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Effect of ADEEM methods (Assess, Do Massage Frirage, Exercise ROM, Evaluation, Making Schedule) on increasing muscle strength upper extremity of ischemic stroke patients at RSU GMIM Pancaran Kasih Manado

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ABSTRACT

Background *: A stroke is when the blood supply to part of the brain stops, causing an inability to carry out central nervous system (CNS) tasks. In stroke patients, 70-80% experience hemiparesis (muscle weakness) as a result of motor neuron disorders. The ADEEM method as a rehabilitation intervention for post-stroke patients aims to increase muscle strength consisting of Asses, Do Massage Frirage, Exercise ROM, Evaluation & Making Schedule.*
Objectives *: This study aims to determine the effect of the ADEEM Method on increasing muscle strength in ischemic stroke patients.*
Methods *: The type of research is quantitative research with a pre-experimental design of one group pre post test. The population of this study was ischemic stroke patients with a stroke duration of > 3 months as many as 37 respondents. Respondents were given the ADEEM Method intervention for 45 minutes with meetings 2-3 times a week for 2 weeks. The instrument used to assess muscle strength is the Manual Muscle Test Observation Sheet. The validity and reliability tests of the instruments obtained reliability coefficient values of α > 0.63 to 0.98 for individual muscle groups, and α > 0.57 to 1.0 for total MMT scores. The validity value of MMT showed r = 0.768 (>0.05).*
Results *: This study was analyzed using univariate analysis (frequency distribution) and bivariate analysis (saphiro wilk normality test and Wilcoxon test) with significance. Wilcoxon test results obtained ρ value <0.05 (0.003), this means that there is an effect of the ADEEM Method on increasing muscle strength in ischemic stroke patients.*
Conclusions *: ADEEM method as one of the practical methods to increase muscle strength for ischemic stroke patients. This method can be done by nurses and family members in caring for ischemic stroke patients.*

KEYWORD : *ischemic stroke; muscle strength; adeem method*

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INTRODUCTION

Stroke is categorized as one of the medical emergencies and is the largest contributor to death in the world. Within 6 hours, stroke can kill at least one person in the world. Every year, 15 million people worldwide suffer a stroke of which 5 million die and another 5 million are permanently disabled, putting a burden on families and society. Stroke is rarely experienced by people under the age of 40; when it occurs, the main cause is high blood pressure. However, stroke also occurs in about 8% of children with sickle cell disease (1).

Stroke is generally divided into two types, namely ischemic stroke or non-hemorrhagic stroke and hemorrhagic stroke. Ischemic stroke or non-hemorrhagic stroke is a stroke that occurs in almost 80% of the existing stroke types. Stroke that is treated late will result in extensive paralysis and cognitive impairment, thus treatment must be given as quickly as possible to reduce the rate of physical disability due to stroke (2).

Stroke patients can experience loss of vision and even speech, paralysis and confusion. The risk of further episodes may increase significantly in someone who has had a previous stroke. Patients who experience stroke for a long time will experience physical, psychological, social and environmental function disorders. Stroke patients will encounter communication difficulties (51%), decreased cognitive ability (64%), loss of independence (86%), falls (87%), decreased independence in bed (88%), muscle disorders (86%), emotional imbalance (83%), and weakness (92%) (4). The main problem of stroke patients at home is impaired daily activities due to weakness or hemiparesis. Hemiparesis causes physical dependence in stroke patients so that it requires assistance from various parties including the community, nursing profession, family members or a combination of nursing profession and family (12).

