

# Diabetes in Malaysia: Problems and challenges

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## DIABETES MELLITUS: The Problems

An estimated 100 million people are affected by diabetes mellitus worldwide<sup>1</sup> of whom 7 million are in the ASEAN region. In Malaysia, the prevalence is about 4%. A significant observation is that prevalence (and incidence) of this chronic disease is on the increase. In the US, prevalence was about 0.4% in 1930 and in 1978 it was almost 2.4%<sup>2</sup>. A similar trend is observed in this country. In 1960 prevalence was about 0.65%<sup>3</sup>; in 1982 2.1%<sup>4</sup> while a limited population-based study in 1984 showed a prevalence of nearly 4%<sup>5</sup>. Type 1 diabetes (IDDM), the more severe form of diabetes mellitus, said to be rare in Asians, is also increasing in developing countries including Malaysia<sup>6</sup>.

Diabetes mellitus is associated with high mortality and morbidity rates. Death is usually related to ischaemic heart disease, stroke or chronic renal failure. The risk of myocardial infarction is twice, of renal failure 17 and of blindness 25 times more respectively in diabetics, compared to normal population. In addition, diabetics are more prone to stroke, gangrene and leg amputations, and chronic infections such as tuberculosis. Blindness is usually a consequence of diabetic proliferative retinopathy while leg amputation is due to neuropathy, micro- and macroangiopathy and diabetic dermopathy. Hypertension too is common amongst diabetics. In Malaysia, the estimated prevalence was 20.6%<sup>7</sup> compared to 14% in the general population<sup>8</sup>. Diabetes especially uncontrolled, is associated with hyperlipidaemia. Both hypertension and hyperlipidaemia singly or combined, with diabetes accelerate atherosclerosis, increasing the risk of cardiovascular diseases such as ischaemic heart disease and stroke. Diabetics, in general, have shorter life span and a reduced quality of life compared to the general population.

The socioeconomic implications of diabetes mellitus cannot be accurately assessed but it is worthwhile to review the impact of the disease on the individual and society. Firstly, an allocation will have to be made from the limited health budget for the treatment of diabetes, its complications and associated diseases such as hyperlipidaemia and hypertension. In addition, there is the loss of personal income and productivity due to early deaths, early retirements because of stroke, heart attacks, amputation, chronic renal failure or blindness and the frequent absenteeism from work. In the United Kingdom, an estimated one billion pounds or 4-5% of health care resources was spent for the treatment of diabetics<sup>9</sup> while in ASEAN, the expenditure (mainly for hospitalisation) may exceed US\$ 750 million per year<sup>10</sup>. Indirect costs for rehabilitation of diabetics with complication(s) and support for dependents must also be included. The psychological impact of diabetes on the individual and the affected family cannot be costed but must also be fully appreciated.

## **DIABETES MELLITUS: The Disease**

Idiopathic diabetes mellitus, the most common form of diabetes, is of two (?three) major types: insulin dependent diabetes mellitus (IDDM) and non insulin dependent diabetes mellitus (NIDDM). The onset of IDDM is usually acute, occurring in childhood. Genetic predisposition and environmental factors such as viral infections have been implicated in its causation. In caucasian populations, IDDM is known to be associated with HLA DR3, DR4, B8 and B15 and these haplotypes could be used as genetic markers for the prediction of risk. IDDM patients would require insulin for life though there might be a reprieve during the early course of the disease (the "honeymoon period"). Untreated cases usually succumb to diabetic ketoacidosis while those who survived may be plagued with chronic complications such as renal failure and blindness.

While IDDM is the most studied and (?better) understood, it contributes to only about 25% (and reportedly much less amongst Asians) of the total diabetic population. The majority of diabetics are of the NIDDM-type. NIDDM occurs mainly in elderly patients (usually above 40 years) and is strongly familial, though the genetic marker(s) is/are yet to be identified. These patients do not usually require insulin (and most can be controlled with diet alone) and are not prone to diabetic ketoacidosis. Nonetheless, they are not spared the chronic diabetic complications especially ischaemic heart disease, stroke and gangrene. NIDDM is usually associated and/or manifested by obesity.

Mention should also be made of another variant of idiopathic diabetes mellitus, the malnutrition-related type (MRDM) which is reported to be common in the tropics. In Malaysia, MRDM is seen mostly in rural areas. This type of diabetes mellitus also affects the younger age group (20-30 years) and is thought to be related to (protein-calorie) malnutrition especially during childhood and (possibly) the ingestion of food toxins such as cassava.

