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The effect Thai massage with virgin coconut oil toward motoric status and incident of pressure sores on stroke patients

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Abstract
Background: The main problem of stroke is hemiparesis which causes a decrease in muscle strength and range of movement of the extremities, patient immobility remains to be one of the primary causes of pressure ulcers. Which can be reduced by giving intervention thai massage therapy and virgin coconut oil may lead to reduce muscle stiffness, and improve feedback from muscle spindle receptors.
Aims: The aimed of this study is to examine intervention of Thai massage therapy and virgin coconut oil on motoric status and incident pressure ulcer of non hemorrhagic stroke patients in stroke unit Tidar, Magelang.
Methods: This research was a quasi-experimental pre-test-post-test with control group design. The number of respondents in this study was 44 respondents, divided equally into intervention group and control group use probability sampling promoted block. The control group was given treatments based on hospitals standard operation procedure (ROM and clapping massage with lotion), while the interventions group was provided with combination of hospitals standard operation procedure (ROM and clapping massage with lotion) and intervention of Thai massage therapy and virgin coconut oil 5 times for 10 days with a duration of 30 minutes.
Results: Statistical test results shows value the influence of intervention Thai massage with virgin coconut oil 5 times in 10 days duration 30 minutes to increase upper and lower extensibility muscle strength with a value of <0.05 (p = 0.000) and a decrease in the incidence of compressive injury risk value <0.05 (p = 0.000).
Conclusion: The results of the study after being given complementary therapy increased the strength of the upper and lower extremity muscles and prevented the risk of pressure wounds in patients receiving therapy Thai massage with virgin coconut oil, so that the complementary therapies were effectively implemented for patients who experienced decreased motor status especially in stroke patients.

Keywords: Thai massage, virgin coconut oil, motor status, press injury, stroke

1. Introduction
Stroke is a neurological deficit that occurs suddenly, caused by ischemia or bleeding in the central nervous system [1]. Worldwide, stroke is the second leading cause of the death and in Indonesia the third leading cause of death after heart disease and cancer [2]. Stroke can be classified as either ischemic (involving an interference to blood supply) or hemorrhagic (involving a rupture of cerebral artery). 87% prevalence of stroke is caused by ischemia, while 13% of stroke events are hemorrhagic in the cerebral artery [3].
Based on data from the World Health Organization (WHO) in 2016 17.5 million people died of cardiovascular disease (CVDs) of which 6.7 million were caused by strokes [4]. In 2018 based on Riskesdas the prevalence of the highest stroke cases at the age of more than 75 years increased by (50.2%). The prevalence of stroke by sex is male (11.0%) compared to women as much as (10.9%) [5, 6]. Hospital medical records of Magelang Tidar average prevalence visit hospitalized patients with a diagnosis of stroke in the past three years as many as 1,386 patients [7].
The main problem with stroke patients is Hemiparesis and hemiplegia at points or places from the control sequence from motor neuron cells to muscle fibers [8]. Causes a decrease in limb muscle strength, decreased flexibility and strength of joints, contractures that the patient is able to perform the activity. Treatment for stroke can be collaborative and independent. Patients who experience an ischemic stroke in early phase receive anticoagulant treatment involving tissue plasminogen activator, is aimed at increasing blood flow to the brain, to break up the clot and minimizing the disability [9]. Independent treatment for stroke recovery, patients was received treatments based on hospitals standard operation procedure that is Range Of Motion (ROM) training and early ambulation. Patients with stroke need good handling to prevent physical and sensory disability [10].
Stroke patient with immobile are at constant risk for developing pressure ulcers. A main reason for developing pressure ulcer beside immobility and malnutrition, is believed to be sustained pressure in the skin long time and combined with shearing force [11]. Pressure on the affected area leads to poor circulation, skin breakdown, compression of the blood vessels which can cause formation of necrosis [12]. The prevalence of pressure sores in Indonesia is high as 33.3%, according to the results of a study in the United States it was found that stroke patients treated in hospitals suffered 3-10% pressure ulcers and 2.7% had a chance to form new wounds.
Insiden kejadian luka tekan di study internasional sebesar(1,9-63.6%), Prevalensi area berisiko luka tekan

15,8% pada superfisial stadium I, 34% stadium II, 30% stadium III, 5% stadium IV, 14% cedera jaringan pada area heels: 26%, area sacrum 20%, dan area telinga 19% [13]. Dari hasil penelitian menunjukkan bahwa prevalensi luka tekan bervariasi, secara umum 5-11% luka tekan terjadi di tatanan perawatan akut (acute care), 15-25% ditatanan perawatan jangka panjang (long term care), dan 7-12% di tatanan perawatan rumah (home healtcare) [14].

