WORKSHOPS ON THE DIETARY MANAGEMENT OF DIABETES MELLITUS

SELECTED PAPERS

Caribbean Food and Nutrition Institute
Kingston 7, Jamaica

Pan American Health Organization
Pan American Sanitary Bureau, Regional
Office of the World Health Organization

August 1981
The Caribbean Food and Nutrition Institute (CFNI), founded in 1967, has as its goal the improvement of the food and nutrition situation in the seventeen member countries\(^1\) through five types of activity: service; education and training; information dissemination; coordination and research. Each activity is carried out in close collaboration with the Governments.

CFNI is a Pan American Health Organization (PAHO) Centre. PAHO represents the World Health Organization in the Region of the Americas. The Institute is responsible to an Advisory Committee on Policy, on which the member Governments form the majority.

\(^1\)Antigua, Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts-Nevis, Saint Lucia, St. Vincent, Suriname, Trinidad & Tobago, Turks & Caicos Islands.
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- Compiled by -

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WORKSHOP COORDINATOR

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Kingston 7, Jamaica

Pan American Health Organization
Pan American Sanitary Bureau, Regional
Office of the World Health Organization

August 1981
The use of visual aids during lectures is an integral part of the Workshops.
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INTRODUCTION

The socio-economic impact of diabetes on the countries of the Region is immense. Direct costs include hospital care, outpatient and private doctor visits and drugs. Indirect costs include time lost from work and early retirement affecting earning power and family income, all related to the considerable morbidity and the wide range of disabilities associated with this complex disease.

Diabetes is, therefore, an important public health problem. Many diabetics suffer, die or become invalids as a result of their disease. As the population structure shifts towards a higher proportion of older people, it is likely that the prevalence of diabetes will increase and the entire problem will become even more grave.

Hence we may find that a growing number of our population in the mature and productive age group of 40 to 55 years will be afflicted by a disease which may seriously impair their health and deny themselves, their family, and country, the benefits of those skills and expertise acquired in earlier years.

Control of diabetes requires an organized effort on the part of all concerned – physicians, nurses, nutritionists and dietitians, social workers, community workers, educators, policy makers, family at-risk groups and, above all, those who already have the disease.

In view of this, the Caribbean Food and Nutrition Institute (CFNI) has conducted two-day Workshops on the Dietary Management of Diabetes Mellitus in 16 of its member countries. Participants represented all of the above disciplines.

This document, compiled by Miss Manuelita Zephirin, Public Health Nutritionist, CFNI, and Coordinator of the Workshops, contains papers distributed during the Workshops and which deal with the medical and dietetic aspects of the problem including approaches to management, control and prevention. It is presented as a companion document to "Dietary Management of Diabetes Mellitus: A Guide for Organizing and Conducting Workshops and Follow-up Activities" with the hope that the information included will provide useful resource materials for persons involved in conducting similar workshops.
AN OVERVIEW OF DIABETES MELLITUS IN THE CARIBBEAN

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INTRODUCTION

For about the past 20 years, patterns of disease in the Caribbean have followed a trend characteristic of the developed Western countries, namely a shift away from communicable towards degenerative diseases. In keeping with increased standards of living among populations in this Region we have witnessed improved nutritional status to the point where in islands such as Barbados, Trinidad & Tobago and Jamaica, problems related to over-nutrition have increased in importance. Available morbidity and mortality studies suggest that diabetes mellitus is prominent among these diseases related to over-nutrition. Not only are prevalence rates for diabetes in the Caribbean high at present, but morbidity and mortality statistics are among the highest in the Western Hemisphere. Furthermore, with changing dietary and exercise profiles, it is conceivable that these indices may well increase in the future.

In many of the smaller countries of the Region lack of public awareness of the condition is an added dimension. This is coupled with the absence of any composite administrative policies to deal with the preventive and therapeu tic aspects of the disease. It follows, therefore, that any meaningful consideration of public health problems in the eighties cannot neglect the impact, present and foreseeable, of diabetes mellitus.

PREVALENCE

Difficulties remain in establishing the true prevalence of diabetes. These arise partly through the use of differing criteria for diagnosis of the disease. Large differences in prevalence rates exist among populations. Although diabetes may occur in any age group, prevalence is highest in the middle-aged and elderly, increasing sharply over the age of fifty with a marked sex-related predisposition for females (Figure 1). Precise figures for overall prevalence in the Caribbean territories are unavailable, but good studies by Poon-King (Trinidad) and Ashcroft (Jamaica) provide the basis for statistical data on diabetes in those countries. In Barbados no accurate figures exist. Recently, however, a pilot survey set up by the National Nutrition Centre and the Caribbean Food and Nutrition Institute to study health statistics in a 1% sample of the population was conducted. This should provide valuable information on these parameters in Barbados.

Comparative prevalence and mortality rates for Diabetes in some Caribbean and Latin American Countries are shown in Figure 2.
Figure 2: Latin America and Caribbean Prevalence of Diabetes

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>% of Population Studied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1967</td>
<td>6</td>
</tr>
<tr>
<td>Brazil</td>
<td>1968</td>
<td>2.7</td>
</tr>
<tr>
<td>Chile</td>
<td>1958</td>
<td>1.2</td>
</tr>
<tr>
<td>Columbia</td>
<td>1971</td>
<td>6.8</td>
</tr>
<tr>
<td>Cuba</td>
<td>1970</td>
<td>3.8</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1961</td>
<td>1.3</td>
</tr>
<tr>
<td>Mexico</td>
<td>1970</td>
<td>4.5</td>
</tr>
<tr>
<td>Trinidad</td>
<td>1961-7</td>
<td>1.9</td>
</tr>
<tr>
<td>Uruguay</td>
<td>1966</td>
<td>6.9</td>
</tr>
<tr>
<td>Venezuela</td>
<td>1970</td>
<td>2.7</td>
</tr>
</tbody>
</table>
AETIOLOGY

A simple classification of diabetes into primary and secondary groups is useful. The latter group consists of those developing diabetes secondarily to other conditions such as liver disease and drug therapy (Thiazide, Corticosteroids, etc.). In the primary group it is reasonable to assume that there are two aetiologically distinct types of the disease, determined by differences in age of onset, relative abruptness of presentation, tendency to ketoacidosis and dependence on insulin. These are generally known as Type I (juvenile) and Type II (maturity-onset). Although a definite cause of diabetes cannot or has not been established, there are many known contributing factors. These include age, sex, genetic factors, obesity, pregnancy, endocrine disease and external agents such as viruses. It is not possible in this paper to give full consideration to the relative importance of these various factors in the causation of diabetes. However, brief discussions on some of the main factors is given below.

1. Age

Prevalence in both males and females increases with age, especially over the age of 45.

2. Sex

There is a marked sex-related predisposition for females, the ratio being 3:1 in maturity-onset diabetes (Figure 3). These figures, taken from the Diabetic Registry of Barbados, are at variance with those of Poon-King (Trinidad), but represent the wide variation of these parameters which may exist, even in such closely related geographical entities as these two Caribbean Islands.

Figure 3: Sex Distribution

Source: Diabetic Registry, Queen Elizabeth Hospital, Barbados, 1979.
3. Genetic Factors

Until recently the role of genetic factors in diabetes had not been established. Original theories suggested that a single gene was responsible for the inheritance of diabetes. This has now been questioned, and a more acceptable theory suggests the interaction of many genes working in concert, affecting susceptibility to diabetes. Inheritance factors are more relevant in Type II (maturity-onset) diabetes than in Type I.

4. Obesity

Perhaps the most important contributory factor in the genesis of diabetes is obesity. The relationship between the two in the Caribbean has been outlined (Richards 1962). Furthermore, Goward, 1953, has suggested that deaths from diabetes are about 4 times as high in obese patients as in those of normal weight. Obesity may be produced by excessive ingestion of calories, particularly carbohydrate, maldistribution of calories throughout the day and inadequate exercise, resulting in lowered metabolic rates. Obesity is traditionally described to be present when weight is more than 10% above the mean established for a particular population. In Barbados over 70% of diabetic women are in excess of 30% above normal weight for age and height, in many instances in excess of 100% overweight (Figure 4). This figure contrasts sharply with the 10% of men who are overweight, making obesity a predominantly female disorder. One factor which may be of importance is the amount of carbohydrate consumed in the diet. The reason for this is that carbohydrate foods have remained cheap, readily available, and therefore, popular with a large proportion of the population.

Figure 4: Weight Distribution - % of Expected Weight

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>-</td>
<td>2.5</td>
</tr>
<tr>
<td>80 - 89</td>
<td>7.1</td>
<td>2.5</td>
</tr>
<tr>
<td>90 - 99</td>
<td>7.1</td>
<td>5.0</td>
</tr>
<tr>
<td>100 - 109</td>
<td>35.0</td>
<td>12.5</td>
</tr>
<tr>
<td>110 - 119</td>
<td>28.6</td>
<td>7.5</td>
</tr>
<tr>
<td>120 &amp; over</td>
<td>21.4</td>
<td>70.0</td>
</tr>
</tbody>
</table>

DETECTION

Traditionally, detection is haphazard and depends on the discovery of glycosuria during the course of a routine visit or during the investigation of another disease. However, we are reaching the stage where positive approaches to detection should be undertaken. These should include screening of selected groups, such as hospital and public health clinics, and surveys of high-risk groups such as women over 45 with multiple pregnancies, siblings or relatives of diabetics and the obese population.

Properly conducted national surveys such as the National Census can provide indications of the true level of the disease in the community. In 1978 a Diabetic Registry was set up in Barbados in order to collate figures from family doctors, district clinics, etc., and over 2,000 diabetics have been registered to date. The establishment of a Registry is of great importance in tabulating data which can subsequently be recalled for the study of particular aspects of the disease.

CONTROL

Control relates to the provision of well-organized care to the majority of diabetics in the community who need such care. The object of such care is to achieve the best possible biochemical control, to prevent, as far as possible, those complications which are typical of the disease, and to provide services and care for those who are disabled by the disease (i.e. blindness, amputation, renal failure, etc.). Good biochemical control can be achieved by providing reliable sources of drugs at an affordable cost to the patient and providing dietary advice in terms of the best cost-effectiveness of expenditure on food. The Barbados Government, in its recently announced drug plan, has paid tribute to this concept by heavily subsidising the cost of diabetic drugs. The effect of drug treatment should be determinable by the patient on a day-to-day basis as a result of urine and blood testing carried out by the patient himself. The control of the patient's weight within locally established norms for height and weight should be a goal in which the patient himself ought to be encouraged to participate actively. Special care of the feet to prevent injury and infection, also close collaboration with family members and with his doctor, may well serve to reduce acute medical emergencies.

Realisation of these objectives depends on the establishment of a reliable system of health care delivery. The system has to be structured to include the provision of central services, preferably in hospital, where registration, record-keeping and specialised treatment are available. This service should also provide scope for research and proper management of difficult cases.
EDUCATION

Education of the diabetic, both in aspects of his disease and in the utilization of available services, is one of the focal points of hospital care. Crucial to this aspect of management is the Special Educator who begins the patient's education in hospital. The Educator also provides integral linkages between hospital supervision and the patient's independence in the community. Routine follow-up and reinforcement of patients would be done in the peripheral clinics at individual and group levels. Access to specialised personnel such as the dietitian, chiropodist and health educator, would help the patient to receive help and advice when and where needed.

DIET

Diet remains the cornerstone in the management of diabetes. Many of the traditional ideas with regard to diet are now untenable and in some cases undesirable. The unnecessary restriction of carbohydrate to a level below 50% of the total caloric intake deprives the individual of needed calories and requires the substitution of protein and fats in order to make up the calorie deficit. In any event, carbohydrate is necessary for the nutrition of cerebral cells and for maintenance and support of enzyme systems which are dependent on CHO sources for energy.

Consequently, the diabetic should have a reasonable CHO input. Restriction should relate largely to the refined sugars which, when ingested, have direct access to the blood-stream and either upset the balance of blood sugar or increase the requirement for insulin. The discovery that fibre in the diet will inhibit the carbohydrate absorption and reduce insulin requirement may well have a significant effect in normalising the diabetic diet.

PREVENTION OF COMPLICATIONS

Deaths from complications of diabetes are outlined in Figure 5 which also shows that death is a more frequent occurrence in the older age groups. This implies that the coexistent diseases of old age increase the risk of death from diabetes in this age group. With regard to other complications, it has been suggested that good control throughout life may well delay or prevent these complications. A review of the degree of control considered acceptable may well be necessary if we are to think in the revolutionary terms of complication prevention. In order to achieve this degree of control, an effective dietary regimen, unerring drug administration, where necessary (possibly by closed computerised systems for insulin injection), revised control criteria such as regular blood glucose, glycosylated haemoglobins, triglycerides, etc. may well have to be instituted on a generalised basis.
Figure 5: Causes of Death

<table>
<thead>
<tr>
<th>Condition</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebro-vascular accident</td>
<td>23.7</td>
</tr>
<tr>
<td>(stroke)</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>14.6</td>
</tr>
<tr>
<td>Respiratory</td>
<td>14.6</td>
</tr>
<tr>
<td>Metabolic</td>
<td>12.3</td>
</tr>
<tr>
<td>Peripheral vascular</td>
<td>10.4</td>
</tr>
<tr>
<td>Renal</td>
<td>10.2</td>
</tr>
<tr>
<td>Infection</td>
<td>6.7</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Source: Hospital Records, Queen Elizabeth Hospital, Barbados (Gibbons and Jordan, 1978).

MANAGEMENT OF COMPLICATIONS

In Barbados the most dramatic complication of diabetes is limb amputation. The provision of prosthetic limbs is presently slow and expensive. Until this service can be provided readily and at reasonable cost to patients, amputation will continue to represent one of our greatest challenges.

Management of gangrene implies a preventive approach. It demands better overall control of the disease and better care of the feet to prevent trauma from nail punctures, infection and injury. Wounds should be referred to specialist facilities where toilet, debridement, antibiotic therapy and close control of blood sugar with insulin should be instituted.

Newer approaches which seek to improve oxygen delivery to the site of the wound are now being investigated and a technique which alters red cell compressibility in order to allow its passage through narrowed vessels looks promising.

Blindness is also a common complication. When it is complete it causes severe dislocation of the patient's livelihood and capacity to earn. Besides it makes the patient dependent for his treatment on external assistance.

