

# Detection of Diabetic Complications by Primary Care Physicians

**FARIS F. MATLOUB<sup>1</sup>**

<sup>1</sup> Primary Health Care, Dubai Health Authority, Dubai, UAE

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While type 2 diabetes is a global pandemic, United Arab Emirates (UAE) is at the heart of a region where sedentary lifestyle and genetic predisposition made its population particularly susceptible to diabetes, one of the highest rates worldwide. Recent data showed age-standardized rates for diabetes (diagnosed and undiagnosed) and pre-diabetes in a population-based sample in the city of Al-Ain, one of the biggest UAE cities, were 29.0 and 24.2% respectively among 30-64 year olds [1]. Unfortunately these numbers are expected to increase unless serious measures are implemented. By 2020, an estimated 32 percent of the adult population (age 20-79), including both UAE nationals and expatriates, may have diabetes or pre-diabetes [2]. This can be attributed to earlier onset of diabetes, undiagnosed and non-compliance, which is consistent to what was noticed in studies from other developing countries [3, 4]. As a result, the morbidity and mortality associated with diabetes and its complications are important for primary care physicians practicing in UAE. The increase in prevalence will inevitably be accompanied by an escalation in medical expenditure with its burden on the healthcare system, a possible cost of \$8.52 billion (USD) over the next decade if current trends continue [1]. This also translates to huge societal costs due to lost productivity.

Correspondence to: Dr Faris F Matloub  
Email: fmatloub@dha.gov.ae

## ABSTRACT

The number of people living with diabetes is growing due to population growth, aging and urbanization. The current Diabetes Epidemic is expected to continue parallel with the rising rates of overweight cases/obesity and reduced physical activity. The United Arab Emirates (UAE) had witnessed enormous changes in lifestyle and wealth over the past few decades; moving from rather primitive to a highly modernized lifestyle, with unhealthy eating habits and physical inactivity seen as the major culprits. Recent advances in knowledge and therapy had raised the quality of effective care for those with diabetes and dealing with its complications. In spite of these developments, many patients still experience suboptimal therapy, putting them at risk of developing of acute and chronic complications that have enormous effects on the person, family and the community at large. Diabetes care and screening for complications at the primary care level provides continuing medical and cost-effective nursing care and offers a chance for an educational opportunity that could improve a patient's lifestyle. Adopting a protocol-driven strategy facilitates early detection of diabetic long term complications, when intervention at the proper time could retard or prevent lifelong difficulties.

**KEY WORDS:** Diabetic retinopathy  
Peripheral neuropathy  
Depression Screening  
Foot care

Diabetes-related long term complications are prevailing and are expected to rise. Much of the disability and cost associated with diabetes are related to the care of chronic complications [5], resulting in a huge burden on the public health plan and the nationwide economy. According to Dr. Marwan Zarooni, head of plastic and reconstructive surgery / Rashid Hospital, Dubai, "One in five diabetic patients in UAE who develop foot ulcers need amputation". A quality improvement program that addresses the care of patients with diabetes had been launched in the primary care. The mission is not limited by improving glycemic control, blood pressure, lipids and is extended to incorpo-

rate evidence based strategies to prevent macrovascular complications which could terminate the life of diabetics early, as well as to delay or avoid microvascular complications that could negatively affect their quality of life. Much of the cost and disability could be spared when knowledge and recommendations are implemented efficiently. Data from Diabetes Control and Complication trials showed that these complications correlate well with the glycemic control (HbA1c) level, and every 1% reduction means a lower risk of developing retinopathy, nephropathy and neuropathy by around 40% [6].

### **Cardiovascular Risk Reduction**

Cardiovascular disease (CVD) is the major cause of mortality and morbidity and is the largest contributor to the disease – related to direct and indirect cost. Studies have suggested that diabetics are at a higher risk to develop coronary artery disease, coronary ischemia and myocardial infarction, as well as asymptomatic coronary disease and silent ischemia [7, 8], a risk similar to those without diabetes but with established CVD. It is advisable to think about reducing CV risk at the prediabetic status, even before the patient is declared to be diabetic. Routine measurement of body mass index, waist circumference (pointer to abdominal obesity) and smoking status are done every visit. The physical exam includes auscultation of the heart and chest, as well as the carotid to detect any bruit or signs of dyslipidemia. Annual checks including baseline Electrocardiogram, fasting lipid profile and microalbuminuria screening could figure out those at early stage. Using the Framingham score or other risk score calculators is becoming a standard practice which helps the healthcare provider convince patients to intensify their treatment and overcome “clinical inertia”. The CV risk reduction is addressed through appropriate lifestyle measures started by a diabetes case manager and then through physician recommendations, which in our culture has a robust influence. We clearly advise on a healthy diet, regular physical activity and smoking cessation. Booking an appointment with a certified dietician gives more detailed plans for culture-specific meals/snacks, where to dine outdoor in the city and advise what to order. Trained educators can emphasize the importance of regular physical activity, exercise prescription plus other health related issues.

