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Effectiveness of akupresure on function and time of sensoric improvement in non hemoragic stroke patients (Ischemia)

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ABSTRACT

Background

Decreased sensory function is a complication that often occurs in non-hemorrhagic stroke patients, as a result of decreased cerebral circulation. Acupressure is useful in improving sensory function by launching the movement of the flow of qi (vital energy) in the body. But not many studies have examined the effectiveness of acupressure in the function and timing of sensory repair in non-hemorrhagic stroke patients.

Method

The type of research used is the study True Experiment Design with aapproach randomized control trial. This study compiled two groups, namely the intervention group and the control group. Technique Probability sampling with a method simple random sampling was used to get 42 respondents divided into 2 groups.

Results

Test results Independentt test shows value p value 0.000 which indicates that there is a significant difference in the value of sensory function between the intervention and control groups.

Conclusion

The results of the study after being given an intervention that an increase in sensory function is better and faster in patients who get acupressure, so this action is effectively implemented for non-hemorrhagic stroke patients with sensory disorders.

Keywords: Acupressure, Function and time, Sensoric, Non Hemorrhagic Stroke.

INTRODUCTION

Stroke is a clinical sign that develops rapidly due to focal or global brain function disorders with symptoms lasting 24 hours or more that cause death without any other obvious cause other than vascular [1]. Stroke consists of hemorrhagic and non hemorrhagic. Hemorrhagic stroke is an acute focal neurological dysfunction and is caused by primary bleeding in the brain substance that occurs spontaneously due to rupture of arteries, veins and capillaries which are not caused by head injury [1]. Ischemic stroke is a stroke that occurs due to blockage of blood flow to certain parts of the brain resulting in a series of pathological processes in

that area. Ischemic stroke covers about 70% of the total incidence of stroke with 50% of the disability rate after the attack. [1, 2] Disability in stroke patients can occur due to impaired sensory and motor functions. This disruption of function has an impact on decreasing activities that can affect the economy and even cause death [3].

An increase in the number of stroke patients has occurred in the last 5 years. In 2013 stroke patients in Indonesia were 7.0 per 1000 inhabitants, while in 2018 the incidence of stroke was 10.9 per 1000 population or an increase of 35.8% [4, 5].

Help in stroke patients prioritizes increasing blood flow to the brain, preventing death and minimizing disability. Someone who suffers a stroke needs to get fast and appropriate treatment to avoid preventing disability, both physically and mentally. As many as 30% - 40% of patients with this disease can recover completely if handled appropriately in the first 3-6 hours (golden period), at this time brain tissue that is experiencing ischemia can still be saved. Retnaningsih said that the most effective treatment for non-hemorrhagic strokes was thrombolytic administration at the latest 4.5 hours after the attack. This statement is in accordance with the stroke guidelines presented by the Stroke Foundation [6]. Examination of CT scans in patients with non-hemorrhagic strokes in the range of 12-24 hours after the onset of symptoms does not indicate abnormalities. So that giving action at this time will likely give results even though the possibility will not be optimal [7, 8].

Handling a stroke can be done with medical or non-medical treatment. In cases of acute stroke, treatment is generally carried out with the administration of drugs. American Hearth Associations (AHA) makes a guide to handling patients with acute ischemic stroke. This guideline details the handling of pre-hospital patients, conducts emergency evaluations, intravenous and intra-arterial treatment, management of hospital care designed for the first 2 weeks [9].

Non-medical or complementary therapy for post-acute stroke patients can be done by taking acupressure. This action aims to open up and stimulate a blockage / unblocking circulation chi by activating the points very specific on the meridian, which is called a pressure point(accupoint) passing near the skin so that it can pass freely [10]. Acupressure is a complementary action and is an alternative therapy in nursing listed in the Nursing Intervention Classification (NIC) [11, 12].

Adam's study showed that acupressure in the scapular area performed for 10 minutes in 7 days could improve upper limb motor skills in stroke patients who had hemiparesis with an effect size *of* 1.85. That is, according to this study acupressure has a very strong influence on increasing muscle strength in stroke patients [13]. Another study conducted by Asmawariza stated that acupressure at 14 meridian points within 15 minutes for 7 days was able to increase the strength of upper and lower extremity muscles in stroke patients with an effect size of 3.00, which means that acupressure measures of 14 meridian points have a very strong against increasing muscle strength in post-hemorrhagic post-stroke patients [14].

