Diabetes: Important Guidelines for Metabolic Diseases

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Abstract

Metabolic syndrome is a condition involving a combination of risk factors, such as obesity, hypertension, insulin resistance and dyslipidemia, increasing the importance of an integrated approach to health management. The management of chronic illnesses is affected by a person's concerns, as the healthcare professional needs to carry out a thorough assessment of individual needs, ensuring that healthcare is appropriate and sufficient for each case. Thus, there are two main dimensions that in the management of the therapeutic regimen for chronic diseases: one focuses on intrapersonal conditions, such as knowledge, attitudes, beliefs and memories; and the other in external conditions, including family interactions, health professionals, daily activities, financial resources and environmental factors. Healthcare professionals must consider the various factors that influence the management of the therapeutic regimen when planning care for patients with diabetes/obesity, which challenges them to focus on multiple aspects of both motivations for action and interpersonal relationships. Understanding the link between diabetes, obesity and metabolic syndrome is crucial for developing effective prevention and treatment strategies to improve metabolic health and reduce the risks associated with these conditions.

Keywords: Type 2 Diabetes Mellitus; Metabolic Syndrome; Obesity

Introduction

Type 2 Diabetes mellitus (T2D) is a chronic and multifactorial disease. It is associated with an unhealthy lifestyle, such as physical inactivity and inadequate nutrition, in addition to economic, cultural and social issues such as population aging [1]. The incidence of people living with T2D is increasing, making it one of the main causes of morbidity and mortality worldwide. To individualize therapeutic choice and avoid of micro and macrovascular complications, if is essential that health professionals know and master all available pharmacotherapeutic resources [2,3]. Diabetes mellitus (T2D) consists of a group of metabolic disorders characterized by the presence of chronic hyperglycemia, when there is no adequate treatment3. DM is classified according to typology (type 1 DM / type 2 DM / Gestational / Monogenic Diabetes and Secondary

Diabetes), favoring the choice of treatment and the definition of strategies for tracking chronic complications [4]. Type 1 Diabetes is an autoimmune disease in which the immune system attacks and destroys the beta cells of the pancreas, responsible for producing insulin4,5. It is usually diagnosed in children and young adults, but can occur at any age [4,5].

Type 2 diabetes occurs when the body does not use insulin effectively (insulin resistance) or does not make enough insulin. It is strongly associated with lifestyle factors, such as obesity, physical inactivity, inadequate diet, in addition to genetic factors. It is the most common type of diabetes, usually diagnosed in adults, but also common in young people due to the increase in childhood obesity5. Gestational diabetes occurs during pregnancy and is diagnosed when blood sugar levels are elevated. It affects a significant proportion of pregnant women and usually goes away after giving birth, but increases the risk of developing type 2 diabetes in the future [5].

In addition to these three main types of diabetes, there are other less common forms, such as: Monogenic Diabetes in which it is caused by a mutation in a single gene; and Secondary Diabetes, which results from another medical condition or medication, such as chronic pancreatitis or prolonged steroid use5,6, however, T1D and T2D are responsible for the majority of cases4,5. Approximately half of the individuals in the world live with T2D and some are unaware of their diagnosis, with a percentage of 45.1% (International Diabetes Federation, 2021) [5,6] which represents a major challenge for public health.

