

Prevalence of type 2 diabetes in the Arab world: impact of GDP and energy consumption

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Abstract. – **OBJECTIVE:** Diabetes Mellitus (DM) is a rapidly growing and most challenging health issue of the 21st century. This study aimed to investigate the prevalence of type-2 DM and its association with Gross Domestic Product (GDP) and energy consumption in the Arab world countries.

MATERIALS AND METHODS: We identified 88 articles through systematic searches including Institute of Scientific Information (ISI) Web of Science, PubMed and EMBASE databases published between 1980-2015. The related literature was searched by using the keywords including diabetes mellitus, prevalence, incidence, epidemiology of type-2 diabetes mellitus (T2DM), and names of the individual Arab world countries. The articles were selected and investigated for the prevalence of T2DM. No limitations were imposed in the design of the study or publication language. Finally, 50 peer-reviewed publications were included and the rest were excluded.

RESULTS: Arab world countries with the highest prevalence of T2DM are: Kingdom of Saudi Arabia 31.6%, Oman 29%, Kuwait 25.4%, Bahrain 25.0% and United Arab Emirates 25.0%. The lowest prevalence was found in Mauritania (4.7%) and Somalia (3.9%). The highest prevalence was observed in Gulf Cooperation Council (GCC) countries (25.45%) whilst non-GCC countries had the lowest prevalence (12.69%). The combined mean prevalence of T2DM in both GCC and Non-GCC Arab countries was 16.17%. The prevalence of T2DM was found to be significantly associated with higher Gross Domestic Product (GDP) ($p=0.020$) and energy consumption ($p=0.017$).

CONCLUSIONS: In the Arab world, the countries with the highest prevalence of type 2 diabetes mellitus are: Saudi Arabia, Oman, Kuwait, Bahrain and UAE, whilst the countries with the lowest prevalence are Mauritania and Somalia. This prevalence was significantly associated with high GDP per capita and energy consumption. Arab states must incorporate diabetes pre-

ventive policies on a war-footing basis to minimize the burden of the disease.

Key Words:

Diabetes mellitus, Prevalence, GDP, Energy consumption, Arab world.

Introduction

Diabetes Mellitus is a primary public health concern with increasing prevalence and long lasting complications. Even with great developments in medical sciences and diabetes science, it is still an incurable life-long disease, which is swiftly growing among different age groups of men and women. It engages various physiological functions, organs and multiple systems¹ resulting in extensive ranging and highly damaging complications². It is rapidly increasing in developing as well as developed countries; however, it is observed to be more increasingly in the Arab world states. The Arab world contains 22 countries with a total population of 362.5 million people with a \$2.55 trillion economy³. The general health condition of the Arab world population has been drastically changed in the preceding three decades. These 30-years became the golden age of GCC Arab world countries for their socio-economic growth due to the fast production of natural resources such as oil and gas. This brought through various advantages such as a more enhanced approach to its healthcare structure, education, clean drinking water and sanitation. However, this swift alteration in the socio-economic condition, particularly in the oil and gas-rich GCC countries, resulted in huge changes, both in the patterns of health and disease. It brought about unexpected

changes to life styles, rapid growth in urbanization, traditional diet habits were eliminated rapidly with deskbound lifestyle penetrating into the society⁴⁻⁶. Additionally, people quickly embraced fast food and remote control culture, which are the two main causes of physical immobility leading to obesity and diabetes mellitus as the people started eating excessively and exercising rarely⁴⁻⁶. According to our knowledge, no wide-ranging studies have been conducted in this region. Therefore, the aim of the present study was to emphasize the prevalence of type-2 diabetes mellitus in the Arab world.

Materials and Methods

Selection of Studies

In the study, 88 papers published on the prevalence, incidence, and epidemiology of diabetes mellitus were identified in the Arab world countries from ISI, Web of Science, PubMed and EMBASE databases published between the periods 1980-2015. The eligibility of papers was identified and screened by title and/or abstract. The relevant literature was explored by using the keywords such as “diabetes mellitus”, “hyperglycemia”, “prevalence”, “incidence” and “epidemiology” of type-2 diabetes mellitus accompanying the names of individual Arab world countries. Moreover, the keywords were also entered into the Google Scho-

lar search engine and, after acquiring any relevant article, the title of that article was re-entered in the ISI Web of Science, PubMed and EMBASE databases. The names of all 22 Arab world countries were included in the database to retrieve the required articles (Saudi Arabia, Bahrain, Kuwait, Qatar, UAE, Egypt, Tunisia, etc.). The title and abstracts were assessed to decide the eligibility of the articles. This study was conducted in the Department of Physiology, College of Medicine, King Saud University, Riyadh, Saudi Arabia.

