

# Effect of the "Sitting Pelvic Tilt Exercise" During the Third Trimester in Primigravidas on Back Pain

AREERAT SUPUTTITADA, M.D.\*,  
TEERA WACHARAPREECHANONT, M.D.\*\*,  
PENIDA CHAISAYAN, M.Sc.\*\*\*

## Abstract

A single center, prospective, randomized, single blinded, controlled study comparing the effects and safety of "sitting pelvic tilt exercise" in relieving back pain during the third trimester in primigravida was carried out. The samples were composed of 67 primigravidas who attended the prenatal clinic at King Chulalongkorn Memorial Hospital. All subjects were selected by the random sampling technique and allocated into two groups for the experimental group and the control group; for 32 and 35 pregnant, respectively. The experimental group received the pelvic tilt exercise program for 8 weeks during the third trimester. Pain intensity was measured by visual analogue scale (VAS) at day 0 and day 56 in both groups.

The result of the study revealed 1) The mean VAS of back pain in the experimental group was significantly lower at day 56 than at day 0 and lower than the control group at day 56 ( $p < 0.05$ ) by unpaired *t*-test 2) There was no incidence of preterm labor, low birth weight or neonatal complication in the experimental group.

In conclusion, the "sitting pelvic tilt exercise" during the third trimester in primigravidas could decrease back pain intensity without incidence of preterm labor, low birth weight or neonatal complication.

**Key word :** Primigravidas, The Third Trimester, Sitting Pelvic Tilt Exercise, Back Pain

SUPUTTITADA A, WACHARAPREECHANONT T, CHAISAYAN P  
J Med Assoc Thai 2002; 85 (Suppl 1): S170-S179

\* Department of Rehabilitation Medicine,

\*\* Department of Obstetrics and Gynecology,

\*\*\* Sport Medicine Program, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand.

Back pain is one of the most common complaints during gestation, affecting 48-90 per cent of pregnant women<sup>(1)</sup>. It may occur at any time throughout the pregnancy but most commonly occurs between the fourth and seventh months<sup>(2-4)</sup>. This discomfort was attributed to the center of gravity shifting forward, placing more strain on the lumbosacral area. Fatigue and leg discomfort are frequent accompanying symptoms<sup>(5-7)</sup>.

The increased lordosis of pregnancy combined with the effects of relaxin on the joints of the pelvis and the weight of the gravid uterus with resultant anterior shift in the center of gravity all contribute to complaints of low back pain in a patient who is pregnant<sup>(2-7)</sup>. As the pregnancy progresses and the size of the uterus increases with the changes noted above, the muscles of the low back must assume much of the work to maintain an upright posture as the abdominal muscles and ligaments of the pelvis stretch<sup>(2-7)</sup>.

Advice to relieve backache includes wearing low heeled shoes, avoiding lifting heavy objects, squatting (not bending over) to pick up objects and performing special exercises. Despite these suggestions, discomfort often persists, especially for women with other risk factors: preexisting back pain, standing for long periods and obesity. Chronic use of analgesics, relaxants, tranquilizers, NSAIDs and so forth is discouraged during pregnancy because of potential harm to the fetus.

In a previous study at Chulalongkorn Hospital, the incidence of back pain was around 50 per cent during the first trimester to 32 weeks of gestation, then increased to 67 per cent during 32-40 weeks of gestation<sup>(8)</sup>.

The pregnant women who exercised regularly during pregnancy had a lower incidence of back pain<sup>(9-11)</sup>. However, there are few studies of the effect of exercise during pregnancy to back pain. Most studies focused only on the incidence, severity and pattern of back pain<sup>(12-17)</sup>.

