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COMPARISION BETWEEN THE EFFECTIVENESS OF ELASTIC RESISTANCE BAND EXERCISE AND PILATES AMONG AUTO DRIVERS WITH MECHANICAL NON – SPECIFIC LOW BACK PAIN

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INTRODUCTION

Low back pain is an economic burden to society, leading to functional disability resulting in loss of number of days at work. The prevalence of low back pain in Indian population has been found to range from 6.2% to 9.2% and found to be increase with age.[3] The lifetime prevalence of low back pain is reported to be as high as 84% and the prevalence of chronic low back pain isabout 23% with 11-12% of the population being disabled by low back pain.[6] Low back pain is defined as pain experienced between the twelfth rib and the inferior gluteal fold with or without associated leg pain. Based on etiology pain is classified into specific and non-specific low back pain.[2] For patient younger than 45 years mechanical low back pain represents the most common cause of disability than in patient aged older than 45 years. Mechanical low back pain is described as a musculoskeletal pain which varies with physical activities and involving root compression or serious spinal disease.[1]

Nonspecific low back pain has become a major public health problem worldwide. Nonspecific pain in general refers to any type of back pain that is caused by placing abnormal stress and strain on muscles of the vertebral column.[2] It is typically associated with pain, soreness and stiffness in the lower back region and functional disability. Pain typically results due to poor posture, poorly designed seating, incorrect bending and lifting motions as required in various occupations.[8]

Nonspecific low back pain is mostly due to core muscles weakness. Core muscles acts as a bridge between upper body and lower body. Core stability refers to a person's ability to stabilize their core. Core stability is very important, without stability, we can't able to sit and stand. Muscles used to stabilize the core are called core muscles. Major core muscles are pelvic floor muscles, transverse Abdominis, Multifidus, internal and external oblique. Deep core muscles such as Transverse abdominus and multifidus are responsible for spinal stability. The main cause of non-specific low back pain is due to muscles weakness which leads to reduction in the stability. To improve the stability, we have to strengthen the core muscles especially transverse abdominus and multifidus.

Studies shows that the common factor is most case of non-specific low back pain is weakness of core muscles. Weak core muscles result in loss of the appropriate lumbar curve and poor posture.

Three wheelers also referred as auto rickshaws, are the popular mode of public transportation. Globally 37% of low back pain is attributed to occupational risk factors. Driving is a task which involves prolonged sitting awkward posture, static position and vibration, any of which could directly leads to musculoskeletal stress.

A recent review suggest exposure to vibration, especially the duration is the key risk factor for occupational low back pain.[18] The role of vibration may be particularly relevant among auto drivers because the engine of auto is often beneath the driver's seat.

To achieve strengthening of these core muscles, exercise program is administrated like elastic band resistance exercise and Pilates. The use of elastic resistance exercise products in therapeutic exercise programs has become widespread in rehabilitation and shown as effective method of resistance and improving muscle strength. Elastic bands are available as grades or thickness, color coding denotes thickness of products and grades of resistance. It has been studied for their effectiveness to improve core muscles strength and functional ability in low back pain patient.[15]

Pilates exercise is a commonly prescribed to people with chronic low back pain. Pilates is named after its founder

Joseph Pilates developed in 1920s to encourage physical and mental conditioning.[10] Pilates based on 6 principles: power house, concentration, control, precision, flow of movements and breathing. Core stability, strength and flexibility are emphasized in Pilates exercise, as in control of movements, posture and breathing.[11]

The Oswestry was originally described in 1980. The questionnaire consists of 10 items addressing different aspect of function. Each item scored from 0 to 5 with higher values representing greater disability. The total score is multiplied by 2 and expressed in percentage.[17]

Numerical pain rating scale was to assess the pain. It has 11 points where the values range from 0 (which means no points) to 10 (which means worst pain imaginable).

The method of measuring spinal ROM is with the use of tape measure. This technique is known as skin distraction method, it is described as Schober. It involves tape measure held directly over the spine 10 cm above the lumbo sacral junction and 5 cm below the Lumbo sacral junction.

Thus, the study was to compare the effectiveness of elastic resistance band exercise and Pilates on auto drivers with non-specific mechanical low back pain.

AIMS OF THE STUDY
The present aim of the study is to compare the effect of elastic band resistance exercise andPilates to reduce pain, to reduce disability, and to improve the range of motion.

