



Effect of Mechanical Neck pain on Neck Disability and Scapula position among School Teachers in Delhi and NCR

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ABSTRACT

Neck pain found to be most common musculoskeletal condition in office workers with 12-month prevalence. Mechanical neck pain can be classified into two categories in clinical studies mechanical neck pain which has patients without any identifiable anatomic cause and leaves patients having neurological dysfunctions cervicogenic headache and inflammatory disorders. Current research work has total of 150 participants out of which there were 100 females school teachers having mean age of 37.8 years (median 38 years) and 50 male school teachers having mean age 40 years (median 39 years). Participants included in the study were professionally active school teachers of primary, secondary and senior secondary. Scapula position and neck disability was examined as per keiblers lateral scapular slide test and Neck disability index. Total 150 teachers were included in the study 80 teachers having mechanical neck pain (study group) and 70 teachers not having mechanical neck pain (control group) statistically significant difference found in scapula position and neck disability. In the present research, it is found that there is statistically significant difference in scapula position protraction and upward rotation at three different levels as well as there are statistically significant changes observed in neck disability.

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INTRODUCTION

Neck pain found to be most common musculoskeletal condition in office workers with 12 month prevalence ([Haldeman et al., 2010](#)).

Mechanical neck pain can be classified into two categories in clinical studies mechanical neck pain which has patients without any identifiable anatomic cause and leaves patients having neurological dysfunctions cervicogenic headache and inflammatory disorders ([Childs et al., 2008](#); [Maigne, 2021](#)). Mechanical Neck pain can be defined as pain which gets accelerated by motion of cervical spine ([Maigne, 2021](#)).

Mechanical Neck pain gradual in onset and is multifactorial in origin like faulty posture, forward head posture, crossed neck syndrome, anxiety, depression, sporting and various occupational activities ([Binder, 2007](#); [Sarig-Bahat, 2003](#)).

School teachers considered to be in occupational group who are at risk of developing shoulder and neck pain problems due to their work posture, wide

variety of task, and excessive workload of preparing notes for classes (Sarig-Bahat, 2003).

As mentioned earlier work of school teacher is not only involve teaching students, but they need to prepare lesson plans, assessment of student work and also requires their continuous involvement in extracurricular activities planned for students. Teachers also have to take part in various school committees, all these leads to severe effect on teachers mental and physical health issues due to variety of jobs functions. Despite this, the impact of mechanical neck pain with forward head posture specifically within the teaching profession has not been given sufficient attention in the literature (Chong and Chan, 2010).

Long working hours in sitting posture leads to prolonged holding of a static posture, which is very common in sitting with forward head posture. Forward head posture will make flexion of neck which leads to increased tension in cervical posture, muscles holding cervical spine increases the compressive force in the cervical spine (Ariens, 2001).

School teachers have many occasions to bear wrong working posture while working on computer, students' assignments or studying literature which will lead to overload on musculoskeletal system resulting in pain in the cervical/ lumbar region (European Agency for Safety and Health at Work, 2004). Therefore, the aim of the study is to analyse effect of mechanical neck pain on neck posture.

METHODOLOGY

Study population

Current research work has total of 150 participants out of which their were 100 females school teachers having mean age of 37.8 years(median 38 years) and 50 male school teachers having mean age 40 years (median 39 years) primary school teacher, secondary and senior secondary school teachers were included in the research work

An information letter was sent to various government and private schools of Delhi & NCR having necessary details of our study. Study was done in medical room of school under school premises after obtaining permission of competent authority. All teachers were selected as per inclusion and exclusion criteria.

Data collection done from October 2019- February 2020. Schools were selected randomly from government and Private schools of Delhi & NCR. Convenience sampling method was utilized for data collection. A written consent was obtained from all school teachers who were selected as per inclusion criteria.

Ethical Clearance

Present research work has obtained ethical clearance from physiotherapy department of Shree Guru Gobind Singh Tricentenary University (S.G.T University) Gurgaon-Badli Road Chandu, Budhera, Gurugram, Haryana 122505 as per letter SGT/FOP/2019/44 dated 4/10/2019. School teachers were abreast about the aims and objectives of the research work. Teachers were also well explained for procedure of data collection in consent form. Consent form is obtained by all participants. From schools we collected 160 questionnaires out of which 150 were duly filled by the participants which were included in the study.

