

Dietary Management of a Patient with Diabetes Mellitus: a Case Report

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INTRODUCTION

Diabetes mellitus is recognized as a major global public health problem. The incidence and prevalence of diabetes is escalating especially in developing and newly industrialized nations. Worldwide, the estimated of 80 million persons with diabetes mellitus in 1990 doubled by the year 2000. Among the ten leading countries, five are in Asia, with India and China expected to be in the forefront in terms of the number of people with diabetes mellitus in the year 2025 (Roglic & King, 2000).

In Malaysia, diabetes is a growing concern. Rapid socio-economic development has resulted in significant changes in lifestyles. According to the Second National Health Morbidity Survey (NHMSII, 1997), the prevalence of diabetes among adults in Malaysia was found to be 8.2% in 1996 compared to a rate of 6.2% found in the first NHMS in 1986. In addition, the NHMSII found a higher prevalence with increasing age, among the urban population and the in lower educational level groups.

The World Health Organization (WHO) recognizes two major clinical forms, namely Insulin-Dependent Diabetes Mellitus and Non-Insulin-Dependent Diabetes Mellitus, or what is presently known as Diabetes mellitus type 2. About 90% of all cases of diabetes in developed and developing countries is diabetes type 2, primarily found in adults more than 30 years of age.

The complications associated with diabetes can be very serious. It is estimated globally that about 15,000 to 39,000 people lose their sight because of diabetes and about 14.6% aged 40 years and above, developed diabetic retinopathy after a 5-year duration of being in a diabetic condition (NHMSII, 1997). People with diabetes are more likely to have heart disease (Clinical Practice Guidelines on Acute Myocardial Infarct, 2001) and to suffer a stroke (Consensus Statement on the Management of Ischaemic Stroke, 2000). It is also estimated that 20 to 40% of diabetics develop diabetic nephropathy (Clinical Practice Guidelines on Diabetic Nephropathy, 2003). Foot complications (which include ischaemia, ulceration, infection and diabetic charcot's joint) have been found to account for 12% of all diabetic hospital admissions. These complications may result in foot/leg amputation (Clinical Practice Guidelines on Management of Diabetic Foot, 2003). The NHMSII results revealed that among the diabetics, 10.9% had hypertension, 22.8% had hypercholesterolaemia and 18.8% were overweight and obese.

Once diagnosed, a diabetic patient must be given prompt and adequate treatment to prevent or delay complications. There are four major components in the management of diabetes mellitus:

diet, exercise, medication and education. In addition, diabetes control and management of complications should also be monitored.

Preferred food advice for diabetic patients has been a controversial issue for many years. Those with diabetes need an understanding of diet to maintain reasonable weight and body composition, reduce blood glucose and lipid levels, and delay the chronic complications of diabetes. A study by Ruzita *et al.*, (1997) found that counseling from dietitians resulted in a significant reduction of total HbA1C levels and BMI among diabetics patients. Nutrition counseling is a process intended to help patients develop and maintain good eating habits. Although each diabetic patient has different personal characteristics and life-styles, counseling can support and motivate patients to learn, especially if done in groups.

CASE PRESENTATION

BA, a 46 year-old Malay man was first diagnosed as having Diabetes mellitus type 2 at a primary health clinic 10 years ago. At the time of diagnosis, his random blood sugar (RBS) was 18.6 mmol/l, blood pressure was 130/80 and body mass index (BMI) was 27 (overweight). He was started on Daonil 5 mg bd tablet. During the next five years, his blood sugar levels remained uncontrolled with fasting blood sugar (FBS) levels ranging from 10.1 to 15.2 mmol/l. The dosage of Daonil was progressively increased and later Metformin was added. Despite this, the patient's diabetes remained uncontrolled and five years later, he was also diagnosed to have hypertension and hypercholesterolaemia (cholesterol level was 6.8 mmol/l, with elevated low-density lipoprotein (LDL) of 4.8 mmol/L). High-density lipoprotein (HDL) level was normal. At this time, his BMI had increased to 30. The patient was started on anti-hypertensives to control his blood pressure, but was not started on any treatment for the hypercholesterolaemia.

Despite being on regular treatment and follow-up, he continued gaining weight and his diabetes was never well controlled. He was referred to a hospital two years ago for uncontrolled diabetes and blurring of vision. At that time, his fasting blood sugar (FBS) was 18.6 mmol/L and HbA1c was 11.8%. He was diagnosed as having diabetic retinopathy, and was further managed at the hospital. Six months later, he was admitted to the hospital for acute myocardial infarct.