OBJECTIVES OF THE STUDY
* To find out the effect of elastic resistance band exercise on auto drivers with nonspecific low back pain to reduce pain, to reduce disability and to improve lumbar range of motion.
* To find the effect of Pilates on auto drivers with non-specific low back pain to reduce pain, to reduce disability and to improve lumbar range of motion.
* To compare the effect of elastic resistance band exercise and Pilates on auto drivers with non-specific low back pain, to reduce pain and disability and to improve lumbar range of motion.

NEED OF THE STUDY
The need of the study is to validate the use of elastic resistance band exercise and Pilates by improving the quality of life and recovery from non-specific low back pain.

Since the prevalence of non-specific low back pain is more, the study is done to reduce pain,improve quality of life and to improve lumbar range of motion and to control the progression of non-specific low back pain.

Thus, this present study will be helpful in understanding elastic resistance band exercise and Pilates to provide betterment for having a healthy lifestyle.

BACKGROUND OF THE STUDY
Peeyoosha V Nitsure (2014) et al, stated that the elastic resistance band exercise group showed more decrease in pain, improvement in range of motion and increased muscle strength than the yoga group.

Esha A. Bhadauria (2017) et al stated that the Pilates showed reduction in disability, compared to the dynamic strengthening. It improves lumbar range of motion.

Yesurajan and Dr T. Indra (2017) et al stated that the factors contributing to low back pain among professional auto drivers. **Misa Noda (2015) et al** stated the prevalence and the occupational risk factors among three wheelers in Sri Lanka.

There was less study on non-specific low back pain among auto drivers. The present study focuses on reducing the pain and disability and improving lumbar range of motion among auto drivers.

METHODOLOGY
1. **Study design**: Comparative study
2. **Sampling methods**: Convenient sampling
3. **Study duration**: 4 weeks
4. **Study setting**: Navallur auto stand auto drivers.
5. **Sample size**: 20

INCLUSION CRITERIA
➢ Auto drivers with low back pain (travelling from navallur to thiruvanmiyur) driving for average 5 hours a day.
➢ Age: 27-55
➢ Mechanical low back pain
➢ Patient with minimum to moderate disability up to 40% on Oswestry Disability Index.

EXCLUSION CRITERRIA
➢ Back pain with trauma
➢ Any neurological symptoms involving prolapsed intervertebral disc, radiculopathy.
➢ Any systemic disease like RA, Ankylosing spondylitis etc.
➢ History of recent abdominal, back surgeries etc
➢ History of fracture.

OUTCOME MEASURES
➢ **Numerical pain rating scale** to measure the pain.
➢ **Modified oswesty disability questionnaire** to assess the disability.
➢ **Modified Schober s test** to measure the lumbar range of motion.

MATERIALS USED
➢ Marker
➢ Inch tape

> Yoga mat
> Elastic resistance band

PROCEDURE
In this comparative study 20 auto drivers are taken from navallur auto stand. Under the inclusion and exclusion criteria and informed consent received from each driver and they were evenly splitted into two groups and the procedures were explained. Group –A (10) performed Elastic resistance band exercise and group-B (10) performed Pilates exercise. Each subject is instructed to do warm up exercise for 5 minutes including light stretches for both groups. Each exercise is hold for 5 seconds with 10 reps of 4 sets for 4 weeks.

ELATIC RESISTANCE BAND EXERCISE
1. ABDOMINAL CRUNCH STEP 1-Lie down on crook lying **STEP 2-**Stabilize the ankle and knee **STEP 3-**Raise the upper body with resistance band.
2. ABDOMINAL OBLIQUE CRUNCH IN SUPINE:
STEP 1-Lie down in supine lying.
STEP 2- Ask to flex the knee.
STEP 3- Stabilize the ankle and knee.
STEP 4 - Perform oblique crunch with resistance band.

3. TRUNK EXTENSION
STEP 1 – Lie down in supine lying.
STEP 2- Put the band on the feet and lift the upper body and hold for 5 secs.

4. TRUNK SIDE BEND
STEP 1 – Standing position with foots apart.
STEP 2- Side bend with resistance band.

PILATES
1. BRIDGING
STEP 1- Lie down on supine position.
STEP 2- Flex the knee.
STEP 3 –Lift the pelvic region hold for 5 secs.

