

**THE IMPACT OF TELENURSING ASSISTANCE ON THE GLYCEMIC
LEVELS OF TYPE II DM CLIENTS AT LOCAL HEALT CLINIC
KAMPUNG BARU
LUWUK IN BANGGAI 2016**

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Abstract

Diabetes Mellitus is a chronic disease requiring treatment in glycemic control. Controlling glycemic can be carried out by a kind of assistance performed by using Telenursing. The purpose of this research is to determine the impact of telenursing assistance on the glycemic levels of type II DM clients at Puskesmas Kampung Baru Luwuk in Banggai. The research design applied is quasi-experimental pre and post test without control group design with 14 type II DM clients as the sample. The result shows there is a difference in average fasting glycemic levels in Type II DM clients prior to the intervention, which is 230,64 mg/dl, and following to the intervention, the result is 127,81 mg/dl thus found a reduction in glycemic level by 102,83 mg/dl. By the statistical test result using Pair T Test, the value (p value of 0.000) was obtained. Therefore, it can be analyzed that telenursing assistance takes effect on lowering fasting glycemic of type II DM clients. The result shows that communication by phone (SMS) can be developed for assisting controlling glycemic level of type II DM clients through Prolanis program.

Key words : Telenursing, Glycemic Level , Type II DM

INTRODUCTION

Change of life style and economic social due to urbanization and modernization, particularly of those living in big cities in Indonesia, may become the cause of degenerative disease prevalence, one of itis diabetes mellitus. Diabetes mellitus is one degenerative chronic disease characterized with inability of body to control glycemic automatically (Purwanto, 2011).

Number of diabetes mellitus sufferer prevalence is getting increase in all over the world, particularly in developing countries due to change of bad life style. In according to International Diabetes Federation (IDF, 2014), the number of diabetes mellitus sufferer in all over the world reached 366 million people in 2011, increased into 387 million people in 2013, and it will be presumptively increased into 592 million people in 2035. Indonesia nowadays is positioning the 7th (seventh) rank of the top ten countries for diabetes sufferer and predicted will increase into the 6th rank in 2035.

The Result Of Health (Riskesdas) 2013, by Department of Health mentioned that 0.6% of people with age more than 15 years old or around 1 million people, who actually feels DM symptoms in recent one month, yet it cannot be confirmed or investigated whether they positively suffer DM. the biggest proportion is in East Nusa Tenggara and Central Sulawesi .

In Central Sulawesi, it is recorded that 3.7% of the people are diagnosed to be suffering diabetes by doctor, yet in the recent one month they have symptoms of easily being hungry, thirsty, over urinating and decrease of body weight, one point six percent (1.6%) has ever been diagnosed to suffer diabetes by doctor and one point two percent (2,1%) has not yet ever been diagnosed by doctor in recent one month yet they have aforementioned symptoms namely easily being hungry, thirsty, over urinating and decrease of body weight (Riskedas, 2013).

Local Health Clinic Kampung Baru Luwuk is one of clinics in District of Banggai, Central Sulawesi. It was recorded that increase of type 2 diabetes mellitus case namely 50 clients in 2014 and 85 clients in 2015 (Rekam Medik Kampung Baru Luwuk, 2016).

Through interview conducted by researcher to heads of health local clinic Kampung Baru Luwuk stated that average glycemic content in most diabetes client coming to the clinic was around 200-450mg/dl. The high content of glycemic is caused by lack of attention to control glycemic routinely. Another information obtained was that most diabetes client during education provision stated that they will run the suggested program by the health personnel. In fact when the clients go back to their daily routine activity, such as diet violation to diabetes, lack of sport, and bad control of glycemic.

Client will perform irregular life style so they will not pay attention to their health or follow the suggested program by health personnel. Thus, client condition will get worse, glucose content in high blood pressure and even worse will cause complication.

