



## Physiotherapy

## EFFECTIVENESS OF BACK SCHOOL PROGRAMME VERSUS STRENGTHENING EXERCISES ON PAIN, MUSCLE STRENGTH & FUNCTIONAL DISABILITY IN INDUSTRIAL WORKERS WITH NON SPECIFIC LOW BACK PAIN – INTERVENTIONAL COMPARATIVE STUDY

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\*Corresponding Author**ABSTRACT**

Approximately 90% of the workers had suffered various degrees of low back pain in industries. NSLBP increases disability rate, and reduces individual's quality of lives which further limiting the activities of their everyday lives. One of the aims of treatment is to reduce disability and increase their quality of lives by reducing their pain, improving muscle strength and thus increasing their activities. 60 patients were taken who randomly divided 1:1 in group –A & Group-B. In Group-A patients were given Back School Intervention while in Group-B patients were given strengthening exercises with Thera bands having different grades of resistance. Total intervention duration for both the groups was 4 weeks. Findings of this study reflects importance of using Back intervention programme is far better than using strengthening exercises only for reduction of Pain, improvement in Muscle strength & reduction in functional Disability in Industrial Workers.

**KEYWORDS :** Non Specific Low Back Pain, Back school programme, Theraband, Ergonomics, Functional Disability

**INTRODUCTION**

Low back pain (LBP) is a major problem Worldwide, 65–80% of the population experience low back pain at some stage of their lives. Approximately 90% of the workers had suffered various degrees of low back pain in industries.<sup>[1]</sup> Risk factors for the development of low back pain include heavy lifting, twisting & bodily vibration. Low back pain is caused by placing abnormal stress and strain on muscles of the vertebral column, typically associated with pain, soreness and/or stiffness in the lower back region.<sup>[1]</sup>

In spite of automation in industrial settings, manual material handling (MMH) still exists in many kinds of work systems in Indian industrial estate. According to the European 90/269/CEE guideline, MMH has been defined as any transporting or supporting of a load, by one or more worker, including lifting, lowering, pulling, pushing, carrying, or moving of a load, which by reasons of its characteristics or of unfavorable ergonomic conditions, involves a risk, particularly of back injury to workers.<sup>[1]</sup>

The Indian working population survives in a sea of bad ergonomic design. Industrialization in India is mostly focused on production and profit, whereas health and safety have a very low priority. Except a few major, reputed, public and private industries, other industrialists are insensitive towards the importance of occupational health and safety. The employers of small scale units are totally lagging behind in providing occupational health and safety to the workers, therefore the manpower employed in small scale casting units are exposed more to the risk of musculoskeletal disorders.<sup>[1]</sup>

Core muscles are referred as spinal stabilizers. The normal function of the stabilizing system is to provide sufficient stability to the spine to match the instantaneously varying stability demands due to changes in spinal posture, static and dynamic loads. Weak core muscles result in loss of the appropriate lumbar curve and poor posture. Multifidi have been found to atrophy in people with chronic low back pain. Hence, weakness of core muscles leads to decrease in overall functional strength and spinal instability.<sup>[1]</sup>

A number of treatment options exist from pharmacotherapy to various forms physical therapy for LBP. Back schools are educational and training programs with lessons given to patients or workers by a therapist with the aim of treating or preventing low back pain. There are various literature shows Back school intervention & core muscle strengthening are effective in the treatment for LBP. Hence need of the study is to evaluate importance of education, ergonomics & work modification plus exercise over only strengthening exercise with Thera band on pain, muscle strength & functional disability in industrial worker with LBP.

**MATERIALS AND METHODS**

Intervention was conducted at GIDC estate of Vadodara. Each subject was treated for a four weeks, 5 days in a week, once a day. Subjects

aged 25-40 years, males working in that industry since one year & having LBP more than 3 months were included while any Spine fracture, Prolapsed disk, LBP with radiculopathy, history of recent abdominal or back surgeries were excluded. After screening, 60 patients were taken & randomly 1:1 divided in two groups. Prior to participation patients were oriented to the study and informed written consent were taken. Outcome measure for pain VAS & Muscle Strength (Sphygmomanometer) & Oswesrty back Disability index scale were measured on 1st Day before giving intervention & after 4 weeks of intervention.

**Group A:** Back school (4 weeks) program was based on theoretical and practical information. The participants allocated to the Back School group received four treatment sessions, once a week. Patients were taught diaphragmatic breathing, stretching of Thoracolumbar fascia, Hamstrings, Iliopsoas & Rectus femoris along with abdominal & strengthening exercises-(kinesthetic training -pelvic tilting exercises, crunches, cycling in supine) & participants were advised to perform exercise at their home for rest of five days. All workers who were taken part in study were informed to make one diary for keeping the records of exercises.<sup>[6]</sup>

	<b>Back School Method.<sup>[6]</sup></b>
1st week	Presentation of the proposed methods, General information about the course, Anatomy and biomechanical notions of the back, Epidemiology, Muscle function and its influence on the back, Physiopathology of the principal disorders that negatively affect the back, Explanation given regarding diary for keeping record of exercise, All exercise should be shown by therapist whom is to be performed by workers, Guidance on how to perform the exercises at home once a day
2 <sup>nd</sup> week	Variation of the mechanical force in diverse movements of the back, Relaxation posture, Guidance on positions when seated or standing
3 <sup>rd</sup> week	Observation of the exercises completed at home, Introduction on lifting and handling the objects, Practical application of techniques for articular protection
4th week	Practical applications of all the above advice given and learned techniques.

