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Effect of Postural Correction Exercises in Postnatal Kyphosis

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Priya Kulkarni

Intern, Department of Physiotherapy, Krishna Institute of Medical Sciences Deemed to be University Karad, Maharashtra, India.

Dr. Amrutkuvar Ryajade

Associate professor, Department of musculoskeletal sciences, Krishna Institute of Medical Sciences Deemed to be University Karad, Maharashtra, India.

Dr. Trupti S. Yadav

Associate Professor, HOD of the Oncology department, Faculty of Physiotherapy, Krishna Institute of Medical Sciences Deemed to be University Karad, Maharashtra, India.

Corresponding Author: Dr. Amrutkuvar Ryajade, Dr. Trupti S. Yadav

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Abstract

Aim: To determine the efficacy of postural correction exercises in postnatal kyphosis.

Materials and Methodology: This study was conducted among women with postural kyphosis, age group of 20-40 years. . Subjects who participated were diagnosed by the physiotherapist. They were chosen based on inclusion and exclusion criteria and organised. The proper detailed postural assessment was taken which included an occiput to wall distance test and a Manual muscle test. A total of 40 subjects were selected. The treatment protocol was 6-8 weeks. At the end of 8th week protocol post treatment assessment were again taken. P value and paired t value were used to analyze statistical analysis and the result was concluded.

Result: p- value and paired t-value was used to analyse the effect of postural correction exercises in postnatal kyphosis. There was significant result seen in patients with postural kyphosis. There was a significant difference in outcome variables OWD, and MMT.

Conclusion: In this present study, there is a significant difference in occiput to wall distance and muscle power between pre and post-intervention there was a significant decrease in occiput to wall distance and an increase in the muscle power. The structured exercise program designed, has been effective for improving posture in postnatal women.

1. Introduction

The ability to maintain a proper relationship between a body segment and the body as a whole determines posture¹. There is a high

range of postural, and physiological adaptations of musculoskeletal, endocrine, circulatory, respiratory, and metabolic changes experienced by women during pregnancy². These

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physiological changes are an increase in joint laxity, an increase in body mass, fluid retention etc². During pregnancy, there is gestational weight gain which is asymmetrically distributed most commonly in the anterior abdominal region³. Postural adaptations to these physiological changes usually involve an alteration in loading and alignment of muscle force along, the vertebral column and weight-bearing joints². Also, postural adaptations are necessary for the anteroposterior re-adjustment of the location of the center of gravity^{4,5}. There is a forward shift of the Centre of gravity that leads to anterior pelvic tilt, a subsequent increase in lumbar lordosis, and compensatory thoracic kyphosis^{6,7}. Because of these factors, there are alterations in pregnant women's static stability⁸. During pregnancy, laxity of the supporting structures is produced because of the relaxin hormone^{9,10}. After delivery, in the postpartum period, postural kyphosis is the most common type, normally attributed to slouching, as the woman is lactating¹¹. Also, musculoskeletal disorders occur because of the hormonal effect and ergonomic stress of caring for newborn^{12,13}. The prevalence of back musculoskeletal discomfort during the postpartum period ranges from 16-61%¹⁴⁻¹⁷. In addition to physical discomfort, emotional disorders may affect women during the postnatal period¹⁸⁻²¹. Emotional health is directly associated with muscle and physiological function and affects posture²². During this postpartum period is a great incidence of mood disorders, particularly postpartum depression (PPD) and its prevalence is 3.6-20%²³⁻²⁵. Few studies have studied the association between depressive disorder and poor posture. Pregnant and postpartum women also complain inadequate of sleep which also affects posture²⁶. After delivery, as there is suture site pain over the lower abdomen in the C section and over the perineal area in vaginal delivery, hence the

women tend to slouch to compensate for the pain.

During pregnancy women's breast becomes heavy, and in the postnatal period, women experience breast engorgement (heavy and full breast). Most women adopt improper breastfeeding posture in which they tend to slouch towards their baby, this can lead to kyphotic changes in the posture. In pregnancy, there is a separation of the rectus abdominis muscle, as the size of the uterus expands, in the postpartum state weak abdominal muscle is also a contributory factor.

