

JSNA: Diabetes

Introduction

Diabetes mellitus is a collection of conditions with common features, of which raised blood glucose levels are the most apparent. It is a chronic disease which can cause substantial morbidity and mortality. There are three main types of diabetes: Type 1 (usually commencing in childhood) where cells producing insulin are destroyed, Type 2 where the body does not respond well to its own insulin, and gestational diabetes (occurring during pregnancy). Type 2 diabetes is the most common and accounts for 90% of all diabetes; Type 2 can develop gradually, generally after childhood, although the numbers in childhood are increasing. Type 2 is also the type that is increasing in prevalence and is the focus of this chapter.

Diabetes mellitus and its complications can cause severe difficulties for sufferers and their families. There is no cure for diabetes and the condition entails a heavy burden on health services. Effective control of blood glucose and hypertension can prevent the development and progression of complications.

Diabetes is the condition that will increase most as the prevalence of obesity increases. In Bolton, middle-aged and older populations and people of South Asian ethnicity are most at risk of developing diabetes. In addition, prevalence is significantly higher in the most deprived fifth of the population.

Diabetes can be prevented by increasing public awareness of the condition and early symptoms. Those at increased risk need to be supported to change their lifestyle by losing weight, becoming more physically active, and eating healthier. Also vital for diabetes prevention are environmental and policy changes to tackle obesity. Diabetes can be well-controlled and treated to successfully delay and even prevent long-term complications. However, poorly managed diabetes can lead to heart disease, stroke, kidney failure, eye disease, mental ill health, and limb amputations.

Implications for commissioning

The number of people diagnosed with diabetes increases each year; nationally, the pace of the increase has been approximately 25% over the past six years. Commissioners need to ensure service capacity to cope with rising numbers of diabetes patients.

Type 2 diabetes is by far the most prevalent diabetes and the one that is increasing. Local diabetes prevention strategies aiming to reduce the incidence of Type 2 diabetes need to engage especially with deprived communities.

Early identification of complications is paramount to reducing the impact of diabetes as well as its associated conditions.

Nationally, QOF (Quality Outcomes Framework) treatment target achievements related to diabetes are beginning to stall. The National Diabetes Audit suggests that increasing levels of obesity may be a barrier to further improvement in glucose and blood pressure control in Type 2 diabetes. Accordingly, the impact on diabetes management of the societal changes in obesity needs to be recognised and addressed; health promotion, physical activity, and diabetes education should be developed and supported.

Nationally, end stage kidney disease treatment has almost doubled within six years. Commissioners and providers should consider how to respond to this evidence for continuing health inequality and the consequent increasing costs of potentially preventable diabetic complications. Progression of end stage kidney disease could be reduced if microalbumin testing was comprehensive and, when it was raised, effective blood pressure management was implemented.

Ensure healthier lifestyle messages are consistent, clear, and culturally appropriate as well as integrated with other health promotion campaigns. Address any misconceptions about the risk of diabetes that can act as barriers to change – including the belief that illness is inevitable and about what constitutes a healthy weight.

The provision of well-organised integrated care, and in particular the education and empowerment of patients and their families, has been shown to reduce the impact and complications of diabetes for individuals. The chief practical tools are: NICE Guidance on the Use of Patient-Education Models for Diabetes, DoH and Diabetes UK Structured Patient Education in Diabetes: Report from the Patient Education Working Group, and Diabetes NST and Diabetes UK How to Assess Structured Diabetes Education: An Improvement Toolkit for Commissioners and Local Diabetes Communities.

Who's at risk and why?

Fixed risk factors

There are risk factors for diabetes that are permanent and beyond the control of services. These include ageing and ethnicity. The prevalence of diabetes increases with age and is more prevalent in the South Asian communities of Bolton. People of Asian and Black origin

are more prone to diabetes than the White population, and so higher prevalence in these groups is to be expected.

Family history of diabetes is a known risk factor and the closer the relative is the greater the risk. Pregnant women can develop a temporary type of diabetes – gestational diabetes. Having this – or giving birth to a large baby – can increase the risk of women going on to develop diabetes in the future.

