Type 2 diabetes prevalence among people of South Asian ethnicity in the UK

Article points

1. It is known that certain ethnic groups are at increased risk of developing type 2 diabetes.

2. From looking at UK datasets from recent years, there appears to have been an increase in the prevalence of diabetes across all ethnic groups, especially for people of South Asian ethnicity.

3. An increased type 2 diabetes prevalence could be a result of changing diagnostic techniques, a more sedentary lifestyle and acculturation to a more Western lifestyle, or even a decrease in the mortality rate for this population.

Key words

– Epidemiology
– Ethnicity
– Type 2 diabetes prevalence

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This article explores the prevalence of type 2 diabetes in the UK among ethnic groups. Data from the 2011–2012 National Diabetes Audit and the more recent Royal College of General Practitioners' Research and Surveillance Centre database, which includes data from 2014, was used. The authors suggest theories for the differences observed between ethnic groups and discuss solutions to improve the identification of those at risk.

The global burden of type 2 diabetes is increasing; it is estimated that 387 million people have the condition and this is forecast to rise to 592 million by 2035 (Diabetes UK, 2015). Globally, ethnicity is a well-established predisposing risk factor for the development of type 2 diabetes, and its prevalence is considerably higher among those of South Asian, African and African-Caribbean descent (World Health Organization [WHO], 2014). This predisposition is also evident in the UK, where type 2 diabetes diagnosis is 2.5–5 times more common in people of South Asian ethnicity (Khunti et al, 2013) and three times more common in people of African-Caribbean ethnicity, when compared to people of White ethnicity (Nazroo, 1997).

In light of an ever-increasing prevalence of type 2 diabetes, our aim was to investigate trends in type 2 diabetes prevalence in the UK and explore whether some ethnicities are particularly associated with an increased risk of type 2 diabetes.

Aim and methods

To investigate our aim, we examined data from two cross-sectional studies: the 2011–2012 National Diabetes Audit and the Royal College of General Practitioners' (RCGP)

Research and Surveillance Centre (RSC) database, which includes data up to 2014.

The 2011–2012 National Diabetes Audit reports key care processes and treatment target achievement rates of 87.9% of primary care practices across England and Wales. The RCGP RSC database contains primary care health data from 170 practices across England and Wales. The Office for National Statistics (2011) was the source of data for the ethnic distribution among the UK population.

In both databases, records of individuals with coded ethnicity data were used; the coded data were recorded using the Read classification (the standard UK coding system [de Lusignan, 2005]). Those with unknown, unstated or mixed ethnicity were excluded. In the RCGP RSC dataset, the following ethnic subgroups were used: White, Black and Asian. In the 2011–2012 National Diabetes Audit cohort, an African-Caribbean subgroup was also present. After selecting those with ethnicity codes, both datasets were then subdivided according to a coded diagnosis of type 2 diabetes.

All statistical analyses were performed using the statistical programme *R* and statistical significance was delimited at *P*<0.05. A preliminary comparison was completed to explore differences in the distribution of the

two datasets for age and male gender using the Chi-squared test.

Observations and analysis

For the age ranges where type 2 diabetes is known to be more prevalent (between 50 and 79 years), there was no significant difference in the number of people with type 2 diabetes between the RCGP RSC and National Diabetes Audit datasets (*Table 1*). The 2011–2012 National Diabetes Audit demonstrated that type 2 diabetes prevalence was higher in those of Asian or Black ethnicity than those of White ethnicity (*Table 2*). Analysis of the RCGP RSC dataset confirmed this finding (*Table 3*).

In both datasets, the prevalence of type 2 diabetes is highest among people of Asian ethnicity compared to Black or White ethnicity. Among the South Asian groups, the type 2 diabetes prevalence was 5.1% (*n*=216 009) in the 2011–2012 National Diabetes Audit and 8.5% (*n*=3219) in the RCGP RSC dataset suggesting there has been an increase between 2011–2012 and 2014. This could be due to the higher incidence rate of type 2 diabetes in the South Asian cohort of 0.95% compared to the Black and White cohorts. Further statistical analysis within this study indicated type 2 diabetes prevalence may be higher than currently observed in the UK population as a whole.

Discussion

Our findings agree with previously published literature that suggest there is an ethnicity-related increased risk of type 2 diabetes, especially in those of South Asian ethnicity. Our findings also suggest that there has been an increase in the prevalence of type 2 diabetes over recent years among South Asian people in particular. For the rest of the article, we will focus on the leading thoughts on the observed ethnic disparity and also why people of South Asian ethnicity are most at risk of developing type 2 diabetes.

Genetic factors

Studies are increasingly demonstrating

Table 1. Distribution of age ranges and gender of the RCGP RSC and 2011–2012 National Diabetes Audit datasets.

Age (years)	RCGP RSC cohort	2011–2012 National Diabetes Audit cohort	*P* value
0≤19	6 (0.02%)	1 295 (0.06%)	0.002
20≤29	118 (0.34%)	10 409 (0.48%)	<0.001
30≤39	794 (2.3%)	58 601 (2.7%)	<0.001
40≤49	3 209 (9.3%)	213 997 (9.8%)	0.012
50≤59	6 478 (18.9%)	421 503 (19.2%)	0.112
60≤69	9 301 (27.1%)	602 374 (27.5%)	0.137
70≤79	8 882 (25.9%)	565 845 (25.8%)	0.736
80≤89	4 803 (14%)	281 392 (12.8%)	<0.001
90+	687 (2%)	35 248 (1.6%)	<0.001
Male gender	19 266 (56.2%)	1 218 651 (55.6%)	0.034

RCGP RSC=Royal College of General Practitioners' Research and Surveillance Centre.

a genetic predisposition for developing type 2 diabetes in some ethnicities. A number of genetic polymorphisms have been isolated, which confer significant susceptibility to insulin resistance and type 2 diabetes:

- South Asians: e.g. apolipoprotein A5 (Yin et al, 2014).
- Chinese: e.g. *SHIP2* gene (Hao et al, 2015).
- African-Americans: e.g. rs7560163 (Palmer et al, 2012).

