



Knowledge and Practice of Stretching Exercises for the Prevention of Musculoskeletal Pain Among School Teachers in Karachi: A Cross-Sectional Study

Fajar Rauf¹, Dr. Maira Muneer PT², Dr. Okasha Anjum PT³

¹ DPT, Department of Allied Health Sciences, Indus University, Karachi

Email: fajarraufo@gmail.com

² Assistant Professor, Department of Allied Health Sciences, Indus University, Karachi

Email: maira.muneeroo@gmail.com

³ Chairperson, Department of Allied Health Sciences, Indus University, Karachi

Email: drokashaanjump@gmail.com

ARTICLE INFO

Received:

February 01, 2026

Revised:

February 27, 2026

Accepted:

March 25, 2026

Available Online:

April 06, 2026

Keywords:

Stretching exercises,
Musculoskeletal pain,
School teachers,
Knowledge, Practice,
Nordic Musculoskeletal
Questionnaire

Corresponding author:

fajarraufo@gmail.com

ABSTRACT

Background: Musculoskeletal disorders (MSDs) are among the most common occupational health problems affecting school teachers because of prolonged standing, repetitive movements, awkward postures, and increased workload. Regular stretching exercises have been recommended as an effective strategy to improve flexibility, maintain joint mobility, and reduce the risk of musculoskeletal pain. However, limited evidence is available regarding teachers' knowledge and practice of stretching exercises in Pakistan.

Objective: To assess the knowledge and practice of stretching exercises for the prevention of musculoskeletal pain among school teachers in Karachi.

Methodology: An observational cross-sectional was conducted among 113 school teachers selected through non-probability convenience sampling from private schools in Karachi. Participants aged 20–50 years with at least six months of teaching experience and working more than five hours daily were included. Data were collected using a structured questionnaire incorporating the Nordic Musculoskeletal Questionnaire (NMQ) and questions assessing knowledge and practice of stretching exercises. Data were analyzed using SPSS version 26. Descriptive statistics, Pearson correlation, Chi-square analysis, reliability testing, normality testing, multicollinearity, and homogeneity analyses were performed. Statistical significance was considered at $p < 0.05$.

Result: Among 113 participants, females constituted 91.2% of the sample. Most teachers (63.7%) reported performing stretching exercises; however, only 14.2% practiced stretching daily, whereas 70.8% performed stretching only occasionally. Significant associations were observed between stretching exercise practice and musculoskeletal pain prevalence ($p=0.04$). The number of painful body regions also demonstrated a significant association with pain prevalence ($p<0.001$).

Conclusion: Although most teachers were aware of stretching exercises, regular practice remained insufficient. Appropriate stretching behavior was significantly associated with musculoskeletal pain, indicating the need for workplace health education and structured preventive exercise programs among school teachers.

Introduction

Musculoskeletal disorders (MSDs) are a leading cause of disability worldwide and represent a major occupational health problem affecting individuals across a wide range of professions. These disorders involve muscles, bones, joints, ligaments, tendons, and related soft tissues, leading to pain, reduced mobility, and impaired functional performance.^[1,2]

Occupational activities such as prolonged standing, repetitive movements, awkward postures, and poor workplace ergonomics increase the risk of developing work-related musculoskeletal disorders (WMSDs).^[3] School teachers are particularly vulnerable because their profession requires prolonged standing during lectures, repetitive writing on classroom boards, sustained sitting during lesson preparation, and repetitive upper-limb activities. These occupational demands place continuous mechanical stress on the musculoskeletal system, particularly the neck, shoulders, and lower back, increasing the likelihood of musculoskeletal pain.^[4,5]

Musculoskeletal pain among teachers has been consistently reported worldwide and is associated with reduced work efficiency, absenteeism, decreased productivity, and poor quality of life^[6]. Therefore, identifying effective preventive strategies for this occupational group is an important public health priority.

