

# Type 2 diabetes in the UK South Asian population

## An update from the South Asian Health Foundation

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FAMILY OF DIABETES COMPANIES



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South Asian Health  
Foundation (SAHF)

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People of South Asian origin make up the largest minority ethnic group in the UK. This group is at a greater risk of developing type 2 diabetes compared with the majority white European population, as well as being at increased risk for a number of macrovascular and microvascular complications of diabetes. As such, the South Asian population is an important target for screening and prevention programmes, and it is essential that these people receive optimal, evidence-based, individualised care. However, at present, there is insufficient evidence to adequately inform many everyday management decisions in this population. In addition, the care and advice provided to South Asian people with diabetes should be culturally appropriate. With these challenges in mind, this document, which is intended for all healthcare professionals with an interest in diabetes, aims to provide a brief overview of what is known about type 2 diabetes in this important sub-population of the UK and, where appropriate, to recommend how treatment decisions might be optimised.

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### Epidemiology of type 2 diabetes in the South Asian population of the UK

#### *What is the prevalence of type 2 diabetes among UK South Asian people?*

According to the 2011 UK census, people describing themselves as Asian or Asian British make up the second largest ethnic group in the UK, after the white population [1]. In total, 4.9% of the total population identified themselves as originating from South Asian countries (India, 2.3%; Pakistan, 1.9%; Bangladesh, 0.7%), totalling approximately 3,080,000 people [1]. The census data highlight the heterogeneity of the South Asian community of the UK, and it is important that the presence of these subgroups is kept in mind during the discussions that follow in this document.

It is widely recognised that the age-standardised prevalence of diabetes is higher in people of South Asian origin compared with the white European population [2–6]. Older studies have suggested that the condition is up to five-times more common in the South Asian population [3–5], but more recent data suggest that the difference is smaller. Holman et al, for example, estimated that the prevalence of diabetes (both diagnosed and undiagnosed) in South Asian people in England in 2010 was 14.0%, compared with 6.9% in the general population (those defined as not black or South Asian; *Figure 1*) [6].

Despite the increased prevalence of diabetes in the South Asian population, the actual number of South Asian people with diabetes is not currently available, as it is not accurately recorded in any databases. Using the prevalence figure from Holman et al [6] as a best estimate for the country as a whole, and applying it to the census data, it can be assumed that there are approximately

431,000 South Asian people with diagnosed or undiagnosed diabetes in the UK. Of the estimated 3.8 million people with diagnosed and undiagnosed diabetes of all types in the UK [7], South Asian people can therefore be estimated to comprise 11.2%. Furthermore, if the proportion of cases made up by type 2 diabetes is consistent with the general population, at around 90% [2], it can be estimated that there are around 388,000 South Asian people with diagnosed or undiagnosed type 2 diabetes in the UK.

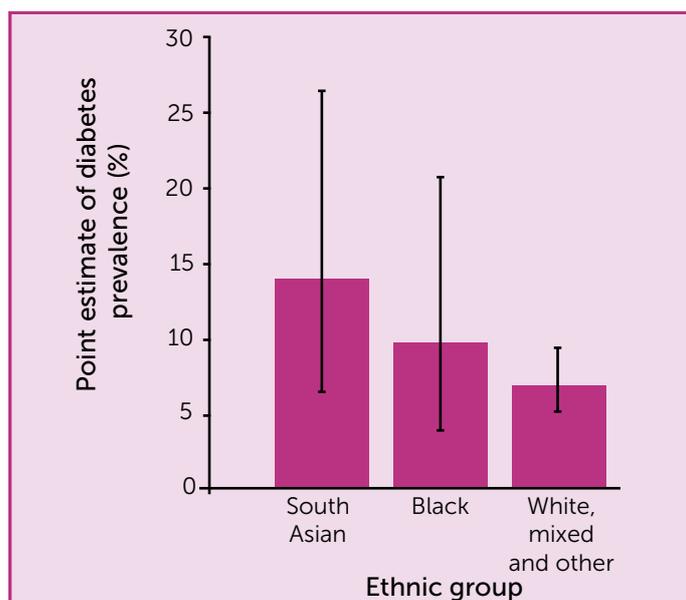
Because of the increased risk of developing the condition, the South Asian population is likely to be disproportionately affected by the persistent rise in the prevalence of type 2 diabetes in the UK [8]. Healthcare professionals should therefore consider South Asian people as an important group in which to target their diabetes screening and prevention programmes.

#### *Is the relative risk of developing type 2 diabetes decreasing in South Asian people?*

One possible interpretation of the prevalence studies discussed in the previous section is that there has been a decrease over time in the relative risk of South Asian people in the UK developing diabetes compared with the white European population, as newer analyses suggest an approximately two-times higher risk compared with the up to five-times higher risk of developing diabetes identified by older ones [3–6]. An optimistic view is that this could be the result of improved efforts to address diabetes risk in South Asian groups. However, it seems unlikely that there has been a true decrease in risk; the more recent estimates of prevalence have come from larger data sets, and hence may be less susceptible to some of the potential biases present in earlier estimates.

