Research Article

Level of Awareness and Compliance in Diabetes Mellitus Management Among Adolescents Diagnosed with Type-1 Diabetes

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Abstract

Photo taken from: http://www.uniteddiabeticsupplies.com/

The study aimed to determine the level of awareness and to assess compliance to Diabetes management of adolescents diagnosed with Type-1 Diabetes. A descriptive correlational type of research was utilized to gather information on the level of awareness and compliance of adolescent patients to diet, exercise and drug management suffering from Type-1 diabetes mellitus. The patients (n=20) were recruited from Institute for Studies on Diabetes Foundation Incorporated, Philippines. A purposive sampling was utilized to select twenty adolescents. A researcher-made questionnaire was utilized as the main instrument in gathering data. Focus group discussion was also done to further assess patient's level of awareness and compliance to diabetes management. Results showed that patients have a moderate level of awareness and some extent of compliance to diabetes. Patients have extreme awareness in diet management and moderate awareness in exercise and drug management. In terms of compliance, patients are compliant to some extent only, while drug management has the highest level of compliance, followed by exercise and diet. There is a low correlation between level of awareness and compliance in diabetes management (r = .32 p = 0.15), indicating that the moderate level of awareness of patients to DM management is not related to their compliance. The results are limited only to the participants of the study. Further study using a larger population and different setting is recommended. Nurses taking care of adolescent patients with diabetes mellitus must understand the importance of health education. Health educations are valuable to increase level of awareness and extent of compliance of adolescent patients with Type-1 diabetes.

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Introduction

The incidence of Diabetes Mellitus (DM) is rapidly increasing in a global basis according to the World Health Organization (Parker & Irons, 2006), resulting in the development of evidence-based guidelines for control and management of DM in many countries around the world. The Asia-Pacific has the largest diabetes burden in the world exemplified by a number of overweight and obesity in almost of the entire region according to Sy (2008).

In the Philippines out of its thirteen regions included in the cohort study by Gallardo (2009), six regions show the alarming growth of diabetes with Impaired Fasting Glucose (IFG) and Increased Glucose Tolerance (IGT). The Philippines warrant early aggressive intervention for diabetes mellitus prevention and management which is comprise of diet, exercise and drugs to effectively manage patients with Type-1 diabetes.

Diabetes Mellitus is a condition requiring a high incidence of self-management along with intensive medical care to reduce the incidence of its acute and chronic complications. DM is one of the chronic lifestyle diseases affecting a large sector worldwide. Figures published by World Health Organization (WHO) estimated that 150 million have DM and that this figure will double by the year 2025. Management studies for DM in first world countries may vary largely from management strategies applied in the third world areas because of economic and manpower factors. In the Philippines, the Department of Health (DOH) included DM prevention control under the Healthy Lifestyle program. It ranks third among the dreaded lifestyle-related diseases in the country today.

The study of Ardena (2010) revealed that, in the Philippines most of the patients with Type-1 diabetes do not own a glucose- meter and do not consult the doctor on a regular basis. The findings may be related to the increased untreated cases of diabetes mellitus. The knowledge, attitudes and practices of Type-1 diabetes patients were impaired and there is a need for health education to improve management of diabetes and prevent complications. In addition, according to Higuchi (2010) there is also an ineffective access to diabetes care and management in the Philippines. The application of standard treatment/management guidelines will be of help to encourage patients to seek and receive regular care.

Similar studies on knowledge regarding causes of Type-1 diabetes, its prevention and the methods to improve health were conducted. Flores (2006) explained that the tools used in diet management include the Food Exchange List (FEL), Food Composition Table (FCT) the nutritional guidelines and the food pyramid. Results of the study by Krousel-Wood (2008) also emphasized the importance of exercise management. Physical activity, tele monitoring and low calorie diet can be effective in lowering the glucose and HbA1c levels. American Associations of Clinical Endocrinologists (AACE, 2007) recommended that intensive insulin therapy may reverse hypoglycemia unawareness in patients with Type-1 diabetes and can substantially prevent hypoglycemia and maintain target glycemic level.

It is of great importance to understand the possible effects of the disease on the lives of these patients which somehow affect their compliance to the management of Type-1 diabetes. Having much knowledge on the effects, anxiety and adjustments confronting these patients, it is important to empower the patients to effectively manage their own disease. For effective management and to be successful in preventing complications of this chronic and debilitating disease, patients must be equipped with necessary knowledge, skills, and attitude.

Objective of the study

The study was conducted to determine the level of awareness and compliance to DM management of adolescents with Type-1 diabetes. It also determined the relationship of the level of awareness and compliance to DM management.