Inclusion and Exclusion Criteria

The inclusion method needed that the study population should be from 22 member states of the Arab League (Figure 1) where the documents containing data about incidence, prevalence, epidemiology, type of diabetes mellitus from Arab world countries were included. No limitations on publication, study design or language of publication were considered obligatory. The studies were published in peer-reviewed Bio-Medical Science Journals. However, secondary reports were not included without the synthesis of novel data like short communications and non-observational correspondence. All studies and reports were re-verified against pre-determined inclusion and exclusion criteria. Eighty eight studies were reviewed, eventually 50 peer-reviewed publications and reports were included in the analysis and the remaining were excluded from the current study. The

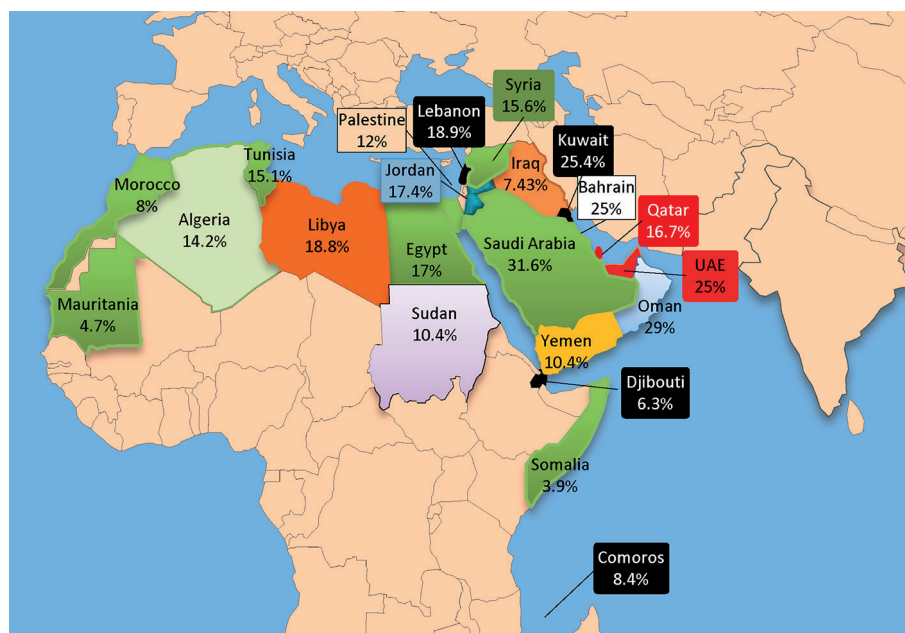


Figure 1. Arab world countries and prevalence of type 2 diabetes mellitus.

Table I. Prevalence of Type-2 Diabetes Mellitus in the Arab world.

