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ORIGINAL RESEARCH

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EFFECT OF YOGA AND ACUPRESSURE ON PAIN AND FUNCTIONAL CAPABILITY OF LOWER BACK IN PREGNANT MOTHERS DURING THE THIRD TRIMESTER OF PREGNANCY

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Abstract

Objective: To examine the effect of yoga and acupressure in lower back pain and functional capability in pregnant women during the third semester of pregnancy.

Methods: A quasi-experimental design with pretest posttest with non-equivalent control group. The research was conducted at the Community Health Center of Kalikajar I, Selomerto I and Garung I in Wonosobo regency Indonesia in January 2017. The samples of this research were 42 pregnant women in trimester III selected using purposive sampling, which 14 samples assigned in the yoga group, acupressure group, and control group. A Visual Analog Scale (VAS) was used to measure pain level, and Oswestry Disability Index to measure functional capability of lower back. Data were analyzed using paired t-test and one-way ANOVA.

Results: Findings showed that there was a statistically significant effect of yoga, acupressure, and pregnancy exercise (control group) in reducing lower back pain and lower back functional capability with $p < 0.05$. Pregnancy exercise (mean = -1.43) was more effective in reducing lower back pain compared with yoga (mean = -2.29) and acupressure (mean = -2.71); and acupressure (mean = -14.29) was more effective in improving lower back functional capability than yoga (mean = -6.57) and pregnancy exercise (mean = -13.29).

Conclusion: There were significant effects of yoga, acupressure, and pregnancy exercise in reducing pain and in improving the functional ability of the lower back. It is recommended for midwife to use these interventions as an alternative to deal with back pain and functional capability in pregnant women, especially in the Community Health Center in Wonosobo regency, Indonesia.

Keywords: yoga; acupressure; pregnancy exercise; pain; functional ability

INTRODUCTION

Back pain in pregnancy is a pain that occurs in the lumbosacral area. Back pain intensity usually increases as the gestational age increases. It is because this pain is the result of a shift in the center of gravity and its posture (Varney, Kriebs, & Geger, 2007). Improper posture will force additional stretching and fatigue in the body, especially in the spinal cord, causing pain or back pain (Brayshaw, 2007). Previous study revealed that more than 50% of pregnant women in the United States, Canada, Iceland, Turkey, Korea

and Israel have spinal pain. While in the Northern America, Africa, the Middle East, Norway, Hong Kong and Nigeria have higher prevalence ranging from 21% to 89.9% (Ansari, Hasson, Naghdi, Keyhani, & Jalaie, 2010). Survey conducted by the University of Ulster in 2014 showed that 70% of a total of 157 pregnant women experienced lower back pain (Dase, RphD, BmedsSc, & PgChep, 2014). In Indonesia, 60-80% pregnant women experienced lower back pain; and in the Community Health Center of Ungaran

showed that there were 45 pregnant women in the trimester III had lower back pain ([Pravikasari, 2014](#)).

Based on preliminary study conducted at the Community Health Center of Kalikajar I, Selomerto I and Garung I in Wonosobo regency, there were 187 pregnant women in the third trimester from January to May 2016. An effort to reduce low back pain in pregnant women in these health centers is by only providing health education about mobilization and following the class of pregnant women to do pregnancy exercise. While based on the results of interviews on 16 pregnant women in trimester III revealed that 12 mothers experienced lower back pain, and to reduce the pain they did more rest and warm compresses on the lower back area.

The lower back will sometimes spread up to the pelvis, thighs and down to the legs, sometimes will increase tenderness above pubic sympathetic ([Cunningham, Leveno, Bloom, Spong, & Dashe, 2014](#)). This will cause pregnant women to have difficulty in performing activities such as standing up after sitting, moving from bed, sitting too long, standing too long, undressing and removing clothes, or lifting and moving objects around ([Kozier, 2008](#)).

There are two kinds of treatments to deal with pain and functional ability, namely pharmacology and non-pharmacology. Considering the impacts of pharmacological therapy, non-pharmacologic therapy should be implemented to reduce back pain experienced by the third trimester pregnant women, those include cutaneous stimulation (massage, hot and cold application, acupressure, and contralateral stimulation), TENS, acupuncture, relaxation, imagination, meditation, hypnosis, aromatherapy, yoga and reflexology ([Thompson, 2004](#)). This study aimed to apply yoga and acupressure to deal with pain and functional capability in pregnant women.

Yoga is one of non-pharmacological therapies that can reduce pain. Yoga is a practical effort in harmonizing body, mind, and spirit, which its benefits are to build a strong posture, and foster flexible and strong muscles, and purify

the central nervous system in the backbone ([Lebang, 2014](#); [Mander, 2003](#)). While acupressure emphasis on the trigger point, where in the case of activating point pain is the same as the acupuncture point. This is in accordance with the theory by previous study stated that one of the benefits of acupressure is to reduce back pain ([Khomsah, Suwandono, & Ariyanti, 2017](#)).