Following are the changes associated with the thoracic kyphosis-

- There is a Head held forward with the cervical spine hyperextended,
- Protracted scapulae,
- An increase in thoracic kyphosis,
- A hip flexed, knees hyperextended,
- The Head is the most anteriorly placed body segment^{27,28}.

Muscles that are commonly elongated and weak-

- Neck flexors,
- Upper erector spinae,
- External oblique,
- Middle and lower trapezius,
- Thoracic erector spinae,
- Rhomboids^{27,28}.

Muscles are commonly tight and short-

- Neck extensors,
- Hip flexors
- Serratus anterior
- Pectoralis major, minor,
- Upper trapezius,
- Levator scapulae,
- Upper abdominal muscles
- Intercoastales^{27,28}.

This postural kyphosis can easily get corrected by certain postural correction exercises which include stretching, strengthening exercises, and also ergonomic advice on sitting, and standing posture and also teaching proper breastfeeding

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positions, giving knowledge on Do's and Don'ts, etc. This study has focused on assessing posture in postpartum women and checking the efficacy of postural correction exercises who are having thoracic kyphosis.

2. Materials and Methodology:

This study was conducted among women with postural kyphosis. This study was conducted at Krishna College of Physiotherapy. A total of 40 patients with postural kyphosis in the age group 20-40year with permission of the institutional Ethical committee also informed consent obtained for the conductance of this study. Using a straightforward random sample technique, subjects were chosen in accordance with inclusion and exclusion criteria. The proper detailed postural assessment was taken

which included an occiput to wall distance test and Manual muscle testing. The treatment protocol was 6-8 weeks. At the end of the 8th week protocol post-treatment assessment was again taken. P value and paired t value were used to analyze statistical analysis and the result was concluded.

3. Materials used:

Plinth, Paper, Pen, Chair, Data collection sheet, Patient information sheet, Consent form, a measuring tape.

4. Result/ Findings:

Outcome measures

OWD (occiput to wall distance test), MMT (manual muscle testing).

Table 1. Mean, standard deviation, P value, paired t value for OWD pre and post-intervention.

OWD	Mean ± SD	Paired t value	p-value	Interpretation
Pre	2.43±0.18	17.59	<0.0001	Extremely significant
Post	1.75±0.20			

Patients treated with a given exercise program have shown a decrease in occiput to wall distance mean score of 2.43 to 0.18. Statistically, it shows that there was an

extremely significant difference between ($p < 0.0001$) and (paired t value 17.59) between pre-intervention assessment and post-intervention assessment.

Table 2. Mean, standard deviation, P value, paired t value for MMT pre and post-intervention.

MMT	Mean ± SD	Paired t value	p-value	Interpretation
Pre	3.16±0.37	24.577	<0.0001	Extremely significant
Post	4.88±0.32			

Patients treated with a given exercise program have shown an increase in muscle power mean score of 3.16 to 4.88. Statistically, it shows that there was an extremely significant difference between ($p < 0.0001$) and (paired t value 24.577) between pre-intervention assessment and post-intervention assessment.

5. Discussion:

The result of this study demonstrated that the exercise program structured for patients with postnatal kyphosis has been effective in correcting the kyphosis of women in the postnatal period.

Previous research has demonstrated that the level of relaxin hormone after delivery is relatively higher for up to 12 weeks, which may

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affect postural alignment due to its direct impact on the ligaments and the structures that support them in the joints. The pregnancy may cause the lengthening and shortening of certain muscles which occurs in lordosis and kyphosis².

A study conducted by Kendall and McCreary found that postural kyphosis leads to an increase in thoracic kyphosis and trunk length. There is a stretching of the paraspinal muscles especially the erector spinae muscle and elongation of the posterior longitudinal ligament, supraspinous, and infraspinous ligament of the thoracic spine¹.