Stretching exercises are widely recommended as a simple, inexpensive, and practical intervention for preventing work-related musculoskeletal disorders. Regular stretching improves flexibility, maintains joint range of motion, reduces muscle stiffness, and promotes normal musculoskeletal function. Evidence from systematic reviews and clinical studies supports the effectiveness of stretching exercises in reducing musculoskeletal discomfort and improving physical function when performed regularly.^[7,8]

Despite these benefits, previous studies have demonstrated that the practice of stretching exercises remains inadequate in many populations. Although individuals may possess basic knowledge regarding stretching exercises, this knowledge is not always translated into routine practice. Limited awareness, workload, lack of time, and poor adherence have been identified as common barriers to regular stretching exercise practice.^[9]

In Pakistan, previous research has primarily investigated the prevalence of musculoskeletal pain among teachers, while evidence regarding their knowledge and practice of stretching exercises remains limited.^[10]

Assessing these factors is essential for designing physiotherapy-based preventive strategies, ergonomic education, and workplace health promotion programmes. Therefore, the present study aimed to assess the knowledge and practice of stretching exercises for the prevention of musculoskeletal pain among school teachers in Karachi, Pakistan.

Methodology

Study Design: This study followed an observational cross-sectional study design.

Study Setting: The study was conducted in selected private schools in Karachi, Pakistan, including The Academy, The Beginners, Little Folks, The Vision School, Al Huda School, and Happy Palace School.

Sample Size: The minimum required sample size was 113 school teachers, calculated using the OpenEpi sample size calculator with a 95% confidence level, 5% margin of error, and an assumed prevalence of 50%.

Sampling Technique: A non-probability convenience sampling was employed to recruit eligible participants.

Inclusion Criteria: Participants were included in the study if they met the following criteria.

- School teachers aged 20–50 years.
- Having at least 6 months of teaching experience.
- Working a minimum of 5 hours per day.

Exclusion Criteria: Participants were excluded if they met any of the following criteria.

- Teachers with diagnosed chronic musculoskeletal or neurological disorders.
- Teachers with systemic diseases affecting musculoskeletal health (e.g., diabetes mellitus or thyroid disorders).
- Teachers performing administrative duties only and not actively involved in teaching.

Outcome Measure Tools: Data were collected using a structured questionnaire consisting of demographic information, questions assessing knowledge and practice of stretching exercises, and the standardized Nordic Musculoskeletal Questionnaire (NMQ) to assess musculoskeletal pain in different body regions.

Data Analysis: Data were entered and analyzed using SPSS version 26. Descriptive statistics were used to summarize the study variables. Pearson correlation analysis was performed to determine relationships among variables, while the Chi-square test was used to examine associations between categorical variables. Reliability, normality, multicollinearity, and homogeneity tests were also performed. A p-value of <0.05 was considered statistically significant.

Ethical Considerations: Permission to conduct the study was obtained from the administrations of the selected schools before data collection. All participants were informed about the purpose and procedures of the study, and written informed consent was obtained prior to participation. Participation was voluntary, confidentiality was maintained throughout the study, and participants were free to withdraw at any stage without any consequences.

Conflicts of interest: There were no conflicts of interest declared by the authors.

Results

Frequency distribution		Frequency	Percent	Cumulative Percent
Age	20-30 years	44	38.9	38.9
	31-40 years	32	28.3	67.3
	41-50 years	37	32.7	100.0
Gender	Male	10	8.8	8.8
	Female	103	91.2	100.0
Teaching experience	1-2 years	29	25.7	25.7
	3-5 years	25	22.1	47.8
	6-10 years	32	28.3	76.1
	11-20 years	22	19.5	95.6
	Above 20 years	5	4.4	100.0
Working hours / day	6-8 hours	45	39.8	39.8
	> 08 hours	68	60.2	100.0
Stretching exercise	No	10	8.8	8.8
	Not sure	31	27.4	36.3
	Yes	72	63.7	100.0
Stretching exercise practice frequency	Occasionally	80	70.8	70.8
	2-3 times / week	17	15.0	85.8
	Daily	16	14.2	100.0
Modifications	Not practice	83	73.5	73.5
	Breaks	15	13.3	86.7
	Physical therapy	9	8.0	94.7
	Exercise	3	2.7	97.3
	Rest	3	2.7	100.0
Count of regions	No region	10	8.8	8.8
	One region	12	10.6	19.5
	Two regions	21	18.6	38.1
	Three regions	22	19.5	57.5
	Four regions	15	13.3	70.8
	Five regions	10	8.8	79.6
	Six regions	11	9.7	89.4
	Seven regions	6	5.3	94.7
	Eight regions	2	1.8	96.5
	Nine regions	4	3.5	100.0