Strokes, heart attacks, renal disease and disease of the nervous system remain important areas of morbidity which are significantly higher in diabetics.
REINFORCEMENT

The diabetic patient needs reinforcement in various settings. Within the home he needs the support of his family, both from the point of view of restoration of his self-esteem and from the point of view of cooperation in diet preparation and presentation. The latter is probably more important. At this level visits from the district nurse can help to solve day-to-day problems arising out of any misunderstanding of his disease. At the clinic level great reassurance can be given by the different health professionals to whom the patient is exposed - the chiropodist, physician and dietitian. The latter may be directly involved in the supervision of diet preparation at home so any advice given may be directed, as well, at members of the patient's family. The same principles apply to district and hospital clinics.

Communication through the media and audiovisual aids will help to provide constant reminders about the management of the disease, and keep firmly focused in the patient's mind the dangers of ignoring the basic principles of diabetic care.

The Diabetic Association also has an important role to play in the maintenance of a diabetic lifestyle. By the organization of discussion groups, radio and television programmes, displays and exhibitions, it can keep members abreast of the latest developments. Assistance, comradeship and support will also be available to individual diabetics within the context of a peer group.

Revision sessions in diabetic workshops help to keep not only the patient but also his therapists up-to-date with the mainstream of developing knowledge on diabetes. This is particularly important in smaller communities where availability of resource personnel may be lacking. Examples of workshops arranged in various Caribbean territories by international agencies such as the Caribbean Food and Nutrition Institute have resulted in renewed interest in meeting the challenge of the disease and its complications. The success of these workshops must be a source of gratification to those participating in their arrangement. Finally, governments at the Regional level, through the medium of Health Ministers' Conferences and subsequently through their own Ministers, can benefit themselves, and by cooperation with their own health personnel, follow and support the leads initiated in the Regional fora.

SUMMARY

Diabetes Mellitus remains one of the major public health challenges of the Region in the eighties. The amazing morbidity and mortality demand new and cooperative efforts at regional and local levels between governments, specialized health personnel and patients.

Finally, the interest of the patient and his cooperation must be maintained through constant education and reinforcement. In this way perhaps we shall have taken a small step towards coping with the ravages of the disease. Hopefully we shall be able in the future to establish the degree of control necessary to halt the progress of complications and offer a better life to the sufferers of this fascinating but remorseless disease.
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THE AETIOLOGY OF DIABETES MELLITUS

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The isolation of insulin from pancreatic tissue by Banting and Best in Toronto in 1921 and the subsequent demonstration of its effectiveness in the treatment of diabetes mellitus was not only a landmark in the management of this hitherto chronic, debilitating and killing disease but it represented the first significant clue to the aetiology of this condition. Indeed from then on, diabetes mellitus came to be regarded as a disease resulting from disease of the pancreas. The realization that some patients with chronic pancreatitis did develop diabetes was regarded as further proof of this relationship.

We now know that this is only a part of the story of the aetiology of diabetes and, unfortunately, the epoch-making extraction of insulin from the pancreas which led to the identification of diabetes with this organ helped to stymie further research into the aetiology of this disease. It is only in relatively recent years that we have come to realize that although deficiency of action of insulin is the salient feature in the causation of this disease, this must not be interpreted to imply inadequate amounts of insulin or even any significant disease process affecting the pancreas. Quite often this is not the case.

The fact that a family history of diabetes mellitus was often noted, pointed to a hereditary basis for the condition and, for several decades it would appear that this realization stifled and suppressed any other opinions which might have developed concerning the aetiology of this disease. Indeed, the fact that it was regarded as an inherited disease made the profession feel very helpless concerning the prevention of the condition. However, as is so often the case in medicine, where there is a hereditary factor operative in the aetiology of a condition, the expression of that condition usually depends on the interplay between the hereditary predisposition and environmental agents. This is no less true for diabetes mellitus. Yet this holds true for only a portion of the large diabetic population present in our society. To tell the truth in many cases hereditary is an irrelevant factor in the aetiology of the condition.

We have now come to realize that diabetes mellitus has a multifactorial aetiology and following this realization, many attempts have been made to classify the causative factors. The terms Juvenile and Maturity types which have been used to classify diabetes imply that age is a significant factor but, although this is true to a certain extent, age does not play as dominant a role in the aetiology as these terms suggest. Primary and Secondary types of diabetes have been described and other terms such as 'pancreatic diabetes', 'gestational diabetes', etc., have also been used.
J-Type diabetes was described in 1955. This was a term coined by one of our lecturers at the University Hospital of the West Indies in the mid-fifties to describe a group of diabetic patients in Jamaica who were young but nevertheless behaved like middle-aged patients in their resistance to ketosis. Similar patients have been identified in other tropical areas of the world but, apart from identifying the behaviour of a certain group of diabetic patients it has done little to elucidate the cause of the carbohydrate disorder.

In recent times a more satisfactory classification of diabetes has developed and interestingly enough, it is based on the insulin content of the body. Two groups are now recognized, they are:

1. **Insulin Dependent Diabetes (I.D.D.)** - Those who produce little or no insulin and so are completely dependent on exogenous insulin for not only health but survival.

2. **Non-insulin Dependent Diabetes (N.I.D.D.)** - A much larger group of patients who display no such dependence on insulin administration for survival because they are able to, and do produce, insulin - sometimes in large amounts.

When we look at these two groups we find that from an aetiological point of view they are vastly different.

**INSULIN DEPENDENT DIABETICS (I.D.D.)**

**Genetic Factor**

This is present in 30-50% of patients and is demonstrated in the possession of certain Human Leucocyte Antigens (H.L.A.)

**Environmental Factors**

1. **Infection** - Cases of diabetes appearing in children who have had certain viral infections, e.g. Coxsackie, mumps, rubella, have been reported. But this accounts for only a very small percentage of diabetes and even in cases, where such an infection does play a role, it is unlikely to be the sole operative factor.

2. **Immunity** - There is a significant amount of islet cell antibodies in I.D.D. However, the exact role that immunity plays is still not clear.
NON-INSULIN DEPENDENT DIABETES MELLITUS (N.I.D.D.)

A greater number of aetiological factors is identified in this group.

Genetic Factors

The hereditary factor is much more in evidence in this type of diabetes. In some patients the condition is transmitted as a dominant characteristic – Mason-type diabetes. Of interest is the fact that approximately 90% of patients with Mason-type diabetes experience Chlorpropamide-induced flushing after ingestion of alcohol. This Chlorpropamide-Alcohol Flush (CPAF) is inherited as an autosomal dominant factor and is often expressed at an early age; therefore, it may well be a genetic marker for the diabetic state which does not usually declare itself until later life. There are also other modes of inheritance.

Environmental Factors

Under this heading fall a number of factors, some of which may overlap:

1. Obesity - The onset of diabetes is related to the degree and duration of overweight and is very likely the result of a decreased population of insulin receptors noted in the obese patient.

2. Age - An increasing impairment of carbohydrate metabolism occurs with increasing age in the older age groups.

3. Sex - In most parts of the world N.I.D.D. is much commoner in females. There may be a number of reasons for this.

4. Pregnancy - In some instances the incidence of diabetes mellitus increases with parity.

5. Diseases - (a) Hormonal, e.g. Acromegaly, Cushing’s Syndrome. (b) Non-hormonal, e.g. Ch. liver disease.

6. Nutritional defect - An increased incidence of diabetes has been observed in malnourished individuals in some populations.

7. Alcohol - Alcoholism is a cause of both chronic liver and pancreatic diseases and, in both these groups, an increased incidence of diabetes occurs.

8. Stress (severe or prolonged) - This term is used to account for the increased incidence of diabetes seen in such conditions as burns and acute myocardial infarction. The pathogenesis remains unclear.
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MANAGEMENT OF DIABETES MELLITUS

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The fact that diabetes mellitus produces ill-health as a result of both the uncontrolled glycosuria as well as the feared complications is a well-known but oft neglected fact. Too often we, the members of the health team, seem satisfied with the management of the patient merely because he is not complaining or has no symptoms. It is necessary to point out that the state of well-being of the diabetic patient is not always a good reflection of the control of the metabolic process. Furthermore, satisfactory control cannot be adequately judged by the degree of glycosuria because, at best, the latter is a mere guide. Periodic blood sugar estimations – fasting and/or 2-hour post-prandial – are necessary for a proper assessment of control. The level of the haemoglobin variant HbAIC circulating in the patient's blood gives us an idea of the degree of control – increased in prolonged hyperglycaemia during the preceding weeks.

Our aim in management of the diabetic patient is not merely to make the patient feel well but to so control the deranged carbohydrate metabolism that the patient's blood sugars are maintained within or close to the normal range. The importance of this lies in the fact that, for the most part, the development of complications of diabetes is related to the degree of hyperglycaemia; this is certainly true for the neurological complications and there is increasing and impressive evidence that this is also true for the vascular complications.

There are many hurdles in the management of diabetes. One such is the difficulty in getting the patient to accept the fact that he or she has the condition and all that this entails. Terms such as "I have a little sugar" and "I had diabetes once" reflect the non-acceptance of the diabetic state by the patient. Another hurdle is adherence to the dietary regime. Quite often both of these hurdles develop because the patient does not have a good understanding of what diabetes mellitus is all about. Sad to say this lack is often due to failure by the members of the health team to communicate – a word used advisedly – with the patient. In some instances this failure of communication really emanates from the out-moded concepts held by and/or lack of a proper knowledge on the part of one or more members of the health team. This is especially true in matters related to the diet. Another hurdle is the social problems with which the diabetic patient has to grapple – problems at home, at the workplace or in the sporting arena.
DIET

The dietary regime remains the main pillar on which the edifice of management is built. Some modification of the average diet is necessary but we should be at pains to point out to the patient that he or she is not required to obtain any special foods. Indeed the modification of the diet usually entails deletion of certain foods and it should be pointed out to the patient that the foods which are deleted from the diabetic diet are really unnecessary and, apart from calorie, their content are of little value. The point should be stressed, especially to the obese patient, that it is the total caloric intake which is important. A full explanation of what the diet entails is necessary and the mere handing out of a diet sheet is not sufficient. In addition the dietary advice should be on a basis of the indigenous foods available to the patient.

Over the years and quite understandably so, the main focus of attention has been on the carbohydrate content of the diet. At one time severe restriction of this type of food was encouraged; however, this was found to be not only impractical but unwise. Indeed, in recent years there have been reports which have shown that better control of blood sugars can be obtained when the patient is put on a fairly high carbohydrate intake. The dietary fibre content has been looked at closely and there is good reason to believe that a fibre content greater than that of the average diet helps to provide better control of blood sugars – at least in the non-insulin-dependent diabetic (N.I.D.D.) patient.

The fat content of the diet has also occupied our attention in recent years – mainly because of the relationship established between the ratio of saturated to unsaturated fatty acid content of the foods and the development of artherosclerosis – a condition which is commoner and more extensive in the diabetic population. The diabetic patient is advised to have a greater proportion of the dietary fat in the unsaturated form.

The further management of the patient depends on a number of factors. For instance, the recognition of the patient as being insulin-dependent or non-insulin-dependent. In the case of the former, exogenous insulin is mandatory. In the case of the latter, dietary modification is often all that's necessary and this is particularly true in the obese patient. Here the excess adipose tissue is the problem and we should get the patient to understand and accept this. As long as that patient remains significantly overweight the problem persists and clinicians should be very reluctant to move on to either oral drugs or insulin unless, of course, the patient's condition demands this. Too often, overweight patients are not given sufficient time to lose weight before they are put on oral drugs and once this is done, weight loss becomes a much greater problem and is much less likely to become a reality.
The immediate management will also be influenced by the general condition of the patient. The acutely ill patient needs insulin; rapid control of the metabolic derangement is necessary to facilitate prompt recovery from the illness and to ensure that even the non-insulin-dependent diabetic does not develop ketosis. One will also encounter some N.I.D.D. patients who are not acutely ill but who will demonstrate the need for insulin therapy on some occasions in order to obtain satisfactory control. Quite often in such cases, control can be subsequently maintained by diet and/or oral therapy.

**EXERCISE**

The diabetic patient should be encouraged to lead an active life and to ensure that he/she undertakes regular physical exercise.

**ORAL DRUGS (TWO GROUPS)**

1. **Sulphonyl-ureas, e.g. Tolbutamide, Chlorproamide, Acetohexamide, Tolazamide, Glibenclamide**

   These drugs increase the output of insulin from the islet cells of the pancreas. There is some evidence to suggest that, in some cases, they also exhibit an 'extra-pancreatic' effect. They are all effective but there are differences in their duration of action and side effects. Chlorproamide remains the most widely used oral anti-diabetic agent; it has the longest duration of action (½ life = 33 hours) - a quality which provides it with an advantage (once per day dosage) but which can prove to be disastrous (prolonged hypoglycemia). Tolazamide and Glibenclamide appeared later on the scene and have gained increasing popularity because, not only are they potent (once daily dosage is often adequate), but they are relatively free from side effects. One unsatisfactory aspect about this group of drugs is their tendency to promote weight gain.

2. **Biguanides (Phenformin, Metformin, Buformin)**

   These drugs owe their effectiveness to a number of factors, viz. reducing absorption of glucose, increasing glycolysis and decreasing the process of gluconeogenesis - including that from lactate. They are not as powerful in reducing blood sugar levels as the Sulphonyl-urea drugs and usually have to be given 2-3 times per day although long acting preparations are available. However, their one big advantage is that they do facilitate loss of weight. Phenformin has become notorious because of lactic acidosis - a very severe condition - which has developed in some patients on the drug; this is especially likely to occur in patients with chronic renal disease, chronic hepatic disease and congestive cardiac failure. The commonest side-effects of the biguanides are those resulting from gastro-intestinal intolerance and this can be often minimised by employing small doses of the drug at the commencement of therapy and, if necessary, gradual increases to larger doses. It is generally agreed that metformin is the safest of this group of drugs.
INDICATIONS FOR THE USE OF ORAL DRUGS

The basic criterion for the use of these drugs is the diabetic patient with the non-insulin-dependent type of diabetes in whom a satisfactory trial on the dietary regime alone has failed to control the metabolic process. Unfortunately, too little importance is placed on adherence to the diet by patient, physician and other members of the health team. This has led to much abuse of the oral drugs. It is important to keep in mind that in situations in which urgent control of blood sugars is important, these drugs should not be relied on to provide proper control and insulin should be administered.

