



Association between Kinesiophobia, Anxiety, and Chronic Neck Pain among Computer Programmers in Bangalore

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Abstract

Background Owing to progress in information and communication technology, use of computers has been increased in developed nations. Neck discomfort is known to have psychological effect that makes daily life challenging and contributes toward persistence. To create an effective, reliable rehabilitation plan and improve the existing protocols available for the patients, the proposed study attempted to address the subject of the association between kinesiophobia, anxiety, and chronic neck pain.

Objective The aim of this study was to find the association between kinesiophobia, anxiety, and severe neck pain among computer programmers.

Method After getting the consent, 388 subjects based on selection criteria were recruited from various information technology industries in Bangalore. Then, the subjects underwent a check for neck pain using Nordic Musculoskeletal questionnaires that were divided into case and control groups, respectively. Subjects were thereafter assessed for kinesiophobia and anxiety using Tampa Scale of Kinesiophobia and Penn State Worry Questionnaire, respectively. Descriptive and inferential statistics were used for the collected data using SPSS software.

Results Out of 388 participants, the neck pain prevalence was found to be 68.80%. The result shows that the mean and standard deviation for kinesiophobia and anxiety score was 43.47 ± 16.132 and 47.15 ± 22.799 for case group, respectively, whereas for control group, it was 22.40 ± 6.470 and 21.92 ± 9.656 , respectively. Significant association between kinesiophobia anxiety and long-term neck pain in computer programmers that shows p-value less than 0.05 was detected with chi-squared test.

Conclusion There was positive association seen in kinesiophobia and anxiety among computer programmers with persistent neck pain.

Keywords

- ▶ chronic neck pain
- ▶ kinesiophobia
- ▶ anxiety
- ▶ computer programmers
- ▶ fear-avoidance model

Introduction

A musculoskeletal condition in neck pain is commonly compromising a person's physical, psychological, and social well-being.¹ The most prevalent occupational health issue, described as a feeling of suffering in the neck region, impacts

up to 67% of the general public at some point in their lives.² The Bone and Joint Decade 2000 to 2010 stated that neck pain begins in the anatomical area of the neck and may or may not radiate to the arms with trunk and head.³ Organizational, demographic, physical (computer usage duration, bad posture, repetitive motions, computing skills, exercise

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performance, and breaks), and psychological variables such as mental stress, anxiety, lack of social support are known influential risk factors for neck discomfort.^{4,5}

The rapid adoption of smart electronics in the workplace has sparked worries regarding computer employees' health and well-being.⁶ Prolonged static working positions, which result in uninterrupted activity in motor units which have less threshold, Ca²⁺ buildup, lower local blood flow, and various homeostatic changes in active muscle fibers, are likely to contribute to musculoskeletal problems related to the neck as well as shoulder in office workers. As a result, pain sensations grow with extended static muscular activity and repetitive job tasks.⁷ Computer employment has been connected to a number of detrimental consequences on health, including high mental demand and workload.⁸

According to Marloes et al, pain in neck, among other areas, can be a risk factor for the onset of anxiety disorders leading to depression.⁹ Anxiety disorders are widespread, with estimates of its peak incidence from 3.8 to 25% worldwide, and prevalence as high as 70% in those with longstanding health issues.¹⁰ Elbinoune et al discovered that 68.4% of patients had a high degree of anxiety.⁷ It is similar to fright, reacting to a real or perceived immediate warning; anxiety, conversely, is a retaliation to the forecast of a future threat plus apprehension. People experiencing it might retreat from situations that have formerly bring about worry.¹¹

Kinesiophobia (fear of movement) is defined as an excessive, illogical, and incapacitating dread of performing a bodily movement as a result of a worry of suffering a painful injury or reinjury.¹² Fear-avoidance model (FAM), a high fear of mobility, is related to the growth of avoidance behavior, which leads to increased impairment and physical deconditioning (inactivity or disuse).¹³ The FAM has explained how psychological factors such as kinesiophobia affect chronicity and disability in musculoskeletal patients.^{14,15} Fear-avoidance belief has been linked to chronic musculoskeletal pain, notably neck discomfort, in terms of prevalence and prognosis.^{16,17}

