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STATE-OF-THE-ART REVIEW

Diabetes Care in Malaysia: Problems, New Models, and Solutions

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Abstract

BACKGROUND Diabetes is a major public health concern in Malaysia, and the prevalence of type 2 diabetes (T2D) has escalated to 20.8% in adults above the age of 30, affecting 2.8 million individuals. The burden of managing diabetes falls on primary and tertiary health care providers operating in various settings.

OBJECTIVES This review focuses on the current status of diabetes in Malaysia, including epidemiology, complications, lifestyle, and pharmacologic treatments, as well as the use of technologies in its management and the adoption of the World Health Organization chronic care model in primary care clinics.

METHODS A narrative review based on local available health care data, publications, and observations from clinic experience.

FINDINGS The prevalence of diabetes varies among the major ethnic groups in Malaysia, with Asian Indians having the highest prevalence of T2D, followed by Malays and Chinese. The increase prevalence of overweight and obesity has accompanied the rise in T2D. Multidisciplinary care is available in tertiary and primary care settings with integration of pharmacotherapy, diet, and lifestyle changes. Poor dietary adherence, high consumption of carbohydrates, and sedentary lifestyle are prevalent in patients with T2D. The latest medication options are available with increasing use of intensive insulin regimens, insulin pumps, and continuous glucose monitoring systems for managing glycemic control. A stepwise approach is proposed to expand the chronic care model into an Innovative Care for Chronic Conditions framework to facilitate implementation and realize better outcomes in primary care settings.

CONCLUSIONS A comprehensive strategy and approach has been established by the Malaysian government to improve prevention, treatment, and control of diabetes as an urgent response to this growing chronic disease.

KEY WORDS chronic care model, diabetes, Malaysia, multidisciplinary, programs, state-of-art, treatment

INTRODUCTION

Malaysia is situated in Southeast Asia and consists of 13 states and 3 federal territories with a total landmass of 329,847 square kilometers (127,350 square miles). Malaysia is separated by the South China Sea into Peninsular Malaysia and East Malaysia. Malaysia is within the equatorial region, where a tropical rainforest climate is apparent year round. The capital city is Kuala Lumpur, and Putrajaya is the seat of the federal government. By 2015, with a population of more than 30 million, Malaysia

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became the 43rd most populous country in the world, and it is a multicultural society in which 67.4% of the population are ethnic Malays, 27.3% Chinese, and 7.3% Indians, according to the 2010 census. Malaysia's gross domestic product is US$326.9 billion, according to 2014 figures from the World Bank, and the country has an open, upper middle income economy, with a growth rate of more than 7% per year for at least the last 25 years. Today, Malaysia has a diversified economy and has become a leading exporter of electrical appliances, electronic parts and components, palm oil, and natural gas. The national language of Malaysia is Bahasa Melayu (literally "Malay language"), though English is widely spoken as second language.

For the most part, health care in Malaysia is the responsibility of the government's Ministry of Health. Similar to many other developing nations, Malaysia has a 2-tiered health care system that consists of a government-run universal health care system and a coexisting private health care system. An extensive and comprehensive primary health care system enhances access to care. The national health priorities include optimizing the health care delivery system to increase access to quality care, as well as reducing the disease burden, for both communicable and non-communicable diseases. The key health challenges are prompted by changing disease patterns, such as a rising prevalence of noncommunicable diseases and their respective risk factors, a rapidly growing private sector with increasing out-of-pocket health care expenditures, and an expanding population of migrant workers who are at high risk for communicable diseases.

Diabetes is a major public health concern in Malaysia that is closely related to increased macro- and microvascular complications, as well as premature and preventable mortality. Over the past decade, there has been an increasing prevalence of type 2 diabetes (T2D) among adults aged $\geq$ 30 years in Malaysia. In 2011, the fourth Malaysian National Health and Morbidity Survey (NHMS IV) reported that the prevalence of T2D increased to 20.8%, affecting 2.8 million individuals, compared with the third National Health and Morbidity Survey (NHMS III), which reported a prevalence of 14.9% in 2006.[1,2] Among the major ethnic groups in Malaysia, Indians had the highest prevalence of T2D (24.9% in 2011 and 19.9% in 2006), followed by Malays (16.9% in 2011 and 11.9% in 2006), and Chinese (13.8% in 2011 and 11.4% in 2006).[3,4] Glycemic control among Malaysians with T2D continued to deteriorate, with the mean hemoglobin A1c (A1C) rising to 8.66% in 2008, compared with 8.0% in 2003.[3,4] Furthermore, only 22% of people with T2D achieved A1C target $<$ 7%, the lowest rate since 1998.[3] Data from the online registry database—Adult Diabetes Control and Management—revealed ethnic differences in glycemic control wherein Chinese in Malaysia with T2D had the lowest mean A1C levels (7.8%) and Asian Indians in Malaysia had the highest (8.5%).[5]

The increase in the prevalence of T2D has contributed significantly to the parallel increase in the prevalence of overweight and obesity. The overall prevalence of abdominal obesity in Malaysia, measured by waist circumference, has been reported between 55.6% and 57.4%.[6,7] Epidemiologic studies investigating abdominal obesity in Malaysia have consistently shown an ethnic trend similar to that seen in T2D with prevalence being highest among Asian Indians (65.5%-68.8%), followed by Malays (55.1%-60.6%), Chinese (49.5%-51.1%), and other indigenous groups (44.9%-48.3%).[6,7] Obesity and diabetes have become inseparable where there has been a growing prevalence of abdominal obesity in people with T2D; indeed, obesity is observed in 75% of Malaysians with T2D.[7] Additionally, in the 2008 Malaysia DiabCare study, an undesirable waist circumference was reported in a higher proportion of women ($\geq$80 cm in 89.4%) than men ($\geq$90 cm in 73.7%) with T2D.[3] This study also found that 72% of people with T2D who were also obese had a mean body mass index (BMI) of 27.8 kg/m^2.[3]

The National Obstetric Registry 2nd Report in 2010 reported that the incidence of diabetes in pregnancy was 9.90%.[8] The majority of these people had gestational diabetes (11,848 [8.66%]), whereas 1009 (0.74%) had pregestational diabetes.[8] Diabetes in pregnancy was highest among Asian Indians (14.39%), followed by Malays (11.37%) and Chinese (10.4%), with the majority between 31 and 40 years of age (48.3%).[8] In diabetes pregnancies, the caesarean section rate was higher (14.7%) compared with vaginal deliveries (8.5%).[8] Type 1 diabetes (T1D), known to be predominant among children and adolescents, is observed in 71.8% of patients.[9] The median age of diagnosis was 7.6 (interquartile range: 4.6, 10.8) years with diabetes duration of 3.3 years.[9] The majority (42.3%) of patients with T1D were between 10 to 15 years old and 57.5% presented with diabetic ketoacidosis. A positive family history for T1D or T2D was reported in 50.2% of patients.[9] About 11.8% of patients with T1D were overweight.[9] Among adults, T1D was prevalent in only 0.6% of the population.[9]