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Comparative effect of yoga therapy and conventional therapy on pain, functional disability and quality of life in post natal females with lumbopelvic pain: Randomized clinical trial

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Abstract
Background: Postnatal period brings about various physiological and psychological changes in women's life. Back pain in pregnancy cannot be considered has one single pain type. Lumbopelvic pain (LPP) is a common MSK disorder in both pregnant and postpartum women. This study aims to compare the effect of yoga therapy and conventional therapy on Pain, Functional disability and Quality of life (QOL) in post natal females with Lumbopelvic pain.
Subjects: This study included 42 females with lumbopelvic pain selected using inclusion and exclusion criteria.
Methods: Lumbopelvic pain was screened by using Active SLR & Posterior Pelvic Pain provocative test (P4). Sampling of population was done by Simple Random Sampling. Subjects in group A (n=21) received Yoga Therapy and subjects in group B (n=21) received Conventional exercises for duration of 4weeks for 4times per week. Pre and Post assessment was done by using NPRS for pain, Modified Oswestry Disability Index for Functional disability and SF 36 for Quality of life. Further data was analysed by using the appropriate statistical analysis and a result was obtained.
Results: After 4 weeks of Yoga therapy, post values of Pain, Functional disability and Quality of life showed extremely significant improvement with p-value of 0.0001.
Conclusion: The current study proves that there is significant influence of Yoga on Pain, Functional disability and Quality of life in postpartum females.

Keywords: Lumbopelvic pain, postpartum period, yoga therapy, conventional exercises, functional disability, quality of life

Introduction
Low back pain (LBP) is most widely recognized has a condition which is highly prevalent, disabling and costly to individual and also the society. Pregnancy related low back pain (PR-LBP) is a significant problem that affects approximately 50% of pregnant women; approx 25% experience significant pain and 8% have severe disability during pregnancy [1]. A review of previous studies has mentioned about 45% of pregnant women suffer through this pain and about 25% of postpartum women suffered from LBP [2]. So overall it is considered as a most common musculoskeletal (MSK) problem with an estimation of 30-78% [3].
Defining postnatal period, it is period beginning immediately after birth of child and which extends for about 6-16weeks. WHO describes postnatal period as the most critical period of women's life yet it is been neglected phase in lives of mothers [5]. However the physical recovery and psychosocial adaptations can take significantly longer time to resolve to its pre pregnancy state [6]. Postnatal period brings about various physiological and psychological changes in women's life. Women undergo physical, emotional and social changes along with other series of complications and co morbidities [7]. There are different post natal complains such as painful perineum, diastalsis recti abdominals, back pain, symphysis pubis pain, bladder and bowel problem, circulatory problem, breast engorgement etc [4].
Lumbopelvic pain (LPP) is a common MSK disorder in both pregnant and postpartum women [2].

The hormonal changes such as release of oestrogen, relaxin and progesterone can cause global relaxation of the muscles and the ligaments [4]. Postpartum women have lax tissues and hyper mobile spinal segments, increasing susceptibility to pain. Postpartum pain usually occurs due to the lumbopelvic instability which is caused by inability of supporting structures of trunk to maintain their optimum position of spine and pelvic girdle [5]. A healthy post partum period requires early physical recovery and ability to meet individual needs and maternal role [6].

Back pain in pregnancy cannot be considered has one single pain type. So it is separated into at least lumbar back pain and posterior pelvic pain, and treated accordingly to the symptoms [9]. Based on the history and physical examination of subject, PR-LBP has been divided into the three subgroups; such has Pelvic girdle pain, Lumbar pain and Lumbopelvic pain. So talking about Pelvic girdle pain (PGP) it is located between the posterior iliac crest and glutei folds and also may radiate down upto thighs but rarely into lower legs. PGP can be present with or without radiating pain in the pubic symphysis. Whereas LBP is defined as pain localized below ribs, but above glutei folds and radiation may or may not be present down the legs. In Lumbopelvic pain, pain is experienced between costal margin and gluteal fold with or without radiation to lower limb or symphyis pubic. So the term Lumbopelvic pain is used when there is no distinction made between Pelvic girdle pain and Low back pain or lumbar pain. This pain is related to MSK system and is not due to gynaecological or urological disorder [8, 9, 19].