The authors designed a program of exercise that is simple, home-based, no need for any special equipment and appropriate for pregnant women, especially in the third trimester. It was a modified pelvic tilt. Usually, the pelvic tilt exercise is performed in the supine position to alleviate low back pain in nonpregnant women. The pelvic tilt is a major abdominal exercise. The pelvis is rocked

backward, the small of the back is flattened against a horizontal or vertical support, and then the muscles of the abdomen and the buttocks are tightened as the woman breathes out. A pregnant woman should do the pelvic tilt in several positions: lying on her back or side, sitting in a chair, or kneeling on all fours<sup>(18)</sup>. Since the aorta and inferior vena cava may be occluded by increased weight and size of the uterus, developing the supine hypotension or inferior vena cava syndrome when the backlying position is assumed<sup>(19)</sup>. Pregnant woman whose gestational age is more than 6 months should not be allowed to do prolonged exercise in the supine position<sup>(20)</sup>, so the authors designed the pelvic tilt exercise in the sitting position. The pelvic tilt exercise was conducted in the sitting position on the floor since it is more convenient than on the chair.

The aim of this study was to determine the effects and safety of the pelvic tilt exercise in the sitting position called "sitting pelvic tilt exercise" during the third trimester in alleviating back pain in primigravida.

## MATERIAL AND METHOD

### Study subjects

The study subjects were composed of 74 primigravida who attended the prenatal clinic at King Chulalongkorn Memorial Hospital from May 1<sup>st</sup> to October 31<sup>st</sup> 2000. All subjects were selected by the random sampling technique and allocated into 2 groups, the experimental group and the control group.

Inclusion criteria were: 1) primigravida, 2) healthy, with no underlying serious disease that would effect exercise, pregnancy and labor such as heart disease, diabetes mellitus, thyrotoxicosis, hypertension and infection, 3) age 20-35 years old, 4) gestational age 26-30 weeks, 5) height  $\geq 140$  cms, 6) body mass index (BMI) before becoming pregnant  $\leq 25$  kg/m<sup>2</sup>, 7) no smoking, 8) no experience of severe back and pelvic pain before, 9) no contraindication for exercise during pregnancy, 10) did not exercise regularly (<1 time / week), 11) intend to deliver at King Chulalongkorn Memorial Hospital, 12) can read and write Thai 13) willing to follow the research study. Exclusion criteria were 1) can not follow the exercise program 5 days/week, 8 weeks in the experimental group, 2) weight gain of more than 25 kgs or less than 10 kgs, 3) do not intend to deliver at King Chulalongkorn Memorial Hospital.

### Exercise program

The "sitting pelvic tilt exercise" was taught to all subjects in the experimental group. The exercise was performed in a sitting position on the floor, flexed hip and flexed knees, with both hands on the floor and back to both hips, and bending the trunk backward slightly for safety. A deep breath was taken in-out slowly 1 time. Slowly lift the hip above the ground while extending both hips and thighs, contracting the abdominal muscles, pelvic floor muscles and buttocks at the same time. Hold this position for 5 seconds together with a deep breath in and out slowly. Do not hold the breath. Then lay the buttocks on the floor and relax the muscle for 5 seconds as in Fig. 1.

Repeat 4 cycles in the first week, and increase 2 cycles per week to 10 cycles in the fourth week as in Table 1.

Do the "sitting pelvic tilt exercise" together with deep breathing 2 times per day, one in the morning and one in the evening, 5 days per week for 8 weeks.

### Study design

A single center, prospective, randomized, single blinded, controlled study comparing the effects on back pain and safety of the experimental group who performed the "sitting pelvic tilt exercise" and the control group that did not perform any exercise. The research ethics committee of the medical faculty at Chulalongkorn University approved the study.

### Method

At the first meeting with primigravida, the investigator explained the purpose, the method of the study, the benefits and the potential risk of the study. Over a 6-month-period, 73 primigravida who met the inclusion criteria and wished to participate in the study were enrolled in this study. They all gave written informed consent. All subjects were selected by the random sampling technique and allocated into 2 groups for the experimental group (42 women) and control group (42 women). Each subject was interviewed for demographic data, age, height, weight, education, work characteristic, monthly income and back pain area.

**Pain intensity:** The subject estimated the severity of their pain using a visual analogue scale (VAS) from 0 to 10 cm line scale where 0 denoted no pain, 1-3 denoted mild pain, 4-6 denoted moderate pain, 7-9 denoted severe pain and 10 denoted the worst possible pain(21).