2. PRONE LEG RAISRE
STEP 1 – Lie down on prone position
STEP 2- Raise one leg

3. LEG RAISE
STEP 1- Lie down on supine lying.
STEP 2- Flex the knee.
STEP 3- Raise hip and knee to 90 degrees.

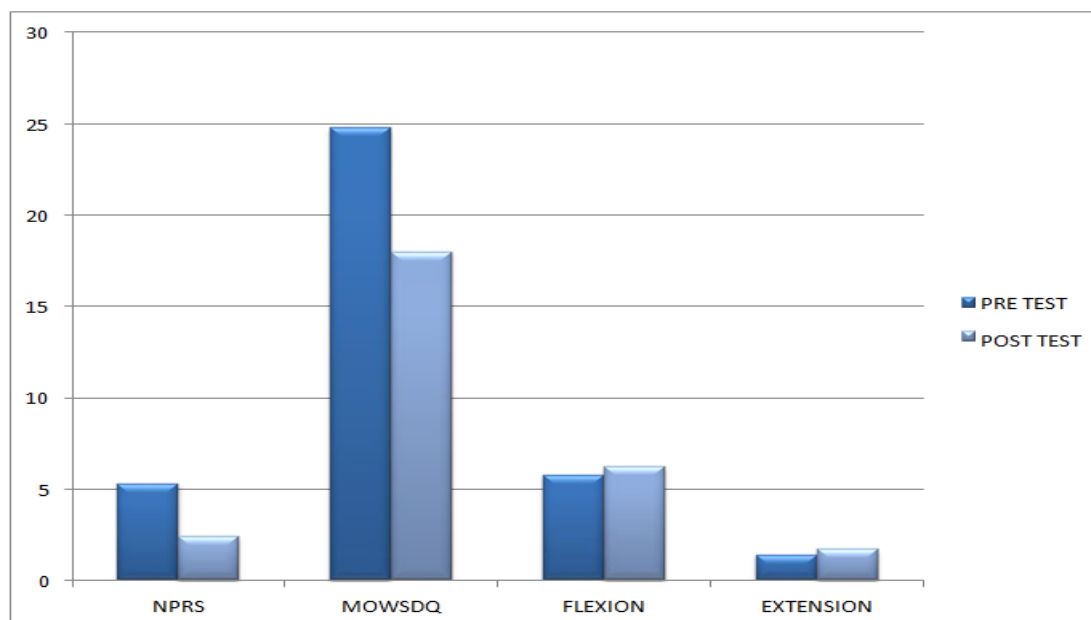### 4. CAT AND CAMEL POSE
STEP 1 – Quadripod position.
STEP 2 – Extension of lumbar region.

DATA ANALYSIS AND INTERPRETATION
**Table 1: Group A (Elastic Resistant Band Exercise).**

SL.NO	NAMES	MEAN VALUE		SD VALUE		P - VALUE	T - VALUE
1	NPRS	PRE	POST	PRE	POST	0.001	10.0131
		5.3	2.4	0.78	0.48		
2	MOWSDQ	24.8	18	6.07	4.81	0.001	3.4136
3	FLEXION	5.79	6.23	0.25	0.30	0.001	-3.5630
4	EXTENSION	1.4	1.72	0.16	0.14	0.001	- 4.734

Graph 1: Representing Mean Value Of Group A (Elastic ResistantBand Exercise).

Table 2: Group B (Pilates).

