

Prevalence of diabetes and metabolic syndrome among Asians

Diabetes has now become a global pandemic and unfortunately, the prevalence of diabetes is increasing most rapidly among developing countries of the world.^[1,2] According to recent estimates of the International Diabetes Federation, not only will the largest increases in prevalence of diabetes occur in developing regions of the world, but it will also affect younger age groups. In the vast majority of low- and middle-income countries, in contrast to the situation in high-income countries, there exist large differences between rural and urban areas in the prevalence of the major risk factors for chronic diseases, including diabetes.^[3] Rising diabetes prevalence rates appear to be closely associated with westernization and urbanization, which are associated with sedentary lifestyles and unhealthy energy dense food choices.

The term "urbanization" is defined as the process whereby a society changes from a rural to an urban way of life. It also refers to rapid population growth and concentration, and improved access to employment, education, and modern health care. The rates of urbanization are increasing globally. In developing countries, the rates of urbanization are increasing even more drastically, from 12.6% of the population living in urban areas in 1970 to 21.9% in 1994, and projected to further increase to 43.5% by 2025.^[4] Over the recent few decades, traditional societies in many developing countries have experienced rapid and unplanned urbanization, which has led to lifestyles characterized by unhealthy nutrition, reduced physical activity, and tobacco consumption.^[5] These unhealthy lifestyles are associated with common modifiable risk factors for chronic diseases such as hypertension, diabetes mellitus, dyslipidaemia, and obesity.^[6] The World Health Organization (WHO) report on chronic diseases lists globalization, urbanization, and population aging as the major underlying socioeconomic, cultural, political, and environmental determinants of chronic disease.

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Addressing chronic diseases, especially diabetes in different subpopulations poses numerous challenges. The predisposition to develop diabetes and the course of the disease varies by ethnic group. Apart from evidence that prevalence of diabetes is higher among urban population, little is known about the epidemiology of diabetes among indigenous populations of various countries. In this context, the paper by Wan Nazaimoon and Suraiami^[7] in this issue of *IJDDC* assumes great significance. The authors report on the increasing prevalence of diabetes, impaired fasting glucose, and metabolic syndrome (MS) among the indigenous people of Peninsular Malaysia, who underwent acculturation and adopted urbanized lifestyle. The term indigenous is defined by characteristics that relate to the identity of a particular group of people in a particular area, and that distinguish them culturally from other people or peoples. Indigenous people are any ethnic group who inhabit a geographic region with which they have the earliest known historical connection. Other related terms for indigenous people include aborigines, aboriginal people, native people, and first people. Asian indigenous population includes indigenous populations in Bangladesh, Burma, Cambodia, China, India, Indonesia, Japan, Laos, Malaysia, Nepal, Pakistan, Philippines, Taiwan, Thailand, and Vietnam.

Tribal or aboriginal populations show an accelerated increase of diabetes rates worldwide.^[8] This may be due to the fact that many of the indigenous people are being gradually dispossessed of their ancestral land and thus are forced to change their indigenous lifestyle and hence it becomes very difficult for them to retain their traditional culture. Studies have shown that migration (both intra- as well as inter country) leads to significant stress due to new environment, social, economic, and language disparities, and job challenges, along with lack of social support, leading to a dysmetabolic state.^[9] Very high prevalence of diabetes has been found among the natives of America, Alaska, Canada, and the aborigines of Australia, the tribal population of northern Sudan, the United Arab Emirates, and Taiwan. Wan Nazaimoon and Suraiami^[7] report on findings from the Orang Asli community in Malaysia, highlighting the increasing prevalence of diabetes, impaired fasting

glucose and MS in this tribal group. This shows further evidence that apart from genetic predisposition, nutritional, and lifestyle transition equally contribute to the predisposition of metabolic disorders in this Asian indigenous populations. The prevalence of diabetes in their study increased from 1.3% reported in 1993 to 8.4%. Presently, a study among the indigenous population of Bangladesh reports a 6.4% prevalence of diabetes, which was double than that reported among rural, and 3.8% (nontribal) population of Bangladesh.^[10] The rising prevalence of diabetes is evident in urban areas from large epidemiological study, such as the Chennai Urban Rural Epidemiology Study (CURES)^[11] in Chennai, India. Chennai is one of the few cities in India where a series of population-based studies have been carried out, which enabled the investigators to compare the prevalence rates of diabetes. From 1989 to 1995, the prevalence of diabetes in Chennai increased by 39.8% (8.3–11.6%); between 1995 and 2000 by 16.3% (11.6–13.5%) and between 2000 and 2004, by 6% (13.5–14.3%). Thus within a span of 14 years, the prevalence of diabetes increased significantly by 72.3%.^[11]

