

A single group trial (before – after) on impact of physiotherapeutic intervention package on relief from low back pain of pregnant women

Pradip Kumar Sarkar¹, Ajit Kumar¹, Amarjeet Singh², Sonika Sharma¹,
Sudip Bhattacharya³

¹Department of Physical and Rehabilitation Medicine, Postgraduate Institute of Medical Education and Research, Chandigarh, India, ²Department of Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh, India, ³Department of Community and Family Medicine, All India Institute of Medical Sciences, Deoghar, Jharkhand, India

ABSTRACT

Introduction: More than half of the women have low back pain (LBP) at some point during pregnancy; the intensity of back pain increases as the pregnancy progresses. Such changes increase their risk for musculoskeletal disorders and fall injuries. **Aim and Objective:** Our study's objective was to estimate the prevalence of LBP in antenatal and postnatal cases of pregnancy in PGIMER, Chandigarh and to ascertain impact of a training intervention on incidence and severity of LBP in the study subjects. **Methodology:** A single group trial (before and after) on impact of physiotherapeutic intervention package on relief from LBP in pregnant women in between 20 and 35 years of age group were selected. The study duration was one year. The numeric pain rating scale was taken for measuring pain intensity at different levels. Where 0 indicates no pain, 1-3 indicates mild pain (which may be nagging, annoying, and interfering little with activities of daily livings (ADLs)), 4-6 indicates moderate pain (interferes significant with ADLs), and 7-10 indicates severe pain (Disabling, unable to perform ADLs). As per available time, it was decided to include at least 30 subjects in the study. **Results:** Initially 45 patients were enrolled. Of those, 30 patients were suffering from backache, that is, 67% of the total and 33% did not have any backache. There were no backaches reported in the first trimester, five cases were in the second trimester, and 18 cases were in the third trimester. Of 30 patients, 11 were less than 25 years of age and remaining 19 patients were in the age group of 26-35 years.

Keywords: Disability, low back pain, pregnancy

Introduction

Pregnancy brings along with lots of changes in a mother's body. Many hormonal changes occur leading to increase in body fat and weight,^[1] increases abdominal pressure which leads to incontinence, low and upper back pain, increases lordosis, pain,

and swelling in the lower limb, etc., Although having a baby is a wonderful experience for any woman, almost all women would like to regain their prepregnancy shape as soon as possible.^[2]

The abdominal muscles, particularly sided of rectus, are stretched to the point of their elastic limit by the end of pregnancy. These greatly decrease their efficiency of contraction. The shift in the center of gravity decreases the mechanical advantage of stretching of abdominal muscles. This requires postural compensations to maintain balance and stability. The lumbar and cervical lordosis increase to compensate the shift of the center of gravity and the

Address for correspondence: Dr. Sudip Bhattacharya,
Department of Community and Family Medicine, AIIMS, Deoghar,
Jharkhand, India.
E-mail: drsudip81@gmail.com

Received: 05-08-2022

Revised: 10-09-2022

Accepted: 04-11-2022

Published: 30-06-2023

Access this article online

Quick Response Code:



Website:
<http://journals.lww.com/JFMPC>

DOI:
10.4103/jfmpe.jfmpe_1566_22

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Sarkar PK, Kumar A, Singh A, Sharma S, Bhattacharya S. A single group trial (before – after) on impact of physiotherapeutic intervention package on relief from low back pain of pregnant women. J Family Med Prim Care 2023;12:1078-82.

knees hyperextend. The shoulder girdle and upper back become rounded with scapular protraction and upper extremity internal rotation because of breast enlargement. This contributes to the “waddling” gait that is typically seen in pregnancy.^[3]

More than half of the women have low back pain (LBP) at some point during pregnancy; the intensity of back pain increases as the pregnancy progresses. Such changes increase their risk for musculoskeletal disorders and fall injuries. Pregnant women fall at a similar rate (27%) to women aged more than 70 years (28%). Most of the falls (64%) occur during the second trimester. However, some factors that may contribute to these injuries include deviations from normal posture, balance, and gait.^[4-7]

