Nurse Media
JOURNAL OF NURSING

Dietary Behaviors among Patients with Type 2 Diabetes Mellitus in Indonesia

Aklima, S. Kep., Ns[1], Charuwan Kritpracha, RN., PhD.[2], Ploenpit Thaniwattananon, RN., Ph.D[3]

Purpose: To describe the dietary behaviors among patients with Type 2 Diabetes Mellitus (T2DM) in Indonesia.
Method: Sixty patients with T2DM who met the inclusion criteria were selected from four villages of the Banda Raya Community Health Centre in Banda Aceh, Indonesia. Patients' dietary behaviors were measured by the Self-Management Dietary Behaviors Questionnaire (SMDBQ). The SMDBQ was modified from the previous study with adequate reliability (Chronbach's alpha was .82).
Result: The subjects who participated in this study were middle aged adults (53 years). More than half of the subjects in this study were female (76.7%). All of the subjects were Muslim. More than one-third had an education level of senior high school (38.3%). The majority of the subjects had no experiences with any previous educational program or counseling program related to dietary behaviors (86.7%). The results showed a moderate level of dietary behaviors of patients with T2DM in Aceh, Indonesia.
Conclusions: The dietary behaviors among Type 2 diabetic patients in Aceh, Indonesia were at a moderate level. Regarding dietary behaviors scales, almost all items were at a moderate level. However, recognizing and consuming the amount of calorie needs was at a low level. Further research is needed in terms of dietary self-management by using an intervention approach to improve the dietary behaviors of diabetic patients.
Key words: Type 2 diabetes mellitus, dietary behaviors.

---

[1] Master Student, Master of Nursing Science (International Program), Faculty of Nursing, Prince of Songkla University, Thailand and Nursing Lecturer of Nursing School, Faculty of Medicine, Syiah Kuala University, Banda Aceh, Indonesia (Corresponding Author: iklil_juli85@yahoo.co.id)
[2] Lecturer, Department of Medical Nursing, Faculty of Nursing, Prince of Songkla University, Thailand
[3] Assistant Professor, Department of Medical Nursing, Faculty of Nursing, Prince of Songkla University, Thailand

Background

Diabetes mellitus (DM) is a global health problem. The current World Health Organization (WHO) indicates 346 million people worldwide have diabetes (WHO, 2011). The World Health Organization statistics show that Indonesia has the fourth highest number of diabetes sufferers. The International Diabetes Federation's 5th convention estimated that in 2011 there were 71.4 million people in the South East Asian region suffering with DM. Within the 21st century a figure projected to reach over 21 million. Within this century it has been predicted that the number of DM sufferers will reach over 21 million and by 2030 the figure is estimated to reach 21.3 million if people do not change their lifestyles (Health Department of the Republic Indonesia, 2005). Currently, based on the statistics of the Health Research Association of Health Basic Research in Indonesia in 2007, three regions in Indonesia have a diabetes prevalence rate above 1.5 %: Aceh, East Java and North Sulawesi (Widjojo, 2011).

Diabetes and associated complications are a major health care burden worldwide (Ignatavicius & Workman, 2010) and present major challenges to patients, and health care systems. In order to control the complications and improve the outcomes, appropriate and adequate management for this disease must be taken. Furthermore, diabetic patients have to control their disease routinely and manage their life style including dietary management to prevent diabetic complications. Dietary management is a fundamental part of managing diabetes (Arsand, Tufano, Ralston, & Hjortdahl, 2008).

There are several studies related to dietary behaviors in Indonesia (Nazir, 2009; Primanda Kritpracha & Thaniwattananon, 2011) which have found that cultural background, monthly income, and experiences in receiving dietary education programs might contribute to dietary behaviors. On the other hand, Indonesia consists of numerous distinct ethnic, linguistic, and religious groups across numerous islands, therefore the results from the previous studies could not be generalized easily. However, these studies were conducted in a single area in Indonesia, and may not be generalized to other settings in Indonesia, a country with various

ethnic groups and cultures, and thus different characteristics of patients. Therefore, dietary behaviors among patients with T2DM in Indonesia still need to be described.

Objectives

The objective of this study was to describe dietary behaviors among T2DM patients in Indonesia.

Method

Settings

The patients of this study have been selected from four villages of the Banda Raya community health center based on the inclusion and exclusion criteria. This study was conducted in their homes.

Sample

Four villages were selected in this study and sixty subjects who met the inclusion criteria were enrolled from those villages. The inclusion criteria included having a fasting blood glucose (FBG) ≥ 126 mg/dl, over 18 years of age, able to communicate in Indonesian language, willing to participate in the study, and having no mental health problems.

