

Time to act on diabetes mellitus prevention in the West Bank, oPt: Current and future direct cost of diabetes and its complications



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ABSTRACT

Aims: To estimate current and future direct cost of diabetes and its complications for the period 2010 and 2030.

Methods: This study is a prevalence-based approach that combines model-based forecasts of diabetes prevalence rates from the validated OPT IMPACT Diabetes forecast model, diabetes complications prevalence rates and health care costs and economic data. We use a societal and health care perspective and a time horizon to 2030, and costs were estimated as international US dollar adjusted for Purchasing Power Parity (PPP).

Results: The estimated direct costs for diabetes per person in 2012 was 1087 PPP dollars (281–1895 PPP dollar) and the direct costs of diabetes and its complications was 2156 PPP dollar (981–4508 PPP dollar). The estimated diabetes direct cost for the year 2012 was 184 million PPP dollar (47–320 million PPP dollar). The cost is expected to increase to 209 million PPP dollar (54–364 million PPP dollar) in 2015, 248 million PPP dollar (64–432 million PPP dollar) in 2020 and 300 million PPP dollar (77–523 million PPP dollar) in 2030 with 3% discounting rate assumption. The estimated direct cost of diabetes complications is 365 million PPP dollar in 2012, 491 million PPP dollar in 2020 and 595 million PPP dollar in 2030.

Conclusions: The burden of diabetes and its complications on the Palestinian health system is huge and actions are needed to address the increasing prevalence of obesity on one hand and providing proper diabetes management on the other hand.

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1. Introduction

Diabetes imposes a heavy health burden globally, and particularly in low and middle-income countries (LMIC) like the occupied Palestinian territory (oPt). Globally, the increase in diabetes prevalence is accompanied with an increase in its complication (Susan van et al., 2010). Several studies reported the high prevalence of

diabetes and selected risk factors for the Palestinian population (Husseini et al., 2000a, 2000b; Husseini, 2002; Abdul-Rahim et al., 2001a, 2001b; Abdul-Rahim, 2002), and in line with most countries, the prevalence of diabetes is expected to increase in the oPt if the current adverse major risk factors (obesity and smoking) trends persist (Abu-Rmeileh et al., 2013). In facts, some studies showed that obesity prevalence is increasing among Palestinian adolescents (Mikki et al., 2009) and associated with unhealthy dietary habits (Mikki et al., 2010).

Diabetes also exerts enormous economic pressure to the health system and individuals because of its chronic nature and severe complications. Global expenditure of diabetes treatment and prevention exceeded 230 million USD in 2007 and is expected to exceed 300 million USD in 2025 (van et al., 2010). In more vulnerable economies, the health, and social impact of diabetes is

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now a major challenge to these societies, and will become even more severe in the near future. A Recent review of evidence on the economic implications of diabetes and CVD in Africa showed that the cost of care is beyond the copy capacities of individuals, families and governments in most African countries (Kengne et al., 2013). This is common in other developing countries (Ramachandran et al., 2007).

Population-based obesity interventions include healthy eating and physical activity. Simulation model testing different intercessions indicated that health information and communication about healthy lifestyle, in addition to fiscal measure that includes taxation of unhealthy food, proper labeling and restriction on marking unhealthy diet are cost-effective and result in substantial health gain (Cecchini et al., 2010).

The economic cost of diseases in general and specifically diabetes and its complications in the oPt is understudied (Younis et al., 2015). In this study, we aim to estimate current direct cost medical of diabetes and its complications and estimate the future cost for the period 2010 and 2030.

2. Material and methods

This study is a prevalence-based approach that combines diabetes prevalence rates, diabetes complications prevalence rates and other health care costs and cost data.

Diabetes Prevalence: The study is based on the estimated diabetes prevalence for the years 2010 up to 2030 with the OPT IMPACT Diabetes Forecast model (Abu-Rmeileh et al., 2014). For this study, we estimated future diabetes prevalence under two scenarios: A) if diabetes risk factors follow similar trends as previous years and no intervention takes place and B) if obesity prevalence (which is the main risk factor for diabetes in this model) reaches certain level and stop rising as suggested by Geiss et al. (2014).

The prevalence of diabetes complications in the West Bank was assumed to be constant overtime. Diabetes complications distributions were obtained from the Palestinian Diabetes Complications and Control Study (PDCC) conducted in Ramallah governorate (2012) (Imseeh, 2013). These estimates were applied to the total West Bank population to estimate the number of people with complications (Imseeh, 2013). Diabetes complications were studied as micro-vascular complications (neuropathy, retinopathy and nephropathy) and macro-vascular complications (coronary heart disease (CHD), cerebrovascular disease (CVA) and peripheral vascular disease (PVD).

