

## ORIGINAL ARTICLE

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# Correlation of Chronic Neck Pain with ADLs, Sleep, and Work Family Conflict in Female School Teachers

<sup>1</sup>Vijayalaxmi Kanabur<sup>2</sup>Abhishek Sankpal<sup>3</sup>Akarsh Nayak<sup>4</sup>Akiza S Mujawar

## ABSTRACT

**Background:** Related to work, musculoskeletal disorders mainly cause the burden of occupational diseases. Particularly those who work in desk jobs, such as computer workers and female school teachers, are more susceptible to these conditions. Female educators face a range of health issues as a result of their physical and psychological workloads, with neck discomfort being a major one. This research aims to correlate chronic neck pain with ADLs, sleep, and work-family conflict in female school teachers.

**Methods:** The study included 188 female school teachers with at least three years of work experience and persistent neck discomfort for two months. The Subjects fulfilling the inclusion and exclusion criteria were administered the outcome measures such as the Pittsburgh Sleep Quality Index (PSQI), Northwick Park Neck Pain Questionnaire (NPNPQ), Numeric Pain Rating Scale (NPRS), and Work and Family Conflict Scale (WAFCS).

**Results:** The correlation coefficient ("r") showed that the numeric pain rating scale, NPNPQ, PSQI, and WAFCS were positively correlated ( $p < 0.05$ ) with each other. There was a negative correlation ( $p < 0.05$ ) between hours of correction work and NPNPQ. The WAFCS were negatively correlated ( $p < 0.05$ ) with age and years of experience, and positively correlated ( $p < 0.05$ ) with hours of class taken.

**Conclusion:** The current study concluded that chronic neck pain is positively correlated with function, sleep, and work-family conflict in female school teachers.

**Keywords:** Chronic neck pain, ADLs, SLEEP, WRMSDs, WAFCS.

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## CORRESPONDING AUTHOR

<sup>1</sup>Vijayalaxmi Kanabur

Assistant Professor, Department of CBR,  
KAHER Institute of Physiotherapy, Belagavi.  
ORCID ID:0000-0003-1799-805X  
Email ID: vvkdeeksha@gmail.com

<sup>2</sup>KAHER Institute of Physiotherapy, Belagavi.

Email ID: abhisheksankapal2001@gmail.com

<sup>3</sup>KAHER Institute of Physiotherapy, Belagavi.

Email ID: akarshnayak8@gmail.com

<sup>4</sup>KAHER Institute of Physiotherapy, Belagavi.

Email ID: akizanujawar@gmail.com



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## INTRODUCTION

It is believed that a variety of factors, including physical, psychological, and sleep-related ones, have a role in the development of musculoskeletal disorders of the neck [1].

In both industrialized and developing nations, musculoskeletal illness related to the workplace is today regarded as one of the most common and expensive occupational health issues [2]. Numerous other factors, such as smoking cigarettes, poor sleeping posture, and a sedentary lifestyle can also cause neck pain [3,4]. Musculoskeletal pain is considered a work-related injury if it happened during working hours, interfered with daily activities, and lasted more than a day. Neck pain is one of the main health issues linked to work-related stress and physical activity [5, 6].

It was discovered that 5% of men and 7% of women have chronic neck pain [7, 8]. The frequency of persistent neck discomfort in the general population is rising. An estimated 67% of individuals will experience neck pain at some point in their lives. It is anticipated that the prevalence rate will continue to rise due to an increasingly sedentary population, particularly with the increased reliance on computer technology in the workplace. Good treatment of this illness is essential for symptom relief as well as, possibly more importantly, preventing recurrent episodes of cervical pain, suffering, and lost productivity at work [8,9].

