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Critical questions in diabetes management: What are the most compelling challenges and how can we handle them?

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ABSTRACT

Background: The prevalence of diabetes mellitus is growing worldwide, showing almost a 10-fold increase in the last five decades. Despite advances in the understanding of the disease mechanisms, preventive measures, and treatment options, morbidity and mortality remain high. Moreover, the burden of uncontrolled glycemia and associated complications have a significant impact on healthcare costs. To be ready for the future and emerging issues in the management of diabetes and related disorders, a holistic approach is essential for the prevention of the next generations. So many challenges in the management of diabetes exist globally, which differ according to the health infrastructure, and cultural, economic, and sociodemographic status of the nations.
Conclusions: In this minireview and commentary on previously unaddressed needs relating to the management of diabetes, we discuss the ubiquitous and most compelling challenges and suggest potential solutions in the care of patients with diabetes.

1. Introduction

Type 2 diabetes (T2DM) is a rapidly growing global public health concern, affecting nearly 537 million people worldwide [1]. A cluster of sociodemographic and economical risk factors such as unhealthy eating patterns, environmental pollutants, changing circadian rhythms, increased screen time, and physical inactivity are the culprit of the rising frequency of T2DM [2–4]. The health budgets of many countries are threatened not only because of the cost of antidiabetic medicines but also the burden of macrovascular and microvascular complications and the subsequent workforce losses [5]. There are many barriers to rational management of T2DM including an unhealthy environment, lack of awareness, economic difficulties, and reimbursement issues. The aim of this minireview and commentary is to recall the most compelling challenges in T2DM management, and to search for solutions within the current knowledge.

2. What are the most compelling challenges in the treatment of diabetes?

2.1. Diabetogenic environment

Obesity is the major cause of T2DM. The growing increase in the prevalence of T2DM is parallel to the increased frequency of obesity [6]. In a nationwide study, we have reported recently that the prevalence of overweight and obesity was more than 90% in patients with T2DM [7]. The motive and awareness for healthy living are quite low in many regions of the world. People largely consume unhealthy food with low nutritional value. This is an even more important problem, particularly for school-age children [8]. It is widely accepted that unhealthy food consumption and low food safety have been the most important problems for the last decades in terms of T2DM development [9].

Reduced physical activity and poor adherence to regular exercise also put individuals at a higher risk of developing diabetes. Much of the population lives in cities where there is poor urbanization and limited

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places for walking, cycling, or other physical activities [10]. Increased screen engagement also contributes to the increased prevalence of obesity and T2DM [11]. There is a robust association between lower screen time and increased physical activity and better metabolic regulation [12,13].

2.2. Health literacy

People with higher levels of education have lower rates of obesity and diabetes [14]. Health literacy is essential in learning the effects and side effects of each drug and taking them correctly. Especially in the elderly population, health literacy is crucial for medication adherence as they usually take more drugs, some requiring additional skills and training due to advanced technology. Health literacy is closely related to the level of education, good metabolic control, and lower rates of complications [15,16]. Even in glucose measurement systems that are commonly used to track blood glucose levels, end-user difficulties may arise due to the complexity of the device. To better get the advantage of these technologies, health literacy appears to be essential. All the components of health literacy, including cultural and conceptual knowledge, writing, reading, listening, speaking and numeracy are crucial for good metabolic control in patients with T2DM. Another, significant challenge in people with lower health literacy is the lack of awareness about diabetes. Complications of diabetes are more common in these people. Self-management of diabetes is easier in better-educated people as they more often attain the treatment goals and seldom encounter diabetic complications [16].

In many healthcare facilities, there is hardly enough time to educate patients [17]. Many diabetes outpatient clinics do not have adequate numbers of diabetes education nurses or registered dietitians [18]. Consequently, patients may not receive adequate education about the management of diabetes and its complications.

2.3. Reimbursement issues

There are also significant challenges in the treatment of diabetes and monitoring glucose control. Several antidiabetic medications and various diabetes technologies are not fully reimbursed in many countries. Therefore, limited access to drugs and technologies becomes one of the most significant barriers to better glycemic management [19].

