Volume : 2 | Issue : 1 | Jan 2013 • ISSN No 2277 - 8160

Research Paper | Science

A Study on Therapeutic Exercise Programme in the Prevention and Management of Neck and Lowback Complaints in Twowheeler Riders

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ABSTRACT

Background: Driving on bad roads regularly can cause permanent spine damage; bad roads can cause cervical (neck) and lumbar (spine) pain. But the effect varies from person to person depending on the body's shock absorbing capacity. This research shows that early intervention like the therapeutic exercise programme is the most successful way to resolve back and neck pain complains in two wheeler riders. bjective: The aim of the study was to determine the effectiveness of therapeutic exercise program in the prevention and management of low back and neck pain in two-wheeler riders. Design: Experimental study. Participants: Participants were from two wheelers (n=30 for neck pain, n=30 for back pain age range= 20-50 years, mean age= 35 years, male or female) and asked to fill questionnaire form about musculoskeletal symptoms and intensity or severity of pain experienced. This study was conducted by physical therapist in physio clinic Trichirappalli, Tamilnadu, India Measurements: Roland Morris Disability Questionnaire and Oswestry Disability Index, Visual Analogue Scale. Results: All the two wheeler riders included in the study completed the six sessions of the exercise program and were re-evaluated at the two-month follow-up .The data obtained was tabulated and statistically analyzed. Due to nature of outcome measures i.e pain and disability pre and post intervention, parametric statistical tests, dependent t sample test and un paired t test were used. The two-tailed P value is less than 0.0001 by conventional criteria; this difference is considered to be extremely statistically significant. Conclusions: This study was done to prove the effectiveness of therapeutic exercises to reduce the pain and disability and improve the health for two wheeler riders.

KEYWORDS: Back pain, Neck pain, Therapeutic exercises, Two wheeler riders.

INTRODUCTION:

Back and neck pain is one of the most common health complaints. Back pain affects approximately 80% of adults at some point in their lives and neck pain; approximately 50%. Back and neck pain can be experienced by people of all ages but can be treated by qualified physiotherapists by a range of treatments. Being caught up in the rush of life, we spend a good deal of time on the roads. And our bumpy roads, punctuated by pot holes, with the bitumen topping disappearing after a slight shower, contribute to a host of health problems(6). In particular, they take a heavy toll on the musculo-skeletal system the back, neck and the spine. Bad roads can cause back and neck problems, particularly in those commuting long distances on a daily basis. As it is, younger people, those in the IT and other industries located on the outskirts, which do a great deal of travelling by road and use two wheelers, are more affected than the elderly, However, when we land in a pothole while riding a bike, the spine absorbs an impact that is much higher, if the vehicle suspension is in not-so-good condition(1)n, the individual is forced to absorb the shock instead of the vehicle's shock absorber and another one fact for two wheelers, the size of the tire is definitely a reason for not absorbing the shock or transferring it with reduction of impact. A large number of people suffer from back and neck pain due to driving on bad roads (1, 6). The problem then will become chronic and recurrent. This research shows that early intervention like the therapeutic exercise programme is the most successful way to resolve back and neck pains.

Objective:

The aim of the study was to determine the effectiveness of therapeutic exercise program in the prevention and management of low back and neck pain in two-wheeler riders.

Subjects and Methods:

A convenience sample of subjects was solicited from physiotherapy clinic. Inclusion criteria included any person (20- 50 years) using two wheelers for at least 4-5 hours per day, complaining of musculoskeletal pain in the neck and back region last three months. Exclusion criteria included pregnant women, persons with rheumatoid arthritis, ankylosing spondylitis, tumors, vertebro basilar insufficiency symptoms, fracture or dislocation, recent undergone surgery or any acute inflammatory problem.

Materials: Roland Morris Disability Questionnaire and Oswestry Disability Index, Visual Analogue Scale.

PROCEDURE: Participants were from two wheelers (n=30 for neck pain, n=30 for back pain age range= 20-50 years, mean age= 35 years, male or female) and asked to fill questionnaire form about musculo-skeletal symptoms and intensity or severity of pain experienced. All the two wheeler users in both groups received in the experimental group A as a therapeutic exercise program, conducted by a physical therapist. Subjects in Control Group B were just asked to Take hot packs for 15-20 minutes at night and postural advice given. Data were collected at baseline and at a two-month follow-up. The intervention started two days after the first evaluation, While follow-up was performed exactly two months after baseline evaluation.