Data Collection Instruments

The Demographic Data Questionnaire (DDQ). This questionnaire was developed by the researcher to collect the patient's demographic data. It consists of the following items: age, gender, religion, marital status, level of education, occupation, income, experiences of attending a dietary educational program and sport activity. Meanwhile, smoking history, co-morbid morbid disease, and the duration of diabetes, the benefit of a checkup, current medication, BMI, and the last FBG were collected as clinical characteristics of the subjects. FBG was classified into three categories based on ADA (2009) as follows: controlled glycemia (FBG ≤ 153 mg/dl), intermediate glycemia (FBG 154 -211 mg/dl), and poorly

controlled glycemia (≥ 212 mg/dl). The patient's BMI was classified based on WHO expert consultation (2004) as follows: underweight (BMI <18.5), normal weight (BMI = 18.5 - 24.9), overweight (BMI = 25 – 29.9) and obesity (BMI ≥30).

The Dietary Behaviors Questionnaire (DBQ). The DBQ was modified from *Primanda's* work (2011) that was developed and used for the Indonesian population. This instrument was reviewed and modified based on the patient's culture in Aceh. The DBQ comprised of four dimensions: selecting a healthy diet, arranging meal times, recognizing the amount of food calories and managing dietary behavior challenges. The questionnaire consists of 29 items. Each item yields a score of 1-4 according to the subjects' responses based on the Likert scale: 1 = never, 2 = sometimes, 3 = often, 4 = routinely, with the possible score ranging from 29 to 116. The higher the DBQ score the better the dietary behaviors indicated.

Ethical consideration

The researcher obtained the approval from the Ethics Committee of the Faculty of Nursing, Prince of Songkla University, Thailand. The permission for data collection was obtained also from the authority of the target setting. The subjects were approached with all needed information given. They had been assured that they had the right to refuse to participate in this study at any time without any negative consequences. They were given an informed consent form and a brief explanation about the study before they decided to participate in the study. The identities of all patients were coded in order to keep confidentiality and anonymity.

Data Analysis

Descriptive statistics were used in this study. Descriptive statistics were used to describe the subjects' demographic and health-related characteristics, and dietary behaviors in terms of frequency, percentage, mean, and standard deviation.

Results

Demographic Characteristics

Demographic characteristics of the patients with T2DM in Aceh, Indonesia are presented in Table 1. According to the data, the subjects who participated in this study are middle aged adults with an average age of 53 years. More than half of the subjects in this study are female (76.7%). The majority of the subjects are married (80%). All of the subjects are Muslim. In terms of education levels, more than one-third of the subjects have an education level of senior high school (38.3%). The results show that 52 of the subjects had no experiences with any previous educational programs or counseling programs related to dietary behaviors (86.7%).

Table 1. Demographic Characteristics of the Patient with T2DM in Aceh, Indonesia (N=60)

Characteristics	M (SD)	N	%
Age (Min-Max = 31-76 years)	51.92 (10.053)		
Gender			
Female		46	76.7
Male		14	23.3
Marital status			
Married		48	80.0
Widow/widower		12	20.0
Muslim		60	100
Education			
None		5	8.3
Elementary school		14	23.3
Junior high school		11	18.3
Senior high school		23	38.3
University		7	11.7
Occupation			
None		37	61.7
Farmer		1	1.7
Laborer		2	3.3
Government employee		3	5.0
Business		11	18.3
Retired		6	10.0
Monthly income			
< Rp.500.000 (<55 USD)		31	51.7
Rp.500.000-Rp.1.000.000 (55-111 USD)		14	23.3
Rp.1.000.000 - Rp.2.000.000 (111-222 USD)		9	15.0

Characteristics	M (SD)	N	%
>Rp.2.000.000 (>222 USD)		6	10.0
Cooking and preparing foods			
Self		32	53.3
Family		28	46.7
Sport activity			
None		28	46.7
<3 times a week		21	35.0
At least 3 times a week		11	18.3
Educational program			
None		52	86.7
Physician		8	13.3

Regarding the clinical characteristics of the patients with T2DM in Aceh, Indonesia (N = 60) as shown in Table 2, the results indicate that nearly all subjects believed that checkups are beneficial for their health. Nearly half of the subjects (48.3%) had no co-morbid disease. The average time of subjects being diagnosed with T2DM was 4 years (3.59). The average BMI of the subjects is close to overweight (23.766). The average FBG of the subjects is 227.78 mg/dl (SD= (85.073).

