



Supporting the lifestyle modification and treatment of type 2 diabetes for people with severe mental illness

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Introduction

The association between type 2 diabetes and the two main severe mental illnesses (SMIs), schizophrenia and bipolar illness, has been recognised for over a century. In 1879, Henry Maudsley described diabetes as 'a disease which often shows itself in families in which insanity prevails'.¹ Although the majority of published papers have focused on schizophrenia, modern literature has confirmed this remarkably insightful observation, and illustrated that the prevalence of diabetes is approximately 10–15% in people suffering from schizophrenia or bipolar illness.² This represents a two- to three-fold increased risk compared with the general population.

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Summary

This review describes the association between diabetes and the two main severe mental illnesses (SMIs), schizophrenia and bipolar illness, which have been recognised for over a century. It also explains how lifestyle modification can improve outcomes. People with SMI have an increased prevalence of other metabolic comorbidities. The increase in diabetes and metabolic syndrome is a predictor of cardiovascular disease, which is the commonest cause of death in people with SMI (accounting for up to 60% of all deaths in these people). Factors contributing to risk of disease are the same in people with SMI as in the general population, but lifestyle is probably most important because this is potentially amenable to modification. Poverty, urbanisation, poor diet and physical inactivity are key risk factors for diabetes that occur more frequently in people with SMI. SMI contributes further to diabetes risk as illustrated by studies of drug-naïve first-episode patients. Antipsychotic medications have been implicated in diabetes development. The high prevalence of diabetes has a number of clinical implications for care. First, we need to screen for diabetes, as recommended by national bodies including the National Institute for Health and Clinical Excellence (NICE) and the American Diabetes Association. Secondly, we need to implement strategies to reduce the risk of diabetes. The Salford Weight Management Clinic, established in May 2000, has shown that lifestyle modification is possible in SMI. Finally, strategies should be developed to manage the health of people with SMI who develop diabetes.

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Key Words

Severe mental illness; schizophrenia; antipsychotic; diabetes

This review aims to describe the association between SMI and diabetes, and to provide practical advice for those involved in managing diabetes in people with SMI. PubMed® and other electronic databases were searched to identify articles that included the key words diabetes, severe mental illness, psychosis, schizophrenia, bipolar illness, antipsychotic, and each individual drug name. In addition, this review is based on the clinical experiences of the author.

Severe mental illness

SMI refers to psychotic illnesses that are characterised by a lack of insight by the sufferer, the most

important of which are schizophrenia and bipolar illness. Schizophrenia affects around 1 in every 100 people, occurring in men and women equally.³ It is rare before the age of 15 but can start at any age after this, most often in people between the ages of 15 and 35 years. Symptoms are often described as either positive or negative. Positive symptoms include delusions, hallucinations and thought disorder. Negative symptoms include a lack of energy, social withdrawal and lack of motivation.

Bipolar disorder involves cycles of mania and depression. Over the course of the illness, the person experiences periods of elevated and depressed mood, although they



may also have times when mood is normal.

The lives of those with SMI were transformed following the development of antipsychotic medications in the 1950s, which led to a marked reduction in the number of psychiatric in-patients. In the pre-antipsychotic era there were approximately half a million in-patients in the UK, whereas the current figure is less than 100 000. Although SMI could be treated effectively for the first time with conventional (typical) antipsychotics, these drugs were marred by the development of a number of stigmatising extra-pyramidal movement disorders such as tardive dyskinesia, parkinsonism, dystonia and akathisia. Second-generation (atypical) antipsychotics were introduced in the 1990s with the prospect that they could treat SMI more effectively, with fewer side-effects (Table 1).

Metabolic abnormalities

In addition to diabetes, people with SMI have an increased prevalence of other metabolic comorbidities. The prevalence of metabolic syndrome is also two- to three-fold higher among those with schizophrenia compared with the general population.^{4,5} Diabetes and metabolic syndrome are predictors of cardiovascular disease development, which is the commonest cause of death in people with SMI and accounts for up to 60% of all deaths in SMI.⁶ The excess incidence of cardiovascular disease in people with SMI presents a major clinical challenge because mortality rates are increased three-fold and life expectancy is shortened by 10–20 years in this group.

