Forecasting prevalence of type 2 diabetes mellitus in Palestinians to 2030: validation of a predictive model

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Background **Projections of the prevalence of diabetes mellitus are mostly based on changes in population demographics. Inclusion of the time trends of the prevalence of obesity and other risk factors could improve the accuracy of the projections and help with the assessment of policy options for prevention. We therefore report the validation of a mathematical model for predicting the prevalence of diabetes.**

Methods **We created a mathematical model in which time trends in population, obesity, and smoking can be integrated, using a Markov approach, to estimate the future prevalence of diabetes. The parameters for the model were derived from publications, except for the incidence of diabetes, which was estimated with DISMOD II (version 1.01), a computer program that can be used to check the consistency of estimates of incidence, prevalence, duration, and case fatality from the baseline estimate of the prevalence of diabetes. We developed the model for the Palestinian population using data that were available for 2000–10. The model was validated by comparison of the predicted and actual prevalence of diabetes. The baseline point was obtained from the Palestinian Demographic Health Survey 2000. We used the Palestinian Family Health Survey 2004, Palestinian Family Health Survey 2006, and Stepwise Survey 2010 to validate the actual prevalence of diabetes. These are national surveys, each with more than 6000 participants. This study was approved by the Institute of Community and Public Health Ethical Review Committee, West Bank.**

Findings **In 2000, the estimated prevalence of diabetes mellitus was 11·5% (95% CI 9·5–13·5) in Palestinian people aged 25 years or older; by 2010, it had increased to 14·5% (12·2–16·7). In this period, prevalence in men rose from 11·7% (9·7–13·6) to 15·9% (13·4–18·1) and in women from 11·4% (9·3–13·3) to 13·2% (11·1–15·2). In 2004, the prevalence reported in the Palestinian Family Health Survey was 10·6% (8·7–12·5) versus an estimated 11·4% (9·7–13·4); in 2006, these values were 11·8% (9·8–13·8) and 12·3% (10·6–14·6), respectively. Comparison of the estimated and reported prevalence showed a good match for 2004, 2006, and 2010. The forecasts for prevalence of diabetes are 20·8% (18·0–23·2) for 2020 and 23·4% (20·7–25·8) for 2030. If the prevalence of obesity starts to fall by 5%, starting in 2010, a 13% reduction in the prevalence of diabetes could be achieved by 2030.**

Interpretation **The estimates of the prevalence of diabetes in 2000–10 obtained with our model were fairly similar to those reported in independent surveys of prevalence in the occupied Palestinian territory. The burden of diabetes is now a huge public health challenge, and according to our model will increase substantially in the next two decades. Therefore, obesity and other risk factors for diabetes need urgent action to address them.**

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Contributors

NMEAR and MOF were responsible for adapting the diabetes model to the Palestinian context and drafted the Abstract. The other authors helped in populating the model and contributed to the writing of the Abstract.

Conflicts of interest

We declare that we have no conflicts of interest.

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