

## Correlation of Stress and Non-Specific Back Pain in High-School Students

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### How to cite this article:

Neha Gupta, Vrinda Sachdeva. Correlation of Stress and Non-Specific Back Pain in High-School Students. Physiotherapy and Occupational Therapy Journal. 2020;13(3):109-114.

### Abstract

**Background:** Stress is basically defined as any alteration in homeostasis due to any physical, mental or emotional factor. Back pain is defined as any ache or discomfort occurring at or in and around the areas of spine. Similar to stress, the etiology behind back pain is different in different individuals. The non-specific type of back pain may develop suddenly after lifting some heavy objects, any abnormal body posture if adapted, prolong sitting hours etc. In today's time, with the growing population, the competition is growing as well. The stress that these students are having is very high. This makes a person more prone or susceptible towards any musculoskeletal disorder including non-specific back pain. Over time, acute onset of back pain may turn into chronic back pain. **Methods:** Total 100 subjects were included in the study. Age was limited from 16-20 years of age taking coaching classes. The study was conducted on students living in PG accommodation in Vikas Puri, New Delhi. The stress levels were measured using perceived stress scale. The non-specific back pain (NSBP) levels were measured using Oswestry disability index. **Result:** In this study, correlation was found between the stress and NSBP in high school students. Out of total 100 students, 15 students had minimal stress levels, 55 students had moderate levels of stress while 30 students were having high levels of stress. Out of 100 subjects, 39 students were having minimal pain. 45 students showed moderate level of pain and 16 students were having high pain levels. Correlation between stress and NSBP came out to be 0.41, which showed that psychological factors like stress are responsible for any musculoskeletal disorder like NSBP. Through the results the conclusion can be made that psychological factors like stress have a relation with certain musculoskeletal disorders like NSBP. Since the coaching students have lots of stress due to the rising competition and getting into good college, they end up risking their own health. Due to prolong sitting hours, studying in awkward postures makes a person more susceptible to any musculoskeletal disorders.

**Keywords:** Non Specific Back Pain; Corelation; High School Students

### Introduction

Stress is basically defined as any alteration in homeostasis.<sup>1</sup> US stress statistics showed that 77% of people regularly experience physical symptoms due to stress. Response to a stressor depends

upon individual to individual. Due to different responses to stress, the physical symptoms may vary from individual to individual. Physical symptoms include fatigue, headache, change in appetite, muscle tension etc. Stress is either acute or chronic. Acute stress cause muscle to tense up while the chronic stress may lead totension related-backpain. Such aches may end up leading to anxiety, irritability, lack of sleep, depression etc.<sup>22</sup>

Similar to stress, the etiology behind back pain is different in different individuals. Muscle tension that is semi contracted state of muscle for prolong time may lead to aches or discomfort in back. Other

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than muscle tension, muscle spasm, disc herniation, any injury, structural deformities are certain causes for back pain. Wrong ergonomic patterns like prolong sitting, abnormal posture, improper lifting techniques have also been a major factor for causing back pain.<sup>3</sup>

It is been studied that 19 out of 20 cases, that are of acute onset can be classified in the category of Non-Specific Back Pain (NSBP). Such type of back pain has been reported by each and every individual at some or the other point in their lives. The reason of calling it as “non-specific” is that it usually doesn’t have any underlying pathology or the cause of pain is not clear. Such pain can therefore be dependent upon the individual and also the severity-mild, moderate or severe. Some researchers have studied that the cause of such pain may include minor changes like an over stretch or prolonged stretch of a muscle or any ligament. Even prolong shortening of some muscles acting as antagonist of over stretched muscles may also be a factor for causing such pain. Other factors including the disc herniation, any injury, any facet joint problem or any structural abnormality may also lead to pain. Therefore, such NSBP is usually difficult to diagnosesince there is no specific reason for the pain.

Such type of pain is usually over lower back but may sometimes radiate down to buttock or even the legs. Pain is usually eased by lying down straight or even prone lying which has been seen very effective. Patients with such type of pain usually recovers once the aggravating activities are subsided. The NSBP is also termed as mechanical back pain. Such pain may have an “on-off” type of episodes of pain. Such pain may sometimes take up weeks or months to get subside while ending up into a chronic stage of pain and discomfort. Such type is called as chronic back pain. Discomfort caused by backpain decreases the overall performance of the person. From childhood to adult, people of all ages are suffering from back pain. The discomfort caused by back pain has also seen to affect people activities of daily living. A study conducted in US stated that approx. 149 million work days are lost per year due to back pain.<sup>4</sup>

