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HEALTH EDUCATION TO PREVENT DIABETES; A STUDY AMONG STUDENTS WITH PREDIABETES IN SURAKARTA, INDONESIA

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ABSTRACT

Background: Pre-diabetes is a condition where blood glucose above normal, called as a pre-diagnosis diabetes. Without any effort to prevention, pre-diabetes will become diabetes within 5-10 years. From the preliminary study, there are 61 students in Nursing Program of Health Polytechnic Surakarta diagnosed with high blood glucose level. Early prevention with health education on the prevention of diabetes, namely physical activity and diet.
Aim: The purpose of this study is to determine the effect of health education to prevent diabetes among students with high blood glucose level.
Method: This research employed a quasi-experimental design with one group pretest and posttest. The fasting blood glucose (FBG) was measured before and after health education. A total of 30 students, with pre-diabetes risk, from Nursing Program of Health Polytechnic Surakarta, selected by purposive sampling, was involved before and after the program. The blood glucose level was measured using blood glucose meter, with three replications. Health education was given using SAP (Events Unit Extension), leaflet and power point slides. Material of the health education program on primary prevention of DM was provided for 20 minutes only 1 time. Paired T-Test was used to find the significant differences of average levels of fasting blood glucose levels before and after given health education.
Results: The level of fasting blood glucose levels respondents before being given health education was 95.30 ± 2.67 mg/dL. While after given health education, the glucose level decreased 1.52 mg/dL to the level of 93.77 ± 2.94 mg/dL. Through paired T-test, it is noted that the decline was significant (p value = 0.014). However, the drop of fasting blood glucose levels among students diagnosed with pre-diabetes cannot ensure the level to the non-diabetes risk.
Conclusion: This results supports the provision of health education on the prevention of diabetes. It suggest the need of providing health education for early prevention.

Keywords: Pre-diabetes, fasting blood glucose, physical activity, diet.

INTRODUCTION

Pre-diabetes is a condition in which individuals have higher blood glucose but not high enough to be classified as diabetes. People with pre-diabetes have an increased risk of developing type II diabetes, heart disease, and stroke [1]. In Indonesia, the prevalence of pre-diabetes was as high as 10.2%, it is estimated

that 24 million people in Indonesia have been bearing pre-diabetes [2]. In Indonesia, 90% of those with pre-diabetes do not know it and up to 70% of people with pre-diabetes will develop into diabetes mellitus type II [3].

The prevalence of pre-diabetes according to the Indonesian province of Central Java province was 13.4%. While the prevalence of pre-diabetes in Indonesia (10.2%) based on the age group 15-24 years age group by 21.9% [2]. The prevalence of diabetes increases with age. In the last decade, increasingly younger age of diabetes mellitus. Pre-diabetes risk increases with age, particularly after age 45 years. However, parents are not the only risk for pre-diabetes and type II diabetes. The incidence of these disorders is also increasing in the younger age group [4]. Lifestyle may lead to type II diabetes, however reversible, including lack of physical activity, the pattern of unhealthy eating habits and unbalanced, and smoking habits [3, 5].

With healthy lifestyle it can lower blood glucose returns to normal values, such as eating a nutritious diet, regular physical activity and maintaining a healthy weight [6]. It believes that pre-diabetes is 5 to 15 times more likely to develop into type II diabetes mellitus (DM) compared to people with normal blood glucose levels. Without intervention, pre-diabetes will develop into diabetes mellitus type II in the past 10 years [6, 7]. The Government of Indonesia through the Ministry of Health launched a program of control of diabetes and metabolic diseases [5]. Implementation of the program focused on prevention and promotion efforts against diabetes risk factors in an integrated and holistic, affecting the private sector. Among the consensus of the Indonesian Association of Endocrinology (PERKENI) in 2011, it mentions five (5) pillars for DM control, including health education, nutrition therapy, physical exercise, controlling blood glucose levels and pharmacological therapy [3].

From a preliminary study at the Nursing Department of Surakarta Health Polytechnic, screening test for fasting blood glucose levels that involved 61 students with a qualify as pre-diabetes to several risk factors, such as obesity, excess abdominal fat (excess fat in the abdomen), there are descendants of families with DM and patterns live less healthy. The purpose of this study is to determine the effect of health education on prevention of diabetes on fasting blood glucose levels among Surakarta Health Polytechnic's student with pre-diabetes.

METHODS

This study is a quasi-experimental with one group pretest posttest design. This research is a quasi-experiment [8], where study was conducted to determine the impact of a given health education intentionally by researchers aimed to assess how it affects to the fasting blood glucose levels. There were 51 students involved in this study but only 30 students voluntary assessed themselves having pre-diabetic status, while the other 20 students not then declared dropped out. The students was selected from Nursing Department of Surakarta Health Polytechnic by purposive sampling method, having DM risk factor with capillary blood fasting blood glucose levels measured at 90-99 mg / dL.