During the consultation, doctors determine the patient desirable targets for Hb A1C, blood pressure and lipid profile and alert the patient why we are keen to keep them at the target level. Several randomized clinical trials have shown a reduction in cardiovascular events, including stroke, with the lowering of systolic blood pressure to less than 140/80 mm Hg. Lifestyle modifications started first to encourage weight reduction and advocate regular physical activity has, in turn, enhanced insulin sensitivity and improve lipid profile. Advice to adopt the dietary approaches to stop hypertension (DASH) diets, low sodium intake and plus pharmacologic management mainly as an angiotensin-converting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB) as a baseline, however, majority will require multiple-drug therapy to obtain treatment goals [9]. Lipid modifying therapy is of paramount importance to reduce CV risk, considering statins as the core part of care followed by dose up titration or using combination lipid lowering therapy to attain low-density lipoprotein (LDL) cholesterol levels to less than 100 mg/dL. Anti-platelet therapy for eligible clients is mainly for secondary prevention. Referrals to the cardiology through urgent or routine visits when suggestive history of IHD is encountered for scheduled echocardiography and angiography if indicated.

### **Diabetic Retinopathy**

Diabetic retinopathy is a major cause of visual loss; similar to what was seen in other developing countries [10]. Early stages of retinopathy are asymptomatic; changes could be present prior to the diagnosis of T2DM. When passed unnoticed, it could progress to more serious changes as macular oedema, retinal ischemia and evolution of retinopathy, manifested by deterioration of visual acuity ending in loss of sight. Historically primary care physicians were not doing a lot in this respect apart from checking visual acuity and asking about any noticeable reduction in vision. Followed by booking an appointment with the ophthalmologist for proper standardized visual acuity and fundoscopy with dilated pupils is the routine at diagnosis and annually thereafter. The introduction of digital retinal camera in primary care services has made a significant step compared to previous examination of the retina with non-dilated ophthalmoscopy by non-eye care pro-

viders. Retinal photography enabled physicians to examine the retina and document results for future assessments and follow up visits. Practitioners were taught how to classify abnormalities and prioritizing patients when considering eye clinic referrals. However, most of the service that follows is usually offered by the ophthalmologist at specialist care centers.

### **Diabetic Nephropathy**

Diabetes is the leading cause of end-stage renal disease (ESRD) in both developed and emerging countries [11]. Diabetic renal disease used to receive less attention in the past because life expectancy of diabetics was limited by cardiovascular disease especially for those with Type 2 diabetes. Type 1 diabetes renal failure has always been a significant cause of morbidity and mortality. In UAE, due to higher prevalence of individuals of Indo-Asian descent, diabetic chronic kidney disease is of major importance reflected by higher rates of microalbuminuria and end stage renal failure compared to other races [12, 13]. Diabetic nephropathy is screened and detected at time of T2DM diagnosis and annually thereafter by checking for proteinuria and any evidence of urinary tract infection. When both are negative, then a measurement of urine albumin / creatinine ratio is ordered. Serum creatinine is checked, glomerular filtration is calculated using the formula [14] at least once a year (if normal) and every visit when evidence of nephropathy is noted. The American Diabetes Association recommends continued repeated testing of urine for albumin excretion to assess natural progress of disease and response to therapy. With the earliest signs of renal injury –microalbuminuria- multiple factors, such as hypertension, hyperglycemia and dyslipidemia are needed to be addressed. More intense glycemic controls is targeted and a renin-angiotensin blocking agent is started and up titrated to keep BP below 130/80 mmHg. A nephrology appointment is planned for further evaluation and advice.

### **Diabetic Peripheral Neuropathy**

Neuropathy is a common diabetes complication. It adds not only to foot problems but also to many upsetting symptoms including pain/paraesthesia in the hands and feet, gastro-intestinal, bladder and sexual problems.