The teaching profession is one of these impacted working sectors. In addition to teaching, teachers also have to arrange classes, grade assignments, and participate in extracurricular activities—none of which are always carried out in a comfortable setting with a head-down posture. Teaching is a difficult job. It has been observed that 39–95% of teachers are affected by WMSDs as a result of these circumstances [10-12]. Pain frequently triggers other problems, such as chronic exhaustion, insomnia, excessive restlessness, retreating from activities, weakened immunity, and mental health difficulties. School teachers frequently report WMSDs. WMSDs were present in 41.1% of teachers. It was stated that the pain was incapacitating and negatively impacted performance. Teachers in Brazilian public schools who have poor sleep quality are more likely to have WMSDs. The age range of the bulk of the population (49.8%) was between 40 and 49; women made up more than half (52.2%) of the population, and nearly all (89.9%) worked for the government. The sample's married participant rate was 84.7% [13, 14].

The connection between MSP and occupation has been the subject of numerous investigations. Owing to their particular professions, some worker groups are particularly susceptible to MSP at work. Workers in the textile industry frequently have MSP, according to researchers.<sup>[10,12]</sup> Musculoskeletal disorders encompass a broad spectrum of diseases that affect various components of the musculoskeletal system, which includes muscular fibers, ligaments, tendons, joints, peripheral nerves, and

blood arteries that supply them. The conditions that make up this group of illnesses are as follows: degenerative and inflammatory conditions, like tendon inflammations; and related conditions, like epicondylitis (inflammation of the tendons that attach to the lateral or medial epicondyle of the elbow, also known as tennis or golfer's elbow); and tenosynovitis (inflammation of the lining of the sheath that surrounds a tendon).

Common Musculoskeletal disorders mainly seen in school teachers are neck discomfort, shoulder discomfort, low back pain, and leg ache. Research indicates that a significant number of school teachers report having musculoskeletal diseases [14].

According to reports, the prevalence rates of NP in teachers were 60% in Hong Kong, 57% in China, 44% in Sweden, and 43% in Turkey. Hence, the prevalence of neck pain among teachers ranges from 43% to 60% worldwide [15-17]. Hence, this study aims to determine the correlation of chronic neck pain with ADLs, sleep, and work-family conflict in female school teachers.

## METHODOLOGY

After Obtaining Ethical Clearance from the Institutional Research Committee (KIPT/651), CTRI Registration (CTRI/2024/07/069724) for the study was done. Different schools in Belagavi city will be listed and grouped in North and South regional clusters. All the schools in this regional cluster were approached, and permission was taken from the head of the institution to conduct the study. All the female school teachers were screened for chronic neck pain, and the inclusion and exclusion criteria, which included Female school teachers with chronic neck pain (>3 months) aged 24 - 45 Years, with two or more years of experience, and Female school teachers who are willing to participate in the study voluntarily. The Female school teachers who were recently (<6 months) diagnosed with upper limb fractures or diagnosed with neurological disorders were excluded. Those fulfilling these criteria were recruited for the study. The need for the study was explained to the female school teachers in a language that is familiar to them. Written consent was taken. A data collection sheet with demographic information and other details, such as hours of class taken, hours of correction work, teaching grade, and years of experience, was completed before the commencement of the study. The included female school teachers were either instructed individually or in groups to fill self-administered scales and questionnaires as listed (NPRS), (PSQI), (WAFCS), (NPNPQ).

### Outcome Measures:

NPRS is a subjective outcome measure of pain, the Numeric Pain Rating Scale (NPRS): Score from 0 to 10 Points, Reliability -100%, Validity - 93% 95% [18].

Northwick Park Neck Pain Questionnaire for assessing ADLs, the maximum score is 36 if all nine questions are answered and 32 if only the first eight questions are answered. The percentage ranges from 0% to 100%. The higher the percentage, the greater the disability and the

pain [19].

Pittsburgh Sleep Quality Index (PSQI): Scores from 0-21. A self-rated questionnaire that assesses sleep quality and disturbances over a one-month interval. Reliability: 89.6%, Validity: 86.5% [20].

Work And Family Conflict Scale (WAFCS): Scores from 0-35. Two-directional process- work inference with family and family interference with work. Reliability – WFC: 91% and FWC: 88%, Validity – 77% [21].

The Investigators were supervising the above process and filling in each questionnaire listed above required approximately 15 minutes, and the whole procedure required 30-45 Minutes. Proper Documentation of the same was done. The data collected at the end was filtered for incomplete answers. Appropriate Data thus obtained was statistically analysed using Spearman’s rho and Kruskal-Wallis H test, considering  $p < 0.05$  as the level of significance.