METHODS

Research Design

This was a quasi-experimental design with pretest posttest with non-equivalent control group.

Setting

The research was conducted at the Community Health Center of Kalikajar I, Selomerto I and Garung I in Wonosobo regency in January 2017. The research was conducted for 3 weeks.

Sample

The target population in this study was all pregnant women in trimester III the Community Health Center of Kalikajar I, Selomerto I and Garung I in Wonosobo regency. The samples of this research were 42 pregnant women in trimester III selected using purposive sampling, which 14 samples assigned in the yoga group, acupressure group, and control group. The inclusion criteria were: pregnant women in trimester III who experienced back pain and lower back functional ability, did not have a bad history of pregnancy, could communicate well, cooperative and willing to be a respondent; while the exclusion criteria included: pregnant women with gestational age less than 29 weeks.

Intervention

For the yoga group, yoga was given two times per week for 3 weeks. Yoga was done for 60 minutes per session in the morning in the Community Health Center of Kalikajar I. Yoga consisted of warm-up exercises, breathing (pranayama), and the core movement as a series of yoga asana movement including Tadasana, Baddakosana, Upavistha konasana, Dandasana, Suptha

baddakosana, and savanna. Yoga was done by an expert for yoga for pregnancy.

For the acupressure group, acupressure was done for 15 minutes per session, which was implemented two times per week for 3 weeks. Acupressure is an emphasis on certain points in the body part of the lower back and legs of the third trimester pregnant women who experienced lower back pain. The points of acupressure included: BL23 (shenshu), GV 3 (yaoyangguan), GV 4 (Mingmen), Ki 3 (taixi). The acupressure was performed by an acupressure therapist at the Community Health Center of Selomerto I.

The control group was given the standard action of pregnancy exercise performed in 60 minutes per session and done two times per week for 3 weeks. Pregnancy exercise is an exercise performed to maintain blood circulation, reduce cramps and stiff complaints. Exercise was done in the form of basic exercises, breathing, and stretching which is different from breathing techniques in Yoga. Poses performed differently, which more with sitting position upright and crawling to stretch the lower back muscles. This exercise was done by a midwife in the Community Health Center of Garung.

Instrument

Back pain was measured using a Visual Analog Scale (VAS) adopted from (Rosyida,

[Suwandono, Ariyanti, Mashoedi, & Fatmasari, 2017](#)), and functional capability of lower back was measured using Oswestry Disability Index (ODI) questionnaire (Fairbank & Pynsent, 2000). Back pain and functional capability were measured during pretest and posttest.

Ethical Consideration

The ethical consideration of this research was obtained from the Ethics Commission of Poltekkes Kemenkes Semarang No.141/KEPK/Poltekkes-Smg/EC/017. Prior to data collection, each respondent was signed a written informed consent.

Data Analysis

Paired t-test was used to determine the mean effect before and after intervention. To determine the difference in the three groups, ANOVA test was used and followed by post-hoc test. The homogeneity test used a Levene test, and normality test used Shapiro-wilk test because the number of respondents was less than 50.

RESULTS

Normality test

The results of Shapiro Wilk test as shown in the Table 1 indicated that lower back pain and functional capabilities in the three groups were in normal distribution with p-value >0.05.

Table 1 Normality test on lower back pain and functional capability before and after given intervention using Shapiro Wilk

Variable	Group					
	Yoga (p-value)		Acupressure (p-value)		Control (p-value)	
	Pretest	Posttest	Pretest	Posttest	Pretest	Posttest
Back Pain	0.251	0.057	0.683	0.504	0.271	0.251
Lower back functional capability	0.809	0.297	0.120	0.539	0.064	0.223

Homogeneity test

Levene's test as shown in the Table 2 showed back pain variable with $F = 3.192$ and $p = 0.052$ (>0.052), and functional capability with

$F = 0.629$ and $p = 0.893$ (>0.05), which indicated that the group of yoga, acupressure and control group were homogenous.

Table 2 Homogeneity test on lower back pain and functional capability using Levene's test

Variable	F	P-value
Back Pain	3.192	0.052
Lower back functional capability	0.629	0.893

Characteristics of respondents**Table 3** Characteristics of respondents based on age, employment status, parity, and body weight

Variable	Group						P-value
	Intervention			Control			
	Yoga n (%)	Mean±SD	Acupressure n (%)	Mean±SD	Pregnancy exercise n (%)	Mean±SD	
Age (year)							
<19	0 (0)		1 (7.1)		2 (14.3)		0.590
20-35	13 (92.9)		11 (78.6)		10 (71.4)		
>36	1 (7.1)		2 (14.3)		2 (14.3)		
Employment status							
Employed	5 (35.7)		6 (42.9)		11 (78.6)		0.253
Unemployed	9 (64.3)		8 (57.1)		3 (21.4)		
Parity							
Primipara	6 (42.9)		6 (42.9)		5 (35.7)		0.906
Multipara	8 (57.1)		8 (57.1)		9 (64.3)		
Body weight		60.164±8.72		61.86±8.67		58.71±4.87	0.102

Table 3 shows that there were no significant differences of the characteristics of respondents in the three groups based on age

($p=0.590$), employment status ($p=0.253$), parity ($p=0.906$), and body weight ($p=0.102$).