SL.NO	NAMES	MEAN VALUE		SD VALUE		P - VALUE	T - VALUE
		PRE	POST	PRE	POST	0.001	9.5148
1	NPRS	5.25	2.45	0.82	0.44		
2	MOWSDQ	28.8	18.6	6.07	3.69	0.001	4.5407
3	FLEXION	5.58	6.35	0.44	0.41	0.001	-4.0487
4	EXTENSION	1.43	1.72	0.16	0.13	0.001	- 4.4484
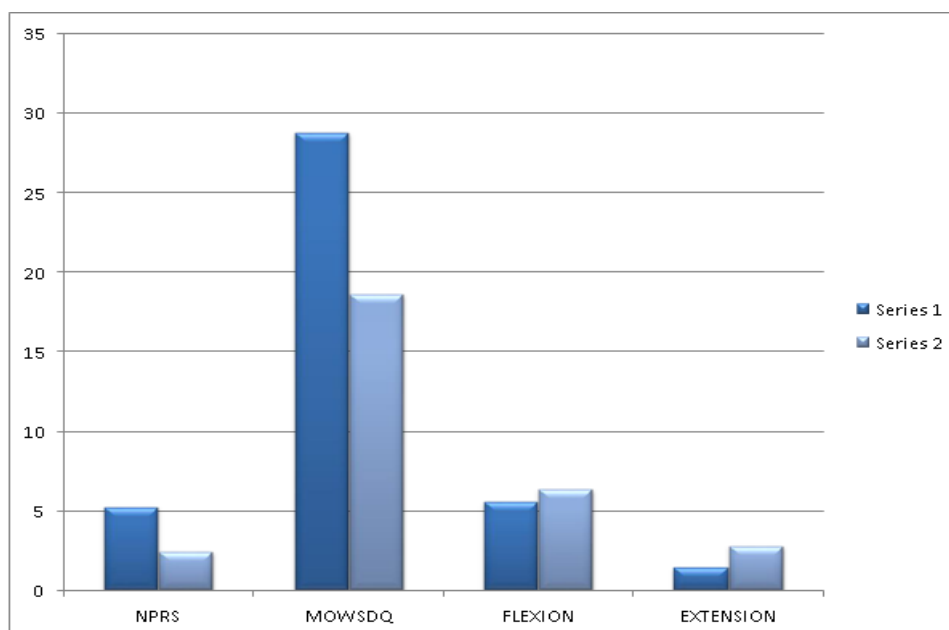
GRAPH 2: REPRESENTING MEAN VALUE OF GROUP B (PILATES).
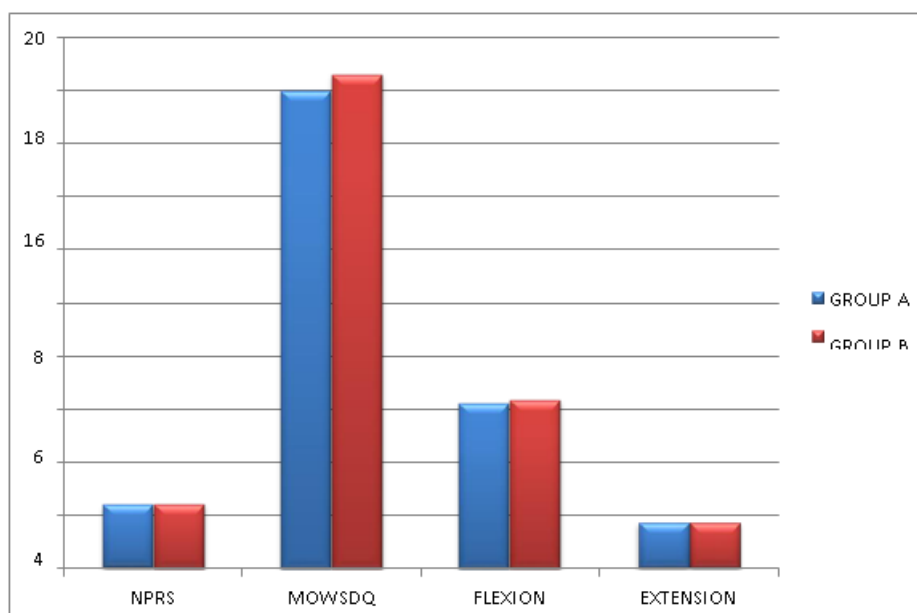
GRAPH 3: REPRESENTING THE POST MEAN VALUES OF GROUP A & B.

RESULT
TABLE 1
The mean value of NPRS for pre and posttest is 5.3 &2.4 and standard deviation value for pre and posttest is 0.78 & 0.48 and p- value is 0.0001, the mean value of MOWSDQ for pre and posttest is 24.8 &18 and standard deviation value for pre and posttest is 6.07 & 4.81 and p-

value is 0.0001, the mean value of lumbar flexion for pre and posttest is 5.79 &6.23 standard deviation value for pre and posttest is 0.25 &0.30 and p- value is 0.0001,the mean value of lumbar extension for pre and posttest value is 1.4 &1.72, standard deviation value for pre and posttest is 0.16 &0.14 and the p- value is 0.0001 It shows a significant difference between the pre and posttest

values within the group.