Modifiable risk factors

Many risk factors for diabetes are modifiable. These include:

- Obesity: Not everyone with diabetes is overweight, but statistics show that over 80% of all people diagnosed with Type 2 diabetes are overweight;
- Waist size: Women are at increased risk if waist measures 31.5in (80cm) or more. White or black men are at increased risk if waist size is 37in (94cm) or more and Asian men if waist size is 35in (90cm) or more;
- Unhealthy lifestyle: Smoking, poor diet, sedentary lifestyle;
- Socioeconomic deprivation: Prevalence is over 35% higher in the most deprived fifth of the population. Other factors related to deprivation are also key risk factors such as poor housing and education;
- Other conditions: Particularly raised triglycerides (a type of blood fat) and severe mental health problems.

The more risk factors an individual has the greater the risk of developing diabetes.

Furthermore, diabetes itself is a key risk factor for cardiovascular disease and other macrovascular complications such as peripheral vascular disease (PVD). The outcomes of these are premature mortality and morbidity from CHD, stroke, and circulatory problems of the lower limb often resulting in ischaemic pain, ulceration, gangrene, and amputation. Diabetes also influences infant mortality, with children from mothers with diabetes being five times more likely to be stillborn, three times more likely to die within the first months of life, and twice as likely to have a major congenital malformation.

The level of need in the population

Impact on life expectancy

Diabetes reduces life expectancy – Type 1 by at least 5 years and Type 2 by 5-7 years.

Circulatory diseases, when grouped, are the largest contributor to our gap in life expectancy to England. Years of life lost (YLL) is a measure of premature mortality. Its primary purpose is to compare the relative importance of different causes of premature death within a particular population and it can be used by health planners to define priorities for the

prevention of such deaths. In Bolton, diabetes is the 11th highest cause of years of life lost, while its cardiovascular complications have an even greater impact.

Mortality

The Yorkshire and Humber Public Health Observatory (YHPHO) and Diabetes Health Intelligence classify Bolton as being in the 'Purple Group' for diabetes. The Diabetes Classification¹ groups all areas in England based on the main risk factors for diabetes. The characteristics used are the proportion of the population aged 40-64 years, the proportion aged 65 years and over, the proportion aged 40 years and older from Asian ethnic groups, the proportion aged 40 years and older from Black ethnic groups, a synthetic estimate of obesity, and the Indices of Multiple Deprivation. The 'Purple Group' is defined by a relatively young population with high levels of deprivation. Areas in the 'Purple Group' have the second highest diabetes prevalence, while the forecasted increase is one of the lowest comparatively – this is likely a result of a relatively young population that is becoming younger (of the five coloured groups, Indigo has the highest prevalence and greatest forecasted increase). It is estimated that in 'Purple Group' areas 12.9% of deaths between the ages of 20 and 79 years are attributable to diabetes. Across England, people with diabetes are twice as likely as those without the condition to die between the ages of 20 and 79 years. On average it is estimated that there would be around 170 fewer deaths per year in Bolton if people with diabetes had the same mortality rates as those without the condition.

People with diabetes tend to die from related macrovascular diseases and as such the diabetes mortality trend in Bolton is erratic. Locally, mortality rates from CHD are 2-3 times higher in people with diabetes compared to the population as a whole.

The South Asian population of Bolton have a greater likelihood of premature death from circulatory related diseases – a major reason for which is the higher prevalence of diabetes in this population group.

Prevalence of disease

In 2012 there were 16,614 people aged 17 years and over diagnosed with diabetes in Bolton. The percentage difference between diagnosed and undiagnosed in Bolton is currently lower than is average for areas in the 'Purple Group' as well as the average for England as a whole.

Diabetes is increasing locally, regionally, and nationally with self-reported prevalence increasing from 5.7% in 2001 to 7.2% in 2007 to 9.0% in 2010. This difference with a QOF prevalence of 5.6% and a modelled estimate of 8.3% suggests some level of unmet need in Bolton.

¹ Diabetes Health Intelligence (2010) *Diabetes Area Classification for PCTs: Classification of PCTs based on risk factors for diabetes*, YHPHO.