However, oral anti-diabetic drugs used wisely are of great help in the management of the diabetic patient. The sulphonyl-urea derivatives are the more effective but the clinician must be alert to the possibility of hypoglycemia, which is more likely to occur in the patient who only recently commenced therapy. Hypoglycemia can be particularly treacherous in the elderly and extreme caution should be exercised in prescribing for this age group. Chlorpropamide by reason of its strength and duration of action is a potential danger in the elderly patient. Another unsatisfactory aspect about the use of sulphonyl-urea drugs is their tendency to promote weight gain. It is for this reason that the biguanides are recommended for the obese patient who has had a prolonged but unsuccessful trial with the dietary regime alone. In some patients in whom control is inadequate with one of the sulphonyl-urea drugs, addition of a biguanide to the regime may lead to surprisingly good results. In some cases of insulin resistance a combination of insulin and a biguanide has been tried with success but this is usually short-lived and such a measure should be regarded for what it is - a 'last-resort' and temporary one. However, one sometimes sees the non-insulin-dependent diabetic patient who has a problem with resistance to exogenous insulin and who will achieve good control with oral therapy.

There are some patients who will not respond initially to oral therapy. This is designated Primary Failure. However, if the metabolic process in these patients is then controlled by insulin, some of these same patients will thereafter demonstrate a good response to the oral drugs. Secondary Failure is the term given to cases who were initially well controlled by the oral drugs but after some period had elapsed - months to years - the control became unsatisfactory. If these patients are then controlled by insulin some of these diabetics may well regain their ability to respond to the oral drugs. Both Primary and Secondary Failures are phenomena more often associated with sulphonyl-urea therapy.

INSULIN

The patient who needs insulin must, whenever possible, be taught to administer his or her own insulin. In addition, proper storage of the insulin in a cool place should be stressed as the substance loses its potency under hot conditions which exist in our countries. Fortunately there are some insulins now available which do not have to be kept in a refrigerator.
The preparations of insulin in common use are derived from both pork and beef although pure pork and pure beef are available. The main differences of the various insulin preparations lie in their duration of action and the allergic reactions produced by the impurities in the insulin as well as the vehicle in which the insulin is carried to provide it with a longer duration of action, e.g. globin, protamine, etc. The latter problem has been eliminated for the most part of the Lente Insulins in which the insulin is attached to inert zinc. The reactions caused by the impurities in conventional insulin have been virtually eliminated by the development of more purified insulins.

The mono-component insulins are generally regarded as the most highly purified insulins. Originally they were made only from pork but are now also produced from beef. The range includes both short-acting neutral insulin (Actrapid M.C., Leo Neutral) a variety of medium-acting (Semitard Monotard) and long-acting insulins. They can be used in place of the more conventional insulins but are more expensive and are not readily available locally. It is important to point out that a decrease in dose of insulin is often required when a mono-component insulin is substituted for the more conventional variety. Because of the fact that they are less likely to stimulate the production of antibodies they are useful in patients who have developed insulin resistance on the basis of the presence of insulin antibodies. This very property recommends the mono-component varieties as the insulins of choice for diabetic children. For a similar reason, they are considered preferable for women who develop gestational diabetes as well as other patients needing only temporary treatment with insulin to lessen the risk of allergic reactions developing if and when insulin therapy becomes necessary in later life. Another great benefit in the use of these insulins is the virtual absence of fat atrophy in patients who use them.

In recent years much attention has been focused on the mode of delivery of insulin because, to tell the truth, the administration of this hormone once per day - the objective we have aimed for over the years - often does not provide a satisfactory control of blood sugars throughout the day. In the knowledge that diabetic complications - both neuropathic and vascular - are considerably less in patients whose blood sugar levels are maintained in a range which is close to normal values, it becomes imperative to devise ways and means of obtaining a more satisfactory control of the metabolic process. Special types of syringes and pumps for delivery of insulin at more frequent intervals have been successfully tried with good results. We also now know that the site at which the insulin is administered subcutaneously may affect the type of blood sugar control obtained; for instance, it has been shown that insulin administered subcutaneously in the abdominal wall yield significantly higher levels of insulin in the bloodstream than can be obtained when the hormone is given in the arm and the latter site yields greater levels of plasma insulin than subcutaneous injections of insulin in the thighs. The ultimate goal in this regard is the use of an artificial pancreas which is capable of delivering insulin in response to the level of blood sugar at the time. Such an instrument has been devised and used but the apparatus is still very cumbersome and costly. The hope is that someday a compact form will be available for implantation into the diabetic patient. This electro-mechanical device
is referred to as the 'closed-loop' system. The 'open-loop' system in which the delivery of insulin is pre-programmed to deliver insulin at relatively low, basal rates between meals and at higher rates before meal ingestion, is now also in use. This does provide better control than the more conventional administration of insulin.

**Insulin Resistance**

Resistance to the action of insulin administered subcutaneously is almost invariable in patients who have developed ketosis and, in some cases, hundreds of units of insulin within a twenty-four hour period may be necessary to make the patient free from ketosis. Interestingly, this resistance to insulin action is not seen when the hormone is administered in frequent small doses intravenously! Insulin resistance is seen in conditions other than ketosis and, in fact, is officially defined as the state in which the daily requirements of insulin exceed 200 units in the absence of ketosis.

Insulin produces its effect at tissue level by first becoming attached to receptor sites on the surface of cells. A reduction in the number of receptor sites leads to decreased action of the hormone despite the presence of increased amounts of circulating insulin. The stage is then set for the development of insulin resistance. This phenomenon is well demonstrated in the obese patient who, it is now known, has a reduced population of receptor sites and consequently develops resistance to the action of insulin. Indeed, this is now thought to be the prime reason for the high incidence of diabetes among obese patients.

Insulin resistance is seen in another group of patients. It is important to remember that in the physiologic state there are a number of hormones and other substances whose actions are antagonistic to those of insulin on carbohydrate metabolism, e.g. Growth Hormone, Cortisol, Catecholamines. If these substances are produced in excessive amounts they produce a state of insulin resistance and, in many cases, a frankly diabetic state e.g. Acromegaly, Cushing's Disease. There are also other pathologic states which are non-hormonal in nature but are also associated with resistance to insulin action, e.g. chronic liver disease, infections – both acute and chronic. The mechanism of the resistance in these cases is not clear. High levels of glucagon have been demonstrated in patients with acute infections and this may provide an explanation for the resistance in such cases.

Resistance to the action of insulin develops for yet another reason – the development of insulin antibodies. The insulins in use are derived from pork and beef and excite antibody production by the human body; a large amount of antibodies will react with a significant percentage of the insulin administered and the net effect of this is a reduced amount of insulin available to the tissues for carbohydrate metabolism. It is of interest to note that the pork insulin differs from the human insulin by only a single amino acid whereas beef insulin differs by three amino acids. Consequently human antibody production to pork insulin is less than that for beef and in cases in which
insulin resistance has developed on a basis of antibody production to the usual mixed insulin, then a shift to pure pork insulin will lead to markedly improved control of blood sugars and often with much smaller doses of the hormone. Indeed, great care should be exercised to prevent hypoglycemia when the conversion from mixed insulin to pure pork insulin is made! It is to be noted that a number of the antibodies produced as a result of the administration of exogenous insulin are to 'impurities' and not to the pure insulin and hence, the use of the mono-component insulins in such a situation may prove very rewarding. Should these measures prove unsuccessful then the clinician may have to resort to the use of glucocorticoids and even cytotoxic drugs to suppress the antibody production.

Human insulin can now be produced by a number of different methods – it can be synthesised, produced by alteration of the structure of pork insulin and man has now displayed his ingenuity in being able to alter the genetic code of certain bacteria that these micro-organisms will then produce an insulin indistinguishable from human insulin! The widespread use of human insulin should eliminate much of the problem of insulin resistance.

OTHER MODES OF THERAPY

The diabetic patient has not been forgotten in today's world of human transplants and both pancreatic tissue and isolated islet cells have been transplanted but the big problem in transplantation – the rejection of the donor tissue by the host – is yet to be conquered and remains a formidable one.

However this and other developments have opened new avenues in the management of the diabetic state. Indeed, the day may not be too distant when the diabetic patient may be ensured a type of control which borders on the physiological which will lead, not only to a greater well-being, but, hopefully, to virtual freedom from the complications which at present bedevil his life.

CONCLUSION

The approach to the management of diabetes which has been outlined above is a general one. It is not the intention of the author to discuss the management of either the complications or specific diabetic states, e.g. the 'pregnant diabetic' or the 'surgical patient' who is to be submitted to general anaesthesia.

Diabetes mellitus poses a major problem to the peoples of the Caribbean. It is responsible for the loss of thousands of man-hours on a daily basis and at anytime it occupies a significant proportion of the hospital bed space in our countries. What would be of tremendous value to us is to try and prevent the onset of the disease. In many cases this can be done but we need to identify those at risk.
There is the huge obese population in our countries; the large numbers of women with too many children; the woman who has given birth to infants 10 lbs. and over; the woman whose blood sugars are normal but who, in the past had impaired glucose tolerance during her previous pregnancy; the individual with a strong family history of diabetes mellitus, especially if that person is female with children and already overweight! The group of alcoholics in our societies is not small and constitutes a reservoir of diabetes mellitus. It would interest you to know that at least one survey of the diabetic males in the Jamaican society revealed that no less than 60% admitted to a daily intake of at least 1 quart of alcohol per day.\textsuperscript{5}

Periodic blood sugar estimations (fasting and/or two-hour post-prandial levels) in those at risk as well as in the middle and older age groups where possible, should be encouraged.

Finally, the practitioner should at all times exercise clinical astuteness in his use of drugs with a known propensity for interfering with carbohydrate tolerance, e.g. glucocorticoids, thiazides, oral contraceptive hormones, etc. and this is especially important in his management of those individuals considered at risk of developing diabetes mellitus.

REFERENCES

THE DIETARY MANAGEMENT OF OBESITY

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Despite the lack of recent prevalence data, obesity in the Caribbean appears to be a major problem affecting adult women. National Food and Nutrition Surveys conducted in Barbados (1969), Guyana (1971) and Trinidad (1970) indicate a prevalence of 7-13% among adult men and 28-39% among women in the same age group. Medical outpatient studies suggest two to three times this prevalence among patients attending hospital.

A contributing factor to this situation may be the traditional attitude to obesity in the Caribbean where fatness is perceived as desirable and a reflection of health and affluence. Very little is known of the epidemiology of this condition among the population of the Caribbean. The true objective is a lifetime eating plan that allows for the maintenance of weight loss.

Obesity is generally defined as a condition in which there is an abnormal accumulation of fat in body tissue. When 20% of body weight is composed of fat, the amount of fat is judged to be abnormally high and the individual is described as obese.

Obesity occurs when energy intake has exceeded energy expenditure. This condition is recognised as a symptom of one or more influences.

CAUSES

Obesity has been described as a disease of multiple origins. The long established concept that fat will accumulate only when calorie intake exceeds calorie expenditure is only a partial explanation of the process. While body fat arises as a storage form of energy, failure to adjust caloric intake successfully to expenditure may be influenced by genetic, metabolic, endocrinologic, nutritional, social, cultural, racial, economic, environmental, psychological and physiological factors. When calorie intake exceeds calorie expenditure, the excess will be stored as body fat once the limited glycogen reserves of liver and muscle have been saturated.

Environmental Factors

1. Availability of food - Consumers are constantly being pressured to buy more food and the mass media is utilized as a vehicle for such information. In Caribbean society a plump, well-fed wife may still be considered to reflect the material success of her husband.
2. **Comfort of environment** - Today less energy is expended in housework, including food preparation.

3. **Food and hospitality** - Food and beverage are used as an expression of hospitality and play an important role in energy intake. Failure to offer food in a social situation may be interpreted as a lack of hospitality and failure on the part of the guest to accept food, may be regarded as an insult.

4. **Family food habits** - Studies on obesity in biologic and adoptive children show a strong familial as well as genetic pattern.

5. **Decreased activity** - A decrease in the amount and intensity of physical activity tends to occur with increasing age. Mayer, in studying the activity patterns of obese and non-obese children, found that the obese exercised significantly less each day than did the non-obese.

6. **Response to external stimuli** - Research studies show that the obese eat in response to external stimuli rather than to internal sensations of hunger. They are more likely to eat in response to physical availability of food, time of day, or stress, than in response to hunger sensations.

7. **Patterns of infant feeding** - There is a tendency among parents to consider large weight gains in early infancy as desirable and to encourage the consumption of large quantities of food. There is evidence that during periods of rapid cell division (the first year of life and adolescence) fat cells will increase in number if there is an excessive caloric intake.

**Psychological Factors**

Overeating may be a response to non-specific emotional tensions or a symptom of underlying emotional tensions or it may represent an addiction to food. If overeating is to be stopped, the individual must be helped to find some other form of emotional support.

1. **Anxiety** - An anxious person deprived of an outlet in physical activity may seek solace in food since eating may represent a pleasureful pastime.

2. **Substitute for love and security** - Overeating may be used as a substitute for love and affection.
3. *Tension or frustration* - Food may be a response to compensation for or defense against tension and frustration.

**Genetic Factors**

Studies to determine the incidence of obesity in children of obese parents have shown that if both parents are obese, the chance is 73% that the children will be; if one parent is obese, the chance is 50% and if neither parent is obese, the chance is only 9% that children will be.

Level of enzyme activity and the sensitivity of the appetite regulating centre of the brain, the hypothalamus, appear to be genetically determined.

**Cultural Factors**

The meaning of body size varies from one cultural group to another and influences attitudes toward obesity. In certain cultures, young girls will be kept in, fed and fattened. In contrast, in Western society, young women are under pressure to maintain a trim figure. Food is offered in feasts used to celebrate births, marriages and deaths in many cultures.

**Physiological Factors**

Decreased basal energy needs. Need for energy to carry on the vital body functions known as basal metabolism, declines gradually with age. Failure to make a satisfactory adjustment of intake to needs can lead over a period of years to a positive caloric balance. Secretion of endocrine glands. The BMR is determined by the level of thyroxin secreted by the thyroid gland. A small segment of the population may find their energy needs depressed because of a depressed secretion of thyroxin. These persons experience an easy accumulation of fat.

**TREATING OBESITY**

Treatment involves the successful reversal of the positive caloric balance that caused the condition, i.e. caloric intake less than expenditure. This may be accomplished either by decreasing the intake or increasing activity or preferably both. The level of caloric intake that will accomplish this varies greatly from one person to another because of the many individual factors that contribute to the situation.

Of prime importance are a high degree of motivation on the part of the patient and the establishment of a realistic goal. The patient should be aware that there may be no drop in body weight for perhaps two or three weeks regardless of strict adherence to a low calorie diet. This is because as fat is withdrawn from storage sites, water enters the cells to replace fat and remains there for a period of time after which it may be released rapidly. It is common for a person to experience periods of weight loss followed by a plateau even with constant caloric intake and expenditure.
APPROACHES TO THERAPY

Group Approach

Groups such as Weight Watchers and TOPS (Take Off Pounds Sensibly) combine sound dietary advice with peer group reinforcement and support. Reporting to a group with similar problems and goals has been proven to encourage dietary compliance.

