THE EMERGING EPIDEMIC OF TYPE 2 DIABETES – AN ASIAN PACIFIC PERSPECTIVE

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Executive Summary *Over the last two decades there has been a dramatic increase worldwide in the incidence of diabetes. This increase is predominately seen in Type 2 diabetes. Globalization and the associated changes in the human environment and lifestyles have eventualized in the increasing rates of people being diagnosed with Type 2 diabetes.*

The current incidence and prevalence rates of Type 2 diabetes in the Asia Pacific region indicate that this disorder is rapidly reaching epidemic proportions with serious health outcomes, and in countries where up until the last decade the major public health issues were malnutrition and infectious diseases.

As a consequence of rapid economic growth, urbanization and a move away from the more traditional way of life, Type 2 diabetes has become a critical health problem of which most countries in the Asia Pacific are not prepared for.[1,2,3]

This article will contain an overview of the issues surrounding the emerging epidemic of Type 2 diabetes in the Asia Pacific and will further illustrate how the increases in incidence in the future will predominately be in this region.

Introduction

The International Diabetes Federation (IDF) estimates that currently more than 240 million people worldwide have diabetes, which is almost 6% of the adult population. By 2025 this number is likely to rise to 380 million and the majority of these cases will be Type 2 diabetes.[4]

The Asian Pacific region includes both developed and developing countries, and more than half of the global population lives in this area. The IDF estimates that 60% of diabetics in the world come from this area. Type 2 diabetes was once considered a disease of affluence and only affecting the more industrialized nations of the world, but prevalence rates have increased dramatically in many of the developing countries of the Asia Pacific region, and the current projections estimate that 80% of the population afflicted with this disease will come from low to middle income countries.[4,6]

Diabetes Mellitus

Diabetes is a complex metabolic disorder characterized by hyperglycaemia and glucose intolerance caused by defects in insulin secretion, insulin action or both. Type 2 diabetes accounts for approximately 85-95% of all diagnosed diabetes cases. Undiagnosed, untreated or poorly controlled diabetes can result in disabling and life-threatening long-term complications and comorbidities which can result in prolonged time off work, increasing disability, reduced life expectancy and escalating health costs.[5,7]

Impaired Glucose Tolerance

Approximately 40% of people with IGT progress to Type 2 diabetes within a 5-10 year period; they also have an increased risk of developing macrovascular complications. In 2007 it was estimated that 7.5% of the adult population in the world had IGT and in 2025 that number is expected to increase to 8.1%. Currently in the Southeast Asia region, the number of people with IGT is approximately 93 million with a prevalence rate of 13.2%. This is the highest in the world, followed by the Western Pacific region with approximately 78 million people. By 2025 the estimated prevalence rate in Southeast Asia will be

13.5% compared to the predicted 10.9% in the European region.[1,4]

Current and Future Epidemiological Predictions of Type 2 Diabetes in the Asia Pacific Region

The Asia Pacific region holds one-third of the world's population and within the countries of this region there is great diversification, not only from a geographical and cultural perspective, but in recent decades there has been rapid economic and social changes.[3]

Today, approximately 113 million Asians are thought to be diabetic and more than 95% of these people have Type 2 diabetes. India has a population of 1.1 billion and has an estimated 40 million people with diabetes, the largest in the world. This is followed by China with 39 million with diabetes, Japan 6.9 million, Thailand 3.1 million, Philippines and Korea both with 3.0 million, and Indonesia with 2.8 million[4,6] [see Figure 1].

The disorder is spreading more rapidly in the Asia Pacific region than anywhere else. By 2025 the number of diabetics in Asia is expected to hit 170 million, with India and China together accounting for over 100 million sufferers.[4]

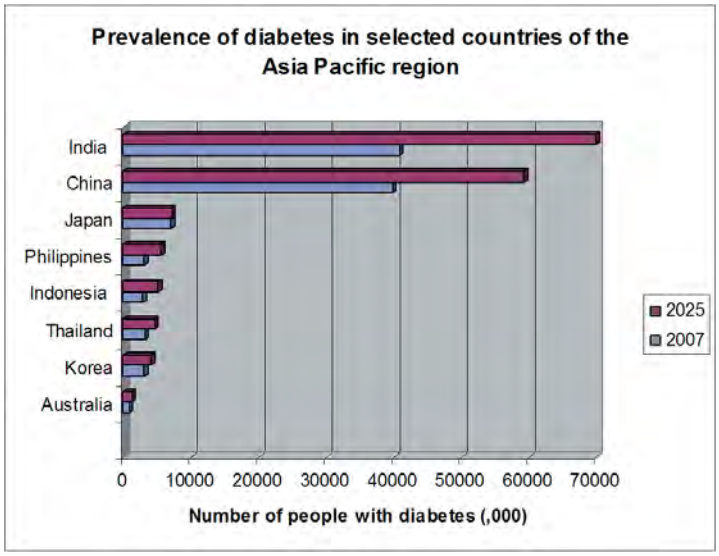
The islands in the Pacific that have high rates of Type 2 diabetes include Tonga, Fiji and French Polynesia, but it is the small island of Nauru with a population of 14,019 that has the highest prevalence of Type 2 diabetes per population in the world. Approximately one-third of the adult population of Nauru, of which the average age is 21 years old, have Type 2 diabetes.[4]

