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Pilot Study on Barriers Influencing the Compliance towards Dietary Intake in Diabetic Patients

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Abstract

Introduction-Despite the importance of diet, previous studies suggest that individuals with diabetes may not follow recommended guidelines for diet.

Objective-The objectives of this study were to identify the pattern of diet in diabetic patients, and to determine the possible barriers influencing compliance towards diet.

Methods-Cross sectional study with the sample of 127 patients who underwent follow up with Diabetic Clinic of Pulau Pinang Hospital. Convenience sampling used and subjects were given a questionnaire consists of questions on dietary habit and barriers to dietary intake compliance related to belief, knowledge, attitude, and environment. The data analyzed using descriptive statistics in SPSS version 12.0.

Results-The intake of fried foods, sweet treats and snacks were only about 1-3 times per week, and the intake of fruit and vegetables were mostly everyday in most patients. This showed that the pattern of dietary intake was as recommended. In term of the barriers to comply with dietary intake recommendation, belief and knowledge of dietary intake were not the barriers, as patient had the right belief and knowledge regarding dietary intake.

Conclusion-No strong conclusion can be made in regard to the attitude towards dietary intake compliance. The study unable to evaluate whether patients have the right attitude or not that might influence the compliance towards diet. A huge number of patients also stated that the 'feeling of difficulty' to control food intake was also a barrier which related to attitude. Environmental factors such as social gathering reported to be a barrier influencing diet compliance in diabetic patients.

Keynote barriers, compliance, diet, diabetes

INTRODUCTION

The number of people for the whole world with diabetes was estimated to be 135 million in year 1995; increasing to 154 million in the year of 2000; and estimated to be 300 million in the year of 2025. The same phenomenon goes in Malaysia, whereby the First National Health and Morbidity Survey (NHMS 1) conducted in 1986 reported a prevalence of diabetes mellitus of 6.3% and this figure increased to 8.2%. by the Second National Health and Morbidity Survey (NHMS 2) that was conducted in 1996. In addition, according to estimation by World Health Organisation (WHO), Malaysia would have a total number of 2.48 million diabetics in 2030 as compared to 0.94 million in 2000. This automatically predicts the 16.4% increment of diabetic prevalence in Malaysia.[1]

Hence, in order to cope with the increasing prevalence of diabetes, there are many activities planned and done in primary prevention and health promotion throughout the world, as many evidence supported that there were significant impact on reducing consequences of diabetes in all ages, by these measured. [2] For example, the American Diabetes Association recommend structured programme that emphasized lifestyle changes including reduce fat and energy intake, which in turn will be able to reduce for about 5-7% weight loss, thus reduce the risk of developing diabetes. [4]

Besides, three large randomized controlled trials (RCTs) reported the manifestation of the decreasing pattern of diabetes by lifestyle modification. To be specific, the incidence of diabetes was reduced up to 58% in intensive lifestyle intervention for both gender possessed high risk of diabetes, as what shown in the Finnish Diabetes Prevention Study. In that study, subjects were counselled to increase fiber intake, reduce total fat below 30% of total calories, and reduced saturated fat below 10%. [5,8] The Da Qing IGT and Diabetes Study also manifested that the combination of diet plus exercise and diet changes alone were significantly reduced the progression of diabetes in Impaired Glucose Tolerance group. [6,8] The Diabetes Prevention Program Research Group that comprised individual training sessions on a low calorie, low fat diet, aerobic exercise, and behaviour modification also showed corresponding decreased incidence of diabetes, which the greatest results in lifestyle intervention group. [7,8]

Moreover, there are many other evidences showing that dietary intake recommendation adherence will lead to decreasing trend of long term disease complications and occurrence of co-morbid condition for diet-modifiable diseases. [9-11]

Despite the importance to comply with dietary intake recommendation, National Health Interview Survey found that only 60% of individuals with diabetes complied to 'a diabetic diet.'[3] Other investigation reported that dietary change and maintenance are difficult in persons with diet-modifiable chronic disease as most of them do not comply with prescribed recommendations.[12] The same trend of results also happened to many other studies, which manifested that long term compliance with dietary regimens in reducing cardiovascular risk factors is difficult to be practiced.[13-15]

This showed that although so many recommendation exist in order to guide diabetic patient in choosing their food, there are still lacking in the implementation of the recommendations and advices among diabetic patients.

