

# Effect Of Pain Education On Cognitive Performance Among Collegiate Students With Idiopathic Neck Pain.

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## **ABSTRACT**

*Idiopathic neck pain is common health problem among young population. Cognition in general deals with mental process that enables the individual to think, plan and execute. Pain directly contributes for physical and cognitive impairments. In modern world pain education is an effective strategy used by health professionals in pain management . Thus this study evaluates the effect of pain education on cognitive deficits especially working memory among college students with idiopathic neck pain. Each groups consisted 15 participants and they underwent 1 week of stretching exercise for neck muscles. Intervention group additionally underwent pain education for 1 week. Pain education include person to person , group learning through power point presentation, animated video, do's and don't s and self management. This study reflects on higher cognition in intervention group compared to control group. Thus Pain education deals with psychosocial factors that influence pain there is higher cognitive performance in pain community.*

**Keywords:** *Pain Education, Working Memeory, Colleegeiate Students Performance, Idiopathic Neck Pain, Cognitive Performance.*

## **INTRODUCTION OR BACKGROUND**

Neck pain is characterized as a pain in anatomical tertiary from occiput to upper thoracic spine and along the lateral sides of the neck<sup>1</sup>. It may originate from cervical structures mechanically and can be due to trauma or at times it may be idiopathic in nature. Precursor of neck pain is due to static posture, strain on muscle, muscular imbalance, abnormal posture and trauma<sup>2</sup>. The idiopathic neck pain does not have any underlying pathology or not traumatic in nature, Central Sensitization will be lack in this idiopathic neck pain, if this idiopathic neck pain becomes chronic it is prone to cause disability<sup>3</sup>. Physical activity and mental health have a higher correlation and it is important for health of an individual. Pain is a result of one's emotional state expectation, personality and cognition. Each individual reacts to pain in different ways. Health care professional has an important role in educating about the pain to the patient community. The aim of the educating pain is to identify, plan, reflect and to self evaluate.

Cognitive domain includes attention, speed, memory, learning and executive function. Cognitive impairment is associated with pain experience<sup>4</sup>. The impairment of cognition is an obstacle for daily activities. A study among children with learning disability details that working memory is a retention of small amount of information in accessible form. It is often related to planning, comprehension, reasoning and problem solving. The physiology behind the impairment of cognition among pain

community is due to the common anatomical, neurochemical and molecular substance for both cognitive processing and supraspinal pain processing<sup>4</sup>. Pain and cognition have a overlap to the fact that pain itself has a cognitive evaluating component require learning, recall of past experience and decision making . Neurotransmitters system helps in slow sensory transmission and reduced pain perception but also slow down the cognitive process due to its ubiquitous property<sup>5</sup>.

Previous studies done on multiple memory in human include recognition memory and working memory conclude that prefrontal cortical integrity in humans is disrupted due to pain. Memory is highly dependent on interaction between prefrontal cortex and regions of hippocampus<sup>6</sup>. Pain interferes with brain function from molecular level to system level<sup>7</sup>. In modern world idiopathic neck pain is a common musculoskeletal problem. This is prevalent among college going students and the prevalence of neck pain among medical college students is 51.9% <sup>2</sup>. Since, Memory is a major cognition domain required for students and pain impairs the cognitive performance among collegiate students. Thus this study is to find out the effect of pain education on cognitive performance among college students with idiopathic pain.

## **MATERIAL AND METHOD**

**Study Design:** It is an experimental design and comparative study.

**Study Setting :** Srm Medical College Hospital And Research Center, Kattankulathur.

**Study Participants :** The study is done among 30 college students include both male and female with age group of 18- 22. The study includes students with idiopathic pain for not more than 2 weeks. In this study the participants with any cervical pathology, recent injury or fracture , congenital deformity had been excluded.

### **Procedure**

Participants were selected based on inclusion and exclusion criteria. Procedure were explained and informed consent was taken. Pre test was done to assess the pain intensity,the assessment was done with Visual Analog Scale (VAS) and the working memory was assessed with digit span test. Participants were randomly assigned into experimental (GROUP A) and control group(GROUP B). Each groups consisted 15 participants and they underwent 1 week of stretching exercise for neck muscles. Experimental group additionally underwent pain education for 1 week. Pain education include person to person, group learning through power point presentation, animated video, sheet about do's and don't s and self management. Post test was done to assess pain intensity with VAS and digit span test to find out working memory.

### **Findings**

The working memory cognition were analysed using digit span test among college students with idiopathic neck pain. There is a significant improvement in working memory on both groups due to decrease in pain. The Mean difference of experimental group is 57.3 which was higher than the control group. Thus this study provides a positive approach of pain education among college students.

TABLE 1 Descriptive table of study participants

Characters	N (no. of people)
Age	
18-19	7
20-21	13
22	10
Gender	
Male	22
Female	8
Year of education	
1st year	0
2nd year	6
3rd year	13
4th year	11

Table 1 explains about the age, gender and year of education distribution among study participants.