Studies have shown that Asian Indians develop diabetes at least 10–15 years earlier than Caucasian populations.^[12,13] An increase in the prevalence of type 2 diabetes at the younger age group has been noted in recent epidemiological studies. The National Urban Diabetes Survey (NUDS) in India showed that more than 50% of diabetic subjects had onset at less than 50 years of age and the prevalence of diabetes in those aged below 30 was 5.4%.^[14] The CURES study reported that there appears to be a further temporal shift to the left in age at onset with the younger age groups being more affected with diabetes.^[11] The younger age at onset of diabetes was also observed by Wan Nazaimoon and Suraiami among the indigenous population of Malaysia. Hence, it is increasingly becoming clear that type 2 diabetes has become prevalent even among younger age groups in Asia. This means that in developing countries, the long-term complications of diabetes can also be expected to occur in a large proportion of diabetic subjects during the most productive years of their lives, causing severe economic and social burden.

The clustering of cardiovascular risk factors that includes central adiposity, blood pressure, glucose, and triglycerides with low high-density lipoprotein (HDL) cholesterol levels is termed the metabolic syndrome. MS is known to strongly predict long-term risk of diabetes and coronary artery disease.^[15] Individuals

with MS have also been reported to experience increased morbidity and mortality.^[16] Different definitions have been proposed for MS and hence estimates of MS vary substantially across populations depending on the criteria used. The different definitions include the ones laid down by the World Health Organization (WHO), European Group for the Study of Insulin Resistance (EGIR), Adult Treatment Panel III (ATPIII), American Association of Clinical Endocrinologists (AACE), and the International Diabetes Federation (IDF). Most of these definitions agree on the essential components, such as glucose intolerance, obesity, hypertension, and dyslipidemia, but differ in the cut-off points used for each component and the method of combining them to define MS.

Convincing evidence has emerged in the last decade showing important ethnic differences in the prevalence of MS. Estimates vary by country, but generally, a higher prevalence of MS is seen in non-European groups such as South Asians, Black African-Carribbeans, Hispanics, and Aboriginals, with significantly lower prevalence in European Whites, the Chinese, and the Japanese.^[17] Population-based research studies have reported more than double the prevalence rate in groups such as south Asians in the UK, aborigines in Canada and Native Americans compared with Europeans of equivalent age.^[18] Wan Nazaimoon and Suraiami report a prevalence of MS as 22.7% based on IDF definition among the indigenous population of Malaysia. This is close to the prevalence rate reported in urban populations in India. The recent publication from CURES, Chennai, showed that the prevalence of MS among Asian Indians using the three definitions (WHO, ATPIII, and IDF) were found to be 23.2%, 18.3%, and 25.8% using the WHO, ATPIII, and IDF definitions, respectively.^[19] The prevalence of MS significantly varies even within the urban environment as shown in the Chennai Urban Population Study (CUPS), where the prevalence of MS as defined by EGIR criteria was found to be 18.7% in the middle-income and 6.5% in the low-income group in Chennai.^[20]

Although the study by Nazaimoon and Suraiami poses important public health issues that warrants the attention of health care authorities, there are some limitations, such as small sample size ($n = 119$) and the fact that only females were studied. Migration studies using larger representative samples of the tribal population are recommended to throw more light in this subject.

As the global burden of diabetes steadily escalates, there

is a need for novel treatments to slow disease progression and achieve metabolic control. Although the knowledge on pathogenesis and its association with metabolic risk factors such as obesity, hypertension, and cardiovascular risk are increasing day by day, the challenge is to translate research findings into substantial clinical improvements for patients. Demographic and epidemiological evidence indicate that unless an effective preventive strategy is developed, there will be a sharp increase in the global prevalence of cardiometabolic risk factors including diabetes and MS. Cardiovascular risk factor screening study conducted in factories in north, central, and south India by the Indian Migration Study Group strongly supports the finding that migration, i.e., rural-urban migrants have higher prevalence rates of obesity and diabetes than rural nonmigrants.^[21] From the study by Wan Nazaimoon and Suraiami, migration can also be added to list of determinants of the diabetes and MS.

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