In conjunction, this study will be conducted in order to determine the barriers that may influence the compliance towards dietary intake recommendation in diabetic patients. The specific objectives were to identify the barriers that influence compliance towards dietary intake recommendation in diabetic patients; and to determine the pattern of dietary intake in diabetic patients.

METHODOLOGY

This study designed as a cross sectional study, which was conducted from January to February 2009. It had been registered and approved by Clinical research Centre (CRC) Pulau Pinang Hospital with registration number 2009/04. It also approved by National Medical Research Register-MOH Research and Ethic Committee with ID NMRR-09-14-3246. The population involved in this study was patients who participated in Diabetes Clinic of Pulau Pinang Hospital. Basically, the Diabetic Clinic was held on Monday (3-5pm), Wednesday (3-5 pm), and Thursday (9am-12 pm) every week.

Sample size calculated using Raosoft Programme**.** According to the record from diabetic clinic, the monthly average patients who showed up for follow up in diabetic clinic per month were about 230 patients. According to the Raosoft Programme [17]**,** in order to get 95% of confidence interval, and margin of error equals to 5%, minimum sample of 145 were needed. Therefore the sample size targeted was 150, and 150 questionnaires distributed to the patients, by random sampling. The questionnaire was developed based on few references [18-21] and also own questions. It consists of 2 parts, which are Part 1 and Part 2. Part 1 consists of questions on demographic of the patients. Part 2 is related to the dietary questionnaire, which scored in 5-point Likert Scale ranging from 1-5. There are 5 questions on dietary habit and 12 questions on possible barriers influencing compliance towards dietary intake. These questions were related to belief, knowledge, attitude, and environment. Questions that related to negative responses were scored in reverse manner. Face and content validation was done by supervisor, lecturers and endocrine specialist.

The inclusion criteria are the patients participated Diabetes Clinic of Pulau Pinang Hospital. Whereas, the exclusion criteria involving patient aged less than 16 years, and the patient who were unable to understand and write in Malay or English language, as the tool of data collection, which was a set of questionnaire was developed in only both language.

All the data collected entered into SPSS Version 12.0 and Microsoft Excel for analysis purposes. The data then analysed using descriptive statistic which are mean and mode, suitable to the objectives of this study.

RESULTS

Basically, 127 out of 150 questionnaires distributed were returned, making about 84.6% response rate. The summary of the demographic and background data of the subjects were summarized in the Table 1. Table 2 contained pattern of dietary intake among subjects, and Table 3 divided into 4 sub tables that listed possible barriers towards dietary intake among subjects, which related to knowledge, attitude, belief and environment.

Table 1: Demographic Data of Subjects (N=127)

Variable	Frequency	%
Gender		
Male	56	44.1
Female	71	55.9
Marital Status		
Single	34	26.8
Married	88	69.3
Widow	5	3.9
Age (years)		
0-18	7	5.5
19-30	21	16.5
31-50	35	27.6
51-65	53	41.7
66-70	11	8.7
Duration of diabetes (year)		
0-10	85	66.9
11-20	30	23.6
21-30	9	7.1
31-40	2	1.6
41-50	1	0.8
Race		
Malay	65	51.2
Chinese	37	29.1
Indian	20	15.7
Others	5	3.9
Religion		
Muslim	68	53.5
Buddhist	36	28.3
Hindu	15	11.8
Christian	5	3.9
Others	3	2.4
Employment Status		
Unemployed	35	27.6
Student	11	8.7
Private	34	26.8
Government	20	15.7
Retired	23	18.1
Self employed	4	3.1

Table 2: Pattern of Dietary Intake among Subjects (N=127)

Question		Frequency	%
Frequency of Taking Fried Foods per Week			
Valid	0 time per week	28	22
	1-3 times per week	**89**	**70.1**
	4-6 times per week	8	6.3
	7 times per week	2	1.6
Frequency of Taking Snacks per Week			
Valid	0 time per week	43	33.9
	1-3 times per week	**81**	**65.7**
	4-6 times per week	3	2.4
	7 times per week	0	0
Frequency of Taking Sweet Treats per Week			
Valid	0 time per week	54	42.5
	1-3 times per week	**66**	**51.9**
	4-6 times per week	6	4.7
	7 times per week	1	0.8
Frequency of Taking Fruits and Vegetables per Week			
Valid	0 time per week	0	0
	1-3 times per week	22	17.3
	4-6 times per week	34	26.8
	7 times per week	**71**	**55.9**

