The Diabetic Foot in the Arab World

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Abstract:

While the problem of the diabetic foot was discussed in many papers from different sites in the world, it has not been discussed well in the Arab world. Some Arab countries were amongst the top ten in prevalence of diabetes world wide . This has not been fully appreciated in the world's literature. We therefore review the magnitude of the diabetic foot problem in the Arab world and seek to ascertain the predominant risk factors and the reasons for its high prevalence in this region.

Key words: Diabetic foot , Arab world, diabetes

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Introduction

The Arab world refers to Arabic speaking countries expanded from the Atlantic Ocean in the west to the Arabian Gulf in the east and from the Mediterranean Sea in the north to the horn of Africa and Indian Ocean in the southeast (*Figure 1*)[1]. One of the great challenges faced the Arab countries is the lack of research and lack of publications on health problems. Diabetic foot problems are among the major complications that may face any diabetic patient at any time of his or her life. Diabetic foot disease represents a real challenge to the health providers caring for these patients and health system in general.

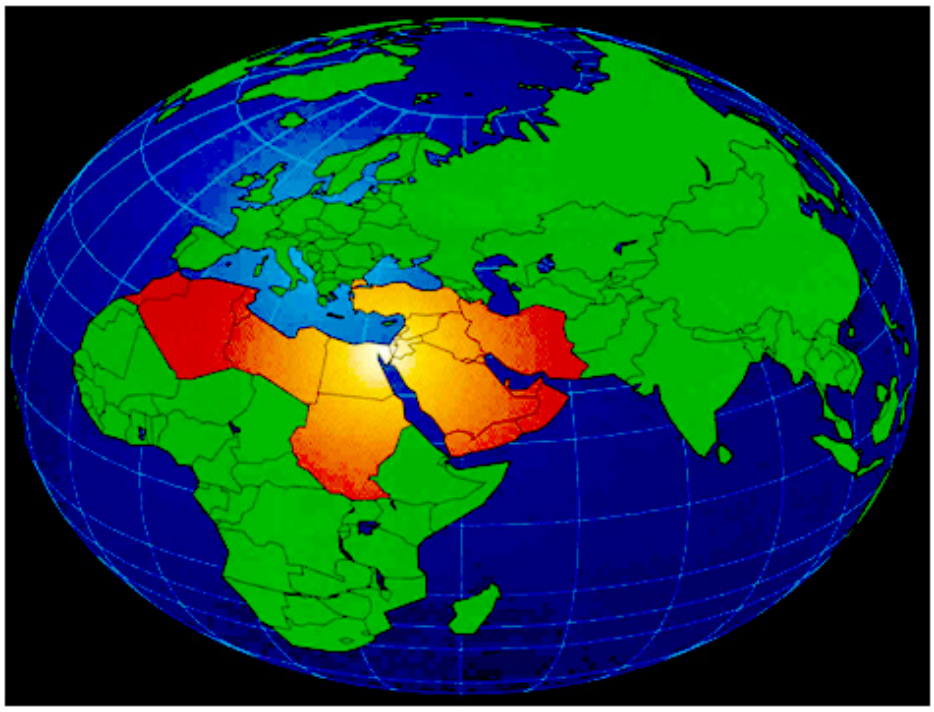

Figure 1: Global map highlighting the Arab Regions

In 2005 the International Diabetes Federation (IDF) published a position statement about common diabetes complications.[2] In this statement , data from epidemiological studies have indicated that between 40 – 70% of all lower extremity amputations are related to diabetes. Eighty five percent of all amputations related to diabetes are preceded by foot ulcers. Researchers established that between 49-85% of all amputations can be prevented[2] . This means that significant reductions in amputation rates can be achieved by adopting well structured preventive policies. Due to a lack of publications on diabetes and its complications in the Arab world , we usually encourage our readers to apply the rule of 15 to understand the significance of this problem (*Table 1*)

The rule of 15 *

15% of people with diabetes develop ulcers

15% of ulcers develop osteomyelitis

15% of ulcers result in amputation

* Armstrong, David G. and Lavery, Lawrence A. (2005). Clinical Care of the Diabetic Foot. American Diabetes Association. ISBN-10: 1580402232

In 2007,the treatment of diabetes and its complications in the United States cost around 116 billion American dollars on its direct expenses, and at least 33% of these costs were linked to the treatment of foot ulcers.[3] Notably, the higher the ulcer grade the higher the cost of care.[3] The cost of care of diabetes and its complications in Arab countries, in comparison with the United States and Europe, unfortunately has a small budget directed to it.[4]