Several attempts can be conducted to avoid from complication of diabetes mellitus disease that is by carrying out treatment of diabetes consisting of five pillars: glycemic monitoring, diet, exercise, medical treatment of OHO or insulin, or education. Diabetes management that is unwell conducted may cause complication. Complication might occur they are acute and chronic complication. In acute complication case, it is possible for hyperglycemia and hypoglycemic and occurring in chronic complication that was disorder of brain blood vessel, eye, heart, kidney, and leg that may cause blindness, kidney failure, cardiovascular disease, stroke and leg amputation (Soegondo, 2015).

Treatment of type 2 diabetes mellitus can be conducted by health personell at Health Local Clinic Kampung Baru Kabupaten Banggai that is the conduct of chronic and prolanic disease management with one most dominant that is type 2 diabetes mellitus. Activity of prolanic includes activity of medical consultation (education), home visit (monitoring), club activity and health health monitoring. So far, the activities carried out to diabetes client are still limited to home visit or assistance. This attempt is considered ineffective by Head of Local Health Clinic.

In accordance with several studies, it is found out that most diabetes client has unwell-controlled glycemic content. a study conducted by Astuti et al (2013) to 86 respondents, it was obtained that 61.6% of respondent has bad control of glycemic content. A related study conducted by Suganda et al (2014) to 25 respondents, it was obtained that control of glycemic content during bad 2-hour postprandial was in amount of 52% with average glycemic of bad 2-hour postprandial in the sample was 239.64 mg/dl. In accordance with the aforementioned study results, it shows that most respondent had bad glycemic

control. If the glycemic content is getting worse, then client will have a risk of complication. In general, glycemic clients of type 2 diabetes are influenced by certain factors: age, sex, education, and family support.

According to Orem, human is a biopsycosocial creature who is responsible for self care in terms of physical, interpersonal, and social aspect of human being function. Human has an ability to develop and learn to fulfill their self care particularly in doing control of glycemic (Ernawati, 2013). Thus, one role of a nurse that can be optimized to control glycemic that is not merely giving education but also monitoring client behavior to maintain their health and control glycemic content through coaching not only during visit but also a followed up assistance.

Various ways can be implemented in assistance, that is nurses can utilize the development and advancement of existing technology of information, one of it is technology of communications in the form of telehealth in particular to provide nursing interventions by using telenursing. Telenursing can be interpreted as the use of information technology in the field of nursing to provide health services in the form of information for monitoring, in which there is far physical distance between nurses and clients (Triwibowo, 2013; Nurhidayah 2010). Based on the results of several studies, it is known that the maximum glycemic control is implanted through assistance by using telenursing.

A study conducted by Kim, Hee Seung Jeong-Ah Oh (2003), in South Korea it results that the interventions made by telephone in the form of education and reinforcement on the client type 2 diabetes client can customize treatment recommendations and monitoring of glycemic to regularly have the average reduction in HbA1c levels of 1.2% and the control group experienced an increase of 0.6%. The intervention group was better obedient to diet and regular glycemic monitoring.

Another study conducted by Timmerberg, et al (2009), in the United States results that videoconferencing is very effective to use when doing nutrition counseling to clients with diabetes, have a positive relationship with an HbA1c and cholesterol levels in total, and can help diabetes clients to manage their condition.

Other studies related to telenursing conducted by Borhani et al (2013), in Kerman (Iraq) shows that the decrease in HbA1c and postprandial glucose (PPG) was more significant in intervention group compared to the control group with value of $(p < 0.001)$. However there was no significant difference between the average fasting glycemic ($P = 0.42$) and body mass index ($P = 0.31$) in both groups after the intervention. Based on the above results, it showed that monitoring or assistance is done on client of type 2 diabetes, using telenursing, to control glycemic levels that will turn out to be very effective.

Nowadays, most people of Luwuk Banggai, have been using technology of communication in example mobile phone or cell phone. Mobile is a communication tool that is used either directly or indirectly, for example in the form of Short Message Service (SMS). SMS is the ability to send and receive messages in the form of text and mobile phone. Sent text can comprise of words or numbers or an alphanumeric combination (Muharyani, 2011).

Communication via mobile phone can be used to overcome a health problem issue of diabetes mellitus. so that researchers want to use Telenursing as a way to resolve the issue.