Table 3: Factors influencing compliance towards Dietary Intake among Subjects (n=127)

Questions	Strongly disagree No (Valid%)	Disagree No (Valid%)	Neutral No (Valid%)	Agree No (Valid%)	Strongly Agree No (Valid%)	Mean (SD)
BELIEF VS DIET INTAKE						
1. Controlling intake of food can control the diabetes?	3 (2.4)	5 (4.0)	5 (4.0)	25 (19.7)	87 (69.6)	4.50 (0.93)
2. Controlling food intake will reduce the risk of getting other diabetes complications such as kidney damage?	4 (3.2)	3 (2.4)	4 (3.2)	28 (22.4)	86 (67.7)	4.51 (0.85)
KNOWLEDGE VS DIET INTAKE						
3. You need to take foods with low level of salt, oil and sugar?	4 (3.2)	0 (0.0)	6 (4.8)	30 (23.8)	86 (68.3)	4.53 (1.03)
4. You need to increase taking vegetables and fruits in your daily food?	6 (4.8)	4 (3.2)	2 (1.6)	18 (14.5)	94 (75.8)	4.53 (1.03)
5. You are given enough information about the foods that are suitable for you?	4 (3.3)	7 (5.7)	19 (15.4)	45 (36.6)	48 (39.0)	4.02 (1.04)
ATTITUDE VS DIET INTAKE						
6. *You like to eat outside (example at foodstalls and restaurants) without considering whether the food may increase your blood glucose level?	27 (22.3)	37 (30.6)	27 (22.3)	20 (16.5)	10 (8.3)	3.42 (1.23)
7. You are mentally strong enough to control your daily food intake although you need to leave your favourite food?	7 (5.6)	14 (11.3)	44 (35.5)	27 (21.8)	32 (25.8)	3.51 (1.16)
8. You are really particular in choosing foods in order to control your diabetes?	3 (2.4)	11 (8.9)	30 (24.2)	40 (32.3)	40 (32.3)	3.83 (1.06)
ENVIRONMENT VS DIET INTAKE						
9. *The availability of so many food will influence you to take the food without so much thinking?	31 (24.4)	29 (22.8)	29 (22.8)	23 (18.7)	11 (8.9)	3.37 (1.29)
10. Did your family members support you to take low sugar, salt and oil foods and take more vegetables and fruits?	7 (5.7)	2 (1.6)	8 (6.5)	29 (23.6)	77 (60.6)	4.36 (1.07)
11. *Is living alone in your house will make you difficult to control your daily food intake?	32 (25.6)	35 (28.0)	26 (20.8)	23 (18.4)	9 9 (7.2)	3.46 (1.25)
12. *Availability of many fast food restaurant (such as KFC, Pizza Hut, Mc Donald) attract you to eat the food at such places?	37 (29.1)	35 (27.6)	24 (18.9)	9 (7.1)	22 (17.3)	3.44 (91.42)

*Question 6,9,11 and 12 were coded in reverse manner

Out of 127 subjects, 44.1% of them were male and 55.9% of them were female. 69.3% of the respondents were married and this showed that majority of the patients had family and therefore had good social support background. The age range reported the highest subject's age were from 51-65 years old (41.7 %), followed by 35-50 years old (27.6%), and the rest as stated in the table. Majority of patient suffered from diabetes for 0-10 years (66.9%). The results showed Malay as the highest respondents (51.2%) in this study. Other classifications involved the employment status of the patients. Most of the respondents were not having any job at the time, as 26.8% of them were unemployed and 18.1% of them were retired.

Table 2 summarized the dietary habit among subjects, which were the frequency of taking fried foods, snacks, sweet treats, and vegetables together with fruits. As reported in the table, most of the patient (70.1%) only consumed 1-3 times per week fried foods, such as fried chicken, French fries, and etc. Regarding snacks intake such as 'keropok lekor', 'pisang goreng' and etc intake, majority of the patients consumed those foods for about 1-3 times per week (65.7%). Moreover, the same results also went to the frequency of taking sweets treats like candy, chocolate and cakes, where the total of 94.4% of the respondents consumed these foods for 0-3 times per week. On the other hand, about half of respondents (55.9%) consumed fruits and vegetables everyday, and none of them never consumed those foods. This showed an acceptable eating pattern possessed by majority of the respondents.

