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RESEARCH ARTICLE

URL of this article: <http://heanoti.com/index.php/hn/article/view/hn30201>

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## The Effect of Diaphragm Breathing Exercise To Lower Back Pain Changes of Pregnant Women in Tapa Public Health Center, Bone Bolango District

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### ABSTRACT

Low back pain to pregnancy is described as a pain in lumbar region, on the sacrum, and can up to the feet. The pain is intermitte, and aggravated by doing activities with the same position in a long time, usually happens in 30 minutes like walking, sitting, and standing. If not handled well, bottom pain will disturb the activities of pregnant women so that it will make the life quality of pregnant women become bad. Diaphragm breathing exercise help the patients to use diaphragm well while breathing. The research type was pre-experimental design, with the design of One Group Pretest-posttest Design. The population of this research were all pregnant women located in the working area of Tapa Public Health Center. Population size were 40 people. Sample size was obtained from total population that were chosen by using purposive sampling technique. The sample size was determined by using Slovin formula which obtains 16 Respondents who fulfill Inclusion and exclusion criteria, the statistical test was by normality test using Shapiro Wilk Test. The results was that 75% respondents who suffer mild pain and 12.5% respondents who suffer moderate pain and there was an effect of giving diaphragm breathing exercise practice to changes in lower back pain to Pregnant women with p value 0.000. Expected able to enhance the society's knowledge especially pregnant women about diaphragm breathing exercise implementation instructions in pressing the changes of lower back pain.

**Keywords:** Diaphragm breathing, Pregnant, Lower back pain

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### INTRODUCTION

During the pregnancy process, the increase of fetal size causes the stomach size to increase too which causes some changes physiologically not only on the cardiovascular system, gastrointestinal, and renal, but also on the musculoskeletal system. The stomach that is getting bigger day by day causes the center of gravity of pregnant women to move forward. In addition sacroiliac ligament becomes weak so that pelvic will rotate forward and increase hyperlordosis to pregnant women. That increases tension on the pelvis or lower lumbar that causes lower back pain<sup>(1)</sup>.

Lower back pain to pregnancy is describes as pain on lumbar region, on the sacrum, and up to the feet. The pain is intermitte, and aggravated by doing activities with same position in a long time, usually happens in 30 minutes like walking, sitting, and standing<sup>(2)</sup>. The research done in Brazil among 97 interviewed pregnant women there are 68% who suffer lower back pain and 43.9% suffer lower back pain that is started in the second trimester<sup>(3)</sup>. The online survey done by University of Ulser n 2014 from 157 pregnant women who fills out the questionnaire, 70% ever experience lower back pain<sup>(4)</sup>. The prevalence of lower back pain during pregnancy in Indonesia, which explains that from 180 pregnant women researched, 47% suffer lower back pain<sup>(5)</sup>. The result from research done to pregnant women in various regions in Indonesia, reaches 60-80% pregnant women who suffer lower back pain<sup>(6)</sup>.

The increase in the incidence of lower back pain in pregnant women is recorded in pregnant women with a history of lower back pain in previous pregnancies, increased body mass index, and a history of joint hypermobility. According Casagrande *et.al*, (2015) A history of lower back pain during the previous pregnancy

is the strongest predictor of the incidence of lower back pain in pregnant women. If not treated properly, lower back pain will interfere with the activities of pregnant women so that it can cause the quality of life of pregnant women to be bad. Lower back pain can be treated with exercise. Exercise is effective in preventing low back pain in pregnancy, reducing the intensity of pain and the possibility of disability<sup>(7)</sup>. That exercise during the pregnancy process can reduce pain and can be recommended for pregnant women.

During pregnancy, mild to moderate exercise is safe for pregnant. Exercises that can be given are exercises with stretching movements that are safe for pregnant women such as lumbar flexion exercise, as well as light exercises such as diaphragm breathing exercise. Many studies also say that there is a relationship between respiratory muscles with low back pain. People with low back pain have an abnormal diaphragm position. In addition, the origins of the diaphragm muscles are in L1-L3<sup>(8)</sup>.

