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CLINICAL OUTCOMES OF ENDURANCE EXERCISE OF BACK EXTENSOR MUSCLES IN PATIENTS WITH LOW BACK PAIN

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ABSTRACT

Objective: In this study our main goal is to evaluate the clinical outcomes of endurance exercise of back extensor muscles in patients with low back pain. **Method:** This clinical trial study was done at Department of Physical Medicine& Rehabilitation, Chattogram Medical College Hospital (CMCH), Chattogram for 6 (Six) months. A total of 92 patients with LBP who fulfill the selection criteria will be taken as sample. They will be divided into two groups (Group-A and Group-B). Each group will consist of 46 patients. **Results:** During the study, Diabetes Mellitus was observed in 7(15.2%) cases in Group A and 5(10.9%) in Group B. Hypertension was found 4(8.7%) in Group A and 13(28.3%) in Group B. Obesity were observed 7(15.2%) cases in Group B and none in Group A. Ischemic heart disease 6(13.0%) in Group and 3(6.5%) in Group B. Prolonged working (21.7%), leaning forward (34.8%), coughing (15.2%), sneezing (10.9%) were the aggravating factors in group A where leaning forward (32.6%), prolong working (32.6%), coughing (6.5%), sneezing (15.2%) and prolonged standing (2.2%) were the main aggravating factors in group B. **Conclusion:** From our result we can conclude that, we can advise back extensor muscles endurance exercises for the management of chronic low back pain, as it increases endurance of back & decreases pain.

KEYWORDS: Back endurance exercise, back extensors, lower back pain (LBP).

INTRODUCTION

Low back pain(LBP) refers pain, muscle tension or stiffness located below the costal margin and above the inferior Glutei fold & defined as chronic when it persists for 12 weeks or more.[5] Most episodes of back pain and associated symptoms resolve within several weeks.[1-2] However, LBP is a recurrent and chronic phenomenon, mostly associated with long-term disability and consequently is a significant socioeconomic burden.

Many risk factors are responsible for generation of low back pain (LBP) & back extensor muscles weakness is important one. Poor endurance of the back muscles may induce strain on the passive structures of the lumbar spine, leading eventually to low back pain. Evidence suggests that muscle endurance is lower in people with low back pain than those without low back pain.[3-4] The first test for evaluating the isometric endurance of trunk extensor muscles was described by Hansen in 1964. In 1984, following a study by Biering-Sorensen, this test became known as the "Sorensen test" and gained considerable popularity as a tool reported to predict low back pain within the next year in males. Using the Sorensen Test as a measure of spinal extensors endurance, some researchers have found a difference in holding time between subjects with chronic low back pain (CLBP) and individuals without low back pain.[5-6] These findings seem to suggest that poor endurance of back extensor muscles is associated with prolonged or recurrent low back pain.

In this study our main goal is to evaluate the clinical outcomes of endurance exercise of back extensors muscles in low back pain.

Objective

General objective

- To evaluate the clinical outcomes of endurance exercise of back extensor muscles in low back pain.

Specific objective

- To identify comorbid diseases of the study populations.
- To detect laboratory investigations findings of the study patients.

METHODOLOGY

Study Type: This was a clinical trial study.

Study place and period: This study was done at Department of Physical Medicine& Rehabilitation, Chittagong Medical College Hospital (CMCH), Chittagong from 6 (Six) months.

Study populations: 92 patients with LBP who fulfill the selection criteria will be taken as sample. They will be divided into two groups (Group-A and Group-B). Each group will consist of 46 patients**.**

Sampling technique: Consecutive sampling

Inclusion criteria

- Males of 18- 45 years
- Patients with chronic LBP
- Patients are agreed to the assigned study program.