Country	Author/year of publication	Urban/Rural	Sample size	Age (Years)	Prevalence %
GCC Arab World Countries					
Saudi Arabia	Al-Daghri et al, 2011 ⁷	U/R	9149	7-80	31.6%
Oman	Al-Sinani et al, 2014 ⁸	U/R	1182	>40	29.0%
Kuwait	Channanath et al, 2013 ⁹	U/R	270172	30-60	25.4%
Bahrain	Al Mahroos et al, 1998 ¹⁰	U/R	2128	40-69	25%
UAE	Malik et al, 2005 ¹¹	U/R	4000	>20	25.0%
Qatar	Bener et al, 2009 ¹²	U/R	1434	30-49	16.7%
Mean percentage of prevalence of type-2 DM in GCC Arab Countries					25.45%
Non-GCC Arab World Countries					
Lebanon	Kristensen et al, 2007 ¹³	U/R	18144	40-70	18.9%
Libya	Abduelkarem et al, 2010 ¹⁴	U/R	30 907	18-95	18.8%
Jordan	Ajlouni et al, 2008 ¹⁵	U/R	1121	>25	17.4
Egypt	Hussam Zayed, 2012 ¹⁶	U/R	5300	15-65	17%
Syria	Albache et al, 2010 ¹⁷	U/R	1168	>25	15.6%
Tunisia	Romdhane et al, 2014 ¹⁸	U/R	7700	35-70	15.1%
Algeria	Zaouiet al, 2007 ¹⁹	U/R	7,656	>20	14.2%
Palestine	Abdul-Rahim et al, 2001 ²⁰	U	492	30-65	12.0%
Yemen	Gunaid and Assabri, 2008 ²¹	U/R	250	>35 years	10.4%
Sudan	Elbagir et al, 2001 ²²	U/R	724	>25 year	10.4%
Comoros	World Bank, 2012 ²³	-	-	20-79	8.4%
Morocco	Ujcic et al, 2009 ²⁴	U/R	314	18-70	8.0%
Iraq	Mansour et al, 2008 ²⁵	U/R	3176	20-68	7.43%
Djibouti	World Bank, 2012 ²³	-	-	20-79	6.3%
Mauritania	Meiloud et al, 2013 ²⁶	U/R	1278	>20	4.7%
Somalia	World Bank, 2012 ²³	-	-	20-79	3.9%
Mean prevalence of type-2 DM in non-GCC Arab Countries					12.69%
Combined mean prevalence of type-2 DM in all the Arab World Countries					16.17%

DM=Diabetes Mellitus; U/R=Urban /Rural; GCC= Gulf Cooperation Council for Arab States, NA=Data not available. Reference has been mentioned against each study.

data about Arab countries, such as their average per capita GDP for previous 5 years and energy consumption data, were gathered from the World Bank sources.

Ethics Statement

In the current study, the database literature was reviewed on the prevalence of T2DM in the Arab world countries and no human subjects were involved directly, so Ethical Approval was not needed.

Statistical Analysis

The extracted data for the prevalence of type 2 diabetes mellitus were entered into the computer programs; Microsoft Excel Version 20013 and SPSS20 software (SPSS Inc., Chicago, IL, USA) and data were analyzed descriptively. The prevalence rate was determined, and its association with GDP per capita and energy consumption was calculated by Bivariate Correlation (Pearson

correlation 2 tailed). *p*-value less than 0.05 was considered significant. Meta-analysis was not attempted due to variability in both data sources and study methodologies.

Results

The Table I demonstrates the prevalence of type-2 diabetes mellitus in all 22 Arab world countries. Among the Arab states, 6 countries are under the umbrella of GCC (Gulf Cooperation Council for the Arab States). The GCC countries show the maximum prevalence of diabetes, namely: Kingdom of Saudi Arabia 31.6%, Oman 29%, Kuwait 25.4%, Bahrain 25.0%, United Arab Emirates 25.0% and Qatar 16.7%. However, the lowest prevalence was found in Non-GCC countries: Mauritania (4.7%) and Somalia (3.9%). In other Arab countries, the prevalence of diabetes was recorded as follows:

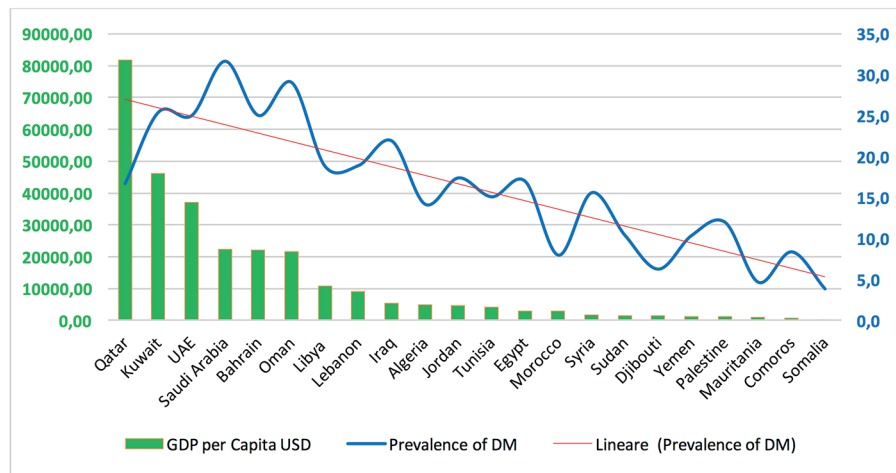


Figure 2. Prevalence of type-2 Diabetes Mellitus and five years GDP per capita in US\$ of Arab world countries.