The results of the research conducted on patients with immobilization in the ICU room were 34 respondents who were giveninterventions efflurage massage4-5 for prevention of compressive wounds using VCO with the duration of massage usedminutes for 12 days explaining the incidence of high pressure wounds in the 12th day control group And there is a significant result by givingintervention efflurage massage using VCO with p = 0.001. Massage using oil aims to improve skin elasticity and provide comfort [15]. Use skin moisturizers to moisturize dry skin to reduce the risk of skin damage. One of the interventions in maintaining the integrity of the skin is by giving lubricant moisturizers such as lotions, creams and low alcoholic alcohol or using a barrier skin barrier.

Complementary and alternative medicine (CAM) therapies are commonly use by stroke patients. The study found that 26,5% of stroke patients used CAM for reducing symptom and complication of stroke. The most common use is Thai massage [16].

Thai massage also known as Nuad Bo Rarn, involves deep massage and passive stretching on the affected muscles. Massage therapy has also been advocated as having good effects on improving muscle strength. Its use has been theorized as decrease melatonin which is related to dopamine production in stroke patient have a hemiparesis [17]. The benefits of massage on the prevention of pressure ulcers aim to increase blood flow through the area and all muscles that are massaged and increase nutrition and oxygen to the area being massaged and help remove toxins, carbon dioxide, and other metabolic results.

One of the main nursing intervention to prevent pressure ulcers is given hygiene skin care with topical for lotion. VCO (Virgin Coconut Oil) as a moisturizer because it contains antioxidants for skin care of patients and is able to produce relatively stable emulsions and pH values that match the skin [18]. VCO contains a saturated fatty acid composition consisting of Lauric Acid 43.0–53.0. The results showed that monolaurin was antiviral, antibacterial and antifungal, lauric acid had high antioxidant activity and was shown to inhibit the growth of pathogenic Listeria monocytogenes bacteria [19]. Thai Massage therapy with VCO makes muscle flexible and smoothens blood and lymph circulation. Major Signal Points used to increase motoric strength and prevent pressure ulcers in stroke patients are located in the area of the legs, back, face, arms, shoulders and neck.

From the research conducted on Parkinson's patients who experience muscle weakness givenintervention massage in the form of 2 treatment sessions in 1 week with the aim of increasing upper extremity muscle strength in 60 respondents who experienced muscle weakness, the results showed that the group treated with massage showed a significant increase on torque muscle flexion and muscle extension torque ($p < 0.001$) [20]. From the results of research conducted on children with Cerebral palsy concluded that the modification of Thai massage can overcome the muscle stiffness experienced by children who have Cerebral palsy. The sample in the study amounted to 20 people, receivedinterventions massage for 30 minutes with a frequency of twice a week [21]. Intervention Massage given to children with Delay Development showed that the group massage showed a greater increase in total motor scores ($p = 0.023$), gross motorized score ($p = 0.047$), and sensory sensitivity behavior ($p = 0.042$) [22].

The handling of stroke patients with hemiparesis in the form ofintervention is Thai massage expected to improve motor status to minimize symptoms and complications, mechanical effects of stretching the muscles.mechanism Massage that is by giving mechanical pressure to muscle tissue can reduce tissue adhesion. Increases muscle-tendons by mobilizing and providing a longitudinal effect on connective tissue. An increase in muscle strength reduces muscle-tendon stiffness. And from the results of the study showed that massage can improve motor skills and various types of movements in children with cerebral palsy. Massage increases the temperature of the erector of the spinal muscle and the vastus lateralis muscle. In addition, massage can produce effects by changing the blood flow from the massage tissue. In the case of pressure sores, theeffect massage causes a rise in the temperature of the skin at the massage. This increase in temperature causes vasodilation, resulting in increased production of sweat and skin blood flow. So that theEffect is Massage useful in preventing the risk of developing compressive wounds for stroke patients.

