JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

To compare the cognitive behavioural therapy and myofascial release along with conventional therapy in patients with cervicogenic headache.

Varsha1, Huma Siddiqui2, Monika Sharma3

Post - Graduation Student (MPT Neurology), Institute of Applied Medicines & Research, Ghaziabad, Delhi, India.

Associate Professor, Faculty of Physiotherapy, Institute of Applied Medicines & Research, Ghaziabad, Delhi, India.

Associate Professor, Faculty of Physiotherapy, Institute of Applied Medicines & Research, Ghaziabad, Delhi, India.

ABSTRACT

Background: Cervicogenic headache (CGH) is a type of secondary headache caused by cervical disorder. CGH is characterized by unilateral headache involving the neck. CGH generally occurs at the cervical 2 -3 zygapophysial joint and dysfunctions may be observed. Understanding these risk factors is crucial in identifying individuals who may be more susceptible to cervicogenic headache.
Objective:

This study aimed to analyse the effect of cognitive behavioural therapy and myofascial release along with conventional therapy and to compare the effect of cognitive behavioural therapy and myofascial release along with conventional therapy in patients with cervicogenic headache.

Methods:

A sample of 30 subjects for four weeks who met the inclusion and exclusion criteria were recruited from Jaipur Golden Hospital OPD, Delhi, A written consent was obtained from the subjects. Data collection of the subjects was collected and examination was done. The subjects were randomly allocated into two groups by convenient sampling.

Group A (Experimental Group) Cognitive behavioural therapy along with conventional therapy.

Group B (Control Group) Myofascial Release along with conventional therapy.

Results: Statistical analysis showed significant improvement in Craniovertebral angle, neck disability index, headache disability index, quality of sleep with $p<.001$ in within group A.

Conclusion: The study's findings implied that cognitive behavioural therapy along with conventional therapy had a considerable impact on quality of life, reduced disability (NDI, HDI), reduce pain and increased (CVA) to the patients with (CGH).

Keywords: CGH- Cervicogenic headache, CVA- Craniovertebral angle, NDI- Neck disability index, HDI- Headache disability index.

1. INTRODUCTION

Cervicogenic headache (CGH) is a common problem associated with neck pain originates in the cervical spine or soft tissues of the neck and is referred to the head. Cervicogenic headache is a chronic, hemi cranial pain syndrome in which the sensation of pain originates in the cervical spine or soft tissues of the neck and is referred to the head. The trigeminocervical nucleus is a region of the upper cervical spinal cord where sensory nerve fibers in the descending tract of the trigeminal nerve converge with sensory fibers from the upper cervical roots. This convergence of nociceptive pathways allows for the referral of pain signals from the neck to the trigeminal sensory receptive fields of the face and head as well as activation of the trigeminovascular neuroinflammatory cascade, which is generally believed to be one of the important pathophysiologic mechanisms of migraine. Also relevant to this condition is the convergence of sensorimotor fibers of the spinal accessory nerve (CN XI) and upper cervical nerve roots, which ultimately converge with the descending tract of the trigeminal nerve. These connections may be the basis for the well-recognized patterns of referred pain from the trapezius and sternocleidomastoid muscles to the face and head.

Headaches affect approximately 66% of the global population, and these can lead to disability and reduced work productivity. Cervicogenic headache (CGH) is a type of secondary headache caused by a cervical disorder. CGH is characterized by unilateral headache involving the neck. In cases like these, a neck palpation indicates limited cervical range of motion (CROM) and upper cervical pain. CGH generally occurs at the cervical 2–3 zygapophysial joint and dysfunctions may be observed at the atlanto- occipital, atlantoaxial, and zygapophysial joints in the cervical spine.

Cervicogenic headache (CGH) arises from pain stimulation of the spinal nerves C1, C2, and C3 in the cervical region, which transmit pain signals to the trigeminocervical complex (TCC). Pain stimulation in the upper cervical region overlaps structurally and terminally with the pain-sensitive nerve endings of the first and second cervical regions of the trigemino-cervical complex (TCC), and this convergence can cause pain associated with the head and around the eyes. Previous studies claimed that a sensory disorder arises from reduced tactile sensitivity and increased mechanical sensitivity of the trigeminal nerve as a result of such negative stimulations.

Previous research has reported that forward head posture (FHP) has a significant impact on the musculoskeletal system. FHP can lead to various conditions, including cervical nerve root compression, CGH, and dizziness. FHP involves an increase in extension of the upper cervical spine and flexion of the lower cervical and upper thoracic spine. As a result, FHP can cause instability in the upper cervical and upper thoracic regions and hypermobility in the lower cervical region, leading to muscle tension and weakness patterns known as Upper Crossed Syndrome. This FHP can cause biomechanical symptoms in the upper cervical region and is considered the root cause of CGH due to joint instability. As a result of such postures, the abnormal contractions around the head and neck induce muscle tension, causing a CGH. Notably, muscles including the sternocleidomastoid (SCM), upper trapezius (UT), levator scapulae (LS), scalene, suboccipalis (SO), pectoralis minor, and pectoralis major are shortened. Self-stretching is often used as an intervention to relax the reduced muscles by increasing the range of muscle extension to restore muscle activity and promote flexibility to improve overall performance. However, although stretching is used to transiently relieve pain, its benefits are limited in cases of the long-term treatment for CGH based on corrected posture improvement.

Due to the association between CGH and cervical dysfunctions, the joint mobilization of the upper cervical spine is reported as the most effective intervention to improve CGH symptoms. So far, various studies on CGH have shown that the joint mobilization of the upper cervical spine could lower the pain related to headaches but induce limited changes in FHP or cervical mobility. Thus, this method is effective solely in pain relief but inadequate as a treatment to improve muscle imbalance or correct postural abnormality.

Cognitive Behavioural Therapy (CBT), myofascial release along with conventional therapy can be an effective approach for managing cervicogenic headaches (CGH). CBT is a form of talk therapy that helps individuals manage pain and stress by changing negative thought patterns and

behaviours. For patients with cervicogenic headaches, CBT along with conventional therapy helpful in pain relief stress reduction improve functionality.

Myofascial release (MFR) is a hands-on technique aimed at releasing tension and tightness in the muscles and fascia (the connective tissue surrounding muscles). This technique particularly beneficial in CGH, as it directly addresses muscle and soft tissue restrictions in the neck and upper back, targeting trigger points improve range of motion reduced muscles tension.

2. METHODOLOGY

2.1 STUDY DESIGN

A Convenient sampling method was used for the subjects were randomly divided into two equal groups of 15 each i.e., Group A (Cognitive behavioural therapy), Group B (Myofascial release technique).

2.2 STUDY LOCATION

The study was conducted at physiotherapy OPD of jaipur golden hospital, Delhi.

2.3 SAMPLE SIZE:

The sample size was calculated by using formula given, n= Z2 pq/e2 where, n= Number of items in samples, Z2= Square of the confidence interval in standard error units, p= Standard of deviation, q= (1-p),e= Acceptable sample error. A total of 30 subjects were participated in the study, which were randomly divided into 2 groups each consists of 15 subjects.

2.4 SELECTION CRITERIA

2.4.1 Inclusion Criteria

1.Male and females between the age group- 25 to 45 years.

2.Cervicogenic headache minimum 4 months.

3.Subject fulfilling the diagnosis criteria according to international classification of the headache disorder on 2nd edition.

2.4.2 Exclusion Criteria:

1.Other second headache.

2.Patient with mechanical injury like RTA, fall etc.

3.History of head trauma or surgery and previous cervical vertebral fracture or deformity.

4.Patient with cervical disc herniation, Spondylolisthesis, Spinal Cord injury, Bone trauma and rheumatoid arthritis.

5.Patient with congenital disorder like Torticollis, Muscular dystrophy, spina bifida etc.

6.Patient with neurological disorder like mental cognitive, alternation etc.

3.7 STUDY VARIABLES:

3.7.1 Dependent Variables:

1.Numeric Pain Rating Scale (NPRS)

2.Neck Disability Index (NDI)

3.Headache Disability Index (HDI)

4.Pittsburgh Sleep Quality Index (PSQI)

5.Quality Of Life Scale (QOL)

6.Craniovertebral Angel (CV angle)

3.7.2 Independent Variable:

1.Cognitive behavioral therapy (CBT)

2.Conventional exercises

3.Myofascial release technique (MFR)

3.8 OUTCOME MEASURES:

1.Pain

2.Disability

3.Headache

4.Quality Of Life

5.Sleep

6.Posture

3.11 PROCEDURE:

The sample of 30 subjects were selected from the population on the basis of inclusion and exclusion criteria. The subjects who fulfilled the protocol was equally divided in two equal groups. Written consent was taken from the participants.
The treatment protocol of 60 min/ day for 3 days/week for a period of 4 weeks were given in the supervision of the researcher for both the groups. Group A was be given Cognitive behavioural therapy (CBT) along with conventional therapy and and group B was given Myofascial release technique (MFR)along with stabilization exercise.

Group A: Cognitive Behavioural Therapy (CBT) with Conventional Therapy

Phase	Description
1st Phase, 1st Week (3 sessions/week)	**Relaxation Strategies**: These sessions will focus on teaching the person about stress, the relaxation response, and how relaxation strategies can help them with their headache symptoms. It can be helpful to teach all three relaxation skills (breathing exercise, progressive muscle relaxation, and guided visual imagery) so that the person has a choice of different relaxation tools available to manage their headache disease. Of note, progressive muscle relaxation has the most evidence to support its use in headache diseases. Encourage the person to try practicing all the techniques so that they can figure out which one works best for them.

