Available online at http://www.advancedscientificjournal.com
http://www.krishmapublication.com
IJMASRI, Vol. 2, issue11, pp. 713-729, Nov. -2022
https://doi.org/10.53633/ijmasri

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY ADVANCED SCIENTIFIC RESEARCH AND INNOVATION (IJMASRI)

ISSN: 2582-9130 **IBI IMPACT FACTOR 1.5** **DOI: 10.53633/IJMASRI**

RESEARCH ARTICLE

IMPACT OF COVID-19 PANDEMIC AND LOCKDOWN ON PREVALENCE AND RISK FACTORS FOR NECK AND SHOULDER PAIN AMONG COLLEGE STUDENTS: A CROSS SECTIONAL SURVEY

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Abstract

Neck pain (NP), & shoulder pain one of the most reported musculoskeletal disorders, is a major cause of illness and absence from university lessons among students. The COVID-19 pandemic affected higher education from university lessons among students. The COVID-19 pandemic affected higher education institutions worldwide. Academic studies shifted to online-learning, changing students' habits and lifestyle. Data demonstrated that the pandemic and consequent lockdowns can affect people's physical and mental well-being. Thus, the aim of this study is to evaluate the impact of COVID-19 pandemic and lockdown on the level of neck pain and shoulder pain among college students compared to the pre-epidemic period.A cross-sectional study was conducted in the form of an online questionnaire survey that included sociodemographic data, Numeric pain Rating scale (NPRS), Neck Disability Index (NDI), Perceived Stress Scale (PSS) & Shoulder Pain and Disability Index (SPADI). A total of 100 students were recruited. Among them the mean, standard deviation, median and the mean percentage of the stress level regarding neck and shoulder pain among college students. The mean score for the stress level was 12.56 with a mean % of 44.12 whereas a median and standard deviation was 12 and 9.75 respectively. It can be concluded that higher the mean scores mean higher the stress level among the students. The variables such as pain Intensity [C=11.67, df=4], lifting [C=10.21, df=4], concentration [C=10.12, df=4], work [C=11.49, df=4], , sleeping [C=10.03, df=4], recreation [C=10.97, df=4] were found to be statistically highly significant with stress scores at 5% level i.e, P>0.05. It indicates that any changes in stress level will affect the neck pain automatically among college students. Therefore, their online sessions will also get influenced due to neck pain in a given study. On other hand, the factors like personal Care [C=9.87, df=4], reading [C=9.50, df=4], headache [C=9.53, df=3], drifting [C=9.75, df=4] were found to be statistically significant with stress scores at 5% level i.e, P>0.05. It is evidenced that these factors were influenced by stress level regarding their neck pain among college students during their online sessions. It is evidenced that any

changes in stress level will also influenced more in the pain Intensity, lifting, concentration, work, sleeping and recreation activities as compared to other factors among college students during their online sessions in a given study. It has been found that there is significant relationship between SPADI and demographic variables namely age, gender and weight. It has been evidenced that there is a significant relationship between the stress level and shoulder pain and its associated factors. There is a high significant 'r' value of mild and moderate shoulder pain among students' is due to the perceived stress level in the above mentioned table. It has also been found that the SPADI scores are statistically significant with stress scores at 5% level i.e, P>0.05. It indicates that any changes in stress level will affect the shoulder pain automatically among college students.

Keywords: neck pain, shoulder pain, NDI, SPADI, PSS & NPRS

Introduction

The coronavirus disease was first identified in the city of Wuhan, Hubei State in China on 31st of December 2019, (Lu 2020) and has affected more than 213 countries around the world (Lai *et al.*, 2020). The causative agent was identified on 7th January 2020 and named as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) by the Chinese Centre for Disease Control and Prevention. The World Health Organization named the disease COVID-19 and declared the outbreak as global emergency on 30th January due to the virulence and highly interactivity (Sohrabi *et al.*, 2020)

During the lockdown, regular outdoor activities were limited, affecting the daily routine of the individuals (Pulla 2020) Staying at home restricted the athletes to perform physical activity leading to development of sedentary habits. Home based fitness activities remained the only solution for being active and helped to maintain exercise routine and fitness during the pandemic (Ravalli and Musumeci 2020)

A recent study reported that during lockdown period there was markedly reduced physical activity and energy expenditure level (Srivastav 2021). Due to COVID-19, both healthy individuals and patients all around the world have suddenly become inactive which lead to development of several kinds of disease (Chen 2020)

NP & SP is one of the most reported musculoskeletal disorders and is a major cause of illness, reduced educational attainment and absence from university lessons, thus affecting students' future careers (De Seze and Lebrun-Frenay 2020). A significant positive correlation has been demonstrated between the duration of mobile phone use and the duration and severity of NP (Velavan and Meyer 2020). Indeed, musculoskeletal pain in students manifested most often in the neck (Al-Hadidi 2019).

