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Relationship between timed online exposure and musculoskeletal health during COVID pandemic in allied health science students

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ABSTRACT

Background: Musculoskeletal issues have persistently growing for students of allied health sciences with the online classes during the coronavirus disease (COVID) pandemic. To find out the relationship between timed online exposure and musculoskeletal health of allied health sciences students even though having mere basic knowledge about the cause and its prevention.

Methods: Students who attended online classes in allied health science colleges were given with online questionnaire and those who volunteered to participate were included. The standardized Nordic questionnaire was used with a demographic section and no of hour's exposure to online classes.

Results: The Nordic questionnaire for cervical spine and upper extremity in 7 days exposure was found to be significant statistically and the positive response for pain was 66.3%.

Conclusions: Musculoskeletal problems increased with the increase in time in front of computers /mobile phones for long hours for their classes. Further initial exposure itself causes it.

Keywords: Musculoskeletal pain, Nordic questionnaire, Pain

INTRODUCTION

SAR-COV first came into existence at the end of December 2019 thereafter the spread of the virus caused various serious illnesses in different countries got evident at the starting of 2020 and was officially announced as a pandemic by World Health Organization (WHO). India being a developing county and being highly populated was been hit hard by the virus. The second wave came in March 2021 with a high impact on lives. With the increase in the rate of people being affected, different states were forced to impose wide restrictions again in the public and private lives of the people. A set of guidelines were made a mandate to be followed by each individual like social distancing, sanitization, and wearing of mask when in public to control the transmission and prevent the spread. The regulations introduced covered all areas of life such as

social life and included the education system.² The start of online classes was first during the first outbreak but with the second wave impact, it played havoc with individuals' psychology and physical attributes of life, the uncertainties about examination raised with a rise in duration of online teaching. Online education is a platform where there is more use of digital content imbibing both audio and video lessons.³ During this online education change, the use of computers and mobile phones as online education tools gained more importance than during the traditional education system.

The changes in education came with a sudden drift with the demand of the situation which was when living was with various uncertainties having a great impact on the physical and psychosocial well-being of a student's.^{4,5} Few studies have been found on studying the impact of online classes

and their impact on musculoskeletal health. Musculoskeletal discomfort creates a negative impact and decreases their efficacy to grasp the subjects and even alters performance during activities of daily living.6 As a result of exposure to different form of stress such as physical, mental and environmental, workers are more prone to various musculoskeletal pain.^{7,8} Allied health sciences students are more aware about the anatomy and physiology behind pain as it is a part of their curriculum and are also exposed to physical and psychological factors, both in the academic setting and when in the work setting, which triggers the occurrence of musculoskeletal pain.⁹ The new change in the education system has increased the duration of computer exposure which is accompanied by an improper chair and sitting area leading to stress overload on various musculoskeletal structures. 10 To enrich their knowledge and for recreation, they use laptops and cell phones frequently, during which they attend faulty posture leading to pain and various alteration in musculoskeletal areas especially in the spine and upper extremity.¹¹ The increase in musculoskeletal issues with increased timed exposure to gadgets is interfering with their overall health and well-being. Therefore, the aim of the study was to find out the relationship between timed online exposure and musculoskeletal health of allied health sciences students even though having mere basic knowledge about the cause and its prevention.

METHODS

A cross-sectional study was carried out in allied health science students randomly in Bhubaneswar, Odisha. A total of 200 students were sent with the questionnaire out of which only 172 responses were recorded. The sample size was calculated using 95% confidence interval with 5% margin of error, therefore it was necessary to get a response of 132 number of students as participant in the survey.

Inclusion criteria

Students enrolled under Utkal University in allied health science course in which only two courses were included BASLP and BPT. The students who had online classes during the COVID pandemic conducted by Institutes located at Bhubaneswar (that is, between 20th March to 11th May 2021 and April 2021 to 10th May 2021). To respond to all of the questions included in the evaluation survey and who provided their consent to participate in this survey.