2nd Phase, 2nd Week (3 sessions/week)	**Contributing Factors & Managing the Headache Threshold**: This session will focus on taking a deeper look at the headache threshold theory that you introduced during the intake session and ways that the person can manage the most commonly reported headache contributing factors (stress, inadequate sleep, skipped meals, caffeine, alcohol, weather changes, hormonal changes in women, and comorbid pain/medical conditions). **Muscle Stretches** During muscle stretching, the key is to gently stretch your muscles with smooth and slow motions. Never force a tight, tense muscle with sudden movements. Your muscles will let you know if you are treating them with the gentleness they like—or if you are not!
3rd Phase, 3rd Week (3 sessions/week)	**Behavioural modification:** Behavioural modification, breaking routine in the use of the Internet. Training time management with a diary of Internet use, changing ways of dealing with family, friends, social activities, physical exercises, and other aspects of life. Insert positive emotion into daily activities to develop social skills to promote less.Internet usage and more in-person interactions.
4th Phase, 4th Week (3 sessions/week)	**Planning Ahead:** Reinforcement of continued recovery and relapse prevention through new beliefs and behaviours, social skills like assertiveness, problem solving, verbal communication, and empathy. Achievement card. Follow-up of scales.

Group B: Myofascial release technique (MFR) with Conventional Therapy

Subcarinal inhibitive distraction (SID) which is a myofascial release technique will be used.

Patient Position: Supine lying
Therapist position: Sitting at the head end of the bed
Muscle that will be released: Suboccipital muscle
Procedure: Place the hand at the base of the occiput, be sure that the patients head will eventually drop into your hand. Rest the back of your hand on the table, use traction equal to the weight of the patient's head, hold and weight for the release. When release occurs, you will feel the full weight of the patient head on your hands. The final stroke is performed with both hands at the same time, ending with the heel of the hands just under the curve of his skull with the fingers extended along the neck.
Conventional therapy will be given to both the groups i.e., Group A and Group B which includes Moist pack for 10 minutes, Stretching of Bilateral Upper trapezius muscle, Levator scapulae and strengthening of deep cervical Muscles.

Statistical Analysis

Statistical analysis of 30 patients with cervicogenic headache on pain, craniovertebral angle, neck disability index, headache disability index, quality of sleep, with cognitive behavioural therapy and myofascial release along with conventional therapy was performed using Software IBM SPSS 28 for Windows Version. Data was entered into an excel spreadsheet, tabulated, and statistical analysis was performed for this purpose. All of the variables' mean and standard deviation were determined. Tables and graphs were used to display the data's properties. At $p<.001$, the results were considered statistically significant.

Result

In this study total subjects were selected aged 25-40 years who met the inclusion criteria and the treatment protocol for periods of 4 week. the subjects include 10 females 20 males out of 30 subjects who were divided into two group, Group A and Group B. Group A (N=15) cognitive behavioural therapy along with Conventional Therapy and Group B Myofascial release alone with conventional. In the result analysis of demographic data, comparison with in the group and in between the group has been done.

Table 5.1 Distribution of total sample according to a Gender between different study group.

Gender	Group A		Group B	
	Mean	%	Mean	%
Male	10	66.66	10	66.66
Female	5	33.33	5	33.33
Total	15	100	15	100

comparison of number and percentage of Gender among Group A and B. The number and percentage in Group A was Male 10 (66.66%) and Female 5 (33.33%) and Group B was male 10(66.66%) and Female 5 (33.33%) respectively. The geographical representation is show in figure.

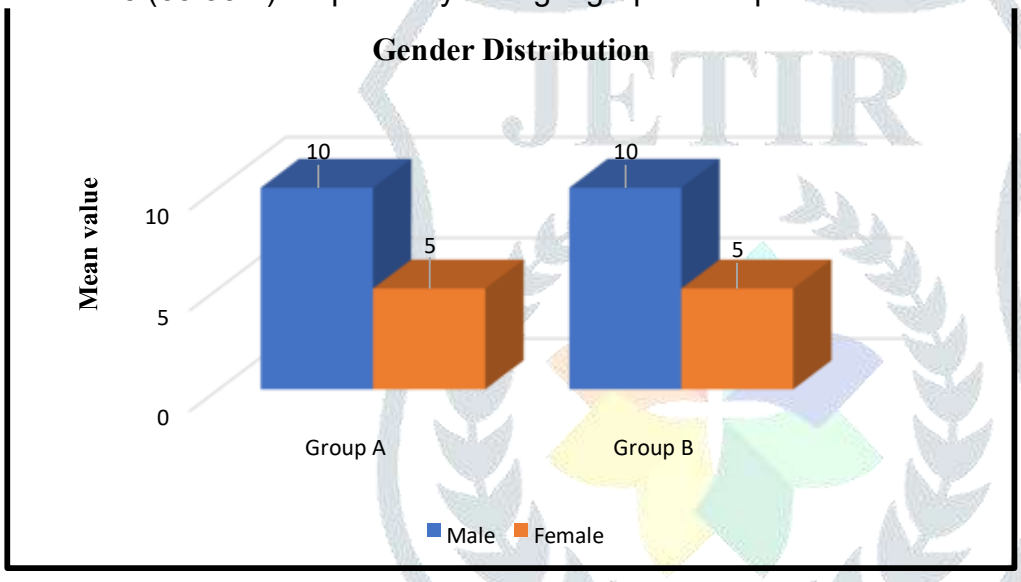


Figure 5.1: Comparison of mean of gender among Group A and Group B

5.1.2 Comparison of mean and standard Deviation (SD) of Age among Group A and B.

Age (in Year)	Age (in years)	
	Mean	Standard Deviation (SD)
Group A	27.7	2.81
Group B	30.3	4.89

Table 5.1.2 show comparison of Mean and standard Deviation (SD) of Age among Group A and B. The Mean and standard Deviation (SD) in Group A and B was 27.7 ±2.81 and 30.3 ±4.89 respectively. The geographical representation is show in figure.

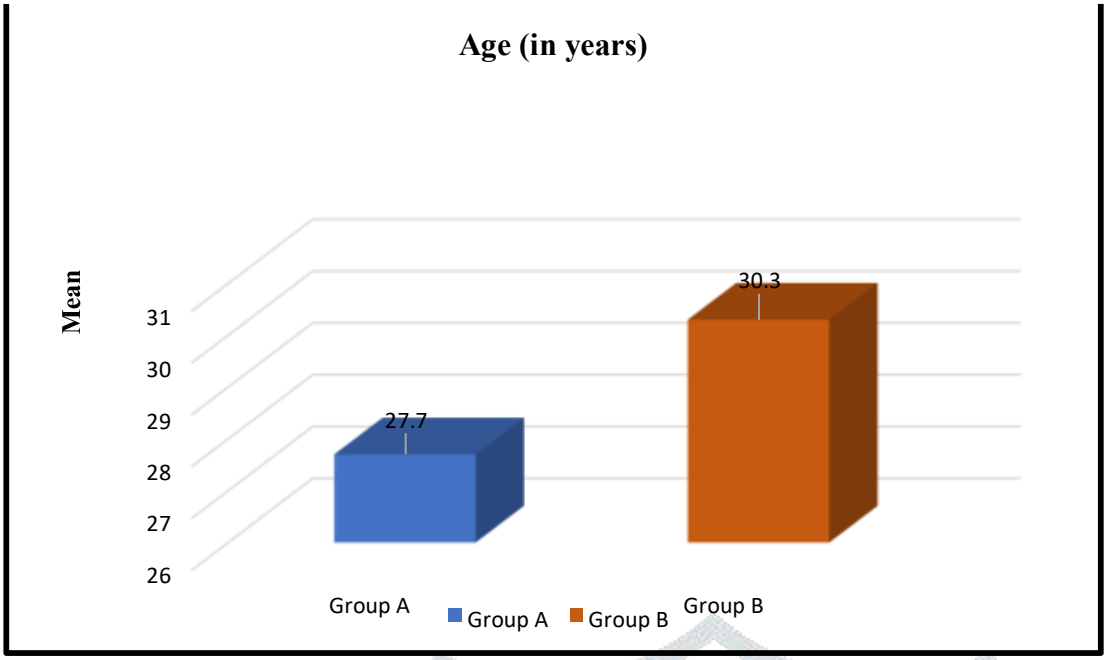


Figure 5.1.2: Comparison of mean of age among Group A and Group B.

5.2 Improvement of Pain on Numeric Pain Rating Scale (NPRS)

5.2.1 Comparison of Mean and standard Deviation (SD) Of Numeric Pain Rating Scale (NPRS) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

NPRS	Pre-Intervention (Baseline)		Post Intervention (End of 4th week)	
	Mean	SD	Mean	SD
Group A	6.47	0.743	3	0.756
Group B	6.93	0.704	4.8	0.862

Table 5.2.1 show Comparison of Mean and standard Deviation (SD) Of Numeric Pain Rating Scale (NPRS) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of NPRS score 6.47 ± 0.743 and 3 ±0.756 respectively were found within the Group A; whereas the mean and standard deviation of pre and post intervention data of NPRS score 6.93 ±0.704 and 4.8 ±0.862 respectively were found within the Group B. The geographical representation is show in figure.