Behaviour Modification

In this programme the individual is guided through a process of analyzing the conditions under which he usually eats or is inactive. He agrees to a set of rules adherent to which produces a reward to encourage continuation of the desired behaviour. He is expected to keep records of his eating behaviour and to work out a plan for weight reduction.

Decreased Calorie Intake

This may be achieved by a strict diet that prescribes a specific number of calories. The individual's customary eating patterns are maintained but smaller portions of foods and the avoidance of high calorie foods are emphasized.

Understanding, guidance and support from family and friends is crucial. Eating slowly, tasting food thoroughly, using a smaller than average plate are practices which may contribute to success. Constant repetition of the serving-size concept may be necessary for some persons.

Starvation Diets

Persons on such diets are usually hospitalized and kept in bed because of the extreme weakness and fatigue accompanying the loss of sodium and water that occurs in the absence of dietary carbohydrate. The short-term effects of such programmes have been dramatic but the long term effects discouraging.

"Fad" Diets

New diets frequently appear in popular magazines and books. This suggests that none of them is ideal; if there were an ideal diet, there would be no need for the continued appearance of new ones. The high protein, high fat, low carbohydrate diet has been a frequently recurring diet. It has been referred to as "Dr. Atkin's Diet Revolution", the "Drinking Man's Diet", the "Air Force Diet", and "Dr. Stillman's Diet", etc. Permanant loss of body fat can occur only when energy intake is less than energy expenditure. High fat, high protein diets may lead to high blood levels of cholesterol and triglycerides, both of which are risk factors in coronary heart disease and atherosclerosis.
Exercise

Moderate exercise will increase calorie expenditure and also improve muscle tone, stimulate circulation and create a general sense of well-being. Persons who voluntarily increase their energy expenditure (exercise) without a corresponding increase in food intake will lose weight. The importance of the rate at which various activities are performed should also be noted. For example, walking fast expends more energy than walking the same distance slowly.

Drugs

When dietary modification combined with exercise fails to produce adequate weight loss, the physician may recommend drugs and surgery.

The use of drugs in treating obesity remains controversial. Products containing amphetamines have been used to overcome depression and nibbling and as a crutch for the compulsive eater during initial period of calorie restriction. Due to the rapid heartbeat, elevated blood pressure and other side effects of these drugs they should be used with caution.

Diuretics are types of drugs which lead to a loss of body water not body fat.

Dietary Aids

Steam baths, special plastic clothing, belts and similar devices also reduce body water but do not effect permanent weight loss. Psychologically-oriented approaches to weight control such as records played during sleep, messages on refrigerator doors are some of the "props" used. Bulk-producing substances are often promoted as appetite depressants due to their tendency to increase in volume. However, it has been demonstrated that the swelling of methyl cellulose takes place in the small intestine rather than the stomach, thus limiting its supposed effectiveness.

Other dietary aids include pills containing sugar, milk solids or gelatin taken about half an hour before meals. These act as an appetite depressant by raising blood glucose levels and depressing the appetite at mealtime. These are relatively harmless but often expensive. The same effect could be achieved with one sweet or with fruit juice.

Surgery

Operation procedures to cure obesity have been performed including gastric and intestinal bypass operations. Stomach and bowel surgery is one of the most drastic solutions to obesity. In view of the hazards and frequent complications, surgery is usually reserved for life-threatening obesity or for patients who are more than twice the desirable weight. Jejunoileal bypass consists of short-circuiting the absorptive area of the small bowel by connecting the jejunum directly to the ileum. The obese person can then in theory, eat whatever he wants but his system simply won't digest and absorb all of it. The mortality rate for such surgery is about 9% in some cases and diarrhea is an unpleasant side-effect.
Wiring the Jaws

Obese patients have had their jaws wired closed with bands connecting upper and lower teeth. The patient is then reduced to a liquid diet.

PROGNOSIS

Studies have shown that successful treatment of obesity is more likely in:
- Adult-onset than in juvenile-onset obesity
- Younger persons than in older
- Married persons than in those widowed, separated or divorced
- Single persons (especially women under 30)
- Higher socioeconomic groups
- Those less than 60% overweight
- Emotionally mature and well-adjusted rather than anxious or depressed persons
- Those with a medical problem that is complicated by obesity

DIET THERAPY

The general approach to the control of obesity is based upon the underlying energy exchange aetiology and the patient's situational needs. The basic principles to be followed are personal decision-making, support from one's peers and health personnel, the maintenance of a diet with calorie adaptations and a planned follow-up programme.

Initial interviews should seek to determine needs, attitudes toward food, what food means to the patient and food habits. Support must be provided by the team of physician, nurse and nutritionist. The diet must be based on normal nutritional needs and then the calorie level adjusted to meet individual weight reduction requirements. One thousand fewer calories daily is the necessary adjustment to lose about 2 pounds a week and 500 fewer calories, to lose 1 pound a week.
Using Food Substitution Lists such as those in the CFNI publication "Meal Planning for Diabetics", a meal plan which will meet the individual's living situation, individual likes and cultural patterns can be prepared in consultation with the patient.

When desired weight has been achieved, the patient should be guided into a maintenance diet. In order to prevent a recurrence of obesity, this should take into consideration the earlier regular diet that led to the initial weight gain. The maintenance diet must be both individualized and compatible with the cultural, environmental and social situation of the patient.

CHARACTERISTICS OF A DIET FOR WEIGHT CONTROL

A sound diet for weight control should:

1. Be low in calories. A daily deficiency of 500 kilocalories will lead to a deficit of 3,500 in a week which should result in a loss of 1 pound per week. The caloric value of the diet should be based on the individual's needs.

2. Be adequate in all nutrients except calories. One simple way of ensuring this is by checking the diet to ensure that it includes servings from all food groups.

3. Have satiety value. A moderate amount of fat and high levels of protein delay the onset of hunger pangs longer than diets of the same calorie value which are composed primarily of carbohydrate.

4. Be planned around the family's meal pattern. Any diet that sets the dieter apart from others with whom he eats, or creates extra work for the person preparing meals, is less likely to be followed, than one which allows the person to eat inconspicuously with family and friends.

5. Be reasonable in cost and make use of seasonable and local foods.

6. Include a wide selection of foods to achieve variety and encourage adherence.

7. Enable the dieter to substitute a new pattern of eating, e.g. making food choices from low calorie rather than high calorie foods and a retaining in new eating habits to which he will adhere.

8. Be palatable and acceptable.
PREVENTING OBESITY

Although much has been written about the causes and treatment of obesity and there is appreciation of the need for prevention, few programmes for the prevelnt of obesity exist.

The answer to weight control is the early establishment and long-term maintenance of properly controlled eating habits.

Education of Mothers

Paediatricians have an opportunity to alert parents and encourage them to help children acquire eating patterns that will forestall weight gain. Obstetricians and gynaecologists who work with women during pregnancy and menopause - two periods when weight gain is frequent - can offer valuable advice and treatment. Physicians dealing with middle-aged men working under stress and who have a family history of heart disease, have a unique opportunity to offer preventive therapy before weight reaches the stage where it enhances coronary heart disease.

If obesity could be prevented in childhood, it could, probably, be controlled. Little attention has been given to the dangers of obese children and many mothers still believe that the pudgy, fat, overfed baby must be a healthy baby. The mother who overfeeds her baby may be creating an obese child in whom control of obesity in later life may be an impossibility.

Education of Children

Children's eating habits are most easily influenced in the early years. For this reason, nutrition education should begin early in life and continue through the life cycle. School feeding programmes should be part of the total school nutrition programme where children learn the relationship between the food they eat and health. Careful attention should be paid to the menus and types of foods served. Systematic, sequential programmes in schools are essential. The school system should be used as a vehicle for dissemination of nutrition and fitness information to the family and weight and height data should be utilized to identify students at risk and to guide them into preventive programmes.

SUMMARY

The most successful approach to the problem of obesity is prevention. Nutrition education and support should be given to mothers and children before obesity develops. Educational programmes must be designed to control weight gain in the early stages. Those persons who, because of genetic makeup, personality characteristics or environmental factors, are most likely to become obese, should be identified and a programme of exercise developed, combining education and training in the choice of food and patterns of eating.
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THE DIETARY MANAGEMENT OF DIABETES MELLITUS

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INTRODUCTION

Diabetes Mellitus is one of the major nutrition-related diseases in this Region, the prevalence rate of which is approximately 2.5% in the total population of the English-speaking Caribbean. Health practitioners are aware of the increased number of diabetics requiring treatment in medical facilities. Appearing as it often does in the 40-55 age group, diabetes significantly impairs the health of individuals at a time of their lives when they can make the best use of the experience and expertise acquired in the earlier years.

Cost of hospital bed-days, out-patient and private doctor visits, drugs, time lost from work and early retirement affecting earning power and family income are some of the factors that demonstrate the impact of the morbidity of this disease on the socio-economic life of a country.

TYPES OF DIABETES

Considerable progress has been made in understanding the priorities of diet therapy in the various types of diabetes and it is now clear that specific objectives and strategies of dietary management are based on the type of diabetes. The two principal clinical categories of diabetes are the insulin-dependent type (Type I) - usually thin or normal weight, and the non-insulin-dependent obese type (Type II). In each of these categories, dietary management plays a primary role in control of the blood glucose concentration.

GOALS OF DIET THERAPY

Regardless of the type of diabetes, the major goal of therapy is the maintenance of blood sugar values within the normal range or as close to the normal values as possible. Another goal in treating diabetes is prevention or control of hyperlipidemia which is frequently associated with diabetes and considered to be a determinant in the development of cardiovascular disease.

The goals of diet therapy common to all types of diabetes mellitus are to:

1. Ensure the overall health of the diabetic patient by attaining optimal nutritional status.

3. Provide for normal physical growth in the child, adequate nutrition for the pregnant woman and her foetus and provide for lactation needs.

4. Maintain plasma glucose and lipids as near the normal physiological range as possible.

5. Prevent or delay cardiovascular, renal, retinal, neurological and other complications associated with diabetes, insofar as these are related to metabolic control.

6. Modify the diet as necessary if complications of diabetes or associated diseases are present.

7. Make the meal plan as attractive and realistic as possible, providing each patient with an individualized education and follow-up programme.

DIETARY CONSIDERATIONS IN INSULIN-DEPENDENT DIABETIC PERSONS

Hyperglycemia and hypoglycemia and their consequences can be prevented through a consistent pattern of diet, insulin and exercise. Effective insulin treatment requires a standardized daily regime of food intake. In planning a diet for these persons, timing of meals, composition of the diet, energy content and level of physical activity must be considered.

Timing of Meals

The time of day at which meals are taken and the number of meals eaten, should be determined by the patient's lifestyle, physical activity and insulin. Regularity of food intake is particularly important for persons taking insulin in order to maintain good metabolic management. Types of insulin and injection times must be carefully planned to coordinate with an acceptable eating pattern. The frequency of feedings may be adjusted appropriately with snacks used between meals and before bedtime to prevent hypoglycemia.

Composition of Diet

The meal plan should be adapted to the patient's usual dietary pattern, ensuring that it meets his nutritional needs. There should be consistency in the kind and amount of carbohydrate in a meal or snack from day to day. The protein and fat content may vary slightly as long as weight remains in the desirable range.
Carbohydrate - The total daily insulin requirement is apparently not much affected when the proportions of carbohydrate, protein and fat are changed under isocaloric conditions. However, the insulin requirement immediately after a high carbohydrate meal is higher than immediately after a low carbohydrate meal even if the meal is isocaloric. Consistency of carbohydrate load per feeding is, therefore, important for people who take insulin, but not crucial for those who do not. Complex carbohydrates and starches should account for 50-60% of total energy (calorie) intake. Simple sugars should be avoided as they tend to produce sharp elevations in blood glucose level with resulting undesirable effects. Most of the carbohydrate in the diet should be in a complex form combined with fibre whenever possible.

Protein - This should account for 12-20% of total energy intake. Protein content of the diet may vary slightly as long as weight remains under control. However, it must be appropriate to the growth needs, current nutritional status, age and body weight of the individual. Those on vegetarian diets will need to ensure that vegetable proteins are properly complemented.

Fat - This should be limited to 30-35% of energy intake. Fat intake has been the topic of much controversy in recent years and its role in diabetic diets is no exception. There is general agreement that an excessive intake of saturated fat is not desirable and that the use of polyunsaturated fats should be encouraged in place of saturated fats. A moderate restriction of cholesterol intake, not exceeding 400 mg per day, is recommended in those patients with hyper-cholesterolemia.

Energy Content

A diet adequate in energy for normal growth and development in children and for attainment of a desirable body weight in adults should be a major goal. The pregnant and lactating diabetic must be given special attention to ensure that the nutritional needs for the growth and development of the foetus and the infant, are adequately met.

Physical Activity

Because of improved utilization of glucose by the exercising muscles and a more rapid rate of insulin release into the blood, an increase in food or a decrease in insulin dosage, may be indicated. If vigorous physical activity is known to induce hypoglycemia, a carbohydrate-rich snack prior to the exercise period is recommended, in order to avoid a hypoglycemic reaction.

The type and timing of insulin administration and the expected patterns of physical activity must be known in order to coordinate an appropriate pattern of food intake. For example, if the patient is active at the same time the insulin is at peak hypoglycemic effect, a larger snack with more carbohydrate is needed.
DIETARY CONSIDERATIONS IN OBESE, NON-INSULIN DEPENDENT DIABETIC PERSONS

The single most important objective in dietary management of the obese non-insulin-dependent diabetic is to achieve and maintain a desirable body weight through reduction in total energy (calorie) intake to levels below energy expenditure. Strategies include reduction of food intake and the encouragement of regular exercise. When a desirable weight is reached, maintenance of body weight will be the prime goal of diet control.

Regularity of Meals

If insulin or glucose-lowering agents are used, regularity of meals and the relationship of meals to physical activity must be emphasized, just as it is for the insulin-dependent diabetic. If the obese diabetic is not receiving insulin or glucose-lowering agents, this requirement is less important, but regulation of meal size and frequency is recommended. Snacks are, in general, unnecessary and undesirable for the person treated by diet alone. With loss of weight and successful maintenance of that weight loss, glucose tolerance in many patients returns toward normal. Weight loss improves both sensitivity to the available insulin and glucose tolerance and, in some cases, results in total disappearance of the symptoms of diabetes.

Composition of Diet

The composition of the diet is less stringent than in the insulin-dependent diabetic but the diet must still provide adequate nutrients. For weight reduction, calories should be restricted.

