



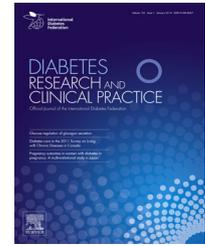
Contents available at ScienceDirect

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IDF Diabetes Atlas

Diabetes in the Middle-East and North Africa: An update



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ARTICLE INFO

Article history:

Available online 1 December 2013

ABSTRACT

In recent decades, the prevalence of diabetes has risen dramatically in many countries of the International Diabetes Federation's (IDF) Middle-East and North Africa (MENA) Region. This increase has been driven by a range of factors that include rapid economic development and urbanisation; changes in lifestyle that have led to reduced levels of physical activity, increased intake of refined carbohydrates, and a rise in obesity. These changes have resulted in the countries of MENA Region now having among the highest rates of diabetes prevalence in the world. The current prevalence of diabetes in adults in the Region is estimated to be around 9.2%. Of the 34 million people affected by diabetes, nearly 17 million were undiagnosed and therefore at considerable risk of diabetes complications and poor health outcomes. Enhanced research on the epidemiology of diabetes in the MENA Region needs to be combined with more effective primary prevention of diabetes; and early detection and improved management of patients with established diabetes, including an increased focus on self-management and management in primary care and community settings.

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1. Introduction

Over the last few decades, the prevalence of diabetes has risen dramatically in many countries in the International Diabetes Federation's (IDF) Middle-East and North Africa (MENA) Region [1]. The countries of MENA Region now have amongst the highest rates of diabetes in the world. This increase has been driven by a range of factors that include rapid economic development and urbanisation; changes in lifestyle that have led to reduced levels of physical activity, increased intake of

refined carbohydrates, and a rise in obesity; and the ageing of their populations [2]. These factors have led to an increase in risk factors for type 2 diabetes and a rapid increase in its prevalence. Consequently, diabetes has become a major public health problem in the Region and imposes a considerable strain on individuals, family members and carers; as well as on health systems and economies in the Region [3]. In this paper, we discuss the epidemiology of diabetes in the MENA Region and its impact on individuals and societies, as well as discussing likely future trends in diabetes prevalence.

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¹ On behalf of the IDF Diabetes Atlas.

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<http://dx.doi.org/10.1016/j.diabres.2013.11.008>

2. Methods

The full description of the methods and global estimates of diabetes prevalence for the International Diabetes Federation (IDF) Diabetes Atlas data is described in detail elsewhere [4]. A list of the countries included in MENA Region is also given in this paper. Briefly, a literature search for studies of diabetes prevalence was conducted and a modelling approach applied to derive the prevalence of diabetes in adults 20–79 years of age in countries and the Region for the years 2013 and 2035.

3. Epidemiology of diabetes in MENA

There is a high burden of diabetes in the MENA Region, and type 2 diabetes predominates; other forms of diabetes such as type 1 diabetes and gestational diabetes, while increasing, are less common, as are cases of diabetes secondary to conditions such as pancreatic disease.

The adult population (aged 20–79 years) in the MENA region was around 374 million in 2013 (Table 1). The current crude prevalence of diabetes in this age group was estimated to be around 9.2% in the same year and equivalent to 34.6 million people with diabetes. This figure is expected to increase to 67.9 million by 2035, or 11.6% of the adult population. The age-standardised prevalence of diabetes in the Region was estimated at 10.9% and projected to increase to 11.3% by 2035. Of the 34 million people affected by diabetes, nearly 17 million were estimated to be undiagnosed and therefore at considerable risk of diabetes complications and poor health outcomes.

In addition to the high prevalence of diabetes, there is also a high prevalence of impaired glucose tolerance (IGT) with around 6.7% (25.2 million people) of the adult population affected and therefore at high risk of progression to diabetes in the absence of effective prevention strategies and lifestyle changes. The

Table 2 – Top 10 countries for prevalence (%) for the MENA Region.

Country/Territory	Prevalence (%), 2013
1. Saudi Arabia	23.87
2. Kuwait	23.09
3. Qatar	22.87
4. Bahrain	21.84
5. United Arab Emirates	18.98
6. Egypt	16.80
7. Lebanon	14.99
8. Oman	14.24
9. Jordan	11.40
10. Islamic Republic of Iran	9.94

numbers of people with IGT are projected to increase to 44.0 million adults by 2035, or 7.5% of the adult population.

