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Effects of Transcutaneous Electrical Nerve Stimulation in Patients with Chronic Non-Specific Low Back Pain

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Abstract **Original Research Article**

The management of low back pain (LBP) encompasses a diverse range of possible interventions including drug therapy, surgery, exercise, patient education, physiotherapy, cognitive-behavioral therapy and various other non-pharmacological therapies. Acute and chronic LBP warrant separate consideration as they may respond differently to the same interventions. Transcutaneous electrical nerve stimulation (TENS) is widely used as a therapeutic adjunct in the management of low back pain. It is relatively safe, non-invasive and easy to use modality that makes it an attractive treatment option. For more than four decades, TENS has been applied in the treatment of acute and chronic pain syndromes. Hence there is still uncertainty about the most effective therapeutic approach in chronic non-specific low back pain. ***Methods:*** This randomized controlled clinical trial was conducted in the department of Physical Medicine and Rehabilitation, Chatto gram from 13/01/2019 to 13/06//2019. The aim of the study was to evaluate the effects of Transcutaneous Electrical Nerve Stimulation on Chronic Non-specific Low Back Pain Patients. 120 patients with chronic low back pain were treated according to inclusion & exclusion criteria. Patients were equally distributed in three groups. Group-A patients (n=40) treated with NSAID+ADL, and Group-B patients (n=40) treated with NSAID+ADL+TENS and Group-C patients (n=40) treated with NSAID+ ADL+ Back extension exercise. Written informed consent was obtained from all patients. Data were calculated and analyzed by computer based software SPSS (Statistical Package for social Science) windows 16.0 version. ***Main Outcome Measure (S):*** Age, Sex, Occupational status, Socio-economic status, Subjective pain intensity score, Visual Analogue Scale, Tenderness index, Disability due to pain, Spinal mobility index, Oswestry disability Index. ***Results:*** The mean age was found 41.82±11.95 years in group A and 42.7±12.52 years in group B and 40.52±13.40 in group C.Majority patients (55-60%) came from middle class family in all groups. Mean duration of pain was found 23.90±2.57 months in group A, 21.0+1.50 months in group B and 22.1±1.89 months in group C. Visual analogue score was improved individually in group-A, group B and group C after treatment, which was statistically significant (P<0.05). Oswestry disability questionnaire score was also improved individually in group-A, group B and group C after treatment, which was statistically significant (P<0.05). And in case of comparison between group-B and Group- C this was not statistically significant (P>0.05). ***Discussion:*** In this current study it was observed that the entire variable individually improved in Group-A, Group-B and Group-C. So, all the three treatment groups were benefited from drugs and therapy. But these were not statistically significant (P>0.05) in between Group-B and Group-C. All therapies were helpful. But there was no significant difference in improvement between TENS and NSAID. ***Conclusion:*** Beneficial effects of TENS were seen in the study population but no firm conclusion could be drawn.

Keywords: TENS, Low back Pain, Effects.

INTRODUCTION

The Low back pain (LBP) is defined as an uncomfortable sensation in the lumbar and buttock region originating from neurons near or around the spinal canal that are injured or irritated by one or more pathologic processes [1]. LBP is commonly categorized into acute sub-acute and chronic. Acute LBP is usually defined by a period of complaint of six weeks or shorter, sub-acute LBP as a period between six and twelve weeks and chronic LBP as a period of complaints more than twelve weeks [2]. Non-specific low back pain is tension, soreness and/or stiffness in the -lower back region for which it isn't possible to identify a specific cause of the pain. Several structures in the back, including joints, discs and connective tissues, may contribute to symptoms. The diagnosis of non-specific low back pain is dependent on the clinician being satisfied that there is not a specific cause for their patient's pain, such as infection, neoplasm, metastasis, fractures, rheumatoid arthritis or inflammatory processes [3].

The type of Low-back pain is most commonly confronting the Physiatrists is of benign non-specific mechanical origin. Mechanical LBP ranks as the second most common symptom related reason for seeing a physician. Surveys suggest that the lifetime incidence of LBP ranges from 60-90% with a 5% annual incidence. For persons younger than 45 years, mechanical LBP represents the most common cause of disability and it is the third most common cause of disability in persons aged older than 45 years. But no consensus exists among different class of physicians regarding appropriate treatment and management of mechanical LBP [4]. According to COPCORD study, the prevalence of chronic non-specific low back pain in Bangladesh is 6.6% [5]. So, it is a large population to treat.