The "sitting pelvic tilt exercise" was taught with the exercise instructor to all subjects in the experimental group. The subjects performed the "sitting pelvic tilt exercise" in the exercise room at King Chulalongkorn Memorial Hospital conducted by the exercise instructor 2 days per week and at home 3 days per week.

All subjects were checked to make sure they had really done exercise at home by keeping a self record book and the exercise instructor would double check by observing the progression of agility

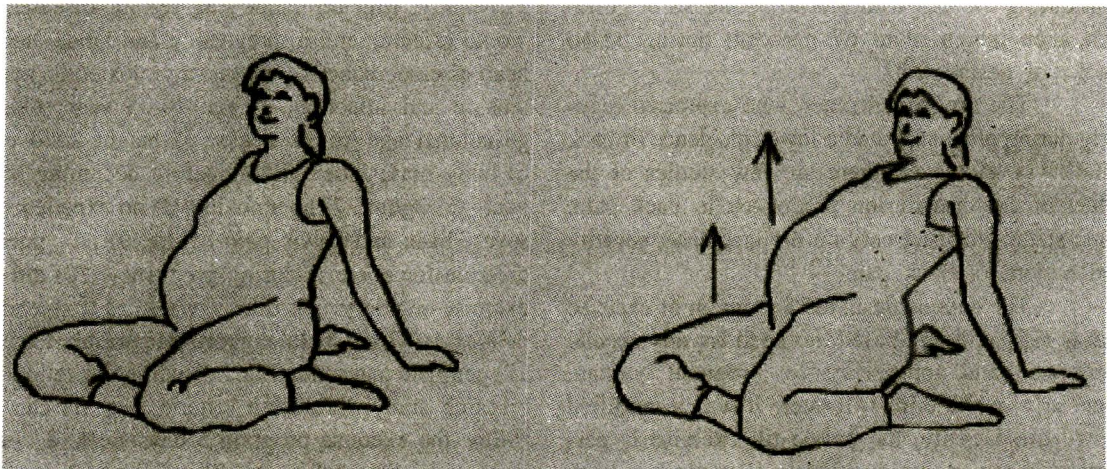


Fig. 1. "Sitting pelvic tilt exercises".

in the sitting pelvic tilt exercise and the fitness of the subject in the exercise room.

Pain intensity was measured by the visual analogue scale again at the end of the eighth week in both groups.

Gestational age at onset of labor, complications of labor, birth weight, apgar score at 1 min and 5 min together with complications of the newborn were recorded in both groups.

### Statistical analysis

Data was analysed by SPSS for windows program for frequency distribution, percentage, arithmetic mean, standard deviation and test for differential significance at the level  $p < 0.05$ . For category data the Chi-square test was used but if the expected frequency was less than five we used Fisher's exact test was used instead. The unpaired *t*-test was used to analyze continuous data.

## RESULTS

### The study population

74 women initially agreed to participate. 7 withdrew before completion for the following reasons 1) three had toxemia of pregnancy, 2) three would not deliver at King Chulalongkorn Memorial Hospital, 3) one had preterm labor from oligohydramnios. None in the experimental group was excluded from intolerance of the exercise program. Finally, 67 women, 32 in the experimental group and 35 in the control group were analysed.

### Demographic and work characteristics

Most in the experimental group and control group were aged 20-24 years old, 46.9 per cent and 42.9 per cent, respectively. Height was mostly in the range of 150-159 cms, 65.6 per cent and 65.7 per cent. Weight gain was mostly in the range of 16-20 kgs, 53.1 per cent and 51.4 per cent. Most

**Table 1. Schedule of "sitting pelvic tilt exercise".**

Week	1st	2nd	3rd	4th	5th	6th	7th	8th
Cycles x Times	4 x 2	6 x 2	8 x 2	10 x 2	10 x 2	10 x 2	10 x 2	10 x 2