Difference of lower back pain before and after given intervention**Table 4** Difference of lower back pain before and after given intervention

Variable		Experiment group		Control group	p-value
		Yoga Mean±SD	Acupressure Mean±SD	Pregnancy exercise Mean±SD	
Lower back pain	Pretest	4.14±1.127	4.93±2.056	4.86±1.562	0.368 ²
	Posttest	2.71±1.204	2.64±1.646	2.14±1.027	0.465 ²
	p-value	0.000 ¹	0.000 ¹	0.000 ¹	
	Mean difference	-1.43±0.852	-2.29±0.914	-2.71±1.069	0.000 ²

¹Paired T test, ²One Way ANOVA

Table 4 shows that the mean of lower back pain in the yoga group before given intervention was 4.14 ± 1.127 , and decreased to 2.71 ± 1.207 after the intervention, and the mean difference of pain levels before and after intervention was -1.43 . The results of Paired t-test obtained p-value 0.000, which indicated that there was a significant effect of yoga in decreasing back pain level. The mean of lower back pain in the acupressure group before given intervention was 4.93 ± 2.056 , and decreased to 2.64 ± 1.646 after the intervention, and the mean difference between pain levels before and after intervention was -2.29 . Paired t-test showed p-value 0.000, which indicated that there was a significant effect of acupressure in lowering back pain.

The mean of lower back pain in the control group before given intervention was 4.86 ± 1.56 , and decreased to 2.14 ± 1.02 after intervention. The mean difference of pain level before and after intervention was -2.71 . Paired t-test showed p-value 0.000, which indicated that there was a significant decrease of lower back pain after given pregnancy exercise. One-way ANOVA test obtained p-value 0.000, which indicated that yoga, acupressure, and pregnancy exercise have a significant effect in reducing lower back pain in pregnant women. However, the mean difference in pregnancy exercise group showed a higher decrease of pain level compared with yoga and acupressure group.

Difference of lower back functional capability before and after given intervention**Table 5** Difference of lower back functional capability before and after given intervention

Variable		Experiment group		Control group	P-value
		Yoga Mean±SD	Acupressure Mean±SD	Pregnancy exercise Mean±SD	
Lower back functional capability	Pretest	32.14±13.091	36.29±12.048	31.14±13.421	0.539 ²
	Posttest	25.57±10.383	22.00±7.104	17.86±5.736	0.048 ²
	p-value	0.009 ¹	0.000 ¹	0.000 ¹	
	Mean difference	-6.57±7.978	-14.29±6.510	-13.29±9.15	0.029 ²

¹Paired T test, ²One Way ANOVA

Table 4 shows that the mean of lower back functional capability in the yoga group before given intervention was 32.14 ± 13.091 , and after intervention was 25.57 ± 10.383 , and the mean difference of lower back functional capability before and after intervention was -6.57 ± 7.978 . The results of Paired t-test obtained p-value 0.009, which indicated that there was a significant effect of yoga on lower back functional capability. While the mean of lower back functional capability in the acupressure group before given intervention was 36.29 ± 12.048 , and after intervention was 22.00 ± 7.104 , and the mean difference between lower back functional capability before and after intervention was -14.29 ± 6.510 . Paired t-test showed p-value 0.000, which indicated that there was a significant effect of acupressure on lower back functional capability.

The mean of lower back functional capability in the control group before given intervention was 31.14 ± 13.421 , and after intervention was 17.86 ± 5.736 . The mean difference of lower back functional capability before and after intervention was -13.29 ± 9.15 . Paired t-test showed p-value 0.000, which indicated that there was a significant effect of pregnancy exercise on lower back functional

capability. One-way ANOVA test obtained p-value 0.029, which indicated that yoga, acupressure, and pregnancy exercise have a significant effect in increasing lower back functional capability in pregnant women. However, the mean difference in acupressure group showed a higher increase of back functional capability compared with yoga and control group.

Table 6 shows that there was a significant difference of pain level between yoga and pregnancy exercise group with mean value 1.500 and p-value 0.000 (<0.05); and between yoga and acupressure group with mean value -1.071 and p-value 0.013 (<0.05). There was no significant difference between acupressure and pregnancy exercise with p-value 0.697 (>0.05).