Cases of diabetes in adults (comprised of mostly type 2 diabetes) far outnumber cases of type 1 diabetes in children (0–14 years), reflecting the preponderance of lifestyle-induced type 2 diabetes in the Region. The majority of children with type 1 diabetes in the Region live in Saudi Arabia, which is also the country with the best available data on type 1 diabetes in children. Evidence points to a growing number of youth and adolescents developing type 2 diabetes which will have profound implications for the diabetes burden and complications for future generations.

When broken down by country, the highest prevalence of diabetes is seen in the countries in the Gulf region, with four of these countries (Saudi Arabia, Kuwait, Qatar & Bahrain) all reporting prevalences of greater than 20%; and a fifth country in the same locality (United Arab Emirates) reporting a prevalence of nearly 19% (Table 2). The high prevalence in the Gulf region can be explained by their rapid societal changes in recent decades with increased economic development and per capita income leading to major changes in lifestyle, diet and physical activity in their populations.

Table 1 – Diabetes in the Middle East and North Africa Region.

	2013	2035
Adult population (20–79 years, 1000s)	374,490.04	583,736.43
Diabetes in adults (20–79 years)		
Regional Prevalence (%)	9.23	11.63
Comparative Prevalence (%)	10.86	11.30
Diabetes cases (1000s)	34,571.43	67,865.13
Cases undiagnosed (1000s)	16,778.37	–
Impaired Glucose Tolerance (IGT) in adults (20–79 years)		
Regional Prevalence (%)	6.72	7.53
Comparative Prevalence (%)	7.48	7.38
Number of people with IGT (1000s)	25,180.99	43,974.98
Type 1 diabetes in youth (0–14 years)		
Number of children with type 1 diabetes (1000s)	63.97	–
Number of newly diagnosed (per 100,000 per year)	10.71	–
Deaths due to diabetes in adults (20–79 years)		
Total deaths due to diabetes	367,699.35	–
% of deaths under 60	50.5	–
Health expenditure		
Health expenditure due to diabetes (billion USD)	13.64	–
Countries in the MENA Region		
Iraq, Jordan, State of Palestine, Syrian Arab Republic, Yemen, Afghanistan, Pakistan, Egypt, Morocco, South Sudan, Sudan, Tunisia, Algeria, Islamic Republic of Iran, Lebanon, Libya, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates		

Table 3 – Top 10 countries for prevalence (cases) for the MENA Region.

Country/Territory	Prevalence (in 1000s), 2013
1. Egypt	7,510.604
2. Pakistan	6,712.696
3. Islamic Republic of Iran	4,395.927
4. Saudi Arabia	3,650.892
5. Algeria	1,639.547
6. Morocco	1,491.285
7. Sudan	1,402.222
8. Iraq	1,226.219
9. Syrian Arab Republic	868.830
10. Afghanistan	794.704

Prevalence of diabetes is also very high by international standards in countries in the Region that are not as affluent as the Gulf States, such as Egypt, Lebanon and Oman. When examined by the number of people affected by diabetes, the largest number of cases is seen in Egypt, Pakistan and Iran; reflecting their status as the countries with the largest populations in the MENA region (Table 3).

4. Type 1 diabetes

In total, 10,700 new cases of type 1 diabetes were diagnosed in 0–14 year olds throughout the MENA Region in 2013. There are currently 64,000 children with diabetes in this age group; a prevalence of 0.03%. Study data was available and selected for 12 out of the 21 countries in the IDF MENA Region, the newest of which comes from Habeb et al. [5], based on an urban population in Saudi Arabia, a country which is estimated to have the fourth highest incidence rates of type 1 diabetes in the world. This is the highest incidence of type 1 diabetes of any country outside Europe, with 31.4 new cases per 100,000 per year, compared to just 0.5 cases per 100,000 in Pakistan as reported by the 2006 DIAMOND study [6]. However, variability in sample populations and methods must be taken into consideration when examining data for different countries, which may account for some of these extreme differences in incidence. With the exception of other DIAMOND data, which reports findings for Algeria, Kuwait, and Tunisia (8.6, 22.3, and 7.3 cases per 100,000 respectively), and Kadiki and Roaeid 2002 [7], which reports 9.0 cases per 100,000 for Libya, the remainder of the data for the MENA Region comes from studies conducted before 2000. Given the age of the studies, the incidence and prevalence of type 1 diabetes may have changed substantially although there is a lack of new data. These estimates include 8.0 cases per 100,000 for Egypt [8], 3.2 per 100,000 for Jordan [9], 2.5 per 100,000 for Oman [10], 11.4 per 100,000 for Qatar [11], and 10.1 per 100,000 for Sudan [12].

