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## **Current Dietetic Practices in the Management of Gestational Diabetes Mellitus: A Survey of Malaysian Dietitians**

<sup>1</sup>A.S. Farhanah, <sup>1</sup>M.D. Fatin Nasirah, <sup>1</sup>M.Y. Barakatun Nisak, <sup>2</sup>M.I. Nor Azlin and <sup>1</sup>M.S. Zalilah

<sup>1</sup>Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia

<sup>2</sup>Department of Obstetrics and Gynecology, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia

*Corresponding Author: M.Y. Barakatun Nisak, Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia*

### **ABSTRACT**

The role of the dietitian in the management of Gestational Diabetes Mellitus (GDM) is highly recognised. However, consensus on dietetic approaches for the management of GDM in Malaysia are scarce. This study aimed to examine the current dietetic practices in the management of GDM and to compare nutrient recommendations provided by dietitians to those of several established international guidelines. A survey was conducted among dietitians who were working in government affiliated hospitals across Malaysia. Of 148 questionnaires posted to dietitians, a total of 101 were returned representing an overall response rate of 68%. The majority of the dietitians (80%) reported that they see women with GDM in their daily practices with more than half (53%) having counselled 5 to 9 women per day during the previous 3 months. Flexible carbohydrate exchanges (82%) was the most common recommendation on carbohydrate intake followed by advice regarding small frequent meals spread over the day (62%) and portion control by using the plate method (54%). Only 11% dietitians incorporated the use of the glycaemic index as a measure of carbohydrate intake into their intervention. While recommendations regarding protein intake were consistent with established guidelines, the amount of carbohydrate recommended by the dietitians was higher than that in established guidelines. Although consistency was seen in key components of nutrition intervention, there were differences in the delivery of nutrient recommendations particularly in regard to dietary carbohydrate intake indicating a need for consensus on dietetic practice guidelines for the management of GDM.

**Key words:** Current practice, dietitian, gestational diabetes mellitus, medical nutrition therapy

### **INTRODUCTION**

Gestational Diabetes Mellitus (GDM) is defined as any degree of glucose intolerance with onset during pregnancy (American Diabetes Association, 2013a). In the United States, about 200,000 GDM cases are reported annually (American Diabetes Association, 2013b) while in Malaysia, the prevalence of GDM has ranged from 12.7-24.9% from 1993 to 2003 (Chan, 1993; Shamsuddin *et al.*, 2001; Idris *et al.*, 2009). This constant increase in the prevalence of GDM is

likely a result of several factors including an increased prevalence of obesity in young people and the increased survival of macrosomic female infants (predisposed as adults to GDM) (Metzger *et al.*, 2007). Women with a history of GDM have a high risk of developing type 2 diabetes and GDM in subsequent pregnancies later in life (Lobner *et al.*, 2006).

Cheung (2009) suggested that self-care which includes information regarding GDM, self-monitoring of blood glucose levels, diet counselling and healthy post-partum lifestyle to ensure optimal pregnancy outcome in women with GDM. Medical Nutrition Therapy (MNT) is a crucial strategy to ensure optimal pregnancy outcome in women with GDM. In fact, many women with GDM have successfully achieved good glucose control via MNT. A recent clinical trial reported that nutrition therapy, blood glucose monitoring and insulin therapy as required for glycaemic control reduced serious perinatal complications with no increase in the rate of caesarean deliveries (Crowther *et al.*, 2005). The goal of nutrition management in women with GDM is to design a diet that provides adequate calorie and nutritional needs to the pregnant woman while attaining and maintaining a normal range of blood glucose levels throughout the gestation period (Boinpally and Jovanovic, 2009).

Nevertheless, optimal management of pre-gestational diabetes and GDM remains under debated (Metzger and Coustan, 1998). To date, there is no internationally consensus on the preferred approach to the detection, diagnosis and management of GDM, diabetes from the international guidelines since 1998 (Cutchie *et al.*, 2006). As a result, there is significant variation in management strategies originating from different approaches and views in obstetric clinics all over the world (Zeck *et al.*, 2007).

