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Efficacy Of Pilates Exercise For Low Back Pain In Adolescents

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ABSTRACT

Background: Non- specific type of LBP is common in adolescent and is also a disabling condition as they grow. There are many techniques of physiotherapy as well as others associated therapy such as yoga etc but there efficiency is unknown.

Pilates was proposed as the best treatment strategies to improve muscle strength and endurance along with flexibility, posture and balance in non-specific type of LBP in adolescent.

Methodology:

Study design: experimental study design. (Pre-test, Post-test)

Sampling Technique: Stratified Random Sampling.

This study included 30 subjects (15 males 15 females) with LBP full-filing inclusion criteria and willing to participate. The subjects were treated with Pilates swimming and teaser exercise for 30mins per day for 5days in a week for 4 weeks. Pre and post treatment assessment for pain in VAS and quality of life by using MODQ were noted andanalysed.

Result: The data (total number 30, male-15, female-15) was analyzed by Wilcoxon Signed Rank Test and Mann-Whitney Test etc. The results stated that there was decreasing in pain in vas and improvement in quality of life of the subjects following above interventions.

Conclusion: The objective was to find out effectiveness of Pilates in adolescent with LBP. This study results showed that Pilates had significantly decreased pain and improved quality of life in adolescent.

Pilates produced highly significant improvement in reducing pain (VAS score) and improvement in function (MODQ score) at the 4th week when compared to baseline values in subject with non-specific type of LBP.

Keywords: *LBP IN ADOLESCENT, PILATES, SWIMMING, TEASER.*

1. INTRODUCTION

The one physical tribute making man among his vertebrae cousins is his upright stature. Other primates may envy the canopy of tropical forest, sometime climbing, sometime semi upright, but man alone is comfortable and confident with the upright bipedal posture due to spine. The anatomical structure of spine curvature at cervical and lumbar region where a mobile segment meets an immobile segment that is Sacrum and where the lumber lordosis merges into the Sacral Kyphosis spine makes it more susceptible to damage.

LBP is one of the most common musculo-skeletal problems encountered by Physiotherapist round the globe. Impairment of back and spine are the most common cause of limitation of physical activity.

Occurrence of LBP nationally and internationally varies from 50-84%.

The LBP can be classified into-

1. Acute LBP (less than 6 weeks).
2. Sub-acute LBP (6-12weeks).
3. Chronic LBP (more than 12weeks).

Low back pain (LBP) in adolescents is a relatively common complaint, many types of LBP has been described, but non-specific type of LBP is the most common type among adolescents.Various and different epidemiology studies shows a higher prevalence of LBP among adolescent. It has been increased in recent years.

Salminen found a correlation in between weakness of the abdominal muscle, tightness of the hamstrings muscle, and back pain in adolescent.

There is a high prevalence of low back pain in high school students and striking association with female sex, electronic devices, and mental health problems.

In terms of treatment patient with LBP undergo a variety of therapeutic interventions such as LLTT, TENS, NSAIDS, muscle strengthening exercise, muscle stretching exercise, manual therapy, interferential therapy, taping technique and, McKenzie exercise[28,29,30,31].

In adults the most effective interventions for reducing pain were Pilates, mind-body, and core-based exercises. The most effective interventions for reducing disability were Pilates, strength, and core-based exercises.

However, therapeutic treatments for LBP in children and adolescents are more recent, and the treatments applied consist of back education, exercise, manual therapy and therapeutic physical conditioning. These interventions are primarily aimed at reducing the prevalence and intensity of LBP and disability, although it is unknown which treatment is most effective in this population.

Pilates is another popular form of mind–body exercise where the focus is on controlled movement, posture, and breathing. Joseph H. Pilates developed the comprehensive program known as the Pilates method in the 1920's.

The Pilates method incorporates both physical and mental elements. The technique focuses in Pilates on the "power house" or what is known today as the core muscles, this includes the abdominal, gluteal, and Para-spinal muscles in particular.

Pilates is an exercise program as a core stability approach to augment the neuromuscular system to control and protect the core body or spine. This method is a comprehensive body-mind conditioning, which coordinates core stabilizing exercise with mind and breath control challenging by flowing movement of the whole body. Since a Pilates approach focuses on core body exercise and breathe control, it facilitates activation of transvers abdomens, diaphragm, multifidus and pelvic floor muscles.

In recent years, there have been a growing number of reports on the benefits of Pilates-based exercises for low back pain.

