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Effect of aquatic therapy v/s relaxation therapy in chronic low back pain

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Abstract
Low back pain is a commonest condition in today's world. There are varieties of treatments used in management of low back pain. Among them, aquatic exercises are given because of unique properties of Water. By utilizing unique properties of water like buoyancy, resistance, flow and turbulence, exercise program is made. Buoyancy gives weightlessness which allows greater range of movement in the joint. Aquatic therapy decreases axial loading of the spine and buoyancy helps in the movement of the spine. Second is relaxation therapy. Relaxation reduces the pain and muscle tension. Relaxation reduces the blood pressure, cools down the body parts and helps the muscles to relax which improves quality of life. Progressive relaxation training has been widely used for chronic pain syndrome, with the rationale that learning to reduce the anxiety and muscle tension.

Keywords: Chronic low back pain, aquatic therapy, relaxation therapy, VAS, MODQ, lumbar ROM

Introduction
According to WHO, Low back pain is defined as muscle tension or stiffness localized below the costal margin and above the inferior gluteal folds, with or without radiating pain [7, 10]. It is leading cause of health problems in this modern era [2, 3, 4] Yearly prevalence of low back pain is 84% [7] whereas monthly prevalence is 35-37%. The prevalence of low back in the world is 62.6% in females and 58.6% in males [3]. In India the prevalence is 64%.
There are varieties of treatments used in management of low back pain [15]. Among them, aquatic exercises are given because of unique properties of water [16]. By utilizing unique properties of water like buoyancy, resistance, flow and turbulence, exercise program is made [7]. Buoyancy gives weightlessness which allows greater range of movement in the joint. It reduces stress on the joints, bones and muscles and decreases loading of the joint [16]. Aquatic therapy is defined as the specialized therapy program and exercise given in hydrotherapy pool, having a temperature of 33 degrees C-36 degrees C and under the guidance of physiotherapist [17]. Chartered society of physiotherapists defined aquatic exercises as a therapy program taking advantage of the properties of water, designed by a qualified physiotherapist, to improve function [18]. Aquatic Therapy reduces stress on the joints, bones and muscles and decreases loading of the joint. Aquatic therapy decreases axial loading of the spine and buoyancy helps in the movement of the spine [16]. It decrease compressive and shear stresses on the spine and facilitate the movement [17]. Continuous limb movements against the resistance of water increase the muscle strength [17].
Relaxation therapy is defined as an effective technique used to reduce tension and stress on the muscles and to divert the attention from the pain [31]. Relaxation reduces the pain and muscle tension. Relaxation reduces the blood pressure, cools down the body parts and helps the muscles to relax which improves quality of life [34]. Relaxation reduces the pain and muscle tension. Relaxation reduces the blood pressure, cools down the body parts and helps the muscles to relax which improves quality of life [34].

Objectives
To compare the effects of both the interventions i.e. Aquatic therapy and Relaxation therapy on chronic low back pain subjects and to know the better outcome of either of the interventions on non-specific, chronic low back pain.

Methods and Materials: 20 participants of age 20-50 years and with low back pain for 3-8 weeks were recruited in the study as per inclusion criteria. The outcome measures used for the study were Visual Analog Scale, Modified Oswestry Disability Questionnaire and Lumbar Range of Motion. The total sample was divided into two equal groups. Group A: Aquatic therapy, Group B: Relaxation therapy. Intervention was given for 8 sessions for two weeks. Intervention was given for both the groups for 8 sessions for two weeks.

Results: Paired t-test and SPSS was used for statistical analysis. Demographic data in relation to outcome measures was also analyzed. Pre and post analysis of both the outcome measures for both the groups showed statistical significance results. According to test of normality, p-value for pre and post intervention for Group A was 0.064 and 0.067 respectively. For Group B p-value for pre and post intervention was 0.091 and 0.110 respectively. Within and between group comparison for VAS scores in group A and B shows pre and post p-value of 0.199 and 0.001 respectively Within and between group comparison of pre and post intervention for Group A and B was done and the mean difference of VAS score was 3.50 for Group A and 1.5 for Group B.

According to test of normality, p-value for pre and post intervention for Group A was 0.055 and 0.180 respectively. For Group B p-value for pre and post intervention was 0.200 and 0.200 respectively. Within and between group comparison for MODQ scores in Group A and B shows pre and post p-value of 0.300 and 0.001 respectively. Within and between groups comparison of pre and post intervention for Group A and B was done and the mean difference of MODQ score was 19.00 for Group A and 9.60 for Group B.

According to test of normality, p-value for pre and post intervention for Group A for flexion was 0.200 and 0.110, for extension was 0.200 and 0.200, for left side flexion was 0.053 and 0.200, for right side flexion was 0.065 and 0.200 respectively. For Group B p-value for pre and post intervention for flexion was 0.200 and 0.200, for extension was 0.200 and 0.200, for left side flexion was 0.168 and 0.200, for right side flexion was 0.150 and 0.200 respectively.