Diaphragm breathing exercise helps patients to use the diaphragm correctly during breathing. If diaphragm activation is well coordinated it will improve spinal stability. Good bone stability will strengthen the core muscles and will reduce lower back pain. Based on the research background above, the researcher wants to investigate about "The Effect of Diaphragm Breathing Exercise to Changes of Lower Back Pain to Pregnant Women in Tapa Public Health Center Bone Bolango District".

## METHODS

The research type was pre-experimental design with one group Pretest-posttest Design. This research was conducted on April until June 2018 in the working area of Tapa Public Health Center Bone Bolango District. The population in this research was all pregnant women in the working area of Tapa Public Health Center Bone Bolango District. Population size were 40 people. The sample of this research was obtained by using purposive sampling technique. This research had to fulfill existing inclusion and exclusion criteria. The data used in this research were primary data, which was the measurement result of lower back pain level. Then the data obtained was analyzed by using SPSS package, and presented in the form of table and narrative. statistic test used was normality test by using Shapiro Wilk Test. The data distribution was normal so Paired Sample T Test was used.

## RESULTS

This research aims to know the effect of Diaphragm Breathing Exercise to the changes of lower back pain to pregnant women in the working area of Tapa Public Health Center Bone Bolango District.

Table 1. Distribution of age of pregnant women in the working area of Tapa Public Health Center

Number	Age (years)	Frequency	Percentage
1	20 -35	13	81.2
2	> 35	3	18.8
Total		16	100.0

Table 2. Distribution of occupation of pregnant women in the working area of Tapa Public Health Center

Number	Occupation	Frequency	Percentage
1	Government employees/ honorer	1	6.2
2	Entrepreneur	5	31.2
3	Housewife	10	62.5
Total		16	100.0

Table 3. Distribution of Gravida of Pregnant Women In the Working Area of Tapa Public Health

Number	Gravida	Frequency	Percentage
1	First Pregnancy	4	25.0
2	Second Pregnancy	8	50.0
3	Third Pregnancy	4	25.0
Total		16	100.0

Table 4. Distribution of medical history of pregnant women in the working area of Tapa Public Health Center

Number	Medical history	Yes	%	No	%
1	Hypertension	4	25.0	12	75.0
2	Asthma	4	25.0	12	75.0
3	Diabetes	2	12.5	14	87.5
4	Anemia	7	43.8	9	56.2
5	Fall History	0	0	16	100.0
6	Smoking History	1	6.2	15	93.8

Table 5. Distibution of pain level before intervention of pregnant women in the working area of Tapa Public Health Center

Number	Pain Level	Total	Percentage
1	Mild Pain	2	12.5
2	Moderate Pain	12	75.0
3	Great Pain	2	12.5
	Total	16	100.0

Table 6. Distribution of pain level after intervention of pregnant women in the working area of Tapa Public Health Center

Number	Pain Level	Total	Percentage
1	Mild Pain	12	75.0
2	Moderate Pain	4	25.0
	Total	16	100.0

Table 7. Pre test data normality and lower back pain level post test to pregnant women in the working area of Tapa Public Health Center

Number	Tests of Normality	Total	Sig.-Shapiro Wilk
1	Pain Pre Test Before Intervention	16	0.165
2	Pain Post Test After Intervention	16	0.086

Table 8. The effect of diaphragm breathing exercise to the changes of lower back pain to pregnant women in the working area of Tapa Public Health Center

Number	Paired Statistics	Mean	SD	T	Sig.
1	Before Intervention	5.12	1.544	13.729	0.000
2	Pain After Intervention	3.00	1.265		