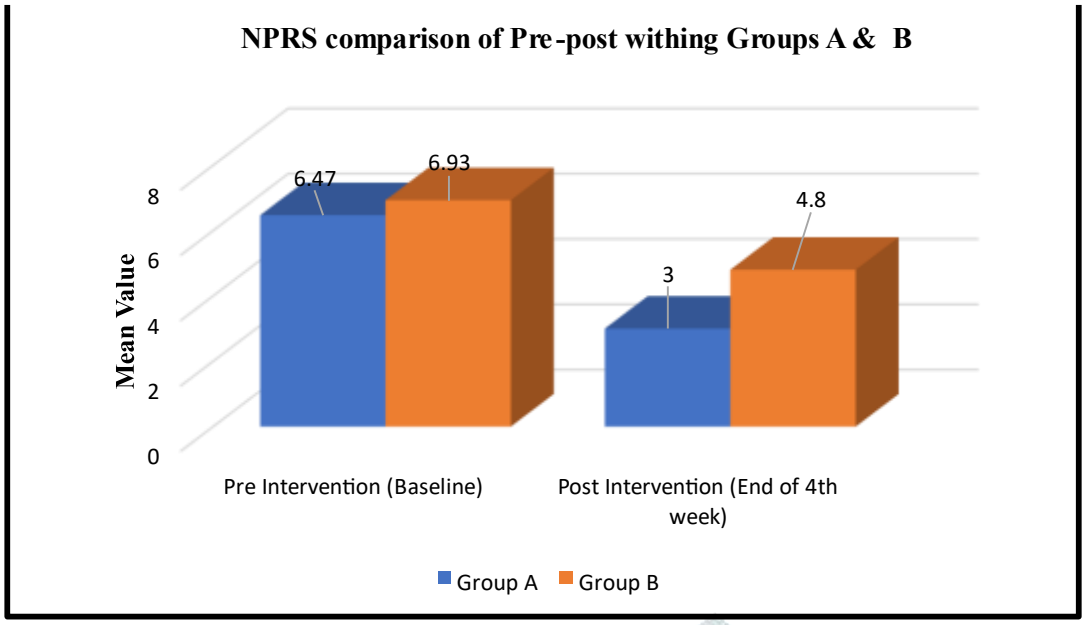


Figure 5.2.1: showe comparison of Mean of Numeric Pain Rating Scale (NPRS) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A & Group B.

5.2.2 comparison of t-value and p-value of Numeric Pain Rating Scale at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

NPRS	Group A		Group B	
	t value	p value	t value	p value
Pre (Baseline) Vs Post intervention (End 4th week)	20.98	< .001	9.91	< .001

Table 5.2.2 show Comparison of t-value and p -value Of Numeric Pain Rating Scale (NPRS) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The t-value and p-value pre- intervention and post -intervention data of NPRS was t=20.98 and p< .001 within Group A and t-value=9.91 and p< .001 within the Group B.

5.2.3 Comparison of Mean of Numeric Pain Rating Scale (NPRS) Score at pre- intervention (Baseline) and post -intervention (End of 4th week) of subjects between Group A (Experimental)& Group B (Control).

NPRS	Group A		Group B	
	t value	p value	Mean± SD	Mean± SD
Pre-Intervention (Baseline)	6.47 ± 0.743	6.93 ±0.704	1.766	0.088
Post Intervention (End of 4th week)	3 ± 0.756	4.8 ± 0.862	6.081	< .001

Table.5.2.3 show Comparison of Mean of Numeric Pain Rating Scale (NPRS) at pre- intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B. The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of NPRS score 6.47 ± 0.743 and 3 ± 0.756 and 6.93 ±0.704 and 4.8 ± 0.862

respectively were found between the Group A &B. There was significant difference in post intervention (p=< .001) between group A & B.

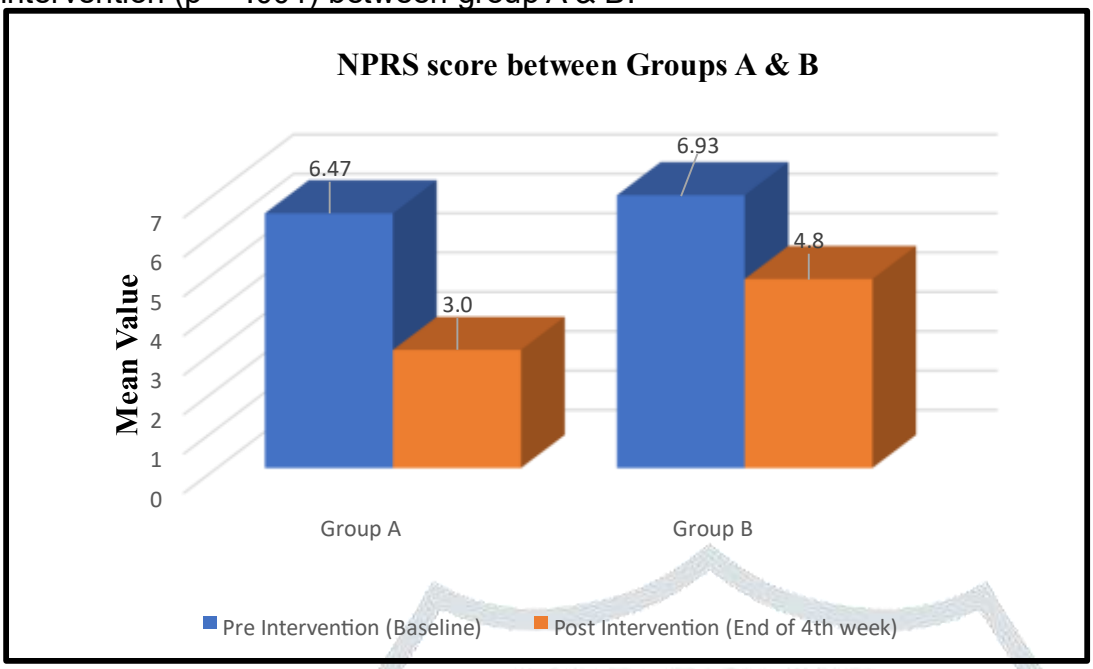


Figure 5.2.3: show Comparison of Mean of Numeric Pain Rating Scale (NPRS) at pre-intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B.

5.3 Improvement of Disability on Neck Disability Index (NDI)

5.3.1 Comparison of Mean and standard Deviation (SD) of Neck Disability Index (NDI) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

NDI	Pre-Intervention (Baseline)		Post Intervention (End of 4th week)	
	Mean	SD	Mean	SD
Group A	32.87	1.642	25.13	2.416
Group B	31.73	2.251	27.8	1.74

Table 5.3.1 show Comparison of Mean and standard Deviation (SD) Of Neck Disability Index (NDI) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of NDI score 32.87 ± 1.642 and 25.13 ± 2.416 respectively were found within the Group A; whereas the mean and standard deviation of pre and post intervention data of NDI score 31.73 ±2.251 and 27.8 ±1.74 respectively were found within the Group B. The geographical representation is show in figure.

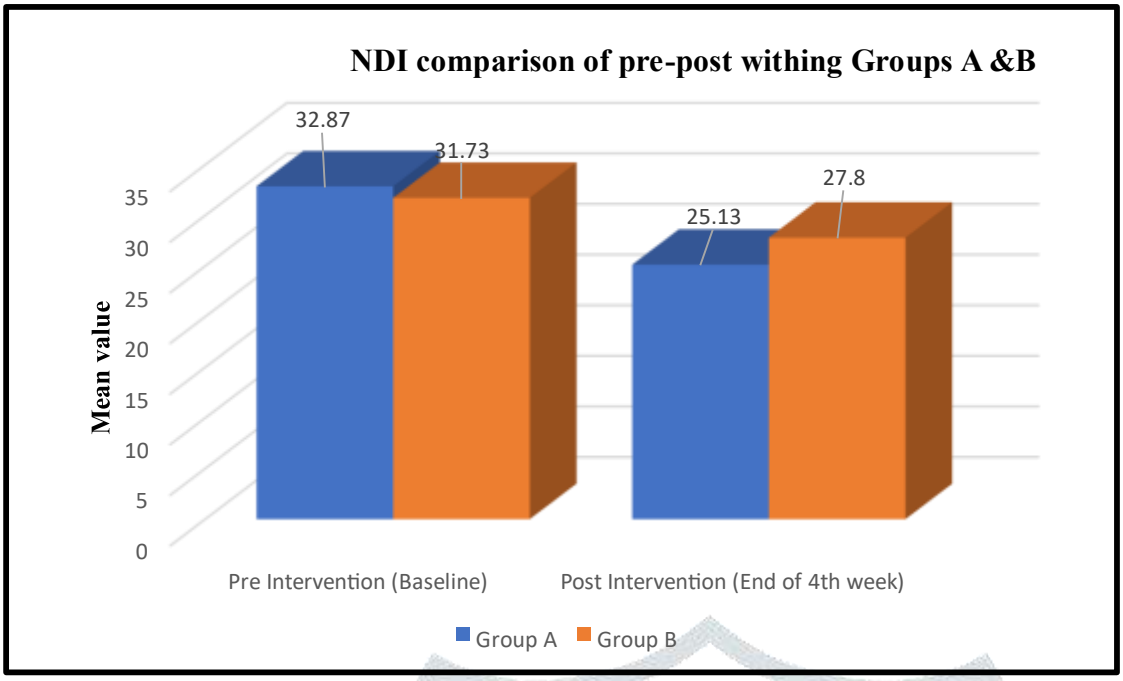


Figure 5.3.1: Show Comparison of Mean of Neck Disability Index (NDI) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A & Group B.

5.3.2 comparison of t-value and p-value of Neck Disability Index (NDI) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

	Group A		Group B	
NDI	**t value**	**p value**	**t value**	**p value**
Pre (Baseline) Vs Post intervention (End 4th week)	15.4	< .001	17.24	< .001

Table 5.3.2 show Comparison of t-value and p -value of Neck Disability Index (NDI) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The t-value and p-value pre- intervention and post -intervention data of NPRS was t=15.4 and p< .001 within Group A and t-value=17.24 and p< .001 within the Group B.

5.3.3 Comparison of Mean of Neck Disability Index (NDI) Score at pre- intervention (Baseline) and post -intervention (End of 4th week) of subjects between Group A (Experimental)& Group B (Control).

NDI	**Group A**	**Group B**	**t value**	**p value**
	Mean± SD	**Mean± SD**		
Pre-Intervention (Baseline)	32.87 ± 1.642	31.73±2.251	-1.576	0.126
Post Intervention (End of 4th week)	25.13± 2.416	27.80 ± 1.740	3.468	0.002

Table.5.3.3 show Comparison of Mean Of Neck Disability Index (NDI) at pre- intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B. The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of NDI score 32.87 ± 1.642 and 25.13± 2.416 and 31.73±2.251 and 27.80 ± 1.740 respectively were found between the Group A &B.