However, on comparison of mean differences of both the groups, group an i.e. Aquatic Therapy showed more significant improvement compared to group B Relaxation therapy.

Discussion

20 subjects were included in the study whose Visual Analog Scale (VAS) score ranged between 3-7 and Modified Oswestry Disability Questionnaire (MODQ) score ranged from 26-80. Aquatic therapy and Relaxation therapy was given for eight sessions over a period of two weeks.

At the end of one month, both the groups were assessed on the basis of VAS, MODQ and Lumbar range of motion.

Total sample size consist of 20 subjects and they were divided into two groups as follows: Group A 10 subjects and Group B 10 subjects. Group A consist of one male and nine females and Group B consist of two males and eight females. This study includes 15% of males and 85% of females.

Age of the participant varied from 20-45 years. Mean age in Group A was 23.60 and in Group B was 24.80. Overall mean age of the participants were 24.20. Participants with MODQ score more than 10% point was included in the study, as less than this amount is attributed to error measurement.

Participants with the history of 3-8 weeks of low back pain duration were included in the study. In Group A, two participants with 3-4 weeks, three participants with duration of 5-6 weeks and five participants with duration of 7-8 months were included. Group B consist of three participants with duration with 3-4 weeks, five participants with duration of 5-6weeks and two participants with duration of 7-8 weeks. According to this study improvement was seen among all the participants after two weeks of intervention.

In this study the level of educational qualification varied from undergraduate students to post graduates. In Group A, 40% were undergraduate students, 40% were undergraduates and 20% were post graduates. In Group B, 70% of undergraduate students, 30% of undergraduates and 0% of post graduates were included.

Participants having chronic and non-specific low back pain were included and assessed using three outcome measures i. e. visual Analog Scale (VAS), Modified Oswestry Disability Questionnaire (MODQ) and Lumbar ROM using Goniometry.

Aquatic therapy is specialised therapy program given in hydrotherapy pool using the unique properties of water. Aquatic therapy was given for 8 sessions over a period of two weeks. Each session lasts for one hour. Assessment of participants were done on the first and the last day using VAS, MODQ and Lumbar ROM. Aquatic therapy (Group A) showed better results post intervention.

Intervention for Relaxation therapy was given for 8 sessions over a period of 2 weeks, each session for 1 hour. Subjects were assessed before and after the intervention using VAS, MODQ and Lumbar ROM.

Within and between group comparison for VAS scores in group A and B shows pre and post p-value of 0.199 and 0.001 respectively. Within and between group comparison for MODQ scores in Group A and B shows pre and post p-value of 0.300 and 0.001 respectively. Within and between group comparison for Lumbar Flexion in Group A and B shows pre and post p-value of 0.962 and 0.020 respectively. Within and between group comparison for Lumbar Extension in Group A and B shows pre and post p-value of 0.036 and 0.375 respectively. Within and between group comparison for Lumbar Left Side Flexion in Group A and B shows pre and post p-value of 0.281 and 0.492 respectively. Within and between group comparison for Lumbar Right Side Flexion in Group A and B shows pre and post p-value of 0.129 and 0.600 respectively.

Within and between group comparison of pre and post intervention for Group A and B was done and the mean difference of VAS score was 3.50 for Group A and 1.5 for Group B. Within and between group comparison of pre and post intervention for Group A and B was done and the mean difference of MODQ score was 19.00 for Group A and 9.60 for Group B. Within and between group comparison of pre and post intervention for Group A and B was done and the mean difference of Lumbar Flexion was 13.20 for Group A and 3.80 for Group B. For Lumber Extension it was 7.00 for Group A and 2.60 for Group B. For Lumber left side Flexion was 4.60 for Group A and 3.20for Group B and for Lumber right side Flexion was 5.30 for Group A and 2.80 for Group B. This shows Group A showed significant improvement than Group B.

Aquatic therapy exercises reduce the low back pain and improve the lumbar ROM of the participants in this study. In this study the participants exhibited chronic low back pain and affected ROM of Lumbar region.

There were many studies carried out studying an individual effect of Aquatic therapy and Relaxation therapy on chronic

low back pain. However there has been no study conducted for comparing an effect of these two. Therefore, this study was taken up to compare the effect of Aquatic therapy and Relaxation Therapy for chronic and non-specific low back pain.

