International Journal of Nursing and Health Services (IJNHS)
http://ijnhs.net/index.php/ijnhs/home
Volume 3 Issue 2, April 20th 2020, pp 326-332
e-ISSN: 2654-6310

The Effectiveness of Pelvic Rocking Exercise (PRE) Movement with Breathing Ball on β-Endorphin Levels in III Trisemester Pregnant Women

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Article info

***Article history*:**
Received; 15 March 2020
Revised: 05 April 2020
Accepted: 10 April 2020

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DOI:
10.35654/ijnhs.v3i2.336

Abstract. One of the discomforts in pregnancy is back pain, and it will increase along with the increasing of gestational age. Pelvic rocking exercises using birth balls can stretch pelvic muscles, manage pain, and increase comfort, thereby they can relax the body and increase beta-endorphin levels. The study aimed to analyze the differences of pelvic rocking exercises of right-to-left, back-forward, and rotating movements using a birth ball against beta-endorphin levels. This study used a quasi-experimental method with a pre-posttest design. The sampling technique used accidental sampling with a total sample of 30 samples. Respondents were divided into three groups using a simple random method. Group 1 received the right-to-left pelvic rocking exercises, group 2 was given the back-forward pelvic rocking exercises, and group 3 was assigned the rotating pelvic rocking exercises using a birth ball with a duration of 30 minutes for eight meetings. Analysis using paired tests, one-way test, and covariance analysis test with a value: 5%. There was no difference in pelvic rocking exercises of right-to-left, back-forward, and rotating movements using the birth ball to β-endorphin levels. Pelvic rocking exercises of right-to-left, back-forward, and rotating movements using a birth ball could not increase beta-endorphin levels in pregnant women.

Keywords: Pregnant women, pelvic rocking, birth ball, beta-endorphin

INTRODUCTION

Pregnancy can be defined as a transition of life before and after birth. It was considered as a period of undergoing the process of preparation both physically and psychologically. The compliance of pregnancy was the enlargement of the stomach, anatomical changes, and hormonal changes. It could impact on low back pain, swelling, and cramps in the legs. Discomfort can cause sleep disturbances of the mother and affect the fetus (1).

More than 50% of pregnant women experience discomfort, one of which is low back pain during pregnancy. Back pain will increase along with the increase of gestational age and can cause severe discomfort to cause insomnia, motor disability, disrupt daily activities, and will cause problems when caring for babies after birth (2). Therefore, if it is not treated immediately, it will have a negative impact, such as long-term back pain and increased pain during labor (3).

This pain will increase along with the increasing of gestational age. When the uterus expands during pregnancy, the center of gravity will move forward so that all weights depend on muscle strength and joint relaxation. Improper posture can suppress stretching and cause fatigue in the body, especially in the spinal cord, which will cause low back pain in pregnant women (4). Low back pain is a complex problem, which can result in system damage (5). and can cause anxiety and fear, thereby increasing stress and physiological changes both in the anatomical position and due to the pathological process (6). Back pain is often felt by pregnant women during the second trimester of pregnancy, at around 22 weeks of gestational (7). Based on a Preliminary Study conducted in the Rowosari Community Health Center, Tembalang District, Semarang City, 49 pregnant women experienced back pain in the third trimester of pregnancy.

Both pharmacologically and non-pharmacologically efforts to reduce or overcome back pain have been made in various ways. Pharmacological methods, namely the use of analgesic drugs, while non-pharmacological methods include pregnancy exercise, pregnancy yoga, massage, relaxation techniques, and reduce pain perception. This method can also increase the comforts during pregnancy to delivery because the mother can control back pain and anxiety and fear (8).

Pelvic rocking exercises are a way to maintain tightness in the pelvic muscles and can relieve back pain (2). Pelvic rocking exercise is a pelvic motion training in the direction of rotation by shaking the pelvis to the right-left, back and forth, and turning. This activity can relax the body. Thereby it can release endorphin hormones during pelvic shaking exercises routinely and continuously (9).

Such exercise can be at risk of causing knee and wrist joints to become sore, so it is recommended to use a base. To perform these movements, pregnant women can use aids like a birth ball. The birth ball is one of the aids that aims to control, reduce pain, and reduce anxiety (10).

The method for assessing pain is using the Visual Analogue Scale (VAS) or using the Numeric Rating Scale (NRS), this method can determine the level of pain and still focus on the patient's pain intensity and is still subjective (11,12). Also, this method still has an infirmity, i.e., researchers need more precise measurements to provide an assessment, patients must be present at the time of measurement, and visually and cognitively able to take measurements. So it is necessary to measure pain using a more accurate method(13).