The management of LBP encompasses a diverse range of possible interventions including drug therapy, surgery, exercise, patient education, physiotherapy, cognitive-behavioural therapy and various other non-pharmacological therapies [6]. Acute and chronic LBP warrant separate consideration as they may respond differently to the same interventions [7].

Transcutaneous electrical nerve stimulation (TENS) is widely used as a therapeutic adjunct in the management of low back pain. For more than four decades TENS has been applied in the treatment of acute and chronic pain syndromes [8]. However, despite its widespread use, the usefulness of TENS in chronic LBP is still controversial [9]. So to find out a relatively effective modality is important.

Sixty to 90% of the adult population is at risk of developing LBP at some point in their lifetime [12]. While the majority of episodes appear to resolve within six weeks, it is estimated that 10 to 20% of affected adults develop symptoms of chronic LBP [13]. Chronic LBP has a significant impact on functional status, restricting occupational activities with marked socio-economic repercussions [12].

Chronic low back pain remains poorly understood and inadequately treated due to the heterogeneity of the patients' population, and the lack of a simple and useful system [14]. Chronic low back pain is one of the most common causes of chronic disability [15, 16]. While there is no mortality associated with mechanical LBP, morbidity is found in terms of lost productivity and use of medical services that cost to society is staggering [4]. LBP is found the most prevalent medical disorders in industrialized societies [17].

Pain sensitive structures in the spine include the periosteum of the vertebrae, dura, facet joints, and annulus fibrosus of the intervertebral disk, epidural veins, and the posterior longitudinal ligament. Disease of these diverse structures may explain many cases of back pain without nerve root compression [18].

The most common sites of Low back pain are around L4/L5 and L5/S1 spine [19]. The type of low-back pain most commonly confronting the physiatrist is of benign mechanical origin. Knowledge of normal functional anatomy and taking a careful history and performing an appropriate examination reveal the deviation that is causing the pain and impairment. The mechanical benign causes are divided into static (postural) and kinetic (faulty biomechanical) types. Of the static causes, the most prevalent is excessive lordosis, in which there is exorbitant facet weight-bearing and foraminal closure. Alternatively, prolonged daily flexed postures may cause posterior migration of the nucleus pulposus, resulting in low back pain and probably sciatic radiculopathy [20]. A multidisciplinary approach has been advocated for some patients with chronic LBP [13]. The treatment goals are to relieve pain, reduce muscle spasm, improve strength and range of motion, promote early return to activity, encourage acting coping strategies and ultimately improve functional status. The risks and benefits of these treatments vary [21]. Acute and chronic LBP warrant separate consideration as they may respond differently to the same physiotherapy [22].

TENS is a non-invasive therapeutic modality. It was added, more than 30 years, ago to existing physical agents used in medicine and physiotherapy for the management of LBP. TENS units stimulate peripheral nerves via skin surface electrodes at well-

tolerated intensities andare capable of being self-administered [23]. The development and application of TENS was based on the *Gate Control Theory* [24]. According to this theory, the stimulation of large diameter, (A-beta) primary sensory afferents activates inhibitory interneurons in the substantia gelatinosa of the spinal cord dorsal horn and, thereby, attenuates the transmission of nociceptive signals from small diameter A-delta and C fibers [25]. Supra spinal mechanisms involving the endogenous opioid system have also been described [26].

Several types of TENS applications, differing in frequency, amplitude, pulse width and waveform, are used in clinical practice. The two most common application modes include: 1) high frequency or conventional TENS (40 to150 Hz, 50 to 100 use C pulse width, low intensity) and 2) low frequency or so called acupuncture-like TENS (1 to 4 Hz, 100 to 400 use C pulse width, high intensity). Conventional TENS is associated with a faster onset and shorter duration of analgesia compared to acupuncture-like TENS. Adverse reactions reported with TENS include skin irritation at the site of electrode placement [23]. TENS is contraindicated in patients with cardiac pacemakers due to the potential of interfering with pacemaker activity. The clinical benefit provided by TENS remains controversial. According to the clinical practice guideline developed by the Philadelphia Panel [27].

Regarding the belief of physicians about treatment efficacy, Cherk in *et al.,* mentioned that physical therapy was found to be the most effective treatment for the patients with low back pain patients. Most physicians believe that physical therapy and multidisciplinary treatment programs were effective for chronic low back pain. This can be due to the absence of clear evidence based clinical guidelines explained Delitto *et al.,* [26].

OBJECTIVES

General

To determine the effectiveness of TENS in the management of chronic non-specific low back pain.

Specific

To find out the aetiological pattern of chronic nonspecific low back pain.

To compare the outcome of chronic non-specific low back pain with/ without TENS.