OBJECTIVES:

1. To find out the effects of Pilates on adolescent with LBP.
2. To find out the effects of Pilates on quality of life and disability in adolescent with LBP.
3. To find out the effects of Pilates on pain in adolescent with LBP.

HYPOTHESIS:

Whether the Pilates exercise will be effective in adolescent in LBP?

EXPERIMENTAL HYPOTHESIS:

There will be significant difference on quality of life and disability and reduction of pain in adolescent with LBP.

NULL HYPOTHESIS:

There will be no significant difference on quality of life and disability and reduction of pain in adolescent with LBP.

2. METHODOLOGY

STUDY DESIGN: Experimental study design. (Pre-test-Post-test)

SAMPLE DESIGN: Stratified random sampling.

SAMPLE SIZE: 30 subjects.

OUTCOME MEASURE:

- Pain: Visual analogue scale (VAS)
- Function and Disability: Modified Oswestry Low Back Pain Questionnaire (MOLBPDQ)

SOURCE OF DATA:

30 Symptomatic patient of both gender (male-15, female-15) fulfilling the inclusion criteria were recruited from Swasthya kalyan hospital.

DURATION OF STUDY:

Duration of the study 9-12 months.

INCLUSION CRITERIA:

- Informed consent.
- Age between 12-18yeras.
- Both genders.
- Suffering from back pain from last 2months.
- Back pain due to Hamstrings muscle tightness or abdominal muscle weakness.

EXCLUSION CRITERIA:

- Cardio-vascular conditions. Asthma.
- Recent fracture of spine or lower limb.
- PIVD.
- Any bone pathology e.g. Bone tumor.
- S.C.I.
- Radiculopathy.
- Hypermobile joints.
- Subjects having structural deformity.

3. RESULTS

TABLE 5.1 AGE WISE DISTRIBUTION OF SUBJECTS IN STUDY:

Age		Frequency	Per cent
	12 – 13	8	26.7
	14 – 15	12	40.0
	16 – 18	10	33.3
	Total	30	100.0

The above table describe the age wise distribution of subjects.

26.70% of the subjects were in the age group of 12-13 years with frequency of 8.

40% of the subjects were in the age group of 14-15 years with frequency of 12.

33.30% of the subjects were in the age group of 16-18 years with frequency of 10.

TABLE 5.2:

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	30	12	18	14.87	1.871

The minimum age was 12 and maximum was 18 years with mean of 14.87 and standard deviation of 1.871.

FIGURE 5.1 AGE WISE DISTRIBUTION OF SUBJECTS IN STUDY:

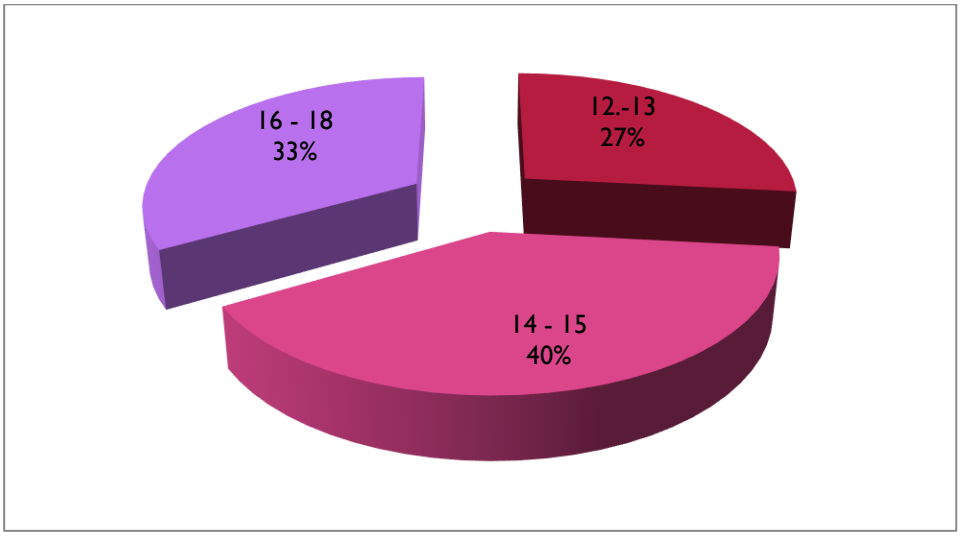
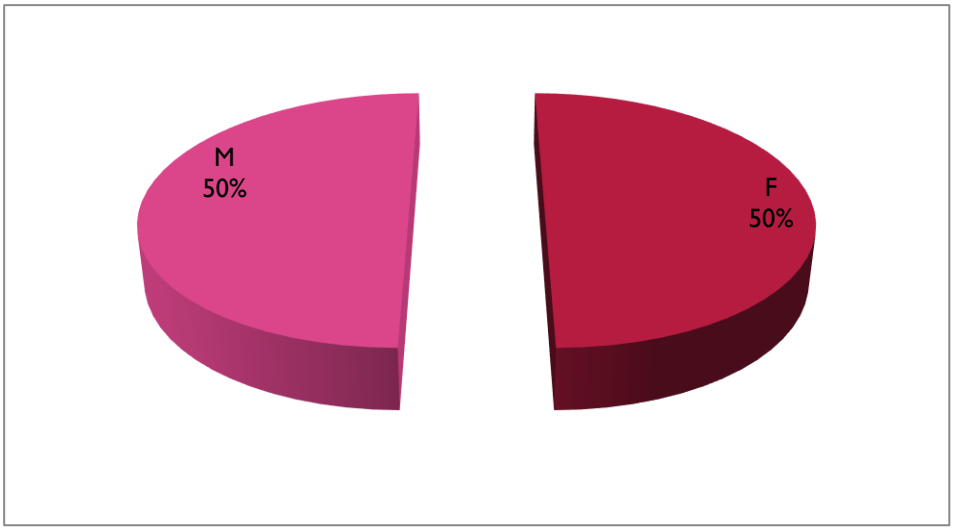