Motherhood is the most important incidents for women’s life but in India it is most neglected situation. For generations, mother learnt to accept the consequences. The women are now-a-days facing double jeopardy. On one hand, with the reduction of family size and breakdown of joint family there are, now, no female relatives to guide the pregnant women as to what to eat, how to deal with pregnancy-related symptoms, and how to prepare for delivery. On other hand, with gradual but steady strengthening of government healthcare delivery system, birth attendants are fast disappearing from the scene. Still, motherhood remains the most important role of women in society.^[8-12]

Treatments are generally conservative, exercise-based interventions and alternative modalities considered effective to reduce

pain. Against this background of withdrawal of support to pregnant mothers from the family, the medical profession has responded in the form of conducting trials of birth preparedness. The objective is to minimize the problems during pregnancy through effective precautionary actions by self-care during pregnancy, labor, and after delivery. So, we need to develop a management package which will help the mother to maintain and improve their fitness level as normal as possible and stay fit in future.

Need of the study

Many interventions have been tried and tested abroad to create evidence for the efficacy of physiotherapy for these problems, but in Indian scenario such effort is lacking. Earlier the focus of the healthcare planner was on maternal mortality rate which does not address individual problems of women. Now we need to focus on morbidity improvement. Because of dearth of studies done on women in prepartum and postpartum stage, their health gets compromised. Often some problems precipitated during pregnancy or puerperium continue throughout their life. In the 21st century, some of the facts of the society have developed tremendously like information technology, hospitality management, tours and travels, aviation industry, teaching, and a very big portion in the sports and games where women need to keep themselves fit.

To deliver this fitness program in a scientific way and with the help of an expert hand is important. It is also important to develop the program as per the need of the subjects. As we

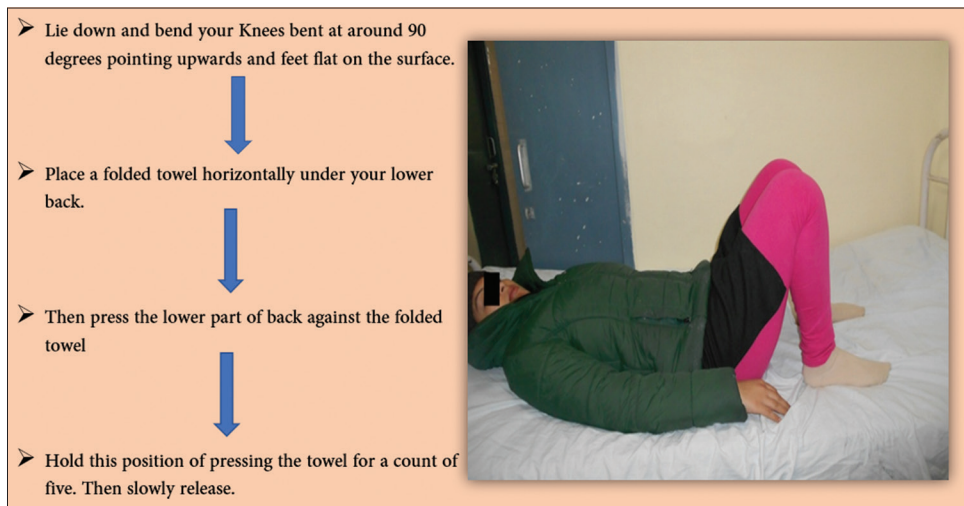


Figure 1: Steps for isometric back and abdominal exercise

Table 1: Numeric pain scale rating of patients before and after training

Severity of pain	Before training		After training	
	No. of patients	Percentage (%)	No. of patients	Percentage (%)
No Pain (0)	15* (30 patients had pain)	33.33%	4 (of 30 patients)	13.33%
Mild Pain (1-3)	6	13.33%	16	53.33%
Moderate Pain (4-6)	21	46.66%	10	33.33%
Severe Pain (7-10)	3	6.66%	-	-
Total Patients	45	-	30	-
Mean Score	4.83	-	2.77	-