Coaching institutes have spread enormously, attracting thousands of students for preparation of entrance exams. Such institutes, include long hours of study, prolong sitting hours which leads to a lot of physical stress inflicted on body. Due to the static and awkward postures, stress is placed on our soft

tissues.<sup>5</sup> Prolong immobility reduces the blood flow and further leading to muscle tension. This makes a person more prone or susceptible towards any musculoskeletal injury. Over time, if the lifestyle remain same, the person may complain of recurrent episodes of backpain.<sup>6</sup>

There is lack of research that specifically focuses on stress and NSBP. Therefore, this study aims to identify a significant relation between stress and NSBP in high school students. Such data is really useful to prevent our young generations from stress related back pain, also aware them to adapt suitable postures and lifestyle modifications in their daily lives.

## Materials and Methods

After obtaining the approval from the coaching students through a consent form. We carried out a correlational study among students of coaching institutes living in PG in Vikas Puri, New Delhi. A total of 100 coaching students participated in the study with 100% response rate. Students were randomly selected and were explained thoroughly about the purpose of the study. The inclusion criteria included all consenting students aged 16-20 years, student who has once/ever experienced back pain, Affluent with English and students taking coaching were only included in this study. We excluded all students with a history of any injury, any spinal disorder including cancer, TB, Neuromuscular disorder or any past back surgery.

2 instruments were used in order to carry out the procedure. Firstly, Perceived Stress Scale (PSS). It is a classical assessment tool that was developed in 1983. This tool basically helps us to measure the degree to which situations in one’s life are appraised as stressful.<sup>7</sup> This questionnaire was filled by all the subjects in order to know the level of stress the student is facing; minimum, moderate, high. Second instrument used is Oswestry Disability Index (ODI). It is used to quantify disability related to back pain. It is an important tool that researchers used to measure a patients functional disability. This questionnaire included certain sections like pain intensity, personal care, lifting, sitting, standing, walking, sleeping etc. One option from each section was selected by the subject based on their personal experience. Based on such options a total score was calculated. This score helped us know the intensity of back pain the subject has; minimum, moderate, high.<sup>8</sup>

The participants were given around 20 min to complete both the questionnaires. The questionnaires were checked for completeness at the time of collection, and, if any information was found missing, they were asked again to complete the information.

*Data Analysis*

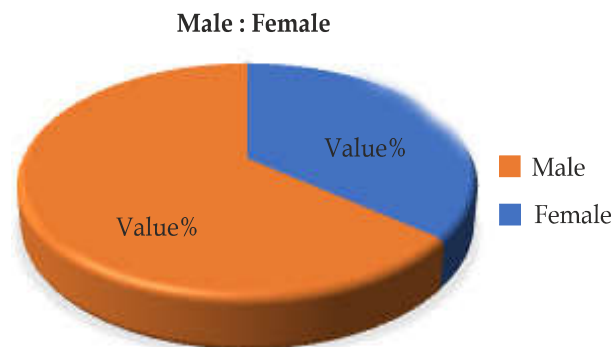
The data was collected through 2 questionnaires. One by perceived stress scale and the other one by Oswestry disability index scale. The relation between two of them was analysed by finding the correlation. The data was analysed on basis of categories of the scale which are as follows: For PSS: 0-13 score is Minimum, 14-26 is Moderate and 27-40 is High. For ODI: 0-20 score is Minimal disability, 21-40 is Moderate and more than 41 is severe disability. Correlation test was done between PSS and ODI. The correlation coefficient (r) may range from -1 to +1 in which -1 is a perfect negative correlation while +1 is a perfect positive correlation.

**Results**

Out of 100 questionnaires administered, 100 were retrieved and were found to be evaluable with a response rate of 100%. Males and females accounted were 38% and 64%, respectively. (Table 1, Fig.1)

**Table 1:** Ratio of Males and Females in the Study.

Males	Females
36	64

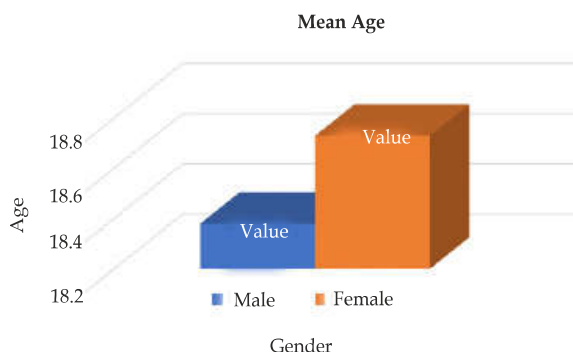


**Fig. 1:** Ratio of Males and Females in the Study

The respondents age ranged from 16- 20 years of age. The mean age of males = 18.38 years and the mean age of females= 18.73 years. (Table 2, Fig. 2)