Based on the background, it is necessary to further study the effectiveness of pelvic rocking exercises (PRE) movements from right to left, back and forth, and rotate with the birthing ball to reduce back pain in third-trimester pregnant women. Therefore, the study was aimed to analyze the differences of pelvic rocking exercises of right-to-left, back-forward, and rotating movements using a birth ball against beta-endorphin levels.

METHOD

This research was a quasi-experimental study using a pre-post test research design. The samples were selected by using the accidental sampling technique on the research subject. The number of samples in this study was 30 samples, divided into three groups by simple random sampling. Each group consisted of 10 respondents.

The intervention group was received the right-to-left movement, group 2 was back forward movement, and group 3 was rotating movement. The results of β-endorphin levels were carried out before and after the intervention eight times using laboratory tests at the GAKI Laboratory, Diponegoro University. This study using some instruments to measure the variables: birth ball, syringe, etd tubes, handscoon, etc

RESULTS

Characteristics of Respondents

Table 1 showed that the majority of respondents are 20-35 years old either in the group of right-to-left movement, back forward, and rotating. In the parity of respondents, most of the primigravida in the group of right-to-left movement and back forward. Whereas, in the rotating group, the majority is multigravida. In the education level, most of the respondents had senior high school education at each group, and at work status, most of the respondents had jobs in all groups (see table 1).

Table 1 Characteristics of respondents

Variable	Group						ρ-value
	Right-to-left		Back forward		rotating		
	n	%	n	%	n	%	
Age							
< 20 years	1	10	0	0	1	10	
20-35 years	7	70	10	100	7	70	0,831*
>35 years	2	20	0	0	2	20	
Total	10	100	10	100	10	100	
Parity							
Primigravida	7	70	6	60	4	40	
Multigravida	3	30	4	40	6	60	0,913*
Total	10	100	10	100	10	100	
Education							
Elementary	1	10	0	0	0	0	
Junior High School	2	20	1	10	1	10	
Senior High School	6	60	6	60	6	60	0,502*
Bachelor	1	10	3	30	3	30	
Total	10	100	10	100	10	100	
Occupation							
Unemployment	2	20	5	50	4	40	
Working	8	80	5	50	6	60	0,133*
Total	10	100	10	100	10	100	

Distribution of β-endorphin levels in the pelvic rocking exercises (PRE) movement with the birthing ball

Table 2 showed that the levels of β-endorphin in the group of right-to-left movement, most of the β-endorphin levels increased as much (12.87%). in the back forward movement group, β-endorphin levels decreased as much (2.94%), and in the rotating group, mostly experienced a decrease in β-endorphin levels with a value (9.15%).

Table 2 Frequency of Cleanliness of Home Environment

Variable	Group					
	Right-to-Left		Back Forward		Rotating	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
β-endorphin level	0,8	7,8	4,0	9,0	11,8	14,8
	8,2	15,8	4,2	12,0	15,2	24,3
	8,6	17,2	15,2	15,1	15,7	24,7
	11,4	17,7	15,3	17,8	20,6	25,0
	12,5	26,8	26,8	19,5	28,7	25,7
	18,7	29,9	33,6	22,5	32,1	35,4
	24,5	40,5	39,6	24,5	62,6	41,8
	28,9	50,0	40,1	35,0	70,4	42,0
	36,0	63,8	47,1	46,8	74,2	47,6
	58,4	67,2	59,5	53,5	119,0	78,3

Mean difference of β-endorphin levels before and after the pelvic rocking exercises (PRE) on right-to-left movement with the birthing ball

Table 3 showed that the average β-endorphin level before being given intervention is 20.80, and after being given intervention, the average level of β-endorphin is increased to 33.67. Based on statistical results using paired sample t-test on β-endorphin levels, ρ-value 0.097 obtained in the intervention group of pelvic rocking exercises with right-to-left movement. These results indicate that statistically, there is no significant difference in the levels of β-endorphin before and after being given an intervention because of the value of ρ-value <0.05. Thus, it can be concluded that there is no effect of pelvic rocking exercises (PRE) movements from right to left with the birthing ball against β-endorphin levels in pregnant women who experience back pain in the third trimester.

Table 3. Mean difference of β-endorphin levels before and after the pelvic rocking exercises (PRE) on right-to-left movement with the birthing ball

Variable		Mean ± SD	ρ-value
β-endorphin level	*Pretest*	20, 80 ± 16, 97	0, 097
β-endorphin level	*Posttest*	33, 67 ± 20, 87	

Mean difference of the β-endorphin level before and after the pelvic rocking exercises (PRE) on back-forward movement with the birthing ball

Table 4 showed that the average β-endorphin level before being given intervention is 28.54, and after being given intervention, the average level of β-endorphin is decreased by 25.60. Based on statistical results using paired sample t-test on β-endorphin levels, ρ-value 0.502 was obtained in the intervention group of forward-backward pelvic rocking exercises. These results indicate that statistically, there is no significant difference in the levels of β-endorphin before and after being given an intervention because of the value of ρ-value <0.05. Therefore, it can be concluded that there is no effect of the back-forward movement of pelvic

rocking exercises (PRE) with the birthing ball against β-endorphin levels in pregnant women who experience back pain in the third trimester.