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This report has been developed to offer advice to all healthcare professionals involved in the management of South Asian people with type 2 diabetes in the UK. It attempts to provide a succinct review of important considerations in this group, as opposed to providing the outcomes of a systematic review. Where information is not currently available in the scientific literature this has been highlighted and the opinion of the authors provided. A review on the topic of research priorities for British South Asians with diabetes has been previously developed by the South Asian Health Foundation and Diabetes UK, and this can be referred to for more information on research gaps in this community [2].



**Figure 1.** Estimates of diabetes prevalence by ethnicity for England in 2010 (adapted with permission from [6]). Error bars show the uncertainty range.

### *Is diabetes being diagnosed earlier in South Asian people in the UK compared with the general population?*

It has been observed that the conversion of impaired glucose tolerance to overt diabetes is often quicker in South Asian individuals compared with their white counterparts [9, 10]. This might partly explain why South Asian people develop type 2 diabetes significantly earlier in life [11–14]. For example, both the UKPDS (UK Prospective Diabetes Study) and the SABRE (Southall and Brent Revisited) study suggested that diabetes is diagnosed approximately 5 years earlier in South Asian individuals than in white Europeans [11, 14, 15]. As diabetes duration correlates strongly with the risk of developing complications, this could have a significant impact on adverse outcomes in the South Asian population with diabetes [16]. This again highlights the need to target diabetes screening and prevention programmes to this population, while emphasising the crucial importance of good control of the condition once diagnosed.

### Screening for and preventing type 2 diabetes in the South Asian population

NICE has published guidance on the prevention of type 2 diabetes, which provides details of populations that might be at increased risk of developing the condition and should therefore be considered for risk assessment [17]. These include South Asian individuals aged between 25 and 39 years.

Furthermore, NICE recommends that a blood test for either fasting plasma glucose (FPG) or HbA<sub>1c</sub> is considered for all South Asian people aged  $\geq 25$  years with a BMI  $> 23$  kg/m<sup>2</sup>. If the blood test indicates that the individual is at moderate risk of developing

type 2 diabetes (FPG  $< 5.5$  mmol/L or HbA<sub>1c</sub>  $< 42$  mmol/mol [ $< 6.0\%$ ]), it is recommended that culturally appropriate lifestyle advice is provided and tailored support services offered. If the individual is at high risk of developing type 2 diabetes (FPG 5.5–6.9 mmol/L or HbA<sub>1c</sub> 42–47 mmol/mol [6.0–6.4%]), an intensive lifestyle change programme should be offered. If a person's blood glucose test results have deteriorated, and he or she cannot participate in an intensive lifestyle programme or this deterioration has occurred despite participation in a programme, NICE recommends that metformin is considered at an initial dose of 500 mg/day, increasing to 1500–2000 mg/day.

### Outcomes in South Asian people with type 2 diabetes

According to a number of older studies, South Asian individuals with type 2 diabetes appear to be at an overall increased risk of developing complications compared with their white European counterparts. However, from more recent data, it is becoming apparent that the scale of the difference in risk varies according to the specific outcome being examined. As it is important to base clinical practice upon the most up-to-date findings in the most relevant populations, a brief overview of some of the current thinking on macro- and microvascular complications and their outcomes is provided below.

#### Macrovascular outcomes

In the UK population as a whole, coronary heart disease (CHD) is more common in South Asian individuals compared with white people, and it has been suggested that the prevalence of CHD has been increasing over time in the South Asian group [2, 5, 15]. It should be noted that the prevalence varies within the South Asian population of the UK according to sex and ethnic subgroup [2, 5, 15]. For example, in one analysis the prevalence of self-reported CHD in people aged  $\geq 55$  years was highest in the Pakistani subgroup (men, 19%; women, 6.9%) [5]. As well as having a higher prevalence of CHD, South Asian people in the UK also appear to have a higher mortality rate from CHD and stroke (up to 50% higher) than the white European population [2, 15, 18, 19].

Much of the increased risk of CHD seen in South Asian individuals in the UK compared with white Europeans appears to be related to a higher prevalence of type 2 diabetes and also factors relating to insulin resistance [15, 20–22]. Furthermore, South Asian people with type 2 diabetes are at higher risk for any diabetes-related endpoint, including myocardial infarction (MI), than their white European counterparts [15, 20–22], and cardiovascular (CV) events are also seen earlier in UK South Asian people compared with the general population [4, 23, 24]. Indeed, the mean age of first MI was approximately 5 years earlier in South Asian individuals compared with white Europeans in one study [25].