Subjects were be divided into two groups Group 1 (with Neck pain) and Group 2 (without Neck Pain)

Scapular protraction measurements done *by utilizing lateral scapular slide test LSST*

Keibler has designed this test for the assessment of scapula position to find out any asymmetry under varying loads (Cleland *et al.*, 2006; Murphy and Lopez, 2013). Three different positions have been assessed with upper extremity abducted at 0-degree, 45 degree, and 90 degree for both left and right side (Carroll *et al.*, 2008; Dahiya and Ravindra, 2013; Dahiya and Kaur, 2017).

1. First position- At rest.
2. Second position- Hands on hip.
3. Third position - 90° glenohumeral abduction with internal rotation.

Scapular Upward Rotation Measurement upward rotation of scapula was measured with the help of baseline digital inclinometer (Dahiya and Kaur, 2017). Upward rotation was measured with the teachers standing in normal, relaxed posture. Inclinometers lateral arm was placed over the posterior – lateral acromion, and medial arm was placed over the root of spine of scapula. Hold button was pressed once desired position achieved and measurements were recorded. Readings was done bilaterally at Rest, 60 degrees, 90 degrees and 120 degrees.

Statistical Analysis

SPSS 15.0 software and descriptive statistics was used for data analysis and excel sheet was utilized for preparation of graphs and tables. Static scapula position was assessed and analysed in three different positions and their means of both sides left and right side were documented. We have used t-test for

comparing means of left and right sides in all positions.

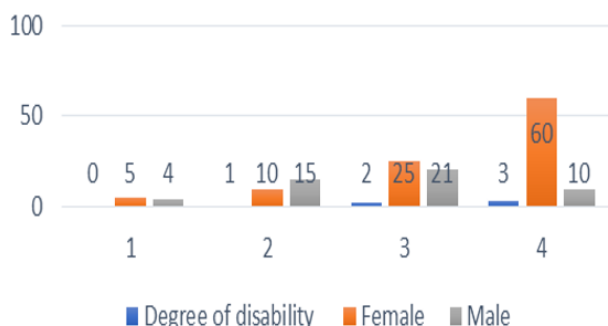
Outcome measures

Present study was done using cross-sectional study design. A validated Questionnaire was formed by author for collection of demographic data which includes sex, age, weight, Height. Weight and height were used for calculation of Body Mass Index BMI. Numeric Pain rating Scale was utilised for assessment of Mechanical Neck pain. Neck disabilities were assessed by using Neck disability index NDI for assessment of cervical spine (Vernon and Mior, 1991).

Primary outcomes for assessment of scapular position are Keibler’s method of scapular protraction assessment at three different positions of glenohumeral abduction that is at rest, at 45 degrees abduction and at 90 degrees abduction.



Graph 1: Description of sample



Graph 2: Neck Disability among School teachers as per gender distribution

Baseline digital inclinometer was utilized for scapula upward rotation measurements at rest, 60 and 90 degree glenohumeral abduction.

RESULTS

Table 1 describes about frequency of school teachers. Total 150 teachers were included in the study 80 teachers having mechanical neck pain (study group) and 70 teachers not having mechanical neck pain (control group).

Graph 1 explains about gender distribution, which shows females comprises 67% and males comprises 33 % which is almost half of total population.

Table 2 gives details of school teachers scapula position who are not having mechanical neck pain at three different levels, as per results there is no statistically significant difference between right and left side in all three positions as well as in upward rotation. (Kataria et al., 2020)

Results from previous studies shows there is no significant difference between right and left side in all three scapula positions and in upward rotation. (Kataria et al., 2020)

The result shows there is a significant difference between the right and left side in all three positions and in upward rotation of scapula among school teachers. (Kataria et al., 2020)

Table 3 explains about the incidence of neck disability among school teachers. Neck Disability Index-Results shows 70 school teachers were suffering from severe cervical disabilities (p<0.05), 46 teachers had moderate level of disabilities, 25 were having mild symptoms of neck pain and discomfort and 9 were not having any symptoms. Results shows significant neck disability among school teachers (p<0.05). Results suggest altered position of scapula may affect neck function and results into neck disability.

Results shows 70 teachers are having severe neck disability, 46 teachers are suffering from moderate level of neck disability, 25 teachers are having mild disability and only 9 teachers are having no cervical dysfunction among 150 school teachers of Delhi NCR. Graph 2

Results exhibits neck pain has significant effect on school teachers neck function, where majority of school teachers have moderate to severe neck disability having p value <0.0. Results signify neck pain and neck disorder affects the neck function to a greater extent where majority of school teachers suffer from moderate to severe neck dysfunction over a period of time.

