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Progressive Muscle Relaxation Therapy to Increase Muscle Strength in the Elderly with Post-Non Hemorrhagic Stroke at Adiwerna Tegal

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Abstract

Background: Stroke is the second highest cause of death in the world and the highest cause of disability in the world. The 2018 *RISKESDAS* results showed that the prevalence of stroke cases in Indonesia was 10.9%. Stroke has a lot of impact on patients and their families. Progressive muscle relaxation therapy is one of the therapies that can be used to increase the muscle strength of the elderly after a non-hemorrhagic stroke by relaxing and tensing the body's muscles. **Purpose**: The study aimed to apply progressive muscle relaxation therapy to increase muscle strength in the elderly after a non-hemorrhagic stroke. **Method**: The study was descriptive research with a case study approach. The subjects were the elderly after a non-hemorrhagic stroke. Data were obtained through interviews, observations, physical examinations, and documentation studies. **Result**: Before applying the therapy, the patients' muscle strength value was 3; the patients' hand grip was weak. After doing the therapy for 3 days, the patients' muscle strength was still 3, but the patients' hand grip felt tight. **Conclusion**: The elderly people after non-hemorrhagic stroke are recommended to do progressive muscle relaxation therapy once a day with a duration of 15-20 minutes to stimulate the muscles so that it can increase their muscle strength.

Keywords: post-stroke in the elderly, progressive muscle relaxation

Introduction

Stroke is generally the second leading cause of death in the world and the leading cause of disability in the world. One in four people is at risk of stroke in their lifetime. This risk can increase the incidence of stroke if supported by an irregular diet, lifestyle, and activity patterns [1]. Stroke is one of the burdens of noncommunicable disease (NCDs) that continues to increase and cause a huge burden in both developed and developing countries, such as Indonesia [2]. The prevalence of stroke cases in

Indonesia is quite high. According to the results of the National RISKESDAS in 2018, the national prevalence of stroke was 10.9%. There are 14 provinces with a prevalence of stroke cases higher than the national rate, including East Kalimantan at 14.7%. The province with the lowest prevalence of stroke cases is Papua province with a prevalence of 4.1%. Central Java Province is also included in the provinces with a higher prevalence of stroke cases than the national rate of 11.8%, and most attack the elderly >75 years old. According to RISKESDAS Central Java in 2013, the highest prevalence of stroke cases in Central Java was in Salatiga City with 17.3%. Tegal Regency itself had a prevalence of stroke cases of 9.8% [3]. Stroke most commonly affects people aged >75 years old [4].

Stroke has a lot of impacts on the sufferer, including making someone insecure, reducing productivity, and lossing enthusiasm for life. The impacts that will be experienced after a stroke are paralysis and disability, communication disorders, emotional disorders, pain, sleep disorders, dysphagia, and many more [5]. The impact of stroke is not only felt by the elderly, but also experienced by the elderly's family. The family must be extra careful when taking care of the elderly after a stroke because they experience limitations in carrying out daily activities such as bathing, eating, and moving due to decreased muscle strength. The family must also be able to adapt quickly regarding the condition of the elderly after a stroke. The role and support of the family for the elderly after a stroke are very important [6].

The role of the family in providing support and caring for the elderly after a stroke is needed. The condition of the elderly after a stroke depends on others to carry out activities of daily living (ADL). Family support is also needed to determine the implementation of therapy and where it is carried out to reduce functional damage so that the elderly are more independent in carrying out their daily activities. The therapy provided serves to increase muscle strength and maintain muscles that have recovered so that their strength is maintained and stimulated properly. Therapies that can be performed by range of motion (ROM), speech therapy, medical therapy, and progressive muscle relaxation therapy [7].

Progressive muscle relaxation therapy is a therapy that can be conducted to train the muscle strength of the elderly after a stroke. This therapy is one of the techniques that can be used to increase muscle strength. This is because when doing

progressive muscle relaxation therapy; there will be muscle contractions that cause the blood supply and oxygen to the muscles and brain to increase so that it can stimulate the smooth blood supply and metabolic processes in the body. Progressive muscle relaxation is a relaxation technique that combines deep breathing exercises and a series of easy and practical muscle contractions and relaxations because it can be applied anywhere and anytime, both in a sitting and lying position, according to the ability of the elderly [8].