Exclusion criteria

- Patient with red flag signs of low back pain
- Inflammatory back pain
- Patients with uncontrolled medical conditions (eg. Diabetes mellitus, Hypertension, Asthma, Heart diseases etc)
- Structural spinal defects (eg. Spondylolisthesis, Spondylolysis etc)

- Has signs of nerve root compromise (eg: decreased tendon reflexes, sensory loss, motor deficits)

Procedure of data collection: After taking details history & proper investigations desire size of sample selected by inclusion & exclusion criteria. Then informed consent from the patient was taken & proper counseling was done and a preset data form filled up for every patient. Data collected from all patients eligible for sampling. After the treatment of the patients as per schedule, the patients were followed up at 3rd, 6th week and the outcomes were recorded in the assessment data sheet from the first visit. Further data collected from each patient in every visit.

Methods of intervention/measurement/estimation

-Sorensen test

 -Visual Analogue Scale. (Annex-D)

Data analysis: After collection of information, these data checked, verified for consistency and edited for finalized result. After editing and coding, the coded data directly entered into the computer by using SPSS/PC software. Data cleaning validation and analysis performed using the SPSS (Statistical package for social sciences) -package program (version-20.0) for Windows. The result presented in tables in mean, standard deviation (SD) and percentages. Student's 't' tests, Chi-square test were done as required to see the level of significance. "P" value <0.05 considered as significant. Pearson's co efficient test was done to correlate between variables.

RESULTS

Table-1 shows distribution of patients according to age. In group A, majority of the patients 14(30.4%) were in the age group of 36 - 40 years and 14(30.4%) patients in Group B. The mean±SD age of the patients was 33.28±7.23 and 30.09±7.64 years in group A and group B respectively. The difference of age between these two groups was not statistically significant (p>0.05). The following table is given below in detail:

Table-1: Age distribution of the study subjects (n=92).

Age group (in years)	Group A (n=46)		Group B (n=46)		Total (n=92)		P value
	n	%	n	%	n	%	
< 25	9	19.6	14	30.4	23	25.0	
26-30	9	19.6	10	21.7	19	20.7	
31-35	9	19.6	10	21.7	19	20.7	
36-40	14	30.4	4	8.7	18	19.6	
41-45	5	10.9	8	17.4	13	14.1	
Total	46	100.0	46	100.0	92	100	
Mean±SD Range	32.28±7.23 (22 – 44)		30.09±7.64 (19 – 43)		31.2±7.4 (19-44)		0.160^{ns}

Unpaired student t-test was done to measure the level of significance

(ns = not significant)

Group A (Conservative treatment + supervised)

Group B (Conservative treatment + non-supervised)

Table-2 shows distribution of patients by BMI. Most of the patients had normal weight in both groups which were 34(73.9%) cases and 26(56.52%) cases in group A and group B respectively; this was followed by overweight which were 8(17.4%) cases and 15(32.61%) cases in group A and Group B respectively. 4(8.7%) and 5(10.87%) patients had obese in group A and group B respectively. The difference of BMI between these two groups were not statistically significant (p> 0.05). The following table is given below in detail:

Table-2: Distribution of the study subjects according to BMI (n=92).

BMI	Group A (n=46)		Group B (n=46)		Total (n=92)		P value
	n	%	n	%	n	%	
Normal weight (18.5-24.9 kg/m^2)	34	73.9	26	56.52	60	65.2	
Over weight (25.0-29.9 kg/m^2)	8	17.4	15	32.61	23	25.0	0.191
Obese (30.0-34.9 kg/m^2)	4	8.7	5	10.87	9	9.8	
Total	46	100.0	46	100.00	92	100.0	

Chi-square test was done to measure the level of significance
ns = not significant