Lebanon 18.9%, Libya 18.8%, Jordan 17.4%, Egypt 17%, Syria 15.6%, Tunisia 15.1%. However, the lowest prevalence was found in Comoros (8.4%), Morocco (8%), Djibouti (6.3%), Mauritania (4.7%) and Somalia (3.9%). In all these countries the prevalence of diabetes was increased in a stepladder pattern, and it was markedly increased in the GCC Arab world countries (Table I and Figure 1). Moreover, the prevalence was associated with a higher GDP per capita ($p=0.003$) (Figure 3, 4). Table II demonstrates the GDP per capita in USD and daily caloric intake per capita (kcal) in the Arab world countries. Among the Arab states, the highest GDP is of Qatar (US\$ 81776.71) followed by

Kuwait (US\$ 46253.68), UAE (US\$ 36952.72), Saudi Arabia (US\$ 22250.72), and the lowest is of Mauritania (US\$ 1013.60), Comoros (US\$ 839.11, and Somalia (US\$ 300.90). The daily caloric intake per capita (kcal) is as follows: Kuwait (kcal 3150), UAE (kcal 3330), Saudi Arabia (kcal 3050), and the lowest is of Mauritania (kcal 1013.60), Comoros (kcal 839.11) and Somalia (kcal 300.90). The mean GDP per capita and prevalence of T2DM of all GCC countries is (US\$ 38470.71) (25.45%); Non-GCC countries (US\$ 3402.81) (12.69%); combined GDP and prevalence of type-2 diabetes mellitus of both GCC and Non-GCC Arab countries is of (US\$ 12966.78) (16.17%) (Table III, Figure 3).

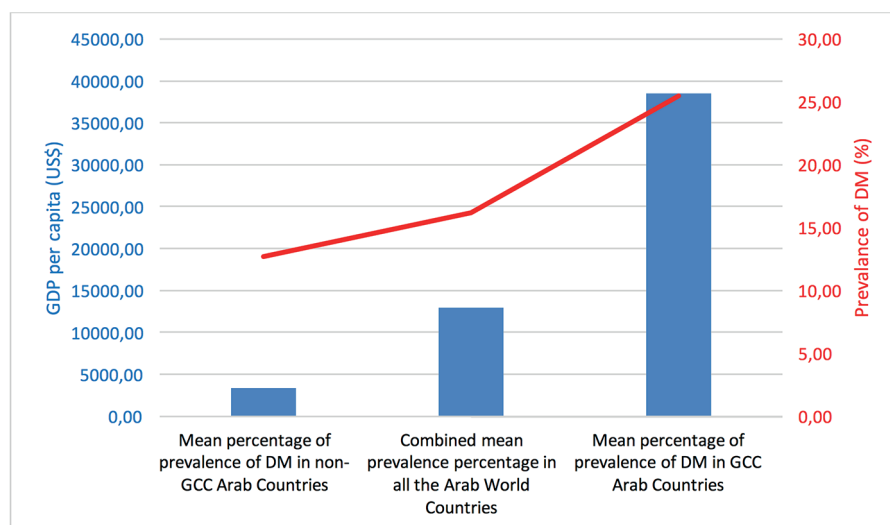


Figure 3. Mean prevalence of type-2 Diabetes Mellitus among GCC and Non-GCC countries and impact of five years GDP per capita.

Table II. Arab World Countries their GDP and Energy consumption.

Countries	GDP per Capita (USD)	Daily caloric intake per capita (kcal)
Saudi Arabia	22250.72	3050
Oman	21607.19	NA
Kuwait	46253.68	3150
Bahrain	21983.24	NA
UAE	36952.72	3330
Iraq	5525.71	2410
Lebanon	9173.35	3150
Libya	10797.33	3100
Jordan	4637.33	2950
Egypt	2961.63	3200
Qatar	81776.71	NA
Syria	1621.54	3050
Tunisia	4234.05	3300
Algeria	4812.59	2900
Palestine	1194.33	2280
Yemen	1342.91	2040
Sudan	1539.05	2250
Comoros	839.11	1760
Morocco	2947.77	3250
Djibouti	1503.72	2180
Mauritania	1013.60	2700
Somalia	300.90	1530

Source: GDP World Bank²³; Energy consumption²⁷⁻²⁸; NA= Data is not available.