*Before training 15 patients did not have any backache, hence excluded

Table 2: Shift in status of LBP severity in individual cases

Before	After				Total patients
	No Pain	Mild Pain	Moderate Pain	Severe Pain	
No Pain	-	-	-	-	0
Mild Pain	3	3	-	-	6
Moderate Pain	1	12	8	-	21
Severe Pain	-	1	2	-	3
Total Patients	4	16	10	0	30

Table 3: Summary of impact of intervention package

Severity of pain	Total no. of patients	Condition of patients post-training			
		Unchanged	Improved	Cured	Deteriorated
Mild Pain	06	03	-	03	-
Moderate Pain	21	08	12	01	-
Severe Pain	03	-	03	-	-
Total Patients	30	11	15	04	-

know, the sportswomen need to develop the fitness in respect of their sports field and so on for each woman. Customized development of fitness program is highly important to evaluate the effect of aerobic exercise in combination of isometric exercises to control complications in prenatal and postnatal stage.

Against this background, the recent study was planned with following objectives:

Objectives

- To estimate the prevalence of LBP in antenatal and postnatal cases of pregnancy in PGIMER, Chandigarh.
- To ascertain impact of a training intervention on incidence and severity of LBP in the study subjects.

Methodology

The investigator sourced the cases from the Obstetrics and gynaecology (OBG) clinic and Physiotherapy department in PGIMER, Chandigarh. Pregnant and postnatal women were selected and were suffering from LBP. They were also asked about care and precautions taken by them pertaining to fitness during pregnancy and lactation. Their treatment-seeking behaviour was also elicited. A proforma was designed for ascertaining these issues. A single group trial (before and after) on impact of physiotherapeutic intervention package on relief from LBP in pregnant women in between 20 and 35 years of age group was selected. The study period was 2014-2015.

Null hypothesis: There will be no impact of the nonpharmacological intervention package on incidence and severity of LBP in study subjects.

Alternate hypothesis: There will be a definite impact of the nonpharmacological intervention packages on incidence and severity of LBP in study subjects.

Inclusion criteria

Women aged 20-35 years, up to second gravida, and at the gestation period of 12-20 weeks were recruited in the study. Their follow-up was continued up to the postnatal stage (till 6 months).

Exclusion criteria

Women having severe cardiopulmonary disorder, unco-operative patient, any major psychological abnormalities, active vaginal bleeding, high fever, HIV+ women, vaginal fistula, third and fourth degree uterine prolapse, spinal cord injury, threatened or recurrent miscarriage, and previous premature births or history of early labor were excluded.

Protocol

Pain rating scale

The pain measuring scale used for backache patients was Numeric Pain Rating Scale (Visual Analog Scale).

The numeric pain rating scale was taken for measuring pain intensity at different levels, where 0 indicates no pain, 1-3 indicates mild pain (which may be nagging, annoying, and interfering little with ADLs), 4-6 indicates moderate pain (interferes significant with ADLs), and 7-10 indicates severe pain (disabling, unable to perform ADLs).

As per available time, it was decided to include at least 30 subjects in the study. Forty five subjects were registered in the study having different types of pain like LBP, upper back pain, knee pain, coccyx pain, etc., of which, 30 patients had LBP.

After the initial check up at the Obstetrics and Gynecology Outpatient Department (OPD), the women were sent to the physiotherapy department and included in the study. Consent was taken and study design was explained to them and administered the intervention packages. They were assessed again in respect of their health, postural, and ergonomically fitness-related problems which can be managed and controlled by intervention package. Throughout their OPD visits (for their self-checkup and immunization of their children), subjects were asked to visit the physiotherapy department for administration of their interventions package.

An introductory session was held by the researcher on the first visit of pregnant subjects (prenatal and postnatal both). It is about 10 to 15 minutes of duration. All the females (ANC/PNC) were included and divided into two groups as per the package prepared (mentioned earlier). The exercise session lasts for 20-40 minutes as per requirements and tolerance of the subjects. The duration starts with 5-10 minutes of warm-up, 10-20 minutes of exercise session including breathing exercise, and ended with 5-10 minutes of cool-down session.

The warm-up session included full range of motion (ROM) exercise of both upper limb and lower limb, neck ROM, and low and medium speed walking with breathing exercise.