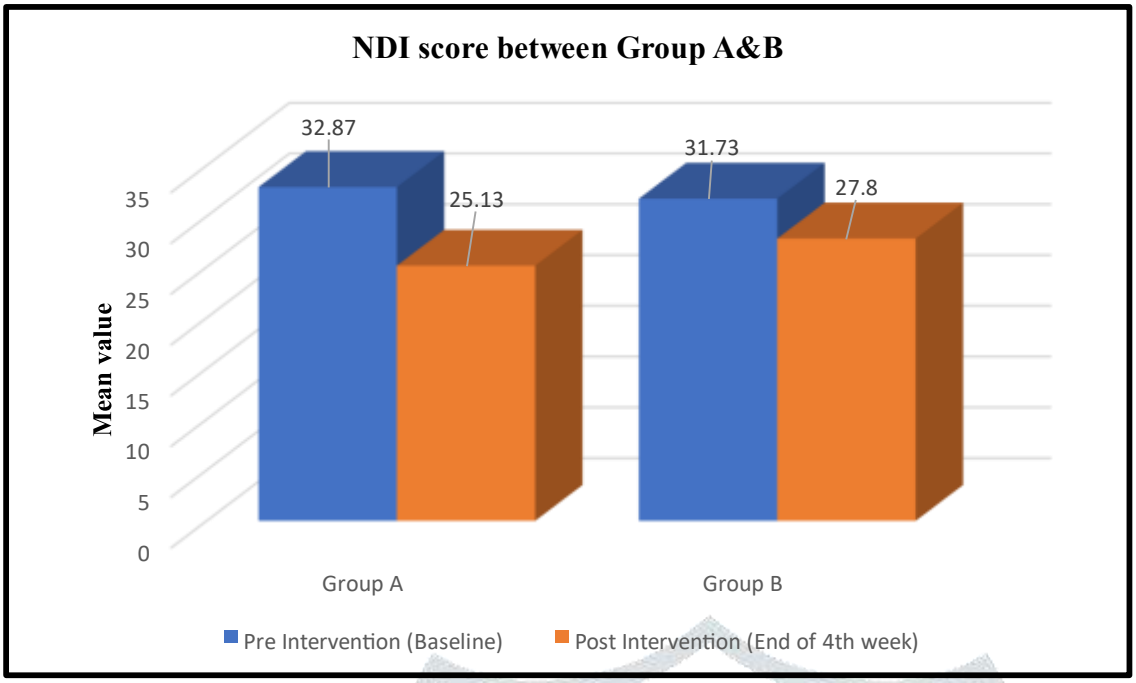


Figure 5.3.3: show Comparison of Mean of Neck Disability Index (NDI) at pre- intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B.

5.4 Improvement of Disability due to Headache-on-Headache Disability Index (HDI)

5.4.1 Comparison of Mean and standard Deviation (SD) Of Headache Disability Index (HDI) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

HDI	Pre-Intervention (Baseline)		Post Intervention (End of 4th week)	
	Mean	SD	Mean	SD
Group A	70.27	3.535	51.87	6.988
Group B	69.73	3.348	39.73	5.994

Table 5.4.1 show Comparison of Mean and standard Deviation (SD) Of Headache Disability Index (HDI) at pre- intervention (Baseline) and post -intervention (End of 4th week)within the Group A (Experimental)& Group B (Control). The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of HDI score 70.27 ± 3.535 and 51.87 ± 6.988 respectively were found within the Group A; whereas the mean and standard deviation of pre and post intervention data of HDI score 69.73 ±3.348 and 39.73 ±5.994 respectively were found within the Group B. The geographical representation is show in figure.

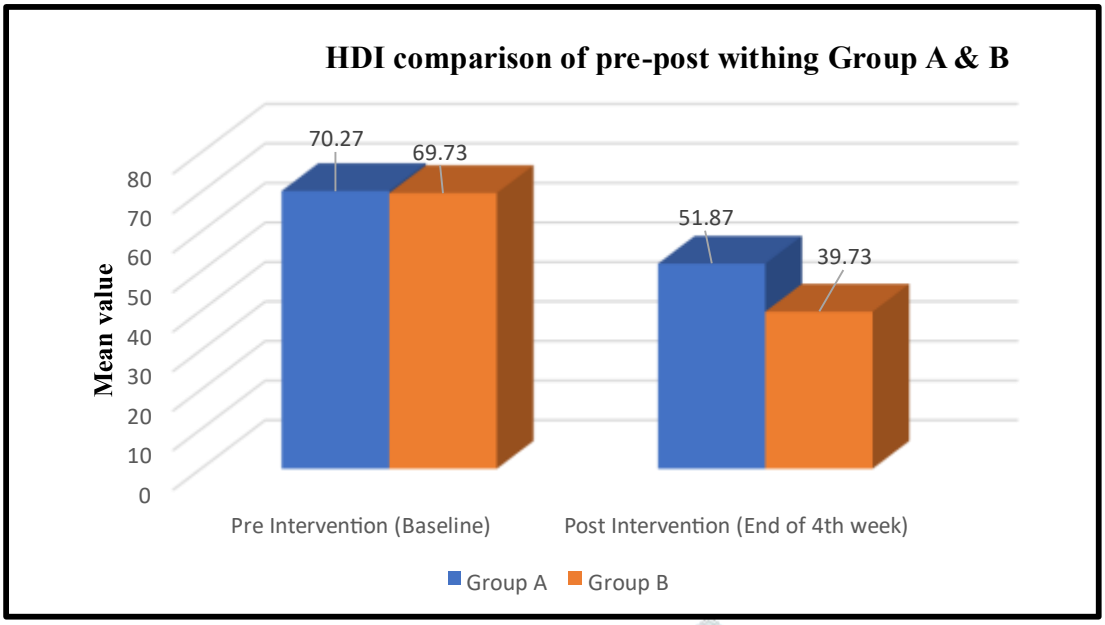


Figure 5.4.1: show Comparison of Mean of Headache Disability Index (HDI) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A & Group B.

5.4.2 comparison of t-value and p-value of Headache Disability Index (HDI) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

HD	Group A		Group B	
	t value	p value	t value	p value
Pre (Baseline) Vs Post intervention (End 4th week)	11.59	< .001	15.79	< .001

Table 5.4.2 show Comparison of t-value and p -value Of Headache Disability Index (HDI) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The t-value and p-value pre- intervention and post -intervention data of HDI was t=11.59 and p< .001 within Group A and t-value=15.79 and p< .001 within the Group B.

5.4.3 Comparison of Mean of Headache Disability Index (HDI) Score at pre- intervention (Baseline) and post -intervention (End of 4th week) of subjects between Group A (Experimental)& Group B (Control).

HDI	Group A Mean± SD	Group B Mean± SD	t value	p value
Pre-Intervention (Baseline)	70.27 ± 3.535	69.73±3.348	-0.424	0.675
Post Intervention (End of 4th week)	51.87± 6.988	39.73 ± 5.994	-5.104	< .001

Table.5.4.3 show Comparison of Mean of Headache Disability Index (HDI) at pre-intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B. The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of HDI score 70.27 ± 3.535 and 51.87± 6.988 and 51.87± 6.988 and 39.73 ± 5.994 respectively were found between the Group A &B.

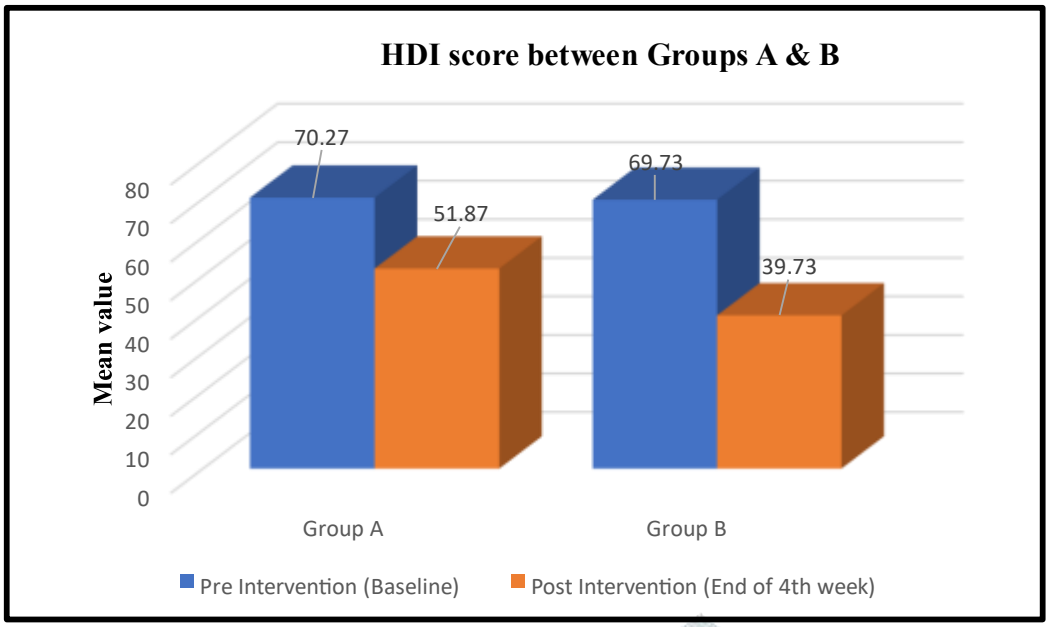


Figure 5.4.3: show Comparison of Mean of Headache Disability Index (HDI) at pre-intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B.