5. Undiagnosed diabetes

The estimates for undiagnosed diabetes are derived from population-based studies using either fasting blood glucose or oral glucose tolerance test to produce a figure of the proportion of people identified at the time of the cross-sectional survey who were not previously aware of their condition. The MENA

Region has a considerable number of population-based studies from which to draw these estimates. Of the 34.5 million cases of diabetes in the MENA Region, nearly 17 million were unaware of their condition. Proportions of undiagnosed diabetes are higher in low- and middle-income countries in the MENA Region (50.0%) than in high-income countries (40.7%) [13]. This could be due to a range of factors, including access to healthcare – both in terms of distance from healthcare provider and affordability of care, the level of training of healthcare providers, and because healthcare priorities in lower-income countries tend to be more focused on acute rather than chronic conditions. There is limited age-specific data available on undiagnosed diabetes in the MENA Region, although some available data suggests that proportions of undiagnosed diabetes are higher in younger age groups [14], which may reflect an absence of routine screening in younger people and their lower frequency of presentation to health services, lower awareness of the disease in younger people, and mortality risks after many years of living with undiagnosed diabetes. As patients with undiagnosed diabetes are at considerable risk of diabetes complications and poor health outcomes, early diagnosis of diabetes is a key priority for all countries in the MENA Region.

6. Health system spending on diabetes

In 2013, health expenditure on diabetes was estimated at around USD13 billion [13]. Future predictions of health expenditure on diabetes are difficult to make but it is likely to increase dramatically, driven both by the increased number of people who are predicted to have diabetes; and the progressive ageing of the diabetes population, which will lead to an increase in the number of people with diabetes complications and therefore requiring more expensive medical care. Costs to health systems will therefore increase through an increase in the resources needed to manage diabetes (such as monitoring agents, laboratory tests and prescription drugs); the intensive management of linked risk factors (hypertension and hyperlipidaemia); and associated comorbidity and the management of complications (such as retinopathy, and renal and cardiovascular diseases). Costs also varied between countries in the Region, with direct diabetes treatment costs reported to reach USD 1605 in United Arab Emirates [15] and USD 175 in Sudan [16] per person with diabetes. This variation in costs will be a reflection of the relative income levels in each country with the more affluent countries able to maintain a higher spending on health services.

7. Risk factors for diabetes and its complications

Key risk factors for diabetes onset, and poor clinical outcomes for diabetes after its onset, include genetic predisposition, family history, overweight, obesity, hyperglycaemia, hypertension, dyslipidaemia, physical inactivity, ethnicity, and environmental factors. A systematic review published in 2011 examined the prevalence of some of these risk factors in a subset of the MENA states [2]. The review reported very high

prevalences of overweight and obesity in prior studies in adults (25–50% and 13–50%) respectively, as well as high prevalences of IGT, hypertension and dyslipidaemia.

The review also noted the variability in the study design, target populations, and quality of previous studies on these risk factors. In addition to the implementation of more effective primary prevention strategies, another key recommendation of the review was the need for more regular studies that use standardised methods that would allow monitoring of these risk factors over time and between different countries. Another review reported similar levels of obesity prevalence in MENA's low- and middle-income countries including Egypt, Gaza, and Jordan [17]. The prevalence of diabetes complications was documented to reach high levels in some North African countries; for instance, the prevalence of retinopathy ranged from 8.1% in Tunisia to 41.5% in Egypt [18].

Prevalence of obesity among the population of the MENA Region is higher than among the population of the North American and Caribbean Region as well as among the European Region. There has been a shift in dietary habits in the last few decades driven by a change in lifestyle and socio-economic status within the Region. These changes have affected diet, physical activity and ultimately on the prevalence of obesity and all leading to an increase in both diabetes and impaired glucose tolerance.