## DISCUSSION

The measurement of the level of lower back pain in pregnant women is done by using Visual Analog Scale (VAS) instrument. Before the intervention is done by administering Diaphragm Breathing Exercise exercises, initial measurement is done. Table 5 shows the results of measurements that most pregnant women experience lower back pain with the criteria of being as many as 12 pregnant women (75%), and there were 2 pregnant women who experience low back pain with criteria of weight and light, each of which is 2 pregnant women (12.5%). After measuring the initial pain level, pregnant women are given training for 4 weeks, every week 2 times Exercise with an average time of 6.5 minutes. Then the level of pain is measured again with the same instrument to get the post test results. The results (table 6) show that pregnant women who experience low back pain with mild criteria are a greater percentage of 12 pregnant women (75%) with an improvement ratio of 62.5% from the previous results of only 12.5%. Likewise the number of pregnant women who feel severe pain after Exercise is not there anymore. The description of the data reinforces the fact that the provision of Diaphragm Breathing Exercise exercises has a significant relationship in reducing Lower Back Pain in Pregnant Women.

Table 8 shows that the mean value before giving Diaphragm Breathing Exercise training is 5.12 with an SD value of 1.544. Then after being given the Diaphragm Breathing Exercise exercise the mean value was 3.00

and the SD score was 1.265. The mean and elementary grades after the intervention have lower numbers compared to the mean and elementary grades before being intervened. This shows that there is a decrease in the level of pain after being given Diaphragm Breathing Exercise training. The T value is positive which shows that there is a decrease in the pain level in pregnant women after being given Diaphragm Breathing Exercise 2 times a week for 4 weeks, where every time Laithan takes 6.5 minutes.

The results of the paired sample t test obtained p values  $<0.00$  ( $p <0.05$ ) which shows that there is an effect of giving Diaphragm Breathing Exercise training to Changes in Lower Back Pain in Pregnant Women. The results of the research obtained are in line with the results of Sahar A. Elkhesen's et. al, in Khaerunnisa (2018) with a total sample of 100 pregnant women divided into two groups, there are control groups and treatment groups with primigravida inclusion criteria, 28-32 weeks gestational age and does not use pain reduction drugs. This study provides exercises with pelvic tilt movements twice a week for 12 weeks. The results of this study indicate that these exercises have a significant effect on reducing disability through decreasing lower back pain in pregnant women<sup>(9)</sup>.

Similarly, the results of this research are done by Barton E. Anderson and Kellie C.H. Bliven (2017) shows that deep breathing exercise can improve respiratory function and core stability, two factors associated with lower back pain<sup>(10)</sup>. Research conducted by Obayashi (2012) illustrates how body posture and breathing affect each other<sup>(11)</sup>. The subject of the study breathed into SpiroTiger for 10 minutes 3 times per week. This study resulted that the kyphosis of the thoracic decreased by 5.5 o, lumbar lordosis also decreased by 3.1 o, lung function increased, and the strength of flexion and trunk extension also increased. this states that exercise in the respiratory muscles can improve posture, due to stimulation of core stability.

The relationship between back pain, core function and diaphragm function. Performed on 18 lower back pain patients and 29 patients without lower back pain. It is found that those in the lower back pain group have smaller diaphragms and a higher position of the diaphragm<sup>(12)</sup>. This study states, the movement of the diaphragm is synchronized with it's stability function. If this synchronization does not work, it will add pressure to the spinal segment. If the activation of the diaphragm is not well coordinated it will affect the stability of the spine. So if the diaphragm is used properly it will improve the stability of the spine. Good spinal stability will strengthen postural muscles and lower back pain will decrease. The study conducted by Janssens et.al, (2015) in Khaerunnisa (2018) by doing a breathing exercise program conducted 2 sessions of 30 breaths per day, 7 days per week for 8 weeks shows significant results in reducing lower back pain. In addition, a study conducted by Kim and Lee (2013) in Khaerunnisa (2018) which provides deep breathing training to the sample for 4 weeks with 5-10 times repetition and 10 seconds hold. The results show activation of postural muscles during the breathing process. If done more than 4 weeks can improve postural muscle function. In the research the researcher does not reduce the dosage because the research is conducted on pregnant women with a high risk of hyperventilation.

