

## The Prevalence of Computer-Related Musculoskeletal Pain Among College Students-a Cross-Sectional Study

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**Abstract: Problem statement:** In the recent years, there has been an increase in incidence of musculoskeletal complaints among college students. Potential risk factors for this might be increased use of computers. The purpose of this study was to examine among college students (a) the prevalence of musculoskeletal pain and (b) the association of musculoskeletal pain with computer use and physical activity performed during last one week. **Approach:** A cross-sectional study was performed among college students aged 19-27 years in the first through third years of their college study. Using random sampling, two surveys, the Boston University Computer and Health Survey and the International Physical Activity Questionnaire with informed consent were distributed to 200 college students. Out of 178 surveys returned, 170 surveys were found to be acceptable. **Results:** About 88% (149/170) of the respondents reported musculoskeletal complaints in the two weeks prior to completing the survey. The prevalence of musculoskeletal pain was higher in female 90% than in male students 76%. Although there was no statistically significant association between the type of computer and musculoskeletal pain, the prevalence of musculoskeletal pain was higher for students using laptop ( 90% ) when compared to those using both desktop and laptop and desktop only ( 87 and 86% ) respectively. There was no statistically significant correlation for musculoskeletal pain with hours of computer use per day, type of computer used and level of physical activity. **Conclusion:** This study strengthens the findings that musculoskeletal pain is common among college students but it is not influenced by computer use and level of physical activity. Future research should continue on larger students' sample to better understand the musculoskeletal complaints, physical activity and computer use and to find whether these factors are related.

**Key words:** Musculoskeletal pain, computer use, physical activity, college students, cross-sectional study, health care systems, statistically significant, information technology, International Physical Activity Questionnaire (IPAQ), statistical analysis

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### INTRODUCTION

The computer has been considered as a device that posses a unique potential to improve the quality of health care systems as well as the study efficiency of health workers both in the developed and developing countries (Bayo *et al.*, 2003). Though information, communication and technology are being used to improve health care systems, there are also associated health hazards with the use of these devices.

In current era of information technology, computers are widely used by students. In a study done by Noack-Cooper *et al.* (2009) students reported more hours of work per day on computers than professional (Noack-Cooper *et al.*, 2009). Musculoskeletal

complaints are also more prevalent among college students using computers than computer using professionals (Noack-Cooper *et al.*, 2009). Intensive use of a mouse or keyboard may give rise to musculoskeletal pain.

Physical activity at its extremes could also be a potential risk factor for musculoskeletal pain. For example (Vikat *et al.*, 2000), neck/shoulder pain is related to exercise among adolescents. El-Metwally *et al.* (2007) identified vigorous exercise as a risk factor for traumatic musculoskeletal pain in preteens and early adolescents.

The hypothesis of our study is that musculoskeletal pain is related to computer use and physical activity. So, the purpose of this study is to evaluate the

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prevalence of musculoskeletal pain among college students and also to assess if musculoskeletal pain is associated with computer use and physical activity.

**MATERIALS AND METHODS**

After getting approval from the college research committee, students of diploma in physiotherapy programme in their first through final third year of study were invited to participate in this study. A random sampling was done. Two questionnaires were used-(1) Boston computer and health survey and (2) International physical activity questionnaire (short version). Prior to this, the questionnaires were pilot tested on a few students for their comprehension and feasibility of administration.

**Computer use assessment:** Data on socio-demographic factors like age and sex, computer use and musculoskeletal pain were assessed by using Boston University Computer and Health Survey. The Boston University Computer and Health Survey is a self-reported questionnaire consisting of 10 sections. Each section consisting of questions related to computer use such as (a) Hours of computer use for work/recreation per day (b) Frequencies of taking breaks from computer per day (c) Number of times of spending more than 4 hours at the computer without getting break (d) proportion of time spend on laptop versus desktop (e) presence of pain in hands, wrists, arms, shoulders/neck during or after computer use (f) visit to any health care provider for pain.

**Physical activity assessment:** Physical activity was measured by using International Physical Activity Questionnaire (IPAQ), short version. In a study conducted across 12 countries, the IPAQ form “last 7 day recall” was found to have acceptable measurement properties for national monitoring among 18 to 65-year-old adults (Craig *et al.*, 2003). The IPAQ, short version was tested against exercise capacity and found to be having acceptable validity properties in Greek adults (Papathanasiou *et al.*, 2010). Its Chinese version was found to have adequate reliability and validity for the measurement of total physical activity (Macfarlane *et al.*, 2007). The Turkish version of the IPAQ, short version was also found to be reliable and valid in assessment of physical activity (Saglam *et al.*, 2010).

**Statistical analysis:** The hypothesis of this study was musculoskeletal pain is related to computer use and physical activity. To test the hypothesis, the following statistical procedure was performed. All analyses were

performed with SPSS (version 18.0). The prevalence of musculoskeletal complaints was assessed using descriptive analysis in this entire cross-sectional study. Logistic regression was used to find out the correlation of presence of musculoskeletal pain with computer use and physical activity.