The Data show that, the prevalence of neck pain in the general population ranges from 0.4 to 86.8% in the world (Alshagga et al., 2011). In addition, the Global Burden of Disease Study showed that neck pain is one of the main causes of years lived with disability among adolescents aged 19 to 24. Compared to the other health problems such as asthma, alcohol and drug abuse it has a higher prevalence (Hoy 2010). Also some studies indicate that shoulder and neck pain is more common among children and teenagers of developing countries (Institute for Health Metrics and Evaluation. GBD compare. 2015). Lifestyle, physical factors, psychological factors, and social factors and improper sitting have been identified as the risk factors associated with neck and shoulder pain among students in different studies (Fares et al., 2017).

Previous systematic reviews have investigated risk factors for non-specific neck pain in children, adolescents and adults, but not in the stage of young adulthood. Female sex, older age, being an ex-smoker, present or previous history of low back pain, previous episode of neck pain or psychosocial factors have been shown to be risk factors for neck pain in adults (Shan et al., 2014).

The aim of this systematic review was to investigate risk factors for non-specific neck pain in young adults.

Up to 67% of world's population may present chronic non-specific neck pain & shoulder pain at least once in their lives. There is a relationship between functional limitation and disability in individuals with chronic pain, and they use health services and medication for pain relief very often. It is considered a public health and it is a frequent cause of job absenteeism which provokes high socioeconomic costs (Shan 2013).

Neck pain with no known cause is called non-specific neck pain. It usually goes away on its own within a few days or weeks but the pain lasts longer in some people or its keeps on coming back. Neck & shoulder pain is considered to be chronic if it lasts longer than three month. Non-specific neck pain is sometimes called simple or mechanical neck pain. The cause and origin of neck pain is not known exactly.

They include minor strain and sprain to muscles or ligament in neck pain. Bad posture may also be a contributing factor in some cases. Pain develops in your neck and may spread to the shoulder or base of your skull (Fallon 2020).

In this cross-sectional study, we designed an online survey with the aim of evaluating the prevalence of NP & SP among college students during the lockdown compared to what they recalled of that during the pre-pandemic period. We also aimed to assess the impact of psychological stress, sociodemographic factors, and lifestyle (such as physical activity and seated hours a day) on NP & SP. Based on previous studies, we hypothesized that, during the COVID-19 pandemic, students' NP & SP symptoms were exacerbated and correlated to psychological stress and various lifestyle factors (Shah and Desai 2021).

Need of the Study

There is much discussion in the literature as the prevalence of neck pain and shoulder pain in covid-19 among college students during the lockdown compared to what they recalled of that during the pre-pandemic period.

Many studies have found use of computer for long working hours in faulty posture may lead to neck and shoulder pain in college student. During COVID-19 pandemic need of online classes has increased all over the world for all the age groups of children and college student.

In Indian education culture online classes is new and it is necessary to find out prevalence and reasons for neck and shoulder pain in college students who are taking online classes to maintain their study and health (Amira Daher and Ofra Halperin 2020)

Objectives

A cross-sectional study was carried out on online classes during COVID-19 pandemic using questionnaire survey. There are 100 students were recruited in this cross-sectional survey.

1. To assess the impact of stress in neck pain on online classes during COVID-19 pandemic.
2. To examine the impact of stress on shoulder pain in online classes during COVID-19 pandemic.
3. To assess the effectiveness of selected demographic data and stress, Neck and shoulder pain.

Research Hypothesis

Null hypothesis:-There is no significant relationship between stress level, neck pain and shoulder pain.

Alternate hypothesis: -There is significant relationship between stress level, neck pain and shoulder pain.

Review of Literature

Amira Daher and Ofra Halperin *et al* 2021 conducted a research survey on The impact of COVID-19 Pandemic and lockdown on prevalence of and risk factors for neck pain among college students. The study was conducted in the form of online Questionnaire survey that included sociodemographic data, Visual Analogue Scale (VAS), Neck disability Index (NDI), and Perceived Stress Scale (PSS).