## RESULTS

The current study included 188 female school teachers (N = 188) with a mean age of  $35.99 \pm 6.89$  years. The descriptive statistics for height, weight, and BMI are as follows: the mean for height (cm) is  $\pm 159.38$  and SD 6.31, the mean for weight (kg) is  $\pm 62.00$  and SD is 9.20, and the mean for BMI is  $\pm 24.37$  and SD is 3.52. The descriptive statistics for scales (NPRS, NPNPQ, PSQI, WAFCS) have shown variations, such as the numeric pain rating scale, which has a mean of  $\pm 5.48$  and an SD of 1.63. In contrast, the Northwick Park neck pain questionnaire has a mean of  $\pm 15.72$  and an SD of 5.69, the Pittsburgh sleep quality index has a mean of  $\pm 7.90$  and an SD of 1.95, and the Work and family conflict scale has a mean of  $\pm 23.57$  and an SD of 4.64.

**Table 1: Descriptive Statistics for age, height, weight, BMI, years of experience, hours of class taken, hours of correction work, numeric pain rating scale, Northwick Park neck pain questionnaire, Pittsburgh sleep quality index, and work and family conflict scale.**

(n = 188)	Range	Mean	S.D.
Age (Years)	24 to 57	35.99	6.89
Height (Cm)	140 to 176	159.38	6.31
Weight (Kg)	39 to 95	62.00	9.20
BMI (Kg/M <sup>2</sup> )	16 to 35	24.37	3.52
Years of experience	1 to 30	10.32	6.75
Hours of class taken	2 to 8	4.76	1.52
Hours of correction work	0 to 8	1.79	1.05
Numeric pain rating scale	2 to 9	5.48	1.63
Northwick Park Neck Pain Questionnaire	5 to 36	15.72	5.69
Pittsburgh Sleep Quality Index	2 to 8	4.76	1.52
Work and family conflict scale	0 to 8	1.79	1.05

The correlation coefficient (“r”) showed that the NPRS, NPNPQ, PQSI, as well as WAFCS, were positively correlated ( $p < 0.05$ ) with each other.

The NPRS showed a positive correlation ( $p < 0.05$ ) with

both years of experience and weight. The number of hours worked on corrections and the NPNPQ showed a negative connection ( $p < 0.05$ ). Weight had a positive correlation ( $p < 0.05$ ) with the PSQI.

**Table 2: Correlation between chronic neck pains with ADLs, sleep, and work-family conflict in female school teachers.**

		Numeric pain rating scale	Northwick Park Neck Pain Questionnaire	Pittsburgh Sleep Quality Index	Work and family conflict scale
Numeric pain rating scale	Spearman’s ratio	1	0.746	0.467	0.396
	p value	--	$< 0.001^*$	$< 0.001^*$	$< 0.001^*$
Northwick Park Neck Pain Questionnaire	Spearman’s ratio		1	0.557	0.367
	p value		--	$< 0.001^*$	$< 0.001^*$
Pittsburgh Sleep Quality Index	Spearman’s ratio			1	0.296
	p value			--	$< 0.001^*$
Work and family conflict scale	Spearman’s ratio				1
	p value				--

Meanwhile, age, years of experience, and hours of correction work had a negative correlation ( $p < 0.05$ ). The WAFCS showed a negative correlation ( $p < 0.05$ ) with age and years of experience, whereas there was a positive correlation ( $p < 0.05$ ) with the number of hours attended in class.