DISCUSSION

School teachers come under such a professional category where pervasiveness of skeletal system disorder is very high because of various multifactorial causes (Kataria, 2018; Mesaria and Jaiswal, 2015).

We have found long working hours on computers and wrong working postures of school teachers on computers or for any other official commitment to be few of predisposing risk factors for develop-

Table 1: Description of sample

School teachers	Frequency of teachers	Percentage
Female teachers	100	66.6%
Male teachers	50	33.3%
Total School Teachers	150	100%

Table 2: Scapula position in primary school teacher without Neck pain

Position	School teachers without any symptoms			School teachers with symptoms of pain		
	Right	Left	p-value	Right	Left	p-value
	(Mean SD)	(Mean SD)	(Mean SD)	(Mean SD)	(Mean SD)	
At rest	10.13(0.22)	10.14(0.02)	0.89	9.03(0.67)	10.21(0.89)	0.00
Hands on Hip(in cm)	10.80(1.65)	10.89(1.87)	0.90	13.33(1.54)	11.30(1.87)	0.01
90° abduction (cm)	12.04(1.23)	12.07(0.45)	0.99	14.01 (0.65)	112.98(0.60)	0.00
Upward Rotation at Rest	17.21(0.56)	17.32(1.46)	0.89	19.21 (1.05)	23.21(1.08)	0.00
Upward rotation 60° abduction	20.12(1.78)	21.14(1.67)	0.88	23.01(0.65)	21.1(1.56)	0.01
Upward Rotation 90° Abduction	10.5(1.2)	10.7(1.17)	0.98	10.5(1.3)	13.7(1.27)	0.004

Table 3: Neck Disability among School teachers as per gender distribution

Degree of disability	Female	Male	p-value
0	5	4	0.000
1	10	15	0.00
2	25	21	0.0006
3	60	10	0.0005

“Neck Disability Index” NDI- 0 –lack of dysfunction ,1 – mild (NDI), 2 –moderate (NDI), 3 – severe (NDI) * p ≤ 0.05 –statistically significant

Table 4: Describing effect of neck pain on disability under two categories among school teachers

		Disability			P-Value*
		Mild Disability N-25	Moderate Disability N-46	Severe Disability N-70	
Numeric Pain rating scale score NPRS	NPRS scores Between 4-5	12 48%	21 45.65%	51 72.85%	<0.01
	NPRS scores Between 6-7	6 24%	12 26.08%	21 30%	
	NPRS scores Between 8-9	13 52%	13 28.26%	07 10%	

ing neck pain and alterations in scapular position among school teachers.

We have studied scapular position and neck disability among 150 school teachers of Delhi NCR where we found statistically significant difference in scapular position among school teachers who were having neck pain as compared to those who were not having any neck pain (Kataria, 2018; Pahadi, 2014). It may be correlated as due to wrong posture which includes forward posture and rounded shoulder position of scapula is also being changed which leads to alterations in its static position at three different levels. Our study indicates that there are many teachers who were having severe neck disability based on Neck disability Index NDI which indicates there is severe problem in work posture of teachers by the fact that 70n teachers were having severe neck disability.

Studies done in different places have also indicates significant disability in cervical and lumbar spine region among school teachers.

In the present study, altered position of scapula is found among school teachers it is possible due to indefinite wrong working posture of school teachers for prolonged period of time and also stress plays very important role in neck pain as due to work pressure teachers are under stress most of the time which leads to tightness of trapezius upper fibres further altering the position of scapula and increasing neck disability (Mesaria and Jaiswal, 2015). Research work done by Green et al. found neck pain to be one of the most common predisposing factor for altered position of scapula. Altered or wrong position of scapula can be described as tilted, winged, rotated depressed, adducted, and abducted scapula (Mesaria and Jaiswal, 2015).

As discussed, it is also found that long period of exposure to work stress can affect the proprioception related muscle function which will at later stages affect muscle spindle may damage to certain extent. In this context cervical compressive stress might inhibit the proprioceptive muscular feedback system (Mesaria and Jaiswal, 2015; Kataria et al., 2020).

CONCLUSIONS

Present research has found notable change in position of scapula protraction in three positions (at rest, hands on hip, 90 degrees abduction) and upward rotation at three different levels (at rest, 60 degrees and 90 degrees abduction) as well as there are statistically significant changes observed in neck disability among school teachers working in Delhi NCR.

Conflict of Interest

There is no Conflict of Interest.

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