**Table 2. Demographic characteristics of the study subjects.**

Demographic data	Experiment		Control		P-value
	Number	%	Number	%	
Age (yr)					
20-24	15	46.9	15	42.9	0.875NS
25-29	12	37.5	15	42.9	
30-34	5	15.6	5	14.3	
Height (cm)					
140-149	6	18.8	8	22.8	0.123NS
150-159	21	65.6	23	65.7	
160-169	5	15.6	4	11.5	
BMI (kg/m <sup>2</sup> )					
20-23	6	18.8	8	22.8	0.145NS
23-25	26	81.2	27	77.2	
Weight gain.(kg)					
10-15	14	43.8	15	42.9	0.927NS
16-20	17	53.1	18	51.4	
21-25	1	3.1	2	5.7	
Education					
Below high school	9	28.1	14	40.0	0.085NS
High school	9	28.1	10	28.6	
College or more	14	43.8	11	31.4	
Total	32	100.0	35	100.0	

NS = not significant at 0.05 using Chi-square

were not educated to high school level; 28.1 per cent and 40.0 per cent. All demographic data in both groups were not statistically significantly different ( $p < 0.05$ ) by chi-square as in Table 2.

Work position was mostly sitting in the experimental group (50%), mostly standing in the control group (45.7%) In both group most did light work, 56.3 per cent and 62.9 per cent. Most did their own housework, 96.9 per cent and 97.1 per cent. Monthly income was mostly less than 10,000 baht; 56.3 per cent and 85.7 per cent. All work data in

both groups were not statistically significantly different ( $p < 0.05$ ) by chi-square except monthly income as in Table 3.

#### Back pain data and intensity

Most subjects had back pain at the first visit when enrolled in the study, 96.9 per cent in the experimental group and 97.1 per cent in the control group. Most had pain at the lower back area, 74.2 per cent and 70.6 per cent. At the end of 8 weeks, most in the experimental group had improved; 90.6

**Table 3. Work data of study subjects.**

Work Characteristic	Experiment		Control		P-value
	Number	%	Number	%	
Work position					
Prolonged sitting	16	50.0	10	28.6	0.092
Prolonged standing	7	21.9	16	45.7	
Prolonged walking	9	28.1	9	25.7	
Workload					
Heavy	18	56.3	22	62.9	0.582
Light	14	43.8	13	37.1	
Housekeeping					
Assistant	1	3.1	1	2.9	0.949
No assistant	31	96.9	34	97.1	
Monthly income					
<10,000 baht	18	56.3	30	85.7	0.008*
>10,000 baht	14	43.8	5	14.3	
Total	32	100.0	35	100.0	

\*  $p < 0.05$  using Chi-square

**Table 4. Back pain data of study subjects.**

Back pain	Experiment		Control		P-value
	Number	%	Number	%	
Pain at day 0					
No pain	1	3.1	1	2.9	0.949
Pain	31	96.9	34	97.1	
Pain at day 56					
No pain	1	3.1	0	0	<0.001*
Same	1	3.1	0	0	
Improved	29	90.6	0	0	
Worse	1	3.1	33	94.3	
Pain area					
Upper back	0	0	1	2.9	0.624
Lower back	23	74.2	24	70.6	
Hip pain	8	25.8	9	26.5	
Total	32	100.0	35	100.0	

\*  $p < 0.05$  using Chi-square

per cent and most in the control group were worse; 94.3 per cent. There was statistically significant difference ( $p < 0.05$ ) by chi-square for back pain data in both groups as in Table 4.

The experimental group had no statistically significant lower mean VAS than the control group at day 0; was  $7.12 \pm 1.11$  in the experimental group and  $7.21 \pm 1.12$  in the control group ( $p > 0.05$  by unpaired  $t$ -test). There was statistically significant lower mean VAS in the experimental group than in the control group at day 56;  $2.03 \pm 1.00$  and  $7.49 \pm 1.02$ , respectively ( $p < 0.05$  by unpaired  $t$ -test). There

was statistically significant lower mean VAS at day 56 than at day 0 in the experimental group;  $2.03 \pm 1.00$  and  $7.12 \pm 1.11$ , respectively ( $p < 0.05$  by unpaired  $t$ -test). There was no statistically significant difference of mean VAS at day 56 and day 0 in the control group;  $7.49 \pm 1.02$  and  $7.21 \pm 1.12$ , respectively ( $p > 0.05$ ) by unpaired  $t$ -test as in Table 5.