TABLE 5. 3 GENDER WISEDISTRIBUTION OF SUBJECTS IN STUDY:

F	15	50.0
M	15	50.0
Total	30	100.0

Above table shows the number of gender in study which is 15 for male and 15 for female.

FIGURE 5.2 GENDER WISEDISTRIBUTION OF SUBJECTS IN STUDY:



ANALYSIS OF TREATMENT PARAMETERS (OTCOME MEASURES)

TABLE 5.4 OF VAS:

:

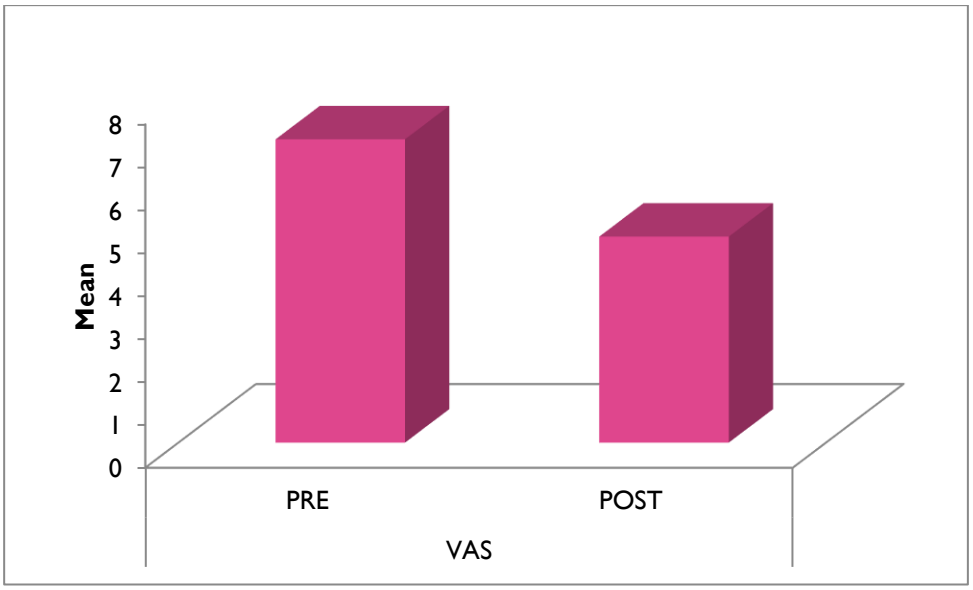
Parameter: VAS

	N	Minimum	Maximum	Mean	Std. Deviation	Median	Mean difference	S.D of difference	Change (%)	Wilcoxon signed rank test Z value	p
PRE	30	6	8	7.07	.868	7.00	2.267	.521	32.08	4.98	.000
POST	30	3	7	4.80	1.031	5.00					HS

The table describe the effect of interventions on pain with VAS. There is 32.08% decrease in pain score with mean of 2.267 and standard deviation difference of .521.