Despite the increased risk of CV morbidity observed for South Asian individuals with type 2 diabetes compared with their white European counterparts, some recent studies have found that the

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risk of CV mortality is similar between these populations [22, 26]. It must, however, be noted that these data are not consistent with those from the long-term follow-up of older studies, which suggest that CV mortality might be increased in the South Asian population of the UK with diabetes [27, 28]. This apparent change over time could be related to improvements in care in this area, as CV mortality has also reduced over time in the general population [29, 30]. Nevertheless, this inconsistency highlights the need for more research in this area; this is because, since the majority of the studies discussed were performed, there have been improvements in both the diagnosis and treatment of MI, and the demographics of the South Asian population of the UK are also likely to have changed, with there now being fewer first-generation migrants [2].

For healthcare professionals, the elevated risk of CV morbidity, but not necessarily mortality, in the South Asian population of the UK with type 2 diabetes emphasises the need to proactively manage CV risk factors in this group.

### Microvascular outcomes

There are also differences in microvascular outcomes observed between South Asian individuals and white Europeans. Studies suggest that South Asian people with type 2 diabetes have a higher risk of retinopathy [31], microalbuminuria [32–34], proteinuria [35] and end-stage renal failure [35, 36]. For example, the UKADS (UK Asian Diabetes Study) found that the prevalence of microalbuminuria was 31% in South Asian people and 20% in white European people ( $P=0.007$ ) [32]. In this study, the difference was highest in people with normal, untreated blood pressure (30.7% vs 10.1% in South Asians and white Europeans, respectively;  $P=0.049$ ; relative risk 3.1, 95% confidence interval 1.0–9.5).

The poorer renal outcomes observed in South Asian groups compared with white Europeans could be the result of differences in risk factor management; in UKADS, for example, South Asian individuals were less likely to be prescribed antihypertensive treatment than white Europeans, and addressing this disparity could be one way of improving renal outcomes in this group [32]. It should also be noted that not all studies have reported worse renal outcomes in UK South Asians [22]; as for macrovascular outcomes, more research would be welcomed.

In terms of foot complications, several studies have reported a reduced risk for peripheral neuropathy, peripheral vascular disease, foot ulcers and lower limb amputation in the South Asian population of the UK with type 2 diabetes compared with the general population with type 2 diabetes [22, 37–40]. This has been suggested to be the result of better skin microvascularisation in South Asian people compared with their white European counterparts [41]. This highlights that the natural history of type 2 diabetes might differ in South Asian individuals and is an area of research that needs greater attention.

### The impact of socioeconomic status on outcomes

Although the outcomes experienced by South Asian people with

type 2 diabetes are different from those of the majority white European group, as previously mentioned, differences in some healthcare outcomes are also seen between the different South Asian subgroups within the UK [42, 43]. It has been suggested that this variation is partly caused by differences in socioeconomic status [43]. For example, in the UK, studies have demonstrated that people of Bangladeshi origin often have worse health outcomes than people of Indian or Pakistani origin, and it has been proposed that this may be related to the fact that, although not all of them are disadvantaged, Bangladeshi people have, on average, a lower socioeconomic status (including income and education) than those in the other South Asian groups [44–46].

Therefore, although we need studies that consider each of the different South Asian ethnicities separately, it is important that socioeconomic factors are considered as potential confounders. Additionally, healthcare professionals should bear in mind that socioeconomic factors are an important driver of health outcomes in general and that targeting health programmes at poorer sections of the community might have a significant impact on addressing health inequalities in an area.

## General considerations when caring for South Asian people with type 2 diabetes

### Inclusion of South Asian participants in clinical trials

Management decisions in everyday practice are largely informed by evidence from clinical trials, with regard to both targets and therapeutic strategies. However, as discussed earlier, type 2 diabetes presents differently in South Asian people compared with the general population, and this could impact on when and how these individuals are best treated. It is, therefore, interesting to note that few clinical trials include a large number of South Asian people. This under-representation was discussed in detail by Hussain-Gambles et al [47], and was demonstrated in a study looking at the proportion of South Asian participants in six multicentre clinical trials in the UK (one in hysterectomy, four in cancer and one in *Helicobacter pylori* eradication) [48]. This study found that the mean proportion of South Asian participants in the study populations was 0.6%, whereas the proportion of South Asian people in Great Britain as a whole was 3.4% at that time.

In type 2 diabetes, South Asian people are also generally under-represented in the large, multinational clinical trial programmes that are undertaken for the registration of new therapies. Nevertheless, there are recent examples of clinical trials carried out specifically in the Asian population [e.g. 49, 50]; however, sub-analyses of the results of these trials split by individual regions of Asia are usually not reported. Additionally, results of studies undertaken in Asian countries might not be directly applicable to equivalent populations in the UK because of differences in lifestyle and proportional representation of the sub-populations.

Therefore, while it is encouraging that Asian-specific trials are now being conducted, the current limitations in the evidence

base with regard to the UK South Asian population with type 2 diabetes in clinical trials should be borne in mind by healthcare professionals when considering management and therapy decisions.