This study was conducted among women with postural kyphosis, age group of 20-40 years. An ethical clearance certificate was obtained by Krishna institute of medical sciences, deemed to be university, Karad. The study was conducted at Krishna college of physiotherapy. Subjects who participated were diagnosed by the physiotherapist. They were chosen based on inclusion and exclusion standards, then put into groups using a straightforward random selection technique. Demographic information was taken which consist of their name, age, etc. For participation in this study, subjects must be 20-40 yr age. Patients were excluded if having any neurological condition, scoliosis, chest condition, or previous trauma to the spine, pelvis, or lower limb. The proper detailed postural assessment was taken which included an occiput to wall distance test was performed, Manual muscle test were also taken. All outcome measures were selected according to their reliability²⁹. A total of 40 subjects were selected. The treatment protocol was 6-8 weeks. The treatment protocol includes the Warming up phase, postural correction exercises, stretching exercises, isometric exercises, and cooling down phase. Corrective exercises along with proper ergonomics and teaching correct breastfeeding posture were beneficial in improving the posture of the subject. Post-

treatment there was a decrease in OWD and an increase in OWD score.

Increasing the sample size and the length of the treatment protocol will allow for future research.

6. Conclusion:

The results of this study indicate that there is a substantial change in muscular power and the distance from the occiput to the wall between the pre- and post-intervention periods. There was a significant decrease in occiput to wall distance and an increase in the muscle power. The structured exercise program designed, has been effective in improving posture in postnatal women.

References:

1. Horak FB. Postural orientation and equilibrium. Handbook of Physiology, Section 12: Exercise. 1996:255-92.
2. Britnell SJ, Cole JV, Isherwood L, Stan MM, Britnell N, Burgi S, Candido G, Watson L. Postural health in women: the role of physiotherapy. Journal of obstetrics and gynaecology Canada. 2005 May 1;27(5):493-500.
3. Jensen RK, Doucet S, Treitz T. Changes in segment mass and mass distribution during pregnancy. Journal of biomechanics. 1996 Feb 1;29(2):251-6.
4. Whitcome KK, Shapiro LJ, Lieberman DE. Fetal load and the evolution of lumbar lordosis in bipedal hominins. Nature. 2007 Dec;450(7172):1075-8.
5. Opala-Berdzik A, Bacik B, Cieslinska-Swider J, Plewa M, Gajewska M. The influence of pregnancy on the location of the center of gravity in standing position. J Hum Kinet. 2010 Dec 1;26:5-11.
6. Lile J, Perkins J, Hammer RL, Loubert PV. Diagnostic and management strategies for pregnant women with back pain: once a serious cause of the pregnant patient's back pain is ruled out, conservative measures may help to relieve the discomfort.