## **DIABETES MELLITUS: A Cure?**

One problem with idiopathic diabetes mellitus is that, at present, it is not curable. Much effort has been directed toward the cure for Type 1 diabetes (IDDM). Pancreatic transplant has been attempted to replace the damaged pancreas but the problems of rejection and exocrine drainage are yet to be overcome. Pancreatic transplant at present is usually reserved for patients with end-stage renal failure when double (kidney and pancreas) transplant is performed. In such instances, the transplanted pancreas in most cases, is only able to supplement the insulin requirement, and patients would still require daily injections. Foetal islet cells implantation has also shown some promise in supplementing insulin requirement but the limited availability of foetal islet cells is still a problem.

Immunotherapy with cyclosporin-A has met with limited success in prolonging the remission period or reducing insulin requirement. The drug however has to be given early in the course of the illness to achieve these effects. The high cost, potential toxicity and limited benefits preclude the wider use of this drug. Nonetheless, trials are ongoing to assess the effectiveness of cyclosporin-A in preventing the development of diabetes in high risk groups.

In NIDDM, there is no evidence of a pancreatic immune reaction and insulin levels may be normal or even increased, that the above strategies for prevention or cure cannot be applied.

## **THE CHALLENGES**

The only recourse for diabetics at present is to ensure perfect control of their diabetes so that complications may be prevented or delayed. Precautionary measures must also be taken to detect the complications early and to ensure that these would not worsen. And when complications do occur, to seek immediate effective treatment to prevent further deterioration. With proper care of the diabetes, it is possible for a diabetic to lead a full and an (almost) normal life. The Government, the general public and the medical profession have a major role in ensuring that appropriate facilities are available for the effective management of diabetes and its complications.

### **Early Diagnosis**

The first step toward an effective care is to ensure an early diagnosis of the disease. In 1982, there were an estimated 310,800 diabetics in this country. However, based on drug rescriptions, only 123,800 could be accounted for. What of the rest?. These "missing" diabetics (more than 60% of them) either refused to seek treatment or otherwise were not aware that they suffered from diabetes. Population studies have shown that for every known diabetic, there are nearly two more who are only diagnosed during the routine surveys. One reason is ignorance of the disease but more importantly, a majority of type 2 (NIDDM) diabetics do not have any (or at most only have minimal) symptoms.

Diagnosis of diabetes mellitus is so simple now that it takes only about two minutes to determine the blood glucose concentration. The Government through the Ministry of Health should make the glucose strips and meters available in all health provider outlets including the rural health clinics. Doctors, both in public and private sectors can help detect diabetes early by routinely checking blood glucose levels in all patients irrespective of the complaints, when they come to the clinics. Public awareness can be promoted with simple information regarding the disease through newspapers, radio and television. As in western countries, the mass media can play a very effective role in creating public awareness of the dangers of untreated diabetes.

### **Effective management**

Once diabetes is diagnosed, it is important that prompt and effective treatment is made available to the patient. There are four major components in the management of diabetes mellitus: diet, exercise, medication and education. In addition, monitoring of diabetes control and management of complications should also be considered.

#### ***Diet***

The aim of diet control in diabetics is to attain euglycaemia through a reduction in the amount and rate of absorption of the ingested food especially carbohydrates. In obese patients, weight reduction is associated with increased peripheral glucose utilisation due to an increase in insulin sensitivity. Diet control is important in diabetics for without it, it is almost impossible to control the diabetes.

The diabetic diet (if there is one) is a normal Asian diet with the minimum of modification. There is need to restrict carbohydrate intake though the proportion can be as high as 60-70% of the total daily calorie requirement. Diabetics should avoid refined sugars (and glucose!) but complex carbohydrates with increased fibres such as (unpolished) rice and leafy vegetables are

recommended. Fat intake should be restricted but as in normal individuals, diabetics must also keep to a balanced diet with adequate amounts of vitamins, minerals and trace elements. Calorie reduction is recommended only for obese diabetics while diabetic children may need no calorie restriction. Calorie adjustment is related to the patient's age, daily activity and weight in relation to the ideal body weight.