In a survey on dietetic practice in the management of GDM among Australian dietitians performed by Morrison *et al.* (2011), differences in regard to nutrient recommendation implemented by Australian dietitians were seen strongly supporting the need for evidence-based data for implementation of standardised GDM practice guidelines and nutritional recommendations (Cutchie *et al.*, 2006). Such a consensus would serve to reduce confusion by embracing one international set of guidelines and compromising over countries with limited information until additional knowledge has been gained. Furthermore, there are no dietetic guidelines or evidence-based nutrition recommendations on GDM specific to Malaysia. Therefore, the aims of this study were to: Examine current dietetic practice in the management of GDM and to compare nutrient recommendations provided by dietitians to those by several established international guidelines. The findings of this study will provide baseline data for future practices of Malaysian dietitians working in GDM.

## **MATERIALS AND METHODS**

This study was conducted as a cross-sectional survey of dietitians in hospital-based practices across Malaysia who provided MNT to women with GDM in 2012. A total of 148 questionnaires were posted by mail to dietitians who were working in government agencies and were involved in the management of GDM for at least 3 years.

The survey was developed, based on dietetic practices in the management of gestational diabetes mellitus as reported in a survey of Australian dietitians by Morrison *et al.* (2011). The 33 items questionnaire survey included open-ended, close-ended and multiple-choice questions to report socio-demographics characteristics (10 questions), dietetics services (7 questions), post-natal services (3 questions) and nutrition education and recommendation (5 questions). The mail survey was pilot tested in 15 subjects around UPM and Serdang Hospital. Descriptive statistics were reported as frequencies and analysed in SPSS version 21.

**RESULTS**

A total of 148 questionnaires were posted to dietitians, of which 101 questionnaires were returned representing an overall response rate of 68%. Respondent predominantly worked as dietitians for 5 to 10 years (41%) and most (84%) were working in a public hospital followed by a teaching hospital (11%) and health clinic (5%). The demographic profiles of the survey respondents are shown in Table 1. Twenty dietitians who responded to the survey did not see GDM patients at the time of this study and were therefore excluded from the analysis resulting in a final sample of 81 dietitians (80%). At the time of enrolment, more than half (53%) of the dietitians had counselled 5 to 9 women with GDM per day during the previous 3 months.

Of all the respondent, 53% reported that they provided a follow-up for all women with GDM after the initial visit and less than half (28%) provided two to three face-to-face follow-up sessions throughout the patient's pregnancy (Fig. 1). Dietitians used individual (77%), group (19%) or a

Table 1: Demographic characteristic of the dietitians (n = 81)

Demographic characteristic	Respondents (%)
<b>Employment sector</b>	
Public hospital	84
Teaching hospital	11
Health clinic	5
<b>Years of dietetic practice</b>	
1-3 years	25
3-5 years	22
5-10 years	41
10-20 years	12
<b>Seen women with GDM</b>	
Yes	80
No	20
<b>No. of GDM clients per day during the previous 3 months</b>	
<4	14
5-9	53
9-12	10
≥12	22
<b>Follow-up service</b>	
Yes	53
No	47