Table 1 presents the demographic and occupational characteristics of the 113 participating school teachers. Most participants were females (91.2%) and were distributed across all age groups, with the largest proportion aged 20–30 years (38.9%). The majority had 6–10 years of teaching experience (28.3%) and worked for more than 8 hours per day (60.2%). Regarding stretching behaviour, 63.7% of teachers reported performing stretching exercises, whereas 27.4% were uncertain and 8.8% reported not performing stretching exercises. However, regular practice was limited, with 70.8% performing stretching only

occasionally. Most participants (73.5%) did not adopt any workplace or ergonomic modifications, indicating limited implementation of preventive strategies despite awareness of stretching exercises.

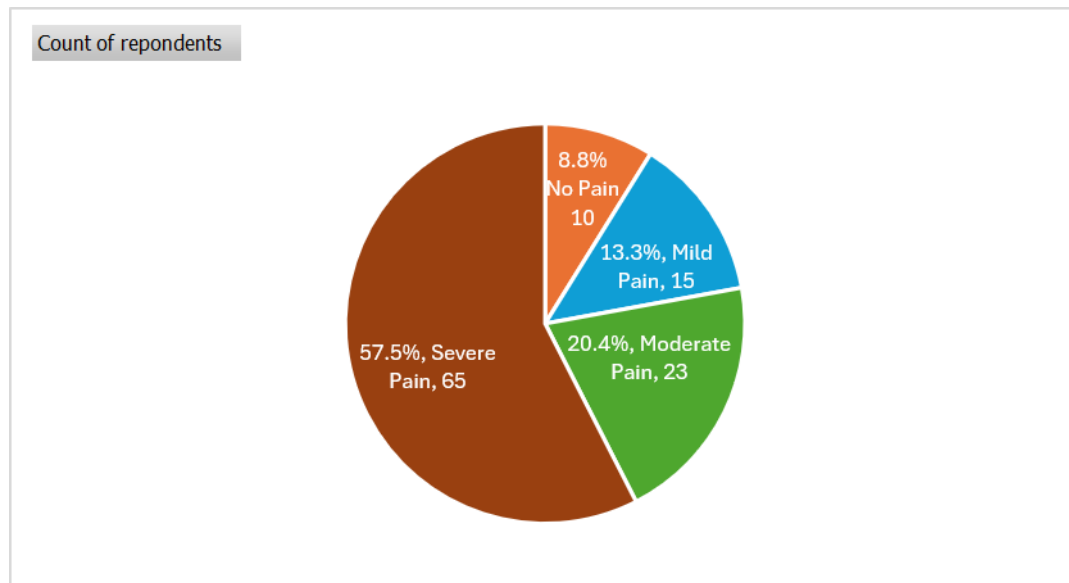


Figure 1 illustrates the distribution of musculoskeletal pain severity among the participants. Severe pain was the most frequently reported category, affecting 57.5% (n = 65) of school teachers, followed by moderate pain (20.4%), mild pain (13.3%), while only 8.8% reported no musculoskeletal pain. These findings indicate a high burden of musculoskeletal pain among school teachers included in the study.

NMQ	Item-01	Item-02	Item-03	Item-04	Item-05	Item-06	Item-07	Item-08	Pain prevalence
Age	1.0	-0.1	.598**	0.0	0.0	-0.1	0.0	0.1	0.1
Gender	-0.1	1.0	0.0	0.1	-0.1	-0.1	0.1	0.0	0.1
Teaching experience	.598**	0.0	1.0	.238*	0.0	0.0	0.1	0.2	0.0
Working hours / day	0.0	0.1	.238*	1.0	-0.1	0.0	.202*	0.0	0.1
Stretching exercise	0.0	-0.1	0.0	-0.1	1.0	.189*	0.1	0.1	0.0
Stretching exercise practice frequency	-0.1	-0.1	0.0	0.0	.189*	1.0	0.1	-0.1	0.0
Modifications	0.0	0.1	0.1	.202*	0.1	0.1	1.0	.218*	.195*
Count of regions	0.1	0.0	0.2	0.0	0.1	-0.1	.218*	1.0	.763**
Pain prevalence	0.1	0.1	0.0	0.1	0.0	0.0	.195*	.763**	1.0