People who had painful experience of cognitive-behavioral models like the fear-avoidance theory may develop a fear of moving, resulting in behavioral agitation and increasing levels of functional impairment. The main causes of complaints about chronic pain are kinesiophobia and fear-avoidance behaviors.¹⁴ It has been found that pain is often misinterpreted leading to fear and avoidance and therefore has a negative impact on function (Lenz et al).^{18,19} The proposed study aimed to answer the question of the association between neck pain, kinesiophobia, and anxiety, which may help to frame a better rehabilitation protocol for the patients. Also, kinesiophobia and anxiety among computer programmers are the least researched parameters. The lack of evidence with reference to the prevalence of kinesiophobia and psychological distress, such as anxiety among computer programmers, warrants this study.

Materials and Methods

Ethical clearance was obtained from the institutional ethical committee of Krupanidhi College of Physiotherapy, Bangalore

(Ref: EC-MPT/2/PHY/009) for conduct of the study. It was an observational case-control study and a convenient sampling technique was performed. The study included both male and female aged 35 to 50 years having primary complaint of neck pain for more than 3 months with a daily working schedule of minimum 6 hours in the computer programming field for a minimum 6 months. Individuals with any physical trauma, tumor, nonmechanical cause of neck pain, history of cervical surgery or infectious neurological disorders (e.g., meningitis) and presence of any inflammatory rheumatic disease (e.g., ankylosing spondylitis and rheumatoid arthritis) were excluded. Each participant signed informed consent was acquired. Three-hundred eighty-eight subjects were registered for the study and segregated into two groups (case group: 194 subjects with chronic neck pain, control group: 194 subjects without chronic neck pain) based on inclusion criteria that included subjects with primary complaint of neck pain, age group 35 to 50 years, computer programming work experience of a minimum of six months, daily working schedule of at least 6 hours, and neck pain persisting for more than 3 months. Subjects were excluded from the study if they had physical injury, tumor, or other nonmechanical causes of neck pain, history of cervical surgery, history of infectious neurological disorders like meningitis, and presence of any inflammatory rheumatic diseases such as ankylosing spondylitis or rheumatoid arthritis.

Data Sources and Measurement

Demographic characteristics of subjects participating in the study were recorded. Fear of movement was determined utilizing Tampa Scale of Kinesiophobia (TSK) consisting of 17 questions rated on a 4-point Likert scoring wherein 4 = strongly agree, 1 = strongly disagree. A total score was calculated between 17 and 68. TSK score lesser than 37 represents "low kinesiophobia," whereas score higher than 37 represents "high kinesiophobia" degrees.¹²

Anxiety was estimated using Penn State Worry Questionnaire (PSWQ) that is a 16-item, self-administered Likert-type scale for measuring worry which is considered as the benchmark for evaluating anxiety.²⁰

Statistical Analysis

Data was analyzed using SPSS (version 29.0) for windows. Descriptive statistics was performed for the demographic data and outcome variables. Chi-squared test was performed to check the association between TSK and the PSWQ for Anxiety. Microsoft excel was used to generate graphs and tables. Significance value desired level is as 0.05.

Hypothesis

Null Hypothesis (H0)

There is no significant association between kinesiophobia, anxiety, and chronic neck pain among computer programmers.

Alternate Hypothesis (H1)

There is significant association between kinesiophobia, anxiety, and chronic neck pain among computer programmers.

Table 1 Descriptive statistics of age of computer programmers

Variable	Case group		Control group	
	Mean	SD	Mean	SD
Age in years	41.72	4.963	42.25	4.452

Abbreviation: SD, standard deviation.

Table 2 Descriptive statistics of kinesiophobia and anxiety

Group		Kinesiophobia (score)	Anxiety (score)
Group A (case)	Mean	43.47	47.15
	Standard deviation	16.132	22.799
Group B (control)	Mean	22.40	21.92
	Standard deviation	6.470	9.656

Results

Based on inclusion criteria, the age group was taken between 35-50 years (►Table 1). The mean value for the case group (group A) of age in years was (mean \pm SD: 41.72 \pm 4.963), and for control group (group B), the value was 42.25 \pm 4.452. The average age in years of computer professionals was almost similar in both groups.