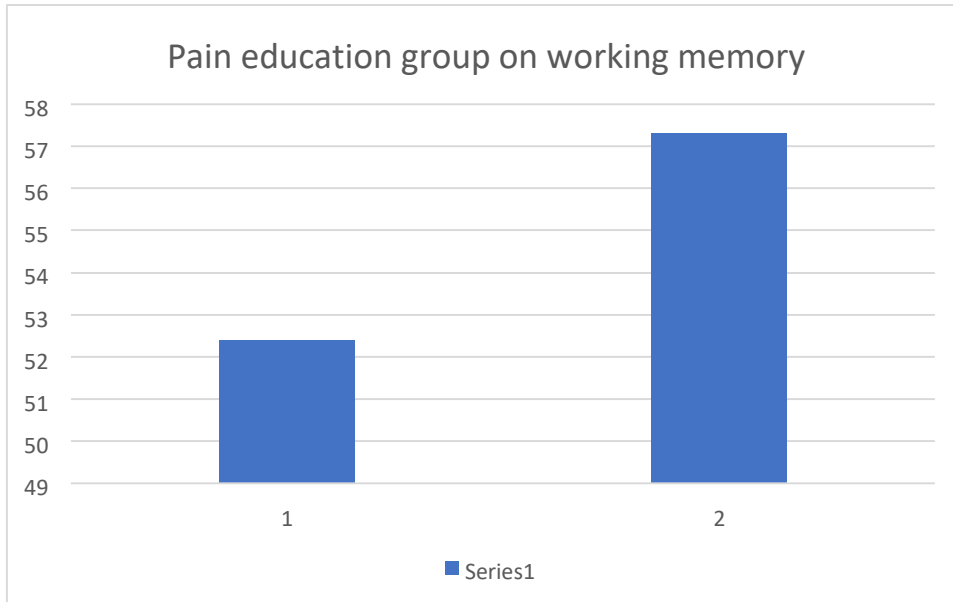
TABLE 2 : Mean values of pre and post test of Group A and Group B of Digit span test.

S.NO	GROUPS	MEAN	N	STD DEVIATION	P VALUE
1	PRE TEST GROUP A	52.4	15	1.95	<0.001
2	POST TEST GROUP A	57.3		2.75	
3	PRE TEST GROUP B	51.4	15	2.41	<0.020
4	POST TEST GROUP B	54.1		2.42	
5	POST TEST GROUP A	57.3	15	2.75	<0.010
6	POST TEST GROUP B	54.1	15	2.42	

TABLE 2 shows the mean values of pre and post test standard score of backward digit memory test of Digit Span Test. The mean value of pre and post test of Group A ( experimental group) is  $52.4 \pm 1.95$  and  $57.4 \pm 2.75$  with  $p < 0.001$ . The mean value of pre test and post test of Group B( control

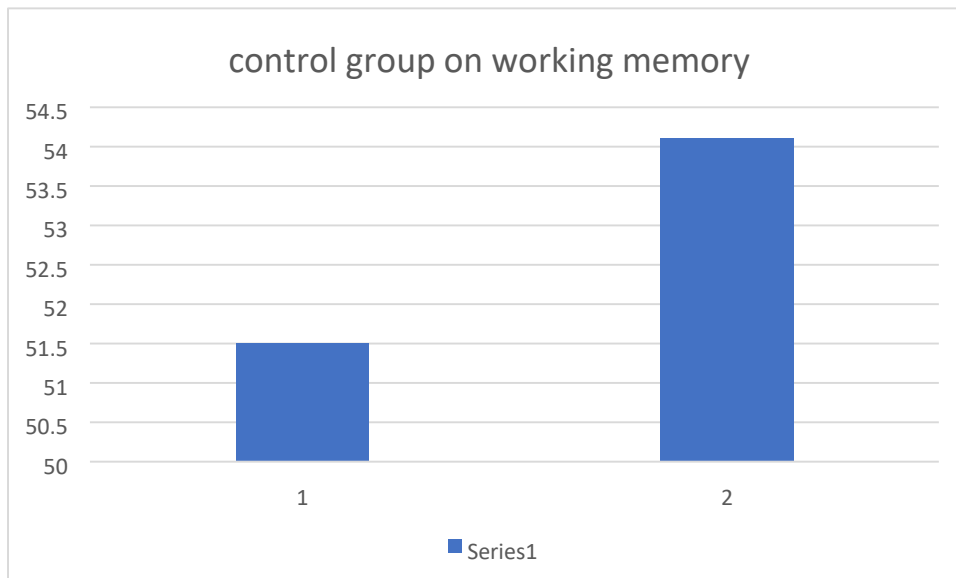
group) is  $51.4 \pm 2.41$  and  $54.1 \pm 2.42$  with  $p < 0.02$ . The mean value of post-test of Group A and Group B is  $57.3 \pm 2.75$  and  $54.1 \pm 2.42$  with  $p < 0.010$ .