There is so much misconception regarding diet that it is important for every diabetic to be given accurate and adequate information on diet as soon as the disease is diagnosed. For this, it is necessary for hospitals to have dieticians. Unfortunately, most hospitals in this country do not have dieticians, while those employed, are involved mainly with the supervision of hospital kitchens rather than with individual patient care. There is indeed an urgent need to emplace dieticians in all (major) hospitals. Further, these dieticians must be allowed to be fully involved with giving advice to patients.

### *Exercise*

Exercise is important for diabetics as it helps to reduce blood sugar levels by increasing peripheral uptake and utilisation of glucose. With diet control, it is an adjunct for weight reduction. Exercise may help increase (cardio-protective) HDL-cholesterol and (because of the release of endorphins,) the feeling of well-being; but most importantly, exercise will improve cardiovascular fitness of patients. It is important however, to stress that exercise should be recommended only after an assessment of the patient's cardiovascular status and metabolic control. It is prudent to advise diabetics to exercise in (graded) stages taking into account the patient's age, physical fitness, type of therapy and the cardiovascular status.

Exercise is recommended not only for diabetics but also for the general population for a healthy lifestyle. Local authorities should provide more public parks and jogging tracks so as to create greater awareness to exercise. Other amenities such as places for indoor sports and gymnasiums should be made more accessible to the general public rather than to be a domain of the privileged few in exclusive health clubs.

### *Medication*

Oral hypoglycaemic agents (biguanides and sulphonylureas) and insulin are used for the treatment of diabetes. Biguanides, for which metformin is the only preparation presently available, is indicated principally for obese NIDDM patients. Its action is to reduce appetite (and weight), increase peripheral glucose utilisation and modulate hepatic enzymes activities. There are many sulphonylurea preparations such as gliclazide, glibenclamide and glipizide but, except for the duration of action, their main activity is essentially the same; that is, to stimulate pancreatic insulin secretion.

One major problem with the use of oral hypoglycaemics is related to the availability of generic preparations. These are much cheaper than the (original) patented formulation, hence are very popular especially in private practice. The potency of these drugs however may vary from one preparation to another and even from batch to batch. This is dangerous to diabetics as use of one preparation may not provide control of the blood sugar while a change may result in life-threatening hypoglycaemias. To ensure comparable bioavailability of the antidiabetic drug prescribed to patients, it is therefore important to use only a drug (preferably patented) preparation whose potency is guaranteed. It may be that the cost is (slightly) higher, but the safety and effective treatment of patients must necessarily be the primary consideration.

Insulin is required for type 1 (IDDM) diabetics; it is also indicated in diabetic hyperglycaemic coma and (for limited duration) for type 2 (NIDDM) patients undergoing acute stress. Insulin is classified according to duration of action (short, medium and long-acting), origin (porcine, bovine and human) and purity of preparation (eg. conventional, single peak and monocomponent). Presently, most insulin is produced synthetically by genetic engineering through DNA biotechnology using bacteria or yeast cultures. When insulin is indicated, it is prudent to use this synthetic, highly-purified human insulin; the slight price increase (which is expected to reduce with greater demand) is offset by the reduction in dose and freedom from allergic reactions.

The use of insulin is made more convenient with the availability of insulin pens and synthetic monocomponent human insulin (both short- and medium-acting preparations) in cartridges ('Penfill'). It is now possible for diabetics to have injections with a minimum of preparation. The insulin pen with the 'Penfill' is expected to be more widely used in the near future because of the convenience and ease of use.

### *Management of chronic complications*

There might not be a need for a diabetologist to manage an uncomplicated diabetes; nonetheless, it is necessary to provide regular and periodic assessments to ensure that the diabetes is well-controlled and complications are detected early. Yearly (or more frequently when indicated) eye examination can be performed by the attending doctor and if an abnormality is detected, the patient may then be referred to an ophthalmologist. Similarly, advice on foot care can be given by a trained paramedical staff and a referral to an orthopedic surgeon is made only when complication is detected. Foot care is of utmost importance especially in long-standing diabetics to prevent infection and the consequent gangrene and amputation. Unfortunately there is hardly any chiropodist or nurse educator (none dedicated to diabetics) in local hospitals. There is a need to establish posts for these important paramedical support staff not only for diabetics but for a betterment of general patient care.

Other facilities such as dialysis units, laser therapy and rehabilitation departments with occupational units and prosthesis workshops should be established to provide for a more complete care for diabetics with complications. Indeed, there is a lot more that needs to be done for diabetics (and other patients), but this must necessarily be constrained by the availability of funds and national priorities. It should be reminded however, that this costly venture could be avoided if greater emphasis is made on primary prevention by ensuring early diagnosis and prompt and effective treatment of the disease.

