

Effect of Telenursing and Diabetes Self-Management Education Towards Fasting Blood Glucose in type 2 diabetes mellitus

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Abstract. Diabetes mellitus causes complication, the decreasing quality of life, and death. One of the efforts to help people with education, but rarely followed up. That is why telenursing method needed. Telenursing is an easy, efficient, without time and distance barriers and it is cheaper than traditional method. It is to find out the influence of telenursing (Telephone Follow-Up) and diabetes self management education for 12 weeks towards fasting blood glucose level. The research method used quasi experiment with control group pre and posttest design; total sampling was 32 people divided into control group and intervention group, parametric measurement of data analysis used t test. The result from the measurement of intervention group, it is obtained that fasting blood glucose (P value 0,00), and analysis result on control group obtained fasting blood glucose (P value 0,00). There is a significant influence between telenursing (follow up via phone) with fasting blood glucose.

Keywords: diabetes mellitus tipe II, education, telenursing, telephone, follow-up.

1 Introduction

Diabetes Mellitus (DM) is one of the chronic disease with the incident number increases each year. WHO recorded that 442 million people suffered from DM in 2014 [1]. In 2013, Indonesia recorded that 1.5 million people suffered from DM and it was predicted to reach 21.3 million in 2030 [2]. The most common type of diabetes mellitus in the world is type 2 DM. type 2 DM is characterized by increase glucose level caused decrease of the insulin hormone performance [3] [4]. Some risk factors that can be prevented include obesity, diet and activity [1]. Poor treatment DM causes complication, the decreasing quality of life, and death. Complication DM include: myocardial infarction, ischaemic heart disease, stroke, heart failure, amputation that leads to hypertrophic scar on post-operative wounds in certain patients [5]–[7] and psychological effect can lead stress, depression and anxiety. Anxiety disorder can exacerbate the disorder [8].

Some efforts that can be performed to decrease the risks of type 2 DM are by maintaining blood glucose levels in normal range, and avoiding complications, such as: diet, increased physical activity, blood glucose monitoring, drug therapy (if required) and education [3], [9].

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Education the treatment of type 2 DM is an important part of the patients. The education in question is by providing patients with some information and skills of the Diabetes Self-Management Education [1]. The overall purpose of the education program is to support decision making, self-care behavior, problem solving, and cooperate with health teams to actively improve clinical outcomes, health status, and quality of life [10], [11]. Education is an important part of chronic disease management, but rarely followed up.

Education on DM should be undertaken by professionals. One of which is a nurse who should be able to be actively involved in the prevention and early detection of diabetes and its complications through the provision of health care, community education, health system management, patients treatment to improve their quality of life [12].

Follow-up is one part of the nursing care process. Using the Telenursing (Telephone Follow-Up) method, patients require an ongoing monitoring of their ability to cope with illness and learn how to change their lifestyle easily and effectively despite the limited human resource situation, time, and costs that compared to traditional methods. By using the phone, the nurse can understand the patient's needs and help them meet their demands. This method can reduce patients' stress, anxiety, and depression, increase their self-esteem, and transfer patient treatment from clinics and hospitals to patients' homes [13], [14].

Telenursing is one of the methods considered by the American Nursing Association focusing on the delivery, management, coordination and service of patient treatment using telecommunications technology used in the field of nursing [15], [16]. Telenursing enables patient monitoring, health education, data collection, nursing interventions, pain management and family support through technology without time and distance constraints [17]. Telephone communications technology is the most widely available in Indonesia with 351,860,784 people in total user, and it can reach across the vast Indonesian territory [18] with limited healthcare resources that is not in accordance with population ratios in Indonesia [19], so telenursing can be applications become more effective for this kind of situation.

2 Research Method

This research used quasi experiment with control group pre and posttest design. The participants of the study were 32 patients undergoing therapy treatment of type 2 DM in Regional Public Hospital of dr. Slamet of Garut, Indonesia. The participants were divided into 2 groups, they are control and intervention group. Control group is a group of patients who are given counseling of Diabetes Self-Management Education, and intervention groups is a group which received counseling of Diabetes Self-Management Education and follow up via telephone for 3 months. The group consists of 16 members each others group.

Diabetes Self-Management Education is a program that provides patients with some information and skills in the management of DM disease. Basic information that should be obtained by the patient include: Simple pathophysiology of DM (Definition, normal glucose level, therapeutic effect, food effects and stress), treatment therapy (insulin administration, dietary basics, blood glucose monitoring), prevention of complications, health service system, resource, preventive treatment (foot treatment, general hygiene, risk factor management) [20].

Education was given to the control group and intervention group in 1 meeting / week for 30 minutes within 4 weeks. After the education session was completed for the intervention group, the routine follow-up by telephone (telenursing) is done for 12 weeks where the first 4 weeks is 2x / week and the next 8 weeks 1x / week and the fasting blood glucose measurement was conducted before or after the cycle activities. Data analysis on this research used parametric with t test to see how significant the influence of telenursing (Telephone Follow-Up) and diabetes self management education towards fasting blood glucose.