The results of research conducted by Muhith stated that after the elderly were given a progressive muscle relaxation therapy intervention, there was a significant difference in muscle strength. This difference is because progressive muscle relaxation therapy has a relaxing effect on the muscles, thereby reducing muscle tension in the elderly. The elderly are given this therapy so that the nerves can be stimulated, and the sensation is when the muscles are tense and when the muscles are relaxed, so that it can increase muscle strength if done regularly and periodically. In this case, the role of nurses is needed to educate on the provision of therapy [9].

Nurses have a complex role in caring for the elderly after a stroke. The role of the nurse as a caregiver is to provide nursing care to the elderly after a stroke. The role of an educator is given in the form of health education, which includes post-stroke care or therapy as well as recommendations to families in an effort to help fulfill daily needs and prevent recurrent stroke attacks in the elderly [10]. Based on this background, the authors are interested in making scientific papers entitled "Progressive Muscle Relaxation Therapy to Increase Muscle Strength in the Elderly with Post-Non Hemorrhagic Stroke at Adiwerna, Tegal Regency."

Method

The study used analytical descriptive research with a case study approach. The subjects of this study were 2 elderly patients after a non-hemorrhagic stroke who were treated with progressive muscle relaxation therapy to increase muscle strength. The inclusion criteria in this study were elderly with more than 60 years old, female, experiencing muscle weakness, post-non hemorrhagic stroke (more than 3 months), and first attack. The exclusion criteria in this study were elderly people who did not agree to be respondents and had mental disorders. This research instrument used manual muscle

testing (MMT) to measure muscle strength. This study was conducted by giving progressive muscle relaxation therapy to the elderly after a non-hemorrhagic stroke once a day for 15-20 minutes and carried out for 3 days.

Result and Discussion

The results of the assessment of patient 1 (Mrs. W) were that she was 60 years old and living at Tembok Lor Village; the patient said the left extremity had experienced weakness for more than 7 years; the scale for muscle strength of the left extremity was 3; the assessment of functional status with the KATZ index obtained a score of C; and the patient's blood pressure was 140/80 mm Hg. The results of the assessment of patient 2 (Mrs. M) were that she was 71 years old and living at Tembok Lor Village; the patient said that the left extremity had experienced weakness for more than 3 months; the left extremity muscle strength scale was 1; the functional status assessment with the KATZ index obtained a score of G; and the patient's blood pressure was 150/90 mmHg.

Table 1.
Results of the Application of Progressive Muscle Relaxation Therapy to Increase Muscle Strength in the Elderly with Post-Non Hemorrhagic Stroke

Subject	Pre Therapy	Post Therapy
Patient 1	- Patient's left extremity is weak, hand grip is weak - Muscle strength scale is 3	- Patient's left extremity is weak, hand grip is slightly firmer - Muscle strength scale is 3
Patient 2	- Patient's right extremity is weak, hand grip is weak - Muscle strength scale is 1	- Patient's right extremity is weak, hand grip is still weak - Muscle strength scale is 1

Evaluation of progressive muscle relaxation therapy performed on Mrs. W for 3 days obtained on the third day, the patient said the left hand and leg still felt weak, was willing to do progressive muscle relaxation therapy; the left extremity still felt weak, but when treated the patient's hand grip began to feel a little firmer, blood pressure 130/80 mmHg, heart rate 84x/min, muscle strength scale of 3. The result of applying progressive muscle relaxation therapy to Mrs. M for 3 days was that on the third day, the patient's family said the patient's right hand and leg were weak, was willing for the patient to do progressive muscle relaxation therapy; the right extremity was still weak; the patient's muscle strength scale was 1; blood pressure was 140/70 mmHg, and heart rate was 80x/min.

Progressive muscle relaxation (PMR) therapy is a simple relaxation exercise performed by tensing and relaxing the body muscles from head to toe. It is an exercise that can be performed manually by patients who experience weakness, hypertension, or insomnia, it can be done in a sitting or lying position in bed [11]. The benefits of progressive muscle relaxation therapy include reducing muscle tension, pain, anxiety, high blood pressure, heart frequency, reducing dysrhythmias, reducing oxygen demand, increasing sense of wellbeing and concentration, building positive emotions, and improving the ability to cope with stress [12].