### Pregnancy outcome

The gestational age (GA) at onset of labour in the experimental group was mostly 37-38 weeks; 56.2 per cent and in the control group it was 39

**Table 5. Visual analogue scale (VAS) of back pain.**

VAS	N	X	SD	SE	95%CI		P-value
					L	U	
<b>Day 0</b>							
Experimental	31	7.12	1.11	0.19	6.71	7.41	0.944
Control	34	7.21	1.12	0.18	6.81	7.49	
<b>Day 56</b>							
Experimental	31	2.03	1.00	0.18	1.67	2.39	<0.001*
Control	34	7.49	1.02	0.17	7.17	7.83	
<b>Experimental</b>							
Day 0	31	7.12	1.11	0.19	6.71	7.41	<0.001*
Day 56	31	2.03	1.00	0.18	1.67	2.39	
<b>Control</b>							
Day 0	34	7.21	1.12	0.18	6.81	7.49	0.956
Day 56	34	7.49	1.02	0.17	7.17	7.83	

\*  $p < 0.05$  using unpaired  $t$ -test

**Table 6. Pregnancy outcome.**

Group outcome	Experiment		Control		P-value
	Number	%	Number	%	
<b>GA (week)</b>					
<37	0	0	0	0	0.002*
37-37+6	9	28.1	1	2.9	
38-38+6	9	28.1	6	17.1	
39-39+6	6	18.8	16	45.7	
40-40+6	5	15.6	12	34.3	
41-41+6	3	9.4	0	0	
<b>Apgar score</b>					
<b>1 min</b>					
<7	1	3.0	4	11.5	0.269
$\geq 7$	31	97.0	31	88.5	
<b>5 min</b>					
<7	0	0	0	0	0.533
$\geq 7$	32	100.0	35	100.0	
<b>Total</b>	<b>32</b>	<b>100.0</b>	<b>35</b>	<b>100.0</b>	

\*  $p < 0.05$  using Chi-square

**Table 7. Birth weight (g).**

Samples	N	X	SD	SE	95%CI		P-value
					L	U	
Experimental	32	3008.75	302.36	53.45	2899.74	3117.76	0.018*
Control	35	3191.71	315.66	53.36	3083.28	3300.15	

\*  $p < 0.05$  using unpaired *t*-test

weeks; 45.7 per cent. There was statistically significant difference in gestational age at onset of labor ( $p < 0.05$ ) by chi-square in both groups, but no subject in both groups had GA less than 37 weeks as in Table 6.

Most new born in both groups had good apgar's score at 1 min and 5 min ( $\geq 7$  score) with no statistically significant difference ( $p < 0.05$ ) by *t*-test as in Table 6.

The mean birth weight in the experimental group was  $3,008.75 \pm 302.36$  g and in the control group it was  $3,191.71 \pm 315.66$  g and had statistically significant difference ( $p < 0.05$ ) by unpaired *t*-test, and none of the babies had a birth weight below 2,800 g as in Table 7.

## DISCUSSION

Back pain is one of the most common complaints during pregnancy, especially in late gestation. Increased lordosis during pregnancy from the gravitational pull on the muscles of the anterior abdominal wall and low back with resultant anterior shift contributes to this symptom. Excessive lumbar lordosis may result from the pregnancy, or pregnancy may aggravate a preexisting lordosis problem. Ideal postural alignment involves a minimal amount of stress and strain and is conducive to maximal efficacy of the body. The intensity of back pain also increases with advancing pregnancy between the fourth and seventh months<sup>(2-4)</sup>. After 30 weeks, a decrease in the prevalence and intensity of pregnancy-associated back pain is noted<sup>(3,11)</sup>. Perhaps the rapid weight gain between the 5<sup>th</sup> and 7<sup>th</sup> months of pregnancy exceeds the adaptive capability of the trunk musculature in susceptible individuals. The results of the present study showed that 97 per cent of the subjects experienced some kind of back pain at the beginning of the study.