Table 3 summarized the possible barriers influencing compliance towards diet intake recommendation, which classified into 4, which were belief, knowledge, attitude, and also environment. Regarding patients' belief, 69.6% (n=87) patients believe that controlling food intake can control the diabetes, and only 2.4% (n=3) strongly disagreed. For the second questions, 68.8% (n=86) of them believed that controlling food intake will reduce the risk of other diabetic complications such as kidney damage and etc, but only 3.2% of them (n=4) did not believed with that statement.

Evaluation of knowledge as a barrier influencing compliance towards diet intake was also done. Firstly, 68.3% of patient answer correctly (n=86) that they need to take food with low level of salt, oil and sugar but only 3.2% (n=4) of them wrongly answered the question. 75.8% (n= 94) of them correctly answer that they need to consume more vegetables in their daily food intake and only 4.8% of them (n=6) falsely answered the question. Total number of 75.6% of subjects (n=93) were strongly agreed and agreed that they had given enough information regarding the foods that are suitable for them.

The third aspect which was attitude as a barrier influencing compliance towards diet intake also summarized in Table 3. About 52.1% of subjects strongly disagreed and disagreed (n=63) and only 25.6% (n=31) of respondents strongly agreed and agreed that they like to eat outside (example at food stalls and restaurants) without considering whether the food may increase their blood glucose level. Besides, total numbers of 64.6% subjects (n=80) strongly agreed and agreed that they were particular in choosing foods in order to control their blood glucose level, and only 10.8% (n=14) answered the other way around. These showed that these patients still had awareness about what foods were best for them, and have good attitude about food intake. However, majority subjects, 35.5% answered neither disagree nor agree (n=44) that they were mentally strong enough to control the dietary intake, although they need to avoid taking their favourite foods.

Last focus will be addressed on the evaluation of environment as the barrier influencing the compliance towards diet intake recommendation. High percentage of subjects, which was 48.8% stated that they were strongly disagree and disagree (n=60) to the fact that the availability of so many foods influence them to take them without so much thinking, but only 27.6% (n=32) of them answered in contrast. This means that majority of them still can control their food intake despite the availability of variety of foods. In addition, 62.6% stated to be strongly agreed (n=77) that their family members support them to take correct amount of foods servings, which are low sugar, salt, oil and more fruits and vegetables, and only 5.7% of the respondents (n=7) were strongly disagreed. Total of 53.6% (n=67) respondents were strongly disagreed and disagreed but only 25.6% (n=32) were strongly agreed and agreed that living alone at home can be a barrier influencing compliance towards diet intake. Majority of patients, totaled up to 56.7% (n=62) denied and only 24.4% (n=31) admitted that the availability of fast food restaurants influence them to noncompliance towards dietary intake for diabetic patients.

DISCUSSION

From the results of first three class of foods above, which were fried foods, snacks, and sweet treats, it showed that diabetic patients who underwent follow up with Diabetic Clinic of Hospital Pulau Pinang had a very good control regarding intake of discussed foods, as majority of them only

consumed 1-3 times of fried foods, snacks, and sweet treats per week. This was because, according to American Diabetic Association's Food Pyramid, these three types of foods located at the very top of the pyramid, which needs to taken only in little amount.[10] The subjects in this study had a very good pattern of fruits and vegetables intake, as majority of them consumed those foods everyday. According to American Diabetic Association Foods Pyramid, vegetables and fruits located at the very bottom of the food pyramid, which means that these foods needs to be taken in the largest amount.[22,23]

However, according to a study done by Neema et al, pattern of dietary intake was very poor in term of compliance, which did not reflect results of this pilot study. The difference might be caused by the difference of patient's characteristics, sample size and also country's type of available food, that influence their food choices.[24]

Further discussion will be addressed on possible barriers influencing compliance towards diet intake recommendation, which classified into 4, which were belief, knowledge, attitude, and also environment.