THERAPEUTIC EXERCISE PROGRAMME:

1. Neck stretching and strengthening exercises for neck.
2. Spinal Mobility Exercises for back

The exercise program was composed of six graded sessions, two per week, with a two-day interval between sessions, for three consecutive weeks. The exercises were selected in order to reinforce lumbar extension and to strengthen the primary stabilizers of the spine (transverses abdominals, oblique abdominal, multifidus, and quadratus lumborum and erector spinae muscles). The physical therapist prescribed prone lumbar extension, upright lumbar extension, quadruped lumbar extension, quadruped hip extension, bridging, abdominal isometric contraction, upright abdominal isometric contraction with the trunk leaning against the wall. Then neck exercises are isometric stretching, and strengthening exercises are taught. The therapeutic exercise program was conducted by a physical therapist.

OUTCOME MEASURES:

The primary outcome measure used in this trial was the perceived level of disability as a result of LBP, assessed by the following self-administered evaluation scales: the Roland Morris Disability Questionnaire (RMDQ) and the Oswestry Disability Index (ODI). The RMDQ is validated in Italian23), and comprises 24 items in which greater levels of disability are reflected by higher numbers on a 24-point scale24). The RMDQ has been shown to yield reliable measurements, which are valid for inferring the level of disability, and to be sensitive to change over time.

For groups of patients with (LBP 25, 26). The ODI, which was used in the Italian pre-tested version27), is structured in 10 sections corresponding to different activities of daily living, each scored on a six-point scale (0–5). Scores of 0–20% indicate minimal disability, 20–40% moderate disability,40–60% severe disability, 60–80% crippled, 80–100%either

bed-bound or exaggerating symptoms28, 29).Secondary outcome measure included the evaluation of cervical and lumbar physical discomfort. Participants were asked to rate the pain intensity of these two sites as pre-determined sites of pain on a Visual Analogue Scale (VAS). Was used a 10 cm VAS with 0 corresponding to no pain, and 10 to the worst possible pain. The VAS has been proved to be reliable and satisfactory in the measurement of pain.

RESULTS:

All the two wheeler riders included in the study completed the six sessions of the exercise program and were re-evaluated at the two-month follow-up. The high compliance may be explained by the small sample size, the short follow-up period and the fact that the intervention was conducted in the clinical setting.

Table. 1 Pre score analysis of Neck pain and Back pain for Group A and B

S.NO	Statistical measurement	GROUP A		GROUP B	
		NECK PAIN	BACK PAIN	NECK PAIN	BACK PAIN
1.	Mean	6.233	6.2	6.3	6.233
2.	Standard deviation	0.504	0.406	0.534	0.504
3.	Variance(Standard deviation):	0.254	0.165	0.286	0.254
4.	Population Standard deviation:	0.495	0.4	0.525	0.495
5.	Variance(Population Standard deviation):	0.245	0.16	0.276	0.245

Table 2.Pre score analysis for neck and back pain disability questionnaire (RMDQ and OD)

S.NO	Statistical measurement	GROUP A		GROUP B	
		BACK PAIN (RMDQ)	NECK PAIN (OD)	BACK PAIN (RMDQ)	NECK PAIN (OD)
1.	Mean	24.666	22.633	24.633	21.90
2.	Standard deviation	0.711	2.220	0.718	2.233
3.	Variance(Standard deviation):	0.505	4.929	0.516	4.989
4.	Population Standard deviation:	0.699	2.183	0.706	2.196
5.	Variance(Population Standard deviation):	0.488	4.765	0.498	4.823

Table 3 Post score analysis for neck and back pain

S.NO	Statistical measurement	GROUP A		GROUP B	
		NECK PAIN	BACK PAIN	NECK PAIN	BACK PAIN
1.	Mean	0.633	0.666	2.966	2.866
2.	Standard deviation	0.490	0.479	0.718	0.860
3.	Variance(Standard deviation):	0.240	0.229	0.516	0.740
4.	Population Standard deviation:	0.481	0.471	0.706	0.845
5.	Variance(Population Standard deviation):	0.232	0.222	0.498	0.715

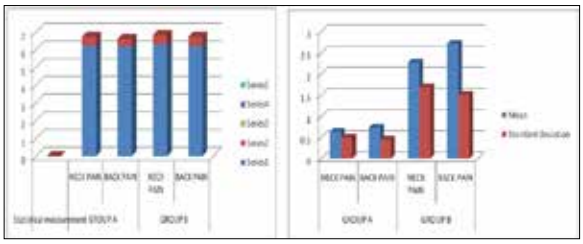
Table.4 Post score analysis for neck and back pain disability questionnaire (RMDQ and OD)