Table 2 demonstrates the correlation between demographic, occupational, and musculoskeletal variables. Age showed a significant positive correlation with teaching experience ($r = 0.598$, $p < 0.01$). Working hours were positively associated with the number of affected body regions ($r = 0.202$, $p < 0.05$), while stretching exercise was significantly correlated with stretching practice frequency ($r = 0.189$, $p < 0.05$). The strongest positive correlation was observed between the number of affected body regions and pain prevalence ($r = 0.763$, $p < 0.01$), indicating that teachers with multisite musculoskeletal involvement were more likely to report pain. Workplace modifications also demonstrated weak but significant positive correlations with the number of affected regions and pain prevalence, suggesting that teachers experiencing greater musculoskeletal burden were more likely to modify their daily activities.

Test Element	Pearson Chi-Square	p-value	Result
Age * Pain prevalence	4.985 ^a	0.55	Accept Null Hypothesis (insignificant association)
Gender * Pain prevalence	1.739 ^a	0.63	Accept Null Hypothesis (insignificant association)
Teaching experience * Pain prevalence	12.914 ^a	0.38	Accept Null Hypothesis (insignificant association)
Working hours / day * Pain prevalence	4.360 ^a	0.23	Accept Null Hypothesis (insignificant association)
Stretching exercise * Pain prevalence	13.130 ^a	0.04	Reject Null Hypothesis (significant association)
Stretching exercise practice frequency * Pain prevalence	6.246 ^a	0.40	Accept Null Hypothesis (insignificant association)
Modifications * Pain prevalence	16.053 ^a	0.19	Reject Null Hypothesis (significant association)
Count of regions * Pain prevalence	241.767 ^a	0.00	Reject Null Hypothesis (significant association)

Table 3 presents the association between demographic and occupational variables and musculoskeletal pain prevalence. Age ($p = 0.55$), gender ($p = 0.63$), teaching experience ($p = 0.38$), working hours per day ($p = 0.23$), and stretching exercise frequency ($p = 0.40$) were not significantly associated with pain prevalence. In contrast, participation in stretching exercises showed a significant association with pain prevalence ($\chi^2 = 13.130$, $p = 0.04$). The strongest association was observed between the number of affected body regions and pain prevalence ($\chi^2 = 241.767$, $p < 0.001$), indicating that pain severity increased with greater multisite musculoskeletal involvement. These findings suggest that musculoskeletal pain was more strongly related to cumulative body-region involvement than to demographic characteristics.

Discussion

This study assessed the knowledge and practice of stretching exercises for the prevention of musculoskeletal pain among school teachers in Karachi. The findings demonstrated a high burden of musculoskeletal pain among teachers, with severe pain being the most frequently reported category. Although most participants were aware of stretching exercises, regular practice remained inadequate, indicating a gap between knowledge and preventive behaviour.

These findings are consistent with previous studies reporting that school teachers are at increased risk of work-related musculoskeletal disorders because of prolonged standing, repetitive movements, awkward postures, and extended working hours. The neck, shoulders, and lower back have consistently been identified as the most commonly affected body regions among teachers, highlighting the occupational demands associated with the teaching profession.

Regular stretching exercises have been reported to improve flexibility, maintain joint mobility, reduce muscle stiffness, and decrease the risk of work-related musculoskeletal disorders. Despite these established benefits, the present study found that most teachers performed stretching exercises only occasionally and that the majority did not adopt workplace or ergonomic modifications. Similar findings have been reported in previous studies, which demonstrated that awareness of stretching exercises does not necessarily translate into regular practice because of workload, limited time, and insufficient adherence to preventive behaviours.

Correlation analysis demonstrated significant positive relationships between age and teaching experience, working hours and the number of affected body regions, stretching exercise and stretching frequency, and the number of affected body regions and pain prevalence. Furthermore, Chi-square analysis revealed that participation in stretching exercises was significantly associated with musculoskeletal pain prevalence, whereas demographic characteristics, including age, gender, teaching experience, and working hours, were not significantly associated with pain prevalence. These findings suggest that preventive exercise behaviour may play a more important role in musculoskeletal health than demographic characteristics alone.