They concluded that the transition from on-campus studies to online learning had negative

effects on students. It significantly increased study-related stress and the development of NP. Identifying risk factors at an early stage may prevent NP from becoming chronic and affecting students' future careers, thereby improving students' quality of life (Lu 2020).

Manali Shah *et al* (2021) conducted a research survey on Prevalence of Neck Pain and Back pain in Computer Users working from Home during COVID-19 pandemic. This survey was conducted in 129 participants to find out prevalence and measure functional disability of neck pain and back pain in computer users working from home. In this study those who had pain were asked to fill NDI Questionnaire and found that 41.9%, 24.8% and 3.1% participants had mild, moderate and severe functional limitation due to neck pain and 67.4%, 31.8% and 0.8% participants had mild, moderate and severe functional limitation due to low back pain ((Lai *et al.*, 2020).

Changwon Son *et al* (2020) conducted an interview survey on Effect of COVID-19 on college students mental Health in higher education. This survey was conducted with 195 students' at large public university.

They concluded that of the 195 students, 138 (71%) indicated increased stress and anxiety due to COVID-19 outbreak. Multiple stressors were identified that contributed to the increased level of stress, anxiety, and depressive thoughts among students, These included fear and worry about their own health and of their loved ones (177/195, 91% reported negative impacts of the pandemic), difficulty in concentrating (173/195, 89%), disruptions to sleeping patterns (168/195, 86%), and increased concerns on academic performances (159/195, 82%). To cope with stress and anxiety, participants have sought support from others and helped themselves by adopting either negative or positive coping mechanism ((Sohrabi *et al.*, 2020).

Elham Gheysvandi, Iman Dianat, Rashid Heidarimoghadam, Leili Tapak, Akram Krimi shahanjarini & Forouzan Rezapur-Shahkolai et al 2021 conducted a cross sectional survey on Neck pain And Shoulder pain among elementary school students. This study was carried out to assess the prevalence of neck and shoulder pain among elementary school students and to investigate the relationship between the pain and its risk factors. This survey was conducted with 693 elementary school students and data were collected through Interviews and Questionnaire.

They concluded that elementary school students reported a high prevalence of shoulder and neck pain. This study found that improper sitting positions, as well as physical factors were associated with pain (Pulla 2020).

Fadi Al-Hadidi *et al* (2017) conducted a cross sectional survey on Association between mobile phone use and neck pain in university students. This study was based on self-administered online Questionnaire. The study sample included healthy students from health care faculties regardless of their age, gender, or handedness.

This study concludes a significant positive correlation between the duration of mobile phone use and the duration and severity of neck pain. Furthermore, the increased severity of neck pain places a huge burden on the healthcare system ((Ravalli and Musumeci 2020).

Zhi Shan (2020) conducted a survey on correlational analysis of neck/shoulder and low back pain with the use of digital products, physical activity, and psychological status among adolescents. This study was based on self-assessment. The CES-D (centre for Epidemiological Studies Depression) scale was also included in the survey. The survey data were analysed using the chi-square test, univariate logistic analyses and a multivariate logistic regression model.

This study concludes high prevalence of NSP and LBP that were closely related to multiple factors. Appropriate interventions should be implemented to reduce the occurrences of NSP and LBP (Srivastav 2021).

Qais B.Yaseen and Heba Salah et al conducted a survey on the impact of e-learning during

COVID-19 pandemic on students' body aches in Palestine. This study was carried out to evaluate the different body aches associated with e-learning on college students. This study was based on self-administered online Questionnaire.

This study concludes using desktop/laptop or tablets among students was associated with increased neck and pain and the longer the duration use the more severe the pain. In addition, the pain could affect the normal activity of the students in certain aspects like sleeping, bending over and walking for long distances. Most of the students usually sit on the chair with supine slopping forward during desktop/laptop or tablets.

The study also showed that the university students that participated in this study had an increase in pain during the e-learning process, and that this pain duration and severity increases if the duration of desktop/laptop or tablet usage increase. This pain can be severe in some students that it affects their ability to perform some of their normal life activities. Our results indicate that these students need help in explaining the best position and daily practices that can decrease their degree of pain (Chen 2020).