The number of results of these studies as described earlier further proves that movement and breathing training techniques, one of which is Diaphragm Breathing Exercise Has the benefit of reducing lower back pain in pregnant women. The diaphragm breathing exercise technique teaches the sample how to properly use the diaphragm during breathing. We know that the diaphragm in pregnant women is pressed up along with the increase in the size of the uterus of pregnant women. According Liddle et.al (2015) The sample is taught to use the diaphragm correctly so that the diaphragm can function properly, and ultimately indirectly affect the stability of the spine and will reduce lower back pain suffered by pregnant women.

The diaphragm breathing exercise technique is performed correctly, the initial physiological effects of the relaxation results will provide comfort. Repeated breathing exercises will train the diaphragm to function properly. It is known that the diaphragm contributes to the stability of the spine. The diaphragm synergizes with the other muscles forming the core area. The core is described as a box with the muscles of the abdomen in the front, praspinal and gluteal at the back, the diaphragm as the roof and pelvis and the hip muscles at the bottom. Physiologically, when the diaphragm contracts, in other words it is inspiring, the diaphragm which is previously dome shaped becomes more straight. Whereas during expiration, the diaphragm will tend to form a dome. Intra-abdominal pressure in the diaphragm causes the diaphragm to be pressed up and form a dome and finally the diaphragm will continue to relax and not function properly. As we know that origo in the diaphragm is at L1-L3. If the diaphragm does not function properly it will cause the segment on L1-L3 to become unstable. Instability in the lumbar segment causes the paraspinal muscles to work extra to maintain a stable spine coupled with the condition of a pregnant woman with hyperlordosis which causes tension in the lumbar muscles will increase and will add to lower back pain.

When viewed based on other data distributions, the crosstab results between several data in this study illustrate that most pregnant women who work as entrepreneurs experience moderate and severe pain. This shows that pregnant women who work tend to experience fatigue. Fatigue can increase pain. The feeling of fatigue due to work causes an intense pain sensation. In a study by Kovacs et al. (2012) in Khafidhoh (2016), some previous studies found a relationship between work and physical activity that was severe with the high risk of occurrence of low back pain during pregnancy. If seen based on the age aspect of pregnant women, it can be seen that most pregnant women with age  $> 35$  years have 66.7% experiencing severe pain. It is known that the age group at risk for pregnancy and childbirth including the risk of pain in pregnancy are mothers  $<20$

years and > 35 years old.

Similarly, when viewed from aspects of the medical history of pregnant women, it shows that as many as 50% of pregnant women who suffer from hypertension and asthma tend to experience lower back pain with great criteria after being assessed using the VAS instrument. While pregnant women with diabetes mellitus and with a smoking history all experience lower back pain with great criteria. For pregnant women with anemia 57.1% experience lower back pain with moderate criteria. The data illustrates that pregnant women who have other health problems such as hypertension, diabetes mellitus, etc. tend to experience lower back pain.

The results of the study clearly have shown that the Diaphragm breathing exercise technique can help patients to use the diaphragm correctly during breathing. If the diaphragm activation is well coordinated it will improve the stability of the spine. Good bone stability will strengthen the core muscles and will reduce lower back pain.

### CONCLUSION

There is an effect of providing the practice of Diaphragm Breathing Exercise to the Changes of Lower Back Pain to Pregnant Women. It is suggested to the researcher, this research result is expected able to enhance the society's knowledge especially pregnant women about Diaphragm Breathing Exercise implementation instructions in pressing the Changes of Lower Back Pain. To the respondent, this research result can be used as an experience and informed to the society especially for pregnant women. For midwife, this research result can be used as an illustration about the importance of Diaphragm Breathing Exercise implementation in suppressing the Changes of Lower Back Pain to pregnant women and for the Public Health Center, this research can be used as a proof of theoretical concepts in providing health education to pregnant women especially about Diaphragm Breathing Exercise.

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