P value is .000 which is highly significant.

FIGURE 5.3 GRAPH FOR VAS SCALE:



The graph shows the mean difference of pre and post data which is 2.267.

TABLE 5.5 OF MODQ:

:

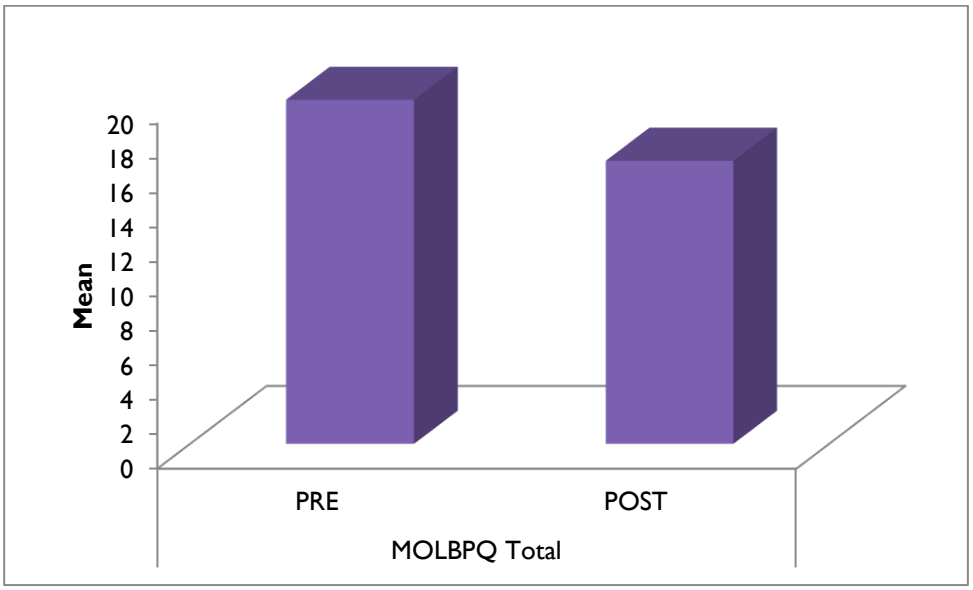
Parameter: MOLBPQ Total

	N	Minimum	Maximum	Mean	Std. Deviation	Median	Mean difference	S.D of difference	Change (%)	Wilcoxon signed rank test Z value	p
PRE	30	12	27	19.93	3.648	20.00	3.533	1.479	17.73	4.81	.000
POST	30	10	20	16.40	2.762	16.50					HS

The above table describe the effect of interventions on quality of life with MODQ. There is 17.73% decrease in disability score with mean of 3.533 and standard deviation difference of 1.479.

P value is .000 which is highly significant.

FIGURE 5.4 GRAPH FOR MODQ SCALE:



This graph shows the mean difference of pre and post data which is 3.533.

TABLE 5.6 COMPARISION OF PRE AND POST DATA FOR MODQ:

:

Parameter		N	Minimum	Maximum	Mean	Std. Deviation	Median	Mean difference	S.D of difference	Change (%)	Wilcoxon signed rank test Z value	p
EMP	PRE	30	1	4	2.03	.765	2.00	.400	.563	19.67	3.21	.001
	POST	30	1	3	1.63	.615	2.00					HS
LT	PRE	30	1	4	2.17	1.085	2.00	.233	.568	10.77	2.11	.035
	POST	30	1	4	1.93	.785	2.00					sig
PC	PRE	30	1	3	1.77	.679	2.00	.400	.563	22.64	3.21	.001
	POST	30	1	2	1.37	.490	1.00					HS
PN	PRE	30	1	4	2.23	.817	2.00	.633	.490	28.36	4.36	.000
	POST	30	1	3	1.60	.621	2.00					HS
SL	PRE	30	1	4	1.90	.803	2.00	.333	.479	17.54	3.16	.002
	POST	30	1	3	1.57	.626	1.50					HS
SLP	PRE	30	0	4	1.13	1.137	1.00	.267	.450	23.53	2.83	.005
	POST	30	0	3	.87	.819	1.00					HS
ST	PRE	30	0	3	1.60	.855	2.00	.400	.498	25.00	3.46	.001
	POST	30	0	2	1.20	.610	1.00					HS
STD	PRE	30	1	4	2.77	.898	3.00	.467	.571	16.87	3.50	.000
	POST	30	1	3	2.30	.651	2.00					HS
TVL	PRE	30	1	3	2.07	.583	2.00	.100	.305	4.84	1.73	.083
	POST	30	1	3	1.97	.490	2.00					NS
WK	PRE	30	0	4	2.27	.868	2.00	.300	.466	13.24	3.00	.003
	POST	30	0	4	1.97	.809	2.00					HS