**Table 3: Correlation between age, height, weight, BMI, years of experience, hours of class taken, hours of correction work, and chronic neck pain with ADLs, sleep, and work-family conflict.**

		Numeric pain rating scale	Northwick Park neck pain questionnaire	Pittsburgh Sleep Quality Index	Work and family conflict scale
Age (Years)	Spearman’s ratio	0.072	-0.309	-0.309	-0.345
	p value	0.325	$< 0.001^*$	$< 0.001^*$	$< 0.001^*$
Height (Cm)	Spearman’s ratio	0.044	0.102	0.102	-0.055
	p value	0.552	0.162	0.162	0.451
Weight (Kg)	Spearman’s ratio	0.147	0.178	0.178	-0.087
	p value	0.044*	0.014*	0.014*	0.233
BMI (Kg/M <sup>2</sup> )	Spearman’s ratio	0.112	0.118	0.118	-0.048
	p value	0.127	0.107	0.107	0.510
Years of experience	Spearman’s ratio	0.161	-0.270	-0.270	-0.236
	p value	0.027*	$< 0.001^*$	$< 0.001^*$	0.001*
Hours of class taken	Spearman’s ratio	0.101	-0.093	-0.093	0.160
	p value	0.167	0.205	0.205	0.028*

Hours of correction work	Spearman's ratio	-0.128	-0.378	-0.378	0.084
	p value	0.079	< 0.001*	< 0.001*	0.253

The Kruskal-Wallis “H” test was used to compare chronic neck pain with ADLs (NPRS and NPNPQ) according to grades of teaching. There was a difference ( $p < 0.05$ ) in chronic neck pain with ADLs (Both NPRS and NPNPQ) according to grades of teaching. A comparison of sleep and work-family conflict according to teaching grades revealed no difference ( $p > 0.05$ ) in sleep (PSQI) and work-family conflict.

**Table 4: Comparison of chronic neck pain with ADLs according to grades of teaching.**

	Grades of teaching	Median	IQR	Kruskal Wallis “H” test	p value
Numeric pain rating scale	Nursery	5	2 to 5	17.46	0.001*
	1 to 5	5	4 to 6		
	6 to 10	6	5 to 7		
	1 to 10	6	4 to 7		
Northwick Park neck pain questionnaire	Nursery	12	8 to 17	11.80	0.008*
	1 to 5	13	10 to 17		
	6 to 10	15	12 to 21		
	1 to 10	16.5	12 to 21		
Pittsburgh Sleep Quality Index	Nursery	7	4 to 9	5.20	0.158
	1 to 5	8	7 to 9		
	6 to 10	8	7 to 10		
	1 to 10	8	7 to 10		
Work and family conflict scale	Nursery	20	18 to 27	3.62	0.306
	1 to 5	23.5	19 to 27		
	6 to 10	25	21 to 27		
	1 to 10	24.5	22 to 27		

## DISCUSSION

The goal of the study was to prove that professional teachers’ function, sleep, and work-family conflict were positively correlated with chronic neck pain. The NPRS, NPNPQ, PSQI, and WAFCS were used in this study to aid in the understanding of the correlation between the variables. The correlation of the components utilizing all four of the measures utilized in this study was not included in the earlier investigations. Additionally, there was no discernible relationship between Neck Pain and any of these factors.

According to a prior study conducted by Fahmy et al. (2022) and Temesgen et al. (2019), occupational musculoskeletal problems are currently regarded as one of the most common and expensive occupational health issues in both developed and developing countries. It is considered a work-related injury if musculoskeletal pain develops during working hours, interferes with daily activities, and lasts longer than a day [2,22].

Employers and workers frequently undertake ergonomic interventions, training programs, and workplace improvements to provide safer working conditions and address MSDs among upper-level working professionals.

By implementing ergonomic principles and conducting regular assessments of working conditions, musculoskeletal problems at work can be avoided or at least minimized.

It was shown that the prevalence of persistent cervical discomfort is 7% in females and 5% in males. Similar prevalences have also been reported for the United Kingdom. Epidemiologic studies indicate that pain is classified as chronic if it persists for more than two, three, six, or five years [14, 16].

According to a study by Temesgen MH (2019), teachers who spend more than 2 hours per day in a static head-down posture for reading, completing paper assessments, scoring, and preparing class activities are more likely to experience shoulder and/or neck pain. This outcome was comparable to one obtained in China. The reason could be that prolonged head down posture causes straining of neck tissues, resulting in discomfort, muscle stiffness or tightness in the cervico-brachial region, and ultimately pain. Furthermore, the student-teacher ratio was larger; 81.2% of the teachers in this survey had more than 40 pupils in their class [22, 23].