METHODOLOGY

Study design was Randomized controlled clinical trial. The Place of study was Chatto gram medical college, chatto gram. Study period was 6(six) months from 13/01/2019 to 13/06/2019. Study population was selected in the Department of Physical Medicine and Rehabilitation, Chatto gram Medical College, Chatto gram who were referred from different departments of the hospital and from the general practitioners outside the hospital the sample size was 120 patients.

Sampling method: Subjects were selected purposively according to the availability of the patients who fulfilled the inclusion criteria and then randomly allocated in three groups by lottery.

Inclusion Criteria

1. Patients of both sexes from 21-65 years.
2. Individuals who had low back pain for >3months.
3. Patients able to complete questionnaire.
4. Preferably residents of chatto gram City who are able to attained for follow-up.

Exclusion Criteria

1. Duration of Pain < 3months.
2. Individuals who were receiving treatment for their pain with another method at the same time.
3. Pregnant Women.
4. Patients who had undergone vertebral column surgery.
5. Individuals with contraindication against electro therapy, such as skin lesion, abnormal sensitivity, infections & blood diseases,
6. Heart pacemakers
7. Inability to answer questionnaire.
8. Individuals with psychiatric problems.
9. Individuals who refused to participate or unwilling to follow a protocol lasting for two months.

Main Outcome Variables

Demographic Variables

Age, Sex, Occupation, Socio Economic Condition, baseline clinical and laboratory parameters in first visit.

Out Come Measure variables

Subjective pain intensity score.
Visual Analogue Scale,
Tenderness index.
Disability due to pain,
Spinal mobility index,
Oswestry disability Index.

Patients with chronic low back pain for at least 3 months duration attended in the Department of Physical Medicine and Rehabilitation, CMCH. Who were referred from different departments of the hospital and from the general practitioners outside the hospital were included according to inclusion & exclusion criteria? After evaluation the patients were randomized by drawing lottery through numbers created by a computer, into three groups: A) Controls (n=40); B) TENS (n=40); C) Back extension Exercise (n=40). In Group-B TENS machine operated with low frequency 0.5 to 10 Hz and high intensity 15 to 50 mA. Electrodes placed paravertebral region over lower back for20

minutes 3 times/week for up to 8 weeks. And in Group-C 10 min back extension exercise 3 times/week. NSAID & ADL advised in Group-A and B and C. NSAID was prescribed in the form of Naproxen 250 mg twice daily orally along with ADL advice to all the groups. The therapeutic procedures were executed in the department and advised to continue.

Data were processed and analyzed using computer software SPSS (Statistical Package for Social Science). The test statistics used were descriptive statistics, Chi-square (X^2) and F-test (Analysis of variance). Test Level of significance was set at 0.05 and $P<0.05$ was considered significant.

Ethical Implications: Keeping compliance with Helsinki Declaration for Medical research Involving Human Subjects, 1964, the study subjects were informed verbally about the study design, the purpose of the study and their right to withdraw them from the project at any time, for any reason, whatsoever. Subjects who gave informed consent to participate in the study were included as study sample

