Effect of Graded Spinal Exercises in Postnatal Women

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Abstract

Background: Postpartum or postnatal period begins immediately after the birth of a child as the mother's body, including hormone levels and uterus size, returns to non pregnant state. This leads to various postural changes during pregnancy. Changes occur to counter the balance with compensatory changes in spinal column. Most common modification occur in pelvis, lumbar and thoracic curvature during pregnancy. Previous studies have found that postural changes occur after delivery like various spinal changes and correction have been done but not according to the graded exercise therapy . So graded spinal exercises are used in this study for these spinal correction.

Objective: To determine the effect of graded spinal exercises program in postnatal women. To correct the posture of the postnatal women.

Materials and Method: Total 40 subjects were selected aged between 25 to 35 years according inclusion and exclusion criteria. Prior consent was taken. Pre assessment was taken for postural examination. After that subjects were asked to perform the set of exercises as noted in the protocol. This set of exercises were practiced for 45 min/day, 5days/week and for 3 weeks. The results gained after completing the one month protocol was noted by post assessment for postural examination . The change in individual's was noted and thus conclusion was made.

Conclusion: The study concluded that there was significant improvement noted for postural correction with graded spinal exercises in postnatal women.

Keywords: *Posture, spinal changes, graded spinal exercises, postnatal women, postural changes, postural assessment.*

Introduction

Postpartum or postnatal period begins immediately after the birth of a child as the mother's body, including hormone levels and uterus size, returns to non pregnant state.[1] Both fetus and mother have physiologic characterizes via simultaneous enlargement during pregnancy.[2]

Mother's center of mass changes with weight distribution pattern as fetal enlargement occurs. This leads to various postural changes during pregnancy. Changes occur to counter the balance with compensatory changes in spinal column. Most common modification occur in pelvis, lumbar and thoracic curvature during pregnancy.[2]

Postural alterations most frequently mentioned in the literature are increased lumbar curvature, pelvic anterversion, increased thoracic curvature increased cervical curvature, protraction of the shoulder girdle, hyper extended knees and extension of the ankles. [3]

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The development of back pain has been related to spinal changes, especially an increase inlumbar curvature, which alters the distribution of loads, causing increased tensions in lumbar structures.[3]

Findings range from an increased lumbar curvature and pelvic ante version to slight postural adjustments attributed to individual adaptations of each woman or a tendency towards lumbar kyphosis and pos+terior inclination of the sacrum.[3]

Postural changes seen during pregnancy: Posture means disposition of the body at any one moment and is composite of the positions of the different joints of the body at that time. When minimum stress is applied to each joint is called correct position. And faulty posture is called when there is increase in the stress to the joints. When the posture is used for the purpose with maximum efficiency and minimum efforts is called as good posture. When the posture is insufficient and fails to complete the purpose is called as poor posture. [4]

Good posture vs bad posture: Common spinal deformities are lordosis, kyphosis, scoliosis. Lordosis is an anterior curvature of the spine. Kyphosis is an posterior curvature of the spine. Scolosis is a lateral curvature of the spine.[4]

Assessment of posture is done in three views anterior. Posterior and lateral view in standing, sitting and supine lying. From head to toe everything is observed.[5]

Anterior view, Posterior view & Lateral view

General posture management guidelines:

Awareness and control of spinal posture: Therapist and patient interaction, helping patient to correct alignment and mirror used by the patient which may act as biofeedback.

Posture, movement and functional relationship: if patient is having faulty posture and pain ask the patient to wait and correct the posture and feel the pain now. Patient having faulty posture and extremity function then ask patient to perform functional activity.

Joint, muscle and connective tissue mobility impairment: stretching and mobilization can be suggested.

Impaired muscle performance: Endurance training are necessary.

Body mechanics: Strengthening exercises can be performed.

Ergonomics: regular exercises to be done with sustained or repetitive basis at work, at home.

Stress management and relaxation.

Healthy exercise habits: Stabilization exercises, aerobic conditioning and functional activities.

Stabilizing exercises differ from general exercises by being more body-specific and requiring more attention and precision from the patient. Importantly, psychosocial factors related to the development of pain and disability, *e.g.*, self-efficacy and fear of movement, may also affect the persistency and recurrence of pain. The stabilizing exercises, by being individually dose and graded into functional and loaded positions, might affect self-efficacy beliefs and possible fear of movement.[6]

Stabilization exercises start with recumbent position and progress to sitting, standing on large gym ball, standing with the back supported against wall and finally standing without support. It can be progressed to unstable surfaces. [6]

Previous studies have found that postural changes occur after delivery like various spinal changes and correction have been done but not according to the graded exercise therapy . So graded spinal exercises are used in this study for these spinal correction.

Need for Study: Postural changes take place during pregnancy and have impact on women's life after delivery. So it is important to study these postural changes and correct these postures. Previous studies have found that postural changes occur after delivery like various spinal changes and correction have been done but not according to the graded exercise therapy . So graded spinal exercises are used in this study for these spinal correction.