Lumbopelvic pain is due to multifactorial ligament laxity because of hormonal changes, lumbar spine, structural changes and the increased lordosis which increase weight predisposes and leads to instability of lumbopelvic region [4, 2] PR-LPP affects across all women's in their child bearing age, level of education, ethnicities, employment and increase risk of experiencing pain in future pregnancies [1]. Lumbopelvic pain has adverse effects on activity level and it diminishes the quality of life (QOL) which may also persist several years after delivery.

Exercise such as pelvic exercise program with pelvic realignment device, Pilates, resistance exercise, aerobics ball exercises etc are often most commonly recommended for LPP. Hence exercise is most frequently used to gain muscle strength, flexibility and endurance and to restore injured tissue and contribute to sustain normal life activity. In recent years Stabilization exercise program involving pelvic floor and abdominal muscle has shown positive effects[10]. Consequently health professionals should be focusing on increasing and improving prevention approaches and treatment options to enhance better QOL [7].

Yoga offers a self-corrective, holistic approach to health and has been shown to be effective. It aims to liberate a human being from the conflicts of duality (body–mind), which exists in every living thing, and from the influence of the gunas, the qualities of universal energy that are present in every physical thing. On the broadest level yoga refers to the enormous body of spiritual values, attitudes, precepts and techniques that have been developed in India over three millennia that may be regarded as the very first foundation of the ancient Indian civilization [11] (Feuerstein, 1989).

Thus the goal of study is to determined the efficacy of yoga and conventional exercises on pain, functional disability and QOL in post natal females with Lumbopelvic pain

Materials and Methodology

Study Design: Comparative study
Sampling Method: Simple Random sampling
Study Setting: Clinics, Hospitals in and around Pune
Study Population: Post Natal females with Lumbopelvic pain
Duration of Intervention: 4weeks
Duration of Study: 1 year
Sample Size: 42

Eligibility Criteria

Inclusion Criteria

- Willing to participate.
- Age between 20-30yr.
- Females with primigravida (after 6wk of delivery).
- Full term normal delivery females(FTND)
- NPRS: 3-7
- Females with positive Active SLR and females with positive Posterior Pelvic Pain provocative test (P4).
- History of low back pain during pregnancy

Exclusion criteria

- LBP caused in the spine, such as malignancy or chronic infection.
- Multiparous women.
- Spinal surgeries.
- Females on hormonal therapy

Withdrawal Criteria

- Patients not willing to disclose data after intervention score are obtained.
- Patients who do not maintain a follow-up of exercises for more than a week
- Patients refusing to comply with instructions during examination and study protocol.

Materials Used

- Yoga Mat
- Paper and Pen.
- Numerical Pain Rating Scale.
- Oswestry Disability Index Scale.
- Sf 36 scale.
- Consent Form.
- Data Collection Sheets.

Outcome Measures

- **Pain**: Numerical Pain Rating Scale
- **Functional Disability**: Modified Oswestry Disability Index. [21].
- **Qol** : SF 36[22]

Procedure

Clearance was taken from ethical institutional committee of institute. Samples were collected by simple random sampling method with said inclusion criteria. The details of research were explained to subjects and written consent form was charted out. Total 42 subjects (n=40) between the age of 20-30 years participated in study. Group A (n=21) participated in Yoga therapy and Group B (n=21) participated in Conventional exercise. Testing procedure was explained as well as demonstrated to the subjects so that they become familiar with the tests. NPRS for pain, Modified Oswestry Disability Index for Functional disability and SF 36 for Quality of life was assessed. After completion of pre assessment training was given for 4 weeks. After 4 weeks post assessment was done and the values were recorded in the record sheet.