About half of the people in the world live with T2D and some are unaware of their diagnosis (International Diabetes Federation, 2021) [5,6]. Therefore, when DM is not detected early through biochemical tests, it can remain unknown for several years, giving rise to the development of complications [4,6]. To avoid clinical complications, reduce mortality and improve the quality of life of people living with T2D, it is essential to screen and monitor individuals at highest risk, taking into account their sociodemographic particularities [5].
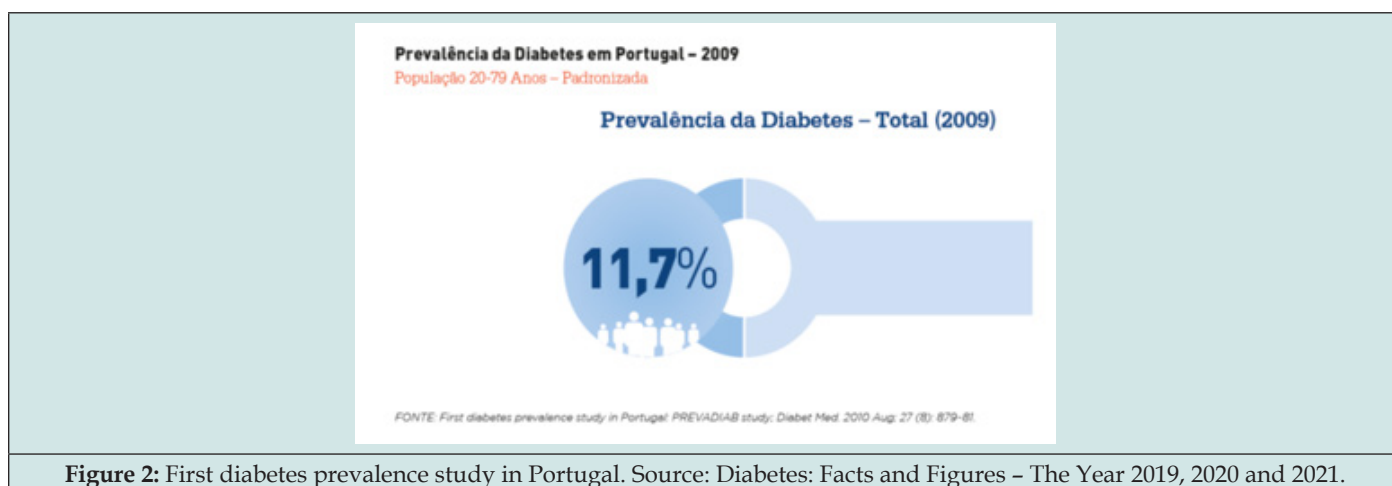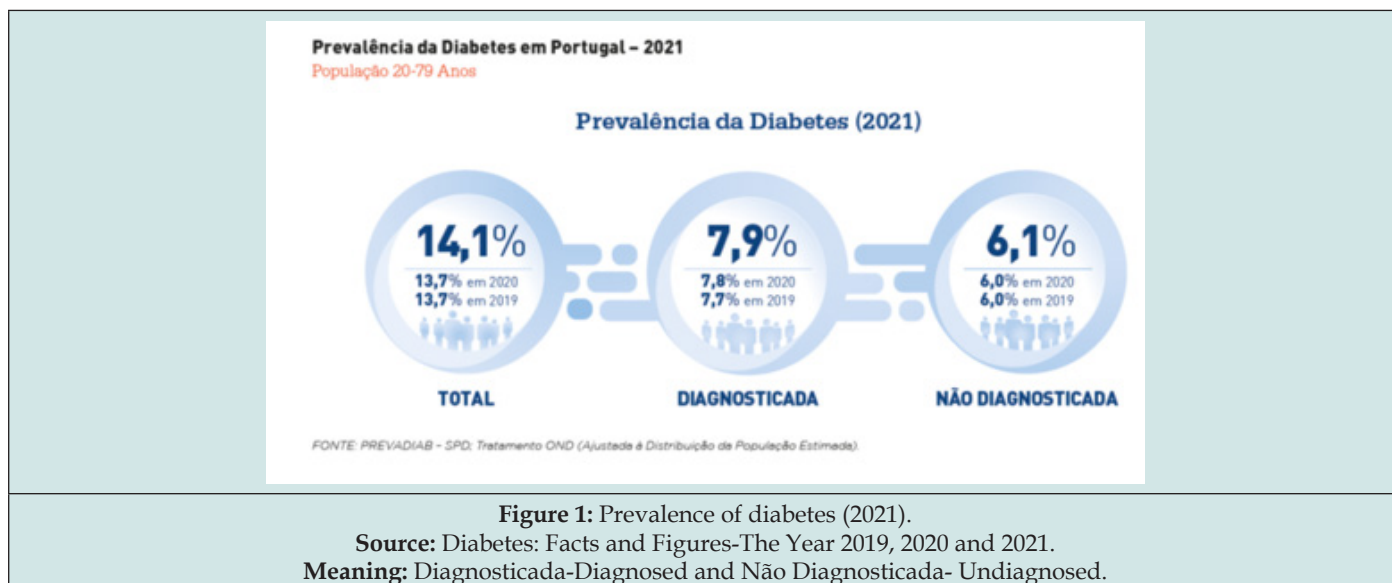
Obesity and Diabetes