Kang's research stated that the acupressure of 14 meridian points in 56 respondents 10 minutes every day for 2 weeks showed the results of an increase in the range of motion both flexion and extension in the upper extremity. The effect size of shoulder flexion is 1.44 and shoulder extension is 1.88. From the results of the calculation shows a very strong influence between acupressure actions at 14 meridian points on the ability of range of motion both flexion and extension. Another study also stated that acupressure at 12 points performed on 27 stroke patients was able to improve walking ability ($p = 0.00$), hand movements ($p = 0.026$) and continued hand activities ($p = 0.038$) [15, 16].

Stroke in addition to causing motor disorders also causes sensory disorders such as impaired vision, touch / touch [17]. Disorders of sensory function are caused by damage to the cranial nerves (Central Nerves) which affect several sensory functions in the body such as changes in sensory sharpness, smell, vision and taste [18]. Patients with stroke can experience inability to interpret sensations. Sensory damage to a stroke can be mild touch damage or even more severe. By losing proprioception (the ability to feel the position and movement of body parts) as well as difficulties in interpreting visual, tactile and auditory stimuli [19].

The research conducted by Astutik about pressure ulcers stated that disturbances in sensory perception in stroke patients can cause pressure ulcers. Based on the statistical test, get p value = 0.007. This result means that sensory perception disorders significantly play a role in the occurrence of pressure ulcers in stroke patients. Thus need

immediate treatment in stroke patients who experience sensory disorders [20].

Acupressure actions stimulate the formation of histamine, heparin and kinase prostase where all three will cause vascular vasodilation and cause perfusion to brain tissue will also be more smooth. With the smooth circulation will affect improving brain function (thalamus area) as a sensory center, so that sensory function will improve. The mechanism of action of acupressure when viewed from this function is to improve sensory function by improving circulation to the area of the thalamus as a sensory center. Stroke non-hemorrhagic occurs due to blockage in the brain's blood vessels which results in decreased tissue perfusion resulting in brain damage. Pharmacologically, the first action of patients with non-hemorrhagic strokes is to give thrombolytic drugs to lyse blockages in blood vessels. The teraupeutic window for administration of drugs in this phase ranges from 12-24 hours. After the blood vessel drug administration process will begin to open, this is where the role of acupressure as a complementary (non-pharmacological) action to help facilitate circulation to the brain area, so that sensory functions will improve [8].

Research as described above has not discussed the effect of acupressure on increasing sensory ability in stroke patients. Thus this study will analyze the effect of acupressure on increasing sensory ability in stroke patients. Previous studies on acupressure for motor strength and range of motion in non-homoragic stroke patients performed by Asmawariza used 14 acupressure meridian points. The results obtained from the study state that the effect of acupressure is very strong on increasing motor strength in the upper and lower extremities of non-hemorrhagic stroke patients [14]. In this study we will use other points of acupressure namely GV-20 (*Baihui*), ST-36 (*Zusanli*), LI-4 (*Hegu*), LI-11 (*Quchi*), KI-1 (*Yongkuan*) which are acupressure points associated with improved cerebral perfusion and sensory function.

Medical record data of Tidar Magelang General Hospital in 2016, 2017 and 2018 the average visit of inpatients with stroke was 1,386 patients, with the distribution of hemorrhagic stroke as many as 428 patients per year, Non Hemorrhagic 858 patients per year and unknown causes of 100 patients per year. In Central Java, based on the 2013 Riskesdas, 40,972 stroke patients were divided into 12,542 hemorrhagic patients and 28,430 non-hemorrhagic patients.

METHODS

This type of research used True Experiment Design with approach randomized control trial. The researchers compiled two groups, namely the intervention group and the control group. Measuring the respondent's sensory function and time using the NIHSS instrument carried out for 15 days, namely before the treatment (pretest) as much as 1 time assessment and after treatment (posttest) 14 times.