Discussion

The ever-rising global prevalence of type 2 diabetes mellitus is a threatening and most demanding situation to the healthcare providers. In the Arab world countries, the highest prevalence of T2DM was observed in the Kingdom of Saudi Arabia at 31.6%, followed by Oman at 29%, Kuwait at 25.4%, Bahrain at 25.0% and in United Arab Emirates at 25.0%. The lowest prevalence was observed in Mauritania (4.7%) and Somalia (3.9%). The highest mean prevalence was observed in the GCC countries at 25.45% whilst in the non-GCC countries it was 12.69%. However, the combined mean prevalence of T2DM, both in GCC and Non-GCC Arab countries, was at 16.17%. This prevalence was significantly associated with higher Gross Domestic Product (GDP) ($p=0.020$) and energy consumption ($p=0.017$) in those countries. Wild et al²⁹ in their report about the global prevalence of diabetes, stated that the total number of diabetes patients was 171 million in 2000 and would be 366 million in 2030. Likewise, Van Dieren et al³⁰ described that in 2007, the global number of T2DM patients was 250 million

Table III. Arab World Countries with their mean GDP and Energy consumption.

Countries	GDP per capita in USD	Prevalence of Type 2 Diabetes Mellitus (%)
GCC Arab Countries	38470.71	25.45 %
Non GCC Arab Countries	3402.81	12.69 %
Both GCC and Non-GCC Arab Countries	12966.78	16.17 %

and is expected to rise to 380 million by 2025. Another study³¹ reported that the worldwide diabetes prevalence is persistently rising and the expected rise would be about 438 million diabetes patients by 2030. Similarly, Shaw et al³² estimated the number of people worldwide with diabetes, and reported that global prevalence of diabetes among people aged 20-79 years was 6.4%, and 285 million adults in 2010 were diabetic patients. This prevalence was expected to increase 7.7% to 439 million adults by 2030. On the contrary, this hypothesis about the estimates of prevalence of diabetes is different from the all above figures reported by Wild et al²⁹, Van Dieren et al³⁰, Ng³¹, and Shaw et al³². The International Diabetes Federation's (IDF) 7th edition of the Diabetes Atlas provided relatively sweeping statistics which specified that 415 million people worldwide are diabetics, and this number is supposed to rise to 642 million by 2040. IDF also estimated that as many as 193 million people were still not aware that they were suffering from diabetes (IDF-Diabetes Atlas, 7th Edition)⁶. This prevalence of type-2 DM is reaching to enormous levels, the prevalence milestone of 2030 was reached in 2012, about 18 years earlier compared to all previous reports and literature on the prevalence of type-2 DM. In Saudi Arabia, a range of studies has been carried out in order to determine the prevalence of T2DM. In 1982, the diabetes prevalence was 2.5%³³, in 1990 was 6%³⁴, in 1997 was 10.3%³⁵, in 2004 was 23.7%³⁶, and in 2011 reached up to 30%³⁷ and 31.6%⁷. All the studies confirmed the hierarchy type rising pattern of diabetes (Table I and Figure 1). However, as the effect of urbanization was obvious, the prevalence rate in urban areas was 25.5% while in the rural areas was 19.5%⁹. Alqurashi et al³⁷ reported in their study on 6024 subjects that the general prevalence of DM was 30% with an average age of 55.3 years. Regarding