Based on the description of the above phenomena, the researcher wanted to examine the Intervention of Thai massage with Coconut Oil Virigin on Motor Status and Injury Event Press Stroke Patients.

2. Methods

This type of research uses research Quasy Experimental with a pre-test – post-test with control group design. The researcher arranged two groups, namely the intervention group that was given the treatment of Thai Massage with Virgin Coconut Oil and the control group was only given treatment in accordance with the standards in the hospital. The therapy of Thai Massage with Virgin Coconut Oil is given 5 times with a duration 30 minutes for 10 days. In this study the intervention and control groups continued to get standard care in the form of ROM and massage using lotions to improve motoric status and prevent the occurrence of patient pressure sores. Assessment of muscle strength can be done using the scale Medical Research Council (MRC) 0-5 and Braden scale with observation sheets of the National Pressure Ulcer Advisory Panel to assess the risk and incidence of pressure ulcers. Measurement of motor status and the risk of the incidence of pressure sores were carried out before and after the treatment was carried out.

The population in this study were patients stroke who had hemioaresis General treated in the stroke unit room Tidar Hospital Magelang City in March - May 2019. Determination of the minimum number of samples using probability sampling techniques with the type of promoted block used to determine intervention groups and control groups by dividing the two blocks. The first block and the second block were divided into 11 intervention group respondents and 11 control group respondents and were based on inclusion and exclusion criteria.

In this study the data normality test was conducted using thetest Shapro Wilk ($p < 0.05$) indicating that the data were

not normally distributed. To determine the effect of therapeutic thai massage intervention on motor status and the incidence of compressive injuries in stroke patients using a non-parametric difference test (Wilcoxon and Kruskal Wallis). The processed data is used as the basis for discussing problem statements, which are then presented in table form so conclusions can be drawn.

3. Results

Based on the table above shows that the average age of respondents in this study is in the age range of 56- 65 years, while in the control group the average age of respondents was 56.68 with a standard deviation of 4.694, the number of respondents in the age range 45-55 and 56-66 which showed the proportion of respondents between the intervention and control groups was equal (p = 0.934). Then the sex of the intervention group was 15 men (68.2%) and 7 respondents (31.8%). Where as in the control group respondents who were male were 13 respondents (59.1%) and women as many as 9 respondents (40.9%).

From the values of age, sex, frequency of stroke and BMI, p> 0.05 showed that the distribution of categories of age, sex, stroke and BMI between the intervention and control groups was equivalent or homogeneous.

Table 1: Frequency distribution respondents based on age, gender, frequency of stroke and BMI based on demographic data

Variables	Respondent Group				P value
	Intervention		Control		
	N	%	N	%	
Age (Mean ± SD)	(57.73±4.783)		(56.68±4.694)		0.934
45-55	9	40.90	11	9	40.90
56-65	13	59.10	11	13	59.10
Total	22	100	22	22	100
Gender					
Male	15	68.2	13	15	68.2
Female	7	31.8	9	7	31.8
Total	22	100	22	22	100
Frequency strole					
First attack	13	59.1	12	13	59.1
Second attack	9	40.9	10	9	40.9
Total	22	100	22	22	100
IMT					
Skinny	3	13.6	2	3	13.6
Normal	13	59.1	10	13	59.1
Grease	5	22.7	8	5	22.7
Obesity	1	4.5	2	1	4.5
Total	22	100	22	22	100

**Homogeneous Test*

Table 2: Differences in Upper Limb Muscle Strength Before and after treatment in the intervention group and control

Respondents Group	Measurement	Values Mean	Measurement	Value Mean	Mean Difference	p
Intervention	Pre	1.55	Posttest 5	4.27	-2.72	0.000
	Pre	1.55	Posttest 1	1.55	0	1.000
	Posttest 1	1.55	Posttest 2	2.18	-0.63	0.000
	Posttest 2	2.18	Posttest 3	3.14	-0.96	0.000
	Posttest 3	3.14	Posttest 4	3.95	-0.81	0.000
	Posttest 4	3.95	Posttest 5	4.27	0.32	0.008
Control	Pre	1.41	Posttest 5	2.41	-1	0.000
	Pre	1.41	Posttest 1	1.41	0	1.000
	Posttest 1	1.41	Posttest 2	1.41	0	1.000
	Posttest 2	1.41	Posttest 3	2.00	-0.59	0.000
	Posttest 3	2.00	Posttest 4	2.32	-0.32	0.008
	Posttest 4	2.32	Posttest 5	2.41	-0.09	0.157