About 20% of stroke survivors require care for three months, and between 15-30 percent of them experience permanent disability. According to the American Hearth Association (AHA), 20% of stroke patients who get good nursing interventions can experience improved motor function, and the other 50% will experience sequelae, such as muscle weakness in the extremities, if they do not get adequate post-stroke intervention or rehabilitation (5). According to research by Nirmalasari et al 2020 (6) Hemorrhagic stroke has more severe symptoms than non-hemorrhagic stroke. Non-hemorrhagic stroke patients are treated for 1 to 17 days, with an average of 7 days, while hemorrhagic stroke patients are treated for 1 to 41 days, with an average of 8 days. The process of post-stroke care requires a long time, making patients desperate because it drains costs, energy, time and emotions. In such conditions, the right method is needed for patients and families to be able to carry out post-stroke care at home. Some previous studies have only mentioned treatment actions that can be performed on post-stroke patients through

ROM and massage but have not been systematically organized. Patients have difficulty when to start treatment actions. In addition, things that need to be studied include blood pressure and comfort in previous studies were not studied by researchers (7).

The goal of massage frirage is to lessen muscle contraction so that muscles can return to their natural state without interfering with blood flow. It does this by combining friction manipulation and efflurage manipulation techniques (8). Research conducted Rohmah (9) showed that the average muscle strength in patients given frirage massage intervention increased from 1.64 to 3.73. Intervention in the form of massage therapy is one of the complementary therapies that can be used by health professionals in handling and improving motor status in non-hemorrhagic stroke patients (10). A meta-analysis study by Yunhui et al (2022) (11) concluded that massage therapy is able to improve motor function and daily living ability of limb spasm and balance function in patients suffering from limb dysfunction after stroke.

In this study, the ADEEM Method was applied as one of the rehabilitation intervention management for post-stroke patients that can help treat upper limb weakness. The ADEEM method was developed to be used by nurses and families. The ADEEM method consists of Assess, Do Massage Frirage, Exercise ROM, Evaluation & Making Schedule. This concept is packaged based on preliminary studies through literature studies of various research results that have been carried out. The ADEEM method is a treatment management developed to increase the muscle strength of stroke patients.

Based on the phenomena described in the background, the problem formulation in this study is how the effect of the ADEEM method in increasing muscle strength in ischemic stroke patients. This study was conducted to determine the effect of the ADEEM method on increasing upper extremity muscle strength in Ischemic stroke patients at RSU GMIM Pancaran Kasih Manado.

MATERIALS AND METHODS

This type of research is quantitative research with a pre-experimental design of one group pre post test. The research was conducted at RSU GMIM Pancaran Kasih Manado on March 6-25, 2024. Initial survey data showed the average number of stroke patients from December 2023 - February 2024 amounted to 118 patients. The variables in this study were the ADEEM Method and muscle strength with the characteristics of respondents including age, occupation, position of paresis and length of stroke.

The population in this study were ischemic stroke patients with upper limb weakness with a population of 37 respondents. The number of samples was determined by total sampling technique. Samples were selected according to the inclusion criteria, namely ischemic stroke

patients with treatment > 3 months at RSU GMIM Pancaran Kasih Manado (minimizing the risk of injury), ischemic stroke patients with weakness in the upper extremities with muscle strength 1-3, outpatients and willing to become respondents.

The ADEEM method is an organized management consisting of Assess, Do Massage Frirage, Exercise ROM, Evaluation, and Making Schedule. The implementation of assessment measures including the degree of muscle strength, blood pressure measurement, safe comfort and the condition of the patient who has eaten or not is an important first step in this method. Blood pressure measurement needs to be done before the next stage in the ADEEM method, namely Massage and ROM Exercise. The form of massage given in this method is Frirage, where this massage technique is a combination of Friction and Effleurage techniques. The next step is exercise with ROM where the patient is given ROM exercises by repeating each movement 5-10 times.

This study applied the ADEEM method intervention for 2 weeks. The application of the ADEEM intervention to respondents was carried out in their respective homes. ADEEM was applied for 2 weeks with a frequency of 2-3 times a week and applied morning and evening. The frequency applied is in accordance with the results of the initial measurement of muscle strength. On a scale of 1-2 muscle strength, ADEEM was applied 3 times a week while respondents with muscle strength of 3 applied ADEEM 2 times a week. Respondents were given action and education about the ADEEM method and also involved the respondent's family. The progress of the action and the results of the application are monitored via WhatsApp. Researchers also provided a guidebook as a tool for respondents and families in applying the ADEEM method.

