Original Article

How progressive muscle relaxation exercise affects patient with hypertension?

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Objective: To assess the effectiveness of family training towards the regularity of progressive muscle relaxation exercise implementation on hypertension patient.

Methodology: In this quasi-experimental study all families with one of the family member experiencing hypertension in the area of Community Health Center (Puskesmas) Pejeruk were included. Total population registered in the Posbindu was 1,301 patients in 2018. This study involved 60 subjects as respondents selected by using purposive sampling method. Families who took part in the training contributed regularly to progressive muscle relaxation, 27 people (90%) while families who did not participate in the training did progressive muscle relaxation regularly by 2 people (7%). The data obtained by questionnaire and was statistically analyzed using Chi-square test.

Result: Family training was significantly effective in patients to carry out progressive muscle relaxation exercises.

Conclusion: The implementation of family training on progressive muscle relaxation exercise affected the regularity of hypertension patient in doing exercise. (Rawal Med J 202;45:62-65).

Keywords: Family training, progressive muscle relaxation, hypertension.

INTRODUCTION

Hypertension is one of the major factors for stroke, heart disease, kidney disease, and peripheral vascular disease.[1] National Hypertension Prevalence based on the Riskesdas year 2012 stated that 25.8% of the highest is in Bangka Belitung island (30%), while the lowest is in Papua (16.8%).[2] Based on these data, from 25.0% of people who have hypertension, only 1/3 are diagnosed. Most of the hypertension patients do not realize that they have hypertension or get treatment.

Hypertension patient needs their family's support, as if they do not get any attention from their family, there is a possibility that the treatment will meet failure.[3] Hypertension is known as 'silent killer' as society is still not have any awareness about the disease.[4] A strict concern by the family is needed to anticipate the complication that might happen due of hypertension.[5]

According to the result of study by our group related to the effectiveness of the management of progressive muscle relaxation videos on changes in blood pressure of hypertension patient in Dasan Agung Health Center work area in 2017 showed that there was a 5 times greater of blood pressure decrease compared to the patient who not doing progressive muscle relaxation.[6] Therefore, the current study attempted to determine the family training provision on progressive muscle relaxation exercise in improving the regularity of hypertension patients in carrying out the activity.

METHODOLOGY

The study was a quasi-experiment with control group was carried out from October 10 to November 20, 2018. The study was approved by the medical ethical commission of the University of Mataram and an informed consent was taken from all participants. The populations included was 1301 respondents' family member with hypertension patient in their family and lived in Puskesmas Pejeruk work area who visited the integrated

development post (Posbindu) actively in 2018. The sample was part of the sum and characteristics owned by the population.[7] The sample was chosen using 'purposive sampling'. The sample inclusion criteria was the family member of hypertension patient ready to become the respondent, able to write and read, have commitment to do observation towards family in doing progressive muscle relaxation exercise, have commitment to join the training, family member that have hypertension patient is in age between 45-55, have family, and did not suffer from comorbidities.

Progressive muscle relaxation exercise technique consisted of 16 movements that involved movements of the hands, forehead, eyes, mouth, and cheeks, nape and neck, shoulders, back, abdominal and chest muscles, thigh muscles, calf muscles, and leg muscles. Each movement lasted 2-3 minutes. Before the family taught the patient the researcher took a blood pressure measurement (pre-test) on the hypertensive patient. After this, the family began to teach hypertensive sufferers to do progressive muscle relaxation 12 times (2 times a day) for 6 days. On Day 6 after the implementation of progressive muscle relaxation, blood pressure measurements (post-test) was taken.

Statistical analysis: The technique of collecting the data was by direct observation towards the patient using progressive exercise relaxation muscle checklist aids for four times. Later, it was analyzed using the Chi-Square test and to see the change in patients' blood pressure, using the t-test. Person Correlation test was used to assess effectiveness of blood pressure control. $P<0.05$ was considered statistically significant.

RESULTS

Respondents' characteristics consists of mostly early elderly (46-55 years old), mostly female and in middle education (Table 1). Picture 1 showed that 27 people doing the exercise regularly in the training meanwhile 2 people doing the exercise regularly but did not follow the training.

Table 1. Characteristics of respondents according to age, gender, profession and educational background.

Variable	Intervention Group (n=30)		Control Group (n=30)	
	No.	%	No.	%
Age				
Early adult (26 – 35 years)	3	10.00	0	0.00
Late adult (36 – 45 years)	10	33.33	11	36.70
Early elderly (46-55 years)	17	56.70	19	63.30
Gender				
Male	12	40.00	5	16.70
Female	18	60.00	25	83.30
Profession				
Working	16	63.30	20	66.70
Not working	14	46.70	10	33.33
Educational Background				
Basic Education	9	30.00	3	10.00
Middle Education	18	60.00	26	86.70
College	3	10.00	1	3.30

Fig. Cross Tabulation of Muscle Relaxation Exercise Training and Implementation at Puskesmas Pejeruk on October 10th until November 20th, 2018.