Table 1: Test of Normality for group A

Variables	Time	Statistic	p-value
Vas	Pretest	0.257	0.064
	Posttest	0.254	0.067
Modq	Pretest	0.268	0.055
	Posttest	0.221	0.180
Flexion	Pretest	0.152	0.200
	Posttest	0.239	0.110
Extension	Pretest	0.165	0.200
	Posttest	0.199	0.200
Flexion Left Side	Pretest	0.260	0.053
	Posttest	0.191	0.200
Flexion Right Side	Pretest	0.255	0.065
	Posttest	0.171	0.200

Table 2: Test of Normality for group B

Variables	Time	Statistic	p-value
Vas	Pretest	0.245	0.091
	Posttest	0.239	0.110
Modq	Pretest	0.122	0.200
	Posttest	0.190	0.200
Flexion	Pretest	0.159	0.200
	Posttest	0.111	0.200
Extension	Pretest	0.208	0.200
	Posttest	0.179	0.200
Flexion Left Side	Pretest	0.224	0.168
	Posttest	0.167	0.200
Flexion Right Side	Pretest	0.228	0.150
	Posttest	0.180	0.200

Table 3: Within and Between Group comparisons for both the groups with respect to VAS

Groups	Pretest		Posttest		Difference	
	Mean	SD	Mean	SD	Mean	SD
Group A	5.40	1.17	1.90	0.73	3.50	0.84
Group B	4.80	0.78	3.30	0.48	1.5	0.52
% of changes in Group A					13.024#	p-value = 0.001*
% of changes in Group B					9.001#	p-value = 0.001*
t-value	1.342		5.020		6.325	
p-value	0.199		0.001*		0.001*	

*Significant at 5% level
applied paired sample t test
All values in absolute form [ignored negative sign for statistical convenience]

Table 4: Within and between group comparisons for both the groups with respect to MODQ

Groups	Pretest		Posttest		Difference	
	Mean	SD	Mean	SD	Mean	SD
Group A	43.60	14.41	24.60	7.05	19.00	8.23
Group B	49.00	6.48	39.40	6.86	9.60	3.23
% of changes in Group A					7.298#	p-value = 0.001*
% of changes in Group B					9.374#	p-value = 0.001*
t-value	1.080		4.735		3.360	
p-value	0.300		0.001*		0.006*	

*Significant at 5% level
applied paired sample t test
All values in absolute form [ignored negative sign for statistical convenience]

Table 5: Within and Between Group comparisons for both the groups with respect to FLEXION

Groups	Pretest		Posttest		Difference	
	Mean	SD	Mean	SD	Mean	SD
Group A	54.20	8.67	67.40	6.27	13.20	3.85
Group B	54.00	9.66	57.80	9.82	3.80	3.04
% of changes in Group A					10.834#	p-value = 0.001*

% of changes in Group B			3.943#	p-value = 0.003*
t-value	0.049	2.603	6.051	
p-value	0.962	0.020*	0.001*	

*Significant at 5% level
applied paired sample t test
All values in absolute form [ignored negative sign for statistical convenience]

Table 6: Within and Between Group comparisons for both the groups with respect to extension

Groups	Pretest		posttest		Difference	
	Mean	SD	Mean	SD	Mean	SD
Group A	19.90	5.66	26.90	4.65	7.00	2.58
Group B	26.80	7.72	29.40	7.29	2.60	2.31
% of changes in Group A					8.573#	p-value = 0.001*
% of changes in Group B					3.545#	p-value = 0.006*
t-value	2.277		0.914		4.009	
p-value	0.036*		0.375		0.001*	

*Significant at 5% level
applied paired sample t test
All values in absolute form [ignored negative sign for statistical convenience]

Table 7: Within and Between Group comparisons for both the groups with respect to Flexion L_ Side

Groups	Pretest		Posttest		Difference	
	Mean	SD	Mean	SD	Mean	SD
Group A	26.50	3.62	31.10	3.44	4.60	2.71
Group B	29.40	7.30	32.60	5.77	3.20	2.69
% of changes in Group A					5.355#	p-value = 0.001*
% of changes in Group B					3.748#	p-value = 0.005*
t-value	1.124		0.705		1.156	
p-value	0.281		0.492		0.263	

*Significant at 5% level
applied paired sample t test
All values in absolute form [ignored negative sign for statistical convenience]

Table 8: Within and Between Group comparisons for both the groups with respect to Flexion R_ Side

Groups	Pretest		Posttest		Difference	
	Mean	SD	Mean	SD	Mean	SD
Group A	27.40	6.02	32.70	6.09	5.30	1.76
Group B	31.10	4.12	33.90	3.60	2.80	2.78
% of changes in Group A					9.485#	p-value = 0.001*
% of changes in Group B					3.184#	p-value = 0.011*
t-value	1.603		0.536		2.399	
p-value	0.129		0.600		0.030*	

*Significant at 5% level
applied paired sample t test
All values in absolute form [ignored negative sign for statistical convenience]

Conclusions

The present study concluded that Aquatic therapy and Relaxation therapy both effective for chronic low back pain by using VAS, MODQ and Lumbar ROM. It is proved that Aquatic Therapy is more effective compared to Relaxation Therapy on Chronic Low Back Pain.

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