In the Arab region the prevalence of diabetes has been rising dramatically within the last two decades. This may be attributed to the changes that occurred in the Arab world cultures towards westernization.[5] Interestingly, the prevalence of diabetes related complications are still low in the Arab countries located in the western regions and become higher towards the eastern Arabic countries. This finding needs more investigation and it is an area for ongoing research. Six of the Arab countries located in the East have among the top ten highest diabetes prevalences in the list published by the IDF (*Table 2*)

	Country (2007)			Country (2025)
1	Nauru		1	Nauru
2	United Arab of Emirates		2	United Arab of Emirates
3	Saudi Arabia		3	Saudi Arabia
4	Bahrain		4	Bahrain
5	Kuwait		5	Kuwait
6	Oman		6	Tonga
7	Tonga		7	Oman
8	Mauritius		8	Mauritius
9	Egypt		9	Egypt
10	Mexico		10	Mexico

Table 2: list of top ten countries in prevalence of diabetes mellitus (20-79 year age group)

We propose the concept of a “diabetic foot continuum”. This is the environment where the interaction of diabetic foot risk factors work together to produce diabetic foot problems. (*Figures 2 and 3*) In the following section we will discuss several of the important risk factors contributing to diabetic foot problems in our region of the World.

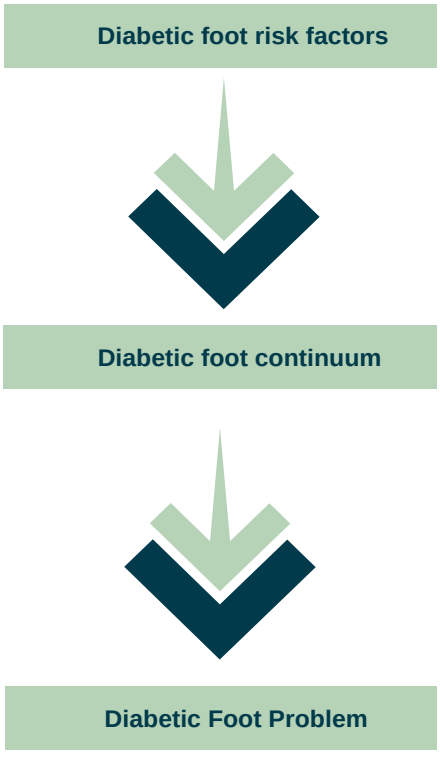

Figure 2: Global map highlighting the Arab Regions

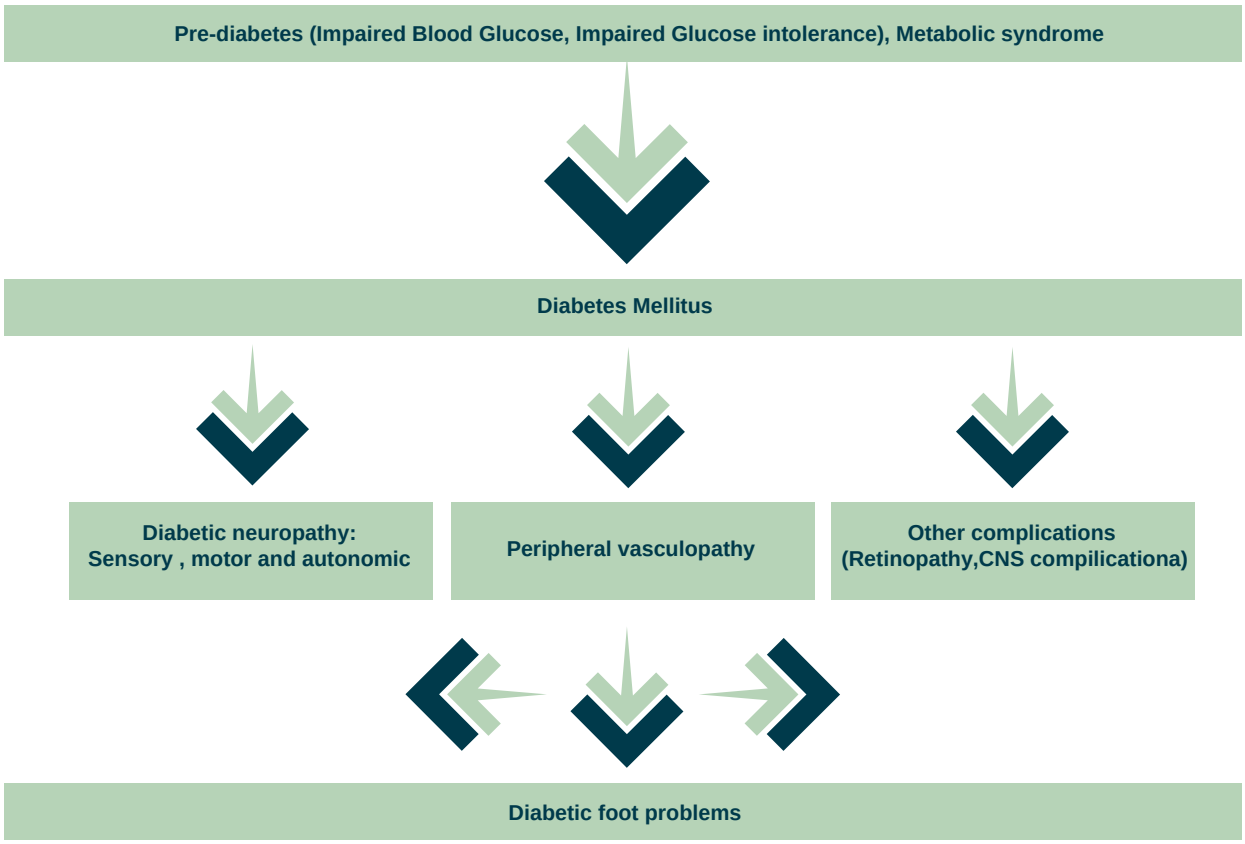

Figure 3: Diabetic foot continuum

Neuropathy:

Studies in the Arab world showed a prevalence of neuropathy ranging between 38-94% in diabetic foot cases. (6,7,8) Sensory neuropathy is a major component leading to the development of diabetic foot ulceration. Loss of protective sensations such as pain may predispose the patients to recurrent injuries without feeling its occurrence. For example, we have observed a case of a diabetic patient with poor self foot care presenting with an abscess on the dorsum of the foot due to the presence of a foreign body (piece of glass) for more than three months.

Motor neuropathy leads to atrophy of the small muscles of the foot and this will lead to foot deformities. Development of foot deformities with lack of foot care awareness and lack of proper foot wear in Arabian patients significantly contributes to the increasing problems of foot complications in our diabetic patients.

Autonomic neuropathy that leads to dry, cracked skin with fissures is a common presentation in clinical practice. The unique character of weather in most of Arab countries (hot, dry) make it very difficult to change the cultural beliefs about footwear. Sandals are the commonest foot wear in the Arab countries and most particularly, the traditional sandals. (*Figure 4*)

Figure 4: Picture showing different styles of improper foot wear commonly worn.

Vasculopathy:

Avicenna (980-1037 AD) ,the famous Arab doctor, described diabetic foot gangrene and the association between diabetes and foot problems.[9] The prevalence of lower extremity vasculopathy is varied based on the method used to detect the vasculopathy. In this regard, the prevalence of peripheral vascular disease in the Arab population ranges between 50 – 78.7% [7, 8, 10].

Life style:

In many Arab world countries, the life style is sedentary. In a comparative international study of populations[11] , physical activity prevalence across 20 countries using the international physical activity questionnaire (IPAQ), Saudi Arabia was the only Arab country to participate. This study reported that the prevalence of low, moderate and high physical activity in Saudi Arabian subjects was 40%, 33.8%, and 26.2% respectively, while it was 15.9%, 22.1% and 62% ,respectively, in the United States.

Overweight and obese diabetic patients develop foot problems by creating extra load in deformed or injured feet. Obesity has become an epidemic problem worldwide and particularly in the east Mediterranean and Middle East region. Unfortunately, 3 - 9% of preschool children have been found to be either overweight or obese.[12] In school children, this prevalence reached 12-25%. [12] Marked increases in prevalence of obesity has been noted among adults ranging from 15-45%; in women it reached 35-75% and in adult men 30-60%. [12]

Country	Prevalence of diabetes	Prevalence of diabetic foot problems
Tunisia (14)	9.9% (9.5% in men and 10.1% in women) It doubled in 15 year period	Data not available
Morocco (15)	6.6%	Data not available
Algeria (16,17,18)	10.6% (10.8% male , 10.5% female)	Diabetic foot ulcer:11.9% \ Neuropathy 84.85% Peripheral arteriopathy :78.78%
Mauritania (19)	1.88% \ 1.3% males \ 2.29% females	Data not available
Libya (20)	Data not available	Peripheral arteriopathy 60% \ Neuropathy 40% (20)
Sudan (21,22,23)	3.4% \ 5.5% in north Sudan \ 8.6% in Khartoum	Neuropathy 37% \ Peripheral vascular disease 10%
Egypt (24,25)	2.4% rural \ 8.4% low socioeconomic class 10% high socioeconomic class	Foot ulcer 1% \ Diabetic neuropathy 22%
Somalia (26)	2.3%	Data not available
Djibouti (27)	4.1%	Data not available
Yemen (28)	4.6% (7.4% male , 2% female)	Data not available
Sultanate of Oman (29)	16.1%	Data not available
United Arab Emirate (30)	DM 29.2% \ Pre-diabetes 24.2%	Neuropathy 34,7% \ Peripheral vascular disease 11,1%
Qatar (31)	DM 16.7% \ Pre-diabetes 13.8%	Data not available
Bahrain (32,33)	DM 25.5% \ Pre-diabetes 14.7%	Neuropathy 36.6% \ Peripheral vascular disease 11.8% Foot ulcer 5.9%
Kuwait (34)	12.8%	Data not available
Iraq (35,36)	21.4%	Diabetic foot 2.3% \ Neuropathy 13% Amputation 0.7% \ Peripheral vascular disease 0.2%
Syria (37)	15.6%	Data not available
Lebanon (38,39)	11.3%	Peripheral vascular disease 18.3%
Jordan (40,41)	17.1%	Diabetic foot ulcer 5% \ Neuropathy 19% Amputation 5%
Saudi Arabia (42,43,44)	23.7%	Peripheral neuropathy 13.7 – 35.9% \ Diabetic foot 4.3% Amputation 1.9%
Palestine (45,46)	9.6%	Data not available