Although BA survived the myocardial infarct, he was no longer able to work due to his illness. Coronary angiogram revealed that three of the major arteries in his heart were blocked. Apart from that, he also had impaired renal profile (blood urea was 10.7 mmol/l, serum creatinine was 152 micromol/l and urine albumin was positive). However all electrolyte levels, serum albumin and albumin-globulin ratio were normal. Despite being on medication, BA's diabetes was not well-controlled and he developed complications (hypertension, hyper-cholesterolaemia, retinopathy, coronary artery disease, renal impairment). Although doctors who attended to him gave him dietary advice, his weight progressively increased and he had become obese (body mass index or BMI on admission was 32 kg/m²).

Discussions with the hospital dietitian during BA's admission revealed that BA had not really attempted to change his diet that was high in fat and sugar. Further sessions between dietitian and BA's wife revealed that BA loved home cooked food and would get angry if his wife did not

cook tasty food. His usual meals for the day would be *nasi-lemak* for breakfast, followed by *roti-canai* for mid-morning snack, rice with 2–3 pieces of chicken /meat / fish for lunch, a multiple variety of *kuih-muih* for tea-time and again rice for dinner. His favourite drinks were *teh-tarik*, *sirap-bandung* and other types of sweet drinks. He felt that taking his medication regularly was enough to control his illness and he was not worried about his increasing weight gain.

MANAGEMENT OF DIABETES IN THIS PATIENT

The physicians at the hospital modified BA's medication. In addition to new diabetic medication (he was started on Diamicon 40 mg bd), he was given medication for his heart disease, hypertension, hypercholesterolaemia and an angiotensin-converting-enzyme inhibitor was added to control his renal impairment. In addition to these medications, BA and his wife were also counseled by the hospital dietitian on a monthly basis.

Taking into account BA's multiple diseases, the dietitian drew up a diabetic menu for him (Appendix 1 and 2; Malay version in Lampiran 1 and 2). The main aim of the diet was to control his diabetes and hypercholesterolaemia. He was not put on any strict protein restriction diet. However, he was advised to control the amount of protein and salt in his meals.

After discharge, BA continued to follow up with sessions at the cardiovascular, diabetic and dietitian clinics. He was always advised to bring his wife along with him, especially during the counseling sessions with the dietitian. BA's wife was educated on healthy cooking, and also told to monitor BA's diet. BA had to reduce taking foods high in sugar and saturated fats. His wife was advised to use vegetable oil like sunflower, corn or olive oil in place of the brand of oil that she had been using. Other recommendations given to BA and wife were:

- Choose lean, protein-rich foods — soy, fish, skinless chicken, very lean meat, and fat free.
- Eat foods that are naturally low in fat — like whole grains, fruits, and vegetables.
- Get plenty of soluble fiber — with oats, bran, dry peas, beans, cereal, and rice.
- Limit consumption of fried foods, processed foods, and commercially prepared baked goods (donuts, cookies, crackers).
- Limit animal products like egg yolks, cheeses, whole milk, cream, ice cream, and fatty meats (and large portions of meat).

BA and his wife also attended “healthy cooking classes” organized by the health clinic near their home. His wife finally changed his diet by modifying her cooking following the dietitian's counseling. In addition to this, BA was also counseled regarding his physical activities. He was advised to go for brisk walks for 20 minutes, three times a week initially, and gradually build up his speed and duration of exercise as his illnesses (especially heart disease) improved.

The outcome in BA's case was extremely good. Not only did this change in diet manage to control his blood sugar and cholesterol levels, he also started losing weight. After six months of intensive counseling, his BMI was reduced to 30 kg/m² and a year later to 28 kg/m². During his latest follow-up at the diabetic clinic, his FBS had reduced to 9.0 mmol/l and HbA1c was 7.8%.

His renal profile and cholesterol levels had also improved. Blood urea was normal and serum creatinine had reduced to almost normal (97 micromol/l). Cholesterol level was 5.3 mmol/l and LDL was 3.7 mmol/l.

CONCLUSION

The Ministry of Health has launched healthy lifestyle and diabetes campaigns. However, adopting healthy lifestyle practices is not easy as revealed in this case. Patients and their families need to be supervised personally and counseled regularly. Healthy lifestyle habits such as maintaining a balanced diet, ideal body weight and physical activities need to be cultivated and practised. Dietary counseling sessions need to be implemented, preferably by dietitians as this has been shown to be effective in motivating diabetic patients to achieve a better food choice, as well as better glycaemic, lipid and weight control, as shown in this case.