Method

Research Design

The study utilized a descriptive correlational research design to describe the level of awareness and compliance to DM management of adolescents with Type-1 diabetes. Beck and Polit (2009) stated that descriptive research is focused on understanding the causes of behavior, conditions and situations and in which data gathering is done through observation, survey and interview.

Study Site

The study was conducted at the Institute for Studies on Diabetes Foundation Incorporated (ISDFI) located at

Marikina City, Philippines. The foundation is known in the Philippines in delivering excellent and humane diabetes care and caters to adolescent patients with Type-1 diabetes (ISDFI, 2009). ISDFI is a private institution operated by different private and government organizations led by medical practitioners and support groups.

Participants

There is an increase incidence of diabetes in children and adolescents in the Philippines, but data on childhood diabetes is scarce (Sy, 2008). In the ISDFI only few adolescent patients with Type-1 diabetes receiving care, falls on our inclusion criteria. A purposive sampling was conducted to identify twenty adolescent patients. Participants were selected according to the inclusion and exclusion criteria set in the study. They are adolescent patients who were diagnosed of Type-1 diabetes and whose age ranges from 12 to 18. They were diagnosed of Type-1 diabetes at least six months before the conduct of this study and were regularly visiting the ISDFI for check-up at the clinic's foundation.

Ethical Clearance and Informed consent

The study has an approved ethical clearance from Centro Escolar University (CEU) Institutional Review Board (IRB) and the ISDFI IRB committee. Informed consents were sought from the parents or guardians of the twenty participants. The rights, privileges, obligations, risks and benefits of the participants were included in the orientation process. They are also oriented about the instrument and the conduct of the Focus Group Discussion (FGD) prior to data collection. Anonymity and confidentiality were observed during the conduct of research and audio-taped used in the FGD were destroyed after analysis of data.

Formulation and Administration of the Questionnaire

A researcher made questionnaire was developed based on the context of the disease process and the management of Type-1 diabetes with the specific treatment protocols and the responses of the participants to the treatments. The instrument was validated by five experts in diabetes management and had undergone reliability testing using Cronbach's alpha coefficient reliability (α coefficient =0.80) with ten respondents excluded in the total sample of the study. The validated questionnaire comprised the level of awareness and compliance of adolescents with Type-1 diabetes to DM management. Responses for each item were weighed using Likert's five point scale which ranges from extremely aware (5) to not aware (1) for the level of awareness; and to a very great extent of compliance (5) to a very small extent of compliance (1) for the level of compliance to Type-1 diabetes management.

A focus group discussion (FGD) was done to deepen the assessment of the level of awareness and evaluate the extent of their compliance to DM management. The FGD was conducted to validate the answers of the patients in the self-made questionnaire regarding their knowledge of the disease and compliance with diabetes management. Results of the FGD were validated from member check.

Data Analysis

The results were analyzed utilizing Statistical Package for Social Sciences (SPSS) version 19 software. Mean and SD was used to describe the level of awareness and compliance of the patients to diabetes management. Pearson correlation was utilized to determine relationship of the level of awareness to the extent of compliance of the patients to diabetes management.

Results

Patients are mostly female (65% n=20); 12 years old (30% n=20) finished primary education (80% n=20); catholic (85% n=20); no vices such as smoking and drinking alcohol (95% n=20); have no physical activity (45.84% n=20); diagnosed of Type-1 diabetes for > 5 years and with history of diabetes in the family (65% n=20). Patients were regularly visiting the ISDFI for check-up at the clinic's foundation.

It can be seen in Table 1 that patients with Type-1 diabetes are extremely aware on the importance of blood sugar control, signs and definition of hyperglycemia and with diet, exercise and drug as part of diabetes management (mean= 5.0, mean= 4.85, mean=4.75, and mean= 4.60 respectively). Patients have moderate awareness on symptoms of diabetes (mean= 4.45), signs of hypoglycemia (mean=4.30), diabetes as a lifestyle related disease (mean= 4.0), obesity and family history as risk factors for diabetes (mean=3.95), and Type-2 diabetes (3.75).