In Australia over the past 2 decades the prevalence rates of Type 2 diabetes has more than doubled. More than 6% of the 22 million people living in Australia have Type 2 diabetes, and it is estimated by 2030 that 3.3 million Australians will have developed the disorder, making diabetes the fastest growing chronic disease in Australia. The Australian Institute of Health and Welfare states that Type 2 diabetes is more common in indigenous Australians than nonindigenous. From a study conducted in 2001 the institute found that approximately 5% of indigenous Australians of all ages reported diabetes as a long-term health condition. The estimated indigenous population of Australia in 2006 was 517,200 or 2.5% of the total population. In some indigenous communities as many as one-third of the population may have Type 2 diabetes, and these rates are among some of the highest in the world.[12,13,29,30]

In New Zealand with a population of 4.3 million, the situation is quite similar, where the lifetime risk for the Maori and Pacific people being diagnosed with diabetes is 25% compared to less than 10% for non-indigenous New Zealanders. Incidence rates for the Maori and Pacific populations are more than three times higher than nonindigenous New Zealanders.[31,32]

These current and projected figures give the Asia Pacific region the unenvious position as being the epicentre of the growing diabetes epidemic.[3]

Figure 1. Prevalence of diabetes in selected countries of the Asia Pacific region.[4]



Obesity and Type 2 Diabetes

Overweight and obesity are the strongest and most consistent risk factors for Type 2 diabetes and impaired glucose tolerance. Approximately 90% of people in the world who develop Type 2 diabetes are classified as obese. Overweight and obesity rates in developed and developing countries are increasing at alarming rates in parallel with the rates of Type 2 diabetes. This is due to biological, behavioural and environmental factors and the Asia Pacific region is no exception. A body mass index in the range of 18.5-25 indicates a healthy weight, overweight is in the range of 25 or over, and obese classification is rated at 30-34. These cut-points have been derived predominately from morbidity and mortality data from U.S. and European populations. However BMI is a generalised measure and does not reflect the same degree of fatness or associated health risks in different populations.[9,11,14]

It has been argued that the waist-to-hip ratio which reflects central adiposity is a better indicator of overweight and obesity and predicting diabetes and cardiovascular disease risk in both Asians and caucasions.[34]

Asian populations generally have a higher percentage of body fat and are more likely to store extra fat centrally around their abdomen (causing a disproportionally large waist-to-hip ratio) compared to Caucasians of the same age, sex and BMI level. This makes them more susceptible to developing diabetes at lower levels of overweight and obesity. The Asian populations tend to accumulate intra-abdominal fat without developing generalised obesity, whereas Pacific Islanders tend to be of large stature, quite muscular and have high BMIs. In fact, the small populations in the Pacific Islands have the highest rates of obesity in the world.[2,11,35]

The current WHO ethnic-specific BMI cutoff points for Asians state: BMI levels at or lower than 25 kg/m2 (who would not normally be classed as overweight in the existing WHO BMI definitions) were at risk of developing Type 2 diabetes because of their Asian ethnicity [see Table 1]. Irrespective of which measure of excess weight is used, the absolute risk of diabetes in a population tends to be higher among Asians compared with Caucasians.[1,2,34]

Type 2 Diabetes in the Younger Population

The rates of Type 2 diabetes in children globally is rising in parallel with the child obesity rates, which is mainly due to alterations in diet, sedentary lifestyle and a family history of obesity and diabetes. In the Asia Pacific region the increasing rates are particularly found in the urbanised young and in more affluent countries of the region where prolonged use of the computer, long hours of study and watching television have led to a sedentary lifestyle and a move away from more physical activities. The allure and increasing accessibility of Western-type fast food from popular chain restaurants in the region have also played a major part in the increasing rates of obesity and diabetes in the younger population. Obesity among Asian children is increasing by approximately 1% each year, which is similar to Great Britain, the U.S. and Australia. The rates are even higher in countries of the Asia Pacific with greater economic development such as China, Malaysia, Japan and Korea and also Indonesia with an emerging economy.[1,3,4,9,28,38]

Although currently Type 1 diabetes is the most common chronic disease of children worldwide, the increasing prevalence rates of Type 2 diabetes may cause this order to be reversed within 1-2 decades. Evidence of this can already be seen in China, Japan and the Pacific Islands, where 70% of children diagnosed with diabetes have Type 2. Among Japanese school children, Type 2 diabetes is seven times more common than Type 1, and in recent years, Taiwan has also been recording more cases of Type 2 diabetes in children than Type 1 within their health screening programs.[1,4,6,36]