### *Attitudes and barriers to diabetes care in South Asian people*

Differences in both culture and language are often highlighted as barriers to the provision of diabetes care in South Asian people in the UK. However, the language barrier seems to be decreasing in importance owing to the decrease in the proportion of first-generation migrants in the South Asian population of the UK over time [2]. For example, according to data from the 2011 UK census, only approximately 10% of Indian, Pakistani and Bangladeshi people do not use English as their main language and either cannot speak English or cannot speak it well [51].

Nevertheless, cultural barriers are still prevalent and include challenges surrounding dietary management, exercise and physical activity, body image and the social stigma attached to having diabetes [52–54]. Additionally, ideas about the use of medicine from a person's country of origin might influence his or her habits. For example, in India, people with diabetes often self-medicate, make selective use of prescribed drugs, and consider oral antidiabetes drugs (OADs) to only provide relief from physical symptoms rather than being needed for "maintenance" of blood glucose levels [52]. There is also a tendency to abandon drugs that do not provide relief from symptoms [52]. In addition, concordance with treatment is often poor in South Asian people, and it has been suggested that this might be because they are less anxious about being concordant and also that they might attach less importance to controlling their diabetes [52, 55–58].

When seeking to address these barriers, a culturally appropriate approach is crucial. Before considering some of the barriers in more detail, it is worth noting that several culturally appropriate educational materials have been developed specifically for the South Asian community (*Box 1*). Indeed, the provision of culturally appropriate health education has been shown to have short-term effects of improved glycaemic control and better knowledge of diabetes and healthy lifestyles [59]. Additionally, when providing advice it is recommended that each person's current knowledge and beliefs about diabetes are assessed and that education is shaped around these [60]. Nevertheless, it should be remembered that knowledge alone does not necessarily translate into action and it might be necessary to include other family and community members in behavioural change programmes [61, 62].

### *Dietary habits*

The South Asian community in the UK is extremely heterogenous and this is reflected in the dietary habits of the various sub-populations; however, there are some commonalities. In the experience of the authors, meals

typically tend to contain large portions of carbohydrates (i.e. bread or rice), fat (e.g. butter or ghee) or salt. In addition, there is a tendency to overcook vegetables, destroying essential vitamins, which to some degree undermines the benefits provided by the fact that meals are often cooked from scratch from fresh ingredients [63]. It should also be noted that the person with diabetes might not be the person who does the cooking within the household and that including the family cook in educational sessions on diet can be beneficial [64].

On a practical note, another important dietary consideration is that meal times may be different between South Asians and the general population, which may influence advice on medication use and timings. For example, breakfasts tend to be small and the major meal eaten quite late at night.

Furthermore, food, in particular the provision of luxurious or traditional foods, has an important social role in the South Asian community. As such, the consumption of these foods is often felt to be obligatory to avoid offending people and potential alienation from the community [65]. This can make visiting friends and relatives problematic for people with type 2 diabetes because healthy choices are often not available. This underscores the importance of efforts to educate South Asian family members and communities about healthy eating as an important aspect of diabetes care.

### *Religious rituals, fasting and feasting*

A large number of South Asians will fast, either on a regular basis (for example, many Hindu people may fast 1 day each week) or as part of a religious observance (for example, Muslim people during Ramadan). In diabetes, fasting may lead to hypoglycaemia, hyperglycaemia and dehydration, and some people may be reluctant to take their medication during their fast [66]. This means that the timing or dosage of antidiabetes medications might need to be adjusted or certain drugs exchanged for more appropriate ones. In addition, some fasts are broken with a "feast", which could significantly impact glycaemic control.

Education about fasting during a religious observance should be performed at least 1–2 months before the fast is undertaken to ensure that any changes to medication are established when the fast begins. Detailed recommendations

#### **Box 1.** Recommended sources of culturally appropriate educational resources for South Asian people with type 2 diabetes.

- Apnee Sehat ([www.apneesehat.net](http://www.apneesehat.net))
- DESMOND BME (<http://www.desmond-project.org.uk/bmefoundationnewlydiagnosed-279.html>)
- Diabetes UK ([www.diabetes.org.uk](http://www.diabetes.org.uk))
- Facts About Fasting ([www.factsaboutfasting.com](http://www.factsaboutfasting.com))
- South Asian Health Foundation ([www.sahf.org.uk](http://www.sahf.org.uk))

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on managing diabetes during Ramadan are available, and include those produced by the Muslim Council of Britain [67] and the American Diabetes Association [68].

In addition to fasting, South Asian people may undertake religious pilgrimages, for example the Hajj. These will involve travel to countries with different climates and changes in diet and daily activity, and this may also require adjustment to medication, as well as appropriate education.

### Body image

It is worth bearing in mind that in South Asian communities medium or large body sizes have traditionally been associated with good health and higher status, with thinness associated with being less healthy [60, 69, 70]. This may reduce an individual's incentive to lose weight when appropriate; however, this attitude now appears to be changing, with younger UK-born South Asian individuals adopting a more Western view that a slim figure is preferred [71].