**Post Hoc Wilcoxon Test*

From the table above me showed differences in the timing of increase in upper extremity muscle strength before and after treatment in the intervention and control groups. The post hoc test in the Thai massage intervention group from the 5th pretest to the posttest was significant between the time of measurement and the value (p=0.000) with the interpretation of the respondents being able to move by overcoming the prisoners given by the nurses. Mean while, the control group was seen to be significant at posttest 2 with posttest 3, posttest 3 with posttest 4, in posttest 4 with posttest 5 not significant (p=0.157), with the value of increasing muscle strength up to a score 2.41, respondents were able to move with nurse help. The increase in upper extremity muscle strength in the intervention group in terms of time was faster and the mean value was higher compared to the control group.

Table 3: Differences in the lower extremity muscle strength before and after treatment on the intervention group and control group

Respondents Group	Measurement	Value	Measurement	Value	Mean Difference	P
Intervention	Pre	1.55	Posttest 5	4.18	-2.63	0.000
	Pre	1.55	Posttest 1	1.55	0	1.000
	Posttest 1	1.55	Posttest 2	2.18	-0.63	0.000
	Posttest 2	2.18	Posttest 3	3.14	-0.96	0.000
	Posttest 3	3.14	Posttest 4	3.90	-0.76	0.000
	Posttest 4	3.90	Posttest 5	4.18	-0.28	0.008
Control	Pre	1.41	Posttest 5	2.32	0.91	0.000
	Pre	1.41	Posttest 1	1.41	0	1.000
	Posttest 1	1.41	Posttest 2	1.41	0	1.000
	Posttest 2	1.41	Posttest 3	2.00	-0.59	0.000
	Posttest 3	2.00	Posttest 4	2.23	-0.23	0.008
	Posttest 4	2.23	Posttest 5	2.32	-0.09	0.157

*Post Hoc Wilcoxon Test

From the table above shows the difference in the time of increase in lower extremity muscle strength before and after treatment in the intervention and control groups. The post hoc test in the Thai massage intervention group from the 5th pretest to the posttest was significant between the time of measurement and the value (p = 0.000), increasing lower extremity muscle strength from posttest 1 (mean 1.55) with the interpretation of the palpation assessment. move from muscle to posttest 5 (mean 4.18) with the interpretation of the respondent being able to move by overcoming the prisoners given by the nurse. Meanwhile, the control group was seen to be significant at posttest 2 with posttest 3, posttest 3 with posttest 4, in posttest 4 with posttest 5 not significant (p=0.157), with the value of increasing muscle strength up to a score 2.32 is respondents were able to move with nurse help. The increase in upper extremity muscle strength in the intervention group in terms of time was faster and the mean value was higher compared to the control group.

Table 4: Analysis Differences in Upper Limb Muscle Strength Between Intervention Groups and Control Groups

Variable			
Measurement of Muscle Strength	**Respondents Group**	**Mean ± SD**	**P value**
Pre	Intervention	1.55±0.510	0.371
	Control	1.41±0.503	
Posttest 1	Intervention	1.55±0.510	0.371
	Control	1.41±0.503	
Posttest 2	Intervention	2.18±0.733	0.001
	Control	1.41±0.503	
Posttest 3	Intervention	3.14±0.774	0.000
	Control	2.00±0.756	
Posttest 4	Intervention	3.95±0.785	0.000
	Control	2.32±0.839	
Posttest 5	Intervention	4.27±0.767	0.000
	Control	2.41±0.854	

**Krustal Wallis Test*

From the table above shows that both groups both had an increase in muscle strength, but based on the mean value in the intervention group given thai massage increased muscle strength reached a higher average value than the control group with a p value <0.05.