RESULTS

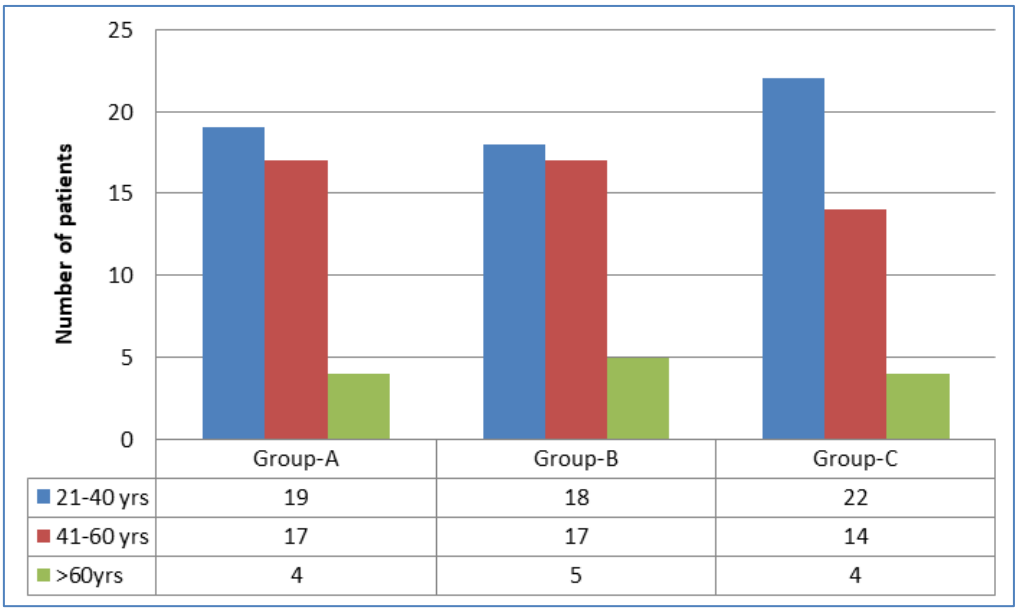

Figure-1: Age distribution of study subjects

Figure-1: Shows age distribution of study subjects. Most of the patients are within 21-40 years age group.

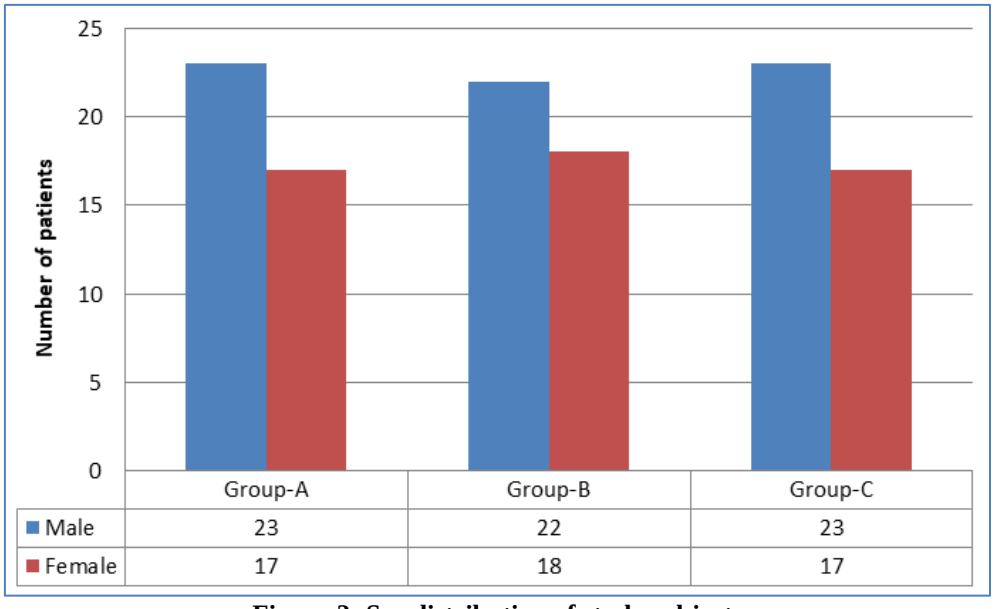

Figure-2: Sex distribution of study subjects

Figure-2: shows sex distribution of study subjects. Here male-female ratio in total study subject (120 patients) is 1.34:1

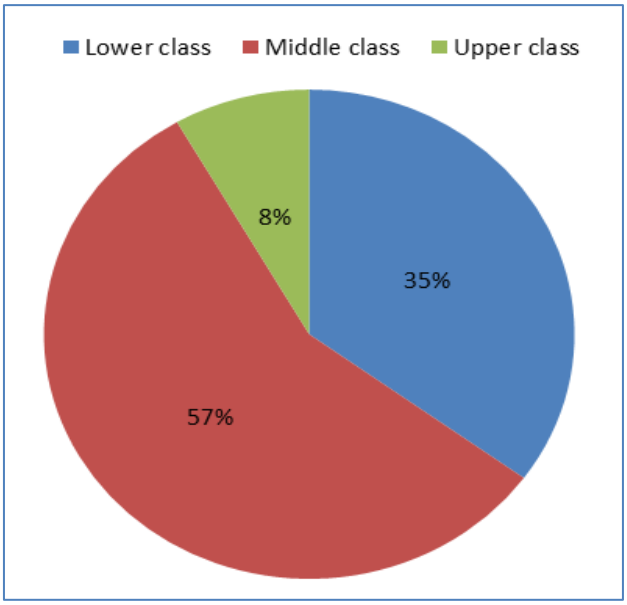

Figure-3: Distribution of socio economic condition of the study subjects

Figure-3: shows socio economic conditions of the study subjects. 57% patients are from middle class family.