Table 2. Clinical Characteristics of the Patients with T2DM in Aceh, Indonesia (N = 60)

Characteristics	M (SD)	N	%
Smoking			
No		50	83.3
Yes		10	16.7
Benefit of checkup			
No		1	1.7
Yes		59	98.3
Duration of having diabetes	4.43 (3.59)		
Co-morbid diseases			
None		29	48.3
Hypertension		9	15.0
Gout		12	20.0
Hypertension and gout		3	5.0
Cardiovascular		6	10.0
Tuberculosis		1	1.7
Medicines			
Insulin		5	8.3
Oral hypoglycemic agent (OHA)		47	78.3
Insulin and OHA		8	13.3
BMI	23.766 (4.00)		
Last FBG	227.78 (85.073)		

Patient's Dietary Behaviors

Table 3 shows the mean, standard deviations (SD), and the levels of dietary

behaviors (N=60). According to the data, the total level of dietary behaviors of the subjects are at moderate levels (M = 76.28, SD = 9.449). Selecting a healthy diet, arranging meal plans and managing dietary behavior challenges were at a moderate level. In contrast to the dimension of dietary behaviors, recognizing and consuming the amount of calorie needs are at a low level.

Table 3. Mean, standard deviations (SD), and the levels of dietary behaviors (N=60)

No	Variables	Possible score	Min-Max score	Mean	SD	Level
1.	Recognizing and consuming the amount of calorie needs	3-12	3-12	8.77	2.020	Low
2.	Selecting healthy diets	14-56	24 - 46	36.92	5.218	Moderate
3.	Arranging meal plans	5-20	8 - 19	14.07	2.603	Moderate
4.	Managing dietary behavior challenges	7-28	10 - 24	16.53	3.175	Moderate
5.	Total of dietary behaviors	29-116	52 - 94	76.28	9.449	Moderate

Discussion

The results revealed that the dietary behaviors of the patients were at a moderate level. The patients improved their dietary behaviors due to several reasons. The first reason may be from the patients' self learning. During the time they had been diagnosed with T2DM, the patients might develop their self-learning process in what the healthy foods are that they need to eat in order to control their blood sugar levels and prevent complications. The patients may have realized that they had to avoid sugar and fatty foods. Therefore, after they had been diagnosed with diabetes mellitus, they managed their dietary behaviors by selecting healthy food, arranging meal plans and managing dietary challenges. Funnell and Anderson (2004) stated that patients with chronic illness are experts on their lives and they learn to control their diseases.

The second reason may relate to the unstructured educational program during the patients' visits to the community health centre. The patients might receive informal information from physicians, and/or nurses. The information improves the patients' knowledge about diabetes management including dietary management. This knowledge is

useful to help the patients to select better dietary behaviors (Primanda et al, 2011).

The third reason may relate to the social support of the family. The family provides direct support to the patient and also benefits self-management (Toljamo & Hentimen; Wang & Fenske at cited in Xu, Toobert, Savage, Pan, & Whitmer, 2008). Support from family members, for example to prepare food, encourage the patient to eat healthy food, and have meal time together help the patients maintain their dietary behaviors. In Indonesia, the families eat together at meal times, especially the midday meal (Culture grams, 2005). Therefore, good communication and supportive behaviors among the family and patient can be one factor to enhance healthy behaviors (Bodenheimer, Lorig, Holman, & Grumbach, 2002). The family members also can provide solutions to the patients in order to manage their dietary behaviors.

The fourth reason may relate to the patients' beliefs. The result showed that the majority the patients understand the benefit of a checkup in order to control their blood glucose levels. Patients' beliefs about the seriousness of their condition and in treatment effectiveness have been associated with better dietary self-management in T2DM. The previous study found that an increased perception of control and understanding of diabetes were associated with better dietary management (Harvey & Lawson, 2009).

The fifth reason may relate to the cultural consideration of the patients and their family in managing their dietary behaviors. In Indonesia, a meal is always eaten with rice (Primanda et al., 2011). Indonesian people feel that they have not really had a meal until they eat rice although they may have eaten some other foods that are made from rice also (Klaudine as cited in Primanda et al., 2011). Regarding the Indonesian traditional customs and ceremonies, there are many customs and ceremonies that incorporate food and invite the relatives and/or other guests to share a meal. They prepare the foods that contain fat and also sweet foods. Those sweet foods are not recommended for diabetic patients and challenge the

patients to self-manage their dietary behaviors. However, the result showed that at the baseline, the patients had good dietary behaviors. The ability of patients to manage dietary behaviors may also relate to the Muslim culture in Indonesia as the majority of people are Muslim. Muslims have to fast during Ramadan month and they are recommended to eat healthy food, arrange meal times and portion out the food consumed during this month. It trains the patients to manage their diet.

