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**RESEARCH**

## Differences In Mean Levels of The Difference Of Pelvic Floor Muscle Strength Before and After Spontaneous Labor Between Stress Urinary Incontinence Group and Normal Group

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**Abstract**

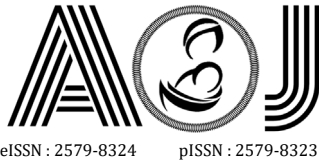
Trauma to the pelvic floor during delivery is now recognized as a major etiological factor against PFM disorders such as urinary incontinence, pelvic organ prolapse and fecal incontinence. This study was conducted to analyze the differences in mean levels of differences of pelvic muscle strength before and after spontanous labor between stress urinary inconti-nence group and normal group. This research was done using analytic method with cross sectional design in 13 women with stress urinary incontinence, and 17 women with normal group. Subjects were collected in hospitals of Pariaman, Padang from May to December 2014. Examination of the pelvic floor muscle strength was performed with a perineometer. Differences between the mean difference in the strength of the pelvic floor muscles before and after spontaneous delivery between the two groups were analyzed using independent t test. The mean difference between the strength of the pelvic floor muscles before and after spontaneous labor in stress urinary incontinence group was larger than normal group ( $3.85 + 1.281 \text{ cmH}_2\text{O}$  vs  $2,00 + 1.173 \text{ cmH}_2\text{O}$ ,  $p = 0.000$ ). The mean difference between the strength of the pelvic floor muscles before and after spontaneous labor in stress urinary incontinence group was significantly greater than the normal group.

**Keywords:** Pelvic Floor Muscle, Urinary Incontinence, Spontaneous Labor

**INTRODUCTION**

Weakened pelvic floor muscle strength can cause a wide variety of symptoms that can interfere with the quality of life and as a common reproductive function problem in women.

Not only due to anatomical changes in the pelvic floor muscles during pregnancy and childbirth but also due to trauma that occurs during the labor process. Trauma to the pelvic floor muscles during labor is currently recognized as a major etiological factor for pelvic floor muscle disorders such as urinary incontinence, pelvic organ prolapse, and fecal incontinence. Nearly 50% of women who give birth have genitourinary organ prolapse, 40% have urinary incontinence, and 4.2% have fecal incontinence. Evaluation of pelvic floor muscle strength is



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an important parameter as a clinical as well as scientific subject and its relationship to pelvic floor weakness,<sup>1,2</sup>

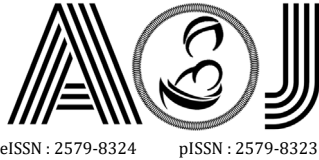
Several studies reported that the most common type of urinary incontinence in postpartum women is stress urinary incontinence (SUI) which is defined as uncontrolled urinary output, due to increased intravesical pressure that exceeds urethral closure pressure, associated with the bodily activity (coughing, laughing, activity). physical) when there is no contraction of the bladder. Several case studies and epidemiology indicate women who have vaginal delivery have a higher risk of developing SUI than nulliparous women and women who have a C-section delivery. It is associated with damage to the pelvic floor due to vaginal delivery which causes neurological changes in the pelvic floor, causing a direct effect on the conduction of the pudendal nerves which affects the closing pressure of the vagina and urethra. The incidence of postpartum SUI is estimated at 34% of women.<sup>1,3,4</sup>

Peschers reported that the strength of the pelvic floor muscles is affected immediately after vaginal delivery and returns to normal within 2 months. In primiparous who underwent vaginal delivery, there was a decrease in pelvic floor muscle strength by 22% during labor and 35% during postpartum. Mascarenhas T measured the strength of the pelvic floor muscles using perineometer and digital at 66 antepartum primigravidas, 6 weeks postpartum, and 6 months postpartum with the result that there was a significant decrease in pelvic floor muscle strength in women who delivered vaginally compared to giving birth by section ( $p = 0.049$ ).<sup>5,6</sup>

Vaginal delivery is also a major contributing factor in the incidence of SUI. This is not only due to labor resulting in mechanical and hormonal changes, but also damage to muscle and nerve tissue. The occurrence of strong muscle strains during labor causes weakness and damage to the pelvic floor muscles resulting in a decrease in urethral closing pressure compared to bladder pressure. Strong strains also occur in the bladder neck, muscles, and ligaments of the urethral sphincter. Several risk factors for an increased incidence of postpartum SUI have been studied, such as age, parity, mode of delivery, body weight, episiotomy, spontaneous perineal rupture, head circumference of children, vacuum extraction or forceps.