Table 4 Mean difference of the β-endorphin level before and after the pelvic rocking exercises (PRE) on back-forward movement with the birthing ball

Variable		Mean ± SD	ρ-value
β-endorphin level	*Pretest*	28,54 ± 18,66	0,502
β-endorphin level	*Posttest*	25,60 ± 14,58	

The difference before and after the pelvic rocking exercises (PRE) on rotating movement with the birthing ball on the β-endorphin level

table 5 showed that the average level of β-endorphin before given intervention is 45.11, and after the given intervention, the average level of β-endorphin decreases 35,96. Based on statistical results using paired sample test est at β-endorphin levels obtained ρ-value 0.442 in the pelvic rocking exercises rotating intervention group. These results indicate that statistically, there is no significant difference in the levels of β-endorphin before and after being given an intervention because of the value of ρ-value <0.05. Therefore, there is no effect of rotating movement of pelvic rocking exercises (PRE) with the birthing ball on β-endorphin levels in pregnant women who experience back pain in the third trimester.

Table 5. The difference before and after the pelvic rocking exercises (PRE) on rotating movement with birthing ball on the β-endorphin level

Variable		Mean ± SD	ρ-value
β-endorphin level	*Pretest*	45,11 ± 35,40	0,442
β-endorphin level	*Posttest*	35,96 ± 18,05	

DISCUSSION

Based on this study, there were no significant differences both before and after being given intervention on β-endorphin levels, many factors affect β-endorphin levels such as stress, morbidity, anxiety, and fear. However, in this study, the researchers did not discuss these factors. β-endorphin will increase if the body is relaxed and not experiencing stress or fear.

In this study, pregnant women experienced fear when taking blood samples, and respondents felt that this was something that was not used to, so there was still tense and not relaxed feeling. Exercise is one of the factors to increase β-endorphin levels if it is done continuously, and respondents are feeling comfortable or relaxed. Each individual has each body's response. Thereby it can affect the results of β-endorphin levels.

Low back pain is influenced by many factors, including increasing gestational age and heavy work or activity. During pregnancy, the relaxin hormone will increase and indirectly will cause joints to weaken. Enlargement of the uterus in pregnant women can result in loss of muscle strength and abdominal muscles stretching due to gravity leaning forward. Therefore, automatically pregnant women try to improve posture by moving the body towards the back (14).

It was consistent with a previous study that reported that exercise during pregnancy does not affect the prevalence of lumbopelvic pain. Women who are offered regular exercise courses seem to be able to cope better with the disorder (15). According to Hau (2012), the

research showed that the birth ball could affect labor pain. However, it is not significant and argues that the effect of the birth ball is similar to other methods (16).

This is because of the respondents of third-trimester pregnant women experiencing low back pain, most of them were experiencing an increase in fluid body volume (hypervolemia) where the condition has begun to occur at the end of the second trimester (17). Decreased levels of β-endorphin are also caused by stress during pregnancy and substantial physical activity (18). The role of β-endorphin produced by the body through the brain (hypothalamus) has decreased due to the presence of pain neurotransmitters, therefore it does not block the pain which results in respondents are not being relaxed or calm (19-20)

CONCLUSION

There is no difference between pelvic rocking exercises (PRE) left-left, back-to-back and rotating movements with the birthing ball to levels of β-endorphin in trimester III pregnant women. There is no difference before and after the right-to-left movement of pelvic rocking exercises (PRE) with the birthing ball on β-endorphin levels in third-trimester pregnant women. There is no difference before and after the back-forward movement of pelvic rocking exercises (PRE) with the birthing ball on β-endorphin levels in third-trimester pregnant women. There is no difference before and after the rotating movement of pelvic rocking exercises (PRE) with the birthing ball on β-endorphin levels in third-trimester pregnant women.

RECOMMENDATION

Future studies need to control respondents' psychological factors and conduct screening using questionnaires that have been tested for validity, like DASS (The Depression Anxiety Stress Scale).

Acknowledgment

Researchers would like to thank the Poltekkes Kemenkes Semarang, GAKI Lab. Of Diponegoro University, Rowosari Public Health Centre, and other parties who have helped the conducting of this research.

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