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Appendix 1

FOOD / DRINKS	QUANTITY
<p>BREAKFAST Choose ONE of the following:</p> <ol style="list-style-type: none"> 1. Whole-meal Bread + salad + cucumber + tomato + boiled egg white or sardines or tuna 2. ### Rice/Mee/Mihun/Fried Kuay teow (<i>add more vegetables and less oil</i>) <p>### Choose only ONE and only ONCE a week.</p> <p>Drinks: Milo without sugar OR Tea / Coffee / Nescafe without sugar + Non-fat Milk</p>	<p>3 pieces</p> <p>2 table spoons</p> <p>2 tea spoons</p> <p>3 table spoons flat</p>
<p>MORNING BREAK / AFTERNOON BREAK / SUPPER Choose ONE of the following:</p> <ol style="list-style-type: none"> 1. Whole-meal Bread 2. Cracker-meal Biscuits <p>Drinks: Tea/Coffee/Nescafe without sugar + Non-fat Milk OR Boiled Water</p>	<p>1 piece</p> <p>3-4 pieces</p> <p>2 tea spoons flat</p> <p>3 table spoons flat</p>
<p>LUNCH / DINNER Choose ONE of the following:</p> <ol style="list-style-type: none"> 1. White Rice + Dishes: <ol style="list-style-type: none"> a) Chicken OR Beef OR b) Fish OR c) Eggs (<i>Limited to 3 per week</i>) OR d) Prawns (<i>4-5</i>) OR Squids (<i>2 small-sized</i>) OR Crab (<i>1 medium sized</i>) (<i>Limited to ONCE a week</i>) OR e) "Tempe" OR "Tauhoo" <p><i>Types of cooking can be either: sweet and sour, spicy, soup, " tomyam" or using saya sauce. However, frying should be limited to only once a week. Use vegetable, corn or sunflower oil which has been advised. For cooking using soya sauce or sweet and sour, bake the fish, do not fry!</i></p> <p>+ Starchy vegetables (carrots, potatoes, yam, pumpkin) AND Green Vegetables and others (beans, long beans / french beans, mushrooms, brinjals, boiled "ulam")</p> 2. Mee/Mihun/Kuayteow - Soup / Tomyam / "Laksa Asam" (Add more vegetables) 3. "Capati" + "Dhal" + Vegetables <p>*Fruits (Refer to Appendix 2) Plain water</p>	<p>1- 1½ cup</p> <p>2 matchboxs-size</p> <p>1 medium-sized</p> <p>1</p> <p>1 medium-sized</p> <p>½ cup</p> <p>½ cup or more</p> <p>1 bowl</p> <p>1 piece</p> <p>1 serving</p>

* Appendix 2

<p>FOODS TO BE AVOIDED White sugar, red sugar, glucose Honey, Syrup Jam, "Kaya" Sweets, Chocolate, Ice-cream, Cake Sweet biscuits or "kueh" Cordial or carbonated drinks, sugarcane water Preservatives, tinned fruits (with syrup) Other food and drinks with sugar</p>	
<p>FOODS WHICH CAN BE TAKEN IN MEASURED QUANTITIES</p> <p>GROUP 1: CARBOHYDRATES (1 serving) 1 cup rice / mee / mihun / kuey teow 2 cups porridge 3 pieces whole-meal bread 1 piece capati 2 pieces tosai 1 cup cornflakes / nestum 8 pieces cracker-meal biscuits</p> <p>GROUP 3: MILK (1 serving) 1 cup (240 ml) fresh milk / UHT milk ½ cup (120 ml) diluted milk 3 spoons (flat) non-fat milk</p> <p>GROUP 5: STARCHY VEGETABLES (1 serving) ½ small cup tapioca / yam / sweet potatoes ½ small cup green / red peas ½ small cup peas ½ small cup corn 1 small cup yellow pumpkin 1 medium-size carrot</p>	<p>GROUP 2: PROTEIN (1 serving) 1 medium-sized fish 1 piece of chicken (60g meat) 60g / 2 matchbox sized beef without fat 2 eggs ½ small cup crab meat / prawn meat</p> <p>GROUP 4: FRUITS (1 serving) 1 apple / orange / pear / mango 1 banana (size 8-10 cm) 2 mangosteens / "jambu air" / "mempelam" 8-10 small grapes / "langsai" / "duku" 4-5 lychee / "rambutans" 1 small piece (100gm) papaya / watermelon / pineapple 1 medium piece "durian" 1 large piece / 2 small pieces "cempedak" / "angka" ¼ or ½ small guava 1 small "ciku"</p>