Aetiology of diabetes in SMI

We need to understand why diabetes and metabolic syndrome are more common among people with

SMI, to enable the development of strategies to meet the clinical management challenges that this increase presents.

In the same way that there are multiple risk factors for diabetes in the general population, several factors contribute to the increased risk of diabetes in SMI. Lifestyle is probably the most important risk factor in people with mental illnesses, not least because this is potentially amenable to modification. Poverty, urbanisation, poor diet and physical inactivity are important risk factors for diabetes that occur more frequently in people with SMI.^{7,8} People with SMI living in the community live alone, in family units or in supported residential accommodation; an individual's circumstances, mental illnesses and finances can affect the lifestyle choices that he or she makes. Hospitalisation occurs at varying frequencies depending on an individual's illness: people can be admitted voluntarily or may be detained under the Mental Health Act. Hospitalisation further affects an individual's choice of diet and may affect his or her level of exercise.

People with schizophrenia have diets that are higher in fat and refined sugar and lower in fibre than the general population, particularly as a result of inadequate fruit and vegetable intake.^{7,8} The reasons for these poorer diets can be lack of education/awareness,

low income or reliance on convenience foods, or can be a symptom of the person's illness. Genetics is also important, as demonstrated by the high number of people with SMI (17–50%) who have first-degree relatives with type 2 diabetes.⁹

Mental illness contributes further to the risk of diabetes, as illustrated by studies of drug-naïve patients during their first episode of psychosis. A study of 26 subjects with first-episode psychosis found that >15% had impaired fasting glucose compared with none of the healthy controls.¹⁰ As this was a cross-sectional study, we do not know when these abnormalities first occurred, so it is unclear whether these preceded the development of psychosis.

Individuals with first-episode psychosis were also found to have three times as much intra-abdominal fat as control subjects.¹¹ During acute episodes of psychosis, people with SMI have higher concentrations of cortisol and catecholamines, which may provide a biological explanation for the link between diabetes and SMI: both these hormones are insulin antagonists.¹²

Antipsychotic medications have also been implicated in diabetes development. The first reports occurred in the 1950s following the introduction of conventional antipsychotics.^{13,14} The term 'phenothiazine diabetes' started to appear in the medical literature, but this

Conventional (typical) antipsychotics	Second-generation (atypical) antipsychotics
Chlorpromazine	Amisulpride
Haloperidol	Aripiprazole
Thioridazine	Clozapine
Trifluoperazine	Olanzapine
Flupenthixol	Quetiapine
Fluphenazine	Risperidone
Pipotiazine	Sertindole
Zuclopenthixol	Zotepine