Figure-1 shows distribution of patients according to co-morbid disease. Diabetes mellitus was observed in 7(15.2%) cases in Group A and 5(10.9%) in Group B. HTN was found 4(8.7%) in Group A and 13(28.3%) in Group B. Obesity were observed 7(15.2%) cases in Group B and none in Group A. Ischemic heart disease 6(13.0%) in Group and 3(6.5%) in Group B. No co-morbid disease was observed 29(63.0%) cases in Group A and 18(39.1%) in Group B. The difference of co-morbid disease between two group were not statistically significant (p>0.05). the following figure is given below in detail:
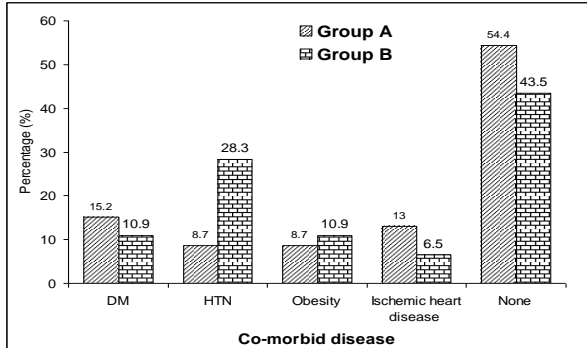

Fig.-1: The comorbid disease of the study patients.

In figure-2 shows pain intensity of the patients where maximum patients had mild intensity (58.7%) and (50.0%) of pain in Group A and Group B respectively. The following figure is given below in detail:
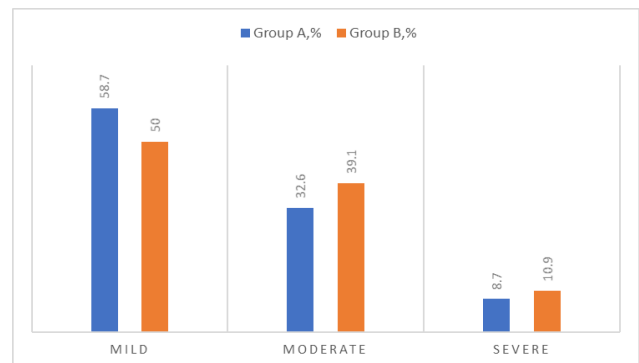

Figure-2: Pain intensity of the patients.

Table-3 shows the aggravating factor of the patients. Prolonged working (21.7%), leaning forward (34.8%), coughing (15.2%), sneezing (10.9%) were the aggravating factors in group A whereas leaning forward (32.6%), prolong working (32.6%), coughing (6.5%), sneezing (15.2%) and prolonged standing (2.2%) were the main aggravating factors in group B. The following table is given below in detail:

Table-3: Distribution of the study patients according to aggravating factors (n=92).

Parameters	Group A (n=46)		Group B (n=46)		Total (n=92)		P value
	n	%	n	%	n	%	
Aggravating factors							
Prolonged working	10	21.7	9	19.6	19	20.7	
Leaning forward	16	34.8	15	32.6	31	33.7	
Coughing	5	10.9	3	6.5	8	8.7	0.625
Sneezing	5	10.9	7	15.2	12	13.0	
Prolonged sitting	2	4.3	1	2.2	3	3.3	
None	8	17.4	11	23.9	19	20.7	

Chi-square test was done to measure the level of significance
ns = not significant
Group A (Conservative treatment + supervised)
Group B (Conservative treatment + non-supervised)

Fig. 3 shows laboratory investigation of the patients. The mean ESR (mm in 1st hr) was 14.13±5.22 and 12.80±1.44 in group A and group B respectively (p=0.101). The HB (gm/dl) was 13.09 ± 2.02 and 13.41±1.26 in group A and group B respectively (p=0.369). The RBS (mmol) was 6.63 ± 0.65 and 7.05 ±0.71 in group A and group B respectively (p=0.004). the following figure is given below in detail:
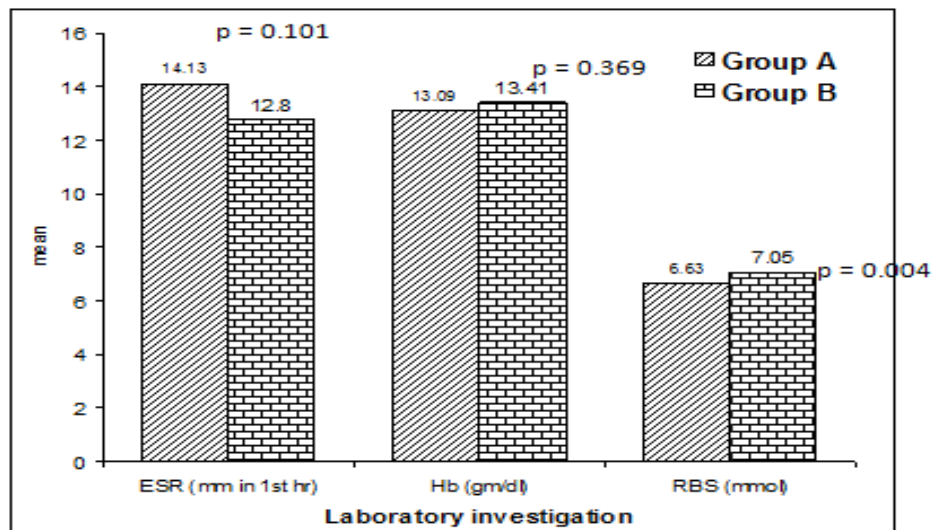