The basic exercise session included

Stretching of upper neck extensors, scapular protractors and shoulder internal rotators, low back extensors, hip flexors, adductors and hamstrings, and ankle planter flexors. Adductor stretching in tailor's sitting position also helps to stretching adductor muscles and perineal muscles which ultimately help to easier vaginal delivery.

Isometric back and abdominal exercise helps in strengthening of the back and abdominal muscles. For strengthening of spinal muscles, women need to lie down on a folded towel or a pillow and press the pillow downward by the back muscles. This can be done in 5-10 repetitions twice a day. Pelvic tilts strengthen the muscles of the abdomen and lower back, increase hip mobility, and help to relieve LBP during pregnancy and labor. Cat and camel exercise in quadruped position, inhale, tightening abdomen, tuck the buttocks under and tilt pelvis forward in one motion, exhale, and then relax. Repeat 10 times. Same position raises lower back, hold it for 5 seconds, and then relax. Massage in the back and abdominal muscles, adductor, perineal and spinal muscle helps to reduce pain, improve flexibility, gives over all relaxation, and ultimately helps for pain reduction and easier vaginal delivery. Standard electrotherapy modalities were used as required for the subjects to reduce low back and coccydynia pain. Ultrasound therapy is very much effective in postnatal stage, but it is contraindicated in prenatal stage when simple hot packs help to reduce pain. Interferential therapy is very much useful to reduce the low and upper back pain. In the end, patient needs to do some cool-down exercise for 5-10 minutes to avoid any adverse cardiopulmonary effect which simply performed by continuing walking, generalized ROM exercise, and deep breathing exercise [Figure 1].

Visit schedule

Subjects were started selecting at 12-20 weeks of gestation period onwards when registration, group allocation, intervention, and demonstration of exercises as per intervention packages were advised. Follow-up, retraining, correction of posture, etc., were continued till 6 months postnatal. Two prenatal and two postnatal visits were asked to follow and at the same time of their OPD visit.

Statistical analysis was done based on percentage, mean, standard deviation, and *P* value were taken out with the help of a standard statistical package.

Ethical clearance was obtained from the ethical committee of PGIMER, Chandigarh for the study. Respondents were explained about the purpose and their written consent was obtained prior to investigation. All data were kept confidential. Dropouts were duly recorded and mentioned as required.

Results

Initially, 45 patients were enrolled. Of those, 30 patients were suffering from backache, that is, 67% of the total and 33% did not have any backache. There were no backaches reported in the first trimester, five cases were in the second trimester, and 18 cases were in the third trimester. Of 30 patients, 11 were less than 25 years of age and remaining 19 patients were in the age group of 26-35 years.

After the training package which was provided to the patients suffering from LBP, there was a decrease in severity of pain.

After 4 weeks of training program, the condition of 11 patients remained unchanged, 15 patients improved, and four patients were totally cured. No deterioration of symptoms was noticed [Tables 1-3].

Discussion

Pregnancy, for good reason, is considered by many a fragile time of a woman's life. Complaints of back pain are frequent in normal pregnancy. It seems to be consequences of circulation changes, hormonal, and mechanical factors. LBP is quite disabling, limits everyday activities of a pregnant women, and impacts productivity. If unaddressed, the symptoms can persist during pregnancy and affect the lifestyle and health of the subject in postpartum period.^[13-16] Hence, it should not be ignored or left untreated. It has been documented that conservative physiotherapeutic treatment can easily prevent and even cure LBP. There was relief of symptoms to more than 50% of the patients. Exercise along with antenatal care has a definite impact to reduce pain in lumbo-pelvic area during pregnancy. However, the present study results are based on a very small (*N* = 30) using only a single group before-after method.

Very small numbers of randomized controlled trials have been done on these subjects. Other studies done in India and abroad have also been documented the benefits of exercise training on severity and occurrence of LBP in pregnant women. Some authors in their study demonstrated successfully that the pregnant be trained to manage the backache symptoms themselves. Even otherwise, level of evidence for therapeutic exercise intervention is still limited.