Back pain can have many causes; biomechanical strain from weight gain, increased spine loading, and pressure from the uterus or fetus, postural

changes such as increased lumbar lordosis creating increased stress on the facet joints, posterior ligaments, and intervertebral discs, postural changes that aggravate preexisting spondylolithesis, degenerative facet joint disease, lateral stenosis, ligamentous laxity affecting the sacroiliac joints, pubic symphysis, sacrococcygeal joint, weakening of the abdominal and pelvic muscles<sup>(18)</sup>. The pathogenesis of back pain in pregnancy thus remains obscure, but a variety of associated features suggest a multifactorial etiology<sup>(5)</sup>.

Recently, the role of exercise during pregnancy has been reported to improve the physical performance of pregnant women. Mild or moderate exercise is not harmful to a normal, low risk pregnant patient or the fetus and should be encouraged in all pregnant women. The selection of exercise should reflect a consideration of the changes in the patient's weight, body habitus, and balance to minimize the risk of injury. In this study, the authors described the sitting pelvic tilt exercise in the third trimester of pregnancy.

One study revealed that altering the pelvic tilt significantly changes the angle of lumbar lordosis. This tends support to the use of pelvic tilting exercises to increase or decrease the degree of lumbar lordosis, at least for the duration of the exercise<sup>(16)</sup>. The pelvic tilt exercise was designed to strengthen or increase the flexibility of the muscles needed to compensate for increased abdominal mass and thereby maintaining normal posture<sup>(22-24)</sup>. This has been shown to be effective in reducing the intensity of ligament pain during pregnancy<sup>(20)</sup>. This pelvic tilt exercise is commonly used in low-back-pain exercise program in nonpregnant women in the supine position<sup>(23)</sup>. But during pregnancy prolonged exercise in this position may lead to supine hypotension syndrome<sup>(18,19)</sup>. So the author designed a pelvic tilt exercise in the sitting position that would be more appropriate for pregnant women in the third trimester. Breathing exercise is also included in the

exercise program to facilitate and help in the labor/delivery process. As opposed to other exercises, the pelvic tilt exercise program is a simple home-based method that needs no special equipment.

This study is the first randomized, prospective research to test the effectiveness of the prenatal "sitting pelvic tilt exercise" program to alleviate low-back pain in the third trimester. The data were gathered from a randomized select group of primiparas not performing exercise on a regular basis (<1 time/week) and a similar group of controls.

The inclusion and exclusion criteria were used to match these two groups as closely as possible and scrutinize the variables that may contribute to the impact of physical conditioning or pregnancy outcome. The age, height, BMI, weight gain, education and work characteristics were not significantly different. (Table 2, 3) Most subjects experienced low back pain at the beginning of the study (~97%). After the 8<sup>th</sup> week of the study, 90.6 per cent of the exercising group had improved back pain while none had improved in the nonexercising group (90.6% vs 0). The satisfaction response of women to the exercise program was uniformly positive. They reported that the exercise session relieved their complaints of back pain.

In no instance did the exercise program have a negative effect on either the mother or the fetus. There was no problem of preterm labor, premature rupture of membrane. The mean gestational age, and apgar scores were not statistically significantly different. Although the birth weight in the

exercise group was slightly lower than the control group (3,008.75 g vs 3,191.71 g) all of the birth weights were in normal range.

The data suggests that this "sitting pelvic tilt exercise" is safe and beneficial to primiparas women. It promotes patient comfort and facilitates self-care in the relief of low back pain during the third trimester of pregnancy. This should reassure obstetricians who wish to consider exercise-training programs for their pregnant patients. The supervision of the training experience is important to avoid the potential dangers from strenuous or exaggerated postural change during exercise.

However, the authors included only primigravida subjects in the study during the third trimester, normal BMI, none younger than 20 years old, none older than 34 years, none with experience of severe back pain before (that might exclude underlying spinal problems, no excessive weight gain, and no smoking. The intensity of pain in the subjects might not be so much because of less positive association for back pain and pregnancy<sup>(5)</sup>, so they had effective relief of back pain by the "sitting pelvic tilting exercise". Futures studies should explore other pregnancy populations expected to have more severe back pain such as multipara, obese, younger or older subjects.