Out of 388 participants of computer professionals, 68.80% had work-related musculoskeletal disorder (WRMSDs) due to neck pain, whereas 31.20% were unaffected by it. There is a prevalence of severe neck pain in computer programmers.

►Table 2 depicts the outcome of TSK score for kinesiophobia among the case and control group. In case group, the outcome of the mean and standard deviation (SD) of kinesiophobia score was 43.47 \pm 16.132, where an average of 43.47 participants responded with kinesiophobia score of more than or equal to 37. In control group, it was found to be less with mean and standard deviation of 22.40 \pm 6.470 with the average 22.40 having value less than 37.

Similarly, the outcomes of PSWQ scores for anxiety in both the groups were presented. In case group, the outcome of the mean and SD was 47.15 \pm 22.799, whereas in control group, the anxiety score was with the mean and SD of 21.92 \pm 9.656. The average PSWQ score for case group was 47.15 with value considered from 30 to 76 suggesting the participants suffering from some anxiety and the control group the average was 21.92 with value less than 29 with no anxiety.

The results showed a strong association among the case and control group of kinesiophobia score with chronic neck pain, in which the variables were statistically significant ($p < 0.05$). This indicated the statistical association between TSK score, suggesting computer programmers enduring chronic neck pain were affected by kinesiophobia.

The results showed significant association between case and control group of anxiety score with chronic neck pain, in which the variables were statistically significant ($p < 0.05$) indicating that there was statistical association between

PSWQ score suggesting that the computer programmers having chronic neck pain were affected by anxiety.

The results showed significant association between the control and case group of kinesiophobia score with anxiety score, in which the variables were statistically significant ($p < 0.05$). This suggested statistical association between TSK and PSWQ score signifying computer professionals having persistent neck pain were affected by kinesiophobia and anxiety.

Discussion

Considering the development of information and communication technology, computer employment has increased from sales to administrative in industrialized countries. Additional health issues and injuries are being recorded as a result of the expanding use and popularity of computers, keyboards, along with corresponding peripheral devices (mouse, touch pads, etc.). Unknowingly increasing job complexity and producing stressful and unhealthy work settings, computer-based technology has led to an increase in work-related musculoskeletal disorders. Concerns regarding the state of being healthy in computer personnel have been expressed by the workplace's increasing use of smart technology. This study intended to look over kinesiophobia and anxiety among computer programmers with chronic neck pain. Analyzing the presence of kinesiophobia and anxiety can reduce the risk of psychological distress affecting individuals suffering from neck pain.^{7,17} This study portrayed significant results that kinesiophobia and anxiety were affected in computer professionals with severe neck pain.

Computer is an essential part of our daily life, and more usage of computer leads to musculoskeletal complaints. Participants in the study reported neck pain as their most common musculoskeletal ailment (68.8%). The results obtained during the course of our study are consistent with earlier researches that have been published in this regard. In a study transmitted by Ardahan and Simsek, computer-using office workers reported musculoskeletal neck complaints are 67.85% of cases,¹² where it was discovered that lack of ergonomic understanding, physical pain, gender, periods of computer use, daily computer usage duration, and uninterrupted computer use aggravated the risk of musculoskeletal system issues.

Asiri et al indicated a substantial positive connection between kinesiophobia and severe neck pain. The age of the participants in this study was greater, and elderly people with persevering neck problems may be less tolerant of pain and kinesiophobia.²¹ Luque-Suarez et al²² found moderate evidence linking superior levels of kinesiophobia to increased level of pain severity and poor quality of life. Additionally, they discovered substantial evidence that links kinesiophobia to pain severity and impairment. The development of impairment over time is predicted by a higher level of kinesiophobia. This avoidance behavior may turn out to be harmful over the long run. Kinesiophobia is assumed to occur in such patients. They frequently avoid against participating in activities that are thought to be likely to result in an actual

or probable injury or reinjury, which leads to increased inactivity. People with musculoskeletal pain over a long duration may exhibit higher degrees of discomfort, impairment, and emotional distress resulting into fear of performing particular motions, leading to a continuous cycle that lowers their quality of life.²³ In a study by Secer et al it was found that there is a low to moderately strong co-relation between pain intensity and anxiety levels in people suffering with chronic neck pain.²⁴