Research data were obtained through measurement of muscle strength before and after the application of the ADEEM method. The measurement used the Manual Muscle Test instrument which consists of a 0-4 scale. This measurement has been tested for reliability by at least 11 previous studies and obtained a reliability coefficient value of $\alpha >$ 0.63 to 0.98 for individual muscle groups, and $\alpha >$ 0.57 to 1.0 for the total MMT score. The validity value of MMT showed r = 0.768 (>0.05).

The results of the study were analyzed using the Saphiro Wilk and Wilcoxon statistical tests. The results of the Saphiro Wilk test showed that the data were not normally distributed where the p value was <0.05 (0.000).

In general, the basic principles of research and data collection are the notion of justice, the principle of benefit, and the principle of protecting the rights of subjects. The process in this study has gone through the research ethics committee of Karya Husada University Semarang with a certificate number : 043/KEP/UNKAHA/SLE/IV/2024.

RESULTS AND DISCUSSION

RESULTS

Distribution of Frequency Characteristics of Ischemic Stroke Patients in 2024. Characteristic respondent in this research are age of respondents, duration of stroke, position of paresis and occupation.

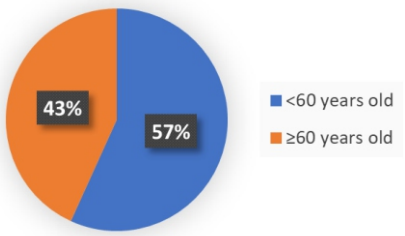

Figure 1. Age of respondents

The **Figure 1** shows the number of respondents aged <60 years is 57% or 21 respondents and ≥60 years is 16 respondents or 43%. This means that there are more respondents <60 years old than ≥60 years old.

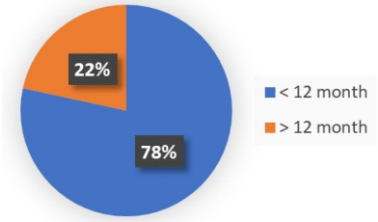

Figure 2. Duration of stroke

The **Figure 2** above shows that ischemic stroke patients who have characteristics of stroke duration < 12 months are greater as many as 29 respondents or 78% compared to ischemic stroke patients with time > 12 months as many as 21.6%.

Based on **Figure 3** bellow, the characteristics of the position of paresis in ischemic stroke respondents were obtained, namely respondents with right limb paresis of 73% or 27 respondents while left limb paresis amounted to 10 respondents or 27%. This data can be concluded that most respondents had paresis of the right extremity with 27 respondents. Various complications can occur in stroke patients due to decreased brain function. One of the impacts experienced by stroke patients is hemiparesis. In this study, ischemic stroke patients who experienced paresis were mostly experienced by the right extremity with a percentage of 73%.

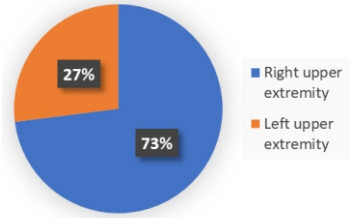

Figure 3. Respondents' paresis position

Based on **Figure 4**, it is known that the characteristics of work in ischemic stroke respondents consist of drivers with a total of 2 respondents (5.4%), pastors as many as 2 respondents (5.4%), private employees as many as 11 respondents (29.7%), lecturers as many as 1 respondent (2.70%), farmers as many as 1 respondent (2.7%), civil servants as many as 1 respondent (2.7%), and not working as many as 19 respondents (51.3%). In these results it can be concluded that respondents who do not work have the highest percentage, namely 51.3% or totaling 19 respondents. In this study, the number of respondents not working occupied the top position with a total of 19 respondents or