A study conducted by Murugan S et al. (2021), meanwhile, female teachers reported that the pain worsened with overhead reaching and increased activity constraints. While male teachers chose hot spring therapy, ladies preferred pain relievers. Females also requested sick leave reports from healthcare professionals more frequently. According to the Beck Depression Inventory, both female and male MSP teachers had mild depression; nonetheless, there was a significant gender difference ( $p = 0.05$ ). Female teachers expressed more depressed symptoms. Gender, age, emotional status, and poor posture are all significant risk factors for getting MSP. Teachers were discovered to be at risk [23, 24].

Baur H, Starker T. et al. (2018) conducted a study in which they failed to find that occupational influence and social support were significant predictors or that they could mitigate the impact of WFC in moderator analyses. In summary, surgery nurses may get neck and back pain as a result of WFC. Interventions related to work and life may help surgery nurses’ WFC [24, 25].

According to a study by Rassas et al. (2022), strain-based work-to-family conflict is a stronger predictor of cervical and lumbar pain in nursing staff than other types of conflict. Therefore, a key element of the preventative strategy for musculoskeletal illnesses in nursing staff should be decreasing strain in health-care settings [25, 26]. Mental health problems that could aggravate musculoskeletal injuries. Musculoskeletal pain is common among teachers, with rates ranging from 39% to 95%. Low back musculoskeletal discomfort is one of the main reasons people live with secondary school teachers throughout the world, who spend a lot of time with their heads bowed while performing their duties. As a result, the presence of these issues in teachers may impact their daily activities, including their job, and increase the rate of absenteeism

from work [23,24].

Employers and workers frequently undertake ergonomic interventions, training programs, and workplace improvements to provide safer working conditions and address MSDs among upper-level working professionals. By implementing ergonomic principles and conducting regular assessments of working conditions, musculoskeletal problems at work can be avoided or at least minimized [24].

Chronic neck pain was found to be favorably correlated with neck function, as measured by the NDI, by Altuğ F et al. (2015). Similarly, our current investigation found a positive association, as higher pain intensities lead to a decrease in movement at the affected area, which in turn causes functional restrictions [23,24,25]. According to a study by Chin WS et al. (2021), women with neck pain report difficulty sleeping and reduced functioning [25,26,27].

Likewise, our research revealed a strong correlation between neck pain and both function and sleep in female participants. The function showed a favorable correlation with both work-family conflict and sleep. Additionally, it was discovered that among females, sleep and work-family conflict were positively correlated. This relates to female educators who bear the heavy burden of caring for their families and kids in addition to working long hours, irregular shifts, and juggling this with the growing workload and crucial role of instructing students, marking papers, and assignments.

The moderator analyses revealed that job influence and social support did not function as major predictors or as a buffer against the impact of WFC. In summary, WFC may have an impact on surgical nurses' back and neck pain. Work-life programs may help surgery nurses have lower WFC.

It was discovered that among nursing staff, strain-based work-to-family conflict was a stronger predictor of cervical and lumbar pain than other forms of conflict. Thus, a key element of the preventative strategy for musculoskeletal illnesses in nursing staff should be lowering strain in healthcare environments.

This study had several drawbacks, including a single-center design, a small sample size, and the researchers' self-understanding of the questions. To improve the generalizability of the findings, bigger sample sizes and multicenter investigations should be carried out in the future. This study suggests using the findings for additional intervention-based research or screening related to neck discomfort in female teachers in the future.

## CONCLUSION

In conclusion, this study of 188 female school teachers revealed significant interconnected relationships between neck pain, sleep quality, and work-family conflict. The findings demonstrate that chronic neck pain is positively correlated with poor sleep quality and increased work-family conflict, suggesting complex occupational health challenges. Teaching grade level emerged as a significant

factor influencing neck pain and daily living activities, while individual characteristics showed varying correlations with health outcomes. The positive correlations between all primary measures suggest that teachers experiencing neck pain are more likely to suffer from sleep disturbances and work-family balance issues, underscoring the need for comprehensive workplace interventions that address physical symptoms, sleep hygiene, and work-life balance.

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