Overall, the findings emphasize the importance of promoting regular stretching exercises, ergonomic education, and workplace health programmes for school teachers. Improving knowledge alone may not be sufficient; strategies should also focus on encouraging consistent stretching practices to reduce the burden of work-related musculoskeletal disorders.

Implications

The findings support the integration of physiotherapy-led stretching programmes and ergonomic education within school settings. Regular workplace health promotion initiatives may improve preventive exercise behaviour, reduce musculoskeletal pain, and enhance teachers' occupational health and productivity.

Limitations

The cross-sectional design limits the ability to establish causal relationships between stretching practices and musculoskeletal pain. The use of non-probability convenience sampling from selected private schools in Karachi may limit the generalizability of the findings. In addition, self-reported questionnaires may have introduced recall and response bias.

Recommendations

Future studies should employ longitudinal or interventional designs to evaluate the effectiveness of structured stretching programmes in reducing musculoskeletal pain among teachers. Studies involving larger sample sizes, probability sampling methods, and teachers from different educational settings are recommended to improve the generalizability of the findings.

Conclusion

This cross-sectional study assessed the knowledge and practice of stretching exercises for the prevention of musculoskeletal pain among 113 school teachers in Karachi. The findings revealed a high prevalence of musculoskeletal pain, despite a generally satisfactory level of awareness regarding stretching exercises. Regular stretching practice and the adoption of ergonomic modifications were limited, indicating a gap between knowledge and preventive behaviour.

Significant positive relationships were observed between age and teaching experience, working hours and the number of affected body regions, stretching exercise and stretching frequency, and the number of affected body regions and pain prevalence. Participation in stretching exercises was significantly associated with musculoskeletal pain prevalence, whereas demographic characteristics were not significantly associated with pain prevalence.

Overall, the findings suggest that encouraging regular stretching exercises and improving ergonomic awareness may help reduce work-related musculoskeletal pain among school teachers. These findings provide evidence to support physiotherapy-led workplace health promotion programmes aimed at improving teachers' musculoskeletal health and occupational well-being.

References

1. World Health Organization. Musculoskeletal health. Geneva: World Health Organization; 2022.
2. Standring S, editor. Gray's Anatomy: The Anatomical Basis of Clinical Practice. 41st ed. London: Elsevier; 2016.
3. Bernard BP, editor. Musculoskeletal Disorders and Workplace Factors: A Critical Review of Epidemiologic Evidence for Work-Related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back. Cincinnati (OH): National Institute for Occupational Safety and Health; 1997.
4. Erick PN, Smith DR. A systematic review of musculoskeletal disorders among school teachers. *BMC Musculoskelet Disord.* 2011;12:260.
5. Yue P, Liu F, Li L. Neck and shoulder pain among school teachers in China, prevalence and risk factors. *Int J Occup Saf Ergon.* 2012;18(4):549-559.
6. Coggon D, Ntani G, Palmer KT, Felli VE, Harari R, Barrero LH, et al. Disabling musculoskeletal pain in working populations: prevalence and impact. *Occup Environ Med.* 2013;70(12):863-869.
7. Page P. Current concepts in muscle stretching for exercise and rehabilitation. *Int J Sports Phys Ther.* 2012;7(1):109-119.
8. Sihawong R, Janwantanakul P, Sitthipornvorakul E, Pensri P. Exercise therapy for office workers with nonspecific neck pain: a systematic review. *J Occup Health.* 2014;56(2):81-91.
9. Aguilar-Reguero JR, Morales-Asencio JM, Romero-Martín M, Cobo-Cuenca AI. Knowledge and practice of stretching by university students. *J Phys Educ Sport.* 2023;23(3):755-762.

10. Ng YG, Tamrin SBM, Yik WM, Yusoff ISM, Mori I. The prevalence of musculoskeletal pain and associated occupational factors among teachers. *Ind Health*. 2019;57(1):78-85.



2026 by the authors; Journal of Global Social Transformation (JGST). This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).