

Effect of Health Education and Diabetic Foot Exercise on Sensory Perception and Knowledge level of Patients With Type 2 Diabetes Mellitus in Cirebon District General Hospital in West Java Province

1st Healthy Seventina
*Sekolah Tinggi Ilmu Kesehatan
Cirebon*

Cirebon, Indonesia
healthy.seventinasirait@gmail.com

2nd Maria Astrid
*Student of Master of Nursing Study
Program*

*Medical Surgical Concentration
Jakarta Indonesia*

3rd Wilhelminus Hary Susilo
Regularn Lecture

*STIK Sint Carolus Jakarta
Jakarta, Indonesia*

Abstract—DM is a silent killer disease characterized by increased blood glucose levels and failure of insulin secretion or use of insulin in an inadequate metabolism that can cause peripheral circulation problems called neuropathy. It is estimated that in 2030 the incidence of DM will increase by approximately 78% (WHO, 2014). In 2015 Indonesia ranked the sixth highest rate of DM sufferers. The prevalence of DM in West Java was around 1.3% of the total national prevalence of 1.5%. The number of diabetic patients in X District General Hospital Cirebon continues to increase every year. Data obtained in 2016 showed that there were 316 patients with DM and 19 people died due to DM and from January to August 2017 there were 376 patients who were recorded undergoing inpatient and 1123 patients who were recorded undergoing outpatient and 27 people were declared dead. The number of amputations during 2017 was 64. Based on the phenomena that occurred at X District General Hospital Cirebon, there is a need for self-care measures as the effort of health promotion and prevention of DM complications such as neuropathy, diabetic ulcers to amputation in the form of education and foot exercise intervention.

Keywords—Health Education, Diabetic, Diabetes Mellitus

I. INTRODUCTION

DM is a silent killer disease characterized by increased blood glucose levels and failure of insulin secretion or use of insulin in an inadequate metabolism that can cause peripheral circulation problems called neuropathy [1]. It is estimated that in 2030 the incidence of DM will increase by approximately 78% [2]. In 2015 Indonesia ranked the sixth highest rate of DM sufferers [3]. The prevalence of DM in West Java was around 1.3% of the total national prevalence of 1.5% [4]. The number of diabetic patients in X District General

Hospital Cirebon continues to increase every year. Data obtained in 2016 showed that there were 316 patients with DM and 19 people died due to DM and from January to August 2017 there were 376 patients who were recorded undergoing inpatient and 1123 patients who were recorded undergoing outpatient and 27 people were declared dead. The number of amputations during 2017 was 64. Based on the phenomena that occurred at X District General Hospital Cirebon, there is a need for self-care measures as the effort of health promotion and prevention of DM complications such as neuropathy, diabetic ulcers to amputation in the form of education and foot exercise intervention [5][6].

II. METHODS

This study was conducted at X District General Hospital Cirebon from July - August 2018. The study design was quasi experimental using pretest and posttest with Control Group by filling in the Respondent Characteristic Questionnaire, MNSI (Michigan Neuropathy Screening Instrument) Questionnaire and Questionnaire on Knowledge about DM. Assessment of Sensory Perception was conducted by examination using Percussion Hammer, and Monofilament. Interventions were given 3 times in 1 week for 4 month and posttest was conducted at District General Hospital Cirebon and home visit to the respondent's house as the evaluation was conducted one day after the intervention. There was no intervention carried out for the control group. The samples in this study were patients with type 2 DM taken with purposive sampling technique [7].

III. RESULTS

TABLE 1. DIFFERENCE TEST ON SENSORY PERCEPTION BEFORE AND AFTER INTERVENTION IN THE INTERVENTION GROUP

		N	Mean Rank	Sum of Ranks	Wilcoxon. Sig. (2-tailed)
Perception Post Test - Perception Pre Test	Negative Ranks	68 ^a	35.04	2383.00	.000
	Positive Ranks	1 ^b	32.00	32.00	
	Ties	10 ^c			
	Total	79			

Based on the results of difference test on Sensory Perception before and after foot exercise and health education interventions in the intervention group, it was obtained a p value = 0.000 (<0.05). The result indicated

that there was a significant difference in the level of knowledge before and after the intervention in the intervention group.

TABLE 2. DIFFERENCE IN SENSORY PERCEPTION BETWEEN THE INTERVENTION GROUP AND THE CONTROL GROUP

	Education and Foot Exercise	N	Mean Rank	Sum of Ranks
POST PERCEPTION1	Control Gorup	28	89.64	2510.00
	Group that was Given Education and Foot Exercise	79	41.37	3268.00
	Total	107		

TABLE 3. DIFFERENCE TEST FOR SENSORY PERCEPTION AFTER TREATMENT IN THE INTERVENTION GROUP AND THE CONTROL GROUP

	Sensory Perception
Mann-Whitney U	108.000
Z	-7.463

Based on the results of difference test on Sensory Perception before and after foot exercise and health education interventions in the intervention group, it was obtained a p value = 0.000 (<0.05):