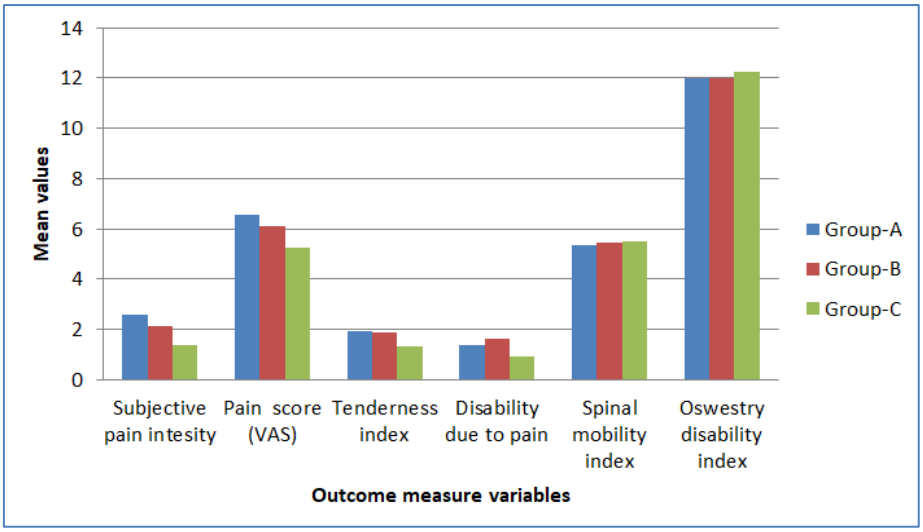

Figure-4: Comparative study between Group-A, Group-B and Group-C (Post treatment score)

Figure-4: shows comparative post treatment score of Group-A, Group-B and Group-C in a nutshell.

Table 3.1: Age distribution of the study subjects (n=120)

Age	**Study group**			
	Group A (n=40)	Group B (n=40)	Group C (n=40)	P-value
21-40 yrs	19(47.5)	18(45.0)	22(55.0)	
41-60 yrs	17(42.5)	17(42.5)	14(35.0)	
> 60yrs	04(10)	05(12.5)	04(10)	
Means ± SD	41.82(±11.95)	42.70(±12.52)	40.52(±13.40)	0.718

Table 3.1 shows the age distribution of patients. Majority 19 (47.5%), 17(42.5%) and 22(55%) age belonged to 21-40 years in Group-A, Group-B and Group C respectively. The mean age were found in Group-A, Group B and Group C 41.82(±11.95), 42.70(±12.52) and 40.52(±13.40) respectively. The

difference ages of patients among Group-A, B, C are not statistically significant.

Table 3.2: Sex distribution of the study subjects (n=120)

Sex	**Study group**			
	Group A N (%)	Group B N (%)	Group C n(%)	P-value
Male	23 (57.5)	22 (55.0)	23 (57.5)	0.793
Female	17 (42.5)	18 (45.0)	17 (42.5)	
Total	**40(100)**	**40(100)**	**40(100)**	

Table 3.2 shows male 23 (57.5%) in Group-A and 22 (55.0%) in Group-B and 23 (57.5%) in Group C. Female were 17 (42.5%) in Group-A, 18 (45%) in Group-B, 17 (42.5%) in Group-C. Males were predominant in all the groups.

Table 3.3: Distribution of socio economic conditions of the study subjects

Socio economic condition	**Study group**			
	Group A N (%)	Group B N (%)	Group C n(%)	P-Value
Lower class	15(37.5)	14(35.0)	13(32.5)	0.542
Middle class	22(55.0)	22(55.0)	24(60.0)	
Upper class	3(7.5)	4(10)	3(7.5)	
Total	**40(100)**	**40(100)**	**40(100)**	

Table 3.3 shows in Group-A 3 (7.5%) persons came from Upper Socio-economic group, 22 (55.0%) persons came from Middle Socio-economic group and from lower socio-economic group 15 (37.5%) persons came. In the Group-B 4 (10%) persons came from Upper Socio-economic group, 22 (55.0%) persons came from Middle Socio-economic group and from lower socio-economic group 14 (35.0%) persons came. And in the Group-C 3 (7.5%) persons came from Upper Socio-economic group, 24 (60.0%) persons came from Middle Socio-economic group and from lower socio-economic group 13 (32.5%) persons came. Majority of the patients came from middle socio economic group in Group-A, Group-B and Group C.