Another benefit of progressive muscle relaxation therapy is that it improves relaxation by reducing sympathetic nerve activity and increasing parasympathetic nerve activity, which will cause vasodilation in the arterioles. The parasympathetic system will release acetylcholine to inhibit sympathetic nerve activity. Acetylcholine is released into the blood vessel wall and stimulates endothelial cells in the blood vessels, which then stimulates the release of nitric oxide (NO) molecules. Nitric oxide molecules can reduce blood pressure in blood vessels. Sympathetic nerve activation decreases with the onset of the relaxation response, leading to reduced catecholamine levels. Catecholamine is produced in the brain, adrenal medulla, and some sympathetic nerve fibers. Catecholamine is a hormone that acts as a neurotransmitter or sends nerve impulses to the brain, narrowing blood vessels and increasing heart rate. This causes dilation of blood vessels and a drop in blood pressure [13].

This study used the Manual Muscle Testing (MMT) research instrument to assess the muscle strength of the elderly after a non-hemorrhagic stroke. Muscle strength assessment using the MMT instrument is popular and widely used by therapists to assess patient muscle strength. MMT has a range of values from zero to five. Scale 0 means no muscle contraction at all; it is the lowest scale. Scale 5 indicates that the patient's muscle strength is normal or has full muscle strength by being able to resist the force of gravity with maximum resistance. The advantages of this instrument are that it can be easily used, and does not require tools to determine or assess a person's muscle strength [14].

The results of the research on patient 1 partially resolved the problem with the difference before and after applying progressive muscle relaxation therapy for three days. The difference was that patient 1's hand grip when grasping the researcher's hand

felt tighter than on the first day of implementation. The results of research on patient 2 showed the same results; there were no significant results or differences between before and after doing progressive muscle relaxation therapy. The results of patient 2's research that have been obtained are in accordance with research conducted by Muhith, which states that there are significant differences after the elderly are given progressive muscle relaxation therapy [9].

This study has several obstacles, including patient 2, who has reduced hearing, so the data collection and implementation process were disrupted. In patient 2, the provision of progressive muscle relaxation therapy was not entirely in accordance with standard operating procedures (SOP) because the patient was unable to perform movements or progressive muscle relaxation independently due to weakness, so almost all actions or movements were assisted by researchers. Another obstacle faced by researchers was patient 1, who sometimes wandered during therapy and was less focused on what was taught or done by the researchers.

Conclusion

The results of the application of progressive muscle relaxation therapy on increasing muscle strength in patient 1 are partially resolved. This is in accordance with research conducted by Muhith, which states that there is a significant difference in the muscle strength of the elderly after therapy [9]. However, in patient 2, no significant changes were felt. This may be due to the older age factor compared to patient 1, decreased hearing function, which makes obstacles in the implementation of therapy so that the elderly are less active in performing progressive muscle relaxation therapy. Progressive muscle relaxation therapy is ideally performed once a day for 15-20 minutes and takes a minimum of one week. It can also be done regularly or periodically for maximum results. For nurses, this research is expected to increase nurses' knowledge, especially regarding the implementation of geriatric nursing care. For health centers, it is expected that it can improve the quality of health services in general and the quality of care for the elderly so that it can help increase independence and muscle strength in the elderly after a non-hemorrhagic stroke. For educational institutions, it can be used as input and information for nursing students in handling the elderly after a non-hemorrhagic stroke. For patients, it is expected that patients and their families can

carry out progressive muscle relaxation therapy to increase muscle strength in the elderly after a non-hemorrhagic stroke independently and routinely every day.

Ethical Considerations

The study has received ethical approval from the research ethics committee of Universitas Bhamada Slawi.

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Thank you to all those who have contributed to this research.

Conflict of Interest

There is no conflict of interest between the authors in this study.

Author Contribution

The authors received their respective tasks: preparation of research proposals, searching for elderly post-stroke respondents, and carrying out therapeutic activities that have been determined by the researchers.

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