TABLE 4 DIFFERENCE IN KNOWLEDGE IN THE INTERVENTION GROUP AND THE CONTROL GROUP

	Education and Foot Exercise	N	Mean Rank	Sum of Ranks
POST PENG2	Control Group	28	87.21	2442.00
	Group that was Given Education and Foot Exercise	79	42.23	3336.00
	Total	107		

TABLE 5. DIFFERENCE TEST ON KNOWLEDGE AFTER TREATMENT IN THE INTERVENTION GROUP AND CONTROL GROUP

	Knowledge
Mann-Whitney U	176.000
Z	-7.325
Asymp. Sig. (2-tailed)	.000

Based on the results of difference test on knowledge before and after foot exercise and health education interventions in the intervention group, it was obtained a p value of 0.000 (<0.05)

TABEL 6. PARAMETER ESTIMATES TEST

		Estimate	Sig.
Threshold Location	[POSTPENGZ2 = 1,00]	-.251	.729
	[POSTPENGZ2 = 2,00]	3.696	.000
	[UMURX2=2,00]	-.444	.406
Threshold	[UMURX2=3,00]	0 ^a	.
	[JKX3=1,00]	-.105	.853
	[JKX3=2,00]	0 ^a	.
	[PENDKX4=,00]	4.112	.066
	[PENDKX4=1,00]	3.058	.000
	[PENDKX4=2,00]	4.585	.030
	[PENDKX4=3,00]	2.652	.000
	[PENDKX4=4,00]	2.762	.000
	[PENDKX4=5,00]	0 ^a	.
	[RMEROKOKX5=,00]	-.305	.628
[RMEROKOKX5=1,00]	-1.337	.371	

[RMEROKOKX5=2,00]	.117	.838
[RMEROKOKX5=3,00]	0 ^a	.
[LAMASKTDMX6=1,00]	-.411	.269
[LAMASKTDMX6=2,00]	0 ^a	.
[GRUPX1=.00]	4.258	.000
[GRUPX1=1,00]	0 ^a	.
[POSTPENGZ2 = 1,00]	-.251	.729

Based on the table above, the effect of the independent variables on the dependent variable in the intervention group that was given health education and foot Exercise obtained p value=0.000 (<0.05). In the health education, the P value regarding the duration of DM diagnosis variable obtained p=0.00 (<0.05), while the other variables obtained a p value of > 0.05. Statistically, it can be concluded that Health Education intervention had a significant influence on Sensory Perception and knowledge. The significant variables for health education and foot exercise interventions were age and duration of DM diagnosis [8].

IV. DISCUSSION

A. Effect of age on foot sensory perception and knowledge

Frequency distribution of age showed that the majority of respondents were in late adulthood (45-65 years). Relationship between age variable and Foot Sensory Perception (P =0.004) showed that age variable had a statistically significant effect on the changes in Foot Sensory Perception (P> 0.05). The incidence of neuropathy among patients aged > 40 years old is 60-70%. Neuropathy is caused by chronic hypoxia in nerve cells and emerges as the effects of hyperglycaemia. The results of the previous study found that most of the respondent aged more than 40 had DM neuropathy [9].

B. Effect of gender on foot sensory perception and knowledge

Frequency distribution of sex showed that the majority of respondents were female as many as 43 respondents (54.4%). The result of parameter estimates (P=0.002) test showed that gender variable did not have a statistically significant effect on the changes in Sensory Perception (P>0.406). Women were more likely to have DM due to the use of Contraceptive Methods which might result in hormonal changes and the presence of a Menopause process [10].

C. Effect of education on foot sensory perception and knowledge

Frequency distribution of education level of respondents showed that the majority of respondents had higher education at Academy/University. Data analysis result in the intervention groups showed that education variable had a relationship with knowledge (P=0.000) and this indicated that education variable had a significant effect on the changes in the level of knowledge. Based on the study results, it was stated that education had an effect on the increase in knowledge so that there could be changes in healthy behaviour.[11][12] [13][14].

D. Effect of duration of dm diagnosis on sensory perception and knowledge

The results showed that 41.1% had the frequency distribution of DM duration of ≥ 5 years. The results of parameter estimates test (tables 5.19, 5.20) showed that there was a significant relationship between the duration of DM variable and Foot Sensory Perception (P = 0.005). This indicated that duration of DM variable had a statistically significant effect on the changes in the score of patient's Foot Sensory Perception (P <0.04). This is consistent with the study result which stated that the incidence of PAD (ABI value below 0.9) increased among patients with DM with a diagnosis duration of more than 10 years [14][15].

V. CONCLUSIONS

There was a significant effect of health education and foot exercise interventions on the decrease in Sensory Perception value (p value was <0.05), which was influenced by confounding variables (age, period of DM diagnosis), and there was an effect of health education intervention on the increase in knowledge level (p value was <0.05), which was influenced by the confounding variable of education level of the respondents. The results of this study can be used as a form of health services for patients with type 2 diabetes mellitus, especially in hospitals that can be implemented to prevent complications of diabetic ulcers and DM patients can do foot exercise independently 3 times a week for 30 minutes.

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