE suggest that lower BMI thresholds should be used to identify individuals from Asian and Black ethnic groups who may be at increased risk of diabetes.^{28,29} Applying lower thresholds to these ethnic groups, Black and Asian men and women were found to be at greatest risk of diabetes, despite Asian men having the

Table 9E				
BMI classification	Waist circumference			Co-morbidities present
	Low	High	Very high	
Overweight	1	2	2	3
Obesity I	2	2	2	3
Obesity II	3	3	3	4
Obesity III	4	4	4	4
1 General advice on healthy weight and lifestyle 2 Diet and physical activity 3 Diet and physical activity; consider drugs 4 Diet and physical activity; consider drugs; consider surgery				

lowest mean BMI. 83% of Black men and 87% of Black women were at either increased or high risk of diabetes, compared with 68% for the whole male population and 59% for the whole female population.

In November 2014, NICE updated its guidance on the identification, assessment and management of overweight and obesity.²¹ In March 2015 they produced guidance for health practitioners and the public on maintaining a healthy weight and preventing excess weight gain.³⁷ NICE recommends that health professionals should be aware of the increased risk for people from Black and Asian ethnic groups, ensure that members of these groups are aware of this increased risk, and use existing local information networks to disseminate this information.²⁹ Similar recommendations about raising awareness of risks are re-iterated in their general obesity recommendations.²¹ Although many of the government policies and initiatives currently in place, such as *Change4Life*, are universal rather than targeted at a section of the population, it is important that resources and activities within these initiatives are accessible and appropriate for use by all ethnic and cultural groups, as well as by those on low incomes and in all areas of the country to avoid widening obesity-related health inequalities.

References and notes

- 1 Body mass index (BMI) is derived by dividing weight in kilograms by the height in metres squared (kg/m^2).
- 2 Moody A. *Adult anthropometric measures*. Chapter 10 in Craig R, Mindell J (eds). *Health Survey for England 2013: Health, social care and lifestyles*. Health and Social Care Information Centre, Leeds, 2014. www.hscic.gov.uk/catalogue/PUB16076
- 3 Moody A. *Adult anthropometric measures*. Chapter 10 in Craig R, Mindell J (eds). *Health Survey for England 2012: Health, social care and lifestyles*. Health and Social Care Information Centre, Leeds, 2013. www.hscic.gov.uk/pubs/hse2012
- 4 World Health Organization. Fact Sheet No 311 *Obesity and Overweight*. WHO, Geneva, 2012. Updated 2015. www.who.int/mediacentre/factsheets/fs311/en/index.html
- 5 Prospective Studies Collaboration. *Body-mass index and cause-specific mortality in 900,000 adults: collaborative analyses of 57 prospective studies*. *Lancet* 2009;**373**:1083-96.
- 6 Calle E, Rodriguez C et al. *Overweight, Obesity, and Mortality from Cancer in a Prospectively Studied Cohort of U.S. Adults*. *New England J Med*. 2003;**348**:1625-38.
- 7 NHS. *Atlas of Risk*. www.locallyhealthy.co.uk/story/nhs-atlas-risk
- 8 Butland B, Jebb S, McPherson K et al. *Tackling Obesities: Future Choices – Project report*. Government Office for Science, London, 2007.
- 9 Health and Social Care Information Centre. *Health Survey for England - 2013, Trend tables*. HSCIC, Leeds, 2014. www.hscic.gov.uk/catalogue/PUB16077
- 10 Health and Social Care Information Centre. *Statistics on Obesity, Physical Activity and Diet – England, 2015*. Health and Social Care Information Centre, Leeds, 2015. www.hscic.gov.uk/catalogue/PUB16988/obes-phys-acti-diet-eng-2015.pdf
- 11 The Statistics on Obesity, Physical Activity and Diet (SOPAD) report (reference 10 above) indicates that there may be some switching from inpatient to outpatient for some procedures relating to obesity, including bariatric procedures, which is likely to be partly responsible for the decrease in admissions. See Section 7.4 of the SOPAD report.