Lampiran 1

MAKANAN / MINUMAN	KUANTITI
SARAPAN PAGI	
Pilih salah SATU antara berikut:	
3. Roti penuh mil + salad + timun + tomato + putih telur rebus atau sardin atau tuna	3 keping 2 sudu makan
4.###Nasi / Mee / Mihun / Kuay teow goreng (<i>lebihkan sayur dan kurangkan minyak</i>)	
<i>### Pilih salah satu dan hanya 1 kali seminggu.</i>	
Minuman: Milo tanpa gula ATAU Teh / Kopi / Nescafe tanpa gula + Susu tanpa lemak	2 sudu teh rata 3 sudu makan rata
MINUM PAGI / MINUM PETANG / MINUM MALAM	
Pilih salah SATU antara berikut:	
3. Roti penuh mil	1 keping
4. Biskut krakermeal	3-4 keping
Minuman: Teh / Kopi / Nescafe tanpa gula + Susu tanpa lemak ATAU Air Masak	2 sudu teh rata 3 sudu makan Rata
MAKAN TENGAHARI / MAKAN MALAM	
Pilih salah SATU antara berikut:	
4. Nasi Putih + Lauk:	1-1½ cawan
a) Ayam ATAU Daging ATAU	2 kotak mancis
b) Ikan ATAU	1 ekor sedang
c) Telur (<i>Dihadkan 3 biji seminggu sahaja</i>) ATAU	1 biji
d) Udang (<i>4-5 ekor</i>) ATAU Sotong (<i>2 ekor kecil</i>) ATAU Ketam (<i>1 sedang</i>) (<i>Dihadkan SATU KALI seminggu</i>) ATAU	
e) Tempe ATAU Tauhoo	1 keping sederhana
Cara masak sama ada masak kicap, masam manis, asam pedas, sup atau tomyam. Cara goreng Cuma SEKALI seminggu. Gunakan minyak sayur, jagung atau bunga matahari yang telah dinasihatkan. Untuk masak sambal atau masak <i>kicap</i> , <i>seeloknya ikan dibakar, bukan digoreng!</i>	
+ Sayur Berkanji (Lobak merah, kentang, keladi, labu) DAN Sayur Hijau serta lain-lain (bendi, kacang panjang / buncis, peria, cendawan, terung, ulam rebus)	½ cawan ½ cawan atau lebih
5. Mee / Mihun / Kuayteow - Sup / Tomyam / Laksa Asam (Lebihkan Sayur)	1 mangkuk
6. Capati + Kuah Dhal + Sayur	1 keping
*Buah (Sila rujuk lampiran 2) Air Kosong	1 hidangan

* Lampiran 2

MAKANAN YANG PERLU DIELAKKAN

Gula putih, gula merah, glukos
Madu, semua jenis sirap
Jem, kaya Gula-gula, Coklat, Ais-krim, kek
Biskut manis, kuih-muih manis
Minuman kordial, berkarbonat, air tebu
Halwa, jeruk, buahan dalam tin (bersirap)
Lain-lain makanan dan minuman yang bercampur gula

MAKANAN BERSUKAT

KUMPULAN 1: BIJIRIN
(1 hidangan)

1 cawan nasi / mee / mihun / kuey teow
2 cawan kanji
3 keping roti penuh mil
1 keping capati
2 keping tosai
1 cawan bijirin sarapan (cornflakes / nestum)
8 keping biskut krakermeal

KUMPULAN 3: SUSU
(1 hidangan)

1 cawan (240 ml) susu segar / susu UHT
½ cawan (120 ml) susu cair
3 sudu makan rata susu tepung tanpa lemak

KUMPULAN 5: SAYURAN BERKANJI
(1 hidangan)

½ cawan kecil ubi kayu / keladi / keledak
½ cawan kecil kacang hijau / merah
½ cawan kecil kacang peas
½ cawan kecil jagung
1 cawan kecil labu kuning
1 biji sederhana lobak merah

KUMPULAN 2: SUMBER PROTEIN
(1 hidangan)

1 ekor ikan sederhana
1 ketul ayam (60g isi)
60g / 2 saiz kotak mancis daging tanpa lemak
2 biji telur
½ cawan kecil isi ketam / udang

KUMPULAN 4: BUAH-BUAHAN
(1 hidangan)

1 biji epal / oren / pear / mangga
1 biji belimbing / pisang (saiz 8-10 cm)
2 biji sederhana manggis / mempelam / jambu air
8-10 biji kecil duku / langsung / anggur
4-5 biji rambutan / laici
1 potong nipis (100gm) betik / tembikai / nenas
1 ulas sederhana durian
1 ulas besar / 2 ulas kecil cempedak / nangka
¼ atau ½ kecil jambu batu 1 biji kecil ciku