### *Monitoring of diabetic control*

For effective management of diabetes, the patient must be able to monitor the diabetic control. Previously, urine tests were used but these do not accurately reflect diabetic control. Blood glucose tests are now recommended. Patients are expected to perform this blood test at home (Home blood glucose monitoring, HBGM) and to adjust diet, activity and/or medications (especially insulin) accordingly. The meters and blood glucose strips however are expensive and beyond the means of many diabetics. To help diabetics, the Government may need to consider tax exemption for these items as is the practice with the urine test strips.

### *Education*

Education is the most important but the most neglected aspect of diabetic management. Most

doctors find it easier to prescribe medications than to spend time with patients, stressing the importance of diet control or exercise. More than 50% of NIDDM in this country are overweight<sup>4</sup> implying that their diabetes may be controlled with diet alone or at most, with the addition of a biguanide. Yet in one survey, only 2.3% to 7.5% were on diet alone while the majority of patients were prescribed both metformin and a sulphonylurea. Most disturbing though, is the observation that a significant number of these diabetics were never given advice regarding diet. As practising doctors, we may want to ponder how often we really spend time educating our patients. If the Malaysian MCGP examination is any indication, not much. 'No time' would be a good excuse.

Diabetes is one disease where full cooperation of the patient is necessary to ensure good control; the patient will have to be his/her own 'doctors'. Full cooperation is possible when there is a clear understanding of the disease and the objectives for control. Education should include an explanation regarding diabetes and its complications, how best to control the disease and monitor the effectiveness of treatment. The importance of diet and exercise, the need to take regular medication and to go for regular check-ups should also be stressed. Pamphlets containing such information can be prepared by the Malaysian Diabetes Association (with support from the Government), and be made available to patients and relatives through health provider outlets. Lectures, seminars, small group discussions can be organised in hospitals or clinics, but individual reinforcement by the attending doctor is necessary and most important.

Education should not be limited to patients and relatives; the medical profession would require regular updates to keep with the latest concepts and management protocols. Unfortunately, many doctors do not consider this a necessity nor continuing medical education a priority. Education will also need to be extended to the general public to eliminate bias against diabetics. A significant number of diabetics avoid seeking treatment for fear that others would know that they suffer from diabetes. Diabetics have been known to be shunned in the belief that the disease is contagious; some are denied marriage while others are refused employment or insurance. Diabetics must be free of these bias so that they are able to openly seek treatment and be accepted into the community.

## CONCLUSION

It would be ideal if diabetes could be prevented but regrettably, this is not possible at present. Hopefully, in time, vaccines may be made available to prevent diabetes perhaps by blunting the immune destruction of pancreas in type 1 diabetes and or blocking the expression of the diabetogenic gene(s). Meantime, genetic counselling may be helpful in high risk groups both for type 1 (IDDM) and type 2 (NIDDM) patients. One potential for intervention relates to the observed association between diabetes and obesity. While obesity may not necessarily cause diabetes in normal individuals, those with compromised beta-cell function may develop the disease when associated with obesity. Hence, preventing obesity and maintaining healthy lifestyles especially for those at risk of developing the disease, is a commendable strategy. Malnutrition diabetes, common in rural areas, could be prevented or eliminated by ensuring adequate and balanced nutrition especially in children. It is worthwhile to take note that diabetes is very rare amongst our 'Orang Asli' population; perhaps there is a message!

While there is a lot more to be learnt to effectively control or prevent diabetes, there is much to be done to help diabetics lead a near normal life in spite of a life-long disease and possible complications. The Government must provide the expertise and the necessary facilities for effective management. Instruments and test kits that help improve diabetes care such as syringes, insulin pens, glucose strips and meters should be exempted from taxation. Concerted effort should be made to encourage adoption of healthy lifestyles with adequate exercise and avoidance of

obesity in an attempt to reduce the incidence of diabetes. Early diagnosis is mandatory. Similarly, prompt and effective treatment must be available for diabetes and its complications. The medical profession has a major role to contribute for the control (and prevention) of diabetes mellitus. Education, though most important, is presently most neglected. Perhaps, as a start, the MMA may want to consider an 'Educate Your Patients' week as a tribute not only to diabetics but to all patients.

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