In conclusion, the "sitting pelvic tilt exercise" during the third trimester in primigravidas could decrease back pain intensity without incidence of preterm labor, low birth weight or neonatal complications.



## REFERENCES

1. Kristiansson P, Svardsudd K, von Schoultz B. Back pain during pregnancy: A prospective study. *Spine* 1996; 15: 702-9.
  2. Runge J. Low back pain during pregnancy. *Orthopedics* 1993; 16: 1339-44.
  3. Fast A, Weiss L, Ducommun EJ, Medina E, Butler JG. Low-back pain in pregnancy. Abdominal muscles, sit-up performance, and back pain. *Spine* 1990; 15: 28-30.
  4. Kristiansson P, Svardsudd K, von Schoultz B. Reproductive hormones and aminoterminal propeptide of type III procollagen in serum as early markers of pelvic pain during late pregnancy. *Am J Obstet Gynecol* 1999; 180: 128-34.
  5. MacEvilly M, Buggy D. Back pain and pregnancy: A review. *Pain* 1996; 64: 405-14.
  6. Kristiansson P, Svardsudd K, von Schoultz B. Serum relaxin, symphyseal pain, and back pain during pregnancy. *Am J Obstet Gynecol* 1996; 175: 1342-7.
  7. Cherry SH, Berkowitz RL, Kase NG, eds. *Rovinsky and Guttmacher's medical, surgical, and gynecologic complications of pregnancy*. 3<sup>rd</sup> ed. Baltimore: Williams & Wilkins, 1985: 422-9.
  8. Mahawanakul S, Chaiwanichsiri D. Gestational back pain in Chulalongkorn antenatal care clinic. *J Thai Rehabil* 1999; 9: 33-40.
  9. Ireland ML, Ott SM. The effects of pregnancy on the musculoskeletal system. *Clin Orthop* 2000; 372: 169-79.
  10. Heckman JD, Sassard R. Musculoskeletal considerations in pregnancy. *J Bone Joint Surg Am* 1994; 76: 1720-30.
  11. Ostgaard HC, Zetherstrom G, Roos-Hansson E, Svanberg B. Reduction of back and posterior pelvic pain in pregnancy. *Spine* 1994; 19: 894-900.
  12. Brynhildsen J, Hansson A, Persson A, Hammar M. Follow-up of patients with low back pain during pregnancy. *Obstet Gynecol* 1998; 91: 182-6.
  13. Mens JM, Vleeming A, Stoeckart R, Stam HJ, Snijders CJ. Understanding peripartum pelvic pain. Implications of a patient survey. *Spine*. 1996; 21: 1363-9.
  14. McIntyre IN, Broadhurst NA. Effective treatment of low back pain in pregnancy. *Aust Fam Physician* 1996; 25 (9 Suppl 2): S65-7.
  15. Perkins J, Hammer RL, Loubert PV. Identification and management of pregnancy-related low back pain. *J Nurse Midwifery* 1998; 43: 331-40.
  16. Sihvonen T, Huttunen M, Makkonen M, Airaksinen O. Functional changes in back muscle activity correlate with pain intensity and prediction of low back pain during pregnancy. *Arch Phys Med Rehabil* 1998; 79: 1210-2.
  17. Gurel H, Atar Gurel S. Dyspareunia, back pain and chronic pelvic pain: The importance of this pain complex in gynecological practice and its relation with grandmultiparity and pelvic relaxation. *Gynecol Obstet Invest* 1999; 48: 119-22.
  18. Strauhal MJ. Therapeutic exercise in obstetrics. In: Hall CM, Brody LT, eds. *Therapeutic exercise: moving toward function*. Philadelphia: Lippincott Williams & Wilkins, 1998: 211-32.
  19. Kinsella SM, Lohmann G. Supine hypotensive syndrome. *Am J Obstet Gynecol* 1994; 83: 774-87.
  20. Andrews CM, O'Neill LM. Use of pelvic tilt exercise for ligament pain relief. *J Nurse Midwifery*. 1994; 39: 370-4.
  21. Price DD, McGrath PA, Rafii A, Buckingham B. The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. *Pain* 1983; 17: 45-56.
  22. Levine D, Whittle MW. The effects of pelvic movement on lumbar lordosis in the standing position. *J Orthop Sports Phys Ther* 1996; 24: 130-5.
  23. Sarti MA, Monfort M, Fuster MA, Villaplana LA. Muscle activity in upper and lower rectus abdominus during abdominal exercises. *Arch Phys Med Rehabil* 1996; 77: 1293-7.
  24. Shields RK, Heiss DG. An electromyographic comparison of abdominal muscle synergies during curl and double straight leg lowering exercises with control of the pelvic position. *Spine* 1997; 22: 1873-9.
-