Table 5: Analysis Differences in Lower Limb Muscle Strength Between Intervention Group and Control Group

Variables			
Measurement of Muscle Strength	**Respondents Group**	**Mean ± SD**	**P value**
Pre	Intervention	1.55±0.510	0.371
	Control	1.41±0.503	
Post 1	Intervention	1.55±0.510	0.371
	Control	1.41±0.503	
Post 2	Intervention	2.18±0.733	0.001
	Control	1.41±0.503	
Post 3	Intervention	3.14±0.774	0.000
	Control	2.00±0.756	
Post 4	Intervention	3.90±0.768	0.000
	Control	2.23±0.685	
Post 5	Intervention	4.18±0.733	0.000
	Control	2.32±0.716	

*Krustal Wallis Test

From the table above shows that both groups both had an increase in muscle strength, but based on the mean value in the intervention group given Thai massage increased muscle strength reached a higher average value with a p value <0.05.

Table 6: Analysis Differences in Press Wound Score Based on the Braden Scale Between the Intervention Group and Control Group

Variables			
Measurement of the Braden Scale Score of	**Respondents Group**	**Mean ± SD**	**P value**
Pretest	Intervention	10.18±1.46	0.118
	Control	9.55±1.53	
Posttest 1	Intervention	10.18±1.46	0.112
	Control	9.45±1.68	
Posttest 2	Intervention	10.41±1.29	0.006
	Control	9.09±1.63	
Posttest 3	Intervention	9.64±1.36	0.119
	Control	8.82±2.06	
Posttest 4	Intervention	10.45±1.71	0.023
	Control	8.77±2.50	
Posttest 5	Intervention	11.18±1.62	0.004
	Control	8.77±2.82	

*Krustal Wallis Test

From table above shows that there is a significant difference between the pressure wound risk score between the intervention groups and the control group after being given treatment for 10 days at the second posttest (p=0.006), posttest 5 (p=0.004), no significant difference in posttest 1 (p =0.112), posttest 3 (p= 0.119), and posttest 4 (p = 0.023).

Table 7: Analysis Differences in Press Injury Between Intervention Group and Control Group

Variables			
Measurement of Press Injury	**Respondents Group**	**Mean Rank**	**P Value**
Pretest	Intervention	22.50	1.000
	Control	22.50	
Posttest 1	Intervention	22.50	1.000
	Control	22.50	
Posttest 2	Intervention	23.50	0.152
	Control	21.50	
Posttest 3	Intervention	25.50	0.009
	Control	19.50	
Posttest 4	Intervention	26.50	0.002
	Control	18.50	
Posttest 5	Intervention	28.00	0.000
	Control	17.00	

*Krustal Wallis Test

From the table above shows there are significant differences in the incidence of press injuries between intervention groups and the control group after being given treatment for 10 days at the third posttest (p=0.009), posttest 4 (p=0.002), and posttest 5 (p=0.000), it can be concluded that there are significant differences in the incidence of compressive wounds between the intervention groups given thai massage and the control group.

5. Discussion

Intervention Application of Thai massage with Virgin Cococnut oil on Motoric Status and Incident of Pressure Sores in Stroke Patients

Giving intervention in Thai massage with virgin coconut oil 5 times for 10 days duration of 30 minutes in this study has a positive influence to improve upper and lower extremity motor status. and the incidence of pressure sores in non-hemorrhagic stroke patients.

Based on the results of the research in the intervention group Thai massage from the pretest to the posttest 5th significant between the measurement time with the value (p=0.000), increasing upper extremity muscle strength and lower extremity starting posttest 1 (mean 1.55) with interpretation of the palpation assessment of the respondent muscle contractility but no movement from muscle was obtained until posttest 5 (mean 4.27 upper extremity and mean 4.18 lower extremity) with the interpretation of respondents being able to move by overcoming the prisoners given by nurses.