8. Quality of management of diabetes

Many countries in the MENA Region have responded to their rising prevalence of diabetes by implementing national diabetes programmes. However, there is limited information on both the extent of implementation and efficacy of these diabetes management programmes. A systematic review of a subset of countries in the MENA Region that summarised the findings of 27 studies reported on the management of type 2 diabetes in three key areas: glycaemic control, hypertension and dyslipidaemia [19]. The review found management of these areas to be sub-optimal, with many studies reporting that less than 50% of patients with diabetes reached target levels for the management of these risk factors which are key drivers for poor clinical outcomes. As with previous research on risk factor prevalence, a key limitation of the review was the variability in the quality of previous studies. However, despite the limitations of previous studies, the findings reinforced the need to improve the management of diabetes in all sectors of the health system – primary, secondary and tertiary care. The rising prevalence of T2DM is clearly an increasing problem for all states in the MENA Region. They may therefore all benefit to a relatively high degree from co-ordinated implementation of broadly consistent prevention, early detection and management strategies.

9. Health system organisation

Primary care is now seen as having a key role in the prevention, early detection and management of long-term

conditions such as diabetes; and in providing whole-person care that can address the multi-morbidity that is present in many people with diabetes [20]. Traditionally, diabetes in the MENA Region has been managed in specialist centres but this is now gradually changing with the emergence – albeit slowly in some countries – of stronger primary care delivery systems. However, many patients and professionals remain uncertain about the role of primary care which needs to be addressed [21]. When effective primary care delivery is combined with structured delivery of care, measurable quality standards, and clear guidelines for referral to specialist centres, the majority of people with diabetes (particularly type 2 diabetes) can be managed in community settings by multi-disciplinary teams of primary care physicians, diabetes nurse specialists, podiatrists, pharmacists and other professional groups. An additional benefit of integrated delivery systems that use electronic health records is that they can provide data on a large number of people with diabetes that can be used to measure quality of care and help plan services to improve the care of people with diabetes, as well as providing data that can be used for research studies [22]. Countries in the MENA Region may benefit from the establishment of integrated care systems as they develop their health systems.

10. Interventional and research strategies

Interventional preventive strategies are needed to address the rising personal and health system costs of diabetes in the MENA Region. These include encouraging more healthy diets and lifestyles that promote physical activity and a reduction in obesity, the main modifiable risk factors for type 2 diabetes. Prevention strategies need to be combined with improved research on the epidemiology, management and prevention of diabetes. Currently, healthcare research is not seen as a priority in many countries in the MENA Region. Consequently, investment in research – both as a percentage of Gross Domestic Product and in per capita terms – is low in the MENA Region in comparison to investment in health research in some other parts of the world [23]. This lack of investment in research infrastructure reduces the capacity of the countries in the Region to respond effectively to the challenge of diabetes and other threats to their health systems.

For example, effective, public health-oriented research is difficult because of the continuing absence of basic population-based surveillance of key health risks (including cardiovascular disease, cancer, mental health and health inequalities), and health system performance data. Reliable and transparent data collection remains limited even in the wealthier MENA countries. A WHO report concluded that this was due to 'insufficient commitment to the systems, lack of practical guidelines, overwhelming reporting requirements, weak involvement of the private sector, lack of transparency, shortage of human resources and poor analysis of data' [24]. The effects of this are evident; recent systematic reviews of epidemiological work on diabetes in the countries of the MENA Region such as those cited in this chapter have reported considerable variations in the quality of available observational studies, including inadequately describing the population characteristics of the subjects examined, variable risk factor definitions, and

failure to report confidence intervals and other key statistical information for prevalence estimates.

11. Conclusions

The MENA Region faces major challenges from tackling the rising prevalence of diabetes and the associated disease burden. We recommend an increase in the number of higher-quality studies using more standardised methods that would allow comparison of diabetes prevalence over time, between countries and among population sub-groups. Enhanced research on the epidemiology of diabetes needs to be combined with more effective primary prevention of diabetes (particularly in areas such as diet, exercise and obesity); and the early detection and improved management of patients with established diabetes, including an increased focus on self-management by patients and carers, and management in primary care and community settings.

Conflicts of interest

The authors have no conflicts to disclose.

Acknowledgements

The 6th edition of the IDF Diabetes Atlas was supported by the following sponsors: Lilly Diabetes, Merck and Co, Inc., Novo Nordisk A/S supported through an unrestricted grant by the Novo Nordisk Changing Diabetes[®] initiative, Pfizer, Inc., and Sanofi Diabetes.

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