**RESULTS**

A total of two hundred 200 college students were invited to participate in this study. Out of 200 surveys given, 178 surveys were returned by the students. Out of 178 surveys returned, 170 surveys were found to be complete and were included in the study. As shown in Table 1, out of 170 students, 145 students were females and 25 students were males. The numbers of students reported having musculoskeletal pain during or after computer use was 149 students (88%), please refer Table 2. The mean age of the participants was 21.28. The prevalence of musculoskeletal complaints was more in females than in males, please refer Table 3. The prevalence of musculoskeletal pain was higher for students using laptop (90%) when compared to those using both desktop and laptop and desktop only (87 and 86%) respectively, please refer Table 4.

As shown in Table 5, none of the independent variables are significant predictors of presence of musculoskeletal pain. There was no statistically significant association between musculoskeletal pain and hours of computer use per day, frequency of computer break and type of computer (p value 0.791, 0.424 and 0.711 respectively). We also did not find any association between musculoskeletal pain and physical activity that was statistically significant (p value 0.985).

Table 1: Total number of male and female students

Gender	Number of students (n)	(%)
Male	25	15
Female	145	85
Total	170	100

Table 2: Number of students complaining of pain

Pain	Number of students (n)	(%)
Yes	149	88
No	21	12
Total	170	100

Table 3: Prevalence of pain among boys and girls

Pain	Male (%)	Female (%)
Yes	76	90
No	24	10
Total	100	100

Table 4: Pain according to type of computer

Pain	Desktop (%)	Laptop (%)	Both (%)
Yes	86	90	87
No	14	10	13
Total	100	100	100

Table 5: Correlation of variables

Model	Unstandardized coefficients		Standardized coefficients			Correlations		
	B	Std.Error	Beta	t	Sig.	Zero-order	Partial	Part
(Constant)	1.141	0.121		9.400	0.000			
Physical activity level	-0.001	0.29	-0.001	-0.019	0.985	0.002	-0.021	-0.021
Hours of computer use per day	-0.006	0.024						
Frequency of computer breaks	-0.017	0.021	-0.064	-0.802	0.424	-0.061	-0.062	-0.062
Type of computer	0.014	0.038	0.030	0.371	0.711	0.012	0.029	0.029

**DISCUSSION**

This study reiterates the previous findings that musculoskeletal pain is a common phenomenon among young adults especially college students (Menendez *et al.*, 2009; Lorusso *et al.*, 2007; 2009).

Several studies which were conducted among adults working in offices in Malaysia concluded that computer use could be a risk factor in developing musculoskeletal problems (Zakerian and Subramaniam, 2009; Rahman and Atiya, 2009; Sen and Richardson, 2007). However, there is little information on the prevalence of musculoskeletal complaints among college students in Malaysia using computers.

In total, 170 students were included in the study. Because of the overall good response rate (85%), this study can be considered representative of the prevalence of musculoskeletal pain and the associations found among the sample studied.

More girls (96%) than boys (76%) reported musculoskeletal pain. This is in accordance with the previous studies which showed a greater propensity among females in reporting pain than males (Ariens *et al.*, 2001; Hoogendoorn *et al.*, 2000). The reason for this is speculative. Pain prevalence may indeed be higher, but it is also plausible that it may be more acceptable for girls to complain about their pain than boys.

Menendez *et al.* (2009) found that among graduate students, years of computer use where weekly computer use was more than 10 h experienced musculoskeletal pain within 1 h of computing. According to Harreby *et al.* (2004), low back pain was not related to computer use. In this study, we did not find an association between computer use and musculoskeletal pain. One possible cause may be students with pain spent less time on computers than they did before experienced pain. This may be because they realized that excessive computer use may be harmful. Few studies concluded that self-reported computer use was overestimated in general (Chang *et al.*, 2010; Faucett and Rempel, 1996). Overestimation of computer use even if hypothesized to be present in our study, however, was not associated with having musculoskeletal complaints.

In line with the previous studies (Andrew *et al.*, 2009; Bernaards *et al.*, 2007; Andersen *et al.*, 2006), we did not find any association between physical activity and musculoskeletal pain. According to Harreby *et al.* (2004), students who considered them to be physically fit experienced less low back pain. Possibility of recall bias of physical activity was less in our study as the activities recalled here using IPAQ are of 7 days' duration only.

**Limitations of our study:** The small sample size involving students from physiotherapy discipline alone could be one of the possible limitations. Another limitation would be the cross-sectional nature of our study considering the temporal variations of the variables studied.

**CONCLUSION**

Musculoskeletal pain is prevalent among college students. It is not associated with computer use and physical activity. Future studies of longitudinal nature using large, diverse sample of college students are warranted to further elucidate this association.

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