El-Metwally, A., Salminen, J. J., Auvinen, A., Kautiainen, H. & Mikkelsson, M. et al conducted a survey on Prognosis of non-specific musculoskeletal pain in preadolescents: A prospective 4-year follow-up study till adolescence. This study was carried out baseline cross-sectional survey of 1756 schoolchildren (mean age 10.8) identified 564 (32.1%) children with musculoskeletal pain. This study was based on a structured questionnaire.

This study conclude that non-specific musculoskeletal pain in preadolescents is not a self-limiting phenomenon. The persistence of musculoskeletal pain in preadolescence was strongly associated with pain recurrence in adolescence (Velavan and Meyer 2020).

Leiros-Rodriguez, R. et al. conducted a study on Musculoskeletal pain and non-classroom teaching in times of the COVID-19 pandemic: Analysis of the impact on students from two Spanish universities. This study was to carried out to analyze the prevalence of musculoskeletal pain and changes in physical activity and self-perceived stress in the student bodies of two Spanish Universities during the lockdown.

A cross-sectional study was carried out in a sample of 1198 students (70.6% women). The main instruments used for measuring were the Standardized Kuorinka Modified Nordic Questionnaire and the Perceived stress scale (the questionnaire regarding the practice of physical activity).

The study concludes that the increase in frequency of carrying out PA and the preference for strength training, especially among women, has been identified. Simultaneously, a reduction in the prevalence of musculoskeletal pain has been identified (Velavan and Meyer 2020).

Kim, M. S. et al. conducted a survey on Influence of neck pain on cervical movement in the sagittal plane during smartphone use. This study was carried out to examine changes in the posture of young adults with and without mild neck pain (MNP) when using a smartphone.

The study concluded that individuals with mild neck pain adopt a posture of greater neck flexion than individuals without mild neck pain when using a smartphone. Our findings suggest that young adults with mild neck pain must be aware of their posture and modify their non-neutral cervical alignment when using a smartphone. To reduce the risk of developing severe neck pain, clinicians should instruct smartphone users to maintain a correct neck posture.

Materials and Methods

Study design:

A cross sectional study was conducted in the form of an online Questionnaire survey posted at the college, during the COVID-19 lockdown. College students were invited to participate in the study. An online survey was circulated to students through Google form link. Informed consent was obtained for experimentation. Participants recorded their responses online and data were collected.

Participants:

College students were invited to participate in the study. The study had no exclusion criteria. We used the google platform to administer the survey Questionnaire in the form of an online survey circulated to students recruited through google form links.

Control variable

Sociodemographic data and clinical Questionnaire: The questionnaire includes demographic data such as name, age, Gender, weight, height. Participants were also asked about pain intensity by NDI questionnaire. Participants were also asked about how severe your pain in shoulder is by SPADI questionnaire. Participants were also asked about to rate their stress related issue to their studies on a scale ranging from 1 (none) to 4 (a lot). The participants were also asked about to rate the pain on NPRS questionnaires.

Assessment tools

1.) Neck Disability Index (NDI)
2.) Shoulder Pain and Disability Index (SPADI)
3.) Perceived Stress Scale (PSS)
4.) Numeric Pain Rating Scale (NPRS)

Statistical tools

- Chi square Pearson test
- Kendell correlation test
- Karl Pearson coefficient test

Methods

Study design: Cross-Sectional Survey

Duration of study: - 6 month study

Study setting: - The study was conducted in Kailash institute of nursing and paramedical science, Greater Noida.

Sampling Criteria: - Random Sampling.

Subjects: - College Students with Neck Pain and Shoulder Pain.

Inclusion Criteria: -

1) Both sexes were selected.
2) Age group between 19-25 years old.
3) Subjects with neck and shoulder pain during online classes.
4) Subjects willing to participate in study.

Exclusion Criteria

1) Depression
2) Feeling.
3) Thoughts.
4) Mental illness.
5) Postural abnormalities.

Procedure

100 volunteers with an average age of 19- 25 years were taken to participate in this survey. The volunteers were patients of Neck Pain and Shoulder Pain between the age of 19 to 25 years of age of our college. All patients were first filled the informed consent form prior to their enrolment in the study. All students were screened for eligibility using exact inclusion and exclusion criteria.

The students underwent a standardized pain and Disability assessment (Format affixed in appendix). Demographic information was collected including Name, Age, Gender, Weight & Height.