Table 3: prevalence of diabetes and diabetic foot risk factors and problems in Arab countries

Diabetic foot disease in the Arab world

The prevalence of diabetic foot disease varies considerably in the Arab world (*Table 3*), but there are some factors shared between most of the Arab countries that make it high:

1) Weather and foot wear:

In most Arab countries the weather is hot and dry most of the year. This makes the habit of wearing closed shoes and socks rejected by many patients and instead they prefer to wear sandals. Sandals do not offer the protection afforded by closed foot wear since they expose feet to heat, dryness and injuries.

2) Habits:

Walking bare-footed especially inside the home is still a common habit in many regions of the Arab world

3) Religion:

Ninety percent (90%) of Arab populations are Muslims. They pray five times per day where the feet have to be washed before praying. These maneuvers help patients to inspect their feet as well as clean them. Washing feet before praying and the praying itself offer some sort of physical massage to the feet. Trimming the nails is a habit encouraged by Islam, but it should be done properly so as not to harm the toes. Also, every year millions of Muslims engage in the holy practice of Hajj. Among them are many persons with diabetes who may sustain unnoticed physical harm to their feet. Diabetes education and foot care is therefore an important issue before going to do Hajj.

4) Education:

The percentage of illiterate people is higher in the Arab world than in western countries. Lack of education leads to unawareness of diabetic foot problems and their prevention. Interestingly, one study showed that 90% of screened diabetic patients had poor knowledge about their disease and 96.3% had poor awareness about its control.[13]

5) Traditional medicine:

Herbal medicine and herbal medications are still commonly used in many Arab countries. We have observed many diabetic foot complications presenting for medical care after severe deterioration due to treatments with traditional herbal medications.

6) Health care system and health care providers:

Health resources available for diabetes care and diabetic foot management differs considerably among Arab countries and still the management of the diabetic foot is not based on a multidisciplinary team approach. Due to the frequency and long hospital stays, diabetic foot cases usually consume a considerable part of the health care budgets. For this reason the hospitals' administrative staff and health care providers are somewhat reluctant to admit patients with diabetic foot problems in their early presentation. This of course results in more complicated problems and subsequently, more amputations.

7) Rehabilitation :

Physical and social rehabilitation is still an underdeveloped field in Arab countries. Patients with amputations may wait for a long time before they can be provided with an orthotic device. Frequently the cost inhibits the patient from seeking appropriate help. Unfortunately, patients isolate themselves after amputation and live a lonely, depressed life. In addition to this, a lack of employment for amputees has a very negative impact on their life and that of their families.

Nonetheless, the future is looking bright as there are many efforts to improve the outcome of diabetes and its complications in many Arab countries. In Saudi Arabia, for instance, there are about 20 well equipped diabetes centers with highly trained health care providers. Also, in Sudan there is a pioneer project to initiate a series of diabetic foot care centers throughout the country. The IDF supports a number of Arab countries to train physicians on how to deliver proper care to diabetic foot patients. The Saudi Ministry of Health cooperated with the University of Toronto to conduct an international wound care course (IWCC) in 2008-2009. Also, many well designed training programs and symposiums have been organized to focus on the issue of diabetes and its complications.

Conclusion

Diabetes care in the Arab world is still in its early stages and much research in this area is urgently needed. Health authorities need to implement preventive policies and invest more financial capital on training programs and problem awareness programs. A structured multidisciplinary approach should be encouraged in the field of diabetes care. Finally, the need for national registries is urgently required in Arab countries to assess the impact of the disease and our outcomes as we strive to improve our delivery of more effective diabetic foot care programs.

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