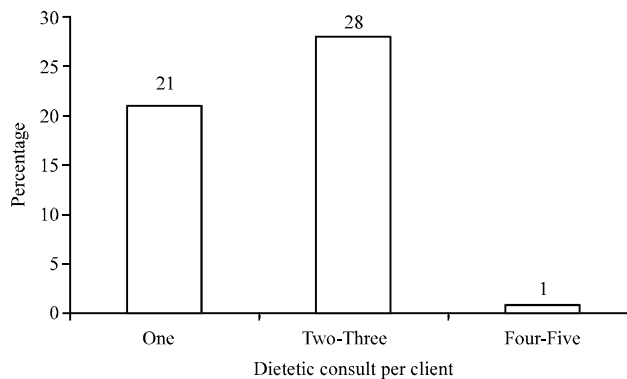


Fig. 1: Frequency of face-to face visits throughout patient pregnancy

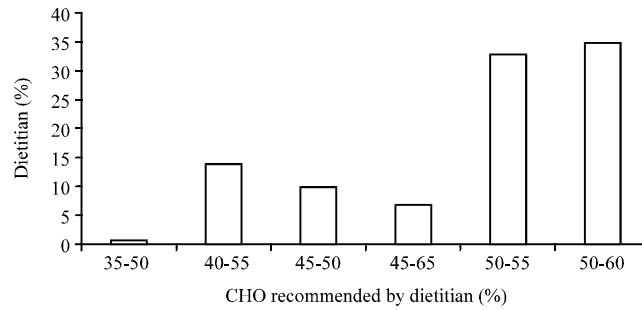


Fig. 2: Current carbohydrate recommendation by Malaysian dietitians

Table 2: Consultation length for GDM dietetic services

Duration	Individual consultation		Group consultation	
	Initial	Follow up	Initial	Follow up
	n = 81%	n = 67%	n = 60%	n = 25%
No.	-	17	26	69
<30 min	28	83	13	21
30-60 min	72	-	56	10
>60 min	-	-	5	-

Table 3: Comparing current macronutrient recommendations between several established international guidelines

References	Carbohydrate (TEI, %)	Protein (TEI, %)	Fat (TEI, %)
Mexico (Perichart-Perera <i>et al.</i> , 2009)	40-45	-	-
California (CDNNS, 2007)	40-45	-	-
American Diabetes Association (2008b)	35-45	-	-
India (SVYM, 2011)	-	20	25
United States (NICHD, 2004)	-	20	28
Canada (Canadian Diabetes Association, 2013)	-	15-20	40
Malaysia current practices	50-60	15-20	20-30

combination of individual and group (5%) dietary counsellings. The types of interventions implemented by the dietitians together with the length of consultation are presented in Table 2.

Dietitians reported that they saw women with GDM usually within 1 week of referral 57 and 65% of women with GDM were provided with initial nutrition information prior to their first dietary counselling. Factors influencing the frequency of dietitians visit included glycaemic control (43%), schedule of appointment with other team members (30%), dietitian clinical judgment (30%), use of insulin (21%), dietetic staffing level (15%) and the patient's literacy levels (10%).

The majority (65%) of respondents reported that their service included recommendation for self-monitoring of blood glucose levels of which 27% provided a reminder or notification program for postnatal glucose tolerance test. In addition, 77% of dietitians documented that women with GDM were provided advice and information during an antenatal dietitian visit regarding lifestyle changes for future T2DM prevention.

Our results showed that 35 and 33% of respondents recommended carbohydrate intake ranging from 50-60% and 50-55%, respectively (Fig. 2). Other macronutrients recommendations were reported to be in the range of 15-20% for protein, 62 and 20-30% for fat (64%; Table 3).

In terms of meal planning, the most common method applied on the first visit was carbohydrate distribution advice was based on flexible carbohydrate portions or exchanges (82%) followed by small meals spread out over the day (62%) and portion control using the plate method (54%). The least common methods used by dietitians were recommending a fixed carbohydrate quantity at meals and snacks (43%) and healthy dietary guidelines based on the Malaysian Food Pyramid (37%). Only 11% of the dietitians incorporated the use of the glycaemic index as a measure of carbohydrate intake into their intervention. Regarding the intake of sugar and sugary food, more than half (58%) of the dietitians allowed women with GDM to consume sugar and sugary food.

## **DISCUSSION**

This study showed the current dietetic practices in the management of GDM among dietitians in Malaysia. The data which included dietetic services, macronutrient recommendations and meal planning methods by Malaysian dietitians in the management of GDM patients are somewhat inconsistencies with international evidence based guidelines for GDM management.

More than half (57%) of respondents reported that they usually saw GDM patients within less than 1 week of referral and the majority (72%) of dietitians documented that individual dietary counselling was done in session of 30-60 min. This is aligned with American Diabetes Association (2008a) guidelines which showed an improvement in maternal and neonatal outcomes with initiation of MNT within 1 week of diagnosis of GDM. Nevertheless, approximately one-third of dietitians provided two to three face-to-face follow-up sessions throughout the patient's pregnancy. In contrast to ADA data, a previous study reported beneficial pregnancy outcomes only when patients underwent at least three nutrition consultations (Reader *et al.*, 2006).

Consistent with international guidelines, the majority of dietitians included a recommendation for patient self-monitoring of blood glucose levels in their nutrition intervention. Self-monitoring of blood glucose is recommended in order to achieve optimal glucose control. In addition to ensure that the patient's diet is adequate, urine or blood monitoring of ketones is also recommended (Canadian Diabetes Association, 2008). According to Metzger *et al.* (2007), because carbohydrates affect blood sugar levels, modifications to the amount and type of carbohydrate recommendations ingested should be included in the diet regime to attain target postprandial blood glucose concentrations.