**Graph 1.1**



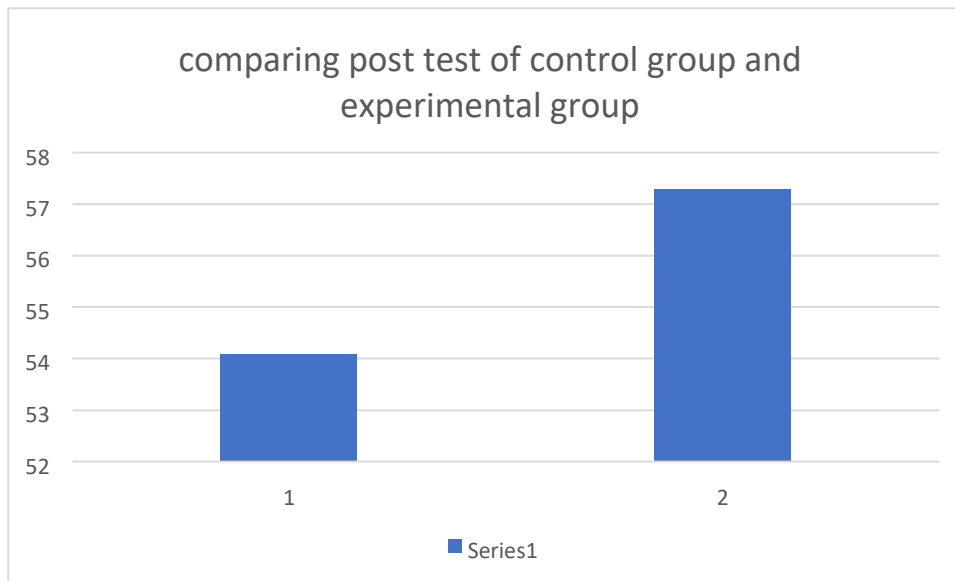
In graph 1.1 indicates the pre and post test results of Experimental group.

**Graph 1.2**



In graph 1.2 represents the pre and post test results of control group.

**Graph 1.3**



In graph 1.3 represents the post test of control group and experimental group respectively.

## DISCUSSION

Many studies have been done about the role of pain in physical and cognitive performance among individuals and the studies concluding that there is a physical and cognitive impairment due to pain and it is affecting daily activities<sup>8</sup>. There are also studies about the effect of pain education on physical performance among chronic low back pain patients<sup>9,10,11</sup>. But there are very few studies that investigated about the role of pain education in cognitive performance among college students.

Memory is one of the most important cognitive domain for college going students. Decreased memory function may negatively impact their overall performance. A recent study on importance of working memory among children concludes that it is a predictor of academic performance and irrespective of intelligence the achievement of students is directly proportional to their working memory<sup>12,13</sup>.

The study on comparison on exercise with and without supervision of physiotherapist concluded that group with supervision of physiotherapist is effective than the other<sup>14</sup>. But supervision of physiotherapy session may be hindered by socio economical factors of individual. Pain education had been evolved few decades back. Pain awareness is a growing strategy in modern health care system and it helps in self realization. Educating patients will provide a great scope of self esteem and improve confidence in them and it stabilize the physical and emotional state in them. Health care professional especially physiotherapist who deals with Neuro musculoskeletal pain and its management have a great role in giving pain education to their patients and they can make the patients to understand about the pain and can get cooperation from patients during the treatment and through this treatments can be made more effective.

In this study, Stretching exercises to the both the groups had decreased the idiopathic neck pain from moderate to mild. Thus, exercise make use of the time productively and prepare them physically and mentally and release of local stress hormones and induces relaxation. The exercise induce neurotransmitters that decrease the pain intensity and perception of pain. The voluntary physical activity and exercise training can influence brain plasticity by facilitating neurogenerative, neuroadaptive, and neuroprotective processes<sup>15</sup>.

There are articles that provide evidence on effect of exercise on cognition by valentni(2009) et al indicate the improvement in working memory after acute exercise<sup>16</sup>. But Pain is a result of complex interaction among physiologic, psychological and social factors. Therefore pain education concentrates on psycho social factors that influence the pain among individuals. Thus working memory could directly affect the academic performance of students with pain, the role of physiotherapist not only ends with pain management but also the psychosocial factors that affect the performance and quality of life among the pain community.

The further research can concentrate on other domains of cognition and gender difference on cognition view after pain education can also be recommaned

## CONCLUSION

The college students affected with musculoskeletal pain have a problem on academic performance affect their productivity in college. Thus this study concludes that there is an improvement in cognitive performance in both the group but higher cognition is observed in experimental group.

## Conflict Of Interest

All authors declare that we have no conflits of interest and disclose that we have no finanacial and personal relationships with other people or organizations that could inappropriately influence this work .

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## Ethical Clearance

This article was submitted to the scientific committee of SRM institute of science and technology and got approval. Informed consent was obtained and clear instructions about the procedure was explained to the participants.

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