SUMMARY OF CURRENT PRINCIPLES

Energy (calories)

The major concern in dietary management over the years has focussed on carbohydrate and fat intake. Today it is accepted that the single most important objective in the dietary treatment of diabetes is control of total energy intake. For the insulin-dependent diabetic, regulation and consistency of distribution of energy intake are vital. For the obese, non-insulin-dependent diabetic, weight reduction to desirable body weight is essential.

Fat

Although dietary fat does not have an immediate effect on blood glucose levels, it is a very concentrated energy source and modifications in its intake may have favourable effects on serum lipid levels. Cholesterol restrictions should be introduced in those patients having hypercholesterolemia.
Carbohydrate

Increasing dietary carbohydrate by the use of complex carbohydrates high in fibre can improve glucose tolerance and will allow a decrease in dietary fat. The low carbohydrate, high fat diet may be disadvantageous to the diabetic in terms of atherogenicity and energy density. Diets with substantial carbohydrate content are well tolerated as long as the total energy intake is controlled. The form of carbohydrate taken is, however, significant. With regard to blood sugar level, complex carbohydrates are absorbed at a slower rate than simple sugars. Current dietary rationale calls for the majority of carbohydrate to be in a complex form, e.g. breads, pastas, some starchy vegetables, legumes and some cereal grains. Restricting the use of simple sugars may result in a desirable reduction in after-meal blood glucose fluctuations.

Fibre

Current research indicates that high fibre diets are desirable in the diabetic diet. Increasing the fibre content of the diet may actually decrease insulin requirements in some individuals. Although the role of fibre in the body has not been completely clarified, it has been demonstrated to have a beneficial effect on gastro-intestinal function including rates of digestion and absorption. Fibre may also contribute to satiety in the diabetic diet and facilitate acceptance of energy restriction.

Sodium

Restriction of salt intake is not essential in management of diabetes. However, based on the association of high sodium intake with hypertension and the many diabetics with hypertension, moderation in sodium intake is desirable.

Artificial Sweeteners and Sugar Substitutes

Sweeteners such as sorbitol, mannitol and xylitol are often used in dietetic products. They are polyols, alcohol sugars, and are metabolized as sugars and have a similar energy value.

"Sugar substitutes" usually consist of an artificial sweetener mixed with a carbohydrate carrier.

Alcohol

In general, the person with diabetes may consume limited amount of alcohol with the approval of their physician but any carbohydrate content of the drink must be taken into account. Alcohol is a concentrated source of energy providing 7 kcal per gram and approximately 80 kcal per fluid ounce (30 ml) of distilled spirits.

In the overweight person, weight reduction will be enhanced by the elimination of alcohol.
LIFESTYLE AND COMPLIANCE

Individualization of treatment must be emphasized and therapeutic measures must consider and be influenced by the patient's lifestyle. A suitable and acceptable diet plan developed with the patient and his family must be provided and effective patient counselling, follow-up and support given. Too often poor dietary compliance is the result of demanding drastic alterations in the patients' lives when such major changes may not be necessary. The entire family should be encouraged to follow the eating plan. The diabetic way of eating is a basically healthy dietary programme and one that can be adapted to suit every member of the family. This helps minimize the psychological impact of "diet".

Although it is abundantly clear that diet therapy in diabetes is effective, few diabetic patients appear to follow their diet prescriptions. Failure to follow a recommended diet may result from many factors including a lack of motivation, inadequate or no instruction, giving a printed diet sheet without explanation, unrealistic expectations and a monotonous choice of foods. The initial approach should, therefore, be to change only a few of the most important factors and if necessary, to change others until the desired level of control is achieved.

Encouraging results can be brought about if special attention is given to an interdisciplinary team approach to patient care. The diabetic patient must be a full and participating member of that team. In this way, patient compliance may become a reality. The need for cooperation with the agricultural team in planning food supplies, particularly low calorie vegetables which are often in short supply in many Caribbean countries, must be given priority.

With the information now available in the CFNI/CANDI publication - "Meal Planning for Diabetics" - and with the liberalization of carbohydrate intake, it is possible to make the diet for the diabetic patient more flexible and more compatible with his Caribbean lifestyle.

The ideal composition of a diabetic diet remains uncertain. As new facts emerge and concepts change, the nutritional recommendations for diabetic and non-diabetic persons will continue to undergo modification and we must therefore be prepared to alter our approach to diet as new information becomes available.
REFERENCES


CONSIDERATIONS IN PLANNING THE DIET
FOR THE PATIENT WITH DIABETES MELLITUS

MANUELITA ZEPHIRIN
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PLANNING THE DIABETIC DIET

1. The diabetic diet and meal plans must be tailored to the patient's lifestyle as much as possible.

2. The meal plan must fit in with family menus and cultural preferences.

3. The meal plan must take into account:
   (a) Patient's age.
   (b) Patient's religious, social and cultural customs.
   (c) Economic status.
   (d) Food habits of family.
   (e) Occupation and whether a lunch or snack is carried or eaten at restaurants.
   (f) Type and amount of physical activity that the job requires.
   (g) Hobbies or leisure time activities in which the patient participates regularly.
   (h) Ability of patient to understand the meal plan.
   (i) Any other pathological condition present, e.g. hypertension, renal disease, etc.
   (j) Ability of patient to understand the meal plan.
   (i) Ability of diet to satisfy appetite and to be appealing as well as nutritionally adequate.

4. The diet must promote desirable weight status in the adult and normal growth and development in children and adolescents.

5. The diet must maintain, as far as possible, normal blood glucose levels throughout 24 hours.

6. Meal size and frequency must be regulated.
7. Emphasis must be placed on quantitative and qualitative restrictions in fat intake so as to achieve control of blood lipid levels.

8. The currently recommended level of carbohydrate in the diet is 50 percent or more of total calories. Most should be derived from a complex form combined with fibre wherever possible.

9. Total energy intake must be controlled and restricted in the overweight non-insulin-dependent diabetic.

Alcohol

Patients need advice regarding the consumption of alcohol and should consult with their doctor. There may be no objection to taking alcoholic drinks in moderation provided the patient realizes that he must take account of their energy (calorie) value and sometimes of their carbohydrate content. It must be remembered, however, that alcohol is high in energy value and devoid of nutrient value, providing 7 kcal per gram of pure alcohol and approximately 80 kcal per fluid ounce of distilled spirits. Alcohol is probably best avoided during weight reduction which is required by the obese diabetic.

COUNSELLING THE PATIENT

The diabetic patient must be helped to accept the fact that his disease cannot be cured, but that he can, with proper dietary care and the use of insulin or oral hypoglycemic agents, if necessary, live a comfortable and productive life. As soon as the patient's diabetes is stabilized, dietary counselling should begin, with the physician, nurse and diet counsellor working closely together. Where necessary, a social worker should be a member of this team. The team must realize that the patient needs continuity of care, follow-up and support. Successful dietary management requires a commitment from all involved - physician, diet counsellor, patient and family. Instruction and methods must be adapted to the patient's lifestyle, intelligence and background.

The primary objective of diet counselling for the diabetic patient is to help him use his meal pattern correctly. He needs to be able to translate his meal pattern into daily menus and to learn the correct size portions of each food. Substitute lists of foods, divided into the Six Food Groups Commonly Used in the English-speaking Caribbean, have been developed as a part of the CFNI/CANDI publication "Meal Planning for Diabetics". Copies of these lists of foods should be given to the patient and he should be taught how to select his menu from these lists.
If possible, portion sizes should be demonstrated with real foods.

Other members of the family should be involved in counselling sessions with the patient so that they can understand and give him support.

"Meal Planning for Diabetics" should be used as the basis for nutrition counselling as this booklet reflects the views of the majority of professional dietitians, nutritionists and physicians in the Region and has been designed to facilitate diabetics in the Caribbean in selecting the foods that will best meet their nutritional needs.

Some Guidelines for Instructing the Patient

1. Explain to the patient the reason for the diet, size of servings, and what substitutions can be made.

2. Give instructions carefully making them as simple as possible.

3. Stress the importance of watching weight and not overeating.

4. Ensure that the patient has a good understanding of kinds and quantities of foods he may eat.

The cooperation of the patient and his family is essential.

METHODS OF COUNSELLING

Individual

The one-to-one contact between diet counsellor and patient is probably the only effective way of bringing about changes in a person's lifestyle. The counselling of a patient involves several stages.

Step 1: The "Listening" stage - This is a time in which the counsellor familiarizes himself with the patient's lifestyle. Questions asked should include: What time do you wake-up in the morning? When do you take your pills or insulin? Do you usually have breakfast? What would you eat for breakfast? Do you have the same foods on weekends? What do you put in your tea? How many cups do you like? What kind of milk do you buy? What kind of work do you do? Do you sit or stand most of the time? What do you do after work? Do you ever eat meals away from home? What is your favourite drink on social occasions? How many drinks would you have on these occasions? How is your budget standing up to today's high food prices?
The counsellor must create a relaxed atmosphere and rapport between himself and the patient. No teaching is necessary at this stage, and the counsellor should avoid making comments or reacting to what is said. Information should be elicited to yield familiarity with the patient’s lifestyle as his unique mark. As the counsellor listens, he should start thinking what changes will be necessary if the ideal goals of normal blood sugar and normal weight are to be achieved. Some factors in lifestyle are not easily changed - meal times, working hours, income, food preferences, type of social life, etc. so necessary adjustments should be made in order to accommodate these considerations in the meal plan.

Step 2: Formulation of a meal plan - This should be practical and acceptable to the patient and should fit into his present lifestyle. It should be close to his established eating habits so that no major change in his lifestyle is necessary.

Consideration should be given to the following:

1. Nutritional adequacy.

2. If the patient is on insulin, adjustment of the carbohydrate level and distribution so that hyperglycemia and hypoglycemia are avoided.

3. Adjustment of the caloric level so that weight is restored or maintained within normal limits.

Step 3: Discussion of meal plan - The counsellor should discuss the plan and changes made in the patient’s normal eating pattern. He should explain what behaviour is expected to accomplish the plan and show the patient how the plan will help him reach his goal. The counsellor should also involve the patient in revising and evaluating the plan until both are satisfied that it is realistic and can be followed.

Step 4: Teaching the patient his diet - Using the CFNI/CANDI booklet “Meal Planning for Diabetics”, the counsellor should show the patient how to substitute one food for another so that he can eat his favourite foods. He should be taught how to compensate for unusual physical activity, how to use his favourite dishes and what to do if he has to delay a meal. Good practices should be identified and their continued use encouraged. The person responsible for food preparation should be included in the counselling process. Methods of food preparation and favourite recipes should be discussed, showing how the family can follow the patient's meal pattern using the same basic foods. The inclusion of various local dishes in the diet through appropriate substitutions should be demonstrated.

Step 5: Record keeping - Points emphasized in counselling should be summarized so that these can be reinforced on future visits. This also provides the counsellor with information for reassessment of further diet counselling.
Group Counselling

Group counselling is a helpful adjunct to individual counselling and classes should be held regularly in clinics. Group therapy can be organized in the clinics for educating, weight watching, exercise programmes, etc. Physicians, nurses and dietitians or trained diet counsellors should share in teaching responsibilities. Group discussions often reinforce personal decisions and the exchange of ideas and experiences provide opportunities for learning.

Diabetic associations are an excellent avenue for teaching patients collectively. They undertake many educational activities and provide psychological support and opportunities for group counselling and therapy. Diabetic associations also promote the development of self-sufficiency and self confidence in the patient.

Home Visits

While diet counselling can be provided most economically in the clinic setting, home visits for assessment of the family and food preparation facilities may be an important supportive service. Home assessment and support may be carried out by the nutritionist, public health nurse or a trained community health aide.

Follow-up

Follow-up interviews continue the learning process. Adjustments may be made, new material introduced and former knowledge corrected or reinforced. Emotional support is provided for acceptance of the disease and the working-out of personal adjustments. Periodic reassessment helps to ensure that the prescribed diet continued to meet the needs of the individual whose activities and nutritional requirements change throughout life. Follow-up visits also serve to extend and clarify the instruction, provide assurance and check progress.
DIET COUNSELLING

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The problem of dietary control in diabetes is not a simple one for the patient. When he is presented with information on the dietary management of his disease, he is suddenly expected to:

1. Avoid overeating or undereating.

2. Exercise control in his use of alcohol.

3. Avoid the use of concentrated sweets such as jams, sweets, preserves, sugar or pastries.

4. Maintain a nutritionally adequate diet which, when balanced with his usual physical activity, will help him to achieve or maintain a desirable weight.

5. Eat meals and snacks at about the same time every day, including weekends, holidays and vacations.

6. Never omit or postpone meals.

7. Maintain a diet of the same composition each day, by selecting suitable meals at home and away from home.

8. Adjust his diet with medication during periods of unusual exercise, acute illness or other emergency.

9. Use concentrated sweets of appropriate kind and quantity only in an emergency for the treatment of hypoglycemia.

In general, patients are provided with meal plans which are designed to meet nutritional needs, compensate for the metabolic defect and overcome weight problems. Although a variety of diet sheets have been in use throughout the Region, in 1978, a series of meal plans were developed by the Caribbean Association of Nutritionists and Dietitians (CANDI) and the Caribbean Food and Nutrition Institute (CFNI). These plans are based on six food substitution lists included in a booklet entitled "Meal Planning for Diabetics".
An educational tool, developed to assist both the patient and professional worker, this booklet has simplified the interpretation of the diet and has provided many ideas for developing teaching materials which are suited to individual countries in this Region. The booklet should not be viewed as an end in itself but as a tool to meet that end.

Too often we tend to discuss the diabetic diet in abstract when it must be considered in relation to the individual who must apply diet modification to his everyday life. Food holds a special place in our culture and everyone wants to enjoy his daily meals. He wants to be able to participate in social functions where food and drinks are served and he wants to eat according to his family's tastes and his own food preferences.

Many physicians, dietitians, nutritionists and nurses have discovered that dietary control of diabetes falls far short of their objectives. A survey carried out by Stone* indicated that of 160 patients with diabetes, 126 were poorly regulated primarily because the patients failed to adhere to the prescribed diet. Lack of knowledge about diet was cited as a major factor, but social and emotional problems were contributory factors. The situation in the Caribbean is no doubt similar.

New approaches to counselling and education must be tried and demonstrated in order to provide better help for those who need it.

Very often the dietary treatment of diabetes is introduced to patients in the form of a few causal statements and a printed diet sheet that bears little or no resemblance to their lifelong pattern of eating. Often the diet sheet is presented before the patient has recovered from the shock of his diagnosis. Although he is often given the opportunity to ask questions, his mind is filled with thoughts of a friend who became blind or lost a limb from diabetes or the necessity of daily insulin injections or what his family's reaction will be.