Prolanis program running in Local Health Clinic district of Kampung Baru Luwuk Banggai in fact does not operate effectively. To overcome these, it can be developed with previous studies, through monitoring / remote assistance is expected to give the effect or impact of glycemic control, especially for people in Luwuk town.

METHOD

This research is quantitative with quasi-experimental design of pre and post test without control group. The research conducted is to provide treatment interventions Local Health Clinic techniques Telenursing in Kampung Baru Luwuk Banggai district. The research was conducted on July 11 to August 12, 2016. In this study population of type II DM clients who meet the criteria for inclusion and exclusion with a sample of 14 people.

The sampling technique using non-probability sampling with purposive sampling approach. Independent variables in this study is Telenursing done by sending an SMS containing diet, daily activities or sports and reminded to take medication (OHO). Implementation of this intervention for 4 weeks.

The dependent variable is the fasting glycemic levels. Implementation of fasting glycemic measurements performed 3 times a week for 1-day interval.

RESULTS

The results of numerical data analysis was presented in the form of mean, standard deviation, minimum, maximum, and 95% CI, while the analysis of categorical data was presented in the form of a frequency distribution consists of the number and percentage. Characteristics of age, Gender, Family Support, physical exercise, and length of suffering from DM. The average age of the youngest respondents were 48 years old and the oldest one was 60 years of age. Sexes, male and female respondents for each was 5 and 9 respondents. The shortest suffering from diabetes was 1 year and the longest was 5 years. Physical exercise is mostly active and less active for each 12 respondent 2 respondents. Distribution of family support was mostly good and less good was for each 9 and 5 respondents. It can be seen in Table 1 and 2.

Table 1. Characteristic of respondents based on age and Length of DM

Variable	Mean	SD	Min-Max	95% CI
Age	56,21	3,827	48-60	54,00-58,42
Length ofDM	3,50	1,345	1-5	2,72-4,28

Table 2. Characteristic of Respondents based on Sex, Physical Exercise, and Family Support

No	Variable	n	%
1.	Sex		
	Male	5	50
	Female	9	50
2.	Physical Exercise		
	Less Active	2	22.2
	Active	12	63.2
3.	Family Support		
	Less Good	5	35.7
	Good	9	64.3

Bivariat analysis was conducted to reveal the influence of assistance with telenursing on glycemictent on type II DM client at Local Health Klinik Kampung Baru Luwuk District of Banggai using Dependent T Test.

Table 3
Average Difference Analysis of fasting Glycemic before and after intervention with Telenursing

Intervention	N	Mean	SD	Average Decrease	T	95% CI	P value
Before	14	230,64	68,946				
After	14	127,81	17,527	102,83	6,158	66,75-138,90	0,000

From the analysis above table it was obtained an average score of fasting glycemictent prior to intervention with telenursing was 230.64 mg / dl with a standard deviation of 68.946. While the average score fasting glycemictent levels after intervention by telenursing was 127.81 mg / dl with a standard deviation of 17.527. The results of statistical tests $P = 0.000$, it can be concluded that there was significant difference fasting glycemictent levels before and after intervention with telenursing. Measurements were performed using a *T Dependent statistical test*.

Table 4
Analisis of Margin of Glycemic decrease of fasting Glycemic content before and after intervention with telenursing

Variable	n	Mean	SD	T	95% CI	P value
Telenursing	14	102,83	62,48	4,565	43,33-118,35	0,000

From the analysis above table it was obtained an average difference of decrease score margin in fasting Glycemic levels before and after the intervention with average Telenursing was 102.83 mg / dl with a standard deviation of 62.48. Based on the results of statistical test showed $P = 0.000$, which means that there is a significant difference before and after assistance with telenursing. Measurements were performed using a Dependent statistical test T.

DISCUSSION

Age

The survey results revealed that the average age of respondents was 56.21 years old, the youngest age was 48 and the oldest one was 60 years old. Along with the increase of age, organ function gets decreased or even failure in carrying out its functions, including cells of the pancreas. For people with age of more than 45 years, the function of pancreatic cells decreased the amount depends on the workload of pancreatic beta cells. The workload of the pancreas is affected by the degree of insulin resistance as well as the duration of the occurrence of insulin.