S.NO	Statistical measurement	GROUP A		GROUP B	
		BACK PAIN (RMDQ)	NECK PAIN (OD)	BACK PAIN (RMDQ)	NECKPAIN (OD)
1.	Mean	6.666	2.066	9.333	6.233
2.	Standard deviation	2.397	1.080	9.333	4.861
3.	Variance(Standard deviation):	5.747	1.167	16.781	23.633
4.	Population Standard deviation:	2.357	1.062	4.027	4.779
5.	Variance(PopulationStandard deviation):	5.555	1.128	16.222	22.845

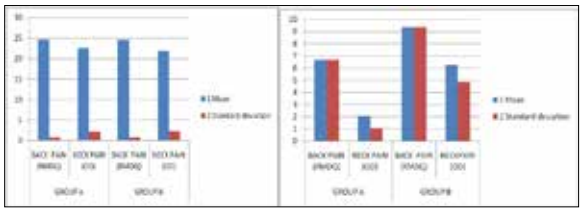
Table.5 Unpaired "t test" values of pain and disability

S.NO	VARIABLES	t value	difference	standard error of difference	results
1.	NECK PAIN	15.208	66	0.153	SIGNIFICANT
2.	BACKPAIN	12.240	58	0.180	SIGNIFICANT
1.	RMDQ	2.492	58	1.404	SIGNIFICANT
2.	OD	4.583	58	0.909	SIGNIFICANT

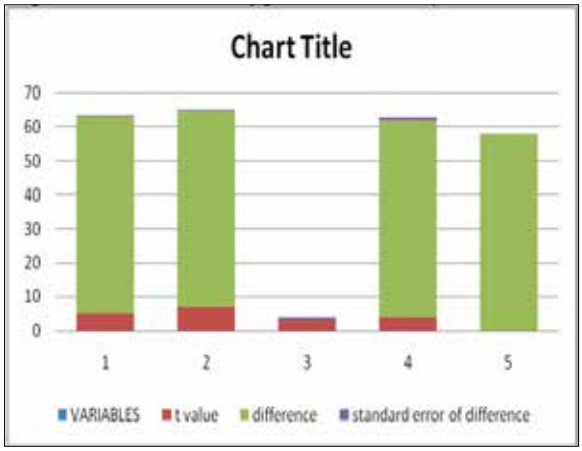
PRE AND PRE AND POST SCORES OF NECK AND BACK PAIN



PRE AND POST SCORES OF NECK AND BACK DISABILITY-QUESTIONERAE



Unpaired "t test" values of pain and disability



DISCUSSION:

This incongruity may be due to an overestimation of symptoms by participants on the VAS scale, whereas the ODI and RMDQ scores reflect the real level of disability, as these two Questionnaires are specifically designed for the evaluation of neck pain and LBP. Neck and Back pain is a common condition presenting to physiotherapy practices. Our results point to the importance of a six-session therapeutic exercise program in the prevention and management of neck and low back complaints and in reducing consequent LBP functional disability among two wheeler riders.

In Group A compared to Group B, there was a highly significant improvement for all the four outcomes evaluated. Table I and 2 shows that the compare Group A and B post score analysis of neck and back pain mean 0.666, 64.3 and SD 2.39 2.25, RMDQ and OD post score analysis of mean 24.6 and SD 0.71.both pre and post analysis of both groups, Group A is a reduce and pain and disability, but Group B is mildly reduce pain and disability.

However, when considering the score difference between baseline and follow-up in Group B alone, improvement may appear to be poor as compared to that reported by other studies using the same questionnaires (13, 14). In fact, we obtained an improvement of 3.078 points on the RMDQ scale, and of 4.015 points on the ODI scale, while the VAS score resulted in a decrease of 6.88 points for LBP and of 5.11 for neck pain (Table 5).

P value and statistical significance: ,

In Neck pain results shows that the two-tailed P value is less than 0.0001, by conventional criteria, this difference is considered to be extremely statistically significant. Confidence interval: The mean of

Group One minus Group Two equals -2.33300 95% confidence interval of this difference: From -2.63927 to -2.02673 Intermediate values used in calculations: t = 15.2085 df = 66 standard error of difference = 0.1539(Table 3,5)

In Back pain results shows that The two-tailed P value is less than 0.0001 By conventional criteria, this difference is considered to be extremely statistically significant .Confidence interval: The mean of Group One minus Group Two equals -2.20000 95% confidence interval of this difference: From -2.55976 to -1.84024 Intermediate values used in calculations: t = 12.2409 df = 58 standard error of difference = 0.180(Table 3, 5)