The population in this study were post-acute non-hemorrhagic stroke patients who were treated in the flashlight room of the Tidar Magelang General Hospital, Central Java Province. Determination of the minimum number of samples using atechnique sampling probability with a method simple random sampling and based on inclusion and exclusion criteria as many as 42 respondents divided into 2 groups with 21 respondents each in the intervention group and 21 respondents in the control group.

In this study researchers conducted data collection by observing, identifying, interviewing and filling out the questionnaire. The collected data was analyzed through the IBM SPSS version 21.0, and continued with a different test, namely parametric test (Paired T test, Independent T test and One Way ANOVA test). The processed data is used as the basis for discussing problem statements, which are then presented in table form so conclusions can be drawn.

RESULTS

Table 1 Frequency distribution of the intervention group and control based on demographic characteristics (n = 42)

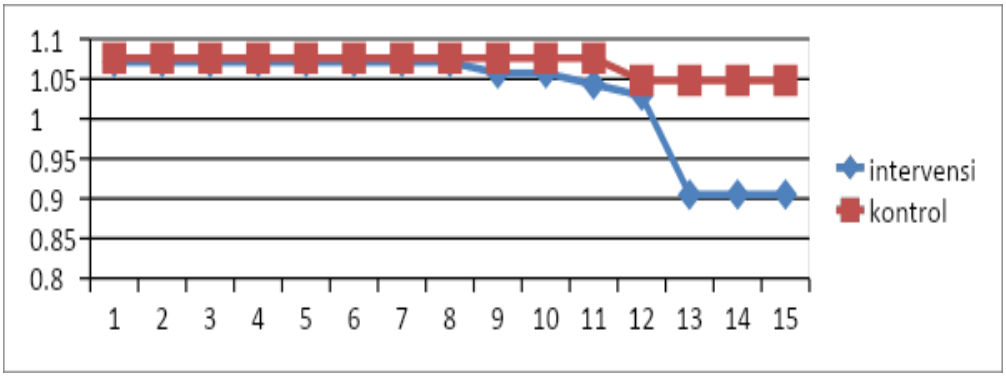
Variable	Intervention		Control		
	N	%	N	%	p *
Age (mean ± SD)	21 (59.36 ± 5.884)		21 (62.00 ± 2.600)		0.838
40-45	1	4.8	0	0	
46-65	20	95.2	21	100	
Total	21	100	21	100	
Gender					0.402
Male	11	52.4	9	42.9	
Female	10	47.6	12	57.1	
Total	21	100	21	100	
Frequency of stroke					0.678
Attack I	11	52.4	10	47.6	
Attack II	10	47.6	11	52.4	
Total	21	100	21	100	
Admission time					-
<4,5 Hours	0	0	0	0	
> 4.5 hours	21	100	21	22	
Total	21	100	21	100	
Stroke Scale					0.353
Mild	2	9.5	2	9.5	
Medium	19	90.5	19	90.5	
Total	21	100	21	100	

Table 1 shows that the average intervention and control groups were in the age range of 45-65 years (elderly). The number of male respondents in the intervention group was 47.6% and women were 52.4%, while in the male sex control group it was 42.8% while women were 57.2%. Respondents experienced a first or second stroke both light and moderate. Where as seen from admission time shows that all respondents both intervention group and control group are on admission time more than 4.5 hours.

Table 2 Over view of overall sensory function in the intervention group and control

Day to	Sensory function (mean)	
	Intervention	Control
1	1.07	1.07
9	1.05	1.07
11	1.04	1.07
12	1.03	1.04
13	0.90	1.04
15	0.90	1.04

Based on table 2 shows that acupressure intervention can reduce sensory disorders in patients. The decrease in sensory disorders began on the 9th day in the intervention group and the 12th day in the control group. The decline occurred several times, namely on the 11th, 12th and 13th days. The average value of sensory impairment in the intervention group from 1.07 to 0.90 on day 15, while in the control group from 1.07 to 1.04 on day 15.



Graph 1 Decreased Overall Sensory Disorders in the Intervention group and Control

Graph above shows that sensory disorders in both groups decreased. However, the decline in the intervention group was faster and more sharp compared to the control group. In the intervention group it was seen that there was a decline on the 9th day to the 13th day. The control group only decrease sensory disturbance occurred on day 12.