## ผลของ "sitting pelvic tilt exercise" ระหว่างไตรมาสที่สามของหญิงตั้งครรภ์แรก ต่ออาการปวดหลัง

อารีรัตน์ สุพุทธธาดา, พ.บ.\*,  
ธีระ วัชรปรีชานนท์, พ.บ.\*\*; เพ็ญนิดา ไชยสายันท์, วท.ม.\*\*\*

การวิจัยเชิงทดลอง single center, randomized, single blinded และมีกลุ่มควบคุมเปรียบเทียบผลและความปลอดภัยของ "sitting pelvic tilt exercise" ในการลดอาการปวดหลัง ในไตรมาสที่สามของหญิงตั้งครรภ์แรก ที่แผนกฝากครรภ์ โรงพยาบาลจุฬาลงกรณ์ เลือกกลุ่มตัวอย่างแบบสุ่มจำนวน 67 ราย แบ่งเป็นกลุ่มทดลอง 32 ราย กลุ่มควบคุม 35 ราย กลุ่มทดลองได้รับการฝึก sitting pelvic tilt exercise เป็นเวลา 8 สัปดาห์ที่โรงพยาบาลภายใต้การดูแลของผู้วิจัย วัดความรุนแรงของอาการปวดหลังด้วย visual analogue scale (VAS) วันแรกก่อนฝึกคือวันที่ 0 และหลังฝึกครบ ในวันที่ 56 ทั้งสองกลุ่ม

ผลการวิจัยพบว่า 1) ค่าเฉลี่ย ของ VAS ในกลุ่มทดลองวันที่ 56 ต่ำกว่าวันที่ 0 ในกลุ่มทดลอง และ ต่ำกว่าวันที่ 56 ในกลุ่มควบคุม อย่างมีนัยสำคัญทางสถิติ ( $p < 0.05$ ) โดยใช้ unpaired *t*-test 2) ไม่พบการคลอดก่อนกำหนด น้ำหนักเด็กแรกคลอดน้อยกว่าเกณฑ์ หรือความผิดปกติของ apgar score ของทารกแรกเกิดในประชากรศึกษาทุกรายในกลุ่มทดลอง

โดยสรุป การฝึก "sitting pelvic tilt exercise" เป็นระยะเวลา 8 สัปดาห์ ในไตรมาสที่สามสามารถลดอาการปวดหลังของหญิงตั้งครรภ์แรกโดยไม่ทำให้คลอดก่อนกำหนด น้ำหนักตัวของทารกไม่ต่ำกว่าปกติ และไม่พบ apgar score ที่ผิดปกติ

**คำสำคัญ :** หญิงตั้งครรภ์แรก, ไตรมาสที่สาม, Sitting Pelvic Tilt Exercise, ปวดหลังปวดเอว

อารีรัตน์ สุพุทธธาดา, ธีระ วัชรปรีชานนท์, เพ็ญนิดา ไชยสายันท์  
จดหมายเหตุทางแพทย์ ๙ 2545; 85 (ฉบับพิเศษ 1): S170-S179

\* ภาควิชาเวชศาสตร์ฟื้นฟู,

\*\* ภาควิชาสถิติศาสตร์-นรีเวชวิทยา,

\*\*\* หลักสูตรเวชศาสตร์การกีฬา, คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย, กรุงเทพฯ ๙ 10330