### Exercise and physical activity

Compared with white European people, South Asian people oxidise less fat during exercise [72]. This means that they may need to perform more moderate-intensity physical activity to exhibit a similar cardiometabolic risk profile [73]. This issue is compounded by the fact that South Asian people tend to have more sedentary lifestyles compared with the general population, and engage in less physical activity [74, 75].

It has been suggested that this could be because exercise may have little cultural meaning, or because it might be considered to negatively impact health or to exacerbate illness by increasing physical weakness [76–80]. There may also be other cultural reasons for reduced physical activity or exercise, including the expectation that women avoid activities outside the home and the belief that mixed-sex activities are inappropriate [81].

With these challenges in mind, it is clear that specific and culturally appropriate advice on exercise (i.e. how much to do and examples of types of exercise) should be provided, rather than vague exhortations to “do more exercise”, as studies suggest that this information may help more people to make lifestyle changes [79].

Importantly, reduced physical activity is also seen in South Asian children, who are 13-times more likely to develop type 2 diabetes than white European children [82]. This highlights the need to start education about, as well as promotion of, exercise early. This can be done both in the school setting and with families, so that young people and their parents and carers are aware of the need for exercise. Nevertheless, as with other cultural attitudes, those around exercise appear to be changing and newer generations are more likely to be accepting of exercise [83].

### Structured education

Ongoing access to structured education from the time of diagnosis of diabetes is widely recommended in general. With

the earlier statements about the importance of culturally appropriate care in mind, healthcare professionals should be aware that a version of the DESMOND (Diabetes Education and Self-Management for Ongoing and Newly Diagnosed) structured education programme specifically for South Asian people with type 2 diabetes is available [84].

### Risk factor management in South Asian people with type 2 diabetes

Given the earlier development of type 2 diabetes in South Asian people compared with other groups, and the increased risk of complications, comprehensive management of risk factors in this group is essential. This section focuses on the management of blood glucose and body weight; however, management of other risk factors, including blood pressure and cholesterol, is also important. When considering the management of blood pressure and cholesterol, there is no compelling evidence to suggest that South Asian individuals should be treated differently to the general population in terms of treatment choices or targets. Therefore, management of these risk factors in accordance with NICE or SIGN guidance [85, 86], as appropriate, is recommended.

### Management of blood glucose

Glycaemic control among South Asian people with type 2 diabetes in the UK has been shown to be either similar [87] or worse [12, 88–92] compared with that among white Europeans. Furthermore, in a longitudinal study in which baseline glycaemic control was similar for South Asian and white European participants, glycaemic control was significantly worse in the former group after 5 years despite greater prescribing of OADs and similar insulin prescription [12, 93]. The authors suggested that the observed difference in control might be a result of poor concordance, clinical inertia or greater deterioration in insulin sensitivity over time in the South Asian group [12].

It must also be noted that current pay-for-performance initiatives do not address the disparities in the management and control of diabetes between ethnic groups [94]. It has been suggested that new management approaches are needed [88], and a number of examples are highlighted in the report *Diabetes in BME Communities: Raising awareness, improving outcomes and sharing best practice* [95].

When considering pharmacotherapy for hyperglycaemia, there are no specific data from clinical trials that suggest that any of the blood glucose lowering therapies act differently in UK South Asian people compared with people from other sub-populations of the UK [2]. As such, existing guidelines from bodies including NICE and SIGN should be followed as appropriate when managing hyperglycaemia in South Asian people with type 2 diabetes [85, 86]. Nevertheless, there is currently a great deal of emphasis on personalising blood glucose targets and antihyperglycaemic therapy to the specific needs of the individual with type 2 diabetes, which is a core concept of

**Table 1.** Therapies for managing hyperglycaemia in type 2 diabetes: Advantages, disadvantages and authors' practical considerations for use in South Asian people (continues over).