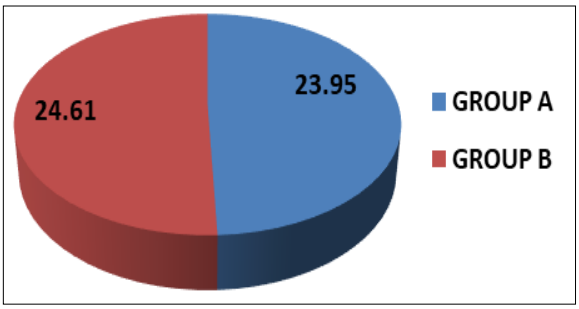
Yoga therapy	Conventional exercise therapy
I) Supine Posture:	1. Standing Hamstring Stretch
1. A) Pavanamuktasana (Wind-releasing pose)	2. Cat and Camel
B) Suptapawanamuktasana (Leg Lock Pose)	3. Pelvic Tilt
2. Ardhanavasana (Half boat pose)	4. Quadriceps Leg Rising
3. Uttanapadasana (Straight Leg Raise Pose)	5. Trunk Rotation
4. Sethubandhasana Breathing (Bridge Pose Lumbar Stretch)	6. Double Knee To Chest
5. Suptaudarakarshanasana (Folded Leg Lumbar Stretch)	7. Extension Exercise
6. Shavaudarakarshanasana (Crossed Leg Lumbar Stretch)	8. Partial Curl.
II **Prone postures**	9. Piriformis Stretch
1. Bhujangasana (Serpent Pose)	10. Bridging
2. Shalabhasana Breathing (Locust Pose)	11. Hook Lying March
Sitting postures:	12. Single Knee to Chest Stretch
1. Vyaghrasvasa (Tiger breathing)	13. Standing Hamstring Stretch
2. Shashankasana Breathing (Moon Pose)	14. Lumbar Rotation
V **Standing Postures**	15. Press Up
1. Ardhachakrasana (Half-wheel pose)	16. Curl UPS
2. Prasaritapadahastasana (Forward bend with legs apart)	
3. Ardhakatichakrasana (Lateral arc pose)	

Yoga Therapy	Conventional Therapy
• Frequeny: 4 days/wk.	• Frequeny: 4 Days/Wk.
• Duration: 35 Min/Day	• Duration: 35 min/day.
• Relaxation done by shavasana.	• Repitions: 3 Sets With 8-12rep.
	• Rest Interval of 2-3min

Results and tables

Table 1: Age Distribution of the sample

Age	Group A	Group B
N (Sample)	21	21
Mean Age	23.95	24.61
STDV	2.7	2.8



Group 1: Mean age distribution

Table 2: NPRS Between Group: Unpaired Test

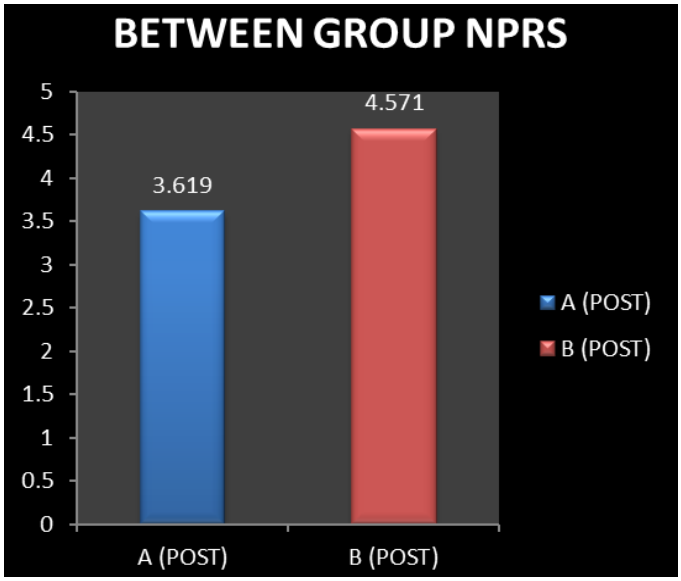
Group	Mean	STDV	P Value	t value
A (Post)	3.619	0.9735	P value is 0.0010	t = 3.558 with 40 degrees of freedom
B (Post)	4.571	0.7464		

Graphical Interpretation: This graph shows changes in post values of NPRS compared with post values of group A and group B. Y axis shows difference in Pain by NPRS and X-axis shows post values.