**Table 2:** Mean Age of Students

Mean Age Male	Mean Age Female
18.38	18.73

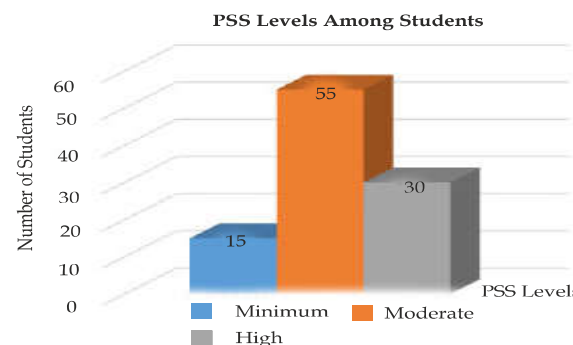


**Fig. 2:** Mean Age of Students

Out of total 100 students; 15 students showed minimum stress levels, 55 showed moderate and 30 showed high stress levels as per the PSS score. (Table 3, Fig. 3)

**Table 3:** Perceived Stress Scale Levels in Students

Levels	Minimum	Moderate	High
PSS	15	55	30



**Fig. 3:** Perceived Stress Scale Levels in Students

As per the Oswestry disability index questionnaire, it showed out of total 100 students, 39 had minimal disability, 45 had moderate and 16 had high disability.(Table 4, Fig. 4)

**Table 4:** Oswestry Disability Level in Students

Levels	Minimum	Moderate	High
ODI	39	45	16

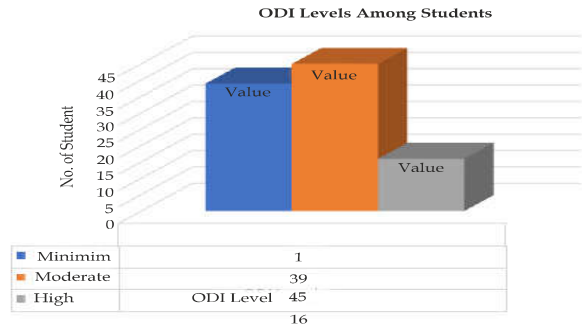


Fig. 4: Oswestry Disability Level in Students

Average PSS score of all 100 high school students is 23.05. The standard deviation of the data is 7.69 (Table 5, Fig. 5)

Table 5: It Represents Average and Standard Deviation of Pss Scores

Scale	Average	Stdev
PSS	23.05	7.69

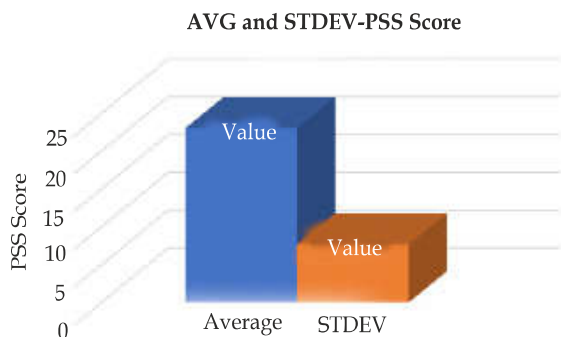


Fig. 5: It Represents Average and Standard Deviation of Pss Scores

Average ODI score of all 100 High School students is 25.18. The standard deviation of data is 15.05( Table 6, Fig. 6)

Table 6: It Represents Average and Standard Deviation of Odi Scores

Scale	Average	STDEV
ODI	25.18	15.05

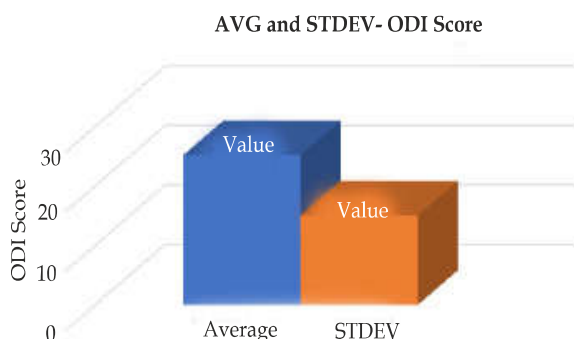


Fig. 6: It Represents Average and Standard Deviation of Odi Scores

Correlation between stress and non specific back pain is 0.41. A total score of stress scale as well as the back pain scale was found. Correlation test was done between the PSS and ODI. The value of correlation depicts that there is relation between stress and non specific back pain. Therefore, the correlation test shows that there is a significant relationship between stress and non specific back pain