3 Result

Table 1 shows that the intervention group's blood glucose level obtained on average of measurement I 199.06 mg / dl and the mean value of measurement II 175.25 mg / dl. The minimum value on measurement I is 134 mg / dl and maximum value is 276 mg / dl, while at measurement II minimum value is 109 mg / dl and maximum value is 263 mg / dl.

Table 1. Blood Glucose Level Distribution in Intervention group Measurement I and Measurement II at RSUD dr Slamet Garut Year 2017

Variable	Mean	SD	Min-Maks	95% CI
Blood Glucose Level				
Measurement I	199,06	16,15	134-276	169,14-228,99
Measurement II	175,25	15,97	109-263	145,43-205,07

Table 2 shows that the control group's blood glucose level obtained average measurement I 208.13 mg / dl and mean value of measurement II is 212 mg / dl. Meanwhile, measurement I is at least 137 mg / dl and maximal value is 318 mg / dl and measurements of II values is at least 106 mg / dl and a maximum value is 346 mg / dl

Table 2. Blood Glucose Level Distribution in Control group Measurement I and Measurement II at RSUD dr Slamet Garut Year 2017

Variable	Mean	SD	Min-Max	95% CI
Blood Glucose Level				
Measurement I	208,13	11,11	137-318	175,56-240,69
Measurement II	212	17,32	106-346	175,35-230,77

Table 3 shows that the average of blood glucose level of the intervention groups obtained on the first measurement was 199 mg / dl with the standard deviation of 16.15. On the second measurement, the average score obtained was 175.22 mg / dl with standard deviation 15, 15. Result of statistical test obtained value of P value 0,00. Hence, it can be concluded that there is significant difference between first and second measurement of intervention groups' blood glucose level.

Table 3. Blood glucose Level Average Distribution in the intervention group Measurement I and Measurement II at RSUD dr Slamet Garut Year 2017.

Variable	Mean	SD	SE	P value	N
Blood Glucose Level					
Measurement I	199	16,15	4,03	0,00	16
Measurement II	175,25	15,15	3,99		

Table 4 shows that blood glucose level on control group at the first measurement is 208.13 mg / dl with the standard deviation of 11.11. In the second measurement, the average obtained is 212 mg / dl with a standard deviation of 17.32. Result of statistical test obtained P value 0,00. Hence, it can be concluded that there is significant influence between telenursing (follow up via phone) with fasting blood glucose..

Table 4. Blood glucose Level Average Distribution in the control group Measurement I and Measurement II at RSUD dr Slamet Garut Year 2017

Variable	Mean	SD	SE	P value	N
Blood Glucose Level					
Measurement I	208,13	11,11	15,27	0,00	16
Measurement II	212	17,32	19,33		

4 Discussion

The results showed that the blood glucose level's (fasting blood glucose level) mean was 199 mg / dl in the group treatment at measurement I, while the mean score in the measurement II was 175, 25 mg / dl. The results showed that there was a difference of blood glucose levels before and after the treatment ($p = 0.000$). Based on these results, blood glucose level in the treatment group potentially tended to decrease within ideal limits after given diabetes management education program. But, it is different from the control group that showed no change in blood glucose level to normal. From the data in Table 5.4, the mean of measurement I is 208,13 mg / dl, and that of measurement II is 212 mg / dl. High blood glucose level can lead to the declining of body function that affects other organ functions such as: heart, nerves, and kidney. Therefore, blood glucose level becomes the main benchmark of a success therapy for patients with type 2 DM. Normal blood glucose level is <100 mg / dl, for fasting blood glucose and <140 mg / dl for fasting blood glucose [3].

The implementation of DM disease education management can be done with several methods. One of which is a traditional method through which a patient is given direct referral to a certain treatment center or home visits by health workers [12]. This method has flaws. The treatment center or hospital requires human resources, time, and high costs [13]. To overcome these problems, it is required an easy and efficient method which can

save time and cost. Telenursing (Telephone Follow-Up) can be considered as one of the aforesaid method[15]. In addition to education, follow-up by telephone is established by creating links to continuous dynamic treatment, followed by improving the quality of life of patients, reducing complications, increasing patient satisfaction, and improving health and service quality [14], [16].

Educational program on the treatment management in DM patients is an important part of the DM patients treatment, especially patients with type 2 DM. Combined with Telenursing (Telephone Follow-Up), this program can be more effective and efficient. The overall objective of the education and telenursing program (Telephone Follow-Up) is to support decision-making information, self-care behavior, and problem solving, cooperate with health workers actively, and improve clinical outcomes, health status, and quality of life of patients [17] with time saving, fewer health resources and more affordable costs [14].

5 Conclusion

There is a significant influence between telenursing (follow up via phone) with fasting blood glucose. The telenursing (follow up via phone) can give a positive effect on blood glucose level to remain within the normal range. The program also affects the process of dynamic behavior change based on awareness of in the type 2 DM patients to seek a healthy and quality life.

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