This is in line with a theory stating that aging process that takes place after the age of 30 years resulted in a change of anatomical, physiological and biochemical. Change begins from the cellular level, continues at the network level and finally at the organ level that may affect the function of homeostasis. It has ever been identified in glycemic and increases glucose tolerance test (Setiati, 2014).

Based on a study conducted by Wardani et al (2014) to 34 respondents showed that most diabetes clients was 56-64 years of the 19 respondents (56%). Another study conducted by Arifin (2011) indicates that the type 2 diabetes client over the age of an average of 60.62 is almost equal to that age younger than 60 years with p value = 0.644 was non-significant correlation that is different from previous studies.

Sex

The survey results revealed that 14 type 2 diabetes clients mellitus i.e. most of 9 respondents were female and male gender was 5 respondents.

According to WHO (2006), DM is one of diseases with the highest incidence rate in Indonesia and higher, it makes Indonesia ranked sixth in terms of number of people with diabetes in the world after India, China, the USSR, Japan and Brazil. Various studies indicate that the incidence of diabetes in women was more than men (Stipanovic, 2002; Wu, 2007). Some risk factors, such as obesity, lack of activity / exercise, age and history of diabetes during pregnancy, leading to high incidence of diabetes in women (Radi, 2007). Based on a study conducted by Mihardja (2009), the 279 respondents showed that glycemic levels uncontrolled 2-hour post prandial obtained in 68.0% of male respondents and 81.1% of women.

Length of Suffering from DM

The survey results revealed an average length of suffering type 2 diabetes mellitus clients is a 3:50 year with a standard deviation of 1,345 years. The fastest length of suffering from diabetes mellitus type 2 was 1 year and the longest one was 5 years.

Length of suffering from diabetes is based on the starting time of DM clients diagnosis, although many clients were found to have experienced complaints several years before clients were positively diagnosed DM. The length of period of DM may be associated with the onset of both microvascular and microvascular complications (Setiati, 2014).

A study conducted by Marissa (2015) to 85 DM respondents, 84.7% had a value of HbA1c \geq 6.5%. Patients with HbA1c \geq 6.5% were mostly women, elderly, low education and long suffering from diabetes for less than five years. To prevent further complications, glycemic control through HbA1c is required regularly.

Physical Activity

The survey results revealed that 14 clients of type 2 diabetes mellitus were mostly with active physical exercise that is 12 respondents (63.2%) and physical exercise are less active was 2 respondents (22.2%). Physical activity affects insulin action in people at risk of type 2 diabetes mellitus Suyono (in Soegondo, Soewondo & Subekti, 2013) explains that the lack of activity is one factor contributing which causes insulin resistance in type 2 diabetes mellitus, a study conducted by Eko (2010) to 33 respondents showed that no significant correlation between physical activity and glycemic levels which obtained value of p = 0.000.

Family Support

The survey results revealed that the proportion of 14 respondents expressing support good family i.e. 9 respondents (64.3%) and those with lack of family support was five respondents (35.7%).

Family is the most important part for everyone. Similarly, for patients with type 2 diabetes mellitus. Able or not, when someone is experiencing diabetes mellitus they will experience difficult times. A study conducted by Wardani et al (2014) to 34 respondents showed that 11 respondents (32.4%) who received family support, they do control glycemic levels well.

Based on the results of the analysis, it showed that the average score of fasting glycemic levels before the intervention by Telenursing 230.64 mg / dl with a standard deviation of 68.946. While the average score fasting glycemic levels after intervention by Telenursing was 127.81 mg / dl with a standard deviation of 17.527. Statistical test results obtained value of $P = 0,000$ it can be concluded that there are significant differences fasting glycemic levels before and after intervention with Telenursing.