Table 1. Currently available antipsychotic drugs

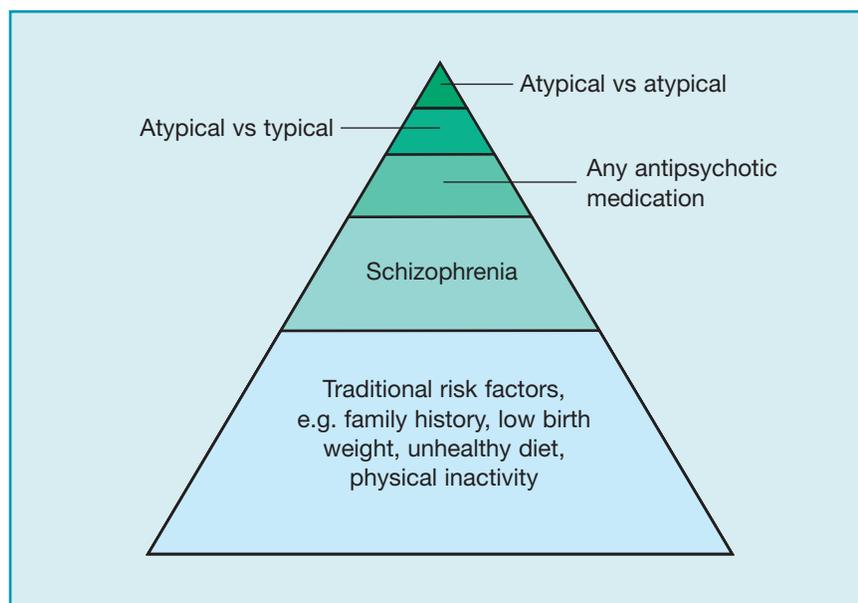


Figure 1. Schematic representation of the reasons why people with SMI develop diabetes. Most of the excess prevalence can be explained by an increase in traditional risk factors, while the illness itself conveys further risk. Antipsychotics increase the risk, but this is small in comparison with overall risk. Adapted from Holt RI, Peveler RC. Association between antipsychotic drugs and diabetes. *Diabetes Obes Metab* 2006; **8**: 125–135¹⁸

side-effect was ignored and then forgotten as there were no alternatives to treatment. The issue only raised its head again after the introduction of atypical antipsychotics.

There are case reports of people who develop diabetes after initiation of treatment with atypical antipsychotics, which then remits after treatment ceases.¹⁵ In such instances it seems likely that antipsychotic therapy has played a major role in diabetes development, but it is less clear how far we can extrapolate these cases to the wider body of people receiving antipsychotics. Observational studies suggest that those on antipsychotic therapy are more likely to develop diabetes than those who are not on therapy, but these data are biased by the confounding effect of SMI and associated genetics and lifestyle.¹⁶ The second theme to emerge from observational studies is that treatment with an atypical antipsychotic is associated with a small increase in the risk of dia-

betes. Although some studies suggest a higher risk of diabetes with clozapine and olanzapine compared with other atypical antipsychotics, reports are inconsistent.¹⁷ Around 20 prospective studies report glucose abnormalities, but in none of these are there significant differences between different antipsychotics or indeed between antipsychotic and placebo, suggesting that the main reasons why individuals develop diabetes are the illness and associated genetics and environment, rather than the treatment (Figure 1).^{16,18}

Implications for the clinical care of those with SMI

The high prevalence of diabetes among those with SMI has a number of clinical implications for care. First, there is a need to screen for diabetes. Secondly, we need to implement strategies to reduce the risk of diabetes. Finally, strategies should be developed to manage patients who develop diabetes.

Screening

The high rates of undiagnosed diabetes and the long duration between diabetes onset and symptom development provide an argument to screen for diabetes in the general population. This imperative is even stronger where as many as 60–70% of all those with SMI and diabetes are undiagnosed.^{19,20} For this reason, national bodies including the National Institute for Health and Clinical Excellence (NICE), Diabetes UK, the American Diabetes Association, the Canadian Diabetes Association and the Australian Diabetes Association have recommended screening for diabetes in people with SMI, irrespective of their treatment.²¹ The NICE schizophrenia guidelines state that ‘Physical health checks should pay particular attention to endocrine disorders such as diabetes and hyperprolactinaemia, cardiovascular risk factors such as blood pressure and lipid levels, side-effects of medication, and lifestyle factors such as smoking.’²² Symptoms of diabetes and blood glucose should be assessed at baseline, after three to four months following initiation or changes in antipsychotic medication, and thereafter annually. While fasting blood glucose is probably the ideal screening test, a pragmatic view is needed because people with SMI often find it difficult to arrive at a clinic in the fasting state necessary for this blood test. In such circumstances, random blood glucose testing is a reasonable alternative.²³

Despite the imperative to screen for diabetes, current evidence suggests that this is not being undertaken. Among in-patients at the Maudsley Hospital in London, only 41% had any evidence of screening for diabetes, whereas in Southampton, only 16% of eligible out-patients had been screened for diabetes in the previous year.^{24,25}