In a special edition of the Epidemiological Bulletin of the National Institute of Health Doctor. Ricardo Jorge in 2021, it is highlighted that obesity is a priority issue in Europe [7]. Approximately one in six adults in the European Union is obese, and this increasing trend persists in most countries. Furthermore, this bulletin highlights that, as stipulated in the Functioning Treaties of the European Union, there are opportunities to improve food environments, especially through legislative measures [7].

Obesity is growing exponentially due to a nutritional deviation. This condition, characterized by excess body fat, not only compromises individual health but has also emerged as a significant public health challenge8. In fact, its increasing prevalence in recent years solidifies it as a chronic disease of increasing importance. Therefore, obesity is one of the biggest public health challenges we currently face, due to its strong link with high mortality and the emergence of comorbidities, such as diabetes mellitus and cardiovascular diseases (CVD) [8,9].

Clinically, obesity is recognized as a chronic disease and an important risk factor for other health problems, such as high blood pressure, strokes, heart failure, gallstone disease, arthrosis and some malignant neoplasms [9]. In the review study carried out by Wallace and Salive on the prevention of chronic diseases, the importance of understanding that a chronic disease does not occur in isolation is highlighted. Therefore, these conditions are frequently linked to other coexisting diseases, affecting multiple physiological structures and presenting diverse clinical manifestations and complications [10]. Chronic diseases present a progressive evolution, directly linked to the increase in average life expectancy and the many changes in people's habits and lifestyles [11]. According to Richard Carmona, physician and former vice admiral of the United States, who served as the 17th Surgeon General of the United States, "Obesity is a disease that not only reduces quality of life, but also has serious economic implications for health systems" [12]. In Europe and Portugal, individuals with obesity face a significantly higher risk of developing diabetes. Therefore, we can find sources that provide us with a solid basis to understand the connection between obesity and diabetes in Europe and Portugal, thus contextualizing the associated risks and prevalence of these conditions [11,12].

According to the National Diabetes Observatory - 2023 Edition, in 2021, the estimated prevalence of diabetes in the Portuguese population between 20 and 79 years old (7.8 million individuals) was 14.1%, which represents approximately 1.1 million Portuguese affected by diabetes alone [13]. The aging demographic structure of the Portuguese population (20-79 years) had a significant impact, on diabetes prevalence, resulting in an increase of 2,4 percentage points between 2009 and 2021. This, represents growth of approximately 20,5% over this period [13] (Figure 1&2) . This increase in the prevalence of diabetes is largely attributed to the lifestyle of the current population, marked by an increase in obesity, a sedentary lifestyle and an excessively high-calorie diet. Furthermore, the aging of the population contributes to this panorama [13]. However, diabetes can be associated with age, although it is not exclusively an age-related disease, but strongly associated with lifestyle and genetic factors [5]. The prevention and treatment of diabetes includes maintaining an adequate diet, regular exercise and maintaining a normal weight. This shows that controlling the disease essentially depends on adopting healthy lifestyle habits. However, weight loss continues to be a challenge in diabetes treatment programs, especially when the person themselves do not understand and incorporate the need to make significant changes to their lifestyle [13,14].

Figure 1: Prevalence of diabetes (2021).
Source: Diabetes: Facts and Figures-The Year 2019, 2020 and 2021.
Meaning: Diagnosticada-Diagnosed and Não Diagnosticada- Undiagnosed.

Figure 2: First diabetes prevalence study in Portugal. Source: Diabetes: Facts and Figures – The Year 2019, 2020 and 2021.