In this study, researchers measured fasting blood glucose level before and after health education intervention [9, 10]. Begin with washing patients' hand, replacing blinds, wearing hand sconce, and adjusting the position of the patient as comfortable as possible, the stick glucometer glucose tool was stabbed to patients' finger by a sterilized lancet. The glucometers tool sounded and the results can be read. Instruments to provide health education included SAP (Events Unit Extension), leaflet and power point slides. Material in health education program for primary DM prevention was provided for 20 minutes, only one time. The initial glucose level was collected in the sampling day, while the posttest level was measured 3 weeks after with 3 replications, using the same procedures.

The data in this study was tested for the normality using Shapiro-Wilk test. Once known data was normally distributed, Paired T-Test, a parametric statistical test, was used to find the significant mean differences of fasting blood glucose levels in the pre and posttest of the group, at significance level of 0.05.

RESULTS

The results of data processing characteristics of the respondents as follows:

table 1. frequency distribution by Characteristics.

Characteristics	Total	Percentage (%)
Gender		
Male	4	13.3
Female	26	86.7
Age		
15-20	21	70
21-25	9	30

Research shows that most of the respondents were female, 26 respondents or 86.7%; while only 4 males (13.3%) were identified with pre-diabetes condition men number 4 respondents or. In addition, the majority (70%) of respondents' age was between 15 and 20 years, while the other 9 students aged 21 to 25 years.

Table 2. Distribution of respondents fasting blood glucose levels before and after health education.

Administration	Fasting glucose level (mg/dL)					
	N	Mean	Std. Deviation	95% CI	Mean Differences	*P* value
Before	30	95.30	2.67	94.30-96.30	1.52	0.014
After	30	93.77	2.94	92.67-94.87		

Table 2 shows the fasting blood glucose levels at the initial and post administration at the control and the intervention group. It clearly presents the significant decrease of fasting glucose level at 1.52 mg/dL, from 95.30 to 93.77 (mg/dL), at significant level of 0.014.

DISCUSSION

This present study noticed most women having pre-diabetes status than the involved men. Previous study may related the BMI (Body Mass Index) to the pre-diabetes [1]. Moreover, thoroughly look to the population in the country, among those aged more than 18, the pre-diabetes was found higher in women (20%) than men (9.6%) [2]. Another study also found more women are suffering from diabetes than men [11]. Shown in the characteristic data, students aged 15-20 are more favorable to pre-diabetes, but the prevalence among the involved group does not increase by the age at the group age 21-25. Even cannot be generalized, the more studies reveal that the pre-diabetes risk increases with age, particularly after age 45 years, however, parents are not the only risk for pre-diabetes and type II diabetes [4].

People with pre-diabetes are in an increased risk of developing type II diabetes, heart disease, and stroke [1]. As a benchmark for blood tests in the diagnosis of DM in accordance with the consensus of the management and prevention of type II diabetes in Indonesia, including Pre-diabetes, if the fasting blood glucose level of 90-99mg/dL [3]. Activities and lifestyle lead to pre-diabetes included lack of physical activity, the pattern of unhealthy eating habits and unbalanced, and smoking habits [3, 5]. Without intervention, pre-diabetes will develop into diabetes mellitus type II in the past 10 years [6, 7].

The result indicates health education contributed is the influence of health education on the prevention of diabetes on fasting blood glucose level. The material in the class and by leaflet provides healthy lifestyle information, including eating a nutritious diet, regular physical activity and maintaining a healthy weight. Prevention actions consist of three (3) stages: primary prevention, secondary prevention and tertiary prevention [9, 10].

In this study, researchers focused on primary prevention of diabetes, to the efforts to the groups who have risk factors, and offers activity to prevent diabetes. Primary prevention unbiased education or health education about prevention of diabetes. Extension materials included weight loss program, healthy diet, physical exercise and stopping smoking. Weight loss is the key indicator to reduce the risk of type II diabetes or pre-diabetes to those has risk of diabetes, wherever has excess weight. It is known that 10-15% weight loss can avoid or slow the appearance of type II diabetes [9, 10]. Based on the results Diabetes Prevention Program (DPP) concluded that diet and physical exercise more meaningful results in reducing the chances of people with impaired fasting glucose or impaired glucose tolerance to be a type II DM patients compared with oral diabetes drugs [6].

People with high risk of type II diabetes should be given appropriate lifestyle counseling and appropriate. The decline in the absolute risk is approximately 15-20 cases per 100 person / years and with lifestyle intervention [12]. The preventive health education is to decrease the incidence of DM. Study shows that the health education changing the lifestyle showed 58% reduction in the incidence rate of diabetes [1]. Another study conducted by Balagopal in the village of Tamilnadu, India in 2008, prove that the health education given to 703 respondents who have risk factors for diabetes and respondents with diabetes decrease the number of adults whoever stated having pre-diabetes by 11% pre-diabetes among the adult, in adolescents by 17%, and in adult patients with type II diabetes by 25% [13].

CONCLUSIONS

Age and gender may related to the pre-diabetes status. The given health education about diabetes prevention reduce the levels of fasting blood glucose levels in students identified with pre-diabetes. As recommendation from this study, fasting blood glucose level checks are needed to know the status of pre-diabetes not only in the people above 45 but also the young generation. In addition, it is known the health providers play important role to improve the quality and quantity of health promotion on the prevention of diabetes. If becomes a new lifestyle for pre-diabetes, the health promotion will significantly decrease the glucose levels among students with pre-diabetes.

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