Due to the association of diabetes with socioeconomic deprivation and ethnicity the areas within Bolton of greatest prevalence and need are Lever Edge, Lower Deane & The Willows, Victory, and Brightmet N & Withins. In some of these areas with large South Asian communities prevalence is over 16%. In addition, analysis demonstrates that people in the most deprived fifth of Bolton's population are more than twice as likely to suffer from diabetes as people from the other end of the deprivation scale. Prevalence of diabetes is even more disproportionate for ethnicity with the Asian Pakistani population in Bolton having a prevalence level of 27%, and this is increasing. This is followed by a prevalence of 19.6% in the Asian Indian population of Bolton, our most significant non-White British community.

Prevalence of diabetes increases with age; self-reported prevalence for those aged 65 and over in Bolton is 20.7% compared to 9.0% in Bolton as a whole.

The risk of developing Type 2 diabetes is 20-80 times higher for people who are obese compared to those of normal weight. It is estimated that 24% of adults in Bolton are obese; this is not statistically significantly different to the England average but obesity is increasing significantly across the country. By 2025 it is projected that 42% of men and 39% of women in England will be obese. Diabetes is expected to increase significantly as a result.

Gestational diabetes is a type of diabetes that arises during pregnancy and affects 5% of all pregnancies. Women who are overweight or obese are at greater risk of gestational diabetes and the risk of developing Type 2 diabetes after gestational diabetes is 30%².

Footcare

It is especially important that people with diabetes look after their feet:

“Diabetes can limit the blood supply to the feet and cause a loss of feeling. This can mean foot injuries do not heal well, and the lack of feeling means patients may not notice if their foot is sore or injured. People with diabetes are 15 times more likely to have a limb amputated due to gangrene” (NHS Choices, 2012).

Footcare admissions to hospital can include the diagnoses of foot/leg ulcer, pressure ulcer, cellulitis, osteomyelitis, gangrene, atherosclerosis, and clinical procedures can include lower limb amputation and debridement of foot/leg wound. In Bolton there have been 643 episodes of care for diabetic foot disease between 2009/10 and 2011/12, accounting for 6,508 nights in hospital. However, over this period the annual episodes of care for diabetic foot disease per 1,000 adults with diabetes is significantly below the average rate across England. In Bolton over the same period there were 32 major amputations, giving an annual rate of 0.7 (per 1,000 adults with diabetes), which is not significantly different from the national average. This activity was caused by 296 unique individuals, of whom 14.2% had

² Diabetes UK (2010) *Diabetes in the UK 2010: Key statistics on diabetes*, Diabetes UK.

more than four periods of care, which again is not significantly different from the national average³.

Key JSNA Indicator Sheets

DISEASE AND ILL HEALTH: Diabetes

BEHAVIOUR AND ACCESS TO SERVICES: Obesity

Current services in relation to need

Total spending on diabetes care compared to HbA1c outcomes (glucose control) shows that NHS Bolton is not statistically different from England in programme budget spending or in terms of HbA1c outcomes. This is an important aspect of diabetes management but does not capture all aspects of care locally. Quadrant analysis of all areas in England shows Bolton falls into the “Low costs and good outcomes” quadrant when the HbA1c outcome is measured against programme budgeting data on diabetes as well as for spending on diabetes prescriptions. (The HbA1c outcome is the proportion of people in Bolton with an HbA1c measurement of 7% or less; prescribing costs concern the Net Ingredient Cost (NIC) of all prescription for items to treat and monitor diabetes per patient)⁴.

There are currently 16,614 people on the primary care (QOF) diabetes register for 2012, this has increased from 15,717 in 2011. Therefore, we are virtually at the estimated number of people with diabetes in Bolton, which is a major goal that we have been working towards locally for a number of years.

Following the national picture, angina is the most frequently cited complication for people with diabetes in Bolton (42.8 per 1,000 diabetes patients). This is based on people with diabetes included in the National Diabetes Audit with a hospital admission that mentions the complication. The rate of angina as a complication is more common in Bolton than the ‘Purple Group’ as a whole (37.8) and England (31.3). Following angina, the most common complications for people with diabetes in Bolton are cardiac failure (14.3), myocardial infarction (7.1), stroke (6.4), ketoacidosis (6.1), and renal failure (3.2). Other complications that are less prevalent include diabetic retinopathy treatments and minor and major lower limb amputations. All diabetic complications apart from ketoacidosis become more likely with increasing age and duration of diabetes. Furthermore, all complications are associated with social deprivation; nationally there is up to a twofold difference between the least and most deprived quintiles.

