

## DIABETES MELLITUS IN THE ARABIAN PENINSULA

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High prevalence rates of diabetes mellitus (DM) have been demonstrated in the populations of the Arabian Peninsula.<sup>1-4</sup> Non-insulin-dependent-diabetes mellitus (NIDDM), in particular, is a growing public health concern in both developed and developing countries.

The World Health Organization (WHO) has been on the outlook globally for standardized data prevalence of DM and impaired glucose tolerance (IGT) since 1988.<sup>5</sup> Within the age range of 30-64 years, DM and IGT have been found to be uncommon in some countries in East Africa, South America and Melanesia. In populations of European descent, the prevalence rates of DM and IGT have been in the range of 3%-10% and 3%-15%, respectively, while in emigrant Hispanic American, Chinese and Indian groups, the rates are estimated at 15%-20%. The highest risk rate was found in the Pima Indians of Arizona and in the urbanized Micronesians of Nauru, where up to one-half of the population between 30 and 64 years had diabetes. The prevalence of total glucose intolerance (diabetes and IGT combined) was greater than 10% in almost all populations, and was within the 11%-20% range for European and U.S. white populations. In Nauruans and Pima Indians, approximately two-thirds of all adults in the age range were affected.

The prevalence of NIDDM is 30% among the native Bahraini population, with females more frequently affected than males.<sup>4</sup> Age-standardized prevalence of diabetes was 25% in men and 36% in women. In multivariate analyses, positive family history of diabetes, low educational status, waist girth, plasma cholesterol, and (in women) post-menopausal status, were independently associated with diabetes. Although obesity is also quite prevalent in this population, it cannot by itself be held responsible for the high frequency of the disease. Coronary heart disease (CHD) has emerged as the leading cause of mortality over a 20-year period of rapid socioeconomic development. Health services utilization data of primary and secondary care for diabetes over a 15-year period in Bahrain show a rise in the use of inpatient hospital beds.<sup>6</sup>

Profound changes in the way of life of the Arabian Peninsula during the last 30 years have been associated with the emergence of diabetes. A genetic susceptibility in these populations may explain why diabetes has become an "epidemic." In comparison to Caucasian and European populations with similar degrees of obesity and glucose tolerance, Arabs are more insulin-resistant than

Europeans. This characteristic, which is a strong predictor of diabetes, seems to be genetically determined in these populations, and an active search for the gene(s) involved has started in Bahrain. For an insulin-resistant population, however, cardiovascular mortality is high in the Bahraini population.<sup>7</sup>

In many countries, diabetes is now a leading cause of death, disability and high health care cost.<sup>8</sup> Various genetic and environmental/lifestyle factors influence diabetes etiology and prognosis. Important differences in the frequency of diabetes and its complications have been reported between countries, ethnic and cultural groups.<sup>9</sup> A community-based survey of DM was carried out in Oman, where age-standardized prevalence in men and women aged 30-64 years was found to be 19% and 24%, respectively, which is similar to that seen in the population of South Asian origin.<sup>5</sup> In Saudi Arabia, epidemiological studies have shown a high prevalence of NIDDM in several regions of the country, and it is shown that urbanization has resulted in increased prevalence of the disease.<sup>1</sup> Diabetes has been found in 41% of total hospital patients in Kuwait, occurring in 51% of Kuwaitis and in 31% of non-Kuwaitis.<sup>10</sup> In Al-Ain, the second largest city in the Abu Dhabi Emirate, diabetes accounted for 6% of all general medical admissions to the hospital over a 5-year period between 1980 and 1984.<sup>11</sup>

Prevention and control of diabetes in the countries of the Arabian Peninsula will require a diabetes program to be implemented through the Ministries of Health. The objectives, budget and time frame of this program should be developed by a program director working with an advisory group. No prevention program should be commenced without a properly constituted evaluation component. This means making baseline measurements to establish the prevalence in the community of NIDDM, CHD and risk factors. These risk factors should be reassessed at the predetermined end of the study, e.g., after 5 to 10 years. As established NIDDM cannot usually be reversed, attention has been given to the possibility of primary prevention of diabetes.<sup>12</sup>

The high prevalence of NIDDM is consistently associated with a high prevalence of obesity in Arab societies. Obesity appears to be the most important single target variable to control if the incidence of diabetes in the Arabian Peninsula is to be reduced. Control of obesity would also help to reduce the prevalence of hypertension,

and to reverse the lipid disturbances that are associated with obesity. Although temporary reductions in weight can be achieved by dietary restraint, long-term control of obesity appears to depend on maintaining higher energy expenditure through greater physical activity. Where most occupations are sedentary, walking and cycling are the two forms of activity through which energy expenditure can most easily be increased. In the extreme heat of the Arabian Peninsula, it is easier to achieve high levels of energy expenditure by cycling than by walking, but cycling by men and women is not at present culturally acceptable. This highlights the difficulty of reversing the adverse effects of lifestyle changes in a rapidly modernizing population. Alternatively, physical activity could be increased by regular participation in exercise training programs, but long-term participation in such programs would require high levels of motivation. Vigorous physical activity of sufficient frequency and intensity to improve fitness may have other benefits, such as reduced CHD risk, even if it does not increase total energy expenditure or reverse obesity.

The prevalence of undiagnosed diabetes in Bahrain<sup>4</sup> was found to be 11%. Although a screening program could easily detect these individuals, it is not certain that early detection and treatment of these individuals would be an effective way to improve outcome. Case findings in primary care through urine tests and random blood glucose measurements might be an alternative means of increasing the proportion of cases that are diagnosed. Most cases of diabetes are managed in primary care rather than in diabetic clinics, and the quality of care of diabetes in primary care is probably not high.

We recommend that a diabetic register be set up in all primary health care centers and outpatient clinics in the government and private hospitals. Diabetic clinics could be set up in primary care centers, and staffed by physicians with special training.

The measures most likely to reduce morbidity from diabetes and its complications are:

1. Education of patients: dietary measures to maintain glycemic control, foot care, and importance of prompt contact with health care providers when problems develop.
2. Treatment of hypertension in those with signs of early nephropathy, even those with mild hypertension. In randomized trials, ACE inhibitors have been shown to reduce the risk of progression to renal failure.<sup>13</sup>
3. Provision of suitable footwear for those with signs of neuropathy.

4. Early detection and treatment of proliferative retinopathy, as outlined in a recent WHO position paper.<sup>14</sup>

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