Diabetes prevention

Convincing studies from China, Finland and the USA show how effective lifestyle modification can be in preventing, or at least delaying the onset of, diabetes.²⁶⁻²⁸ For too long, the physical health needs of people with SMI have been ignored and the opportunities for lifestyle modification have been passed over. Published studies have also challenged the view that lifestyle modification is impossible in those with SMI.^{29,30}

The longest running weight-management clinic in the UK for people with SMI was set up in Salford in May 2000, at the request of a small group of patients with SMI who were concerned about their weight. At the time, there was little published literature on weight management in patients with SMI, so the degree of success of the clinic could not be ascertained. The clinic was open to people receiving psychotropic medications, living within the clinic's catchment area, who wanted to lose weight. Patients, who could refer themselves to this clinic, learned of its existence mostly by word of mouth from other patients, or professionals involved in their care. Attendance at sessions was voluntary and patients were allowed to attend the clinic for as few or as many sessions as they chose. Several patients could also re-refer themselves to the group after a break from attendance. Initially the clinic was staffed by a community psychiatric nurse and an occupational therapist, and was run weekly on a Thursday at lunch time.

Sessions were divided into three parts. During the first 15 minutes, all patients were weighed, told how much weight they had lost or gained since their last visit, and given their actual weight on a card to prevent others knowing their weight. The second 15 minutes

were used for a discussion within the group, during which time group members voluntarily shared their experiences from the previous week and the programme was explained to new members. The final 30 minutes of the group were used to discuss a series of eight rotational topics, which were flexible and informal. The sessions included healthy eating, exercise, self-esteem, meal planning and demonstrations, activity scheduling, motivation, quizzes and an evaluation. Additional sessions were incorporated to help the patient address potential weight issues around Christmas, Easter, birthdays and school holidays.

Attendees were asked to keep a record of their dietary intake, which was used individually or within the group to negotiate a single change in the person's lifestyle behaviour, depending on their individual weight loss. Changes included switching to non-sugary soft non-alcoholic drinks, eating more fruit and vegetables, changing to semi-skimmed or skimmed milk, using artificial sweetener instead of sugar in tea and coffee, frying less, using low-fat spread instead of butter or using less butter, and drinking less alcohol.

Results from the clinic have been impressive, given the pessimism and lack of enthusiasm for lifestyle programmes among many psychiatric healthcare professionals. After 5 years, 100 patients (of whom two-thirds were women) had attended the clinic. Most had schizophrenia, but 16 had an affective disorder. The average number of sessions attended was 51.8 (median 39, range 2-240 sessions). The initial mean body mass index on enrolment was 32.4 kg/m² and mean weight loss was 7.0 kg. The only predictor of weight loss was continued attendance at the clinic, with an average weight loss per

patient per session of 0.24 kg ($r=0.53$, $p<0.0001$). There was no difference in weight loss with psychiatric diagnosis, treatment, age or gender. When asked, individuals in the group said that the main factors which affected weight loss were attending the group regularly and being weighed. Reinforcement for losing weight and education, both from other people in the group and from staff running the group, was also viewed positively. Friendships and support outside the groups have also resulted from attendance.

Other studies demonstrate that lifestyle change is possible for those with SMI.³⁰ These data provide a challenge to us all, to ensure that people with SMI have access to lifestyle modification programmes and the opportunity to adopt healthy behaviours.

Management of patients with diabetes and SMI

Diabetes management is complex, requiring a multidisciplinary team to ensure that patients receive sufficient education, medical and nursing input to allow them to take control of their illness for the majority of the time, when they have no contact with a professional diabetes team. For this reason, we believe that it is vital that the diabetes of a person with SMI is managed by someone with expertise in the management of diabetes.

Despite this imperative, we recognise that most diabetes clinics are not set up to facilitate the multiple health needs of people with comorbid SMI. Consequently, it is vital that there is a strong interaction between physical and mental health services to ensure that both mental and physical aspects of patients' healthcare needs are addressed.

The first priority for a person with SMI and diabetes is to ensure that the psychosis is adequately



treated, even if this involves using an antipsychotic that may increase the risk of diabetes. Without adequate control of the psychosis, patient education and management are likely to be futile. With good control of the mental state, however, diabetes may be managed in people with SMI along the same principles as it is managed in the general population.