Table 3.4: Distribution of the occupation of the study subjects

Occupation	**Group A n=40(%)**	**Group B n=40(%)**	**Group C n=40(%)**	**P-Value**
Service	6(15)	5(12.5)	6(15)	0.568
Business	5(12.5)	4(10)	5(12.5)	0.954
House wife	9(22.5)	08(20)	7(17.5)	0.307
Driver	04(10)	5(12.5)	6(15)	0.669
Teacher	3(7.5)	3(7.5)	3(7.5)	1.001
Nurse	2(5.0)	2(5.0)	2(5.0)	1.000
Day Laborer	3(7.5)	6(15)	5(12.5)	0.030
Student	5(12.5)	5(12.5)	5(12.5)	1.000
Others	3(7.5)	2(5.0)	3(7.5)	0.459

Table3.4 Shows majority in all the groups were House wife which were 9 (22.5%) persons in Group-A and 08 (20%) persons in Group-B and 7(17.5%) persons in Group-C. Next higher number of persons was service holder in Group-A 6 (15%) and in Group-B 5 (12.5%) and in Group-C 6(15%), followed by businessman and Driver. On the other hand people engaged as Nurse and other staffs were least affected.

Table 3.5: Baseline clinical criteria during the first attendance of the subjects

Parameters	**Group A (n=40) Mean ±SD**	**Group B (n=40) Mean ±SD**	**Group C (n=40) Mean ±SD**	**P-Values**
Duration of pain	23.9 ± 2.57	21.0 ± 1.50	22.1±1.89	0.562
Height (inch)	62.42 ± 2.55	63.24 ± 3.15	62.73±3.64	0.954
Weight (kg)	57.28 ± 10.32	58.58 ± 10.75	57.89±11.5	0.760
Pulse/min	73.95 ± 4.73	74.56 ± 4.64	73.90±4.32	0.449
SBP (mmHg)	122.45 ± 9.13	117.10 ± 10.09	119.72±9.87	0.758
DBP(mmHg)	78.91 ± 6.23	76.43 ± 4.50	76.17±5.36	0.659
Hemoglobin (g/dl)	11.72 ± 1.45	12.05 ± 1.42	11.58±1.54	0.370

ESR mm 1st hr	17.43 ± 7.45	19.35 ± 9.42	18.29±8.41	0.149
Schober's test	4.32 ± 0.75	4.67 ± 0.73	4.445±0.46	0.750

Table 3.5Shows mean duration of pain in Group-A was 23.9 + 2.57, in Group-B 21.0 + 1.50 and in Group-C 22.1 + 1.89. Rest of the demographic variables i.e. height, weight, pulse, BP, Hemoglobin, ESR, schober's test were all most similar in Group-A, Group-B and Group-C.

Table 3.6: Treatment Response in Group-A

	Mean ± SD	P value
Subject pain intensity		
Pretreatment score W_0	3.21±0.72	
Post treatment score W_8	2.56±0.62	0.007
Pain score (VAS)		
Pretreatment score W_0	7.06±0.81	0.004
Post treatment score W_8	6.55±0.77	
Tenderness index		
Pretreatment score W_0	2.49±0.71	0.020
Post treatment score W_8	1.94±0.64	
Disability due to pain		
Pretreatment score W_0	2.05±0.72	0.021
Post treatment score W_8	1.38±0.69	
Spinal mobility index		
Pretreatment score W_0	5.33±0.28	0.009
Post treatment score W_8	5.37±0.27	
Oswestry disability index		
Pretreatment score W_0	54.00±4.96	0.002
Post treatment score W_8	12.00±4.05	

Table-3.6 Shows significant improvement in Subjective pain intensity, VAS, tenderness index, disability due to pain, spinal mobility index and Oswestry disability index in Group-A.

Table 3.7: Treatment Response in Group-B

Parameter	Mean ± SD	P value
Subject pain intensity		
Pretreatment score W_0	3.27±0.66	
Post treatment score W_8	2.11±0.67	0.001
Pain score (VAS)		
Pretreatment score W_0	7.11±0.83	0.002
Post treatment score W_8	6.11±0.75	
Tenderness index		
Pretreatment score W_0	2.72±0.46	0.001
Post treatment score W_8	1.88±0.58	
Disability due to pain		
Pretreatment score W_0	2.44±0.61	0.021
Post treatment score W_8	1.61±0.50	
Spinal mobility index		
Pretreatment score W_0	5.41±0.33	0.004
Post treatment score W_8	5.45±0.32	
Oswestry disability index		
Pretreatment score W_0	53.40±4.96	0.002
Post treatment score W_8	12.00±4.05	

Table-3.7 Shows significant improvement in Subjective pain intensity, VAS, tenderness index, disability due to pain, spinal mobility index and Oswestry disability index in Group-B.