When the newly-diagnosed diabetic patient carries his diet sheet home and takes a closer look at it he may be even more bewildered. He and his family may not understand the meal plan or may be unable to figure out how to use the six food substitution lists. The meal plan may call for milk as a beverage but the patient may not drink milk; unfamiliar foods may be included and he may be unable to find familiar foods. At this point, the patient may be seriously tempted to push his diet sheet away in the back of a drawer and try to "get away" with just avoiding "sweets".

Placing a printed diet sheet into a patient’s hands without adequate counselling can only indicate that the professional worker does not view the diet as a necessary part of treatment.

Even for the patient who understands the diet sheet, living within its confines can be most trying. Eating on schedule, saying "no" to appealing foods that he has always enjoyed, selecting the "proper" food, at home or away from home for breakfast, lunch or dinner 365 days a year, including weekends, holidays and vacation, requires a continuous struggle against temptation. Friends and relatives who plead "just a little bit won't hurt you" constantly contribute to his distress and feelings of guilt.

ASSESSING THE PATIENT AND MEETING HIS NEEDS

It is not easy for the diabetic patient to adhere to a prescribed diet. All those guiding him — physicians, nurses, dietitians and nutritionists as well as others trained as diet counsellors — must be aware of the problems that he must face. They must work with him in designing his meal plan and setting realistic goals. The patient must be convinced that lifelong dietary control is vital in managing diabetes. Once the patient understands and accepts the diagnosis, he and his diet counsellor must seek ways to control food intake within the patient's lifestyle. Learning the principles of the modified diet, understanding food values and substitutes and acquiring the ability to select foods for meals and snacks is within the ability of most patients if they receive suitable and sympathetic guidance.

Many diabetic patients are looking for such guidance as is evidenced by the many phone calls and inquiries about diet received by dietitians, nutritionists and other members of the health care team as well as by diabetic associations. It is evident that these people have many questions which require answers, and numerous problems which demand solutions.

Many factors influence the patient's behaviour and his ability to adhere to a controlled routine of food selection and eating. The following questions should assist the dietary counsellor in looking at the patient objectively, in his present situation, and in understanding his problems.

Is the patient motivated to achieve adequate control of diabetes?

Is he willing to admit that he requires a modified diet?

Is he emotionally stable enough to refrain from indulging in frequent "food binges" or impulsive eating?

Is his meal plan tailored to fit his food preferences, family's tastes, daily routine, ability to prepare food and available kitchen equipment?

Is his appetite satisfied by the kind and amount of food included on the meal plan at the times when meals and snacks are scheduled?

Has his cultural and religious background been considered in preparing the meal plan?
When printed materials are used, are they in a language that either the individual or a member of his family can read and understand with ease?

Are family members or others with whom he eats willing to incorporate appropriate foods into their daily menu?

Does the patient and his family have an adequate food budget to purchase the suggested foods and are these food available?

Does the patient eat most of his meals at home or carry meals prepared at home? If he eats in a restaurant or cafeteria, does he know how to select suitable foods?

A negative answer to any of these questions indicates the need for further diet counselling or for referral for other professional assistance. Answering these questions can help the diet counsellor to understand the patient's own perception of his condition, and this information can be used to motivate the patient in the control of his disease. The diet must be adapted to the individual; to meet needs that go far beyond the physical and nutritional.

By understanding the patient and his environment, the diet counsellor can help him learn how to select and prepare his food in whatever situation he might find himself. The diet counsellor must be ready to answer questions about the wide variety of regular foods as well as "dietetic" foods available in most supermarkets and drugstores and about the choice of foods offered in restaurants. In this way the patient will be better able to adjust to and accept his meal plan. Methods of preparing foods appealingly for special occasions and attendance at social functions must be discussed. In general, the more the patient understands about food values and food substitutes, the wider his range of choice.

Sustaining the patient with continuing encouragement and support is a facet of dietary counselling that is frequently neglected. Diet problems must be discussed periodically and human frailties taken into account in order to help the patient carry out his resolve to continue this often tedious aspect of care.

IMPROVING AND EXTENDING DIET COUNSELLING SERVICES

Effective dietary counselling requires time, background, skill and respect for fellow human beings. It requires the cooperative efforts of professional workers with a variety of skills, including the physician, dietitian, nutritionists, nurse and social worker. Even though some patients can accept and adjust to the most haphazard diet instruction and others cannot adjust to a diet despite the most painstaking counselling, it is believed that better dietary control could be achieved by more patients if better counselling were given to them. Good dietary counselling, if begun early, may prevent future complications and much patient suffering.
Those diabetic patients treated in the hospital should be introduced to the concept early in their stay that controlling food intake is an important part of treatment. The physician-in-charge should help the patient understand that diet is an important part of treatment and the diet counsellor should use every opportunity at her disposal to teach the patient about food selection. This can be accomplished through demonstration and practice. For example, the patient's meals, served on a tray three times a day, can provide an opportunity to teach the patient about meal planning, portion sizes and methods of preparing food in an appetizing manner. By using a varied menu the patient can be guided in the selection of his food. By planning for continuity of care and through referral, supportive assistance can be provided to the patient after his discharge from the hospital. Guidance undertaken initially in the hospital can be supplemented and further interpreted at home where the patient must practise what he has learned.

Diabetic clinics should have a dietitian and/or trained counsellor to provide individual diet counselling and group classes. Referral to a public health nurse for continued guidance at home may provide the patient with additional dietary help. Regular follow-up sessions are essential. They not only provide an opportunity to check results and the patients acceptance of the meal pattern prescribed, but give the patient encouragement, reinforcement and support.

Every effort should be made to include family members in counselling so that the meal plan neither creates conflicts within the family nor disrupts usual family activities.

Some physicians take the time and know how to provide adequate diet counselling. Those who do not have the time or the skills, should refer the patient to a diet counsellor. Public health nurses are skilled in providing realistic guidance to patients and can help the person with diabetes to learn about the many aspects of treatment, including diet. Nutritionists, dietitians or dietician technicians can provide diet counselling to patients, or give appropriate individualized diet information to the public health nurse who visits the patient. Where there are no professional dietitians or nutritionists, training programmes should be developed for nurses, teachers, food service supervisors, nutrition assistants, community health aides and other allied health professionals to provide diet counselling.

Some countries in the Caribbean have diabetic associations which offer group education and counselling to persons with diabetes. Sharing their experiences, problems and solutions with other members of the group has helped many to understand and accept their condition, as well as to obtain information about it. The programmes generally cover such subjects as diet, medication, exercise, personal hygiene, dental health, complications and other aspects of care that must be assumed by the person with diabetes. These associations deserve the support of all health professionals because they not only make our jobs easier but they promote the development of self-confidence and self-sufficiency in the patients.
A closer look needs to be taken at dietary treatment in diabetes. It is true that the practical application of dietary control measures is often difficult, but in most countries the efforts made to help the person with diabetes to live with his diet have been inadequate. Better use must be made of existing community resources, the health care team, diabetic associations, diabetic clinics, information services, and the media and some new approaches in motivating, educating and guiding diabetic persons should be explored. Physicians, dietitians, nutritionists, nurses, social workers and educators must work together, plan and seek solutions to help persons with diabetes understand and control their diets, and thus their disease.

Diabetes is an increasingly common condition in our Caribbean society but most cases can be prevented or controlled by adherence to principles of sound nutrition. However well we manage our patients with diabetes let us not forget that "prevention is better than cure". Many different factors can produce diabetes or increase risk of the disease; one of the most important of these is obesity. Since obesity is one of our major nutrition-related problems, we must focus on its prevention and treatment.

Reduced caloric intake in those persons at-risk, increased exercise and control of alcohol abuse must be emphasized. In our dietary counselling, let us encourage the public we serve to adopt these principles into daily practice.

Education for the at-risk groups, the health care team and the public in general could be a major approach to the prevention of diabetes.

REFERENCES


ROLE OF THE NUTRITIONIST IN THE COMMUNITY MANAGEMENT OF DIABETES MELLITUS

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THE DIABETIC IN THE HOSPITAL

Dietitians have an important role in the care of institutionalized patients. At present, the major part of professional nutritional education for the patient with diabetes takes place in the hospital setting while the patient is institutionalized. But hospital admission is but a short and not always very significant interlude in the course of the disease, for the management of which, the skills of the dietitians are required.

Patient follow-up and support after discharge from the hospital are vital to the success or failure of dietary prescriptions. The role of the dietitian cannot begin when the patient enters the hospital and stop when he leaves. This does not mean that the dietitian should not be based at the hospital or that she should not use her expertise in food service management, but the dietitian cannot be confined to the hospital alone if the best use is to be made of her skills in the management of diabetes.

No real contribution can be made to the control of diabetes on the basis of the hospital alone and the rigid line between dietitian and community nutritionist must be erased.

THE DIABETIC AT HOME

The diabetic patient at home is faced with the responsibility of filling the dietary prescription himself day after day. "But how do I go about this for every meal?" he asks in bewilderment. Prepared diet sheets and menus answer some questions but individual adjustments are both necessary and inevitable. Each patient must understand how to fit a prescribed diet to his own everyday living.

The kinds of problems with which patients need help are well expressed in their own words:

"When the doctor explained the diet in his office I thought I understood everything but when I got home and started to figure out what I was going to eat, I got all mixed up."
"Can my husband have peas soup with dumplings and things like that? I don't know how to work out his diet that way."

These and many other questions are familiar to every dietitian, nutritionist and nurse engaged in the field of patient education. They illustrate some of the inter-related factors which explain why few patients are treated by diet alone. These include:

- Failure, in some instances, of the professionals themselves to define a sufficiently specific programme of dietary management in keeping with the needs of the patient.

- Difficulty of changing ingrained dietary habits especially for obese persons.

- High cost of the diets traditionally recommended which do not reflect the socioeconomic level or cultural patterns of the patients.

- Most importantly, lack of the motivation so essential to the success of any dietary regime.

Diet, with or without additional therapeutic measures, is a cornerstone in the treatment of diabetes yet overall results of dietetic instruction have not been satisfactory. Poor observance of the dietetic regime persists and the general knowledge of patients and members of the health team is still deficient. Even those who have been diabetic for years rarely understand the diet and have no idea why certain dietary restrictions are made.

The wide discrepancies between the diet consumed and the diet prescribed are in no small measure attributable to the failure to make appropriate adjustments to fit the patient's changing conditions.

The patient's home provides an ideal environment for dietary follow-up because it is there that one recognises and assesses the existing facilities and socioeconomic problems and usually encounters a receptive atmosphere for dissemination of information to the family. Guidance undertaken initially in the hospital or clinic should be supplemented and further interpreted at home where the patient must practise what he has learned.

The best way of constructing the prescription is to begin with the diet that the patient would follow if he did not have diabetes, modifying this only to the degree necessary to meet the truly essential requirements and the diet prescription.

What do we want to know about the patient?

- Does he prepare his own meals or is he dependent on relatives, friends or neighbours?
- If someone else is responsible for the diet, does that person as well as the patient understand the importance of the diet?

- What are his preferred eating patterns and food preferences?

- What facilities are available for food preparation and storage?

- What is his capacity for self discipline?

Having gained insights into these questions, it is usually possible to construct a diet that is suitable, attractive and feasible.

The booklet "Meal Planning for Diabetics" a collaborative effort of CFNI and CANDI, published in 1977 is geared specifically to the diabetic in the Caribbean and is designed to help the diet counsellor make the diet more acceptable to the patient. The use of complex carbohydrates which form the basis of the local diet is liberalized for the non-insulin-dependent diabetic but calorie control is emphasized. This concept normalizes the diabetic diet and lessens the stress caused by drastic changes in a patient's customary diet pattern.

DIETARY COUNSELLING IN THE COMMUNITY

With the small number of professionals currently working in the field of nutrition, how can the nutritionist become more actively involved in the prevention of diabetes and in the prevention of its complications?

One way is through the further training and professional development of different levels of nutrition and dietetic personnel who can participate in dietary counselling. The preparation of such personnel has already begun. We need, and can use these individuals in nutrition and dietetic services. Not only is it possible to delegate some of the inappropriate duties and activities which now take up the time of dietitians and nutritionists, but also under proper supervision and after adequate training, such personnel can play effective roles in the dietary instruction of diabetic patients in the community.

THE HEALTH CARE TEAM APPROACH

Health service systems are emphasizing the team approach. The health care team in the hospital has utilised dietitians: now it is time for the nutritionist to be a part of community health care services. For example, nutritionists can ensure that appropriate individualized diet information is given to the public health nurse who visits the patients. Public health nurses are skilled in providing realistic guidance to patients and can help
the person with diabetes learn about the many aspects of treatment including diet. The nutritionist should also include home visits on her schedule so that she can become familiar with the home environment of the patient and so provide appropriate information on food selection and preparation.

Inservice training of the team, with respect to the dietary management of diabetes and especially, a better appreciation of the use of local foods in the diabetic diet, should also not be overlooked. In this context the nutritionist has an important role to play.

EDUCATING THE EDUCATORS

Another major role for nutritionists is in the education of teachers in the preventive aspects of diabetes so that they can convey appropriate knowledge to school children who, in turn, will impart this information in the home.

Diet therapy will only be effective in the control and management of diabetes when community nutritional services are an integral part of community health care.

More than 20 years ago an adviser on health affairs to the Secretary of the U.S. Department of Health, Education and Welfare, stated that the physician who tries to discuss diet with a diabetic patient is not using his time wisely. More recently this viewpoint has been restated by the Canadian Dietetic Association in their brief to the Community Health Centre Project Director.

The time has come for nutritionists to take a close look at dietary treatment in diabetes. Better use should be made of existing community resources, diabetic associations*, diabetic clinics, information services and some new approaches in motivating, educating and guiding diabetic persons should be explored. Physicians, dietitians, nutritionists, nurses, social workers and educators must work together, plan and seek solutions to help persons with diabetes understand and control their diets and thereby maintain sound management of their disease.

ANALYSIS OF THE NUTRITIONIST'S ROLE

In the light of present knowledge of the prevention and control of diabetes the nutritionist can perform a vital role in:

Information Services

- To patients individually by means of booklets, pamphlets, diet sheets, food displays, lending library

*Diabetic associations offer group education and counselling to persons with diabetes. Sharing their experiences, problems and solutions with other members of the group has helped many to understand and accept their condition as well as obtain information about it.
- To patients collectively by means of diabetic associations and diabetic clinics.

- To public through mass media and other programmes, e.g. talks to service clubs and community groups.

- To governments with the provision of data which would enable an informed choice of priorities to be made in respect of health care services for diabetics.