Materials and Methodology

Methodology:

Study type: Experimental

Study design: Pre and post test

Sampling method: Simple random sampling

Sample size: 40

Study duration: 6 months

Place of study: Krishna hospital, Karad

Inclusion Criteria:

Postnatal women with normal vaginal delivery

Primigravida women

Age group- 25 to 35 years

Exclusion Criteria:

Fracture of lower limb

Psychological problem

Visual defect

Outcome Measure:

Postural assessment

Materials:

Inch tape

Data collection sheet

Pen

Procedure:

Subjects were selected as per the inclusion and exclusion criteria.

Written consent was taken from the subjects.

After selection of the subject the postural examination was done before the treatment.

Subject were asked to perform the set of exercises as noted in the protocol

Each Session:

1. **Warm up for 10 min:**
   - free exercises: Squats, lunges, side bending, hip rotation, hip flexion and extension.
2. **First week protocol:**

Breathing Exercises: Pursed lip breathing: ask the subject to sit back straight or lie down, relax shoulders as much as possible. Now inhale deeply through nose and exhale slowly through mouth like blowing a candle.

Diaphragmatic breathing: lie down on back on flat surface or in bed with knees and head supported. Place one hand on upper chest and other just below rib cage. Feel the diaphragm as performing breathing. Now inhale slowly through nose and exhale through mouth.

Stretching of lower limb with 10 sec hold: Hip extensors: ask the subject to lie flat on back on flat surface or in bed. One leg rest and other leg raised as high as possible. The therapist is on one leg on the floor and shoulder against the back of the raised leg. Now therapist will raise the leg slowly. Hold this position for 5 sec and relax.

Strengthening:

Basic Crunches: Ask the subject to lie down on back on flat surface or in bed. Place your hand behind the head hold your elbow out to the side. gently pull your abdominals inward. Curl up and forward so that your head, neck and shoulder blades lift of the floor towards your knee. hold this position for 5 sec and relax.

Pelvic tilting: Ask the subject to lie down on back on flat surface or in bed without head supported. Now bend the knee. Now perform by pulling belly button in toward the spine, pushing pelvis up toward the ceiling. Tighten gluteus and hip muscles as you tilt pelvis forward. Hold for 5 sec and repeat.

Pelvic Bridging: Ask the subject to lie down on back or flat surface or bed without head supported. Now bend the knee. Lift your tail bone to the ceiling to stretch your lower back and pull in your stomach. To go into a bridge lift the entire spine except neck. Hold this position for 5 sec and relax.

Cat and camel: Get on to your hands and knees, with your knees spaced hip width apart and your hands directly beneath your shoulder. Tighten your abdominal muscles and arch your spine upward toward the ceiling. Hold this position for 5 sec and relax your back. Allow your stomach to fall towards the floor and stretch your back downwards. Hold this position for 5 sec and relax.

- **Ergonomic Advices:** To maintain correct posture during breastfeeding. Relax after every set of exercise.
- **Home Protocol:** Follow all the exercises given.

Second Week Protocol:

Swiss Ball Exercises:

Spinal Stretching:

Squats: By placing swiss ball between you and wall, a standard squat can be performed.

Third week protocol: Above 2 weeks protocol to be continued with increase in number of repetition and hold time.

This set of exercises were practiced for 45 min/day, 5 days/week and for 3 weeks.

The results gained after completing the one month protocol was noted by postural assessment.

The change in individual's was noted by the pre and post assessment of posture and thus conclusion was made.

Statistical Analysis: Data of all outcome measures was measured as pre treatment & post treatment values. Mean & standard deviation was calculated for each outcome measure.

Within group comparison was done by applying 'Paired t-test' to pre and post treatment values of same group for all outcome measures.

Data Presentation:

Age Distribution In The Study:

Table No. 1: Age distribution

Age	Total
25-30	38
31-35	2

Anterior View:

Table No. 2: Anterior view

ANT View	Pre	Post	MD	t value	p value	Remark
H	2.25±0.95	1.52±0.96	0.72	5.23	<0.0001	ES
M	1.17±0.38	1.07±0.26	0.1	2.0782	0.044	S
SHD	1.05±0.23	1.02±0.16	0.025	1	0.323	NS
RIB	0	0	0	0	0	
SC	0	0	0	0	0	
PELVIS	2±0	1.5±0.5	0.5	6.24	<0.0001	ES
HIP	0	0	0	0	0	
FEMUR	0	0	0	0	0	
KNEE	0	0	0	0	0	
PT	0	0	0	0	0	
TB	0	0	0	0	0	
ANK	0	0	0	0	0	
RF	0	0	0	0	0	
FEET	0	0	0	0	0	
TOES	0	0	0	0	0	
LL	0	0	0	0	0	

Lateral View:

Table No. 3: Lateral view

LAT View	Pre	Post	MD	t value	p value	Remark
H	1.12±0.82	0.3±0.64	0.82	5.97	<0.0001	ES
M	1.17±0.38	1.024±0.15	0.15	2.62	0.012	S
SC	0	0	0	0	0	
THK	0.85±0.36	1.32±0.85	-0.47	4.002	0.0003	ES
LL	1±0	1.62±0.49	-0.62	8.06	<0.0001	ES
PELVIS	1±0	0.52±0.50	0.47	5.94	<0.0001	ES
KNEE	0.52±0.5	0.42±0.5	0.1	2.08	0.044	S
FEET	0	0	0	0	0	

Posterior View:

Table No. 4: Posterior view

POST View	Pre	Post	MD	t value	p value	Remark
H	0	0	0	0	0	
SHD	0.95±0.22	1±0	-0.05	1.43	0.159	NS
SC	0	0	0	0	0	
SPINE	0	0	0	0	0	
PELVIS	2±0	1.22±0.42	0.77	11.59	<0.0001	ES
HIP	0	0	0	0	0	
KNEE	0.52±0.50	0.3±0.46	0.22	3.36	0.0017	VS
LEG	0	0	0	0	0	
ANKLE	0	0	0	0	0	
CP	0	0	0	0	0	

Discussion

This study "EFFECT OF GRADED SPINAL EXERCISES IN POSTNATAL WOMEN" was conducted to see the effect of graded spinal exercises among postnatal women. Postpartum or postnatal period begins immediately after the birth of a child as the mother's body, including hormone levels and uterus size, returns to non pregnantstate. Both fetus and mother have physiologic characterizes via simultaneous enlargement during pregnancy. Mother's center of mass changes with weight distribution pattern as fetal enlargement occurs. This leads to various postural changes during pregnancy.

Changes occur to counter the balance with compensatory changes in spinal column. Most common modification occur in pelvis, lumbar and thoracic curvature during pregnancy. Postural alterations most frequently mentioned in the literature are increased lumbar curvature, pelvic anterversion, increased thoracic curvature increased cervical curvature, protraction of the shoulder girdle, hyper extended knees and extension of the ankles.

Previous studies "Changes in trunk posture and muscle responses in standing during pregnancy and postpartum" by Gemma Bivia -Roig, Juan Francisco Lison, Daniel Sanchez-Zuriagaconcluded that in standing, pregnant women in the third trimester of pregnancy do not show alterations in the position of the lumbar spine and pelvis respective to postpartum and nulliparous women (p=<0.01). "Postural Changes during First Pregnancy" by S. Kouhkan, A. Rahimi, M. Ghasemi Et alshowed a significant increase in most variables that became higher as the months of pregnancy increased (p=<0.05).

"Postural changes during normal pregnancy" by Amal M. Yousel, hala M. Hanfy, Fniyz F. Elshamy, Et al concluded that there was a statistically highly significant increase in the thoracic kyphosis angle, lumbar lordosis angle an pelvic inclination angle during normal pregnancy (p=<0.001). "Static trunk posture in sitting and standing during pregnancy and early postpartum" by Wendy L. Gilleard, Jack Crosbie, Richard Smith concluded that there was no significant effect of pregnancy on upper body posture during sitting and standing and a flatter spinal curve was found during standing postpartum.

The aim of the study is to find out the effect of graded spinal exercises in postnatal women. The objectives were to determine the effect of graded spinal exercises program in postnatal women and to correct the posture of the postnatal women.

The study was conducted with 40 subjects. Subjects were selected according to the inclusion and exclusion criteria. Inclusion criteria was Postnatal women with normal vaginal delivery, Primigravida women, Age group- 25 to 35 years. Exclusion criteria was Fracture of lower limb, Psychological problem, Visual defect.

Prior consent was taken from them. Pre assessment was taken. The interventions were carried out for 45min/day, 5days/week and for 3 weeks. The outcome

measure was Postural assessment. After 3 weeks post assessment was taken. Thus conclusion was done. This was confirmed using statistical analysis by using 'Paired t- test' for within group comparison.

During the study few discontinued and even did not give the response towards the treatment protocol. Few showed better improvement as proper counselling was done with psychological support was provided. The study was effective among postpartum women as immediately treatment was given in early postpartum phase as normal delivery was done. Primiparous women were included which showed better result.

In anterior view: pre and post training there was significant improvement noted for head (p=<0.0001), mandible (p=0.044), shoulder (p=0.323) and pelvis (p=<0.0001). In lateral view: pre and post training there was significant improvement noted for head (p=<0.0001), mandible (p=0.012), thoracic kyphosis (p=0.0003), lumbar lordosis (p=<0.0001), knee (p=0.044) and pelvis (p=<0.0001). In posterior view: pre and post training there was significant improvement noted for pelvis (p=<0.0001) and knee (p=0.001) and not significant improvement noted for shoulder (p=0.159).

This study was limited to a small geographic area and study duration was short and limited. A future study with large sample size and among LSCS delivered women can be done.

Conclusion

The study concluded that there was significant improvement noted for postural correction with gradedspinal exercises inpostnatal women.

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Conflict of Interest: There was no conflict of interest carried out during the study.

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Ethical Clearance: The institutional ethics committee has given permission to initiate the research project.

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