Piliansjah (2003) in a descriptive study measured the strength of the pelvic floor muscles using perineometer. Of the 50 nulliparous, primiparous, and multiparous women who attended the RSCM, it was found that the pelvic floor muscle strength was weak in primiparous and multiparous, although both showed the same results. The study found that nearly all women who gave birth to their first child vaginally experienced partial denervation of the pelvic floor, but only mild denervation and nearly all returned to normal 2 months after post partum.<sup>9,4</sup>

Dietz (2002) compared 3 different pelvic floor muscle strength measurement techniques, namely digital proofing, perineometer, and ultrasonography (USG). The study included 48 women with lower urinary tract dysfunction or pelvic organ prolapse. The study found a strong association between perineometer and palpation, with a kappa value of 0.73



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(95% confidence interval), while ultrasound parameters only had a strong association with mobility of the bladder neck. Measurements using perineometer are considered the gold standard in measuring the strength of the pelvic floor muscles. The most recent technique used is transperineal ultrasound, which can determine the elevation of the bladder neck, change the angle between the line and border of the pubic ureterovesical, and the tendency for changes in the proximal urethra.<sup>10,11,12,13</sup>

Damage to the pelvic floor occurs primarily as a result of vaginal delivery due to pressure on the soft tissues. The process in stage II of labor results in pressure between the baby's head and the vaginal wall in an average of 100-230 mmHg. When it happens for a long time then this obstetric stress will cause permanent physical changes. Labor as a contributing factor to stress urinary incontinence in women has been studied several studies that looked at the relationship between labor and stress urinary incontinence.<sup>14,15, 16</sup>

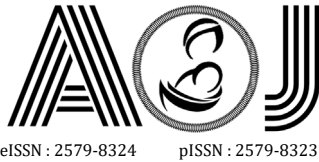
**METHOD**

The study was analytical, cross-sectional in 13 women with stress urinary incontinence, and 17 women in the normal group. Subjects were collected at Pariaman Hospital, from July to October 2016.

Inclusion criteria are primigravida women who control term pregnancies at the obstetrics clinic of RSUD Pariaman or who come to the delivery room of RSUD Pariaman with age 20-40 years, single pregnancy, EFW 2500-4000 grams, do not suffer from SUI during pregnancy, do not have pelvic defects. , no history of operative action on the vagina, rectum or pelvic floor, normal infant head circumference, were willing to join this study. Exclusion criteria were birth by procedure or vaginal delivery, infants with EBW> 4000 g, prolonged second stage, grade IV perineal rupture, obesity (BMI> 25.0 kg / m<sup>2</sup>), performing Kegel exercises in the last 3 months, anomalies in internal genitalia and internal genitalia. external and the presence of genital infection.

The pelvic floor muscle strength examination is carried out by measuring its strength using an instrument called perineometer, while the determination of the SUI status is carried out by using a Pad Test. Statistical analysis was performed using SPSS version 20.

The data distribution in this study was normal with  $p > 0.05$ . The difference between the mean in pelvic floor muscle strength before and after spontaneous delivery between the stress urinary incontinence group and the normal group was tested by independent t-test.



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**Website:**<http://jurnalobgin.fk.unand.ac.id/index.php/JOE>**RESULTS****Characteristics of Research Subjects**

30 subjects consisted of 13 people with stress urinary incontinence and 17 normal people. There were no differences in the characteristics of maternal age, maternal age group, BMI group, and BMI birth weight between the two groups with  $p$  value  $> 0.05$  as shown in Table 1.