TABLE 2
The mean values of NPRS for pre and posttest value is 5.25 & 2.45, standard deviation value for pre and posttest is 0.82 &0.44 and p- value is 0.0001, the mean value of MOWSDQ for pre and posttest value is 28.8 &18.6, standard deviation value for pre and posttest is 6.07 & 3.69 and the p- value is 0.0001, the mean value of lumbar flexion for pre and posttest is 5.58 &6.35, standard deviation value for pre and posttest is 0.44 & 0.41 and the p- value is 0.0001. the, mean value of lumbar extension for ore and posttest is 1.43 & 1.72, standard deviation value for pre and posttest is 0.16 & 0.13 and the p- value is 0.0001. It shows a significant difference between the pre and posttest values within the group.

TABLE 3
The post mean value of group A and B is 2.4 and 2.45 in NPRS,18 and 18.6 in MOWSDQ, 6.23 and 6.35 in lumbar flexion and 1.72 and 1.72 in lumbar extension.

DISCUSSION
The current study compares the effectiveness of elastic resistance band exercise and Pilates in mechanical non – specific low back pain. The outcome measures of the study are Modified Oswestry low back pain, Numerical pain rating scale, Modified Schobers test (lumbar ROM). The statistical result of the study shows the significant difference between pretest and posttest for both group A and group B. It shows that both groups were effective in reducing pain, increasing ROM and improving the functional abilities in the duration of 4 weeks. From the mean values of NPRS and MOWSDQ, it is significantly proved that the Pilates is more effective when compared with elastic resistance band exercise. Whereas from the mean values of lumbar ROM both are effective.

Elastic resistance is a unique type of resistance training compared to isotonic and isokinetic resistance. It provide continuous tension to the muscle being trained and it also increase the range of motion. The elastic resistance exercise which is included in the present study was based on force elongation and resistance provided which has proven to be effective in increasing the core strength.

The Pilates is based on the use of functional exercise for improving muscular strength and endurance, it focus on rehabilitation, recruit deep stabilizer muscles at a submaximal effort, while disassociating the extremities from the trunk and pelvis, so the deep stabilizers work efficiently to maintain control. it improved absolute core strength and more over encouraged proper activation patterns of core muscles.

Mohammed sheeba kauser, Mahendra Yadav(2020) et al, states that the resistance band exercise are more impressive than given exercise in reducing pain, research

hypothesis has been affirmed that resistance band utilization are more impressive in reducing lumbar pain, and increasing stability and strength of spinal extensors and a great posture.

Yonas Biratus Terfa, Adugna olani Akuma (2022) et al, states that the finding showed 26.26% of the three-wheel drivers experienced low back pain in the last 12 months, this indicates the tightness of muscle beneath the coastal edge and lower gluteal pleat.

Thus the previous study states that elastic resistance band exercise is more effective in reducing pain than other exercise, it also increase spinal strength and stability and improve posture and our current study proves that Pilates are effective in reducing pain and disability and improving range of motion.

Another study was done on the physiotherapy students. There was less evidence for the comparative study on auto drivers with mechanical non – specific low back pain. Thus, the present study was a comparative study which focus on the reducing pain and disability and improving lumbar range of motion among auto drivers

However, the group B showed better improvements in pain severity when compared to group A.

In modified oswestry disability questionnaire group b showed better improvement in disability when compared to group A.

However Pilates shows better improvement and the elastic resistance band exercise where elastic resistance band mainly focus on the mobility but stability in needed to do any functional activities Pilates mostly concentrate on the stability thus the present study it compared the effects of Pilates and elastic resistance band exercise on auto drivers with mechanical nonspecific low back pain.

CONCLUSION
Group A and group B showed better improvement in reducing pain, reducing disability and increasing lumbar range of motion. But the group B showed better improvement in reducing pain and disability when compared to group A. The both groups showed better improvement in increasing the lumbar range of motion. This study concluded that Pilates group (group B) showed better improvement in reducing pain and disability than the elastic resistance band exercise group (group A) and both groups showed better improvement in increasing the lumbar range of motion.

LIMITATIONS
➢ The study was a comparative study
➢ The sample size was less
➢ The samples were taken from only continuous 5 hrs driving auto drivers.

RECOMMENDATION
- The study can be done with larger sample size
- The study can be done on females auto drivers
- The study can be done to check the prevalence of low back pain among autodrivers.
- The study can be done on different shift auto drivers.

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