This study revealed inconsistencies in macronutrient recommendations among dietitians. The largest discrepancy was seen in carbohydrate recommendations with a range of 50-60% of total energy intake. Carbohydrate intake affects postprandial blood glucose levels and high postprandial blood glucose level are associated with increased risk of macrosomia and rate of caesarean section while, insufficient calorie and carbohydrate intake could trigger ketone production (American Diabetes Association, 2008a). Hence, international guidelines advise carbohydrate intake of less than 45% of the total calorie intake (American Diabetes Association, 2008b) and the carbohydrate recommendations in California and Mexico (Perichart-Perera *et al.*, 2009) are 40 and 45%, respectively. Likewise, similar variations were seen in fat recommendation between Malaysian dietitians and other international guidelines including NICHD (2004) and SVYM (2011). Study regarding optimal nutrient intake in the GDM patient population in Malaysia is comparatively limited indicating the need for standardised evidence-based guidelines and recommendations for GDM.

Despite differences in GDM nutrient recommendations, some consistency was seen in the general recommendations for diabetes mellitus between current practice and guidelines. Similarly

to the guidelines by American Diabetes Association (2008b), Current Malaysian practices on meal planning methods incorporated flexible carbohydrate portions and exchanges and small meals spread over the day.

The LGI diet has been reported effective in controlling glucose level in GDM patients. The effect of a low GI diet on women with GDM has been investigated in several well-designed Randomised Controlled Trials (RCTs) that have provided strong evidence supporting this diet. One study performed in Australia showed that the subjects in the low GI group had a significantly reduced the need for insulin compared to the High Glycaemic Index (HGI) group. In addition, that study showed that women who met the criteria to initiate insulin therapy no longer required insulin after using the LGI diet meaning that modification to diet effectively avoided the use of insulin which may present a cost-effective treatment for GDM (Moses *et al.*, 2009). In terms of postprandial blood glucose levels, Perichart-Perera *et al.* (2012) documented that women with a Low GI diet achieved glycaemic goals within 2 h postprandial at lunch and dinner and pre-prandial blood glucose throughout treatment. A low GI diet may be feasible in Asian populations as the staple food in Asia commonly consists of polished rice and refined wheat with high GI and Glycaemic Load (GL) values (Ludwig, 2002) suggesting that the reduction of blood glucose by low GI diet may confer more significant outcomes when apply to Asian women (Yusof *et al.*, 2014). Nevertheless, despite the proven benefits of a low-GI diet, the incorporation of such a diet is low among Malaysian dietitians. Similarly, a cross-sectional study was conducted in 2003 among members of dietitians in Canada found that approximately one-third of dietitians did not incorporate LGI diet in the management of GDM cases. The majority of dietitians documented that the GI concept is too complex for patients and that there is lack of access to educational tools and resources to educate patients on the mechanisms of GI diets (Kalergis *et al.*, 2006).

Despite clear evidence that women with GDM have a high tendency to develop diabetes later in life, there was limited encouragement of postnatal dietetic follow-up in the high risk group, as only 27% of dietitians provided reminders or notification programs for postnatal glucose tolerance testing. However, the majority of dietitians (77%) provided information regarding lifestyle changes for future T2DM prevention during antenatal dietitian visits. Dietitians providing continual advice on healthy food choices, cooking methods and portion size control may help potentially reduce the patient's risk of developing diabetes, obesity, cardiovascular disease (CVD) and cancer later in life (Metzger *et al.*, 2007).

Overall, the results of this study highlight several differences in current dietary practices for the management of GDM among dietitians in Malaysia. Consistency was seen in key components of nutritional intervention. However, there were differences in the delivery of nutrient recommendations particularly in regards to dietary carbohydrate intake indicating the need for consensus on dietetic practice guidelines for the management of GDM. With an increased emphasis on evidence-based medicine, a standardize glycaemic control approaches can be developed to manage women with GDM in Malaysia and thus pregnancy and obstetric outcomes from MNT.

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