Primary care physicians usually ask if the patient is having postural hypotension, erectile dysfunction, and numbness or tingling in the extremities when screening for neuropathy. Several questionnaires have been developed to assist clinicians in the diagnosis of DPN [15]. Monofilament testing for the light touch using 10 g monofilament, position sense and vibration test by the tuning fork are done at diagnosis and annually thereafter. Ankle and knee reflexes are elicited. When abnormalities detected the patient is encouraged to have better glycemic control, to pay extra attention to their feet since they could get injured without being noticed. Pain and paraesthesia is approached with Pregabalin or Duloxetine. Neurology referral is requested for doubtful cases where nerve conduction study is done or non-responders.

### **Depression Screening**

Diabetes and depression occur together approximately twice as frequently as would be predicted by chance alone. Comorbid diabetes and depression are a major clinical challenge as the outcomes of both conditions are worsened by the other [16]. It is widely accepted in many recent guidelines to consider screening for depression in T2 diabetics. Of the most acknowledged questionnaires that have been developed to aid clinicians in the diagnosis is the PHQ-9 questionnaire [17], to be filled by the patient himself or the healthcare provider. The primary care practice with long term doctor patient relationship and commitment offer the best chance for depression screening. Validated copies are available in Arabic and English as well as many other languages. This made physicians more alert to the psychological impact of diabetes which could negatively affect the management plan, adherence to diet, compliance for medications and attending scheduled appointments.

### **Foot Care**

Foot ulceration is among the major drivers of impaired health and of health-care costs in diabetes care. Screening of the underlying damage to nerves and vessels is essential step in patient assessment and risk factors are to be dealt with in order to reduce this burden and cost on both the patient and society. In practice, a search for foot abnormal cutaneous thickening and ulceration is needed with provi-

sion of suitable footwear during daily activity and exercise sessions. An observation for foot deformity or bone prominences which could be a late manifestation of combined vascular and neurogenic abnormalities is part of routine care. As mentioned earlier, the 10-g monofilament and 128-Hz tuning fork help to identify early sensory neuropathy. Palpation of peripheral pulses of the foot (namely dorsalis pedis and posterior tibial arteries) is part of physical examination. Any area of undue pressure like callus, dry skin is dealt with using emollients, massage and careful observation.

### Area for Improvement

Care of diabetics in a cosmopolitan community like in Dubai is pretty challenging. It entails a continuing task of primary care physician that requires long-term commitment from the doctor as well as patient to ensure compliance with the treatment plan, self-administering drugs, monitoring plus undertaking healthy behaviors. This is facilitated through a better understanding of the nature of the disease that affect the biopsychosocial profile of the patients.

It is required to establish a continuing medical and cost-effective nursing care as well as a prepared educational plan- in particular self-management to prevent acute complications and reduce the risk of long-term complications

- We believe in education and empowerment where the whole medical team plays a role. Pamphlets and posters hanged on the walls of consultation rooms could help to give a nutritional message as well as video tapes running in the waiting area to eliminate misconceptions and negative attitudes.
- We need to encourage “Diabetes networks and forums” supervised by well trained staff where diabetics could log on to gain additional nutritional information.
- Diabetes friend societies that enable them to sit together and describe their experiences, offering free/low priced glucose meters and test strips. It could promote healthier lifestyle by offering gym membership, outdoor walk and running competitions.
- For the healthcare providers, they are encouraged to adopt patient centered approach where his/her be-

liefs, thoughts and expectations are explored and considered when deciding treatment plan.

- Risk stratification is to be used routinely, lipid and blood pressure should be measured regularly, any abnormality is to be evaluated and actively addressed using a “proactive approach” to eliminate clinical inertia. Specialist lipidology clinic to be consulted when needed.
- Smoking cessation services become more available and covered with insurance plans to reduce CV risk.
- Accessibility to Digital Retinal Photography for all, including those with basic insurance plans. These cameras could be operated by well-trained healthcare professional.
- Diabetic Foot Academy that includes various medical professionals (including general surgeon, vascular and plastic surgeons, endocrinologist, foot care nurses, podiatrist) to ensure comprehensive quality service.
- Podiatrist services and Doppler ankle / brachial pressure to be available at the level of primary care sector.

### Conclusion

The IDF report suggests the need to focus more on preventing diabetes complications in developing countries. Adopting a protocol-driven strategy for type 2 diabetes complications prevention is of paramount importance in primary care since most of these complications give minimal or no symptoms to start with, and it is important to be discovered while asymptomatic since late detection might be “too late” for intervention whereby therapeutic options are limited. All what we need is more and more comprehensive and prescriptive protocols to implement what we knew from clinical trials and published guidelines to prevent complications in an evidence-based approach.

### Conflict of Interest

We declare that we have no conflict of interest.

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