5.5 Improvement of Sleep on Pittsburgh Sleep Quality Index (PSQI)

5.5.1 Comparison of Mean and standard Deviation (SD) of Pittsburgh Sleep Quality Index (PSQI) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

	Pre-Intervention (Baseline)		Post Intervention (End of 4th week)	
PSQI	**Mean**	**SD**		
	34.93	2.404	**Mean**	**SD**
Group A	37	2.204	28.27	2.086
Group B			31.87	2.386

Table 5.5.1 show Comparison of Mean and standard Deviation (SD) Of Pittsburgh Sleep Quality Index (PSQI) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of PQSI score 34.93± 2.404 and 28.27 ± 2.086 respectively were found within the Group A; whereas the mean and standard deviation of pre and post intervention data of PQSI score 37 ±2.204 and 31.87 ±2.386 respectively were found within the Group B. The geographical representation is show in figure.

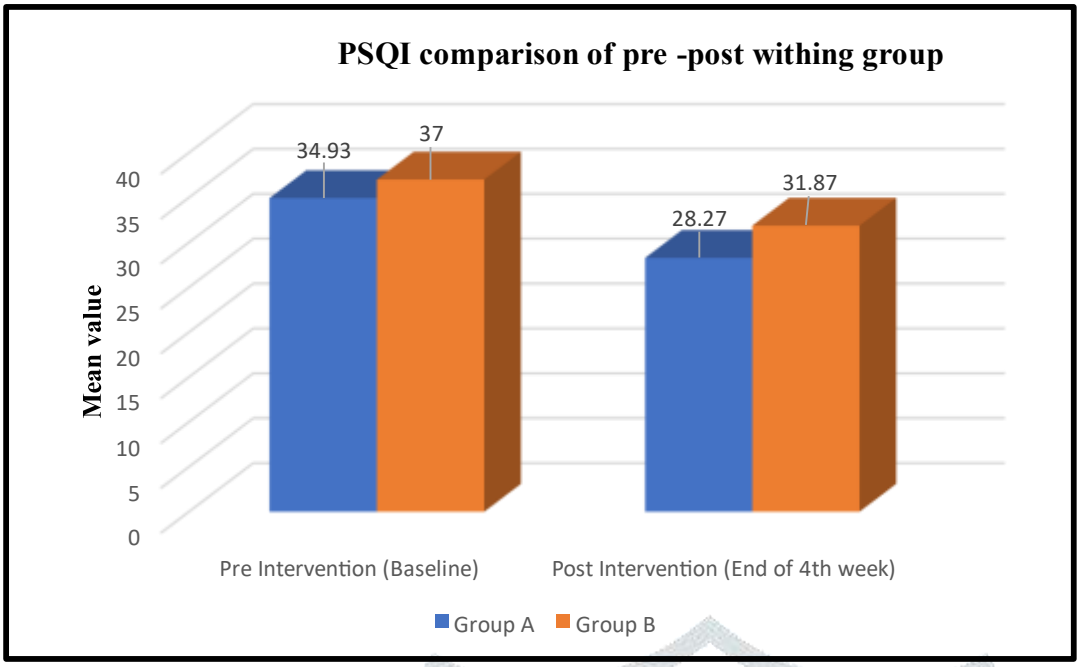


Figure 5.5.1: show Comparison of Mean of Pittsburgh Sleep Quality Index (PSQI) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A & Group B.

5.5.2 comparison of t-value and p-value of Pittsburgh Sleep Quality Index (PSQI) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

PSQI	Group A		Group B	
	t value	p value	t value	p value
Pre (Baseline) Vs Post intervention (End 4th week)	23.2	< .001	15.96	< .001

Table 5.5.2 show Comparison of t-value and p -value Of Pittsburgh Sleep Quality Index (PSQI) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The t-value and p-value pre- intervention and post -intervention data of PSQI was t=23.2 and p< .001 within Group A and t-value=15.96 and p< .001 within the Group B.

5.5.3 Comparison of Mean of Pittsburgh Sleep Quality Index (PSQI) Score at pre- intervention (Baseline) and post -intervention (End of 4th week) of subjects between Group A (Experimental)& Group B (Control).

PSQI	Group A	Group B		
	Mean± SD	Mean± SD	t value	p value
Pre-Intervention (Baseline)	34.93 ± 2.404	37.00±2.204	2.454	0.021
Post Intervention (End of 4th week)	28.27 ± 2.086	31.87 ± 2.386	4.399	< .001

Table.5.5.3 show Comparison of Mean of Pittsburgh Sleep Quality Index (PSQI) at pre- intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B. The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of PSQI score 34.93 ± 2.404

and 28.27 ± 2.086 and37.00±2.204 and 31.87 ± 2.386 respectively were found between the Group A &B.

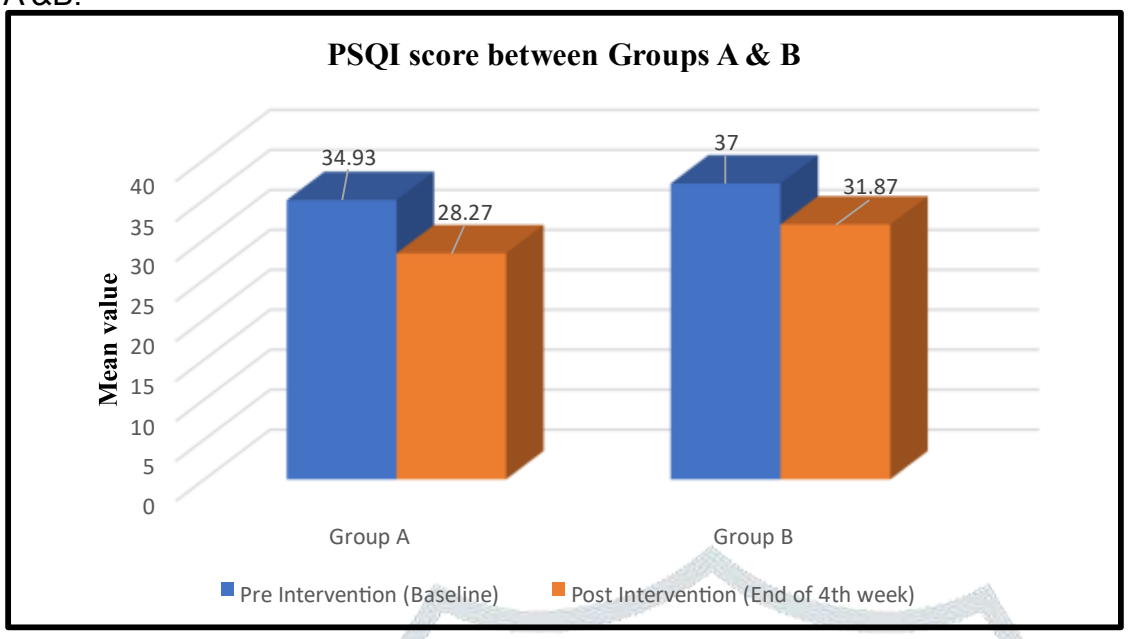


Figure 5.5.3: show Comparison of Mean of Pittsburgh Sleep Quality Index (PSQI) at pre-intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B.

5.6 Improvement of Quality-of-Life Scale on Cervicogenic Headache of Quality of Life

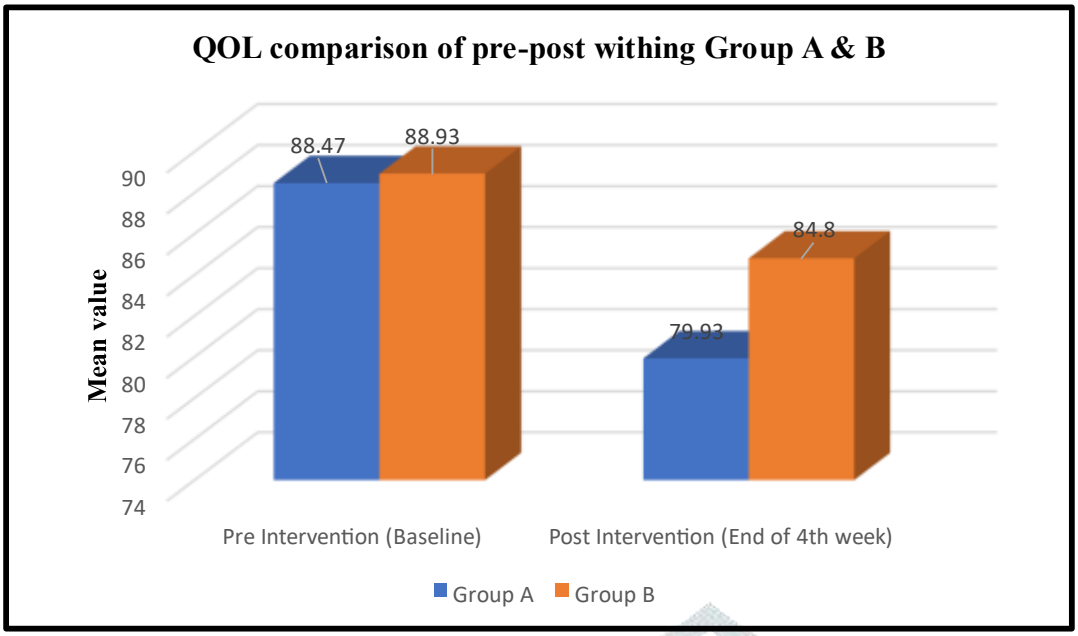
5.6.1 Comparison of Mean and standard Deviation (SD) of Quality-of-Life Scale (QOL) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

QOL	Pre-Intervention (Baseline)		Post Intervention (End of 4th week)	
	Mean	SD	Mean	SD
Group A	88.47	1.807	79.93	3.369
Group B	88.93	3.369	84.8	3.212

Table 5.6.1 show Comparison of Mean and standard Deviation (SD) Of Quality-of-Life Scale (QOL) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of QOL score 88.47± 1.807 and 79.93 ± 3.369 respectively were found within the Group A; whereas the mean and standard deviation of pre and post intervention data of QOL score 88.93 ±3.369 and 84.8 ±3.212 respectively were found within the Group B. The geographical representation is show in figure.

Figure 5.6.1: show Comparison of Mean of Life Scale (QOL) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A & Group B.