Table 3 Analysis of differences in sensory function day - 1 (pre) and day - 15 (post) in the intervention group and control

Group	*Mean*	Standard deviation	*p value**
Intervention	-0.166	0.233	0.004
Control	-0.028	0.090	0.162

**Paired T test statistic*

From the table above, shows the differences in sensory function before and after treatment in the intervention group value $p = 0.004$. This shows that there is a significant difference between sensory function before and after treatment in the intervention group. Where as in the control group $p = 0.162$, which means that there is no significant difference between sensory functions before and after treatment.

Table 4 Analysis of differences in sensory function day 15 (post) and difference test (deviation) between the intervention group and control

Group		*Mean*	Standard deviation	*p value* *
Intervention	Difference	0.210	0.181	0.000
Control		0.028	0.090	

**Independent T test statistic*

Table above, can be seen the results of the difference test between the intervention and control groups $p = 0.000$. This shows that there is a significant difference between the difference in sensory function values between the intervention groups and control.

Table 5 Analysis of the sensory repair time of the intervention group

N	*Mean*	Standard deviation	F	*p value* *
21	1.031	0.245	1.595	0.079

**One Way ANOVA Statistic*

The analysis of the time of sensory improvement stated that there was no effect of day on sensory function in the intervention group with $p = 0.079$.

DISCUSSION

Description of function and time of improvement of sensory function of non-hemorrhagic stroke

The results of the assessment using the NIHSS instrument showed the results of improvement in sensory function in the intervention group and the control group as a whole as in the table above. However, changes in sensory improvement in the intervention group were far greater than those in the control group.

The time to improve sensory function with the NIHSS assessment in the intervention group was faster than the control group. Improvement of sensory function in the intervention group began to occur on the 9th to 11th day as many as 1 respondent, on the 12th day to 2 respondents and on the 13th to 15th day to 13 respondents or around 31% of all respondents. Sensory repair in the control group began on the 12th to 15th day of 2 respondents or by 4.7% of all respondents.

The data above can be concluded that the provision of complementary acupressure measures provides greater improvement in sensory function than if only an action was given according to the hospital program. The biggest changes occur in the face area. The acupressure point that gives a local indication to the face is the G-20 point (*Baiui*) which is on the head, a cut off point of the median line of the head and the connecting line of the top of the right and left earlobe. There are branches of the ophthalmic nerve, trigeminal nerve and occipital nerve. Local indications at this point affect the tissue around the top of the head and cerebral cortex. Special properties at this point are improving brain blood vessel circulation, regulation of brain function and often used in post-stroke patients.[21] Point GV-20 (*Baihui*) can improve neurogenesis in neuroblast plasticity in the cerebral. Kim said that acupuncture at this point can improve tissue perfusion in the cerebral cortex due to the release of acetylcholine (Ach) due to the stimulus at the acupressure point. Other studies suggest that acupuncture at this point improves sensory function and balance in stroke patients [22-24].

The provision of complementary acupressure measures to accompany the therapy program from the hospital is considered to be faster to produce results in terms of the speed of sensory repair time. This is in line with Asmawariza's research which states that improvement in motor function of non-hemorrhagic stroke patients who receive complementary acupressure therapy has a time of improvement on the second day of treatment, while the control group when repairing starts on day 5.

Analysis of differences in the effectiveness of acupressure with sensory function between the intervention group and control

Based on the results of different tests of deviation between before and after treatment in the intervention and control groups with the Independent Samples Test using the NIHSS instrument, the deviation value in the intervention group was 0.210 while the control group was 0.028. Based on this value, thevalue is effect size 1.27 (very strong). This value indicates that the acupressure intervention significantly (significantly) influences sensory function in non-hemorrhagic stroke patients.

Acupressure action carried out in this study is by giving emphasis or rotation on five acupressure points which are expected to be able to improve sensory function in non-hemorrhagic stroke patients. The five points are GV-20 (*Baihui*), ST-36 (*Zusanli*), LI-4 (*Hegu*), LI-11 (*Quchi*), KI-1 (*Yongkuan*) are acupressure points associated with the process of neurogenesis, improvement in cerebral perfusion and sensory functions. According to Li Geng in the fMRI study (*Functional Magnetic Resonance Imaging*) there appears to be a change in regional blood flow in post-stroke patients, especially in areas that lack perfusion in the area around the ischemic, ipsilateral and contralateral sensomotor areas when stimulated at the acupuncture point [24, 25].