Increase of glycemic levels that often occur on type 2 diabetes mellitus client is due to the lack of assistance or monitoring during visits by nurses. One of the possible interventions that can be conducted by nurses to achieve normal glycemic levels do mentoring on the client type 2 diabetes mellitus is by utilizing the development and advancement of information technology so as to provide intervention as optimal as possible by using telenursing (Triwibowo, 2013; Nurhidayah 2010).

Telenursing is utilization of information technology in the field of nursing service to provide information and nursing services remotely. Excellence in the use of telenursing is to reduce waiting time, reduce maintenance costs, health needs, and facilitate access for health care workers who are in remote areas.

Assistance with telenursing assistance by telenursing keeps using the nursing process to assess, plan, implement and evaluate as well as document nursing care. Telenursing also involves the provision of health education to clients. In addition, telenursing also still requires the therapeutic relationship between the nurse and the client, in telenursing relationship is to be built up through the use of telephone, internet or other means of communication.

During the researcher conducted assistance, it required will of client, in which the client must follow the rule of game during assistance by researchers using telenursing methods namely assistance to guide diet, exercise, and OHO need to be implemented by client type 2 diabetes mellitus through via SMS and Follow Up via Telephone for 3 minutes. This is supported by a study conducted by Kim, Hee Seung Jeong-Ah Oh (2003), in South Korea in getting the results that the interventions made by telephone in the form of education and reinforcement on the client type 2 diabetes can customize treatment recommendations and monitoring of glycemic regularly had an average decrease in HbA1c levels of 1.2% and the control group experienced an increase of 0.6%. The intervention group was better adherence to diet and regular glycemic monitoring.

Other studies related to telenursing conducted by Borhani et al (2013), in Kerman (Iraq) in getting the results that the decrease in HbA1c and postprandial glucose (PPG) was significantly more in the intervention group compared to the control group by value ($p < 0.001$). However there was no significant difference between the average fasting glycemic ($P = 0.42$) and body mass index ($P = 0.31$) in both groups after the intervention.

If seen from the results obtained, Telenursing assistance interventions with a decrease in fasting glycemic levels before and after the Telenursing average was 102.83 mg / dl with a standard deviation of 62.48. The statistical test showed $P = 0.000$, which means there are significant differences between the two groups.

Based on the above results, it is in line with a study conducted by Kawaguchi et al (2004), showed that the average fasting glycemic levels decreased significantly from 142gr / dl to 127gr / dl, systolic blood pressure fell significantly from 153 mmHg to 141 mmHg, diastolic blood pressure fell significantly from 85.4 mmHg to 81 mmHg. In addition, the clients felt that they were able to perform self-management of health and disease-related conditions. Meanwhile, according to the nurses, telenursing greatly helps create a close correlation between the client and the nurse, and can streamline the time in care. So we can conclude assistance interventions conducted by telenursing is more effectively used for the control of fasting glycemic levels in type 2 diabetes mellitus clients.

CONCLUSION

The present study has identified the characteristics of age, gender, family support, physical exercise, and long-suffering from DM. Most of the respondents were female in amount of 9 respondents which was more than males that is 5 respondents. The average age of the respondents is 56.21 years. The average length of DM group 3.50 years. Based on physical exercise most of respondents with active exercise is 12 (63.2%) and less active is 2 respondents (22.2%).

There is a difference in the average fasting glycemic levels before the intervention with telenursing that was 230.64 mg / dl with a standard deviation of 68.946 and after the intervention by telenursing showing 127.81 mg / dl with a standard deviation of 17.527. Thus, the difference in the margin of score reduction in fasting glycemic levels before and after the intervention by telenursing average was 102.83 mg / dl with a standard deviation of 62.48. It can be concluded that assistance with telenursing affect the decrease of fasting glycemic levels in type II DM, client.

Suggestion*a. Nursing service*

The results of the present study can be used as a basic reference for developing the nursing care by utilizing communication by phone (SMS), especially for the program of prolansis type II diabetes client which can be cooperated with the local health department to create an application that can be used in controlling glycemic levels

b. Future studies

Future studies are expected to not merely see measurement of pre and post intervention but also a continued measurement can be carried out to see effectiveness of telenursing and expected to increase the number of respondents.

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