Disability Measurement

❖ Neck Disability Index (NDI) Questionnaire:

Neck Disability Index is a self-report questionnaire used to determine how neck pain affects a daily life and to assess the self-rated disability of patients with neck pain.

Participants answered the NDI questionnaire that included ten questions, each rated on a five-point scale ranging from 0 = "painless" to 5 = "worst pain imaginable." The maximum score was 50. A higher score indicated a high disability rating (NDI), where Cronbach's alpha $\alpha = .87$. The cut-off value of the NDI for detecting NP associated with disability was determined to be

15, such that 0–14 indicated no disability, while a score of 15 and up pointed to disability.

- Shoulder Pain and Disability Index (SPADI) Questionnaire

The Shoulder Pain and Disability Index (SPADI) is a self-administered questionnaire that consists of two dimensions, one for pain and the other for functional activities. The pain dimension consists of five questions regarding the severity of an individual's pain.

- Perceived Stress Scale (PSS) Questionnaire

The Perceived Stress Scale (PSS) is the most widely used for psychological instrument for measuring the perception of stress. It is a measure of the degree to which situation in one's life are appraised as stressful. Participants answered questions about their feelings and thoughts over the past month on a 4-point scale (1 = never; 4 = often), with a high score reflecting a high level of stress. The questionnaire score is calculated by averaging the items. 9. The questionnaire includes eight positively worded items (4, 5, 6, 7, 8, 9, 10 and 13) and six negatively worded items (items 1, 2, 3, 11, 12 and 14). Higher scores indicate higher levels of perceived stress.

PAIN ASSESSMENT

- Numeric pain Rating Scale (NPRS) Questionnaire: - A 10 point Numeric Pain rating scale (NPRS) was used to measure the pain intensity. The scale is anchored on left (score of 0) with the phrase "no pain" and on right (score of 10) with phrase of "Worst imaginable pain". Numeric pain rating scale (NPRS) has been shown to yield reliable and valid data.

Data Analysis and Interpretation

Objective -1:- To assess the effect of stress level on neck pain during their online sessions.

TABLE 1: STRESS LEVEL

Frequency and percentage distribution of level of stress regarding neck and shoulder pain during covid-19 pandemic and lockdown among college students.

S.No	Score	Level Of Stress	No.Of Frequency (N)	Percentage (%)
1.	0-13	Low	49	49.0
2.	14-26	Moderate	31	31.0
3.	27-40	High	20	20.0

Table 1 reveals that majority of the college students, 49 (49%) had low stress level, 31 (31%) had moderate stress level and 20 (20%) had high stress regarding neck and shoulder pain.

Table 2. Mean, Median, SD and Mean % of stress level regarding neck and shoulder pain among college students.

Domain	Max Score	Range	Mean	Median	SD	Mean%
Stress Score level	40	39	12.56	12	9.75	44.12

In The Present Study, The Mean, Standard Deviation, Median And The Mean Percentage Was Calculated On The Stress Level Scores Regarding Neck And Shoulder Pain Among College Students. The Mean Score For The Stress Level Was 12.56 With A Mean % Of 44.12 Whereas A Median And Standard Deviation Was 12 And 9.75 Respectively.

Table 3: To Examine The Effectiveness Of Stress Level By Associating The NDI And Its Prevalent Factors Among College Students During Their Online Sessions.

S.No	NDI AND ITS ASSOCIATED FACTORS	Total	Low (49)	%	Moderate (31)	%	High (20)	%	$\chi 2$ Value	Result
1.	**Pain Intensity**									
	a. No Pain	43	16	32.65	11	35.48	16	80	11.67**	
	b. Mild Pain	66	32	49.23	20	64.51	14	20	Df4	S
	c. Moderate Pain	01	01	2.04	-		-			
	d. Severe Pain	-								
2.	**Personal Care**									
	a. No Pain	62	40	81.63	20	64.52	02	10	9.87*	
	b. Mild Pain	36	08	16.32	10	32.26	18	90	Df4	S
	c. Moderate Pain	02	01	2.04	01	3.22	-			
	d. Severe Pain	-								
3.	**Lifting**									
	a. No Pain	45	25	51.02	10	32.25	10	50	10.21**	
	b. Mild Pain	53	23	46.93	21	67.74	09	45	Df4	S
	c. Moderate Pain	02	01	2.04	-	-	01	5		
	d. Severe Pain	-								
4.	**Reading**									
	a. No Pain	39	22	44.89	08	25.80	09	45	9.50*	
	b. Mild Pain	59	26	53.06	22	70.96	11	55	Df4	S
	c. Moderate Pain	02	01	2.04	01	3.22	-			
	d. Severe Pain	-								
5.	**Headache**									
	a. No Pain	32	23	46.93	01	3.22	08	40	9.53*	
	b. Mild Pain	65	25	51.02	29	93.54	11	55	Df4	S
	c. Moderate Pain	03	01	2.04	01	3.22	01	5		
	d. Severe Pain	-								