In contrast, the result showed that patients had low levels of recognizing and consuming the amount of foods based on calorie needs. This might be due to the patients not paying attention to the amount of foods they consume when they have a meal and the enjoyment of their food although the food has high sugar or high calorie content. If the patients enjoy these foods, they will continue eating many of them (American Medical Association [AMA], 2003). Another reason may relate to food taste. Familiar foods have the potential for patients to become accustomed to the taste, which could lead to a desire to eat more of them and consume more than the required amount, which would thereby reduce their dietary management behaviors (Ahring, Be´ langer-Quintana, Dokoupil, Ozel, Lammardo, MacDonaldet al., 2009).

Conclusions

The dietary behaviors among type 2 diabetic patients in Aceh, Indonesia were at a moderate level. Regarding the items of dietary behavior scales, almost all items were at a moderate level. There are some factors that relate to these findings; patients' self learning, unstructured educational program, social support of the family, patient's beliefs, and cultural consideration. However, recognizing and consuming the amount of calorie needs was at a low level which might relate to the patient's awareness, the food tastes and the difficulty of calorie needs measured.

Recommendations

Several factors should be considered and appropriately used to achieve better dietary behaviors of diabetic patients. Further research is needed in terms of dietary self-management by using an intervention approach towards the individual, family support or group-based programs.

References

Ahring, K., Be´ langer-Quintana, A., Dokoupil, K., Ozel, H. G., Lammardo, A. M., MacDonald, A., et al. (2009). Dietary management practices in phenylketonuria across European centers. *Clinical Nutrition, 28*, 231–236.

American Medical Association (AMA). (2003). *Assessment and management of adult obesity: A primer for physicians*. The Robert Wood Johnson Foundation.

Arsand, E., Tufano, J. T., Ralston, J. D., & Hjortdahl, P. (2008). Designing mobile dietary management support technologies for people with diabetes. *Journal of Telemedicine and Telecare, 14*, 329–332.

Bodenheimer, T., Lorig, K., Holman, H., & Grumbach, K. (2002). Patient self-management of chronic disease in primary care. *Journal of the American Medical Association, 288* (19), 2469-2475.

Culture Grams. (2005). *Republic of Indonesia*. Retrieved on June 15, 2011. From http://www.proquestk12.com/downloads/Indonesia.pdf

Funnell, M. M., & Anderson, R. M. (2004). Empowerment and self-management of diabetes. *Clinical Diabetes, 22* (3), 123-127.

Grey, M., Knafl, K., McCorkle, M. (2006). Aframework for the study of self- and family management of chronic conditions. *Nursing Outlook, 54*, 278-286.

Harvey, J. N., & Lawson, V. L. (2009). Review article: The importance of health belief models in determining self-care behaviour in diabetes. *Diabetic Medicine 26*, 5–13.

Health Department of the Republic Indonesia. (2005). *Diabetes mellitus masalah kesehatan masyarakat yang serius (Diabetes mellitus is a serious helath problem).* Pusat data & Informasi Departement Kesehatan. Retrieved September 23, 2010, from http://www.Dinkes-tanjab-barat.go.id

Ignatavicius., Workman., & Mcleod, M. E. (2010). *Medical surgical nursing; Patient-centered collaborative care (6th ed)*. Saunders, chapter 67, pp.1465-1521.

Kang, C-M., Chang, S-C., Chen, P-L., Liu, P-F., Liu, W-C., Chang, C-C., & Chang, W-Y. (2010). Comparison of family partnership intervention care vs. conventional care in adult patients with poorly controlled type 2 diabetes in a community hospital: A randomized controlled trial. *International Journal of Nursing Studies 47*, 1363–1373.

Nazir, Y. H. (2009). *The effect of a health belief model based education program to prevent diabetes complications on dietary behaviors of Indonesian adults with type 2 diabetes mellitus*. Unpublished master thesis, Prince of Songkla University, Hatyai, Thailand.

Primanda, Y., Kritpracha, C., & Thaniwattananon, P. (2011). *Effect of dietary self-management support program on dietary behaviors in patients with type 2 diabetes mellitus in Yogyakarta, Indonesia*. Unpublished master thesis, Prince of Songkla University, Hatyai, Thailand.

Widjojo, B. (2011). *The rapid rise of Diabetes in Indonesia*. Retrieved on June 20, 2011, from http://www.republika.co.id/berita/nasional/umum/11/06/08/lmh6cj-wew-penderita-diabetes-di-indonesia-melonjak-pesat

World Health Organization. (2011). Diabetes. Retrieved February 27, 2012, from: http://www.who.int/mediacentre/factsheets/fs312/en

Xu, Y., Toobert, D., Savage, C., Pan, W., & Whitmer, K. (2008). Factors influencing diabetes self-management in chinese people with type 2 diabetes. *University of Miami, 31* (6), 613-25.