For lower back functional capability, post hoc test showed a significant difference between yoga and acupressure with mean 7.714 and p-value 0.042 (<0.05). There was no significant difference between yoga and pregnancy exercise with mean 6.714 and p-value 0.094 (>0.05), and between acupressure and pregnancy exercise with p-value 1.000 (>0.05).

Table 6 Mean difference of lower back pain and functional capability using post hoc test

Variable	Group	Mean Difference	p-value
Lower back pain	Yoga vs pregnancy exercise	1.500	0.000
	Acupressure vs pregnancy exercise	0.429	0.697
	Yoga vs acupressure	-1.071	0.013
Lower back functional capability	Yoga vs acupressure	7.714	0.042
	Yoga vs pregnancy exercise	6.714	0.094
	Acupressure vs pregnancy exercise	-1.000	1.000

DISCUSSION

Effect of yoga on lower back pain and functional capabilities compared with pregnancy exercise

The results showed that there was a significant effect of yoga on the decrease of lower back pain. Back pain in pregnancy is the pain that occurs in the lumbosacral area. This is in line with previous study stated that alternative treatments to reduce low back pain in pregnancy were massage (61.4%), acupuncture (44.6%), yoga (40.6%) and chiropractic (36.6%) ([Wang et al., 2005](#)). Yoga is one form of exercises that can be done by pregnant women. Yoga can make the body more flexible and comfortable in addition to supporting blood circulation, overcoming back pain, waist, aches and swelling ([Kozier, 2008](#)). Doing yoga routinely can increase ability to stand better, walk longer, run faster and all done without leaving the pain after doing so. The function and efficacy of yoga can overcome problems related to the anatomical functions of the body ([Brayshaw, 2007](#)). This study also revealed that there was a significant effect of Yoga in the improvement of lower back functional capability.

However, in this study, pregnancy exercise was more effective in reducing lower back pain and improving functional capability in pregnant women compared with yoga. However, it does not mean that yoga has no effect to decrease the lower back pain level and increase functional capability, but there are several factors that can affect the decrease of pain level in the yoga group, one of which is the environment. The physical environment has an influence on human thoughts, feelings, and behavior. Environment is stimuli from the outside that can be responded by the system of the five senses of human (sight, hearing, tasting, smell and touch), where psychologically potentially form a perception that indirectly affects the emotional and human behavior.

Physical environment referred to in this study is that during the implementation of yoga where 14 respondents with a narrow room will cause uncomfortable feelings, and there was a sense of stuffy and hot and lack of ventilation for air circulation that will cause

poor yoga movements. In addition, different instructors in yoga group and pregnancy exercise group might be one of factors. In pregnancy exercise, the instructor was the midwife of the health center itself so that the respondents were easily to communicate and more comfortable, while a yoga instructor was not a midwife who was not yet known by the respondents. Pregnancy exercise is one of the activities in the prenatal care service during pregnancy to provide better pregnancy or delivery compared with pregnant women who do not do pregnancy exercises ([Thompson, 2004](#)). This is in accordance with previous research revealed the effectiveness of pregnancy exercise on decrease of back pain in pregnant mother at the Community Health Center of Inpati Karya Wanita Pekanbaru with p-value 0.001 (<0.05) ([Lebang, 2014](#)).

Effect of acupressure on lower back pain and functional capabilities compared with pregnancy exercise

Findings showed that there was a significant effect of acupressure on lower back pain and functional capabilities. It proves that acupressure is a healing technique by pressing, massaging, massage the body to activate the circulation of energy.

Acupressure is one of the traditional treatments by doing massage on acupuncture points. Acupressure enhances body relaxation and creates positive thoughts ([Mander, 2003](#)). Acupressure is powerful to alleviate discomfort and working greatly in improving mother's mental and emotional well-being because of the key to learning disorders and emotional trauma. Emphasizing in the acupressure points could improve blood circulation and stimulate the release of endorphin hormones ([Khomsah et al., 2017](#)). This is in line with previous study revealed that acupressure could reduce lower back pain by 86%, and more effectively when combined with psychotherapy ([Wang et al., 2005](#)). Supported by another study stated that acupressure can effectively build a weak body and increase muscle strength and range of upper extremity motion in stroke patients. The results of this study revealed that acupressure was more effective in improving lower back functional capability compared with yoga and pregnancy exercise ([Pravikasari, 2014](#)).

CONCLUSION

It is concluded that there was a significant effect of yoga and acupressure in reducing lower back pain and improving functional capability of lower back. Therefore, it is recommended for midwife to use these interventions as an alternative to deal with back pain and functional capability.

Declaration of Conflicting Interest

None declared.

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Author Contribution

All authors contributed equally in this study.

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