**Group B:** Participants were received sets of Elastic resistance band (ERB) exercises in which 1) Thera band abdominal crunch in supine 2) Thera band abdominal oblique crunch in supine 3) Thera band abdominal crunch (lower abs) 4) Thera band trunk "Chop" 5) Thera band trunk "Lift" 6) Thera band trunk extension (in long sitting) 7) Thera band trunk Sidebend-Overhead (in standing) 8) Thera band trunk rotation (in sitting) . Each exercise was repeated for 10 times. 30sec of break were given after 10RM. Every week level of resistance was added like started with yellow then progress with Red, Green & ended with blue colored.<sup>[7]</sup>

**RESULTS**

Descriptive statistical analysis has been carried out in the present study. Out Come measurements are measured using VAS and core muscle strength (mm/hg) & Oswestry Back Disability Index in industrial workers. and presented as mean SD. Significance was assessed at 5% level of significance  $p < 0.005$  ( 2-tailed hypothesis test considered).

- As the study includes human subject ethical clearance was obtained from ethical committee of institution and institution where the subject belongs. Also a written consent were taken from each subject who had participated in the study
- The Statistical software namely IBM SPSS Statistics version 20. Were used for the analysis of the data and Microsoft word and Excel have been used to generate tables etc.
- Paired t test, Unpaired t test, wilcoxon test and mann-whitney test were used to find the significance of parameters pre to post test.

**TABLE-1: Baseline Characteristics Data**

Groups	NO	Mean age (years)	SD
Group-A	30	32.4	3.5
Group-B	30	31.3	2.9

**TABLE 2-Mean difference in Visual Analog Scale score within & between Group-A & Group-B**

Groups	Pre		Post		Z-value	P value
	Mean	SD	Mean	SD		
Group A	6.40	0.6	3.15	0.8	4.7	0.001
Group B	6.62	0.8	4.26	0.8	4.7	0.001
Between Group A & B	3.2	0.8	2.3	.7	3.4	0.001

**TABLE 3-Mean difference in Muscle strength difference in (mm/hg) within & between Group-A & Group-B**

Groups	Pre		Post		t-value	P value
	Mean	SD	Mean	SD		
Group A	6.40	0.6	3.15	0.8	4.7	0.001
Group B	6.62	0.8	4.26	0.8	4.7	0.001
Between Group A & B	3.2	0.8	2.3	.7	3.4	0.001

**TABLE 4-Mean difference in OSWESTRY Back Disability Index score within & between Group-A & Group-B**

Groups	Pre		Post		Z-value	P value
	Mean	SD	Mean	SD		
Group A	43.2	3.8	65.5	4.4	24.1	0.001
Group B	44.6	2.6	58.5	4.4	16.6	0.001
Between Group A & B	22.3	5.1	13.9	4.6	6.8	0.001

**DISCUSSION**

CLBP increases disability rate, and reduces individuals' quality of lives which further limiting the activities of their everyday lives. One of the aims of treatment is to reduce disability and increase their quality of lives by reducing their pain, improving muscle strength and thus increasing their activities. The principal finding of the present study was both groups showed improvement post intervention. But back School intervention program showed significant improvement in Pain & functional disability while strengthening exercises with thraband showed significant improvement in muscle strength.

Back school programmes educate patients about the anatomy of the spine and low back pain, correct ergonomics in day to day life and at work place even educate about how to cope with low back problems. Results of this study supported by Heymans et al. <sup>181</sup> The intervention which was given in group-A leads to the behavioral changes obtained by the use of techniques for protection of the spine and education enable patients to gain knowledge of health behavior that influence learning and how to deal with low back pain is the major aspect to avoid undue stress & strain over spine & surroundings musculature. Adaptation in new ergonomic environment enhances occupational health & reduces potential risk for developing reoccurrence of LBP Hence, significantly improves QOL. <sup>191</sup>

According to Ylinen & Ruuska et al suggested positive relationship between strength training & reduction in musculoskeletal pain. Resisted exercises increases muscle strength by increasing the cross sectional diameter of muscle by (hypertrophy & hyperplasia).It also increases ability of a muscle to generate better force after resistance training through increasing recruitment of motor unit'. <sup>(47)</sup>While Andersen LL; et al had shown that Strength training program improves

muscle endurance, elevates the fatigue threshold of the muscles and increases durability of the muscles responding to loading. The reason for getting difference in disability is thought to be because of the endurance levels. The endurance levels increase with exercise and this leads to an increase the durability of muscles against loading might be the reasons for the getting improvement. <sup>[34,48]</sup>

Nilay Sahin,et al, who suggested that The addition of back school was more effective than exercise and physical treatment modalities alone in the treatment of patients with low back pain<sup>91</sup>. As Back school programmes deal with patient's psychology through education regarding normal structure, its function, pathophysiology of LBP & correct ergonomics in daily life and work, how to cope with low back problems along with the physical exercises increasing their self-esteem might be the reason for getting better improvement compared to strengthening group. Limitation of this study was not able to take any follow up later on 8<sup>th</sup> or 12<sup>th</sup> week to see sustained effects of both the intervention in industrial workers.

**CONCLUSION**

Clinically Back School intervention programme is better recommended than only strengthening exercises for reduction of Pain, improvement in muscle strength & reduction in functional Disability in industrial workers.

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