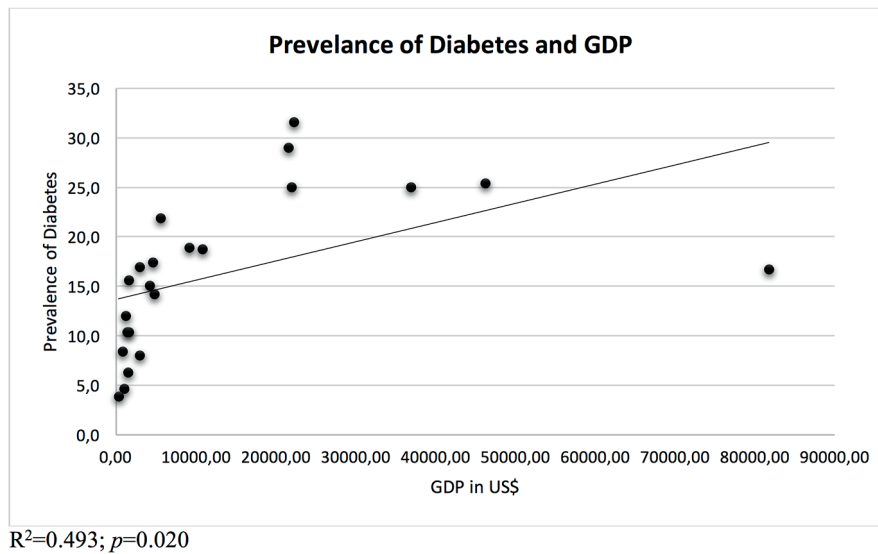


Figure 4. Pearson Correlation Coefficient between Prevalence of type 2 diabetes mellitus and five years GDP per capita in US\$ of Arab world countries.

gender, the diabetes prevalence was found to be at 34.1% in men and 27.6% in women, wherein this prevalence further increased with the increase in age. In the present work, we observed that the prevalence of diabetes mellitus increased rapidly in all age groups in the Kingdom of Saudi Arabia, regardless of gender differentiation. However, more common risk factors were economic growth (Figures 2, 3, 4), caloric consumption per day (Figure 5) and sedentary life style. Similarly, in Bahrain it was found that diabetes mellitus has markedly increased. The current prevalence rate

is (25%). Musaiger and Abdulaziz³⁸ reported that diabetes mellitus in Bahraini population was 0.8% in 1980 and 11.1% in 1982, and it was higher in urban areas compared to the rural areas. The prevalence of diabetes among elderly Bahrain population was 13.4% (males 10.2%, females 15%). In another study, Musaiger⁴ reported that the occurrence of DM among elderly Bahrain population was 13.4% (15% in women and 10.2% in men). Being obese, physical inactivity, changes in eating habits and alteration in social conditions played a vital role in the growing prevalence of

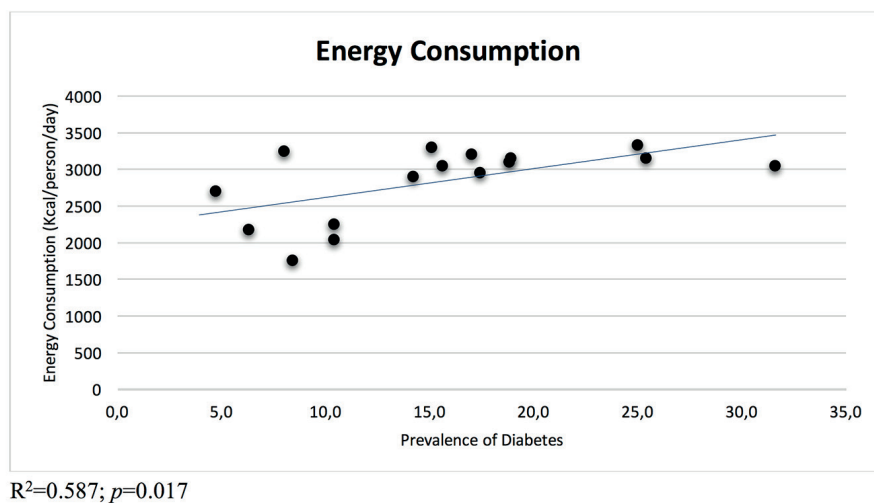


Figure 5. Pearson Correlation Coefficient between Prevalence of type 2 diabetes mellitus and energy consumption of Arab world countries.