Parikh et al²⁵ demonstrated a correlation between anxiety and neck pain that was positive in computer workers. Patient's quality of life is significantly impacted by long-standing chronic pain, having major effect on their mental health that makes them more susceptible to unpleasant feelings like anxiety and worry.²⁶ Likewise, in a review of psychometrically established pain catastrophizing, pain anxiety, and intolerance of pain variables among young people with chronic pain was carried out by Fisher et al. Significant positive correlations between factors for pain severity, disability, generalized anxiety disorder, and depression were discovered.²⁷

According to our study, it was evident that there is significant difference between TSK and PSWQ score ($p < 0.05$) which proves significant association between kinesiophobia and anxiety in computer programmers with chronic neck pain. The possible significant result could be due to work stress being strongly linked to long working demands, a lack of social support, and computer-related difficulties, particularly in the pandemic condition. Additionally, with regard to WRMSDs, ergonomic and psychological workplace factors interact to increase the musculoskeletal injury risk.

Conclusion

The findings of this study state that there is a fundamental difference in kinesiophobia and anxiety in computer programmers with chronic neck pain and those without it. There is positive association seen in kinesiophobia and anxiety among computer programmers with chronic neck pain. To lower the prevalence of cervical symptoms, it is essential that prevention efforts consider all work-related risk factors, including ergonomic and psychosocial ones. The structure of the job should get special consideration to provide the probability of suitable work breaks. Additionally, the workplace should be suitably designed taking into account each employee's distinct job prospects.

Limitations

The study involved single population. It has no standardized workstation design. Because the study was a web survey, ergonomics testing was not possible. Numerous psychological component such as stress and insomnia that affect cervical pain are discarded.

Future Scope of Studies

A large sample size and a diverse population can be applied for additional research. Future research can be done on the

assessment and treatment of neck impairments and range of motion issues for computer professionals. To inform the workforce about risk factors for neck pain that can impair their abilities and offer ergonomic recommendations, occupational-related education camps can be held. Future studies could incorporate diverse psychological factors.

Conflict of Interest

None declared.