Role of the diabetes nurse specialist

Although mental health services staff are becoming increasingly aware of the physical health issues of people with SMI, these lie outside the traditional realm of psychiatric services. This provides an opportunity and challenge to increase the liaison between psychiatric and diabetes services. Diabetes nurse specialists have a vital role in educating healthcare professionals who work in psychiatry, as well as patients. In some settings, diabetes nurse specialists have taken the lead in ensuring that patients receive the screening and advice about diabetes prevention they deserve.

Conclusion

Rates of diabetes are increased two- to three-fold in people with SMI compared with rates among the general population; therefore, in many developed countries, 10–15% of those with SMI will have diabetes. Underlying reasons for this are multifactorial and include genetic and environmental risk factors, as well as disease and treatment factors. There is a need for screening, diabetes prevention, and strategies to manage diabetes if it is identified. Finally there is an opportunity and challenge to bring psychiatric and diabetes services closer together, to ensure that vulnerable people with SMI and diabetes are able to enjoy long and healthy lives.

Conflict of interest statement

J Pendlebury has received fees for lecturing, advisory boards and attendance at conferences from the following companies: Astrazeneca, Bristol Myers Squibb, Eli Lilly & Co, Janssen-Cilag Ltd and Novartis.

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Eurowatch

Call for an EU Council Recommendation on diabetes

There is now a clear consensus at EU parliamentary level that diabetes is a serious condition, but I wish I could say the same across the range of member state governments, parliaments, health services and insurers, media and people.

The global acknowledgement of the public health challenge which diabetes poses may point us towards some of the answers to this crucial question. I remind us all that the St Vincent Declaration in Italy in 1989 saw representatives of government health departments and patients' organisations from all over Europe meeting with diabetes experts under the aegis of the WHO Europe and the IDF. They unanimously agreed on general goals for people with diabetes and on five-year targets for combating it.

Fifteen years on, and the Heidelberg Declaration was signed. This declaration stated that politicians and representatives of the healthcare system had yet to sufficiently recognise that the linked obesity and diabetes epidemics represent an enormous threat to Europe. The message was clear. Poor diets and unhealthy lifestyles lead to diabetes and cause the destruction

of arteries that can lead to stroke, kidney failure and amputation.

The St Vincent and Heidelberg Declarations are still important concepts for Europe and the wider world. They are still used as a guide to national diabetes service developments. However, we must do better than that. That is why I will not weaken my resolve and our campaign to achieve an EU Council recommendation for diabetes prevention, diagnosis and control.

So far, progress towards this objective has been tantalisingly slow. We have seen some significant successes. In Dublin in 2004, we had an important step forward when the Irish Presidency initiated a move towards placing diabetes more firmly on the EU agenda. This led to a call in the EU Health Council in June 2004 for a European strategy on diabetes.

Then during its 2006 Presidency of the EU, Austria chose diabetes as one of its key health issues. In order to draw up recommendations and joint strategies, a conference was held by the Austrian Health Institute in Vienna.

The recommendations of the working groups were amalgamated

into a single document, now known as the Vienna Declaration on Diabetes. The declaration highlighted the need for an EU diabetes strategy to include a recommendation on diabetes prevention, diagnosis and management.

In addition to the conference, a written declaration on diabetes was submitted and signed by myself and a large majority of MEPs. It called upon the EU to prioritise diabetes and to call, again, for an EU recommendation for its prevention, diagnosis and control.

We now need to step up our action on diabetes, aiming for the development of such a recommendation. These declarations can serve as a foundation on which the commission can draft its proposal.

I believe an EU Council Recommendation for diabetes prevention, diagnosis and control would act as a wake-up call for the citizens of Europe.

John Bowis MEP is co-chairman of the European Parliament's Diabetes Working Group and EPP-ED Spokesman for the European Parliament's Environment, Public Health and Food Safety Committee