5.6.2 comparison of t-value and p-value of Quality-of-Life Scale (QOL) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group



B (Control).

QOL	Group A		Group B	
	t value	p value	t value	p value
Pre (Baseline) Vs Post intervention (End 4th week)	12.64	< .001	17.49	< .001

Table 5.6.2 show Comparison of t-value and p -value Of Quality-of-Life Scale (QOL) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The t-value and p-value pre- intervention and post -intervention data of QOL was t=12.64 and p< .001 within Group A and t-value=17.49 and p< .001 within the Group B.

5.6.3 Comparison of Mean of Quality-of-Life Scale (QOL) Score at pre- intervention (Baseline) and post -intervention (End of 4th week) of subjects between Group A (Experimental)& Group B (Control).

QOL	Group A	Group B		
	Mean± SD	Mean± SD	t value	p value
Pre-Intervention (Baseline)	88.47± 1.807	88.93 ±3.369	0.473	0.64
Post Intervention (End of 4th week)	79.93 ± 3.369	84.80 ± 3.212	4.049	< .001

Table.5.6.3 show Comparison of Mean of Quality-of-Life Scale (QOL) at pre- intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B. The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of QOL score 88.47± 1.807 and 79.93 ± 3.369 and 88.93 ±3.369 and 84.80 ± 3.212 respectively were found between the Group A &B.

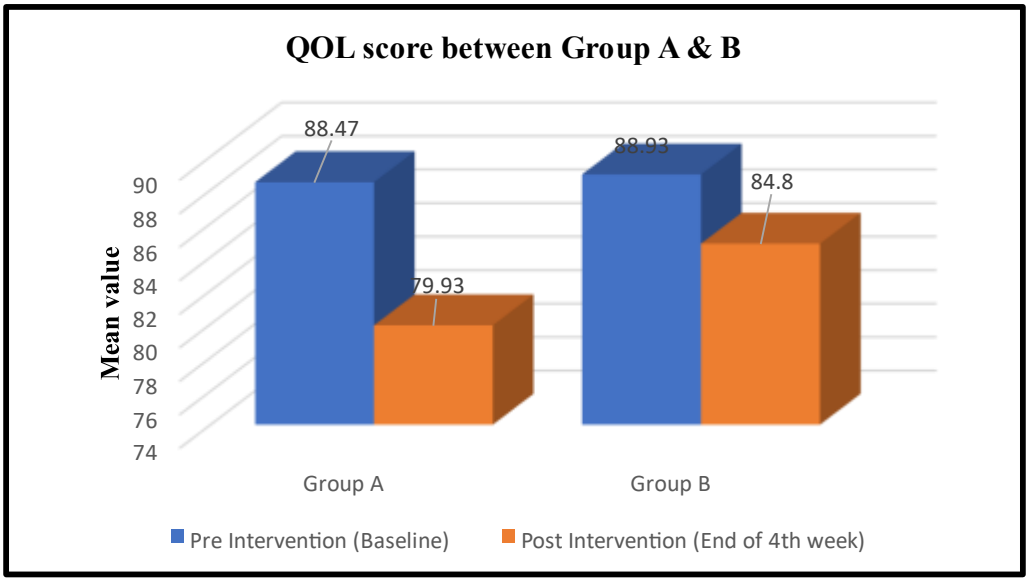


Figure 5.6.3: show Comparison of Mean of Quality-of-Life Scale (QOL) at pre- intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B.

5.7 Improvement of Forward Head Posture on Craniovertebral Angle (CV Angle)

5.7.1 Comparison of Mean and standard Deviation (SD) of Craniovertebral Angle (CV Angle) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

	Pre-Intervention CV Angle (Baseline)		Post Intervention (End of 4th week)	
	Mean	**SD**	**Mean**	**SD**
Group A	37.95	2.976	41.69	2.12
Group B	37.43	3.241	44.03	1.812

Table 5.7.1 show Comparison of Mean and standard Deviation (SD) Of Craniovertebral Angle (CV Angle) at pre- intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of CV score 37.95± 2.976 and 41.69 ± 2.21 respectively were found within the Group A; whereas the mean and standard deviation of pre and post intervention data of CV score 37.43 ±3.241 and 44.03 ±1.812 respectively were found within the Group B. The geographical representation is show in figure

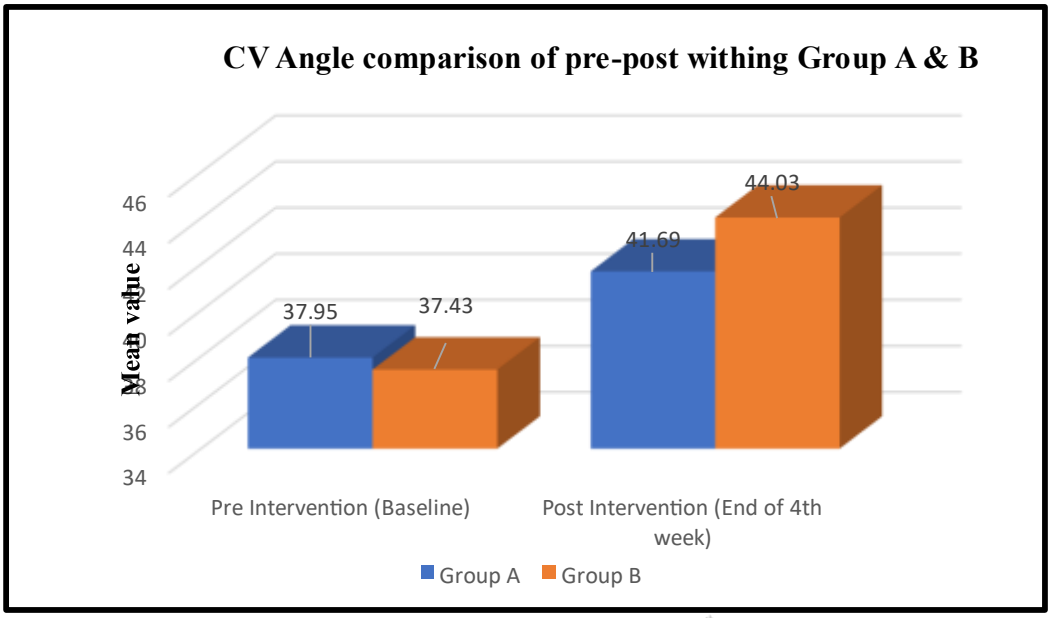


Figure 5.7.1: show Comparison of Mean of Craniovertebral Angle (CV Angle) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A & Group B.

5.7.2 comparison of t-value and p-value of Craniovertebral Angle (CV Angle) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control).

CV Angle	Group A		Group B	
	t value	p value	t value	p value
Pre (Baseline) Vs Post intervention (End 4th week)	-4.09	0.001	-9.2	< .001

Table 5.7.2 show Comparison of t-value and p -value Of Craniovertebral Angle (CV Angle) at pre-intervention (Baseline) and post -intervention (End of 4th week) within the Group A (Experimental)& Group B (Control). The t-value and p-value pre- intervention and post -intervention data of CV was t=-4.09 and p0 .001 within Group A and t-value=-9.2 and p< .001 within the Group B.

5.7.3 Comparison of Mean of Craniovertebral Angle (CV Angle) Score at pre- intervention (Baseline) and post -intervention (End of 4th week) of subjects between Group A (Experimental)& Group B (Control).

CV Angle	Group A	Group B	t value	p value
	Mean± SD	Mean± SD		
Pre-Intervention (Baseline)	37.95± 2.976	37.43 ±3.241	-0.452	0.655
Post Intervention (End of 4th week)	41.69± 2.120	44.03 ± 1.812	3.249	0.003

Table.5.7.3 show Comparison of Mean Of Craniovertebral Angle (CV Angle) at pre- intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B . The Mean and standard Deviation (SD) of pre- intervention and post -intervention data of CV score 37.95± 2.976

and41.69± 2.120 and 37.43 ±3.241 and 44.03 ± 1.812 respectively were found between the Group A &B.

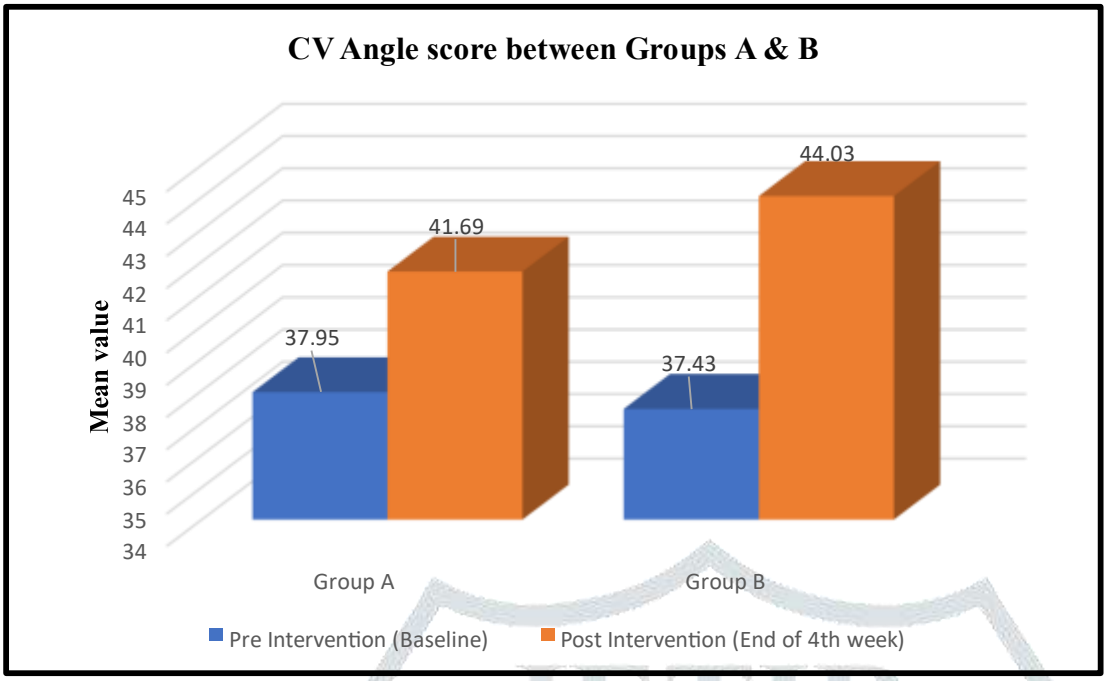


Figure 5.7.3: show Comparison of Mean of Craniovertebral Angle (CV Angle) at pre-intervention (Baseline) and post -intervention (End of 4th week) between the Group A & Group B.