The results of this study are in accordance with the research that providesinterventions massage therapy to improve motor status. The research conducted by Tahnitta aims to determine the effectiveness of massage in reducing spasticity given to 50 elderly patients who have had a stroke. In the intervention group, treatment was given twice a week for massage, while the control group was given standard treatment, namely physical therapy. It was found that after giving twice a week interventions decreased spasticity which was assessed using asworth scale with a value (p = 0.008) in the intervention group, while in the control group the value (p = 0.025). However, no significant difference was found between the intervention group that received massage and the control group that received physical therapy treatment (p = 0.805).[21]

In line with the results of research conducted on Parkinson's patients who experience muscle weakness, intervention was

given in the massage form of 2 treatment sessions in 1 week with the aim of increasing upper extremity muscle strength in 60 respondents who experienced muscle weakness, the results showed that the group treated with massage showed an increase significant torsion of muscle flexion and muscle extension torque ($p < 0.001$).[20] The results of research conducted in patients with Cerebral palsy concluded thatmodification massage can overcome muscle stiffness. The sample in the study amounted to 20 people, receivedinterventions massage for 30 minutes with a frequency of twice a week.

Thai massage is a complementary therapy used by stroke patients. Followed by the results of research conducted on stroke patients, explained that 26.5% of stroke patients using complementarytherapy massage aimed to overcome the symptoms and complications of stroke.[17]

At the time of massage at each MaSP point it will stimulate the parasmpatis or tissue nervous system under the skin thereby reducing muscle spasticity, increasing circulation, and finally causing relaxation.[23] There are multifactors that affect Thai massage to increase muscle strength, fromtechniques deep massage can cause biomechanical effects directly and indirectly. The biomechanical effect can directly reduce muscle stiffness and increase relaxation. Indirect mechanism that is by increasing muscle flexibility, circulation lysis adhesion, and decreasing neuromuscular stimulation.[24]

The mechanism of Thai massage is the same as the acupressure technique by stimulating the central nervous system. At the time of massage follow the NES line to balance the body's energy. Then massaging the MaSP of the shoulder to increase the range of external motion over stroke patients who experience muscle weakness.[25] Thai massage has one characteristic that distinguishes it from other massages, namely massaging the inner tissues by triggering at MaSP points using the thumb and palm.[26] MaSP points are mainly located in the muscle structure that connects blood vessels and nerves. By producing serotonin, serotonin stimulates the noiseptor against bradykinin, this improves blood circulation and relaxation to reduce joint stiffness.[27]

To prevent compressive wounds, Thai massage can produce effects by changing the blood flow from the massage tissue.[28] Combination of massage with Virgin coconut oil containing Lauric Acid, which has high antioxidant activity and proven to be able to inhibit the growth ofpathogenic bacteria Listeria monocytogenes.[29] The fatty acid content, especially lauric and oleic acids in VCO, is softening the skin. In the case of pressure sores, theeffect massage causes a rise in the temperature of the skin at the massage. This increase in temperature causes vasodilation, resulting in increased production of sweat and skin blood flow. So that theEffect Massage with VCO is useful in preventing the risk of developing compressive wounds for stroke patients.[30]

With the results of this study and the results of previous studies it can be concluded that the provision ofintervention Thai massagewith a combination of Virgin Cococnut Oil at MaSP (Major Signal Pointpoints)at the Base Line Massage located in the Base Massage Shoulder and Arm Line located on the shoulder area , area (lateral side of leglateral side of leg) and the medial side of the leg , giving at MaSP points (Major Signal Point) at the Base Line Massage located in the back area, and at the Base Line Massage Face can improve motoric status and prevent pressure sores in stroke patients.

6. Conclusion

Based on the results of the research about giving Thai massage with virgin coconut oil towards increasing motor status and the incidence of pressure sores in stroke patients, conclusions can be drawn as follows:

6.1 There is an influence of intervention Thai with virgin coconut oil 5 times in 10 days duration 30 minutes to extra muscle strength over stroke patients mean value in intervention group 4.27 while control group 2.41 ($p=0.000$).

6.2 There is the influence of intervention Thai with virgin coconut oil 5 times in 10 days duration 30 minutes on lower extremity muscle strength in stroke patients mean value in intervention group 4.18 while control group 2.32 ($p=0.000$).

6.3 There is the influence of intervention Thai with virgin coconut oil 5 times in 10 days duration 30 minutes to the risk score of the incidence of stroke patients with stroke patients the mean value of the intervention group 11.18 while the control group 8.77 ($p=0.004$).

6.4 There is the influence of intervention Thai with virgin coconut oil 5 times in 10 days duration 30 minutes for the incidence of pressure sores in stroke patients with a value ($p=0.000$).

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