DNA methylation has also been proposed as a mechanism that may explain ethnic differences (Chambers et al, 2015). These genetic aberrations may be why certain ethnicities are seen to be more insulin resistant than White people, even when matched for BMI and age (Mohan et al, 1986). They may also affect the tendency of those of South Asian ethnicity to accrue greater visceral fat, which is strongly implicated as an independent risk factor for insulin resistance (Indulekha et al, 2011).

Environmental factors

Environmental factors associated with acculturation may be another reason for the disparity observed among ethnicities. As a result of global westernisation, there

Page points

1. Analysis of the 2011–2012 National Diabetes Audit demonstrated that type 2 diabetes prevalence was higher in those of Asian or Black ethnicity than those of White ethnicity.

2. Analysis from the present study suggests that the prevalence of type 2 diabetes increased between 2011–2012 and 2014 in the South Asian population.

3. Studies are increasingly demonstrating a genetic predisposition for developing type 2 diabetes in some ethnicities.

Table 2. Type 2 diabetes prevalence according to ethnicity based on the 2011–2012 National Diabetes Audit.

Ethnicity	Prevalence of type 2 diabetes in the cohort (%)	Proportion of UK population* (%)	Type 2 diabetes as a percentage of the UK population (%)
Asian	5.12	7.51	0.39
African-Caribbean	3.89	3.33	0.13
Mixed	1.42	2.18	0.03
White	2.69	85.9	2.31

*According to the Office for National Statistics (2011).

Table 3. Type 2 diabetes prevalence according to ethnicity based on the RCGP RSC database.

Ethnicity	Prevalence of type 2 diabetes in the cohort (%)	Proportion of the dataset (%)	Type 2 diabetes as a percentage of the UK population (%)	Incidence of new-onset cases of type 2 diabetes in a year (%)
Asian	8.5	6.8	0.6	0.95
Black	5.2	4.1	0.2	0.63
White	4.8	89.1	4.3	0.46
Total population	**5.1**	**n/a**	**n/a**	**0.35**

RCGP RSC=Royal College of General Practitioners' Research and Surveillance Centre.

has been a significant change in dietary habits, with increased intake of saturated fats and sugar and an associated reduction in fibre intake. This, coupled with a lack of physical activity, cumulatively results in an increased likelihood of insulin resistance. Interestingly, acculturation has been shown to significantly increase the prevalence of type 2 diabetes across migrant populations (Abate and Chandalia, 2003).

Diagnostic tools

In 2011, WHO introduced HbA_{1c} as a diagnostic tool for diabetes (Mostafa et al, 2010a). While validated as a diagnostic test in type 2 diabetes, HbA_{1c} levels have been found to be consistently higher in those of non-White ethnicity when adjusted for factors likely to affect glycaemia (Herman et al, 2007). Furthermore, the prevalence of type 2 diabetes has been shown to be higher in South Asians when the WHO-derived HbA_{1c} target of ≥48 mmol/mol (6.5%) is used compared to when the oral glucose tolerance test is used (Mostafa et al, 2010b). While the introduction of HbA_{1c} testing may be a potential cause of the rise in prevalence of type 2 diabetes, this may not fully explain the observation.

Decreased mortality rate

Increased prevalence of a medical condition in a population can be due to a decreased mortality rate. Due to the nature of the RCGP RSC dataset, mortality rates could not be determined. The current data tend to underestimate death, and, in the future, we hope to link RCGP RSC data to the Office of National Statistics death data. We can, therefore, not discount that the increase in type 2 diabetes prevalence was due to a decrease in mortality rate, perhaps caused by improved care of these individuals.

Limitations and caveats

Although the RCGP RSC dataset is represented by over 110 practices across the UK, the National Diabetes Audit is a much

larger dataset, which means type 2 diabetes prevalence from the RCGP RSC could be overestimated. Another difference between the datasets is the methodologies used for data collection. The RCGP RSC practices receive feedback about data quality and this might also impact on data recording. It is important to be aware of these differences as it makes comparing outcomes difficult.

Ethnicity coding

We selected people that were coded "Asian", but we were not able to determine whether these individuals were of South Asian or East Asian origin. Therefore, we cannot be certain the cohort representing people of South Asian origin comprised only people of South Asian origin. Appropriate ethnicity coding within primary care medical records remains suboptimal (Kumarapeli et al, 2006), and consistent ethnicity coding would facilitate more sophisticated risk analysis tools for screening of potential high-risk individuals (Mathur et al, 2014). Therefore, we propose that practices should use more specific ethnicity codes that allow identification of those individuals.

The study highlights the continuing need to target certain ethnic groups who are at increased risk of developing type 2 diabetes. Primary prevention strategies for at-risk groups are essential, and we encourage the implementation of culturally appropriate interventions, focusing on lifestyle modifications, and early identification to be employed on a national level to better manage this burgeoning epidemic (Ramachandran et al, 2013).

Conclusion

Our study concludes that there are variations in the prevalence of type 2 diabetes between ethnic groups, and that it is highest among people of Asian ethnicity. The reason for this is multifactorial, so it is important to be aware of this difference and target individuals in this increased at-risk group. ∎

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