Class or agent	Advantages	Disadvantages	Considerations relevant to South Asian people
Metformin	<ul style="list-style-type: none"> <li>• Extensive experience</li> <li>• No weight gain</li> <li>• Low inherent risk of hypoglycaemia</li> <li>• Possible reduction in CVD events</li> <li>• Low cost</li> </ul>	<ul style="list-style-type: none"> <li>• GI side effects</li> <li>• Risk of lactic acidosis</li> <li>• Risk of vitamin B<sub>12</sub> deficiency</li> <li>• Multiple contraindications</li> </ul>	<ul style="list-style-type: none"> <li>• Risk of vitamin B<sub>12</sub> deficiency may be a concern in particular South Asian sub-populations that are predominantly vegetarian or vegan, as this vitamin is mostly obtained from animal sources [97]</li> <li>• Modestly increases insulin sensitivity, which might be beneficial in South Asians owing to increased insulin resistance in this population [98, 99]</li> </ul>
Sulphonylureas	<ul style="list-style-type: none"> <li>• Extensive experience</li> <li>• Possible reduction in microvascular risk</li> <li>• Low cost</li> </ul>	<ul style="list-style-type: none"> <li>• Hypoglycaemia</li> <li>• Weight gain</li> <li>• Low durability</li> <li>• Possibly blunt MI preconditioning</li> </ul>	<ul style="list-style-type: none"> <li>• Hypoglycaemia has been linked to CV events [100, 101]; South Asian people are at elevated CV risk compared with white European people [15]</li> <li>• May not be appropriate for people who are fasting owing to the risk of hypoglycaemia</li> <li>• Treatments associated with weight gain may not be appropriate in South Asian people owing to the lower BMI cutoff for obesity in this group [102–104]</li> </ul>
Pioglitazone	<ul style="list-style-type: none"> <li>• Low inherent risk of hypoglycaemia</li> <li>• Durability</li> <li>• Increases HDL-cholesterol</li> <li>• Reduces triglycerides</li> <li>• Possible reduction in CVD events</li> </ul>	<ul style="list-style-type: none"> <li>• Weight gain</li> <li>• Oedema/heart failure</li> <li>• Bone fractures</li> </ul>	<ul style="list-style-type: none"> <li>• Works by increasing insulin sensitivity, which might be beneficial in South Asian people owing to increased insulin resistance in this population [98, 99]</li> <li>• Treatments associated with weight gain may not be appropriate in South Asian people owing to the lower BMI cutoff for obesity in this group [102–104]</li> <li>• Fracture risk may be a concern owing to higher rates of vitamin D deficiency in South Asian people [105]</li> </ul>
DPP-4 inhibitors	<ul style="list-style-type: none"> <li>• Low inherent risk of hypoglycaemia</li> <li>• Well tolerated</li> <li>• No ischaemic CVD concerns highlighted in CV outcomes trials published to date [e.g. 106]</li> </ul>	<ul style="list-style-type: none"> <li>• Generally modest HbA<sub>1c</sub> efficacy</li> <li>• Urticaria/angioedema</li> <li>• Questions raised regarding pancreatitis risk and heart failure [106]</li> </ul>	<ul style="list-style-type: none"> <li>• Weight neutral; treatments that do not cause weight gain may be preferable for South Asian people owing to the lower BMI cutoff for obesity in this group [102–104]</li> <li>• Hypoglycaemia risk profile is good during fasting [107]</li> </ul>

*Advantages and disadvantages are adapted from Inzucchi et al [96]. Considerations relevant to South Asian people are based upon the authors' clinical experience. Meglitinides and acarbose omitted owing to less frequent use in the UK [96]. CV=cardiovascular; CVD=cardiovascular disease; DPP-4=dipeptidyl peptidase-4; GI=gastrointestinal; MI=myocardial infarction.*

the most recent position statement on the management of hyperglycaemia from the American Diabetes Association and the European Association for the Study of Diabetes [96].

When considering which class of therapy to prescribe, each

has advantages and disadvantages that should be taken into consideration when treating anybody with type 2 diabetes (e.g. effect of the agent on body weight) and these are detailed in Table

1. There are also specific considerations that are relevant when

**Table 1 (continued).** Therapies for managing hyperglycaemia in type 2 diabetes: Advantages, disadvantages and authors' practical considerations for use in South Asian people.

Class or agent	Advantages	Disadvantages	Considerations relevant to South Asian people
SGLT2 inhibitors	<ul style="list-style-type: none"> <li>• Low inherent risk of hypoglycaemia</li> <li>• Weight reduction</li> <li>• Blood pressure reduction</li> </ul>	<ul style="list-style-type: none"> <li>• Genital mycotic infections and urinary tract infections</li> <li>• Increased urinary output and volume depletion</li> </ul>	<ul style="list-style-type: none"> <li>• Weight loss; treatments that result in weight loss may be preferable for South Asian people owing to the lower BMI cutoff for obesity in this group [102–104]</li> <li>• May be appropriate for use during fasting owing to good hypoglycaemia risk profile. However, volume depletion may be a concern for those who fast [108, 109]</li> <li>• Insulin independent mechanism of action may be beneficial as South Asian people are generally more insulin resistant [98, 99]</li> </ul>
GLP-1 receptor agonists	<ul style="list-style-type: none"> <li>• Low inherent risk of hypoglycaemia</li> <li>• Weight reduction</li> <li>• Blood pressure reduction</li> </ul>	<ul style="list-style-type: none"> <li>• GI side effects (nausea/vomiting)</li> <li>• Questions raised regarding pancreatitis risk</li> <li>• Injectable</li> <li>• Training requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Weight loss; treatments that result in weight loss may be preferable for South Asian people owing to the lower BMI cutoff for obesity in this group [102–104]</li> <li>• Hypoglycaemia risk profile is good during fasting [110]</li> <li>• BMI cutoffs for use suggested by NICE and SIGN should be reduced for South Asian people [85, 86]</li> </ul>
Insulins	<ul style="list-style-type: none"> <li>• Universally effective</li> <li>• Theoretically unlimited efficacy</li> <li>• Reduced microvascular risk</li> </ul>	<ul style="list-style-type: none"> <li>• Hypoglycaemia</li> <li>• Weight gain</li> <li>• Questions raised regarding mitogenic risk</li> <li>• Injectable</li> <li>• Training requirements</li> <li>• "Stigma" (for patients)</li> </ul>	<ul style="list-style-type: none"> <li>• May not be appropriate for people who are fasting owing to the risk of hypoglycaemia</li> <li>• Hypoglycaemia has been linked to CV events [100, 101]; South Asian people are at elevated CV risk compared with white European people [15]</li> <li>• Doses and timing of administration may need adjustment according to the dietary habits of South Asian people</li> <li>• Treatments associated with weight gain may not be appropriate in South Asian people owing to the lower BMI cutoff for obesity in this group [102–104]</li> <li>• Stigma surrounding insulin use and reluctance to initiate insulin may be greater in South Asian people [62, 111–113]</li> </ul>