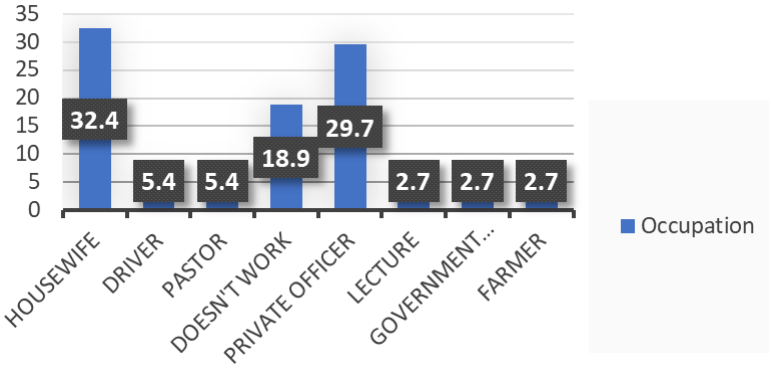

Figure 4. Occupation of Respondents

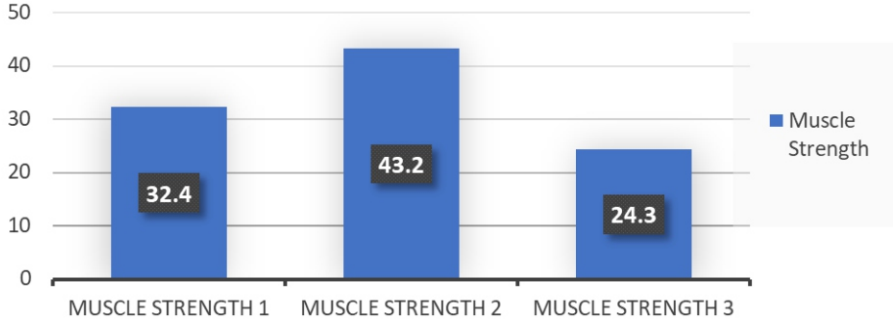

Figure 5. Muscle strength before intervention

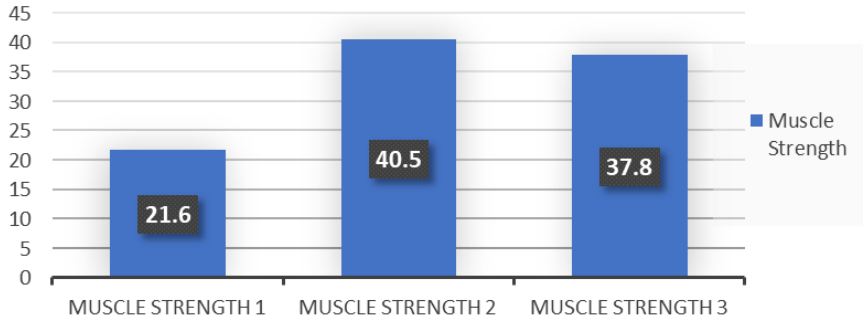

Figure 6. Muscle strength after intervention

51.3%. Research explains that stress experienced by housewives triggers a stroke. The results of measuring muscle strength before and after applying the ADEEM Method are depicted in **Figure 5** and **Figure 6**.

In **Figure 5**, a description of the respondent's muscle strength is obtained where the number of respondents with muscle strength 1 is 32.4% or 12 respondents where muscle strength 1 in the patient is palpable contraction but cannot move. Muscle strength 2 amounted to 43.2% or 16 respondents. In muscle strength 2, the patient is able to move the fingers to the wrist but is unable to lift the hand. For respondents with muscle strength 3 was found in 9 respondents or 24.3%. In muscle strength 3, the patient is able to move and lift the hand but is not strong against resistance. The mean value of the respondent's muscle strength before the

intervention was 1.92.

After applying the ADEEM Method intervention to each respondent for 2 weeks for each respondent, the researcher again measured muscle strength using the Manual Muscle Test with a scale of 0-4. The measurement results show a change in data after the application of the intervention. The number of respondents with muscle strength 2 was 40.5% or 15 respondents, muscle strength 1 was 21.6% or 8 respondents and respondents with muscle strength 3 were 37.8% or 14 respondents. The mean or average value of respondents' muscle strength after the intervention increased to 2.16.

