REVIEW

Diabetes Care in Iran: Where We Stand and Where We Are Headed

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Abstract

BACKGROUND The prevalence of diabetes has steadily increased in Iran from the time of the first published nationally representative survey in 1999 and despite efforts and strategies to reduce disease burden.

OBJECTIVES The aim of the present review was to describe the current status of diabetes care in Iran.

METHODS A selective review of the relevant literature, focusing on properly conducted studies, describing past and present diabetes care strategies, policies, and outcomes in Iran was performed.

FINDINGS The quality of diabetes care has gradually improved as suggested by a reduction in the proportion of undiagnosed patients and an increase in affordability of diabetes medications. The National Program for Prevention and Control of Diabetes has proven successful at identifying high-risk individuals, particularly in rural and remote-access areas. Unfortunately, the rising tide of diabetes is outpacing these efforts by a considerable margin.

CONCLUSIONS Substantial opportunities and challenges in the areas of prevention, diagnosis, and management of diabetes exist in Iran that need to be addressed to further improve the quality of care and clinical outcomes.

KEY WORDS diabetes, diabetes epidemiology, health care policies, Iran, population surveillance, quality of care, type 2 diabetes

INTRODUCTION

Over the past 4 decades, the prevalence pattern of various diseases and their respective causes of death have significantly changed in Iran. A developing country, Iran is located in a predominantly flat terrain with a mostly subtropical climate throughout the year. Iran has undergone a rapid rise in urbanization and industrialization that is in line with drastic cultural and socioeconomic transitions over the past few decades. This rapid transition has been accompanied by changes in nutritional habits and physical activity, whereby sedentary lifestyles and frequent consumption of fast foods have grown into a major part of daily habitual behaviors.[1,2] At present, Iran's population is young:

Individuals under the age of 35 years make up about 64% of the population.[3] However, increased life expectancy, coupled with decreased birth rates, are transforming the population pyramid and graying of the population.[4] As a result of these lifestyle and demographic changes, noncommunicable diseases (NCDs), such as cardiovascular disease, cancer, motor vehicle injuries, and diabetes are the main causes of morbidity and mortality.[5-7] Diabetes is a major public health concern in Iran given its high prevalence rate, increasing incidence rate, and overall economic burden.[8] The International Diabetes Federation Atlas for Diabetes shows that the Middle East and North Africa region of the world has the highest prevalence of diabetes and is ranked second worldwide in terms of projections of diabetes increase by 2030.[9]

Reports on the quality of care in diabetes from developing countries are not widely available. For instance, in the United States, under the Catalyst to Better Diabetes Care Act of 2009, the Centers for Disease Control and Prevention is required to publish a biannual "Diabetes Report Card."[10] But in Iran, there are significant knowledge gaps with respect to key indicators of diabetes control, making the presentation of a nationwide picture of diabetes care an unattainable goal, at least for now. With that said, this review will briefly depict the current status of diabetes care in Iran using the available resources and published literature. In lieu of conducting an exhaustive systematic review of the articles published, more recent, properly performed, and representative studies in the area of diabetes care in Iran are selected. These references and the interpretations that follow may provide useful insights into the problem at hand, namely depicting a realistic image of the current status of diabetes care with a focus on epidemiology and control, prevention, and policies in place to reduce the burden of disease.

EPIDEMIOLOGY OF DIABETES AND ITS COMPLICATIONS

Prevalence and Incidence. In a national survey conducted in 2011, 11.4% (95% confidence interval, 9.86-12.89) of Iranian adults aged 25 to 70 years had diabetes (defined here as type 1 [T1D] and type 2 [T2D] combined; also defined as fasting plasma glucose concentrations $\geq$126 mg/dL).[11] At present, data describing specific prevalence rates of T1D and T2D, or all forms of prediabetes are not available. In about one-fourth of the population with diabetes (specifically, 2.71% of the adult

population), individuals were not previously diagnosed with diabetes and were unaware of their status. The prevalence of diabetes was higher in women (12.86%) than in men (9.90%), and in urban (12.69%) than in rural (7.62%) residents. Furthermore, trend analyses showed that there was a 35% increase in the diabetes prevalence rate among Iranian adults from 2005 to 2011.[11] The prevalence of one form of prediabetes—impaired fasting glucose (fasting plasma glucose concentrations 100-125 mg/dL)—was considerably high (14.60%).[11] Although no nationwide report on the prevalence of another form of prediabetes—impaired glucose tolerance—is available, a 2008 study conducted in Tehran (the capital city of Iran) estimated the prevalence of isolated impaired glucose tolerance among adults aged 20 years and older to be 5.4% and 7.6% in men and women, respectively.[12] The incidence rate of diabetes in Iranian population is assessed in other studies with an annual incidence rate estimated to be about 1% of the total population.[13-22]

Significant knowledge gaps with respect to the prevalence of diabetes complications exist. Most published studies in this venue are clinic-based samples of small sizes and often are confined to a single region so nationally representative estimates are not available.[23] Cardiovascular diseases are regarded as the main cause of morbidity and mortality in patients with diabetes.[24] Results from one study demonstrated that the incidence rates of cardiovascular and coronary heart diseases are about 25 and 23 per 1000 person-years, respectively.[25] The data on the prevalence of diabetic foot among patients with diabetes is also scarce.[26,27] In one study, the prevalence of diabetic foot amputation was 0.7% among 4150 patients with T2D.[23] Among Iranian patients with diabetes, the prevalence of diabetic retinopathy is about 30% to 40%[28-30] and diabetic nephropathy about 16% to 87%.[27,31-33] Among patients with T2D, the prevalence of microalbuminuria (25.9%) is estimated to be higher than macroalbuminuria (14.5%).[29] A retrospective cohort of 1000 patients with T2D demonstrated that over a period of 10 years, 10.9% developed peripheral neuropathy.[34] The 10-year incidence rates for diabetic foot ulcer, diabetic nephropathy, and ophthalmologic complications including retinopathy were 8%, 4.6%, and 9.1%, respectively.[34] Selected studies on the prevalence of diabetes complications are summarized in Table 1.

Burden and Costs. Diabetes is a leading cause of mortality and high economic costs in Iran. The