Advantages and disadvantages are adapted from Inzucchi et al [96], except for those for SGLT2 inhibitors which are from Yang et al [108] and Zhang et al [109]. Considerations relevant to South Asian people are based upon the authors' clinical experience. Meglitinides and acarbose omitted owing to less frequent use in the UK [96]. GI=gastrointestinal; GLP-1=glucagon-like peptide-1; SGLT2=sodium-glucose cotransporter-2.

thinking about treatment choices for South Asian individuals, and these are also summarised in Table 1. For example, hypoglycaemia may be of particular concern if an individual will be fasting [67, 68].

In keeping with the recommendations from NICE and SIGN, unless hyperglycaemia is particularly elevated, we feel that it is most appropriate to avoid initiating a South Asian individual on

metformin therapy immediately on diagnosis of type 2 diabetes and that lifestyle modification should be trialed first, despite the poorer outcomes observed in this population. This should enable the individual to experience first-hand the impact that lifestyle interventions can have on the condition, emphasising that type 2 diabetes is not solely controlled by medication

and that behaviour is important too. This is a lesson which, if learned, would be expected to provide sustained benefits.

Another aspect of treatment that can be particularly difficult in South Asian people with type 2 diabetes is the initiation of insulin, owing to cultural concerns about injecting insulin and also about insulin treatment itself [62, 111–113]. It is suggested that the eventual requirement for insulin to maintain optimal glycaemic control is discussed at diagnosis, as this may help counter concerns about insulin being a “failure” or “the end of the road”. Similarly, it may be advisable to show the individual examples of insulin pen devices at this time to help allay fears about injections.

### Management of body weight

According to research using conventional criteria for obesity, 14% and 20% of Indian men and women, 15% and 28% of Pakistani men and women and 6% and 17% of Bangladeshi men and women are obese, compared with 23% of men and women in the general population [114]. Such findings indicate that the incidence of obesity is generally lower in the South Asian groups compared with the general population. However, conventional BMI cutoff points for overweight (25 kg/m<sup>2</sup>) and obesity (30 kg/m<sup>2</sup>) have been developed based upon epidemiological associations with morbidity and mortality derived mainly from white populations, and it has been suggested that these thresholds under-represent cardiometabolic risk in Asian individuals [102, 115].

Excess adiposity is a key causative factor or comorbidity for several chronic diseases, including type 2 diabetes, and South Asian individuals on average develop type 2 diabetes at a significantly lower BMI than white Europeans [11]. It has been suggested that this occurs because South Asian individuals are more likely to deposit intra-abdominal fat, which is metabolically active and strongly linked to insulin resistance [74, 98, 116]. Indeed, a recent consensus statement recommended that BMI thresholds for overweight and obesity should be revised downwards to 23 kg/m<sup>2</sup> and 25 kg/m<sup>2</sup>, respectively, in Indian Asians [102, 103]. Furthermore, in 2013, NICE recommended that action to prevent type 2 diabetes should be triggered at a lower BMI cutoff among Asian (South Asian and Chinese) populations (23 kg/m<sup>2</sup> and 27.5 kg/m<sup>2</sup> to indicate increased and high risk for developing type 2 diabetes, respectively) than those for white Europeans (25 kg/m<sup>2</sup> and 30 kg/m<sup>2</sup>) [104].

It should also be noted that some treatments (e.g. glucagon-like peptide-1 receptor agonists [Table 1]) and interventions (e.g. referral for specialist weight management) are recommended for use based upon BMI cutoffs. In this context and based upon the discussion above it is reasonable to use lower BMI thresholds for South Asian individuals compared with white Europeans when considering these interventions.