To assess the effect of the application of the ADEEM Method on increasing muscle strength of ischemic stroke patients, bivariate analysis was carried out which was preceded by a normality test. Test the normality of data on the effect of the ADEEM Method on increasing upper limb muscle strength of ischemic stroke patients using “Spahiro Wilk”. The “Spahiro Wilk” test is a normality test that applies to studies with <50 respondents.

Table 1. Normality test results of the effect of adeem method on increasing upper extremity muscle strength of ischemic stroke patients at RSU GMIM Pancaran Kasih Manado

Variable	Mean	Median	Std. Deviasi	Sig	Data distribution
Muscle Strength					
Pre test Muscle Strength	1.92	2	0.759	0	Abnormal
Post test Muscle Strength	2.16	2	0.764	0	Abnormal

Table 2. Wilcoxon test results on the effect of ADEEM method

Variable	ρ value	Negative Ranks	Positif Ranks	Ties
Muscle Strength	0.003	0	9	28

Based on **Table 1**, the muscle strength data before and after the application of the ADEEM Method is not normally distributed because the ρ-value <0.05, so to determine the effect of the ADEEM Method on increasing muscle strength in ischemic stroke patients at RSU GMIM Pancaran Kasih Manado is assessed based on the Wilcoxon non-parametric statistical test.

DISCUSSION

Figure 1 shows the number of respondents aged <60 years is 57% or 21 respondents and ≥60 years is 16 respondents or 43%. This means that there are more respondents <60 years old than ≥60 years old. Nowadays, stroke does not only affect patients aged >60 years but also young and old adults. The results showed that the

incidence of stroke occurred mostly at the age of <60 years with a percentage reaching 57%. Research conducted (6) states that currently there is a tendency for stroke to attack the age of 20-44 years or <60 years. The occurrence of stroke at a young age causes several problems in quality of life, namely physical disability, depression, cognitive impairment and loss of productivity, affecting the socio-economy (7).

Based on **Figure 2** above, it shows that ischemic stroke patients who have characteristics of stroke duration < 12 months are greater as many as 29 respondents or 78% compared to ischemic stroke patients with time > 12 months as many as 21.6%. In this study, ischemic stroke patients who experienced paresis were mostly experienced by the right extremity with a percentage of 73%. Work is one of the risk factors that can affect the occurrence of stroke. Through the results of research stated the influence of work on the incidence of stroke. In this study in **Figure 4**, the number of housewife respondents was as follows.

Data analysis through the Wilcoxon test in **Figures 5 and 6** shows that the ρ value < α (0.05), this means that the analysis results show an effect on the value of muscle strength after the application of the ADEEM Method. The results of the analysis showed a difference in the average value of the pre-test and post-test muscle strength. The mean value of post test muscle strength is higher by 2.30 compared to the mean value of muscle strength in the pre test of 1.92. Increased muscle strength was found in 9 respondents, including 5 respondents with male gender and 4 respondents with female gender. Muscle strength that has increased is muscle strength 1 to 2 with a total of 4 respondents and respondents with muscle strength that has increased from 2 to 3 totaling 5 people. All respondents who experienced improvement performed the ADEEM method according to the provisions taught and were disciplined in doing ADEEM according to the schedule set.

This study focuses on knowing the effect of the ADEEM Method on increasing muscle strength in ischemic stroke patients at RSU GMIM Pancaran Kasih Manado which is assessed based on the Wilcoxon non-parametric statistical test. Based on **Table 1 and 2** The results of the Wilcoxon test with a significance value (sig.2-tailed) obtained is ρ value < α (0.05), which proves that there is a difference between muscle strength before and after being given the ADEEM Method in ischemic stroke patients at RSU GMIM Pancaran Kasih Manado. This means that the results of the analysis show an effect on the value of muscle strength after the application of the ADEEM Method.

The ADEEM method is an organized management consisting of Assess, Do Massage Frirage, Exercise ROM, Evaluation, and Making Schedule. The implementation of assessment measures including the degree of muscle strength, blood pressure measurement, safe comfort and the condition of the patient who has eaten or not is an important first step in this method (13).