Diabetic patients are at greater risk of developing nephropathy and for this reason it is recommended that all patients with diabetes should have their urinary albumin

³ Diabetes Health Intelligence (2013) *Diabetic Foot Disease Profile*, Diabetes Health Intelligence.

⁴ Yorkshire and Humber Public Health Observatory (2013) *Diabetes Outcomes Versus Expenditure Tool (DOVE)*, YHPHO.

concentration measured at diagnosis and at regular intervals thereafter, usually annually. Bolton has historically performed poorly for micro-albuminuria testing in patients with diabetes, but while still having a lower coverage than the North West and England, the gap has reduced to around 1% from a 7% gap in 2008. This has been a significant improvement over recent years, but there remains variation across local GP practices.

Despite higher prevalence, diabetes sufferers from BME groups in Bolton are less likely to visit their GP and to be on prescribed medication to manage the condition.

Regarding inpatient activity, the National Diabetes Inpatient Audit 2010⁵ conducted at Royal Bolton Hospitals NHS Foundation Trust found that 16.9% of people in the inpatient beds audited had diabetes, which is slightly higher than the average for England (15.0%):

- At the time of audit, 97.3% of inpatients with diabetes in Royal Bolton had been admitted as an emergency compared to 86.7% across England as a whole;
- Of the inpatients with diabetes in Royal Bolton, 2.6% had Type 1 diabetes and 21.1% had Type 2 diabetes being treated with insulin (with or without tablets). This means that there is a lower proportion of inpatients with diabetes on insulin when compared to all units included in the audit;
- In Royal Bolton, appropriate blood glucose testing of diabetes patients was undertaken on 6.3 days out of the previous 7 days; after adjusting for casemix glucose testing took place on 0.1 more days than expected based on the pattern across England;
- Royal Bolton patients had 4.5 good diabetes days in the previous 7 days; after adjusting for casemix there was an average of 0.2 more good diabetes days than expected;
- Just 12.5% of Royal Bolton diabetes inpatients had a documented foot review within 24 hours of admission compared to 22.6% across England, and 29.4% of patients had been visited by a member of the diabetes team compared to 30.6% across England;
- In Royal Bolton 38.6% of diabetes inpatients had been involved in designing a treatment or care plan compared to 29.1% across England, and they were also more likely to have been able to take control of their diabetes care whilst an inpatient;
- Concerning whether harm resulted from the inpatient stay, 30.8% of inpatients at Royal Bolton experienced at least one medication error, which is lower than the England average (37.1%). Whilst overall prescription and management errors at Royal Bolton are lower than average, 70.0% of patients on insulin experienced at least one insulin prescription or management error – this is the only one of the main prescription/management measures that is significantly worse than average in Bolton;
- The inpatient experience of diabetes patients at Royal Bolton is generally positive, especially concerning staff team work where patients scored this the highest in the audit, with the only complaint being a perceived lack of emotional support.

⁵ Royal Bolton Hospital is not included in more recent updates of the Inpatient Audit, and so this is the most recent picture available.

Analysis of mortality among inpatients across England shows that patients with diabetes are 9.9% more likely to die than those without recorded diabetes. There is no association between deprivation and inpatient mortality among diabetes patients (unlike there is for inpatients without diabetes). Between 1st April 2009 and 31st March 2011 there were 9,249 inpatient admissions for patients with recorded diabetes at Royal Bolton Hospitals NHS Foundation Trust, of which 555 ended with the patient dying. After adjusting for age, sex, method of admission, and HRG, diabetes inpatients in Royal Bolton have an SMR of 119 – meaning the mortality rate is 19% higher than the average for all Trusts across England. If Royal Bolton had the same mortality rate for diabetes patients as we see nationally there would have been 103 fewer deaths during this period.

Projected service use and outcomes

Bolton's population is ageing, with the 50+ population projected to increase from 93,000 in 2012 to 107,400 in 2022. In consequence, the prevalence of diabetes is expected to continue increasing into the future. Future increases in prevalence will also be affected by the younger profile of BME groups in Bolton ageing, particularly the South Asian group because of their association with diabetes.

Obesity levels are projected to increase in Bolton and in the UK as a whole, and with it the prevalence of diabetes. Furthermore, there will also be 1,537 extra people (a total of 13,323) in 2020 who over 65 and are obese than there are in Bolton at present (an estimated 11,786). Following this increase in obesity, diabetes prevalence will also increase substantially.