Waist circumference is increasingly used as an alternative measure of adiposity, as it provides a surrogate marker for abdominal fat deposition and, in turn, visceral fat mass. As previously mentioned, South Asian individuals are more likely

to deposit intra-abdominal fat, and, to reflect an increased risk of cardiometabolic disease, lower waist circumference cutoffs have also been proposed for these people compared with white Europeans. The suggested cutoffs vary depending on whether they are based on expert opinion or surrogate risk markers, such as blood glucose levels [103, 115].

For the reasons described above, in clinical practice, we recommend that adiposity is assessed not solely by BMI but also by waist circumference in the South Asian population. In addition, we have found that measuring the body fat percentage of a person with diabetes can be a very useful means of encouraging behavioural change and assessing the success of weight management efforts.

### Conclusions

Overall, the South Asian population of the UK is an important target group for type 2 diabetes prevention and screening programmes, as these individuals are at a higher risk of developing the condition than white European people. South Asian people also develop type 2 diabetes at a younger age and a lower BMI, and are at an increased risk for a number of complications, including CHD. When treating this group, specific cultural considerations should be kept in mind, including differences in diet compared with the general population. However, it is essential to note that the South Asian population of the UK is a heterogeneous group, with differing cultures and beliefs. As such it is important that care for diabetes, including education, is culturally appropriate and tailored based upon this knowledge. This, together with an appreciation of South Asian-specific considerations related to risk factor management, such as lower cutoffs for obesity, should help improve outcomes for this population. ■

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### Conflicts of interest

**WH** has spoken at meetings, attended advisory boards and been principal investigator for AstraZeneca, Boehringer Ingelheim, Lilly, MSD, Novo Nordisk and Sanofi. **KK** has acted as a consultant and speaker for AstraZeneca, Boehringer Ingelheim, Janssen, Lilly, MSD, Novartis, Novo Nordisk and Sanofi. He has received grants in support of investigator and investigator-initiated trials from AstraZeneca, Boehringer Ingelheim, Lilly, Novartis, Novo Nordisk, Roche and Sanofi. **SB** has received educational grants and consultation and speaker fees from AstraZeneca, Janssen, Lilly, MSD, Novo Nordisk and Sanofi. He has received research funds for investigator-initiated trials from Novo Nordisk. **HB** has spoken at meetings arranged by Lilly, MSD, Novartis, Novo Nordisk, Sanofi and Takeda. He chairs the North West Youth Diabetes Study Group for Novo Nordisk. He has not received any grants in support of investigator or investigator-initiated trials. **MAK** has spoken at meetings for Boehringer Ingelheim, Lilly, MSD and Novo Nordisk. He has received educational grants from Sanofi and the QEHB Charity. He has been principal investigator for a sponsor-led trial by Roche. **KP** has received honoraria from Daiichi Sankyo and Janssen in the past 12 months for advisory functions. **VP** has worked with most of the large pharmaceutical companies, mainly in relation to primary care education and workshops in diabetes care. He has received occasional sponsorship for educational and research conferences.

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# Key points

- South Asian people make up the second largest ethnic group in the UK, after the white population.
- South Asian individuals are at an increased risk of developing type 2 diabetes compared with the white European population and are therefore likely to be disproportionately affected by the persistent rise in the prevalence of the condition. They also develop the condition earlier in life.
- In terms of prevention, NICE recommends that all South Asian people aged 25–39 years are encouraged to have a risk assessment for type 2 diabetes. NICE also recommends that action to prevent type 2 diabetes should be triggered at a lower BMI cutoff in South Asian individuals than in white European people.
- South Asian individuals appear to be at an increased risk of a number of the complications of type 2 diabetes compared with their white counterparts; however, the scale of the difference in risk varies according to the outcome being examined. Elevated cardiovascular risk is a particular concern in this group.
- Culturally appropriate advice should be provided to South Asian individuals with type 2 diabetes, including advice about diet and exercise.
- South Asian people are generally under-represented in clinical trial programmes; the current limitations in the evidence base with regard to the UK South Asian population with type 2 diabetes should be borne in mind when considering management and therapy decisions.
- There are no specific data from clinical trials to suggest that blood glucose, blood pressure or cholesterol levels should be managed differently in South Asian individuals with type 2 diabetes compared with the general population, in terms of the targets or therapies chosen.
- When individualising the choice of antihyperglycaemic therapy, there are specific considerations relevant to South Asian people with type 2 diabetes (for example, the risk of hypoglycaemia associated with an agent and its effects on body weight). These are provided within the document.
- Conventional BMI and waist circumference cutoffs for defining obesity are thought to underestimate cardiometabolic risk in South Asian individuals, and lower thresholds are recommended in this population. Furthermore, some treatments and interventions are recommended for use based on BMI cutoffs; these thresholds should also be lower in South Asian people.
- Assessments of adiposity in South Asian people should include a consideration of waist circumference, because there is a tendency for these individuals to accumulate intra-abdominal fat.



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