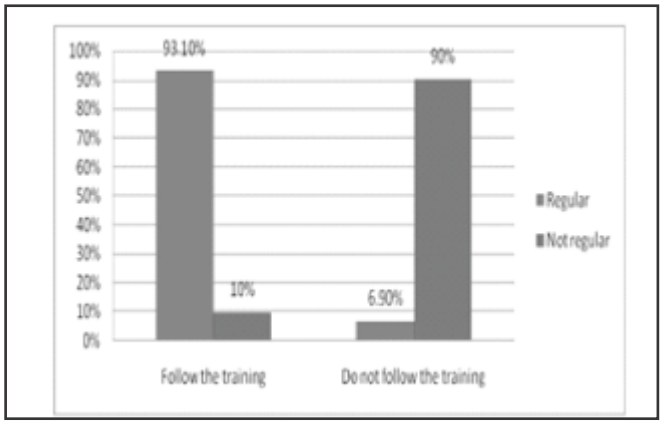

Table 2. Mean Arterial Pressure (MAP) before and after exercise.

Group	MAP		P Value
	Pre	Post	
Intervention	116.60	94.47	0.000
Control	113.43	117.43	0.000

The analysis result using Person Correlation test ($p=0.00$) indicated that the progressive muscle relaxation training was effective towards the regularity of progressive muscle relaxation training.

This also supported by t-test of the progressive muscle relaxation exercise implementation by seeing the mean value on intervention and control group. The Mean Arterial Pressure (MAP) value of the intervention group was 116.60 and the post MAP value was 94.97, meanwhile the pre MAP value for control group was 113.43 and post MAP was 117.43 which indicated that intervention group that implemented the progressive muscle relaxation exercise regularly have a MAP decreasing into 11.23 mmHg while for the control group the MAP was increasing to 4.00 mmHg (Table 2).

DISCUSSION

The training used lecturing, role-playing, and discussion.[8] The presenters were people that were competent in organizing the progressive muscle relaxation exercise such as doctors at the community health center, program manager, motivator, and progressive muscle relaxation exercise trainer. The participants were enthusiast to follow the activity as they considered the knowledge as something new for them and later would be a reference to conduct the exercise for the family member who has hypertension as it is expected to facilitate the blood pressure reduction towards the family member that has hypertension.

The training was also supported by the age of the training participants that between 46-55 years old where this age is mature enough and able to think more rational because of their previous experience. Moreover, patients were attended by mostly female participants until the implementation of the training was more effective as they were more patient and full of responsibility. Education also supported the training as most of the training participants were in middle education until the material delivering process done successfully and the information was more acceptable and understandable.[9]

The goal of the training was to improve the technical, theoretical, conceptual and moral abilities of the participants so that later they able to reach the optimal working result and lead them to eagerness in working.[10] To achieve the goal, it is supported by training so that they will have the ability and skill that suitable with their fields of work. The purpose of training is to give appropriate skill, knowledge, and behavior to live life effectively and the needs to develop of human resources in the organization.[11]

Effectiveness of exercise in management of hypertension has been reported by several studies. Yoga exercises has been effective towards hypertension stage 1.[12] In elderly, fitness exercise towards the blood pressure and life quality of elderly improved.[13] Niranjan et al investigated 47 patients with moderate hypertension, that given exercise program plus yoga program for 9 months showed that there was a decrease in the systolic blood pressure of 12 mmHg and diastolic blood pressure of 9 mmHg.[14]

Regular exercise causes the baroreceptors at the end of a peripheral nerve of the wall of arteries to be sensitized and later will block the center of vasoconstrictor and stimulate vasodilatation to all the peripheral circulation system. The dilation of blood vessels increases blood flow; therefore it will increase the shear stress in blood vessel endothelium.[15] The increase of shear stress on blood vessel endothelium stimulates Nitric Oxid Synthase (eNOS) endothelium to change L Arginin amino acid to Nitric Oxid (NO) gas.[16] After diffusing from vascular endothelial cells, NO reacts with Ferro ions in heme prosthetic groups on guanylate cyclase which dissolve in vascular smooth muscle cells and increases *cyclic guanosine monophosphate* (cGMP) concentration.[17] The release of cGMP caused the vascular relaxation until the Total Peripheral Resistance (TPR) decrease and finally decreases the blood pressure and resting pulse.[16]

Exercise is also able to stimulate the decreasing of sympathetic nerves and increasing of parasympathetic nerves that affect the adrenaline hormone decreasing norepinephrine and catecholamines and vasodilation in blood vessels that cause oxygen transport throughout the body, especially make the brain runs well, and later will decrease the blood pressure and pulse becomes normal.[3] Exercise stimulates HPA (*Hypothalamus-Pituitary-Adrenal*) mechanism axis to stimulate the pineal gland to secrete serotonin and melatonin. From hypothalamus, the stimulation will be delivered to pituitary to form beta-endorphin and enkephalin that causing relax and comfort feeling.[18]

A regular exercise could improve the level of

physical fitness, so that patient feels fit, less anxiety arises pleasure and self-confidence which can ultimately improve the quality of life.[19]

CONCLUSION

Implementation of family training related to progressive muscle relaxation exercise affected the hypertension patient's regularity in doing exercise. It is suggested that medical personnel focus on approach to patients' family until they can support the hypertension patient to do the progressive muscle relaxation exercise regularly.

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