The acupuncture point GV-20 (Baihui) is on the head, is the cut off point of the median line of the head and the connecting line of the right and left ear lobes. There are branches of the ophthalmic nerve, trigeminal nerve and occipital nerve. Local indications at this point affect the tissue around the top of the head and cerebral cortex. Special properties at this point are improving brain blood vessel circulation, regulation of brain function and often used in post-stroke patients [21]. Point GV-20 (Baihui) can improve neurogenesis in neuroblast plasticity in the cerebral. Kim said that acupuncture at this point can improve tissue perfusion in the cerebral cortex due to the release of acetylcholine (Ach) due to the stimulus at the acupressure point. Another study states that acupuncture at this point

improves sensory function in the form of balance in stroke patients [22-24].

Acupressure measures can not only improve sensory function, but also increase muscle strength and range of motion in non-hemorrhagic stroke patients. This is like the research conducted by Asmawariza about the effect of 14 point acupressure for 7 days on muscle strength and range of motion in non-hemorrhagic stroke patients. The results of the study stated that acupressure had a strong effect on the increase in upper limb muscle strength (effect size 1.88). Another researcher who raised the effectiveness of acupressure on non-hemorrhagic stroke patients was also carried out by Mustopa, who stated that 12-point acupressure was able to significantly increase muscle strength in walking activities (p = 0.00), hand movement (0.026) and continued activities (p = 0.038) in patients with non-hemorrhagic stroke.

Qualitative research conducted by Luqman on 10 respondents after treatment for non-hemorrhagic stroke in the city of Lhokseumawe stated that all respondents experienced a good change after alternative massage therapy with a time that varied from 1 to 7 months [26].

The results of this study indicate that complementary nursing actions at 5 acupressure points have effectiveness in improving sensory function in non-hemorrhagic stroke patients. In previous studies, acupressure was widely used as a non-pharmacological therapy to help restore motor function in patients with non-hemorrhagic stroke. On motor recovery, the time needed is faster than the improvement of sensory function.

Analysis of differences in sensory repair time after being given acupressure.

Assessment with NIHSS analysis of sensory repair time in the intervention group obtained p = 0.079, meaning that there was no effect of time on sensory improvement in the intervention group.

Adam's research on the effect of acupressure on increasing the range of motion and limb muscle strength states that acupressure increases muscle strength after 7 days of intervention, with a value of p = 0.001 and increases the range of motion with a value of p = 0.000. Another study on the effect of 14-point stroke acupressure on function and limb motor repair states that improvement in muscle strength starts from the 3rd day with a value of p = 0.008 to the 7th day with a value of p = 0.000 [12, 13].

Giving acupressure action at 5 points in general can help in accelerating sensory repair time. giving acupressure at the meridian points can improve circulation of *qi* and blood in the body, so that it relaxes muscles that harden and stimulates natural improvement in skeletal abnormalities and range of motion. Giving pressure at the GV-20 (*Baihui*), ST-36 (*Zusanli*), LI-4 (*Hegu*), LI-11 (*Quchipoints*), KI-1 (*Yongkuan*) is an acupressure point associated with neurogenesis, improving cerebral perfusion and sensory function can increase.

CONCLUSION

Processing and analysis of data regarding the effectiveness of acupressure on the function and timing of sensory improvement can be concluded as follows:

1. Overview Sensory function after being evaluated on day 15 tended to be improved in both groups. However, in the intervention group the improvement was greater than the control group. This occurs in all assessment areas, both the face, arms and legs.
2. The description of the time of sensory repair in the intervention group improved more quickly compared to the group. An overview of the time of sensory improvement with NIHSS showed that sensory improvement began on the 9th day for the intervention group and 13 respondents on the 15th day. The improvement control group occurred on 12 days as many as 2 respondents until the 15th day.
3. Analysis of differences in sensory function between the intervention groups and the control group showed that there were significant differences in sensory function between the intervention group and the control group.
4. Analysis of the time of sensory improvement in the assessment with the NIHSS instrument stating that there was a significant effect of the day on sensory function between the intervention group and the control group.

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