6.	**Concentration**									
	a. No Pain	41	20	40.81	11	35.48	10	50	10.12**	
	b. Mild Pain	57	27	55.10	20	64.51	10	50	Df4	
	c. Moderate Pain	02	02	4.08	-		-			S
	d. Severe Pain	-								
7.	**Work**									
	a. No Pain	48	18	36.73	19	61.29	11	55	11.49**	
	b. Mild Pain	50	31	63.26	10	32.25	09	45	Df4	
	c. Moderate Pain	02	-		02	6.45	-			S
	d. Severe Pain	-								
8.	**Drifting**									
	a. No Pain	55	29	59.18	09	29.03	17	85	9.75*	
	b. Mild Pain	33	13	26.53	20	64.51	-	-	Df4	
	c. Moderate Pain	08	03	6.12	02	6.45	03	15		S
	d. Severe Pain	-								
9.	**Sleeping**									
	a. No Pain	53	38	77.55	04	12.90	11	55	10.03**	
	b. Mild Pain	44	10	20.40	26	83.87	08	40	Df4	
	c. Moderate Pain	03	01	2.04	01	3.22	01	5		S
	d. Severe Pain	-								
10.	**Recreation**									
	a. No Pain	49	29	59.18	13	41.93	07	35	10.97**	
	b. Mild Pain	49	20	40.81	16	51.61	13	65	Df4	
	c. Moderate Pain	02	-	-	02	6.45	-	-		S
	d. Severe Pain	-								

NOTE: *indicates significant, ** Indicates highly significant, # indicates not significant

The above table represents the statistical outcomes of stress level scores and NDI & its prevalent factors of the subjects. In order to examine the effectiveness of stress level by associating the NDI and its prevalent factors, the chi square Pearson test was worked out. Among these variables accounted for association, the variables such as pain Intensity [**C**=11.67, df=4], lifting [**C**=10.21, df=4], concentration [**C**=10.12, df=4], work [**C**=11.49, df=4], , sleeping [**C**=10.03, df=4], recreation [**C**=10.97, df=4] were found to be statistically highly significant with stress scores at 5% level i.e, P>0.05. It indicates that any changes in stress level will affect the neck pain automatically among college students. Therefore, their online sessions will also get influenced due to neck pain in a given study.

On other hand, the factors like personal Care [**C**=9.87, df=4], reading [**C**=9.50, df=4], headache [**C**=9.53, df=3], drifting [**C**=9.75, df=4] were found to be statistically significant with stress scores at 5% level i.e, P>0.05. It is evidenced that these factors were influenced by stress level regarding their neck pain among college students during their online sessions.

To conclude that, any changes in stress level will also influenced more in the pain Intensity, lifting, concentration, work, sleeping and recreation activities as compared to other factors among college students during their online sessions in a given study.

Objective 2: To assess the effectiveness of stress level, NDI and SPADI with demographic variables among college students.

RELATIONSHIP BETWEEN STRESS AND DEMOGRAPHIC VARIABLES AMONG COLLEGE STUDENTS

Stress means by Demographic Group **(Higher Means = More Adequate Stress Level)** ***indicates Statistically Significant Difference at the 0.05 level**		
S.No	**Variables**	**Stress Scores**
1	**Age [In Years]**	
	Below 20	4.6104**
	20-22	5.6104**-
	Above 22	3.4501#
2.	Gender	
	Male	6.1375**
	Female	2.3494#
3.	Weight (in Kg.)	
	Below 45	3.678*
	45-55	3.569*
	Above 55	5.2383**

NOTE: *Indicates significant , #indicates not significant.