These responses were confirmed during the FGD, two of the patients mentioned the common factors that can contribute to an increase in blood sugar are lack of

Table 1: Level of Awareness of Patients with DM

Awareness to Diabetes Mellitus	Mean ± SD	Verbal Interpretation	Rank
1. Diabetes Type 2 is non-Insulin dépendent Diabetes Mellitus	3.75 ± 1.37	Moderately aware	10
2. Diabetes is a lifestyle-related disease	4.00 ± 1.30	Moderately aware	7
3. Obesity is one of the risk factor of Diabetes Type 1	3.95 ± 1.23	Moderately aware	8
4. A family history of diabetes will increase the chance of getting diabetes mellitus	3.90 ± 1.17	Moderately aware	9
5. Fatigue, increased thirst and urination are one of the many symptoms of diabetes	4.45 ± 1.05	Moderately aware	5
6. Hyperglycemia is increased blood sugar level	4.75 ± 0.55	Extremely aware	3
7. Blurred vision, confusion, headache are signs of hypoglycemia or low blood sugar level.	4.30 ± 0.86	Moderately aware	6
8. 7Increased thirst, frequent urination, nausea and fatigue are signs of hyperglycemia or high blood sugar level	4.85 ± 0.37	Extremely aware	2
9. The key to optimal blood sugar control is to balance food, exercise, insulin and medication.	5.00 ± 0.00	Extremely aware	1
10. The diabetes management for diabetes is diet, exercise and drugs	4.60 ± 0.94	Extremely aware	4
Total	4.36 ± 0.16	Moderately aware	

exercise and eating sweet foods. Patients are aware that they can definitely control their blood sugar especially if they have high level of awareness to disease process.

"Diabetes results to lack of exercise"
"Diabetes results to eating too much sweet"
"Proper education may help us to comply with diabetes management"

As reflected in Table 2 patients are extremely aware on diet management (mean=4.51) and moderately aware on exercise (mean=4.31) and drug management (mean=4.16). But, many of them during the FGD verbalized that they do not anymore prepare meal plan.

"We don't prepare meal plan"
"I have to choose my meal"
"My food has to be measured"

Adolescent patients do not need close supervision from health personnel on diet management because they are taught by the ISDFI through the conduct of series of training. Thus, on the view of the patients they do not need close supervision.

"We are taught inside the camp"
"Carbohydrate counting and serving size are included in our training"

The moderate awareness of patients to exercise is supported by only a few of them engage in regular exercise and physical activity. Although they have extreme awareness on exercise and physical activity as part of diabetes management, many of them preferred to watch television and read books. Many of the patients believed that there is a need for patients with Type-1 diabetes to be exempted in physical education classes and team sports because this has been imposed to them by people around them.

"We don't have any more time for exercise"
"I preferred reading books and watching TV"
"We are exempted from PE classes"
"My parents feared that if I'll join the PE class, I might experience hypoglycemia"

Table 2: Awareness and compliance of patients to DM Management

Criteria	Awareness Mean ± SD	Verbal Interpretation	Compliance Mean ± SD	Verbal Interpretation
Diet	4.51 ± 0.32	Extremely Aware	3.16 ± 0.58	Some Extent
Exercise	4.31 ± 0.44	Moderately Aware	3.24 ± 0.76	Some Extent
Drugs	4.16 ± 0.47	Moderately Aware	3.42± 0.99	Some Extent
Total	4.33 ± .315	Moderately Aware	3.27 ± 0.55	Some Extent

Further, in Table 2, the patient's compliance to diabetes management are somewhat compliant to drug (mean=3.16), exercise (mean=3.24) and diet management (mean=3.42). The low compliance on these items can be explained by the limited financial resources of the patients as explained during the FGD. Some of the patients were supported by the foundation (ISDFI) in terms of drug management; they are provided assistance in their insulin.

"Our parents support us but we have limited finances"
"We only rely on the foundation -ISDFI"

Patient's higher compliance in drugs can be attributed to their training on the types, uses and proper administration of insulin. The patient's competence in managing their insulin has been the focus of the training in ISDFI.

"ISDFI help us in managing our drugs"
"We *are taught on proper insulin injection"*

Patient's compliance to walking as an exercise management is also of great extent. Walking has been the usual exercise done by the patients because most of them walk when they go to school. On the other hand, aerobic and cardiovascular exercises are to some extent only because of the busy schedule of the patients in school activities. Most of them are already tired because of the too many activities in school.

"I walk going to school"
"I cannot exercise anymore after school, I'm already tired"

Although, patients are extremely aware that individualized meal plan is necessary to control diabetes, results show that they only comply with some extent.

From this research results, it revealed that there was a low correlation between diabetes level of awareness and compliance to DM management. The correlation between level of awareness and compliance was not significant (r = .32 p = 0.15) to consider in the study. It indicates that the moderate awareness of patients to diabetes management is not related to their extent of compliance.

Discussion

The purpose of the study was to determine the patient's level of awareness and extent of compliance to DM management. In addition it sought to determine the relationship between awareness and compliance to DM management.

Results revealed that patients have extreme awareness on blood sugar control and signs of hyperglycemia but moderate awareness only on signs of hypoglycemia. It is of primary importance in the prevention of long-term complications the maintenance of normal glucose level and awareness in the signs and symptoms of both hyperglycemia and hypoglycemia.