Graphical Result: The result obtained for Unpaired t test for NPRS suggests considered extremely significant improvement in 'p' value obtained (p< 0.0001) for both groups statistically. But group A (mean 3.619) suggests more significance and decrease in pain more than group B (mean 4.571).

Table 3: ODI between group: unpaired test

Group	Mean	STDV	P Value	t value
Post (A)	26.143	1.558	< 0.0001	t = 5.192 with 40 degrees of freedom.
Post (B)	23.190	2.089		



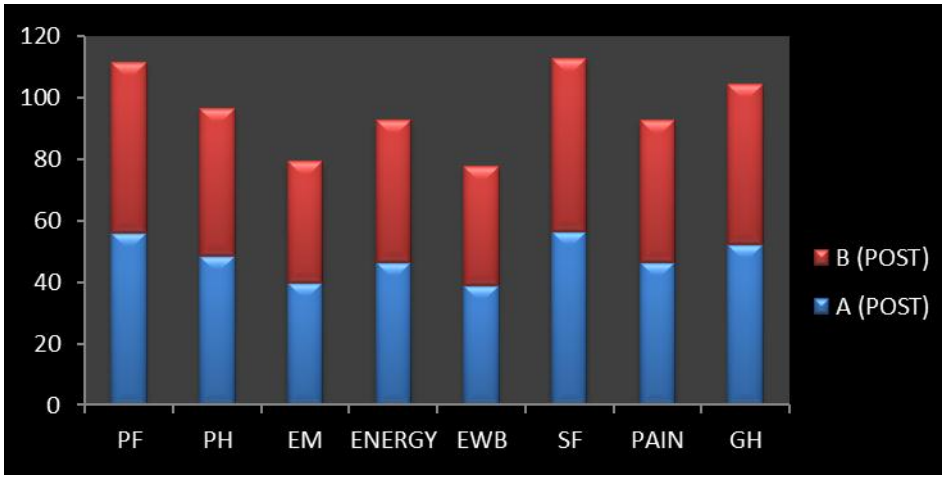
Group 2: NPRS between A (Post) and B (Post)

Graphical Interpretation: This graph shows changes in ODI post values of group A and group B. Y axis shows difference in Disability by ODI and X-axis shows post values.

Graphical Result: The result obtained for Unpaired t test for ODI suggests considered extremely significant improvement in 'p' value obtained (p< 0.0001) for both groups statistically. But mean difference of group A (4.905) suggests more significant and decrease in disability more than group B (3.81).

Table 4: Sf-36 between Group: Unpaired T Test

Group	PF	PH	EM	Energy	EWB	SF	Pain	GH
Mean (Post A)	61.00	62.619	48.857	52.857	46.714	61.381	56.619	58.286
Mean (Post B)	55.857	48.333	39.667	46.667	38.762	56.429	46.333	52.1443
STDV (Pre)	7.409	19.276	8.150	10.071	8.174	4.566	13.013	5.676
STDV (Post)	7.344	15.519	7.405	9.373	8.426	5.919	16.304	5.606
P Value	0.0294	0.0116	0.0004	0.0384	0.0035	0.0042	0.0294	0.0011



Graph 3: Sf-36 between Group: Unpaired T Test

Graphical Interpretation: This graph shows changes in SF-36 post values of group A and group B. Y axis shows difference in QOL by SF-36 and X-axis shows post values of group A and B.

Graphical Result: The result obtained for Unpaired t test for SF-36 suggests considered extremely significant improvement in 'p' value obtained (0.0004) for EM, very significant (p=0.0011) for GH and considered significant for PF(p=0.0294), PH (p=0.0116), ENERGY (p=0.0384), SF (p=0.0042), PAIN (p=0.0294) for both groups statistically. But mean difference of group A suggests more significant and increase in QOL more than group B.