- 12 Some of the increase in numbers of admissions in the earlier years of this period may reflect an improvement in the recording of secondary diagnoses.
- 13 NHS. *Change4Life campaign*. www.nhs.uk/Change4Life/Pages/why-change-for-life.aspx
- 14 Department of Health. *Public Health Responsibility Deal*. Department of Health, London, 2011. <https://responsibilitydeal.dh.gov.uk/wp-content/uploads/2012/03/The-Public-Health-Responsibility-Deal-March-20111.pdf>
- 15 Department of Health. *Living Well for Longer*. Department of Health, London, 2013. www.gov.uk/government/uploads/system/uploads/attachment_data/file/181103/Living_well_for_longer.pdf
- 16 Public Health England. *Obesity and the environment briefing – regulating the growth of fast-food outlets*. Public Health England, London, 2014. www.gov.uk/government/publications/obesity-and-the-environment-briefing-regulating-the-growth-of-fast-food-outlets
- 17 Public Health England. *Obesity and the environment briefing – increasing physical activity and active travel*. Public Health England, London, 2013. www.gov.uk/government/publications/obesity-and-the-environment-briefing-increasing-physical-activity-and-active-travel
- 18 Craig R, Fuller E, Mindell J (eds). *Health Survey for England 2014: Report. Volume 2: Methods and documentation*. Health and Social Care Information Centre, Leeds, 2015. www.hscic.gov.uk/pubs/hse2014
- 19 This chapter includes results of waist circumference measurements but not waist:hip ratios; details of how hip circumference was measured are therefore not included in this chapter but can be found in Appendix B, Volume 2 of this report.
- 20 The Frankfort Plane is an imaginary line passing through the external ear canal and across the top of the lower bone of the eye socket, immediately under the eye. A participant's head is positioned so that the Frankfort Plane is horizontal. In this position the headplate of the stadiometer will rest on the crown of the head.
- 21 Lean M, Han T, Morrison C. *Waist circumference as a measure for indicating need for weight management*. *BMJ*. 1995;**311**:158-61.
- 22 Schneider HJ, Friedrich N, Klotsche J et al. *The Predictive Value of Different Measures of Obesity for Incident Cardiovascular Events and Mortality*. *J Clin Endocrinol Metab*. 2010;**95**:1777–1785.
- 23 National Institute of Health and Care Excellence. *Obesity: Identification, assessment and management of overweight and obesity in children, young people and adults*. NICE, London, 2014. www.nice.org.uk/guidance/cg189/chapter/1-recommendations#identification-and-classification-of-overweight-and-obesity
- 24 National Heart, Lung and Blood Institute Obesity Education Initiative. *The Practical Guide. Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. National Institutes of Health, 2000. www.nhlbi.nih.gov/files/docs/guidelines/prctgd_c.pdf
- 25 Keys A, Fidanza F, Karvonen M et al. *Indices of relative weight and obesity*. *J Chron Dis*. 1972;**25**:329–343.
- 26 World Health Organization. *World Health Organization body mass index (BMI) classification*. www.who.int/mediacentre/factsheets/fs311/en/
- 27 NHS Consensus Development Conference. *Gastrointestinal surgery for severe obesity*. *Nutr*. 1996;**12**:397-402.
- 28 K. Swanton for the National Heart Forum/Cross-Government Obesity Unit/Faculty of Public Health Healthy Weight, Healthy Lives. *A Toolkit for Developing Local Strategies*. 2008. www.fph.org.uk/uploads/full_obesity_toolkit-1.pdf
- 29 World Health Organization. *Waist Circumference and Waist-Hip Ratio. Report of a WHO Expert Consultation*. WHO, Geneva, 2008. http://apps.who.int/iris/bitstream/10665/44583/1/9789241501491_eng.pdf?ua=1
- 30 WHO expert consultation. *Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies*. *Lancet* 2004;**363** (9403):157-163. www.sciencedirect.com/science/article/pii/S0140673603152683
- 31 National Institute of Health and Care Excellence. *BMI: preventing ill health and premature death in black, Asian and other minority ethnic groups*. NICE, London, 2013. www.nice.org.uk/guidance/PH46
- 32 For this analysis, White includes all those who identify themselves at the interview visit as White English, Welsh, Scottish, Northern Irish, British, Irish, Gypsy or Irish Traveller, or from any other White background. Black includes those who identify as African, Caribbean, or from any other Black background. Asian includes those who identify as Indian, Pakistani, Bangladeshi, Chinese or from any other Asian background. Mixed ethnicity includes those who identify as White and Black African, White and Black Caribbean, White and Asian or any other mixed or multiple ethnic background. 'Other' ethnicity includes those who identify as Arab or any other ethnic background.
- 33 The 12-item General Health Questionnaire (GHQ-12) is a widely used measure of mental health covering characteristics such as general levels of happiness, depression and self-confidence. Each item is rated on a four-point scale to indicate whether symptoms of mental ill health are 'not at all present', present 'no more than usual', present 'rather more than usual' or present 'much more than usual'. A score is applied

of zero for the first two responses above, and 1 for the third and fourth responses. Scores range from 0-12: 0 indicates no evidence of probable mental ill health; 1-3 indicates less than optimal mental health; and a score of 4 or more, referred to as a 'high GHQ-12 score', indicates probable psychological disturbance or mental ill health.

- 34 Not all households provide information about household income. 22% of adults with valid height and weight measurements, and 17% with valid waist measurements, lived in households that did not have any information about household income.
- 35 The Index of Multiple Deprivation 2010 combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score at the small area level in England. More detail about this measure is provided in Volume 2, Methods and documentation, Chapter 8.5.4.
- 36 Health and Social Care Information Centre. *Health Survey for England - 2014, Trend tables*. HSCIC, Leeds, 2015. www.hscic.gov.uk/pubs/hse2014trend
- 37 National Institute of Health and Care Excellence *Maintaining a healthy weight and preventing excess weight gain among adults and children* NG7. NICE, London, 2015. www.nice.org.uk/guidance/ng7