**Training**

- Seminars, conferences, in-service training of physicians and other specialists, dietitians, dietetic technicians, nurses, social workers, food service supervisors, health and nutrition auxiliary workers, educators and the various types of professionals who form the health team.

- Improvement in the nutrition component of basic training for medical students, nurses, dietetic technicians and allied health personnel.

- Provision of locally-relevant materials and manuals on treatment/control for professionals.

- Advanced professional training in diabetes for a limited number of nutritionists and dietitians.

**Operational Research**

- Development of nutrition care services in the community. Decentralization of dietary counselling services.

- Organization of Obesity Clinics and evaluation of their effectiveness.

- Studies of pathogenesis of obesity.

- Promotion and evaluation of Weight-Watchers Clubs.
SOME SOCIAL FACTORS RELATED TO CONTROL OF DIABETES MELLITUS IN ADULT JAMAICAN PATIENTS*

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A population of 103 adult diabetic patients was interviewed at the Outpatient Clinic for diabetic patients of the University Hospital of the West Indies to examine the effects of severity of the illness and social variables, such as facilities at home, education attained, employment status, informal medication, and understanding of the illness in relation to its control.

Patients were classified as severe if there were clinical evidence of vascular or neurologic complications of diabetes and as mild if there were no complications. Control of diabetes was regarded as good if the patients were free from or had less than 2+ glycosuria and as poor if they had had 2+ or more glycosuria during the six months before the study.

We found that the quality of control was mainly determined by the severity of the disease. In the mild diabetic, proper diabetic control was not influenced by any social variable examined. In the severe diabetic the quality of control was associated with social amenities, educational status, employment status, and understanding of the disease.

The successful management of a chronic illness in the ambulant patient depends on a combination of factors, including the individual's ability to adapt to a new way of life, the extent of residual disabilities, understanding of the illness, familiar supportive help, and resources within the community.

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The community resources that such an individual needs include primary health care and interest groups that would help him or her to adjust. Naturally, availability of necessary medical ingredients of therapy is also required if the patient is to maintain a proper regimen.

In the more developed countries, attention is focused not only on the medical aspects of the treatment of chronic illnesses, but there have been several studies on such factors as effectiveness of communication in relation to control of diabetes.\textsuperscript{1-3} In the Caribbean, little attention has been paid to the social and other related factors that affect the efficiency of control of a chronic disease like diabetes mellitus.\textsuperscript{4} Our study was carried out in an attempt to gain insight into some of these factors.

Our results suggest that, in Jamaican patients with diabetes mellitus, the motivation for adequate control is related to the severity of symptoms and also to the social status of the patient. This is indeed unfortunate, since the severe symptoms are usually present in the advanced stage of the disease. Our results indicate the need for greater motivation of patients with the mild form of the disease, if we are to reduce effectively the development of complications and transition to the severe state.\textsuperscript{5-8}

\textbf{METHODS}

The study was conducted between November 1976 and March 1977 in the Outpatient Clinic for diabetic patients, which is held once a week, at the University Hospital of the West Indies. Patients were classified as severe if there were clinical evidence of vascular or neurologic complications of diabetes and as mild if there were no complications. Their control was regarded as good if they were free from or had less than 2+ glycosuria and as poor if they had had 2+ or more glycosuria during the six months before the study.

We used a quota sample, based on the severity of the illness and the quality of diabetic control, to select 103 patients (13% sample) who had attended the clinic for at least six months. The sample was selected from a population of 797 mature-onset diabetic patients, aged 30 years and older, who attended the clinic during that period when the interviewing was carried out. A more rigorous sampling schedule could not be attempted in view of the unpredictability of the patient's attendance at the clinic; therefore, contact was made when they arrived at the clinic. Interviews per day ranged from one to nine, but on the average five respondents were interviewed each day.

Initially, selection was done throughout each session while the patients were in the waiting area. The researchers intended to obtain 25 patients in each of the four categories. The most readily available group of patients was the severe poorly controlled diabetics, and the quota for this group was exceeded by eight. The severe diabetics who maintained good control were the most difficult respondents to obtain. After only nine of these patients were obtained, all of whom were in the other categories, special effort was made to
fill the quota by selecting from the clinic records those severe diabetics with good control as they turned up at the Outpatient Clinic; 12 patients were selected in this way, making a total of 21 of these severe diabetics with good control. The limitations of time brought the study to an end before the quota could be filled.

Two patients were excluded from the study. One was a referral who turned out to be a nondiabetic and the other had not attended clinic long enough for the physician to establish the control status of his diabetes. No one refused to be interviewed.

The sample was regarded as being representative because the age and sex distribution was similar to that of the diabetic outpatient population (see Results page)

In Jamaica it is difficult to be precise about race, but the majority of the patients in the sample were predominantly black. Of the 103 patients, 89 (86.5%) lived in the city, and 56% of these urban patients lived in the depressed, low socioeconomic areas in Kingston at the time the study was conducted. Although only 13.5% of the total sample was living in the rural areas when the study was done, 70% of the 103 patients were educated in rural Jamaica and had migrated to Kingston since they left school.

Interviewers were instructed to obtain the present or most recent occupation, and occupation was used as a means of socioeconomic classification and not as an indicator of current employment status.

Only 9.7% of the total sample was classified as professional or managerial (nurses, teachers, accountants, civil servants, and administrative personnel), while 28.2% were categorized as clerical and sales, craftsmen, and those employed in processing productions; 23.3% were in personnel service or were manual and general workers; and 26.2% were housewives. In the remaining 12.6% occupational classification was not ascertained.

The respondents were a mixed group in terms of prescribed medication: 21 patients took insulin, two patients were treated with diet only, and the remaining 80 patients were on oral hypoglycemic drugs.

The duration of the illness of the 103 patients ranged from 1 to 33 years, with a mean of 14.4 and 9.1 years for severe and mild diabetic patients, respectively.

All interviewers were state-registered nurses who were not in clinical practice at the time the study was conducted. They were either native Jamaicans or had worked in Jamaica long enough to be familiar with the Jamaican lifestyle and methods of communication. Interviewers were trained with the aid of a manual specially designed for use in developing countries. A pretested, structured, response schedule was used, and the interviewers were responsible for collecting the data to assess the severity of the illness, facilities at home, education attained, employment status, informal medication taken, alcohol
intake, and difficulties in maintaining the regimen and understanding of the illness in relation to diabetic control (see response schedule in Appendix).

A physician determined the severity of the illness and the quality of diabetic control from the clinic records of the 103 patients who were seen, on the average, at bimonthly intervals; this was done without the interviewer having any previous information.

A social amenities rating, as an indicator of the standard of living, was compiled by allocating the following scores to facilities:

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply</td>
<td></td>
</tr>
<tr>
<td>Piped water in the house</td>
<td>3</td>
</tr>
<tr>
<td>Piped water in the yard</td>
<td>2</td>
</tr>
<tr>
<td>Standpipe (a central tap usually on the sidewalk)</td>
<td>1</td>
</tr>
<tr>
<td>Drums or tanks in the yard</td>
<td>2</td>
</tr>
<tr>
<td>Water fetched from stream/river/reservoir</td>
<td>1</td>
</tr>
</tbody>
</table>

Electricity and Electrical Appliances

| Electricity | 2 |
| Refrigerator | 3 |
| Radio       | 1 |
| Television | 4 |
| Telephone | 3 |

Toilet

| Water-borne system | 2 |
| Pit latrine        | 1 |

To assess the respondent's knowledge of the ingredients conducive to proper management of diabetes, a scoring system was established by allocating points, ranging from 2 for each correct answer to -1 for incorrect answers, to 10 questions based on indices necessary for maintaining the diabetic regimen (see Appendix).

RESULTS

Of the 54 patients who were classified as severe, 21 had good control and 33 were poorly controlled, while those assessed in terms of control in the mild group were evenly distributed.
Ages ranged from 30 to 84 years, with a modal age group of 60 to 69 years, closely followed by the patients in the 50 to 59 age group, in both the sample and the clinic population. The mean ages were 59.1 and 58.0 years, respectively, for the sample and the clinic population.

The female dominance in all age groups, with a sex ratio of 2.7:1 in the sample, was similar to the sex distribution in all age groups of the clinic population, which had a 2.8:1 sex ratio.

Social Amenities

The relationship between social amenities and the severity and level of control of the diabetes is shown in Table 1 and Figure 1. Table 1 shows that, in the severe diabetics, those who were poorly controlled had a lower social amenities' rating. A rating of 15 was arbitrarily selected for use in Figure 1, which shows graphically that there was a significant difference in the state of control between the severe and mild diabetic patients. In those diabetics with a social amenities' rating (SAR) equal to or less than 15 (<15), there was a significant difference in the state of control between the severe and the mild diabetics. A higher proportion of the severe diabetics in this group was poorly controlled, and the higher the SAR in the severe diabetics, the better was their control. Among the mild diabetics, however, there was no relationship between social amenities and efficiency of control.

Table 1: Severity and control of diabetes mellitus in relation to the social amenities rating

<table>
<thead>
<tr>
<th>Severity and control of illness</th>
<th>Social amenities rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-9</td>
</tr>
<tr>
<td>Severe--good control*</td>
<td>2</td>
</tr>
<tr>
<td>Severe--poor control*</td>
<td>14</td>
</tr>
<tr>
<td>Mild--good control**</td>
<td>5</td>
</tr>
<tr>
<td>Mild--poor control**</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
</tr>
</tbody>
</table>

\[ x^2 = 6.9; \ P < 0.01 \]

**NSD. No Significant Difference
Figure 1: The relationship of social amenities rating to quality of control in diabetes mellitus. Poor control indicated by pulses within bars; good control indicated by open bars.

Difficulties in Maintaining Diabetes Regimen

Enquiry among the severe group into the major difficulties encountered in maintaining the diabetes regimen revealed that unavailability of dietary foodstuffs and financial problems were experienced by 60% of those who were poorly controlled in comparison with 25% in the well controlled group. In the group of mild diabetics, 64% of those who were well controlled experienced these difficulties compared with 50% of the poorly controlled patients who did.

Employment Status

There was a 63% unemployment in the whole sample, but in the patients who were severe, those who were employed showed better control (38% employment among those with good control as compared with 26% employment among the poorly controlled).

In the mild diabetic, employment status was irrelevant to the quality of control (33% employment in those with good control and as much as 55% employment among the poorly controlled).

Education Attained

There was a significant difference in the quality of control for the severe diabetics in relation to education - the higher the education attained, the better the control. There was no significant relation between education attained and diabetic control among the mild diabetics (Table 2).
Table 2: Education attained in relation to severity and control of diabetes mellitus

<table>
<thead>
<tr>
<th></th>
<th>Education attained</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;9th Grade</td>
</tr>
<tr>
<td>Severe, good control*</td>
<td>6</td>
</tr>
<tr>
<td>Severe, poor control*</td>
<td>21</td>
</tr>
<tr>
<td>Mild, good control</td>
<td>16</td>
</tr>
<tr>
<td>Mild, poor control</td>
<td>15</td>
</tr>
</tbody>
</table>

*χ² = 6.2; P<0.02

NB: Ninth grade is equivalent to five years below the high school diploma in the U.S.A.

Knowledge

In the total sample there was a mean score of 10.5 in relation to the knowledge necessary for maintaining a diabetic regimen. The severe diabetic who had good control appeared to have a higher knowledge rating, as is shown in Table 3. There was a significant difference between the knowledge rating of the severe diabetics with good control and that of the mild diabetics with good control (t = 2.238; P<0.05).

In the mild diabetics with good control, only 4% had a knowledge rating of 15 or more, and those who were poorly controlled appeared to have a better knowledge of the disease, thus indicating that knowledge had little part to play in the control of diabetes in this group.

Table 3: Patients' knowledge of diabetes mellitus classified by severity of illness and quality of control

<table>
<thead>
<tr>
<th></th>
<th>Mean rating</th>
<th>Knowledge rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of patients</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe, good control</td>
<td>21</td>
<td>12.4</td>
</tr>
<tr>
<td>Severe, poor control</td>
<td>33</td>
<td>10.8</td>
</tr>
<tr>
<td>Mild, good control</td>
<td>25</td>
<td>9.4</td>
</tr>
<tr>
<td>Mild, poor control</td>
<td>24</td>
<td>9.6</td>
</tr>
</tbody>
</table>
Initial Understanding of the Disease

Among the 103 patients, initial understanding of the disease was inadequate, as only 15.7% said that they had a full explanation about diabetes and hence a good understanding of the diabetic regime initially; 74.8% of the total sample said the doctor told them that they "had sugar" but gave them no explanation, while 8.7% said that the doctor said nothing to them about diabetes at the onset of the illness.

Among the severe diabetic patients there was a significant difference in diabetic control between those who said they were given a full explanation about the disease initially and those who said they were told that they had sugar but had had no explanation about a diabetic regime as shown in Table 4.

In the mild diabetics there was no significant difference in relation to initial understanding and diabetic control.

Table 4: Patients' initial understanding of their disease in relation to quality of control in severe diabetes

<table>
<thead>
<tr>
<th>Doctor/patient discussion</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Sugar--No explanation</td>
<td>14</td>
</tr>
<tr>
<td>Full explanation</td>
<td>7</td>
</tr>
</tbody>
</table>

\[ X^2 = 4.69; P<0.05 \]

Informal Medication

Of the total sample of 103 patients, 41.7% admitted that they were using informal medication (patent medicines and home remedies) along with formal medication at the time of the interview; two of these patients were actually substituting informal medication twice weekly for their prescribed medication. In the severe diabetic patients it was significant that there was a greater number of poorly controlled patients in the group that used both formal and informal medication, as is shown in figure 2. In the mild group, informal medication had no noticeable effect on the quality of diabetic control.