The cost of Diabetes and its complications: Cost data for the year 2012 was estimated based on the literature. An extensive literature review was conducted locally, regionally and internationally to obtain the direct medical cost estimates for diabetes and its complications as defined above. The search strategy included the following keywords: cost, economic burden, cost of illness, diabetes type II, complications, macrovascular, microvascular, direct cost, health care expenditure. Initially, the search started in PubMed, and then was expanded trying to find regional data. Any study that looked at the economic burden of diabetes and/or its complications defined as microvascular or macrovascular were included in the analysis. Because of the shortage of local and regional costing studies (as per our definition), mostly international costing studies were considered. Cost data was converted to PPP and then inflated to the year 2012 using cumulative country-specific inflation rates. Mean, minimum and maximum costs were identified and used as baseline estimates for the study. (Supplement 1).

Most studies included in estimating the final cost did ingredient costing, a bottom-up approach and were a prevalence based studies, estimating cost per patient. The direct medical costs included: outpatient care visits (number of physician visits

including GP, Dialectologist and other specialists), paramedical visits (those include nurses, dietitian, psychotherapist, foot care, etc), procedures, hospitalization, emergency room visits, drug use. The cost of complications included: hospitalization, rehabilitation, nursing, home nursing, outpatient therapy, physician visits, diagnostic and therapeutic procedures such as CABG, PTCA, coronary angiography, Home health care, cardiac rehabilitation.

Using these cost estimates and diabetes population in the West Bank, cost per patient for each subgroup was estimated.

Sensitivity analysis: The baseline cost data for this study depended on estimated costs from different countries and on different time frames. Therefore, we conducted a sensitivity analysis with minimum and maximum costs.

3. Results

3.1. Diabetes prevalence

The prevalence of diabetes mellitus in the year 2010 was 15.3% and is expected to increase to 19.7% in 2017, 21.2% in 2020, 22.8% in 2025 and 23.4% in 2030 (Fig. 1). If the prevalence of obesity reached a natural plateau in 5 years as observed in the USA between 1980 and 2012, then the prevalence of diabetes mellitus is expected to reach 21.2% in 2020, 22.3% in 2025 and 22.5% in 2030.

3.2. The direct cost of diabetes

Based on the cost obtained from several studies, the estimated direct cost for diabetes per person in 2012 was 1146 USD (392–2336 USD) while the estimated direct cost for diabetes and its complications was 2056 USD (1411–3109 USD). Table 1 presents all estimated costs for diabetes and its complications.

Table 2 shows the predicted diabetes and diabetes complications direct cost for the period 2012 up to 2030 accounting for 3%, 5% and 7% discounting rates. The estimated diabetes direct cost (without complications) for the year 2012 was 194 million USD (66–395 million USD). If no national intervention was taken by the governorate, the cost is expected to increase to 220 million (75–449 millions) in 2015, 261 million (89–532 millions) in 2020 and 316 million (108–644 millions) in 2030 with 3% discounting rate assumption.

Diabetes direct cost is estimated to take 11.9%–15.4% of the Total Health Expenditure in the period 2012–2030 (Table 3).

If obesity prevalence level off by the year 2017, the estimated

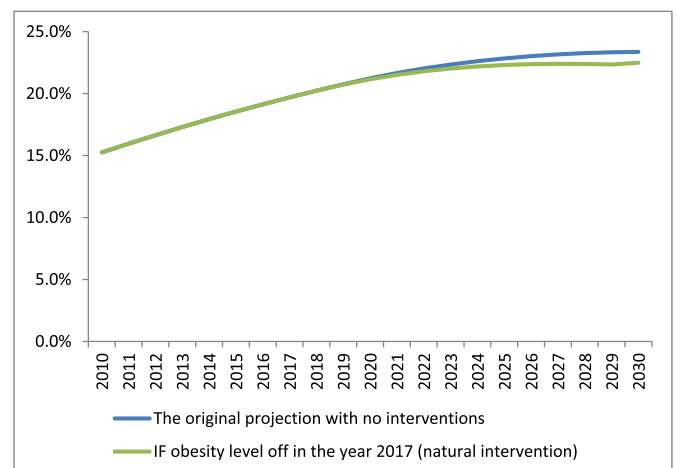


Fig. 1. Estimated diabetes prevalence for the period 2010–2030.

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