Patient's belief towards effects of diet intake towards their diabetes condition is not likely the barrier influencing compliance towards dietary intake among diabetic patients. This was because majority of the patient held a right belief regarding the effects of food to their diabetes condition, hence won't be a possible barrier for them to comply with the right dietary intake. This finding was also supported by a study titled The Relationship between Health Belief, Adherence, and Metabolic Control of Diabetes, Kathleen L. W, et al that demonstrated that health belief are amendable to positive changes, perhaps as a result of the process of diabetes education, however, whether or not modification in health belief in turn, improve adherence or metabolic control of diabetes remains an unanswered question.[25] Other research by Anna Maria Patino, et al, founds out that health beliefs of minority youths with Type 1 diabetes mellitus did not predict regimen adherence or glycemic control.[26]

These results on assessment of patients' knowledge resembled that mostly patient understand the basic principles of their diet intake, and had good knowledge in term of suitability of foods for them. The information mainly given in the form of counseling and written materials such as pamphlets, and were easy accessed by the patients. Based on the results, clearly showed that knowledge is not the barrier to compliance towards diet intake in diabetic patient. This most probably due to efforts of health care practitioner in increasing knowledge of these group of patients, by giving counseling on dietary intake. In conjunction, a DOVES Study by Jayendra H Shah, et al; poor compliance with American Diabetic Association-Diet Recommendation (ADA-DR) was not related to diabetes knowledge or cognitive functioning. [16] This automatically supported our study's result.

Overall, no strong conclusion can be made in regard to the attitude towards compliance to dietary intake. The study unable to evaluate whether patients have the right attitude or not that might influence the compliance towards diet. This could be explained by the high number of patients who uncertain or doubtful about the ability to avoid their favorite food, although the foods may increase their blood glucose level. The effects of attitude towards diabetic patient's compliance also reported by a study titled Diabetes, Attitude, Wishes, and Needs (DAWN). The study revealed that rates of self-management attitude and behaviours were low, especially for diet and exercise. [27] Therefore, in order to have a concrete manifestation on this matter, this pilot study might need to be improvised, by having higher sample size in the future.

The findings on environmental factors concluded that environment; in the sense of availability of so many foods, living alone, and availability of many fast foods restaurant were not a barrier influencing compliance towards diet intake among diabetic patients. These group of people also were likely won't be influenced by availability of so many foods, living alone, and availability of many fast foods restaurant nowadays that offer variety kinds of delicious foods. Besides, the other environment factor, which was family support also showed positive outcome, where majority of patient's family members did support them to comply with diet intake recommendation.

Besides the factors above, patients were also asked about the other barriers that may influence compliance towards diet control in them. Majority of the respondents (46.3%) answered that 'feels difficult to control food intake' was the highest barrier for them (n=19). This had to do with lack of determination to control food intake, difficult to follow food regimen, and because of the taste of foods which was not parallel with one's appetite. Social gathering was reported to be a barrier in complying with diet intake recommendation as 22.0%, (n=9) of them answered that. Besides, 17.1% of them (n=7) answered that festivals or ceremonies also would be the barriers for them to control diet intake. This might be because in these kind of occasion, they tend to eat whatever given to them as there were not many choice of suitable

foods available for them as diabetic patients. In addition, 14.6% of subjects (n=6) reported that stress also would be a barrier to control their food intake. Based on a study by Vijan et al on the barriers to follow dietary recommendations stated that in the focused groups, the most commonly identified barrier was support and family issues, and quality of life and lifestyle issues and also rigid schedule of a diabetes diet was problematic, as what experienced by the subjects of this study [28] However, in our study, family issue is not the barriers, as the diabetics' family members provided utmost support to practise recommended dietary intake for diabetics.

In conjunction, a similar study in a larger extent can be conducted in future as this survey study only involved samples from patients who underwent follow up at Diabetic Clinic of Pulau Pinang Hospital. Hence, the results might not able to reflect all of the diabetic patients throughout Malaysia and all over the world.

CONCLUSION

In term of the barriers to comply with dietary intake recommendation, belief and knowledge of dietary intake were not the possible barriers, as patient had the right belief and knowledge regarding dietary intake. Overall, no strong conclusion can be made in regard to the attitude towards compliance to dietary intake. Environmental factors as festivals, ceremonies and social gathering also reported to be a barrier influencing diet compliance in diabetic patients.

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