Discussion

This study explored the relationship of low back pain with stress in high school students taking coaching. Students in coaching classes have an immense amount of both physical and mental stress due to vast syllabus for clearing entrance exams with good results. Such preparation involves prolong studying hours which involves prolong sitting, abnormal or awkward postures, irregular and unhealthy eating habits and most importantly lack of physical activity.<sup>9</sup> The stress is a risk factor leading to all the habits mentioned above. Due to such habits students are prone to certain musculoskeletal pain. Many students even try to take medical help but most of them usually neglect their symptoms and think of giving such things time after the entrance exams are over.<sup>10</sup>

Due to such high levels of stress, students avoid taking part in any extracurricular activity, which is quiet fine in order to crack entrance with good score. But, students usually forget that certain amount of exercise is required in order to maintain proper equilibrium of the body. This ends up child in prolong immobile state due to continuous studying hours.<sup>11</sup> This prolong immobility further leads to reduction in blood flow. This reduced blood supply further causes the muscle to tense up. Muscle tension further makes a person more susceptible for any musculoskeletal injury. The available literature indicated the link between psychological factors like stress towards back pain. Such acute back pain maybe changed into a chronic one if appropriate measures are not taken.<sup>12</sup>

Ergonomics is basically a branch of science that deals with laws to be followed at working place. The seat on which the student sit or the table height on which the student is studying should be of optimal height. That is an ergonomically designed materials must be used in order to reduce any risk of musculoskeletal injury. One quarter height of the total body height is an optimal height

that must be there in a seat. Seat height must be adjustable so that whether the person is tall or small can be accommodated easily. Cushioned seats have been seen more beneficial than the plastic or any metal ones. Also, the width of the seat must be adequate enough to fit in properly rather than being uncomfortable. Such ergonomic corrections if are made do not completely avoid any injury, but yes they do prevent risk or reduce risk of any musculoskeletal injury. Researchers established that 41 out of 123 subjects had at least one musculoskeletal problems due to work setting factors like stress, prolong working in same position, awkward postures while working which further, eventually leads as a risk factor of musculoskeletal disorder including low back pain.<sup>13</sup>

In this study, correlation was found between the stress and NSBP in high school students. Correlation between stress and NSBP came out to be 0.41, which showed that psychological factors like stress are responsible for any musculoskeletal disorder back pain. Results obtained through the study shows that correlation between the stress and NSBP is 0.41. According to Correlation coefficient Interpretation Guideline,  $0.2 \leq |r| < 0.4$  shows weak correlation.<sup>14</sup> Since our study shows a correlation of 0.41 between the stress and low back pain, which further shows that there is a weak correlation between stress and NSBP. The reasons leading to same may include small sample size, certain errors while analysing the data, other factors excluding stress like lack of physical activity, unhealthy lifestyle, improper diet were not included in the study.

#### *Limitations*

The sample was selected based on convenience sampling which may affect the generalization of the findings. The sample size was small, thus the result cannot be very reliable. Anthropometric measurements were not being performed which might help us in giving good ergonomic solutions. Age limitation was there. Number of prolong sitting hours, postures were not being assessed.

#### *Future Scope*

This study can be used to sensitize the medical professionals about the rising musculoskeletal discomforts that these young adults are facing and the lifestyle modifications required for the same in

order to prevent such discomforts as far as possible. Also, these students who are preparing for their future career are indirectly risking their long term health. Such information may also be used by certain health care professionals, which may further help in formation of certain health strategies, further reducing risk of such musculoskeletal disorders in coaching students.

#### *Clinical Significance*

The study shows that there is a significant relationship between the stress and NSBP. Correlation was obtained with help of study - 0.41, which is towards the moderate amount of correlation according to Correlation coefficient Interpretation Guideline. This signifies that psychosocial factors like stress are responsible for nonspecific back pain among the individuals.

#### **Conclusion**

Through the results the conclusion can be made that psychological factors like stress have a relation with certain musculoskeletal disorders like non-specific back pain. Since the coaching students have lots of stress due to the rising competition and getting into good college, they end up risking their own health. Students sit for a prolong time for studying, have awkward postures, have lack of physical activity. Due to prolong immobility the muscles get tensed up. These factors make a person more susceptible towards any musculoskeletal disorder like low back pain.

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