diabetes in the country⁴. Zurba and Garf³⁹⁻⁴⁰ conducted epidemiological studies among Bahrain population with the mean age of 43.9 years. The diabetes prevalence was 25.5% in men and 26.4% in women. Zurba⁴¹ observed that the prevalence of type 2 DM was 25.5% among Bahrain population in the age group of more than 20 years old and there was a sharp increase in the prevalence after the age of 40. In another study, the prevalence of diabetes in Bahrain was also reported at 25.7%⁴². Al-Mahroos and McKeigue¹⁰ conducted a cross-sectional survey in Bahrain natives aged between 40-69 years where the highest number of diabetics were seen in the 55-59 years age group with 31.9% males and 36.1% females. Another GCC country, Kuwait, also showed a rise in the number of children and adolescents with type-2 DM, making it an emerging public health problem. Al Khalaf et al⁴³ reported that the overall prevalence of diabetes in Kuwait was 21.4%, from which 4.1% were newly diagnosed diabetics. Recent papers⁶ published in IDF suggest that the current prevalence of diabetes in Kuwait is 23% (IDF report, 2013). In a more recent study it was reported that the prevalence of type-2 DM among native Kuwait population was 25.4%. This prevalence increased to 47.3% among its Asian expatriates and 56.3% in native Kuwait with advancing age-group of 55 years⁹. A similar pattern was observed in UAE, wherein the prevalence of DM was 25% among UAE national citizens which increased with age¹¹. In Oman, Al-Lawati et al⁴⁴ showed that the prevalence of DM was 16% in men and 15.4% in women. Age adjustment population increased the total to 16.3% in men and 16% in women. The prevalence of DM in the urban regions of Oman ranged from 8-18%. The greatest combined prevalence of DM was seen in Muscat 26%, Adh-Dhahirah (22%) and Dhofar (21%), and was more frequent in urban than rural regions. The overall DM prevalence amongst adult Qatar nationals was 16.7% with diagnosed DM 10.7% cases and newly diagnosed DM 5.9%. The DM proportion was higher in Qatar females (53.2%) than in males (46.8%) and the highest proportion was seen in the age group 40-49 years (31.2%)¹². In Qatar, the prevalence of DM was 29.2% among 30-49 years of the age-adjusted population. In the present study, we found that the prevalence of T2DM also increased in the Non GCC Arab countries. In Jordan, Ajlouni et al¹⁵ revealed the age-standardized prevalence of DM in Jordan population increased from 13.0% to 17.1% during the last decade. In Egypt, the DM preva-

lence was 17%. In the Republic of Syria, Albache et al¹⁷ found the prevalence of T2DM at 15.6%. Similarly, in Libya, Kadki and Roaaid⁴⁵ reported that the overall prevalence of DM was 14.1% (males 16.3%, females 13.0%). DM was identified in 19.4% (males 22.7%, females 17.6%) in 30-64 years age population and was slightly higher in urban than in rural areas (14.5% vs. 13.5%). Abduekkarem et al¹⁴ performed a study in Libya among 30907 people, which found the prevalence of diabetes to be about 18.8%. In Algeria, the prevalence of diabetes was 14.2% in urban and rural areas of the Western region of Algeria, wherein it was greater among males (20.4%) than females (10.7%). The prevalence of T2DM was 10.5%. In general, the prevalence was greater in urban 15.3% than in rural 12.9% areas¹⁹. Gunaid⁴⁶ determined the prevalence of DM amongst adults in Sana'a, Yemen. The prevalence of DM was 6.57%. The age-adjusted prevalence for 30-64 years was 9.75% in the urban region of the country. Gunaid and Assabri²¹ concluded that the prevalence of T2DM was 10.4% near to the capital of Yemen. Abdul-Rahim et al²⁰ reported the prevalence of DM and its related factors in a cross-sectional study of an urban Palestinian population consisting of 492 males and females aged 30-65 years, with 12.0% of the population suffering from diabetes. Husseini et al⁴⁷ observed the estimated prevalence of diabetes among Palestine rural population aged 25-65 was 9.7% in 2000 which increased to 15.3% in 2010. The occurrence of DM in males increased from 9.1% to 16.9% and in females from 10.2% to 13.6%. The authors also predicted that it would be about 20.8% in 2020 and 23.4% in 2030. The prevalence of DM in Morocco was 8.0%²⁴, 7.43% in Iraq²⁵ and 18.9% in Lebanon¹³. Similarly in Sudan, Elbagir et al²² demonstrated the prevalence of DM and impaired glucose tolerance among 724 subjects aged 25 years. The occurrence of DM and IGT was 8.3% (males 9.9%, females 7.5%) and 7.9% (males 4.1%, females 9.7%), respectively. Age-adjusted rate of prevalence of DM was 10.4%. Bouguerra et al⁴⁸ conducted a study in 3729 Tunisian adults found that the DM prevalence was 9.9% [9.5% in males and 10.1% in females] with age-adjusted prevalence of diabetes to be at 8.5% [7.3% in males and 9.6% in females]. Romdhane et al¹⁸ performed a research in a random sample of 7700 subjects with age ranged 35-70 years. The prevalence of T2DM was twice as higher in urban areas and was associated with high economy. Overall prevalence of T2D was 15.1% with 16.1% men and 14.1% women,