DISCUSSION

Cervicogenic headache is pain perceived in the head but referred from a primary source in the cervical spine. The physiologic basis for this pain is convergence between trigeminal afferents and afferents from the upper three cervical spinal nerves. The possible sources of cervicogenic headache lie in the structures innervated by the C1 to C3 spinal nerves, and include the upper cervical synovial joints, the upper cervical muscles, the C2-3 disc, the vertebral and internal carotid arteries, and the dura mater of the upper spinal cord and posterior cranial fossa. (Bogduk et al.,2001)

In order to accomplish the study 30 subjects who fulfilled the selection criteria were taken and divided into 2 groups i.e., Group A and Group B.CBT along with conventional therapy was given to Group A. In Group B MFR along Conventional therapy exercises were given which included Cervical spine exercises - Range of Motion exercises- Flexion, Extension of the neck and Passive stretching of upper trapezius and levator scapulae. The data was collected at baseline and at end of 4 weeks of the study. The outcome measures were NPRS, NDI, HDI, PSQI, QOL and cv angle.

The data was analysed in which the descriptive analysis described about the Age and Gender distribution among Group A and Group B. In Group A mean and standard deviation was 27.7 ±2.81 and 30.3 ±4.89 was found in Group B respectively. There was no significant difference of age was found among both groups.

In Gender distribution among Group A 10 (66.66%) of Male and 5 (33.33%) of Female and in Group B 10 (66.66%) of Male and 5 (33.33%) of Female were found.

6.1 Role of CBT along with conventional therapy on pain in patients with cervicogenic headache.

Numeric Pain Rating Scale is a segmented numeric version of the VAS in which a respondent chooses a whole number (0-10 integers) that best reflects the intensity of pain. A horizontal bar or line is the most common format. **(Fayers PM et al.,2011)**

In group A (Experimental), it was observed that mean and standard deviation (SD) of NPRS at preintervention i.e., on the Baseline was 6.47 ± 0.743 respectively and after the administration of treatment the post-intervention i.e., at the end of 4th Weeks was 3 ±0.756 respectively. The comparison of mean value within group A was done, the statistical difference between the t-value

and p-value at baseline Vs end of 4th week was 20.98. It reveals that there was a significant difference in scores. The p value is< .001 which signifies highly significant difference between the baseline and end of 4th week.

In group B (Control), it was observed that mean and standard deviation (SD) of (NPRS) at preintervention i.e., on (Baseline) was 6.93 ±0.704 respectively and after the administration of treatment the post-intervention i.e., at (end of 4th Week) was 4.8 ±0.862 respectively. The comparison of mean value within group B was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was 9.91. It reveals that there was a significant difference between the baseline and end of 4th week scores, (p-value < .001).

The comparison of mean value between Group A and Group B was done; the statistical difference the t-value and p-value at baseline Vs end of 4th week were 1.766 and 6.081 respectively. It reveals that there was a significant difference between the baseline and the end of 4th week scores (pvalue< .001). While comparing the mean value of group A and group B, it was found that Group A was significantly improved than group B. The findings of Young et al.,2017, The NPRS was used to capture the patient's level of pain (headache intensity). Patients were asked to indicate the intensity of their current pain level using an 11-point scale, ranging from 0 (no pain) to 10 (worst pain imaginable). Chronic headache patients receiving CBT with an intensive cognitive component targeting pain catastrophizing reported significant changes on self-report measures of catastrophizing, anxiety, and headache management.

In summary both groups have shown significant effect in reducing Pain. But Group A shown more significant reduction in Pain. Hence CBT along with conventional treatment has shown significant improvement in variables given in the study.

6.2 Role of CBT along with conventional therapy on Neck disability in patients with cervicogenic headache.

Neck Disability Index (NDI) useful tool to measure disability due to neck pain. The ten items are summed to gain the total score thus ranging from 0 (no disability) to 50 (maximum disability) **(sterling et al.,2005)**

In group A (Experimental), it was observed that mean and standard deviation (SD) of NDI at preintervention i.e. on the Baseline was 32.87 ± 1.642 respectively and after the administration of treatment the post-intervention i.e. at the end of 4th Weeks was 25.13 ± 2.416 respectively. The comparison of mean value within group A was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was 15.4. It reveals that there was a significant difference in scores. The p value is< .001 which signifies highly significant difference between the baseline and end of 4th week.

In group B (Control), it was observed that mean and standard deviation (SD) of (NDI) at preintervention i.e. on (Baseline) was 31.73 ±2.251 respectively and after the administration of treatment the post-intervention i.e at (end of 4th Week) was 27.8 ±1.74 respectively. The comparison of mean value within group B was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was17.24. It reveals that there was a significant difference between the baseline and end of 4th week scores, (p-value < .001).

The comparison of mean value between Group A and Group B was done; the statistical difference the t-value and p-value at baseline Vs end of 4th week were -1.576 and 3.468 respectively. It reveals that there was a significant difference between the baseline and the end of 4th week scores (p-value 0.002). While comparing the mean value of group A and group B, it was found that Group A was significantly improved than group B. While comparing the mean value of group A and group B, it was found that Group A was significantly improved than group B. According to our study CBT along with conventional treatment showed highly significant results in management of Neck disability as compared to the MFR along with conventional treatment. The findings of **Odonkor et al 2017** The patient continued to experience improvement in her NDI scores, with clinically meaningful improvement. Chronic pain patients with poor sleep report higher levels of anxiety and depression. On further discussions with our patient, she reported in management insomnia due to pain

interference. We recommended sleeping aids, cognitive behavioural therapy. As noted elsewhere, a multidisciplinary approach to pain including CBT and sleep management before and after procedure could help with overall outcomes in patients with chronic pain, with or without insomnia.

In summary both groups have shown significant effect in reducing Disability. But Group A shown more significant reduction in Disability. Hence CBT along with conventional treatment has shown significant improvement in variables given in the study.

6.3 Role of CBT along with conventional therapy on Headache in patients with cervicogenic headache.

Headache disability index (HDI) is useful in assessing the impact of headache, and its treatment, on daily living. It consisted of 25items, each requiring a “yes” (four points), “sometimes” (two points), or “no” (zero points) response based on items. **(Jacobson et al., 1994)**

In group A (Experimental), it was observed that mean and standard deviation (SD) of HDI at preintervention i.e. on the Baseline was 70.27 ± 3.535 respectively and after the administration of treatment the post-intervention i.e. at the end of 4th Weeks was 51.87 ± 6.988 respectively. The comparison of mean value within group A was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was11.59. It reveals that there was a significant difference in scores. The p value is< .001 which signifies highly significant difference between the baseline and end of 4th week.

In group B (Control), it was observed that mean and standard deviation (SD) of (HDI) at preintervention i.e. on (Baseline) was 69.73 ±3.348 respectively and after the administration of treatment the post-intervention i.e at (end of 4th Week) was 39.73 ±5.994 respectively. The comparison of mean value within group B was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was 15.79. It reveals that there was a significant difference between the baseline and end of 4th week scores, (p-value < .001).

The comparison of mean value between Group A and Group B was done; the statistical difference the t-value and p-value at baseline Vs end of 4th week were -0.424 and -5.104 respectively. It reveals that there was a significant difference between the baseline and the end of 4th week scores (pvalue< .001). While comparing the mean value of group A and group B, it was found that Group A was significantly improved than group B. The findings of Thorn et al.,2007 Chronic headache patients receiving CBT with an intensive cognitive component targeting pain catastrophizing reported significant changes on self-report measures of catastrophizing, anxiety, and headache management. Thus, the treatment was effective for reducing cognitive and affective distress associated with the headaches, and in approximately 50% of the cases, the treatment produced clinically significant reductions in headache frequency or other measures of headache activity.

In summary both groups have shown significant effect in reducing Disability. But Group A shown more significant reduction in Disability. Hence CBT along with conventional treatment has shown significant improvement in variables given in the study.

6.4 Role of CBT along with conventional therapy on Sleep in patients with cervicogenic headache.

Pittsburgh Sleep Quality Index (PSQI**)**a widely used self-reported questionnaire, is considered to be a generic instrument to measure sleep quality in diverse populations and has been employed in several centenarian studies. The PSQI covers a broad range of indicators relevant to sleep quality and its components (namely, subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction) provide references for clinical decisions. **(Zhang et al., 2020)**

In group A (Experimental), it was observed that mean and standard deviation (SD) of PSQI at preintervention i.e. on the Baseline was 34.93± 2.404 respectively and after the administration of treatment the post-intervention i.e. at the end of 4th Weeks was 28.27 ± 2.086 respectively. The comparison of mean value within group A was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was 23.2. It reveals that there was a significant difference

in scores. The p value is< .001 which signifies highly significant difference between the baseline and end of 4th week.

In group B (Control), it was observed that mean and standard deviation (SD) of (PSQI) at preintervention i.e. on (Baseline) was 37 ±2.204 respectively and after the administration of treatment the post-intervention i.e at (end of 4th Week) was 31.87 ±2.386 respectively. The comparison of mean value within group B was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was 15.96. It reveals that there was a significant difference between the baseline and end of 4th week scores, (p-value < .001).