The data collection was carried out in online mode during the months of April and May 2021, using Google forms which had two sections, Section A comprising of sociodemographic information like age, gender, duration of online education, pain before pandemic(COVID) and duration of daily use of computers and other technological devices and attention to body alignment. Section B consisted of the standardized Nordic Questionnaire (SNQ), The SNQ is divided into two parts, the general, and the specific. The part used asked focused 27 questions with Yes/No answers about any musculoskeletal symptoms experienced during the previous 12 months or the previous seven days in regards to the impact on activities during the 12 months. All of the questions were focused on nine areas: neck, shoulders, elbows, wrists/hands, the upper part of the back, the lower part of the back, hips/thighs, knees, and ankles/feet.12,13

The statistical analysis was done using IBM Statistical package for social sciences (SPSS) 20. A descriptive analysis of section A variables was done by calculating average values (to determine the central tendency) and standard deviation (as a measure of dispersion). The 2 way ANOVA test was done to find out the impact of musculoskeletal pain in the nine areas with duration of exposure of altered posture, each segment was analyzed for.

RESULTS

This study showed out of 172 responded 88 were women i.e., 52% (Table 1). A descriptive statistics showed the female population had a more exposure and consistency in attending classes.

Table 1: Descriptive statistics of sample.

		Age of participants	How long do you seat infront of computers to attend your classes	Gender	Do u have any pain
N	Valid	172	172	86	172
1	Missing	0	0	88	0
Mean	•	20.35	4.02	1.49	1.66
Median		20.50	3.00	1.00	2.00
Std. Devi	ation	2.068	1.402	0.503	0.474
Variance		4.275	1.964	0.253	0.225

Table 2: Prevalence of pain in students due to online classes.

		Frequency	Percent	Valid percent	Cumulative percent
	NO	58	33.7	33.7	33.7
Valid	Yes	114	66.3	66.3	100.0
	Total	172	100.0	100.0	·

Table 3: Timed exposure of both gender for online classes.

		How long do classes	Total		
		1-3	4-6	Total	
Gender	Female	38	50	88	
Gender	Male	34	50	84	
Total		72	100	172	

Table 4: A two way ANOVA analysis of upper extremity pain in 7 days and 12 months/alteration in activities in relation to duration of exposure.

ANOVA: two-factor with replication									
Source of variation	SS	df	MS	F	P value	F crit			
Duration	0.744186	2	0.37209302	1.96976242	0.139842	3.001571			
Areas of impact	4.3875969	2	2.19379845	11.6133909	0.000010	3.001571			
Interaction	1.751938	4	0.4379845	2.31857451	0.05509	2.37771			
Within	290.72093	1539	0.18890249						
Total	297.60465	1547							

Table 5: A two way ANOVA analysis of spine pain/alteration in activities in relation to duration of exposure.

ANOVA: two-factor with replication									
Source of variation	SS	df	MS	F	P value	F crit			
Duration	4.52713	2	2.2636	9.62	0.000071	3.002			
Areas of impact	15.0853	2	7.5426	32	0.000000	3.002			
Interaction	1.17829	4	0.2946	1.25	0.287231	2.378			
Within	362.279	1539	0.2354			·			
Total	383.07	1547							

Table 6: A two way ANOVA analysis of lower extremity pain/alteration in activities in relation to duration of exposure.

ANOVA: two-factor with replication									
Source of variation	SS	df	MS	F	P value	F crit			
Duration	4.0155039	2	2.007752	9.7682	0.000061	3.001571			
Areas of Impact	0.8062016	2	0.403101	1.9612	0.141043	3.001571			
Interaction	0.5271318	4	0.131783	0.6412	0.633186	2.37771			
Within	316.32558	1539	0.20554			·			
Total	321.67442	1547							

Table 7: A two way ANOVA analysis of 9 areas of pain in 7 days and 12months/alteration in activities in relation to duration of exposure.

ANOVA: two-factor with replication									
Source of variation	SS	df	MS	F	P value	F crit			
Duration	5442.667	2	2721.333333	11.99804	0.000488	3.554557			
Areas of impact	1394.667	2	697.3333333	3.074461	0.051019	3.554557			
Interaction	202.6667	4	50.66666667	0.223383	0.921813	2.927744			
Within	4082.667	18	226.8148148						
Total	11122.67	26							

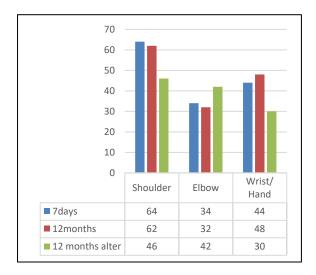


Figure 1: Relationship between upper extremity, duration and activities alteration in 12 months.