and was twice as higher in urban areas (17.7%) than in rural areas (9.7%). In the current study, we found that Arab states had high prevalence of T2DM. The highest prevalence of DM was observed in Saudi Arabia 31.6%, followed by Oman 29%, Bahrain 25.5%, Kuwait 25.4%, and United Arab Emirates 25%. whilst the lowest prevalence was found in Mauritania (4.7%) and Somalia (3.9%). The highest mean prevalence was seen in (GCC) countries (25.45%) whilst in non-GCC countries it was (12.69%) (Table I, Figure 1). However, the combined mean prevalence of T2DM both in GCC and Non-GCC Arab countries was 16.17% (Table I). This prevalence was significantly associated with higher Gross Domestic Product (GDP) ($p=0.020$) (Figures 2, 3, 4) and a high energy consumption ($p=0.017$) (Figure 5). Moreover, the prevalence was more common among males and in urban population. Figures show that T2DM is rapidly increasing in the Arab world. Similarly, Badran and Ismail⁴⁹ reported that the Arabic-speaking countries have some of the greatest T2DM prevalence. This is especially true in the high-income oil-producing GCC Arab countries, where the rates of prevalence are at the top. The prevalence rate of T2DM in the Arabic-speaking countries is between 4-21% with the lowest being in Somalia and the greatest in Kuwait. Economic development has made the people migrate to urban areas where people have more chances to adopt lifestyles with high-calorie food intake and physical inactivity. We also believe that, in addition to these factors, environmental pollution is also an emerging factor causing insulin resistance and T2DM⁵⁰. These factors are the major cause of increased prevalence of T2DM in the Arabic-speaking countries. The strengths of current study are: we recorded the information regarding the prevalence of T2DM among all the 22 Arab world countries. The literature was searched using very reliable sources such as Institute of Scientific Information (ISI) Web of Science (Thomson Reuters), PubMed and EMBASE databases. Conversely, the limitations of the current study are: frequently search tools may be not able to find out a paper. We tried to hunt the homogeneous type of studies like randomized, cohort, community-based, large sample size studies which followed either ADA or WHO criteria, but we faced few methodological challenges; as we selected all 22 Arab countries, in every country different methods were used to assess the glycaemic status. Due to the heterogeneity in the literature in hand, we were not able to choose the homogene-

ous studies. We were unable to control for some known variables when comparing urban vs. rural populations. Furthermore, the literature is deficient from some states; therefore, we choose both randomized, cohort, and cross-sectional, community and hospital-based studies, which followed either ADA or WHO criteria to verify DM among the subjects.

Conclusions

The ranking of countries by highest prevalence of type 2 diabetes mellitus in the Arab world are Saudi Arabia, Oman, Kuwait, Bahrain and United Arab Emirates, whilst the lowest prevalence was found in Mauritania and Somalia. This prevalence was significantly associated with higher GDP and high energy consumption. Arab States should incorporate the diabetes defensive strategies on an emergency basis in their national health policy to reduce the burden of T2DM. The government, health, and educational institutes should provide public awareness about healthy lifestyles, physical exercise, and nutritional awareness to the community, to control the increasing prevalence of diabetes mellitus in the region. Diabetes and its complications must be discussed repeatedly in scientific and academic assemblies and in both electronic and print media, to increase the public awareness of the disease to decrease its prevalence.

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Conflict of interest

The authors declare no conflicts of interest.

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