References

- Genebra CVDS, Maciel NM, Bento TPF, Simeão SFAP, Vitta A. Prevalence and factors associated with neck pain: a population-based study. *Braz J Phys Ther* 2017;21(04):274-280
- Louw S, Makwela S, Manas L, Meyer L, Terblanche D, Brink Y. Effectiveness of exercise in office workers with neck pain: a systematic review and meta-analysis. *S Afr J Physiother* 2017; 73(01):392
- Guzman J, Hurwitz EL, Carroll LJ, et al. A new conceptual model of neck pain: linking onset, course, and care: the bone and joint decade 2000-2010 task force on neck pain and its associated disorders. *J Manipulative Physiol Ther* 2009;32(2, Suppl): S17-S28
- Oha K, Animägi L, Pääsuke M, Coggon D, Merisalu E. Individual and work-related risk factors for musculoskeletal pain: a cross-sectional study among Estonian computer users. *BMC Musculoskelet Disord* 2014;15(01):181
- Cohen SP. Epidemiology, diagnosis, and treatment of neck pain. *Mayo Clin Proc* 2015;90(02):284-299
- Ye S, Jing Q, Wei C, Lu J. Risk factors of non-specific neck pain and low back pain in computer-using office workers in China: a cross-sectional study. *BMJ Open* 2017;7(04):e014914
- Elbinoune I, Amine B, Shyen S, Gueddari S, Abouqal R, Hajjaj-Hassouni N. Chronic neck pain and anxiety-depression: prevalence and associated risk factors. *Pan Afr Med J* 2016;24(01):89
- Brandt LPA, Andersen JH, Lassen CF, et al. Neck and shoulder symptoms and disorders among Danish computer workers. *Scand J Work Environ Health* 2004;30(05):399-409
- Jensen C. Development of neck and hand-wrist symptoms in relation to duration of computer use at work. *Scand J Work Environ Health* 2003;29(03):197-205
- Zakerian SA, Subramaniam ID. The relationship between psychosocial work factors, work stress and computer-related musculoskeletal discomforts among computer users in Malaysia. *Int J Occup Saf Ergon* 2009;15(04):425-434
- Bhalala SH. Prevalence of neck pain in computer workers in Surat City: a cross-sectional study. *Int J Curr Res Rev* 2019;11(20):1-8
- Lundberg M, Grimby-Ekman A, Verbunt J, Simmonds MJ. Pain-related fear: a critical review of the related measures. *Pain Res Treat* 2011;2011:494196
- Kim T, Kang MY, Yoo MS, Lee D, Hong YC. Computer use at work is associated with self-reported depressive and anxiety disorder. *Ann Occup Environ Med* 2016;28(01):57
- Gerrits MMJG, van Oppen P, van Marwijk HWJ, Penninx BWJH, van der Horst HE. Pain and the onset of depressive and anxiety disorders. *Pain* 2014;155(01):53-59
- Remes O, Brayne C, van der Linde R, Lafortune L. A systematic review of reviews on the prevalence of anxiety disorders in adult populations. *Brain Behav* 2016;6(07):e00497
- Barker P. *Psychiatric and Mental Health Nursing: The Craft of Caring*. 2nd ed. London: CRC Press; 2017
- Smith BW, Zautra AJ. The effects of anxiety and depression on weekly pain in women with arthritis. *Pain* 2008;138(02): 354-361

- 18 Lentz TA, Barabas JA, Day T, Bishop MD, George SZ. The relationship of pain intensity, physical impairment, and pain related fear to function in patients with shoulder pathology. *J Ortho Sports Phys Ther* 2009;39(04):270–277
- 19 Leeuw M, Goossens ME, Linton SJ, Crombez G, Boersma K, Vlaeyen JW. The fear-avoidance model of musculoskeletal pain: current state of scientific evidence. *J Behav Med* 2007;30(01):77–94
- 20 Pedler A, Kamper SJ, Sterling M. Addition of posttraumatic stress and sensory hypersensitivity more accurately estimates disability and pain than fear avoidance measures alone after whiplash injury. *Pain* 2016;157(08):1645–1654
- 21 Andersen TE, Karstoft KI, Brink O, Elklit A. Pain-catastrophizing and fear-avoidance beliefs as mediators between post-traumatic stress symptoms and pain following whiplash injury - a prospective cohort study. *Eur J Pain* 2016;20(08):1241–1252
- 22 Luque-Suarez A, Martinez-Calderon J, Falla D. Role of kinesiophobia on pain, disability and quality of life in people suffering from chronic musculoskeletal pain: a systematic review. *Br J Sports Med* 2019 May;53(09):554–559
- 23 Woby SR, Roach NK, Urmston M, Watson PJ. Psychometric properties of the Tampa Scale of Kinesiophobia (TSK)-11: a shortened version of the Tampa Scale for Kinesiophobia. *Pain* 2005;117(1-2):137–144
- 24 Ardahan M, Simsek H. Analyzing musculoskeletal system discomforts and risk factors in computer-using office workers. *Pak J Med Sci* 2016;32(06):1425–1429
- 25 Parikh S, Chhibber K. Use of the penn state worry questionnaire to identify individuals with gad: an Indian perspective. *J Psychol Clin Psychiatry* 2016;6(05):00375
- 26 Shariat A. Musculoskeletal disorders and their relationship with physical activities among office workers: a review. *Malays J Public Health Med* 2016;16:62–74
- 27 Asiri F, Reddy RS, Tedla JS, et al. Kinesiophobia and its correlations with pain, proprioception, and functional performance among individuals with chronic neck pain. *PLoS One* 2021;16(07):e0254262