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Trends in the prevalence of type 2 diabetes mellitus and obesity in the Arabian Gulf States: Systematic review and meta-analysis

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ABSTRACT

We report trends in type 2 diabetes mellitus and obesity in adults residing in the Arabian Gulf States. Among the Saudi population, the prevalence of diabetes increased from 10.6% in 1989 to 32.1% in 2009. Prevalence of the disease increased faster among Saudi men than women, with growth rates of 0.8% and 0.6% per year, respectively.

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The prevalence of type 2 diabetes mellitus (T2DM) has increased rapidly in Arabic countries over the past 30 years. According to the International Diabetes Federation (IDF), three of the Arabian Gulf countries have the highest prevalence of T2DM anywhere in the world [1]. Obesity is one of the main factors affecting the prevalence of T2DM, which has also reached epidemic proportions in the Arabian Gulf States [2]. However, exact figures relating to the increasing prevalence of these diseases have yet to be collected, compared and analyzed for the region [3–5]. We report how the prevalence of T2DM and obesity had changed over the last 30 years among adults residing in the Arabian Gulf States.

1. Methods

We conducted a comprehensive literature search for studies of T2DM and obesity using Medline and Embase. In addition, we reviewed the reference lists from retrieved articles in order to identify additional relevant papers. We included publications dating from 1st January 1979 to 31st December 2011 and focussed specifically on studies describing the prevalence of diabetes and obesity according to the WHO criteria, or the equivalent, explicit, blood glucose-level criteria for the diagnosis of diabetes. We included studies that considered

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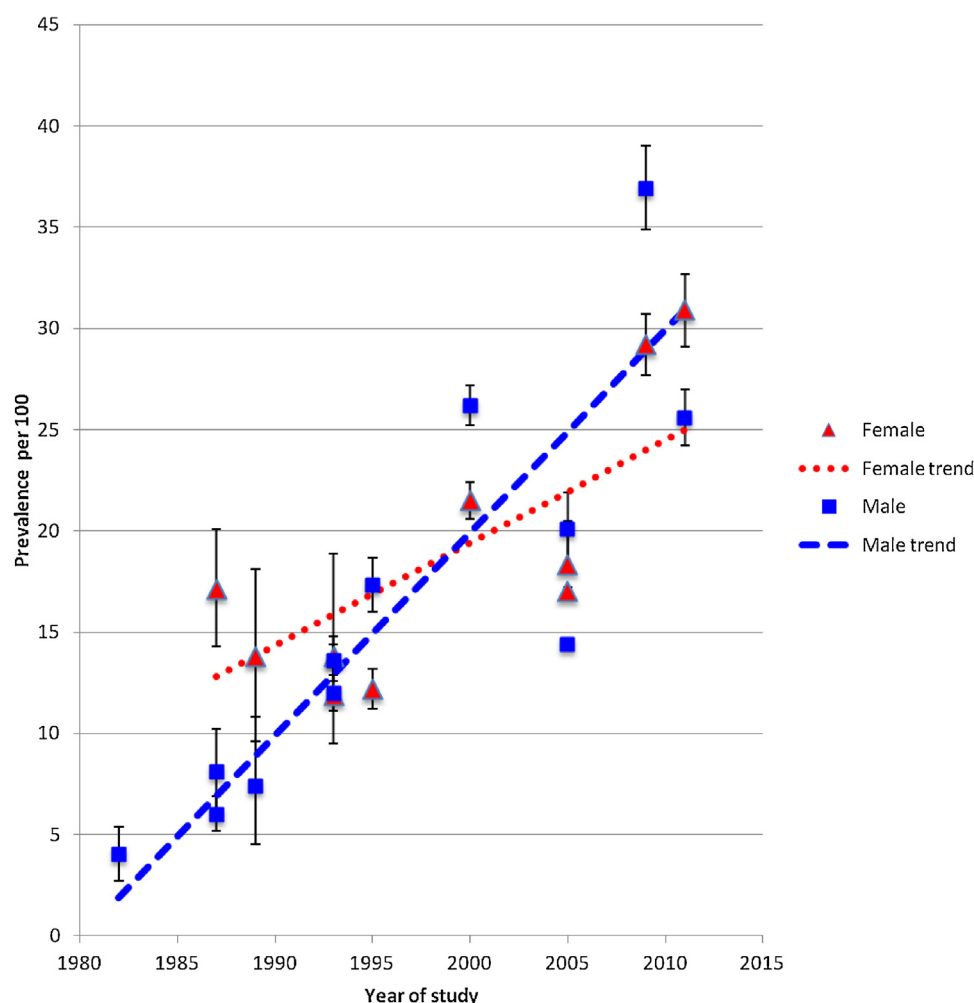


Fig. 1 – Rise in the prevalence of diabetes among Saudi women and men 1980–2012.

both type 1 and type 2 diabetes, because T2DM accounts for over 90% of all diabetes cases [6].

Two reviewers (N. H. and R. M.) independently reviewed the title, the abstract, and the article. Discrepancies were resolved by consensus or determined by other reviewers (K. K. and S. de L.). Meta-analysis was performed to estimate pooled prevalence rates using a random-effects model which gives an average estimate across studies weighted by sample size. In addition, we used meta-analysis to assess the prevalence trends by year for both sexes.

2. Results

A total of 34 papers (36 studies) met our inclusion criteria: 21 assessed the prevalence of T2DM, and 12 reported the prevalence of obesity, while a further 3 assessed the prevalence of both diabetes and obesity. The prevalence of diabetes varied between the countries. The current estimated prevalence of T2DM among the Arabian Gulf population ranged from 5.9% in the United Arab Emirates [7] to 32.1% in Saudi Arabia [8], while the recorded prevalence of obesity ranged from 20.3% in Saudi Arabia [9] to 56% in Kuwait [10]. Details of individual prevalence studies are reported in Appendix 1.

Although the overall estimate of the prevalence of T2DM was 14.9% we used a random-effects model to identify differences among the collected data. This heterogeneity arose from differences in the countries, and the year of publication. We could not apply the heterogeneity test to the obesity studies because there was too small a number of studies included and most of them were conducted in Saudi Arabia.

The prevalence of diabetes among the Saudi population increased over time from 12.4% in 1987 [11] to 27.7% in 2011 [12]. Using a simple statistical analysis (t-test), it appeared that there was no significant difference in the prevalence of T2DM between genders. However, there was a significant difference in the rate of increase between males and females with T2DM. Our results showed that the prevalence of T2DM was estimated to increase by about 0.8% in males and 0.6% in females each year ($p < 0.0001$). There were insufficient data on the prevalence of obesity in adults to observe a clear trend occurring over time (see Fig. 1).

3. Discussion

Consistent with the findings of other studies is our observation that T2DM and obesity have a higher prevalence in Arabian

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