Therefore, there is a need for multicentric double-blind randomized controlled trial. Further research should also focus on specific training parameters, timing of intervention, possible preventive role of exercise in early pregnancy, and better understanding of an etiology and pathophysiology of pregnancy-related LBP.

Conclusion

In the present study, there was a significant improvement in LBP severity after administration of the training package. The

degree of relief was determined by duration of exercise and pattern of performing correct exercise. In this study 67% of the patients got relief symptomatically. Rest of the patients had mild to moderate pain. This shows the positive impact of physiotherapeutic intervention to reduce pain of women during pregnancy.

Acknowledgments

We are grateful to Prof. Amarjeet Singh to help to conduct the study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Sidebottom AC, Brown JE, Jacobs DR Jr. Pregnancy-related changes in body fat. *Eur J Obstet Gynecol Reprod Biol* 2001;94:216-23.
2. Roth H, Homer C, Fenwick J, McCandlish R, Elbourne D. "Bouncing Back": How Australia's leading women's magazines portray the postpartum 'body'. *Women Birth* 2012;25:128-34.
3. Albers L, Garcia J, Renfrew M, McCandlish R, Elbourne D. Distribution of genital tract trauma in child birth and related postnatal pain. *Birth* 1999;26:11-7.
4. Casey BM, Schaffer JI, Bloom SL, Heartwell SF, McIntire DD, Leveno KJ. Obstetric antecedents for postpartum pelvic floor dysfunction. *Am J Obstet Gynecol* 2005;192:1655-62.
5. Dass GS. Reproductive morbidity: *J Indian Med Assoc* 1995;93:55-7.
6. De Tayrace R, Panel L, Masson G, Mares P. *J gynecolobstet Biolreprods (Paris)* 2006;35 (1 Suppl):1S24-31.
7. Fleck SJ, Kraemer WJ. *Designing Resistance Training Programs*. 3rd ed.ampaign, IL: Human Kinetics; 2004.
8. Hay-Smith J, Morkved S, Fairbrother KA, Herbison GP. Pelvic floor muscle training for prevention and treatment of urinary and faecal incontinence in antenatal and postnatal women. *Cochrane Database Syst Rev* 2008:CD007471. doi: 10.1002/14651858.CD007471.
9. Inanir A, Cakmak B, Hisim Y, Dimirturk F. Evaluation of postural equilibrium and fall risk during pregnancy. *Gait Posture* 2014;39:1122-5.
10. Gupta MK, RS R, Kumar D, Visengrawala F. Empowerment and engagement of SHGs against RTI/STI in Karnataka, India: an interventional study. *Int J Res Med Sci* 2017;3:680-7.
11. Pennick V, Liddle SD. Interventions for preventing and treating pelvic and back pain in pregnancy. *Cochran Database Syst Rev* 2013;8:CD001139.
12. Richards E, VanKessel G, Virgara R, Harris P. Does antenatal physical therapy for pregnant women with low back pain or pelvic pain improve functional outcomes? A systematic review. *Acta Obstet Gynecol Scand* 2012;91:1038-45.
13. WHO. Measuring reproductive morbidity. Report of technical working group. WHO./MCH./90. 4. Division of family planning. WHO, Geneva. August 30-September 1, 1989. p. 1-39.
14. Poděbradská R, Šarmírová M, Janura M, Elfmark M, Procházka M. The effect of physiotherapy intervention on the load of the foot and low back pain in pregnancy. *Vliv fyzioterapeutických postupů na zatížení plosky a bolesti zad v těhotenství*. *Ceska Gynekol* 2019;84:450-7.
15. Wójcik M, Jarzabek-Bielecka G, Merks P, Luwański D, Plagens-Rotman K, Pisarska-Krawczyk M, *et al*. Visceral therapy and physical activity for selected dysfunctions, with particular emphasis on locomotive organ pain in pregnant women-importance of reducing oxidative stress. *Antioxidants (Basel)* 2022;11:1118.
16. Wojcik M, Plagens-Rotman K, Merks P, Mizgier M, Kedzia W, Jarzabek-Bielecka G. Visceral therapy in disorders of the female reproductive organs. *Ginekol Pol* 2022;93:511-8.