Fig.3: Laboratory investigations.

Unpaired student t-test was done to measure the level of significance
ns = not significant
Group A (Conservative treatment + supervised)
Group B (Conservative treatment + non-supervised)

DISCUSSION
The demographic characteristic of study people found Mean±SD age among the patients was 31.2±7.4. Most of the patients 25% belong to <25 (18-25) years age group. Rest 19% and 2% were belong to 26-30- and 31-35-years age group respectively. In group A, majority of the patients 14(30.4%) were in the age group of 36 - 40 years and 14(30.4%) patients in Group B were in the age group of <25 years. The mean±SD age of the patients was 33.28±7.23 and 30.09±7.64 years in group A and group B respectively. The difference of age between these two groups was not statistically significant (p>0.05).One study was found the mean age was 27.1 (±9.2) years among 38 patients age ranged from18 years to 40 years.[6]

Age composition of their study population showed that 30% of patients were more than 25 years and 65% of patients were in the age-group of 30-40 years.

BMI of the patients had normal weight which were 34(73.9%) cases and 26(56.52%) cases in group A and group B respectively; this was followed by overweight which were 8(17.4%) cases and 15(32.61%) cases in group A and Group B respectively. 4(8.7%) and 5(10.87%) patients had obese in group A and group B respectively.

Distribution of patients according to co-morbid disease shows DM was observed in 7(15.2%) cases in Group A and 5(10.9%) in Group B. HTN was found 4(8.7%) in Group A and 13(28.3%) in Group B. Obesity were observed 5(10.9%) cases in Group B and 4 (8.7%) in Group A. IHD 6(13.0%) in Group A and 3(6.5%) in Group B. No co-morbid disease was observed 29(63.0%) cases in Group A and 18(39.1%) in Group B. The difference of co-morbid disease between two group were not statistically significant (p>0.05).

The aggravating factor of the patients is recorded. Leaning forward (23.7%) & prolonged standing (23.7%) were the main aggravating factors in both groups, but in group A leaning forward (34.8%) & in group B prolonged standing (32.6%) was the main factor. Other factors include coughing (8.7%), sneezing (13.0%), prolong sitting (3.3). There are several aggravating factors of PLID of which prolong working is the most common to all. Similar to the present study, one study has reported that non-occupational lifting of objects or children weighing 25 or more pounds with knees straight and back bent are associated with increased risk of herniated lumbar disc.[7]Another studyhas reported that different activities are directly related with LPB.[8]

Laboratory investigation of the patients in this study the mean ESR (mm in 1st hour) was 14.13±5.22 and 12.80±1.44 in group A and group B respectively (p=0.101). The HB (gm/dl) was 13.09 ± 2.02 and 13.41±1.26 in group A and group B respectively (p=0.369). The RBS (mmol) was 6.63 ± 0.65 and 7.05 ±0.71 in group A and group B respectively (p=0.004).

CONCLUSION
From our study we can say that, HTN & DM are common co morbidities in LBP patients; also for the management of chronic low back pain back muscles endurance exercise is effective as it not only increase back endurance but also decrease pain.

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