The comparison of mean value between Group A and Group B was done; the statistical difference the t-value and p-value at baseline Vs end of 4th week were 2.454 and 4.399 respectively. It reveals that there was a significant difference between the baseline and the end of 4th week scores (pvalue< .001). While comparing the mean value of group A and group B, it was found that Group A was significantly improved than group B. The findings of Kim et al.,2017 In the present study, we observed that, among individuals with Headache, those with insomnia exhibited a higher frequency of headache and increased impact of headache on daily function than those without insomnia. In accordance with our findings, previous studies have indicated that individuals with a high frequency of Headache may experience increased disability, decreased quality of life, and a higher rate of comorbidities than those with low frequency of Headache. Therefore, proper identification and management of insomnia may reduce the impact of headache among individuals with Headache. While pharmacological treatments for insomnia have demonstrated efficacy in randomised controlled trials, research has indicated that non-pharmacological alternatives such as cognitive behavioural therapy (CBT) are also effective.

In summary both groups have shown significant effect in sleep. But Group A shown more significant effect in sleep. Hence CBT along with conventional treatment has shown significant improvement in variables given in the study.

6.5 Role of CBT along with conventional therapy on Quality of Life in patients with cervicogenic headache.

The WHO Quality of Life Scale-Brief (WHOQOL-Brief), still in field trials, is a subset of 26 items taken from the WHOQOL-100. The same steps for scoring WHOQOL-100 should be followed to achieve score for this version. The WHOQOL-Brief (Field Trial Version) produces a profile with four domain scores and two individually scored items about an individual's overall perception of quality of life and health. The four domain scores are scaled in a positive direction with higher scores indicating a higher quality of life. **(Vahedi et al., 2010).**

In group A (Experimental), it was observed that mean and standard deviation (SD) of QOL at preintervention i.e. on the Baseline was 88.47± 1.807 respectively and after the administration of treatment the post-intervention i.e. at the end of 4th Weeks was 79.93 ± 3.369 respectively. The comparison of mean value within group A was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was 12.64. It reveals that there was a significant difference in scores. The p value is< .001 which signifies highly significant difference between the baseline and end of 4th week.

In group B (Control), it was observed that mean and standard deviation (SD) of (QOL) at preintervention i.e. on (Baseline) was 88.93 ±3.369 respectively and after the administration of treatment the post-intervention i.e at (end of 4th Week) was 84.8 ±3.212 respectively. The comparison of mean value within group B was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was 17.49. It reveals that there was a significant difference between the baseline and end of 4th week scores, (p-value < .001).

The comparison of mean value between Group A and Group B was done; the statistical difference the t-value and p-value at baseline Vs end of 4th week were 0.473 and 4.049 respectively. It reveals that there was a significant difference between the baseline and the end of 4th week scores (pvalue< .001). While comparing the mean value of group A and group B, it was found that Group A was significantly improved than group B. The findings of Klausen et al.,2019 Sleep was infrequently

evaluated. Two of 13 studies incorporated sleep education into CBT. One found a small but significant effect on sleep quality at follow-up; the other did not. In addition to pain reduction, better functional outcomes in daily life are vital for children and adolescents with headache. In the included studies, different aspects of Qol and coping strategies were measured; in some studies, the concepts of Qol and coping overlapped, rendering comparison difficult. Clearly defined outcome measures of Qol and coping are required to compare CBT intervention studies.

In summary both groups have shown significant effect in Quality of Life. But Group A shown more significant effect in Quality of Life. Hence CBT along with conventional treatment has shown significant improvement in variables given in the study.

6.6 Role of CBT along with conventional therapy on Forward Head Posture in patients with cervicogenic headache.

Craniovertebral angle was identified using the intersection of horizontal line passing through C7 spinous process and the line joining the midpoint of the tragus of the ear. Ferreira et al., (2014) in one of their previous studies concluded that patients suffering from migraine exhibited small angular forward head posture. In our study as well, we found the forward head posture of the participants. The mechanism that can explain the forward head posture could be convergence of trigeminal and cervical affrents in the brainstem (Ferreira et al., 2014). Fernández-de-lasPeñas et al. (2006) found out that headache and neck pain might be due to forward head shift and antalgic posture in order to reduce the pain.

In group A (Experimental), it was observed that mean and standard deviation (SD) of CV Angle at pre-intervention i.e. on the Baseline was 37.95± 2.976 respectively and after the administration of treatment the post-intervention i.e. at the end of 4th Weeks was 41.69 ± 2.21 respectively. The comparison of mean value within group A was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was-4.09. It reveals that there was a significant difference in scores. The p value is 0.001which signifies highly significant difference between the baseline and end of 4th week.

In group B (Control), it was observed that mean and standard deviation (SD) of (CV Angle) at preintervention i.e. on (Baseline) was 37.43 ±3.241respectively and after the administration of treatment the post-intervention i.e. at (end of 4th Week) was 44.03 ±1.812 respectively. The comparison of mean value within group B was done, the statistical difference between the t-value and p-value at baseline Vs end of 4th week was-4.09. It reveals that there was a significant difference between the baseline and end of 4th week scores, (p-value < .001).

The comparison of mean value between Group A and Group B was done; the statistical difference the t-value and p-value at baseline Vs end of 4th week were -0.452 and 3.249 respectively. It reveals that there was a significant difference between the baseline and the end of 4th week scores (pvalue0.003). While comparing the mean value of group A and group B, it was found that Group A was significantly improved than group B. The angle between a horizontal line passing through C7 and a line extending from the tragus of the ear to C7 spinous process. The craniovertebral angle values indicate the degree of forward head position (Ho Ting Yip et al, 2007 and Anabela, 2009), Prakash et al.,2020 CBT goals of postural correction exercises are focused on improving cervical muscle strength and correcting the forward head posture. In this study, the patients who received this intervention were instructed to do the exercises with concentration over the movements without holding the breath. Holding the breath will build up tension in the body and inhibit the supply of oxygen to the muscles and thus reduces the performance of the muscles.

In summary both groups have shown significant effect in Posture. But Group A shown more significant effect in Posture. Hence CBT along with conventional treatment has shown significant improvement in variables given in the study.

6.7 Limitation of study

1. Sample size of the present study was small, which may make it difficult to generalize the result to a larger community.
2. The duration of the present study was 4 wee, so study with a longer course is necessary.

6.8 Future recommendations of the study 1.

Future studies with large sample sizes.

2. Long-term follow up.

CONCLUSION

The purpose of the study was to investigate the comparison of CBT (Group A) and MFR along with conventional therapy (Group B) in patients with cervicogenic headache. The findings of the present study showed highly significant results in experimental group as compared to the control group.

Cognitive behavioural therapy along with conventional treatment has been effective on Quality of Life, reduced disability (NDI, HDI), reduce pain and increased Craniovertebral Angle to the patients with cervicogenic headache.

REFERENCES

1-Bogduk, N. (2001). Cervicogenic headache: anatomic basis and pathophysiologic mechanisms. Current pain and headache reports, 5, 382-386.

2- Biondi, D. M. (2005). Cervicogenic headache: a review of diagnostic and treatment strategies. Journal of Osteopathic Medicine, 105(s4), 16-22.

3-Antonaci, F., Bono, G., Mauri, M., Drottning, M., & Buscone, S. (2005). Concepts leading to the definition of the term cervicogenic headache: a historical overview. The Journal of Headache and Pain, 6, 462-466.

4-Biondi, D. M. (2000). Cervicogenic headache: mechanisms, evaluation, and treatment strategies. Journal of Osteopathic Medicine, 100(s9), 7-14.

5-Antonaci, F., & Sjaastad, O. (2011). Cervicogenic headache: a real headache. Current neurology and neuroscience reports, 11, 149-155.

6.Youssef, E. F., & Shanb, A. S. A. (2013). Mobilization versus massage therapy in the treatment of cervicogenic headache: a clinical study. Journal of back and musculoskeletal rehabilitation, 26(1), 17-24.

7.Khalil, M., Alkhozamy, H., Fadle, S., Hefny, A., & Ismail, M. (2019). Effect of Mulligan upper cervical manual traction in the treatment of cervicogenic headache: a randomized controlled trial. Physiotherapy Quarterly, 27(4), 13-20.

8.Bini, P., Hohenschurz-Schmidt, D., Masullo, V., Pitt, D., & Draper-Rodi, J. (2022). The effectiveness of manual and exercise therapy on headache intensity and frequency among patients with cervicogenic headache: a systematic review and meta-analysis. Chiropractic & Manual Therapies, 30(1), 49.

9.Becher, B., Lozano-López, C., de Castro-Carletti, E. M., Hoffmann, M., Becher, C., Mesa-Jimenez, J., ... & Armijo-Olivo, S. (2023). Effectiveness of therapeutic exercise for the management of cervicogenic headache: A systematic review. Musculoskeletal Science and Practice, 102822.

10.Abaspour, O., Akbari, M., & Rezasoltani, A. (2020). Ultrasonography Method of Deep Cervical Muscles and Thickness Measurement Reliability in Cervicogenic Headache and Healthy Subjects: APilot Study. Journal of Modern Rehabilitation.

11.Nambi, G., Alghadier, M., Ebrahim, E. E., Vellaiyan, A., Tedla, J. S., Reddy, R.S., ... & Saleh, A. K. (2022, December). Comparative Effects of Mulligan's

Mobilization, Spinal Manipulation, and Conventional Massage Therapy in Cervicogenic Headache—A Prospective, Randomized, Controlled Trial. In Healthcare (Vol. 11, No. 1, p. 107). MDPI.

12.Islam, R., Quddus, N., Miraj, M., & Anwer, S. (2013). Efficacy of deep cervical flexor strength training versus conventional treatment in cervicogenic headache. International Journal of Current Research and Review, 5(8), 84

13. Choi, W. (2021). Effect of 4 weeks of cervical deep muscle flexion exercise on headache and sleep disorder in patients with tension headache and forward head posture. International Journal of Environmental Research and Public Health, 18(7), 3410.