FIGURE 5.5 GRAPH COMPARISION OF PRE AND POST DATA FOR MODQ:

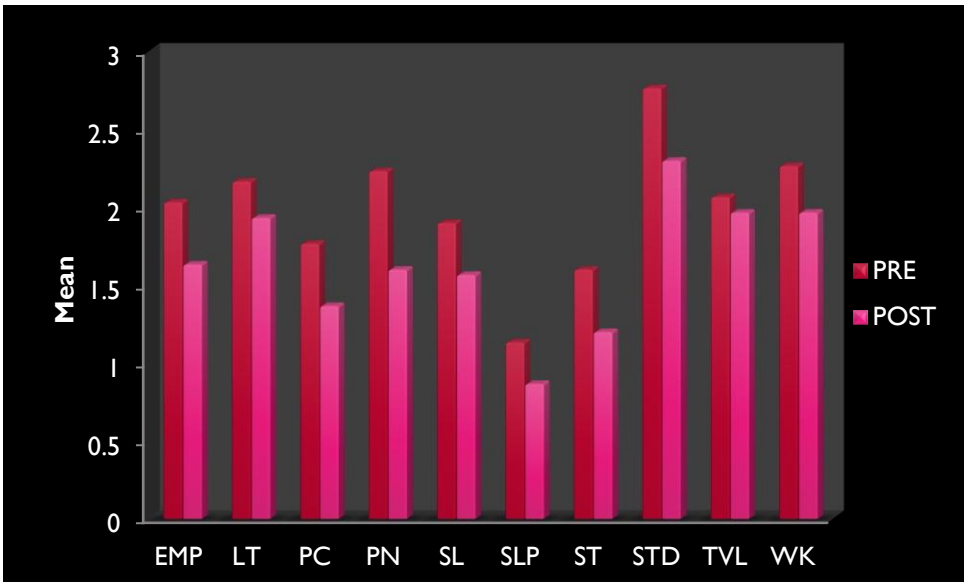


TABLE 5.7 COMPARISION OF EFFECT ON GENDER:

change

Parameter: MOLBPQ Total

GENDER	N	Mean	Std. Deviation	t value	p
F	15	3.33	1.18	.735	.469
M	15	3.73	1.75		NS
Total	30	3.53	1.48		

change

Parameter: VAS

GENDER	N	Mean	Std. Deviation	t value	p
F	15	2.33	.49	.695	.493
M	15	2.20	.56		NS
Total	30	2.27	.52		

These tables describe that Pilates is not significant to genders. It has same effects on males as well as females.

TABLE 5.8 COMPARISION OF EFFECT ON AGE:

Correlations

Parameter			Karl pearson correlation coefficient r value	p	
MOLBPQ Total	change	AGE	-.135	.476	NS
VAS	change	AGE	.427	.019	sig

The table described that Pilates is not significant to age when analyse at MODQ score but it is become significant to the VAS scale.

4. DISCUSSION

The finding of this suggest that Pilates exercise is very effective in reducing low back pain. It is also improving muscle endurance, posture, balance, stability, and facilitate breathing pattern.

The results of this study also showed highly significant values towards pain (VAS) and quality of life (MODQ).

It may also help in preventing and attenuating the injury and dysfunction of musculoskeletal system. Pilates is also effective to improve flexibility and stability of lower back.

5. CONCLUSION

The objective was to find out effectiveness of Pilates in adolescent with LBP. This study results showed that Pilates had significantly decreased pain and improved quality of life in adolescent.

Pilates produced highly significant improvement in reducing pain (VAS score) and improvement in function (MODQ score) at the 4th week when compared to baseline values in subject with non-specific type of LBP.

Based on the above discussion and conclusion, it has been proved that this study supports the alternate hypothesis.

Limitation of the study

- Study included only 30 subjects which is a small sample size. Larger study involving increased number of participants should be employed.

Duration of study was short (4 weeks). Hence long duration intervention is necessary for better outcome measures.

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