Table 3.8: Treatment Response in Group-C

Parameter	Mean ± SD	P value
Subject pain intensity		
Pretreatment score W_0	3.15±0.48	
Post treatment score W_8	1.35±1.08	0.001
Pain score (VAS)		
Pretreatment score W_0	7.15±0.75	0.001
Post treatment score W_8	5.25±0.16	
Tenderness index		
Pretreatment score W_0	2.90±0.30	0.001
Post treatment score W_8	1.30±1.08	
Disability due to pain		
Pretreatment score W_0	2.10±0.64	0.001
Post treatment score W_8	0.90±0.71	
Spinal mobility index		
Pretreatment score W_0	5.36±0.32	0.001
Post treatment score W_8	5.49±0.26	
Oswestry disability index		
Pretreatment score W_0	48.87±5.71	0.001
Post treatment score W_8	12.25±4.05	

Table-3.8 Shows significant improvement in Subjective pain intensity, VAS, tenderness index, disability due to pain, spinal mobility index and Oswestry disability index.

Table 3.9: Comparative study between Group-B and Group-C

	Study Group		P value
	Group-B Mean ± SD	Group-C Mean ± SD	
Subject pain intensity			
Pretreatment score W_0	3.27±0.66	3.15±0.48	0.503
Post treatment score W_8	2.11±0.67	1.35±1.08	0.015
Pain score (VAS)			
Pretreatment score W_0	7.11±0.83	7.15±0.75	0.880
Post treatment score W_8	6.11±0.75	5.25±0.16	0.011
Tenderness index			
Pretreatment score W_0	2.72±0.46	2.90±0.30	0.167
Post treatment score W_8	1.88±0.58	1.30±1.08	0.047
Disability due to pain			
Pretreatment score W_0	2.44±0.61	2.10±0.64	0.101
Post treatment score W_8	1.61±0.50	0.90±0.71	0.100
Spinal mobility index			
Pretreatment score W_0	5.41±0.33	5.36±0.32	0.631
Post treatment score W_8	5.45±0.32	5.49±0.26	0.679
Oswestry disability index			
Pretreatment score W_0	53.40±4.96	48.87±5.71	0.220
Post treatment score W_8	12.00±4.05	12.25±4.05	0.781

Table 3.9 shows the treatment responses of one group at each follow up were compared with that of another group. There were no significant difference in pre-treatment assessment between the groups and the difference of improvement during post treatment also were not significant.

Table 3.10: Comparative study of Group-A, Group-B and Group-C

		Study Group		P value
	Group-A Mean ± SD	Group-B Mean ± SD	Group-C Mean ± SD	
Subject pain intensity				
Pretreatment score W_0	3.21±0.72	3.27±0.66	3.15±0.48	0.824
Post treatment score W_8	2.56±0.62	2.11±0.67	1.35±1.08	0.001

Pain score (VAS)				
Pretreatment score W_0	7.06±0.81	7.11±0.83	7.15±0.75	0.935
Post treatment score W_8	6.55±0.77	6.11±0.75	5.25±0.16	0.001
Tenderness index				
Pretreatment score W_0	2.49±0.71	2.72±0.46	2.90±0.30	0.064
Post treatment score W_8	1.94±0.64	1.88±0.58	1.30±1.08	0.030
Disability due to pain				
Pretreatment score W_0	2.05±0.72	2.44±0.61	2.10±0.64	0.162
Post treatment score W_8	1.38±0.69	1.61±0.50	0.90±0.71	0.004
Spinal mobility index				
Pretreatment score W_0	5.33±0.28	5.41±0.33	5.36±0.32	0.752
Post treatment score W_8	5.37±0.27	5.45±0.32	5.49±0.26	0.001
Oswestry disability index				
Pretreatment score W_0	54.00±4.96	53.40±4.96	48.87±5.71	0.272
Post treatment score W_8	12.00±4.05	12.00±4.05	12.25±4.05	0.070

Table-10 Shows the treatment responses of Group-A were compared with other two groups. There was no significant differences in pre-treatment assessment and the improvement during treatment in all three groups were significant.

Table 3.11: Comparative study of Group-A, Group-B and Group-C (ANOVA-F)

	F	P value
Subject pain intensity		
Pretreatment score W_0	0.025	0.824
Post treatment score W_8	8.760	0.001
Pain score (VAS)		
Pretreatment score W_0	2.620	0.935
Post treatment score W_8	12.79	0.001
Tenderness index		
Pretreatment score W_0	2.890	0.064
Post treatment score W_8	5.080	0.030
Disability due to pain		
Pretreatment score W_0	0.591	0.162
Post treatment score W_8	3.900	0.004
Spinal mobility index		
Pretreatment score W_0	3.410	0.752
Post treatment score W_8	5.318	0.001
Oswestry disability index		
Pretreatment score W_0	2.33	0.272
Post treatment score W_8	10.22	0.070

Table-3.11 Shows The treatment responses of Group-A were compared with other two groups. There was no significant differences in pre-treatment assessment and the improvement during treatment in all three groups were significant.