Discussion

Current study was conducted to find the effect of Yoga Therapy versus Conventional Therapy on Pain, Functional Disability and Quality of Life in Post Natal Females with Lumbopelvic Pain. A total of 42 females (n=42) with postpartum 6 weeks with Lumbopelvic pain participated in the study with the age group of 20-30years. Subjects was been assessed for Lumbopelvic pain by using Active SLR & Posterior Pelvic Pain provocative test (P4) and accordingly was screened out. Women were divided into two groups Group A (yoga) and Group B (conventional exercise) for duration of 4 weeks. Pre and Post assessment was been done by using NPRS for pain, Modified Oswestry Disability Index for Functional disability and SF 36 for QOL.

The result of the current study showed that, Pain was statistically significant ($p< 0.0001$) in both Group A and Group B post 4 weeks by NPRS. But when compared with their mean difference, Group A (2.81) is more significant than Group B (1.191) in reducing lumbopelvic pain in postpartum females. Also study results shows, statistically significant ($p< 0.0001$) in Functional Disability by ODI between both Group A and Group B post 4 weeks. But when compared with their mean difference, Group A (4.905) is more significant than Group B (3.81) in reducing disability in postpartum females. SF-36 suggests considered extremely significant improvement in 'p' value obtained (0.0004) for EM, very significant (p=0.0011) for GH and considered significant for PF (p=0.0294), PH (p=0.0116), ENERGY (p=0.0384), SF (p=0.0042) and PAIN (p=0.0294) respectively for both groups statistically. But mean difference of group A for all components of SF 36 suggests more significant and increase in QOL when compared with group B.

The study indicates 4 weeks of yoga session significantly reduces lumbopelvic pain, improves their quality of life and reduces functional disability in post partum females. The results of present study suggested that physical activity and yoga-based interventions may be helpful for the reduction of pain and related symptoms and warrant additional attention for their role in minimizing or preventing PR-LBPP. It shows that lumbopelvic pain is reduced which has positive impact on self esteem, perception of symptoms and satisfaction which contribute to an overall perceived improvement in QOL by reducing disabling factors.

Yoga is the integration and harmony between thoughts, words and deeds or integration between body and system. It can be defined as "complete control over the different patterns or modification of consciousness". Yoga has proved to be beneficial by helping in improving the physiological factors. It enhances musculoskeletal flexibility and increases joint range of motion, by correcting improper posture and also increasing endurance and work of energy level. Yoga has also shown improvement in reducing pain and improving individual sleep and immunity [17].

Govindaraj *et al*., concluded that Exercise typically involves the following sequence: Warm up, Exercise and Relaxation. Some of the warm up exercises are used as a preparatory work out for yogasana to avoid muscle soreness, as yogasana for the beginners iphysiologically a combination of isotonic and isometric exercise (including both the movements and the posture holding) [13]. In our cuurent study we have included warm up session prior to yoga sessions which shown positive impact by no soreness or muscle spasm to females.

Hecimovic M. *et al*., concluded a possible reason for the greater improvement in lumbopelvic group is the inclusion of

the Sidebend, also known as the Side Bridge, and Side Plank. This maneuver can activate muscles of the posterior abdominal wall and back such as the lumbar erector spinae, a key endurance muscle [14] (McGill *et al*., 1996; McGill, 1998). Similar to the results in the current study, Yoga group which includes postures such has, Sethubandhasana, Ardhakati chakrasana and Ardha chakrasana and prone postures helped in activating weak muscles of lumbar spine and abdominals, it work synchronously such as the obliques and quadratus lumborum that are key for stabilizing thereby improving their stabilization component and helping in reducing pain. Bridge pose ie Setu Bandhasana develops a supple back and strong waist. This pose passively stretches the psoas and quadriceps and by elevating hips it gave good relief for the lumbar spine.

Nilima Bedekar (2019) [15] suggested that Yoga combines physical practice with mental awareness. Stability has to be gained to control the flexibility and achieve mobility [16]. In current study beauty of asanas is richness and variety of postures linking all segments of extremities including spine segments, for example: Sputa-Udharakashanasna, Bhujangasana, Ardha-Badhakonasana have impact on spinal mobility and rotator components which stimulate autonomic function vital for women. The muscles group activation produces a corset-like stabilization effect on the trunk and spine, giving stable base for the limb movements.