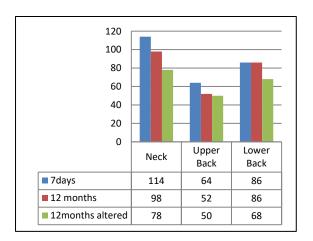


Figure 2: Relationship between spine, duration and activities alteration in 12 months.

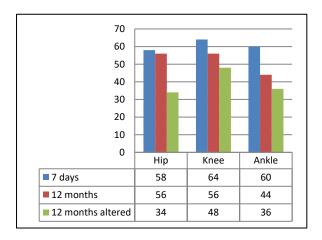


Figure 3: Relationship between lower extremity, duration and activities alteration in 12 months.

Difference between timed exposure and pain was found to be significant i.e., students exposed to more than 4 hrs had a high prevalence rate of musculoskeletal pain (Table 2, 3). Two way ANOVA analyses were carried out to find out impact in different areas and its chronicity. Pain areas showed consistency from 7 days to 12 months with neck, shoulder and wrist showing higher significance and no significance was found in alteration of activities during last 12 months. With increase in duration (12 months) showed a consistent result for upper extremity but for lower spine and extremity showed increase in incidence.

DISCUSSION

The COVID pandemic has taken a toll on every individual life's making him inactive staying at home due to guidelines given by government leading to alteration in balance, and with advent of online classes students are exposed to phones/laptops for long in faulty ergonomic and unfamiliar environment leading to poor musculoskeletal health.

This research study intended to find out prevalence of musculoskeletal issues in allied health science students with advent of online classes as a need of the hour with one year of lockdown and shutdown in a on and off phase .These students are aware of the faulty postures and its resultant effect on various soft tissues but then also showed a significant musculoskeletal issues . This study wanted to state even with awareness there is lack of self realization for maintenance of once health. Health being on stake during COVID a focus by all students to inoculate good habits and proper ergonomic care during online classes or online exposure for other purposes should be watched carefully. The nine areas of musculoskeletal pain analyzed indicates that both the gender suffered from areas (cervical spine and upper extremity) of pain, both in 7 days and 12 months; although both gender didn't predict any significant loss in activities for the same.

Various research studies have found out relationship of faulty ergonomics, timed exposure more in female and male but this study depicts both gender are in similar risk for musculoskeletal pain. 14,15 Research studies have showed relationship between timed exposure and musculoskeletal health but the relation in first and second decade of life is yet to be researched upon where as lumbar spine pain had been found out to be frequent complain and persistent complain in young women. 16,17 Further to the increase in prevalence of pain in neck, shoulder and wrist. earlier researches had found a correlation between have correlated with long time exposure in mobile phones /laptops, with elevated pain in the mentioned areas. 18-21 Proper ergonomic adjustments like adjustment of keyboard height at or below elbow level, arm support for supports to be elaborate chair and environmental modification can decrease the risk of musculoskeletal issues.²² The change of teaching platform to online exposing students to electronic devices without any proper ergonomic correction and stretches /break further lack of selfrealization.

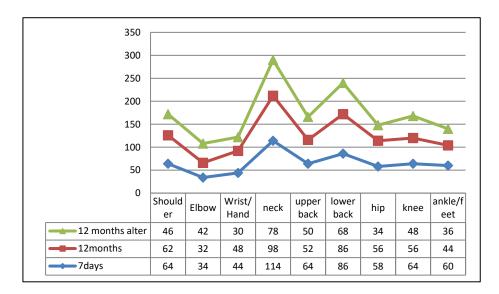


Figure 3: Relationship between all nine areas of pain/discomfort /numbness due to timed exposure.

Finally, the population being studied belong exclusively to allied health science students and the population been less is a limitation of the study. Although there is minor limitation, there are significant strengths. This is a wideranging relational study representing the young health care workers of India and shows both gender are at risk with prolonged exposure for a day for classes.

CONCLUSION

With COVID new strains and variant the phase of lockdown shutdown has been a part of our lives and education being an integral part has changed its methodologies and platform of teaching. Musculoskeletal problems increased with the increase in time in front of computers /mobile phones for long hours for their classes as a change of platform teaching as the need of the hour. Further initial exposure itself causes it which this research study depicts. With focused approach of teaching, continuous self realization and academic professionals inputs it can be kept at bay this study wants to make the allied health professionals to be aware. Further health institution should implement various measures for health regulations, for the promotion of good health and to improve the quality-of-life of the allied health care students.

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Institutional Ethics Committee

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