In the study, patient Self-Monitoring of Blood Glucose (SMBG) control is one of the effective primary techniques patients utilized to assess the glycemic control. However, guidelines in diabetes care suggested evidence-based approaches. Effective management of blood glucose levels have been shown to reduce the risk of diabetes complications according to American Diabetes Association (ADA, 2012). A study also recommends Continuous Blood Glucose Monitoring (CBG) in conjunction with intensive insulin regimens to lower A1C in children, teens and young adults (Pick-up, Freeman & Sutton, 2011). CGM is also found effective in handling wide variability in glucose profiles before, during, and after physical exercise (Kapitza, Freeman & Sutton, 2010).

Patients were extremely aware on diet management exclusively on individual meal plan, physical activity, cardiovascular fitness and checking of blood glucose level. Although patient's awareness in exercise management were moderate; patients are extremely aware in physical activity, cardiovascular fitness and checking of blood glucose level. They also have moderate awareness on exception in physical education classes and adjustment of insulin during exercise. However, ISDFI encouraged patients to engage in household chores and play as their means of exercise and activity. These are more appropriate to their age, more manageable and of no expense on their part as adolescents. Patient's education on DM management given by the ISDFI was helpful in increasing their level of awareness. In related studies on exercise, diet and drug management, there is increased awareness in physical activity to promote fitness and a diet that includes carbohydrate counting and decreased saturated fat intake (Delahanty, 2009; Al-Agha et al., 2011, Michaliszyn, 2009). These are recommended therapeutic modalities in the management of diabetes. However, patients have only moderate awareness on carbohydrate counting and the used of decreased saturated fat intake. Health education on carbohydrate counting and used of decreased saturated fat intake may be the focus of further health education to help patients effectively managed diabetes.

Patients followed the diabetes management to some extent but shows great extent of compliance on insulin management. The ISDFI staff taught them on insulin management as revealed in the FGD. In drug management of patients with Type-1 diabetes, it is recommended by ADA (2012) to use multiple dose insulin injections (three to four injections per day of basal and prandial insulin). Continuous Insulin Infusion (CII) therapy was recommended in the study of Valla in 2010. But the use of CII is not evident in the study because in the Philippines, only few patients use CII because it is too expensive. The adolescent patients are only using multiple dose insulin injections which were monitored and supervised by their doctor's and funded by ISDFI. This shows that the health education conducted by ISDFI is sufficient to manage insulin treatment.

The result also shows that patient have some extent of compliance in monitoring blood glucose before injecting insulin and performance of exercise or physical activity. Although, ISDFI taught them on SMBG, most of the patients do not own a glucose meter or if they have they cannot afford to buy the glucose strips needed for regular monitoring of blood glucose. This may be due to lack of financial resources and most of them are relying on the assistance of ISDFI. ADA (2012) guidelines on diabetes management recommended that in individuals taking insulin, physical activity can cause hypoglycemia. It is recommended that regular blood glucose monitoring is important to avoid hypoglycemia during and after exercise (Younk, Mikeladze, Tate and Davis, 2011). The possibility of the occurrence of hypoglycemia after exercise or physical activity on patients is high. Health education is necessary to teach the patients on effective blood glucose monitoring.

Patient's lowest compliance is on diet management. Although patients have high level of awareness in individual meal plan they only follow the management to some extent. The health education given by the ISDFI may be sufficient for these patients to comply on diet management, however patients do not anymore prepare meal plan as revealed in FGD. This may be attributed to lack of motivation, support in the family and school canteen. ADA (2012) recommended individualized meal planning and optimization of food choices to meet recommended daily allowance (RDA)/ dietary reference intake (DRI) for all micronutrients in patient with diabetes.

The study also determined the relationship of awareness to compliance to DM management. Results show that there is low correlation between the patient's awareness and compliance to DM management. Although there is correlation, it is not statistically significant. The results show no support to the study hypothesis. This may be due to limited participants included in the study.

Conclusion

Health education is necessary to increase the level of awareness and extent of compliance of patients in diabetes management particularly in the importance of individual meal plan and controlling blood sugar level before exercise and physical activities. Level of awareness is important but adherence to diabetes management is of higher importance to prevent long term complications of DM. Health education process that is more specific and appropriate to their needs can improve more the compliance of the patients to the three diabetes management. The nurse's role is important in educating adolescent patients with Type-1 diabetes. The results of the study may only be applicable to the participants because of low statistics significance and further study

with a larger population and multiple setting is recommended to achieve adequate results.

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