Metabolic Syndrome and Diabetes

The first formal definition of Metabolic Syndrome (MS) occurred during a discussion by a group of Diabetes consultants from the World Health Organization in 1998. At the time, the issue of insulin resistance was highlighted as the main risk factor and the need for clinical proof of this for the diagnosis [14,15]. The Joint Scientific Declaration published in 2009 characterized MS as a complexity of risk factors related to the cardiovascular system and Diabetes Mellitus [14]. Metabolic Syndrome is defined by a series of metabolic dysfunctions and several elements of cardiovascular risk. This syndrome is often associated with central fat accumulation and insulin resistance, with abdominal obesity and insulin resistance being the main comorbidities that contribute to the development of metabolic risk factors" [16]. Therefore, metabolic syndrome is the presence of certain pathologies, including diabetes [17]. Thus, MS, like diabetes, has a high prevalence in the world, as it is related to the increase in obesity and a sedentary lifestyle. Several studies suggest that people with MS are five times more likely to develop type 2 diabetes [14,18].

Several studies [19,5,7] highlight that obesity and insulin resistance are the main causes of MS, emphasizing that central obesity, characterized by the concentration of fat in the abdominal region, is strongly associated with MS [19]. In this sense, central obesity may also be involved in the development of DM2 and increase the risk of cardiovascular diseases [1,5,10]. It is important to highlight that diabetes is a serious health problem and reaches alarming levels. Today, more than half a billion people are living with Diabetes worldwide [20] (Figure 3). Therefore, MS is seen as a public health challenge due to the constant increase in its prevalence. Many experts highlight the importance of a healthy lifestyle and draw attention to the need for comprehensive health policies at the national level [20]. In the clinical context, the goal is to identify and mitigate risk factors related to MS, with a special focus on lifestyle.
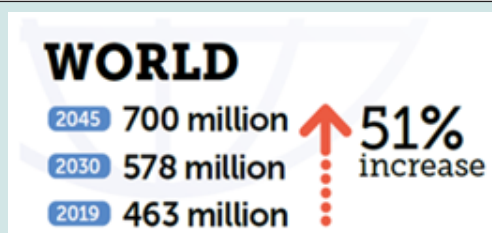
Figure 3: Forecast of the increase in diabetes in the world. Source: IDF Diabetes Atlas | 9th edition.

Conclusion

Several studies indicate that Metabolic Syndrome is a set of different metabolic disorders that, when combined, lead to serious changes in the body, mainly affecting patients with T2D and overweight people. It is important to highlight that there are several factors that contribute to the development of obesity over time, with the greatest impact being behavioural factors. Modifying inappropriate eating behaviour and losing weight, combined with regular physical activity, are considered first-choice therapies for the treatment of MS, as they help reduce abdominal circumference and visceral fat, improve insulin sensitivity and reduce plasma glucose and triglyceride concentrations, increase HDL values and, consequently, reduce risk factors for the development of T2D. All of these pathologies can be minimized with an adequate diet, physical exercise and regular medical monitoring, in order to maintain balanced values/results. It is also worth noting that people with a recent diagnosis of Diabetes can be "contemplated" with this type of syndrome (MS), as it can affect younger diabetics, or older diabetics. Closely linked to all this will be the duration of diabetes, a factor that can facilitate the onset of MS more or less quickly, due to the various associated comorbidities, including heart and vascular problems.

As diabetes is a complex disease with multifaceted treatment, it will require a lot of participation/involvement from the person with diabetes in their treatments, to prevent long-term complications. Health professionals have been developing more strategies/efforts in education for people with this pathology. It is important to highlight that these health professionals must be the leaders of propulsion, to provide people with diabetes with all the information and care they need, preventing the emergence of complications, and involving them in their self-care process/ self-management. It should also be taken into consideration that the environment to which the person belongs (e.g. geographic region, or place of residence) may be conducive to this type of pathology (SM/DM). Other characteristics are also prone to modulate the disease progression like the working place, the eating and, hygiene habits, the social conditions, among others. A possible conclusion is that the socioeconomic condition, provided by the environment and the way in which our population lives, namely Europe, is a risk factor for cardiovascular diseases and other comorbidities, namely Metabolic Syndrome. As this is a critical analysis, future studies should be carried out to evaluate the relationship between diabetes, obesity and metabolic syndrome. It is suggested that more studies be carried out on this topic, such as those carried out in Eastern countries and underdeveloped countries, so that we can evaluate and compare health conditions, diseases and epidemics.

Acknowledgements

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