In Oswestry disability scale analysis of disability for neck, this scale shows that the results the two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant. Confidence interval: The mean of Group One minus Group Two equals -4.16700, 95% confidence interval of this difference: From -5.98683 to -2.34717 Intermediate values used in calculations: t = 4.5835, df = 58, standard error of difference = 0.909(Table 4,5)

In Ronald Morris disability questionnaire shows that the results for the two-tailed P value equal 0.0155 by conventional criteria, this difference is considered to be statistically significant. Confidence interval: The mean of Group One minus Group Two equals -3.50000, 95% confidence interval of this difference: From -6.30952 to -0.69048 Intermediate values used in calculations: t = 2.4937, df = 58, standard error of difference = 1.404(Table 4,5)

At follow-up, a great improvement was obtained in the experimental group for the primary Outcome measure .In the analysis between groups, the decrease in RMDQ and ODI scores observed in the experimental group was statistically significant with respect to the score difference before and after intervention in the control group. A statistically significant Improvement was also observed in secondary outcome measures. After the intervention, the intensity of low back/ neck symptoms was significantly reduced in the experimental group as compared to the control group. The graphical presentations are shown that the significant improvement of Group A and B.

Several reviews of the effect of exercises as a preventive measure for back and neck pain problems have appeared, generally supporting the conclusion that exercise may have a positive effect, 13, and 14). This is about the correct exercises protocol to use in primary prevention of low back and neck pain in a two wheeler riders. Regarding secondary prevention, the current 9

literature provides evidence for the effectiveness both of an therapeutic exercise programme 13, 14, 15) and of spinal mobility strengthening exercises of the primary stabilizers of the spine1 4,15) in reducing LBP recurrence and disability as compared to a hot pack applications and postural advice.

The subjects of both the groups in our study improved significantly on all the three outcome measures. Group-A subjects showed significantly better improvement than Group-B particularly at the end of second week. This suggests that immediate effects of pain reduction, and functional ability improvement occurred following therapeutic exercise programme with neck isometric and strengthening, spinal mobility exercises.

SUGGESSIONS AND LIMITATIONS:

1. This study was done in a short-time period with a small number of subjects. Therefore to make the results more valid, long-term study with a larger sample size is recommended.
2. This study does not include EMG analysis or Biofeedback training. So further studies utilizing EMG analysis of muscle activity, EMG Biofeedback training can be carried out.
3. Inclusion of a control group would be helpful in validating the results.
4. Further studies are recommended to analyse the effect some other modified exercise regimen.
5. This study does not include muscle morphology measurement. So, further studies with muscle morphology as an outcome measure are recommended.

This research seems to suggest that a six session therapeutic exercise program, conducted in the clinical setting, can be decisive in the prevention and management of low back and neck complaints and in reducing consequent LBP functional disability among two wheeler riders, as assessed at a two month follow-up. No evidence was obtained regarding the Effectiveness of the ergonomic brochure, suggesting that the ergonomic training alone is not sufficient for the prevention and management of the trunk complaints and disability. These results must be confirmed by future studies with higher methodological standards, including a larger sample sizes, a longer-term follow-up and an initial clinical assessment for sub grouping classification.

The limitations of this study include the small sample size, the lack of physiologic assessment with different stages of LBP or neck pain (acute, sub acute or chronic), and the relatively short follow-up period, i.e. variables that might have affected the results.

CONCLUSION:

Exercise is commonly used to improve physical function, decrease symptoms and minimize disability caused by chronic low back or neck pain. Numerous randomized trials and clinical practice guidelines have supported this practice, and studies suggest that individually tailored, supervised exercise programs are associated with the best outcomes. (16). There is also strong evidence to support that therapeutic exercise programs result in reduced disability, reduced

absenteeism and faster return to work rate compared to control groups (Frost et al, 1995, Gundewall et al 1993, Kellett et al 1991, Mitchell et al 1990, Moffett et al 1999). Physiotherapists have the necessary training and skills to design, implement and supervise such exercise programs. Physiotherapists are also pioneering investigations into the proposed mechanisms contributing to chronic and recurrent low back and neck pain by evaluating the effects of specific exercise programs (O'Sullivan et al 1997). In conclusion this research can be decisive in the prevention and management of low back and neck complaints and in reducing consequent LBP functional disability among two wheeler riders, as assessed at a two month follow-up. This study was done to prove the effectiveness of therapeutic exercises to reduce the pain and disability and improve the health for two wheeler riders.

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