DISCUSSION

Age of the patient: In this current study it was observed that mean age in Group-A was 41.82± 11.95 and 42.7± 12.52 in Group-B and 40.52 ± 13.40 in Group-C. The mean age differences among all groups are not significant. Internationally chronic non-specific low back pain can begin in person as young as twenty years as increase as age advances [16]. In Shakoor MA *et al.*, [11] study mean age was 42.22 ± 8.07 years in a study conducted with 102 patients of choric low back pain. The above study findings are all most similar with the current study.

Sex of the patients: In this present study it was observed that male was predominant in all groups, which were 57.5% in Group-A and 55% in Group-B and 55.7% in group-C. The male-female ratio in the present study was 1.34:1. Hossain MS *et al.*, [31] found female predominance where male to female ratio was 1: 1.33.But in large epidemiological studies no statistically significant difference exists between male and female [32]. The above findings are consistent with the recent study.

Occupation: In this study it was observed that most of the patients were mostly house wives (22.5%, 20% and 17.5%) in three groups. Zaman M M *et al.*, [33] found 15 % housewives, 24% students, 19% service holders, 13% farmers, 11% Workers. Sakoor *et*

al., [11] in a study conducted with 102 patients in BSMMU found that most of the patients were housewives (58.8%). This findings are consistent with the present study because the in our country, the housewives perform nearly repetitive, lifting and bending In furnishing their household activities like washing, floor moping, cooking, cutting things in an uncomfortable squatting position. These may lead to recurrent rotational strain causing low back pain.

Socio-economic condition: In this study, it was observed that majority patients came from middle class followed by poor class. Poor people in our country have to do heavy works which includes repetitive twisting, bending, heavy weight lifting etc. In addition they do not have enough money to manage balanced diet and proper medication in early stage of disease which increase the incidence of chronic illness. Interestingly few patients were attended from reach group. This is due to our public health service with recent notable improvement still count reach the satisfactory label. Rich people usually take treatment from private clinic and from private doctors but the poor and middle class people do not have enough money to take treatment from private sector and these two groups comprise most of study population. Shakoor *et al.,* [11] in as study with patients with chronic low back pain that maximum patients were from middle socio-economic group. So the above findings are consistent with the present study.

Duration of pain: In this study, mean duration of pain was found 23.9± 2.57 months in Group-A and 21.0 ± 1.5 months in Group-B and 22.1 ± 1.89 months in Group-C. Borman, Keskin and Bodur showed the mean duration of low back pain 34.09 ± 14.1 months and 27 ± 19.5 months in Group-A and Group-B respectively. Almost similar observation were also made by shimada *et al.,* [34] and Kramer [35].

Outcome variable: In this current study it was observed that the entire variable individually improved in Group-A, Group-B and Group-C. So, all the three treatment groups were benefited from drugs and therapy. But these were not statistically significant in between Group-B and Group-C. All therapies were helpful. But there was no significant difference in improvement between TENS and Back Extension exercise.

VAS was better in patient who took TENS or Back extension exercise than in those who did not but this difference was not statistically significant. Subjective pain intensity, tenderness index improved in both the groups and statistically significant (P<0.05) but in between the groups these are not statistically significant (P>0.5).Disability due to pain and spinal mobility index- both the variables improved at the end of week 8and statistically significant (P<0.05) Deyo *et al.,* [23] showed all most similar observation.

The measurement of disability is an important component of the management of patients with chronic low back pain, as the physical performance of patients with low back pain is obviously different from that in patients with other clinical pain syndromes [37]. No statistically significant (P>0.05) difference was observed between two groups regarding the Oswestry disability questionnaire score.

CONCLUSION

The number of patients studied was small and there were some limitations of this trial. Beneficial effects of drugs, ADL training, TENS, Back extension exercise were seen in this study. Considering the information gathered from this study, it can be concluded that all the tested therapies seemed to improve the patients with chronic low back pain. But TENS and Back extension exercise showed no significant difference in improvement for the patients with chronic LBP.

RECOMMENDATIONS

The information collected needs verification by larger long term follow-up studies. Multicenter study at different region of the country should be carried out.

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