**Table 1.** Characteristics of Subjects between the Urinary Stress Incontinence Group and the Normal Group

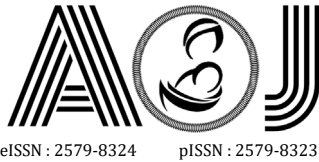
Karakteristik	Stress inkontinensia (n = 13)	Normal (n=17)	P
Usia Ibu (x ± SD), tahun	26,15 ± 3,891	24,24 ± 3,580	0,172
BB Bayi Lahir (x ± SD), gram	3.153,85 ± 401,799	3.123,53 ± 198,524	0,788
IMT (x ± SD), kg/m <sup>2</sup>	21,81 ± 1,214	21,233 ± 1,267	0,418
• Normoweight	11 (84,62%)	15 (88,24%)	0,773
• Overweight	2 (15,38%)	2 (11,76%)	

**The difference in the average pelvic muscle strength before and after spontaneous delivery between the urinary incontinence stress group and the normal group**

Pelvic muscle strength before birth in the stress urinary incontinence group was 10.85 + 0.899 cmH<sub>2</sub>O, while in the normal group it was 10.88 + 0.928 cmH<sub>2</sub>O. Pelvic floor muscle strength after delivery in the stress urinary incontinence group was 7.00 + 0.707 cmH<sub>2</sub>O, while in the normal group it was 8.88 + 1.166 cmH<sub>2</sub>O. The average difference in pelvic floor muscle strength before and after spontaneous delivery in the stress urinary incontinence group was 3.85 + 1.281 cmH<sub>2</sub>O, while in the normal group 2.00 + 1.173 cmH<sub>2</sub>O, with a 95% CI 0.908-2.784. This is significant with  $p < 0.000$ .

**Table 2.** Differences in Average Pelvic Muscle Strength Before and After Spontaneous Labor between the Urinary Stress Incontinence Group and the Normal Group

Kekuatan otot dasar panggul	Stress inkontinensia (n=13)	normal (n = 17)	p
Sebelum persalinan (x ± SD), (cmH <sub>2</sub> O)	10,85 ± 0,899	10,88 ± 0,928	0,915
Sesudah persalinan (x ± SD), (cmH <sub>2</sub> O)	7,00 ± 0,707	8,88 ± 1,166	0,000
Selisih kekuatan otot dasar panggul sebelum dan sesudah persalinan spontan (x ± SD), (cmH <sub>2</sub> O)	3,85 ± 1,281	2,00 ± 1,173	0,000



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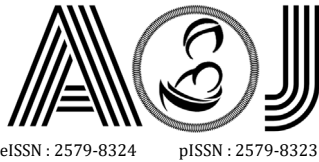
**DISCUSSION**

The mean difference in pelvic floor muscle strength before and after spontaneous delivery in the stress urinary incontinence group was  $3.85 + 1.281$  cmH<sub>2</sub>O, while in the normal group  $2.00 + 1.173$  cmH<sub>2</sub>O, with 95% CI 0.908-2.784. The statistical test showed a p-value <0.000, which means that the difference between the strength of the pelvic floor muscles before and after spontaneous delivery in the stress urinary incontinence group was significantly higher than the normal group. Weakened pelvic floor muscle strength can cause a variety of symptoms that interfere with the quality of life. Pregnancy and childbirth will cause weakening or damage to the pelvic floor so that it doesn't function properly. The loosening of the muscles surrounding the vagina is often caused by vaginal delivery. Nearly 50% of women who have given birth will develop urogenital organ prolapse and 40% will be accompanied by urinary incontinence.

During pregnancy, there are changes in the lower urinary tract caused by hormonal influences. The mucosal urethra appears hyperemic and enlarged, the transitional epithelium will turn squamous due to an increase in the hormone estrogen. The urethra passively extends up to 5 cm to the bladder which is then compressed by the reduction in the baby's head and uterine size. Studies show that the urethral closure pressure increases from 61 to 73 cmH<sub>2</sub>O. This increase will ensure that the pregnancy is maintained. The bladder will shift anteriorly and superiorly with pregnancy so that the bladder may be more in the abdomen than the pelvis in the third trimester. The hormone estrogen will cause temporary hypertrophy of the detrusor muscle, the hormone progesterone will cause hypotony of the detrusor muscle as the bladder capacity increases. As a reaction to the effect of progesterone on the increase in bladder pressure from 9 cmH<sub>2</sub>O in early pregnancy to 20 cmH<sub>2</sub>O in just months of pregnancy and will return to normal at postpartum.<sup>4, 16</sup>