During the Yoga sessions, the participants were instructed to become aware of how core muscles feel during breathing, exercises and relaxation. The breathing techniques of Yoga may be responsible in activating and training core abdominal muscles involved in spinal support and stabilization (Michels *et al*., 2006). These breathing techniques were not only taught as a different exercise, but also during the practice of Asanas. The breathing patterns taught in Yoga improved the mental focus and concentration (Satchidananda, 1990) along with activating parasympathetic nervous system such that the participant was able to modulate the sympathetic nervous system over an activity [17, 18].

Anantharaman V *et al*., Comparison of yoga group with conventional exercise group concluded that yoga dominates the parasympathetic nervous system whereas exercise dominates sympathetic nervous system. Yoga is slow dynamic and static movements which helps in normalization of muscle tone whereas exercise is a rapid forceful movement which increases muscular tone. In yoga balanced activity of opposing muscle groups is seen and in exercise group imbalanced activity of opposing muscle group is seen. Effort is minimized in yoga group whereas in exercise group efforts are maximized [12].

Research has shown psychological benefits by increasing somatic and kinaesthetic awareness, self acceptance and self actualization, anxiety and depression and improves mood and well being of individual. Yoga also improves cognitive and psychomotor components and keeps body free from impurities and makes person healthy by practicing physical asana which tones up the internal organs of the body [12, 20].

Melissa Buttner *et al*. or Masoumeh Sohani *et al*. comprising of the PNC females had the significant positive effects of Yoga have been confirmed. Few studies depict that, the nature of Yoga is controlling the mind and central nervous system and unlike other sports, it a moderating effect on the nervous system, the hormonal emissions, physiological factors, and regulation of nerve impulses; therefore, it can be effective in improving quality of life. In our present study females QOL is seen to be improved more significantly in yoga group when compared with conventional exercises.

Primiparas delivering vaginally were associated with a 22–35% reduction in pelvic muscle strength between the pregnancy and postpartum period (Sampselle *et al*. 1998). In addition, spinal extension exercises prevent back pain, abdominal training improves abdominal distention and constipation, and taking deep breaths and relaxing enhances blood circulation and eases physical and mental stress (Rooney & Schauberger 2002, Krummel *et al*. 2004). At three months postpartum, gentle exercises such as yoga and gymnastics can help recover muscle tone, muscle strength and flexibility [15]. In the present study standing postures work on creating balanced skeletal structure, which stabilize the pelvis, as the psoas shortens all the lateral extension postures helped in lengthening muscles evenly on both sides. Prone postures gave nice traction by elongating and releasing compression in the spine. Twisting postures contract and twist muscles and provide a good relief from strain. Forward bending postures gave a symmetric stretch for the back by keeping the entire back even from the pelvis. Extension postures in standing helped by engaging extensor muscles of the back. Above all postures proved to be beneficial in women.

In conclusion the current study proves that there is significant influence of Yoga on pain, functional disability and QOL in postpartum females.

Conclusion

The present study concluded that,

a) Yoga can be used to decrease pain, reduce disability and improve quality of life in females with post partum lumbopelvic pain.
b) Conventional therapy can be used to decrease pain, reduce disability and improve quality of life in females with post partum lumbopelvic pain.
c) However, Yoga is better as compared to Conventional therapy in decreasing pain, reducing disability and improving quality of life in females with post partum lumbopelvic pain.

Clinical Implication

- The results of this study can be used to make a good treatment program for postpartum women's with lumopelvic pain.
- Yoga can be incorporated as an intervention plan for all post natal females so it will help in enhancing their quality of life.
- Yoga have a positive effect on fitness and physical flexibility with its secondary effect on mental health, while yoga practices results in greater awareness, less stress and higher well being and quality life.

Limitation

Limitations of the present study were:

a) Females with caesarean section were not included in study.
b) Other factors such has posture, flexibility and strength were not assessed.

Future Scope

a) This study can be done in larger sample size and including different style of yoga.
b) This study can be done in patients with who had under gone caesarean section.
c) More outcome measures such has flexibility, strength, fatigue can be assessed for postpartum females
d) Different duration of study protocol can be implemented.

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