The Big Bolton Health Check has increased the numbers of people identified as having CVD related conditions and also those at risk. These additional patients will require primary care to manage their symptoms and increased risk.

Evidence of what works

Bolton's Health Matters has created a collection of evidence and intelligence to ensure best practice in decision within this area. To view this collection, [please click here](#)

Community views and priorities

A health needs assessment⁶ was conducted in three of Bolton's NRS Areas to ascertain peoples' understanding of health, their experiences, expectations, and engagement with services and to allow comparison with other data sources.

From the findings, that there is a gap in these communities between peoples' aspirations to adopt 'healthier' behaviours and them taking action to do so can be explained by their lived

⁶ Griffiths, B. et al (2012) *Concerning Health Matters: Voices from 3 NRS Areas*, NHS Bolton.

situations, and understood in terms of the effect of those situations on their mental wellbeing and its constructs such as self-esteem, self-efficacy, and aspiration – each of which were shown as being relevant to the efficacy and appropriateness of interventions designed to improve health.

The report includes analysis from questions asked regarding obesity, which is causing the projected increases in diabetes, and the full report is available on Bolton's Health Matters [here](#).

Equality impact assessments

No recent local equality impact assessments have been carried out that we are aware of. If you are aware of any such work locally please let us know at [Bolton Health Matters](#)

Unmet needs and service gaps

Analysis clearly demonstrates that people in the most deprived quintile of Bolton are significantly more likely to suffer from diabetes as people from the other end of the local deprivation scale.

There are socioeconomical variations in the frequency of diabetic complications. The complications of diabetes, especially retinopathy and CVD are more prevalent in areas of high socioeconomic deprivation in Bolton. Furthermore, the use of insulin in such areas has been shown to be less than elsewhere.

NICE guidance^{7 8} recommends that all people with diabetes receive nine specific care processes at least once a year. These care processes are essential for the ongoing management of diabetes and the early detection of complications; they are also incentivized within the QOF. In 2011 for Type 1 diabetes 16.1% and for Type 2 30.6% of patients received these care processes. This is an acknowledged problem and Bolton started with a low performance, but considerable effort has been made locally towards improvements in this area and we expect our position to progress notably in future national data releases. This work must continue.

In Bolton the very high rates of recorded blood pressure, weight, and HbA1c measurement reveal that the majority of people with diagnosed Type 2 diabetes are in contact with primary care at least once a year. However, the National Diabetes Audit has shown in the past that these contacts are not being converted into effective care because complication reducing treatment targets are not being reached. However, there is now a Triple Aim programme locally to address this and improvements are to be expected.

⁷ National Institute of Clinical Excellence (2008) *CG15 Type 1 diabetes*, NICE.

⁸ National Institute of Clinical Excellence (2008) *CG66 Type 2 diabetes (partially updated by CG87)*, NICE

Historically, the number of emergency readmissions for patients with diabetes in Bolton has been over 65% higher than we would expect had those with diabetes had the same rates of readmission as patients with diabetes. Furthermore, this difference has been increasing. This follows the national pattern as across England as a whole patients with diabetes are around 59% more likely to be readmitted as an emergency within 28 days of a previous spell of care when compared to patients of a similar age without diabetes. This shows a level of unmet need and poor management for people with diabetes in Bolton, and nationally, and this inequality seems to be widening.

Few local services regularly collect and usefully disseminate views from patients.

The National Service Framework for diabetes⁹ has 12 standards to be reached by 2013, covering prevention, identification, empowering people with diabetes, treatment, diabetes and pregnancy and detection and management of long-term complications. Nationally, progress has been made but there persist unacceptable inequalities in diabetes care which need to be addressed such as the eightfold difference in blindness and amputation rates in people with diabetes between different parts of the country and different socioeconomic groups.

Recommendations for further needs assessment work

Assessment and regular monitoring/analysis of the Public Health Outcomes Framework indicators linked to diabetes are necessary. These are: 2.12 Adult obesity; 2.17 Recorded diabetes.

Key contacts

Lesley Hardman – Health Improvement Specialist (Primary care)

⁹ Department of Health (2001) *National Service Framework for diabetes*
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4002951