Stroke patients who experience weakness on one side of the limbs and experience interference in activities due to decreased muscle strength (15). Blood pressure measurement needs to be done before the next stage in the ADEEM method, namely Massage and ROM Exercise. Billah explains that increased blood pressure is one of the causes of stroke & states that massage cannot be performed on patients who have eaten.

The recovery process in stroke patients in the ADEEM method is also carried out through the application of massage. The form of massage given in this method is Frirage, where this massage technique is a combination of Friction and Effleurage techniques that can be given. Massage therapy is a therapy that utilizes fingers to perform treatment with one or more fingers. Massage therapy is beneficial to improve blood circulation and increase energy where massage will mechanically train nerves and muscles (14).

The provision of massage therapy is one of the elements of increasing the average post-test value in respondents of ischemic stroke patients who experience an increase in muscle strength values. In this study, massage as part of ADEEM was performed for 5 minutes from the farthest part of the body with the Frirage technique. Through his research suggests that massage is an effective method in improving motor function. In addition, massage also provides the benefit of relaxing or calming the muscles of ischemic stroke patients who experience paresis. Massage needs to be done 2-3 times a week for someone who is experiencing health problems (19).

The results of research prove that the average upper extremity muscle strength after frirage masage and acupressure shows a difference. The results of this study indicate that the application of a combination of frirage masage and acupressure performed together is able to increase muscle strength compared to the group that only performed acupressure. Masase provides manipulations that aim to relax tense muscles, improve blood circulation, and lymph (16,19).

The next step is exercise with ROM where the patient is given ROM exercises by repeating each movement 5-10 times. The results of this study are in line with the results it is stated that the application of ROM exercises for 2 weeks which are repeated 8 times and performed 2 times a day affects the range of motion of the upper extremity joints. The results research show that active ROM can increase changes in joint range of motion. Measurement of the angle of flexion range of motion in the group that performed active ROM exercises increased or improved the angle of flexion range of motion (17). According to his research shows that ROM training with a frequency of twice a day in ischemic stroke patients improves muscle ability more than ROM training with a frequency of once a day (18). Range of Motion (ROM) is a type of exercise that moves joints and allows muscle contraction

and movement. This exercise is performed on each part of the joint in a manner similar to normal movement, both actively and passively. Range of Motion (ROM) exercises are movements or activities that aim to maintain flexibility and increase the movement of each joint. The results obtained through exercise in the form of maintaining joint flexibility and the ability to move and function psychologically, can reduce pain perception and signs of depression in post-stroke patients (20).

The systematic implementation of ADEEM makes it easier for families and enumerators to implement this method. The existence of evaluation stages and making a schedule to monitor the progress of implementing this action helps families and implementers to be more disciplined. It was found that some respondents who did not take action with discipline according to the specified time and stages, did not experience an increase in muscle strength compared to families who took action according to the directions and specified time. The ADEEM method was also developed through the Adaptation theory proposed by Calista Roy. Roy through her theory explains the role of nurses is to help patients adapt to the process of change that will be experienced by patients where the adaptation process includes input-process-output. Nurses and families through the ADEEM method help patients adapt from the weakness experienced to experiencing increased muscle strength. During the change, it is expected that the nurse will continue to assist the patient in adapting both behaviorally and emotionally.

CONCLUSION AND RECOMMENDATION

The ADEEM method is a systematically designed method to facilitate stroke patients and families and nurses in providing post-stroke recovery care for those who experience weakness. The ADEEM method applied to stroke patients through the results of its analysis can be recommended to be applied to stroke patients who experience weakness in the upper extremities. Stroke patients are expected to improve their ability to perform independently. Patients and families are also expected to continue to apply this ADEEM method to obtain maximum results. Future researchers can conduct research with more research respondents. Researchers can also continue by adding a control group to see the comparison between the two sample groups, namely the control group and the intervention group.

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