In the entire sample of 103 patients, 45 were moderate to heavy drinkers who reduced their alcohol intake markedly after discovery of their disease. Of these patients who had good control of their diabetes, fifteen (seven severe and eight mild) had either stopped drinking completely or took the occasional drink. Of the 30 patients who were poorly controlled (15 severe and 15 mild), nine continued to drink heavily.
DISCUSSION

Our sample is small in comparison with other studies from the U.S.A. and U.K., but it is still possible to draw some conclusions from our data. It was shown previously in diabetes that level of knowledge about the disease correlated with the degree of management capability.\textsuperscript{10} That view is not universal, and, in a study among hypertensives, Canadian workers reported that health education programmes, which taught the patients facts about hypertension and its treatment, were not reflected in better compliance.\textsuperscript{11} It was also shown that level of knowledge among mothers did not enhance their compliance in treatment of their children who have an acute illness.\textsuperscript{12}

The difference between our results and some of the studies quoted above may be related to the level of the basic knowledge in our communities. In North America, good communication systems, a high level of exposure to the press and other media, and a high standard of literacy must provide the type of awareness of illnesses to be at a level higher than that which is obtained in Jamaica. We are unaware of any investigation made in the Jamaican population on levels of knowledge of chronic illnesses. In a recent study in Jamaican patients with leg ulcers caused by sickle cell anaemia, it was found that only 15% knew that their primary disease was related to any abnormality of the red blood cells and 7.5% were emphatic that the disease was not inherited and was caused by external factors such as infection, nutritional deprivation, or physical accidents (Sylvan I. Alleyne, unpublished data). Since this is the level of knowledge of a hereditary disease, it is not difficult to envisage the ignorance about an acquired disease, like diabetes, which does not necessarily have the obvious external stigmata of sickle cell anaemia. Any increased
level of health education in North America is, therefore, less likely to augment the knowledge of the disease to the same extent as it would in Jamaica.

No workers have had the opportunity to study patients like ours in the deprived conditions of developing countries to determine whether the factors such as education and knowledge of illness relate to diabetic control.

It is noteworthy that, in the North American studies referred to above, there was no attempt to group patients according to the severity of their illness, as we have done in the present study. It is clear from our data that it was among the severe diabetics that knowledge of the disease appeared to be associated with the level of control. Perhaps even among the North American hypertensive patients, stratification according to severity of disease might demonstrate an effect of knowledge of illness on compliance with the various therapeutic regimens. It is important to point out that the study we quote as showing that level of knowledge about the disease correlated with management also dealt with diabetes. It is possible that there are differences in the patients' appreciation of the two chronic diseases, hypertension and diabetes, such that knowledge of them affects the degree of compliance and control to different degrees.

Because of our ability to classify our patients according to their social amenities, we were able to document that, at least in the severe diabetics, those patients who possessed more social amenities and, presumably, were more affluent had a better degree of control. It is perhaps obvious that the more affluent diabetic is, likely, to be better educated, communicate better with his or her doctor, and thus be more likely to comply with the limitations imposed by the diabetic regimen. Our findings do indeed show that, in the severe diabetic, a higher level of education is associated with better control. The effect of employment on control in severe diabetes is also related to the social amenities and education attained.

It is of interest that there was no relation between diabetic control and any of the social factors in the mild diabetics. The reason for this is not immediately obvious, since we might assume that severe and mild diabetics are, simply, ends of the diabetic spectrum. It is possible that all mild diabetics were so casual about their disease that this factor overrode any effects of knowledge, education, or amenities, and the ease with which mild diabetes can be controlled removes any discriminant power from any of the social factors examined in this study.

In our environment, many patients with diabetes become concerned about their illness only when the complications arise. It is only at this state that differences in management capability will be reflected in variations in control.

A general point should be made in relation to the understanding of the disease in the whole group of patients. It has been shown that, in diabetes, although there was no direct correlation between control of the disease and level of physician-patient communication, certain specific aspects of the disease regimen, e.g. urine testing, was definitely related to the level of
communication. It was shown that, in those patients taking insulin, and therefore, presumably the more severe diabetics, communication was best.\textsuperscript{13}

It is a reflection of the state of our health care services that 75% of the patients were given no full explanation of the disease at diagnosis. This, perhaps, spells out the need for health personnel other than doctors to be included formally in the treatment of the chronically ill. Again among the severe diabetics the control was related to whether the nature of the disease was explained. The important factor here may not be simply the giving of the explanation, but it is likely that, in the more educated patients, the explanation was appreciated; here we are seeing an effect of education rather than one of any communication deficit.

In our society the effect of culture differences on the doctor-patient relationship was described,\textsuperscript{14} and this phenomenon may also play a role in the present setting.

Some 42% of our patients were using informal medication. It is unlikely that this figure underrepresents the magnitude of the problem. Here again the effect of control was apparent only among the severe diabetics. There is widespread use of informal medication among the population represented in our Diabetes Clinic, and in a previous study the point was made that there is a coexistence of folk and scientific medical systems in our people.\textsuperscript{15} The reasons for this statement are beyond the scope of this study, but other workers speculated on the cultural ambivalence of our people as a cause.\textsuperscript{14}

Perhaps some of our patients may be so preoccupied with devising means of meeting the basic physical necessities for existence that they haven't time to pay attention to the basic strategies for dealing with the management of a chronic illness like diabetes mellitus.\textsuperscript{16}

CONCLUSIONS

In general, the quality of control was associated with the severity of the disease. In the mild diabetics the quality of control was not influenced by any of the social variables examined.

In the severe diabetic, the quality of control was related to social amenities, education attained, employment status, and understanding of the disease.

ACKNOWLEDGEMENTS

The study was supported by Commonwealth Caribbean Medical Research Council. We thank Mrs. L. DaCosta, Mrs. J. Maxwell, and Mrs. C. French for assisting with the interviews.
APPENDIX

PSYCHOSOCIAL FACTORS RELATED TO PATIENTS WITH DIABETES MELLITUS

ADULT

Date of interview: To be filled in by the Doctor
Interviewer: Medical Status
Serial number: (I) Poorly Controlled/Moderate/
Hospital number: Stable

(I) Mild/Severe
Type of Medication
Insulin/Diabinese/Glucophage,
etc.

1. Name of Patient:

2. Address:

3. Date of birth: Present age:

4. Sex:

5. Highest grade reached in school: Primary (grades 1-6); junior secondary (grades 7-11); secondary; other (specify).

6. Name of school:

7. Age at leaving school:
   Reason for leaving school:

8. Qualifications: Less than 5 years; 5-15 years; 16 and over.

9. How many children have you got alive?

10. Household roster:
    No.
    Name
    Relationship to head
    Age
    Sex
    Marital status
    Highest education
    Previous/present occupation
    Employment
11. Which of the following facilities do you have at home?
   Piped water in the house; piped water in the yard; standpipe;
   other water supply (specify); electricity; refrigerator; radio;
   television; water closet; pit latrine; telephone.

12. How old were you when you found out that you had diabetes?

13. Before your illness, did you have to deal with a diabetic?
   Yes: Whom? No.

14. What do you think is the cause of diabetes?

15. What did the doctor say was wrong with you when you were first
told you had the illness?
   Dr. said nothing about sugar
   Dr. said sugar but no explanation
   Dr. said sugar and gave explanation

16. What was your reaction to this illness when the doctor first told you?
   Did you think: It could be cured; it could not be cured.

17. After your first visit to the doctor, how seriously did you take it?
   Didn't take it seriously; took it seriously; but felt I could cope;
   it was too serious to cope with it by myself; other (specify).

18. How is the urine tested? Benedict; Uristick; Clinitest.

19. What treatment do you need to keep the diabetes under good control?
   Diet; Tablets; Injection; Other. (Show the patient the different
   brands in the kit and let him/her select those he/she is now using.)

Skip questions 20 and 21 if not applicable.

20. If injections, who gives it to you? Self administered; spouse;
   someone besides the above mentioned but within the home (specify);
   relative from outside the home (specify); Hyacinth Lightbourne Visiting
   Nursing Service; other (specify); not applicable.

21. (Probe for substitute) If you/the person who normally gives the
   injection are/is unable to do so for one reason or another, who
   would be the next person to give it to you?

22. I am going to ask you some questions about diabetes. I would like you
to answer each of the following: (a) Is diabetes inherited? (b) Can
   it be cured? (c) Should you pay attention to diet? (d) Does it matter
   if you miss insulin/tablets one day? (e) Will you become ill if you
   have too little or too much insulin/tablet? (f) If you start to perspire
   extra (cold sweat) and feel faint, does that mean too much or too
   little insulin/tablet? (g) Can people with diabetes play games normally?
   (h) If you become faint and perspire extra (cold sweat), is it correct
to take a sweet drink? (i) If on testing the urine the colour is orange
or red, is the diabetes under good control? (j) Is there anything that you can use instead of insulin/tablets (Diabinese) in the treatment of diabetes?
(PROBE) Where did you get your information about diabetes?

23. Is the diet that the doctor put on sufficient for you, or do you get hungry?
(PROBE) If gets hungry: What do you do then?

24. What are the difficulties you have in keeping up the treatment necessary to keep you under good control? (The most difficult one first.) (Treat as open-ended question. If the following points do not come up in answer, PROBE EACH ONE.)
Sometimes forget to take medicine/injection - (fed up with medicine/injection).
Dietary - like sweet things, so eat them now and again.
Dietary - cannot get the food necessary to keep up the diet.
Financial problems.
Problems of fitting in as a mother, wife/worker (adjust for male respondents).
Conflict - quarrels in the home.
Difficulties in obtaining medication.
Other difficulties (specify).
No difficulties.

25. Have you ever been in hospital for this illness?
Yes (number of times) No.

26. (a) If answer to 25 is no: What do you think you have been doing that has contributed most to your controlling the illness?
(b) If answer is yes, Were there any special events that led up to your going into hospital?

27. Have you discussed your illness with anyone other than the doctor or nurse?
No one. Why not?
Yes. With whom.
What was the person's reaction?

28. Does your husband/partner comfort or help you with regards to the illness?
Yes. In what ways? No. Why not?

29. Does any other relative comfort/help you with regards to the illness?
Yes. Whom? In what ways? No. Why not?

30. Apart from family and relatives, has anyone or any organization helped you in coping with this illness?
Yes. Whom? In what way(s)? No.

31. Have you noticed any loss of the desire for having sex (libido) or diffi-
culties in sex relations since you have diabetes? Yes. No.
If yes, probe for loss of desire or difficulty in performance.
32. Do people with diabetes have such difficulties?  
   (PROBE): Why do you think so?

33. What difficulties or problems (if any) does your illness cause you with your work/job?

34. What do you dislike most about your illness?

35. How often did you take a drink (whisky, rum, gin, beer, stout, wines, etc.) before you had diabetes?  
   (PROBE) Do you still drink as much?

36. Apart from the treatment the doctor has put you on, do you use any home remedies for diabetes?  Yes.  No.  
   (PROBE) If yes, what?

37. What method of transportation do you normally use?

38. How do you feel about life in general since this illness started?

39. What complications (if any) have you got because of the diabetes?
REFERENCES


THE DIABETIC CLINIC AT MAURICE BYER POLYCLINIC, BARBADOS

ELAINE YARDE

Nutrition Officer
National Nutrition Centre
Ministry of Health, Barbados

INTRODUCTION

This clinic was started at the end of January 1980 with a total of thirty (30) diabetics and is conducted twice monthly with fifteen (15) diabetics attending each clinic session.

The aims and objectives of the clinic are as follows:

1. To create an awareness of diabetes mellitus among diabetics and their families.

2. To give them a better understanding of the disease, and how to come to terms with the limitations of the condition.

3. To alert the individual to the need for proper management.

4. To prevent further complications and minimize those present.

5. To help the diabetic to maintain the highest level of health and mobility in the community.

METHODOLOGY

On the initial visit, the nurse:

1. Takes a medical and social history from the patient.

2. Records the patient's height, weight and blood pressure.

3. Tests the urine for sugar.

4. Refers the patient to the nutritionist.
The nutritionist then:

1. Takes a diet history from the patient.
2. Tries to find out what problems the patient is experiencing with his diet and counsels the patient accordingly.

On subsequent visits, the nurse:

1. Weighs the patient.
2. Takes the blood pressure.
3. Tests the urine for sugar.
4. Checks the weight and urine results against previous records taken.

If the patient has not yet seen the nutritionist or is having problems with his diet, the nurse then refers the patient to the nutritionist.

After all the patients have been checked routinely, they then come together in a group and are exposed to some educational aspects of their condition. This covers either a film, a talk or a demonstration followed by discussions conducted by members of the health team (see outline of the proposed educational programme for the diabetic, pages 71-73).

SUMMARY

Thus education of the diabetic in both the individual and the group setting form the basis of the educational approach in this clinic. So far the response to the sessions conducted have been quite encouraging and have stimulated and evoked quite a lot of discussion from the diabetics.

Most of the diabetics are over 50 years of age and so they seem quite at home with each other, sharing their experiences and their difficulties in trying to control their condition.

The role of the nurse and the nutritionist is therefore to give them the guidance, the moral support and the encouragement needed in coping and managing their diabetes.
OUTLINE OF THE PROPOSED EDUCATIONAL PROGRAMME FOR THE DIABETIC

SESSION I - NURSE

Introduction to Routine of Clinic - Aims

DIABETES MELLITUS - A Talk - What is Diabetes?

Open discussion - Focus on problems common to participants' areas of concern.

Film - What you don't know can hurt you.

Individual counselling on request re diet or medical referral when necessary.

Session end with outline for next meeting.

Open invitation to family members involved in the immediate care of the diabetic.

SESSION II - NURSE/NUTRITION OFFICER

Living with Diabetes

How diabetes can be controlled?

The importance of diet and medication?

Dietary counselling.

The relationship between diet and medication and the control of diabetes.

SESSION III - NURSE

Medication

Group discussion - What they do now.

What they ought to do - stress need for regular and consistent taking of prescribed medication.

Deal with any misconceptions or misuse of drugs.

Recap and reinforce teaching - 1. Diet

2. Drugs

SESSION IV - NUTRITION OFFICER

Combination of food substitution list.

Patient participation in meal planning.
SESSION V - NUTRITION OFFICER

Continuation of Session IV. Patient's participation in meal planning.

SESSION VI - NURSE

Methods used to indicate presence of sugar in the body

Blood Test - Talk
Urine Test - Demonstration
Keeping daily record of tests done at home and how they assist in the assessment and control of the diabetic.
Record Sheet supplied - Pamphlets

Individual dietary counselling - Nutrition Officer

SESSION VII - NURSE

Common effects of diabetes on the body when not controlled.
Talk - How to recognise same.
Stress importance of FOOT CARE.
SKIN CARE - Need for early medical attention re injuries.
Question time allowed - group participation
"Leaflets on Foot Care"

SESSION VIII

More complications and diseases that usually exist with diabetes.

Individual Counselling - Nurse

Demonstration of Food Portions - Nutrition Officer

SESSION IX - NUTRITION OFFICER

Demonstration of Food Preparation

SESSION X - NURSE

Family Involvement

Need for family involved to be aware of proper care and control of the diabetic and the importance of their support and acceptance.
Group participation - Question time allowed.
SESSION XI

Individual Teaching

1. Nutrition Officer
2. Nurse

Involvement of Other Agencies

For example, talk by members of the Diabetic Association.

SESSION XII

Evaluation

Yes - No Quiz

EVALUATION THROUGHOUT PROGRAMME