Spontaneous labor is divided into three stages: the first stage begins at the beginning of the cervical opening until it is complete, stage II begins when the cervical opening is complete and ends when the fetus is born, and stage III begins as soon as the fetus is born and ends when the placenta and fetal membranes are born. At the end of stage II, the occiput reaches the bottom of the pelvis in an occiput anterior position. This process pushes the baby's head through the vaginal introitus resulting in a lowering into the lower part of the pelvis so that most of the uterine pressure is directed to the perineal body and anorectal. The lowering of the head further pushes the head forward so that the occiput is born and increases the stretch around the pubis. When the top of the head, forehead, and face is born, there is stretch and pressure towards the back of the anal sphincter. During stage II the pelvic floor structures are at high risk for damage.<sup>16, 17</sup>

Suryani 2006, has researched to determine the effect of vaginal delivery on the strength of the pelvic floor muscles. The mean strength of the pelvic floor muscles before birth was  $10.783 + 0.951$  cmH<sub>2</sub>O, almost the same as that obtained in this study. The mean strength of



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the pelvic floor muscles after 3 days postpartum was  $3.913 + 0.733$ , 6 weeks after delivery was  $8.304 + 1.020$  cmH<sub>2</sub>O, and 3 months postpartum was  $8.478 + 1.082$  cmH<sub>2</sub>O, but not associated with stress urinary incontinence. The conclusion in this study obtained a significant difference between the strength of the pelvic floor muscles at 3 days after delivery with 6 weeks and 3 months after delivery, whereas no significant differences were found in pelvic floor muscle strength at 6 weeks postpartum and 3 months postpartum.<sup>18</sup>

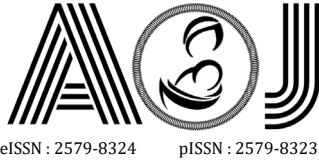
Gratitude 2010, has examined the relationship between mode of delivery and the incidence of stress postpartum urinary incontinence. In this study it was found that the incidence of stress urinary incontinence in vaginal delivery was 23.3% higher than the incidence of stress urinary incontinence in vaginal delivery that was only 5%, so we got a significant difference with  $p = 0.009$ . However, this study did not assess changes in the pelvic floor muscles after vaginal delivery.<sup>19</sup> Similar results were obtained by Press in 2007 which showed that delivery by Caesarean section had a lower risk for postpartum stress urinary incontinence (10%) than vaginal delivery (10). 22%).

The same result was obtained by Wesnes (2009), which showed that the risk of SUI incidence was 3.2 times higher than that of vaginal delivery. Chaliha (2004) found a higher incidence of SUI during vaginal delivery (36%) compared to abdominal delivery (3%).<sup>13, 20, 21</sup>

Lubis 2009, has conducted a study comparing the strength of the pelvic muscles (PFM / Pelvic Floor Muscle) in women after normal delivery and a post-Caesarean section with perineometer. In this study, there was a significant mean difference with  $p = 0.000$  between the mean strength of the pelvic floor muscles in women after normal delivery and post-C-section where the pelvic floor muscle strength after normal delivery was  $9.41 + 0.969$  cmH<sub>2</sub>O, whereas in women after Caesarean section is  $11.09 + 0.941$  cmH<sub>2</sub>O.<sup>22</sup>

Research conducted by Eason (2004) regarding the impact of pregnancy and childbirth, found that there is an increased incidence of stress urinary incontinence during pregnancy and immediately after delivery. This study concluded that stress urinary incontinence as a result of pelvic floor damage occurs not only as a result of labor but because pregnancy itself is a risk of stress urinary incontinence. From the results of this study, the incidence of stress urinary incontinence was 31.2% at first vaginal deliveries, 36.8% at subsequent normal deliveries, and 11.5% at deliveries by Caesarean section.

Based on the foregoing, there is a relationship between vaginal delivery and changes in pelvic muscle strength. There is also an association between increased urinary incontinence in vaginal delivery versus delivery by cesarean section because pelvic floor muscle strength is significantly lower after vaginal delivery than after cesarean section. It can, therefore, be concluded from the above studies that the differences in the pelvic floor muscles were significantly greater at the time before and after spontaneous delivery which would lead to stress urinary incontinence. This is consistent with the results obtained in this study, where



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there was a mean difference between the urinary incontinence group and the normal group with  $p = 0.000$  ( $p < 0.000$ ).

**CONCLUSION**

There was a significant difference in the strength of the pelvic floor muscles before and after spontaneous delivery between the stress urinary incontinence group and the normal group.

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