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- JAAPA-Journal of the American Academy of Physicians Assistants. 2003 Dec 1;16(12):31-9.
7. Moore K, Dumas GA, Reid JG. Postural changes associated with pregnancy and their relationship with low-back pain. *Clinical Biomechanics*. 1990 Aug 1;5(3):169-74.
 8. Opala-Berdzik A, Błaszczuk JW, Bacik B, Cieślińska-Świder J, Świder D, Sobota G, Markiewicz A. Static postural stability in women during and after pregnancy: a prospective longitudinal study. *PloS one*. 2015 Jun 8;10(6):e0124207.
 9. Dumas GA, Reid JG, Wolfe LA, Griffin MP, McGrath MJ. Exercise, posture, and back pain during pregnancy: Part 1. Exercise and posture. *Clinical Biomechanics*. 1995 Mar 1;10(2):98-103.
 10. Dumas GA, Reid JG, Wolfe LA, Griffin MP, McGrath MJ. Exercise, posture, and back pain during pregnancy: Part 2. Exercise and back pain. *Clinical Biomechanics*. 1995 Mar 1;10(2):104-9.
 11. Hanfy HM, Awad MA, Allah AH. Effect of exercise on postural kyphosis in female after puberty. *Indian Journal of Physiotherapy and Occupational Therapy*. 2012 Jul 1;6(3):190.
 12. Borg-Stein J, Dugan SA. Musculoskeletal disorders of pregnancy, delivery and postpartum. *Physical medicine and rehabilitation clinics of North America*. 2007 Aug 1;18(3):459-76.
 13. To WW, Wong MW. Factors associated with back pain symptoms in pregnancy and the persistence of pain 2 years after pregnancy. *Acta obstetricia et gynecologica Scandinavica*. 2003 Jan 1;82(12):1086-91.
 14. Gaudet C. The association of acute and chronic postpartum pain with postpartum depression in a nationally representative sample of Canadian women. University of Ottawa (Canada); 2011.
 15. Webb DA, Bloch JR, Coyne JC, Chung EK, Bennett IM, Culhane JF. Postpartum physical symptoms in new mothers: Their relationship to functional limitations and emotional well-being. *Birth*. 2008 Sep;35(3):179-87.
 16. Gutke A, Josefsson A, Öberg B. Pelvic girdle pain and lumbar pain in relation to postpartum depressive symptoms. *Spine*. 2007 Jun 1;32(13):1430-6.
 17. McGovern P, Dowd B, Gjerdingen D, Gross CR, Kenney S, Ukestad L, McCaffrey D, Lundberg U. Postpartum health of employed mothers 5 weeks after childbirth. *The Annals of Family Medicine*. 2006 Mar 1;4(2):159-67.
 18. Cooper PJ, Tomlinson M, Swartz L, Woolgar M, Murray L, Molteno C. Postpartum depression and the mother-infant relationship in a South African peri-urban settlement. *The British Journal of Psychiatry*. 1999 Dec;175(6):554-8.
 19. Moraes IG, Pinheiro RT, Silva RA, Horta BL, Sousa PL, Faria AD. Prevalence of postpartum depression and associated factors. *Revista de Saúde Pública*. 2006;40:65-70.
 20. Cantilino A, Zambaldi CF, Albuquerque TL, Paes JA, Montenegro AC, Sougey EB. Postpartum depression in Recife-Brazil: prevalence and association with bio-socio-demographic factors. *Jornal Brasileiro de Psiquiatria*. 2010;59(1):1-9.
 21. Pawar G, Wetzker C, Gjerdingen D. Prevalence of depressive symptoms in the immediate postpartum period. *J Am Board Fam Med*. 2011;24:258-61.
 22. Morari-Cassol EG. Amamentação e desconforto músculo-esquelético da mulher.
 23. Moraes IG, Pinheiro RT, Silva RA, Horta BL, Sousa PL, Faria AD. Prevalence of postpartum depression and associated factors. *Revista de Saúde Pública*. 2006;40:65-70.

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24. Cantilino A, Zambaldi CF, Albuquerque TL, Paes JA, Montenegro AC, Sougey EB. Postpartum depression in Recife-Brazil: prevalence and association with bio-socio-demographic factors. *Jornal Brasileiro de Psiquiatria*. 2010;59(1):1-9.
25. Abou-Saleh MT, Ghubash R. The prevalence of early postpartum psychiatric morbidity in Dubai: a transcultural perspective. *Acta Psychiatrica Scandinavica*. 1997 May;95(5):428-32.
26. Opala-Berdzik A, Błaszczuk JW, Bacik B, Cieślińska-Świder J, Świder D, Sobota G, Markiewicz A. Static postural stability in women during and after pregnancy: a prospective longitudinal study. *PloS one*. 2015 Jun 8;10(6):e0124207.
27. Kendall FP, McCreary EK. *Muscles, testing and function*. Williams & Wilkins; 1983.
28. Kendall FP, McCreary EK, Provance PG. *Muscles, testing and function* Baltimore: Williams and Wilkins.
29. Wiyanad A, Thaweewannakij T, Wattanapan P, Sooksuan T, Mato L, Amatachaya P, Amatachaya S. Appropriate Occiput-wall Distance to Screen for a Risk of Kyphosis. In *The National and International Graduate Research Conference 2017*.