One of the most important factors in the inadequacy of reimbursement of drugs and technologies is the incomplete understanding of the cost of overall diabetes treatment. The rational way to show the cost of diabetes requires a holistic approach, revealing the complications, hospitalizations, acute events, reduced functionality, and early death as contributors to increased healthcare expenditure. The monthly cost per box is unfortunately misleading, negatively guiding the regulations and reimbursement policies.

2.4. Inertia in screening and management of diabetes and its complications

Another significant challenge of diabetes management is the lack of timely and appropriate screening and the lack of implementing agents which show significant protection from the outcomes. It is necessary to periodically refer patients to an ophthalmologist to screen for diabetic retinopathy while it will be sufficient to periodically check the creatinine level and measure the albumin/creatinine ratio in the spot urine for nephropathy screening. Detection of sensory-sensory neuropathy often can be made by taking history and performing a physical examination. It is even more complicated and time-consuming to detect heart failure, coronary, cerebrovascular, or peripheral vascular disease. Physicians should spare more time for the patient, to take a good anamnesis, and perform a systemic physical examination. Then, it is necessary to perform the diagnostic tests for early detect macrovascular complications and refer the patient to the relevant units. In many parts of the world, physicians do not pay much attention to identifying macrovascular complications before the development of a hard outcome. In addition, the knowledge and attitudes of physicians dealing with diabetes vary about which patient should be referred to a cardiologist [20,21]. Patients with T2DM experience a long period of hyperglycemia due to treatment inertia, predisposing them to diabetic complications and reduced quality of life [22]. In many parts of the world, people with diabetes with cardiorenal complications are still not prescribed drugs with established cardiorenal benefits [23,24].

2.5. What can be done to establish a constructed, stepwise patient management system?

It is not possible for physicians who are specialized in diabetes management to care all patients with T2DM given the high number of patients with diabetes and the very small number of diabetologists. Thus, it is necessary to increase the number of specialized services in the care of patients with diabetes. Starting from the primary care healthcare facilities, all patients with T2DM should be evaluated, followed up, screened for complications, and treated appropriately. The workshare of the healthcare facilities should be well defined and the role of each step in the treatment of diabetes should be determined. Only the patients who cannot achieve adequate metabolic control or who need to be followed up by other units due to multiple complications should be referred to secondary or tertiary care centers. The primary-care physicians and family physicians should be better educated to screen diabetic complications, and to better implement antidiabetic medications to patients with T2DM [17].

The implementation of a stepwise patient management system would reduce the burden on healthcare facilities.

More definitive guidelines that show how each patient should be managed at each stage should be established, disseminated, and carefully followed. On the other hand, there has been guideline inflation in recent years. Physicians taking many other tasks in primary care may not have enough time to follow and implement these comprehensive guidelines. Targeted efforts should be given to standardizing diabetes management at every step, and easy-to-read, well-accepted, short, and clear consensus reports should be published. The recently published ENCARNE consensus report is a good example of such potential collaborative efforts using multilevel diabetes management [25].

3. Future perspectives and conclusions

Considering the patient burden and the pathophysiology of diabetes, it has been clear that more effort should be spent on the prevention and management of diabetes. Such a prevalent disease with serious threats to human well-being can only be brought under control by a shared action of the relevant parties. The recent COVID-19 pandemic has shown us that modern technologies should be widely used in patient management and follow-up. In particular, telehealth applications, wearable health technologies, and electronic systems that facilitate continuous monitoring of patients enabling communication with health professionals should be widespread. The health authorities of the governments should identify their own obstacles for better management of diabetes and produce local policies to overcome the increasing burden of diabetes-related health issues. After that, all stakeholders such as policymakers, non-governmental organizations, media organs, and food and pharmaceutical industries should come together and find ways to facilitate the execution of these policies to improve the management of T2DM.

Credit author statement

Alper Sonmez: Conceptualization, Methodology, Writing- Original draft preparation, Cem Haymana: Writing- Reviewing and Editing, Ibrahim Demirci: Reviewing and Editing, Mustafa Cesur: Reviewing and Editing, Manfredi Rizzo: Methodology, Supervision, Ilker Tasci:

Methodology, Reviewing and Editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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