Culture and Economic Development and the Impact on Type 2 Diabetes

In the Asia Pacific region, there is a great diversity in cultural and ethnic groups, social and economic conditions, and nutrition transitions, and within these groups there are varying states of health and morbidity and mortality rates.[11]

Over the last two decades, economic development in the majority of Asia Pacific countries has seen a move from a traditional to a more modern or Westernised lifestyle. Globalization and urbanization have over time changed the nature of the work environment. Accelerated shifts in income have caused many people to move from rural areas to the cities for work, and

Table 1: Calculated Body Mass Index Cutoff Points for Overweight and Obesity in Certain Asian Populations.[11]

Countries	Overweight BMI (Kg/m2)	Obesity BMI (Kg/m2)
China	24	29
Hong Kong	23	27
Indonesia	24	26
Japan	25	30
Singapore	22	27
Thailand (urban)	25	30
Thailand (rural)	27	31

These values are based on the assumption that the percentage of body fat in Asians at the cutoff point for overweight and obesity is the same as the percentage of body fat in Caucasians with a BMI of 25 and 30 kg/m2 respectively.[11]

their lifestyle becomes more sedentary due to changes in occupation from physical or outdoor work to a more office-bound or stationary, repetitive occupation and longer working hours, which in turn reduces time for physical activity.[1,10]

In rural areas of countries such as China, India and Korea where a majority of people are still working in more traditional roles in agriculture and farming, the use of mechanical aids in the workplace, as well as employees being transported to work instead of walking or riding bikes, has played a role in the development of weight gain and Type 2 diabetes over time.[33] Economic growth and accumulated wealth have led to escalating rates of ownership of motor vehicles or increased use of improved public transportation systems.

Families are generally consuming more fats and oils, sugar and meat than in the past where traditional diets consisted of fish, fresh fruit and vegetables, and cereals. The affordability and convenience of takeaway food in the urban areas of each country have had a great impact on the rates of obesity and Type 2 diabetes. Many Asia Pacific countries that were once self-sufficient in growing their own food have seen a huge increase in importing foods that are high in fat and calories and are not part of their traditional diet. Even in rural areas where traditional meals are still being consumed, the use of vegetable oil in cooking has greatly increased. An example of this is in China were the per capita consumption of vegetable oil in the last two decades has increased from 1 liter to 17 liters per year. Korea, Malaysia and Thailand have also seen large increases in their oil consumption over recent years, causing obesity and Type 2 diabetes rates to soar in the rural areas.[2,4]

Genetics and Family History

It's estimated that a person with one parent with Type 2 diabetes has double the risk, while having both parents with the disease can increase the risk up to six times. There is a strong genetic susceptibility to Type 2 diabetes in the Asia Pacific population. The basis for this susceptibility is known as the thrifty genotype which is a certain "evolutionary gene" in certain populations, especially Australian Aboriginals and Pacific Islanders whose ancestors were hunter-gatherers. This gene promoted storage of calories in times of plenty, which would then ensure survival of the fittest in times of famine and/or starvation during the change in seasons. In current times where food is in more plentiful supply, especially in carbohydrates and saturated fats, accompanied with the reduction in physical activity, these genes have played a part in the development of obesity and Type 2 diabetes.[1,13,18]

Low birth weight in many developing countries in the Asia Pacific region has also been associated with the subsequent risk of development of Type 2 diabetes and other noncommunicable diseases later in life. This is known as the "thrifty phenotype." This hypothesis states that poor nutrition in foetal and infant life can be lead to insulin resistance for certain populations under the stress of obesity. This is especially so for countries such as India where approximately 30% of infants are underweight.[3,6]

Conclusion

Escalating rates of Type 2 diabetes in the world have confirmed predictions that this disease is one of the main threats to human health in the 21st century and the Asia Pacific region is at the centre of this evolving epidemic.[1]

The growing prevalence rates of Type 2 diabetes in this region in such a short period of time reflects the increases in the population and the changes in society, culture and lifestyle. An integrated and international approach is required by governments to target prevention education, early detection and effective multidisciplinary treatment programs to have any impact on the premature morbidity and mortality that this disease causes.[1,39]

People in the Asia Pacific region are developing Type 2 diabetes at a younger age and at lower degrees of obesity compared to European populations and they also have a strong genetic susceptibility. But a lot of these newly diagnosed cases are preventable.[1,3]

Many developing countries of the Asia Pacific region struggle with the double burden of (1) treating communicable diseases such as HIV and tuberculosis along with noncommunicable diseases such as diabetes and (2) limited resources and lack of public awareness to the serious threat that diabetes can have on the health and quality of life of a population.[3]

However, risk of developing diabetes or even progression of complications for people suffering from diabetes can be prevented if people follow a healthy diet, increase physical activity and maintain a healthy body weight.

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