We examined if the stress level faced by college students were related to the demographic variables. High stress level among college students were found under the age group of below 20 and 20-22, more males were faced high perceived stress level as compared to females and college students were having high stress level under the weight group of above 55. It has been found that there is significant relationship between stress level and demographic variables namely age, gender and weight in a given study.

NDI means by Demographic Group **(Higher Means = More Adequate Dietary Level)** ***indicates Statistically Significant Difference at the 0.05 level**		
S.No	**Variables**	**NDI Scores**
1	**Age [In Years]**	
	Below 20	4.6509**
	20-22	2.4589#
	Above 22	6.7098**
2.	Gender	
	Male	3.6509*
	Female	4.4512**
3.	Weight (in Kg.)	
	Below 45	4.3455**
	45-55	5.4590**
	Above 55	2.9037#

NOTE: *Indicates significant #indicates not significant

We examined if the neck pain faced by college students were related to the demographic variables. High neck pain among students were found under the age group of below 20 and above 22, more females were faced more neck pain as compared to males and college students were having large weight under the group of below 45 and above 55. It has been found that there is

significant relationship between NDI and demographic variables namely age, gender and weight in a given study.

RELATIONSHIP BETWEEN SPADI AND DEMOGRAPHIC VARIABLES AMONG COLLEGE STUDENTS

SPADI means by Demographic Group **(Higher Means = More Adequate Dietary Level)** ***indicates Statistically Significant Difference at the 0.05 level**		
S.No	**Variables**	**SPADI Scores**
1	**Age [In Years]**	
	Below 20	2.2450#
	20-22	4.2365**
	Above 22	1.2356#
2.	Gender	
	Male	1.0469#
	Female	4.2365**
3.	Weight (in Kg.)	
	Below 45	0.2356#
	45-55	4.7034**
	Above 55	4.6509**

NOTE: *Indicates significant

#indicates not significant

We examined if the shoulder shoulder pain faced by college students were related to the demographic variables. High shoulder pain among students were found under the age group of 20-22, more females faced more shoulder pain as compared to males and college students were having high weight under the group of below 45 and 45- 55. It has been found that there is significant relationship between SPADI and demographic variables namely age, gender and weight in a given study.

Objective 3: To examine the effectiveness of stress level by associating the SPADI and its prevalent factors among college students during their online sessions.

RELATIONSHIP BETWEEN STRESS LEVEL AND SPADI AMONG COLLEGE STUDENTS

Stress means by SPADI factors **(Higher Means = More Adequate Stress Level)** ***indicates Statistically Significant Difference at the 0.05 level**		
S.No	**Variables**	**Stress Scores**
1	**At Worst Conditions**	
	No pain	3.487*
	Mild Pain	4.509**
	Moderate Pain	3.068*
	Severe Pain	0.543*
2.	**Lied on Involved Side**	
	No pain	3.087*
	Mild Pain	3.465*
	Moderate Pain	4.986**
	Severe Pain	0.986*
3	**Reaching on high shelf**	
	No pain	3.987*

	Mild Pain	4.341*
	Moderate Pain	3.686*
	Severe Pain	0.656*
4.	**Touch the back of your neck**	
	No pain	3.927*
	Mild Pain	3.165*
	Moderate Pain	4.086**
	Severe Pain	0.243*
5	**Push with involved arm**	
	No pain	3.0467*
	Mild Pain	3.901*
	Moderate Pain	4.532**
	Severe Pain	0.432*
6	**Washing your hair**	
	No pain	3.507*
	Mild Pain	4.136**
	Moderate Pain	3.974*
	Severe Pain	0.986*
7	**Washing your back**	
	No pain	4.516**
	Mild Pain	4.108**
	Moderate Pain	3.321*
	Severe Pain	0.670*
8	**Putting on undershirt**	
	No pain	3.452*
	Mild Pain	3.390*
	Moderate Pain	3.765*
	Severe Pain	0.432*
9	**Put on shirt that buttons down the shirt**	
	No pain	3.207*
	Mild Pain	3.936*
	Moderate Pain	3.774*
	Severe Pain	0.486*
10	**Putting your pants**	
	No pain	3.617*
	Mild Pain	4.406**
	Moderate Pain	3.934*
	Severe Pain	0.206*
11	Place object on high shelf	
	No pain	3.0071*
	Mild Pain	4.296**
	Moderate Pain	3.314*
	Severe Pain	0.766*
12	Carrying an high Object	
	No pain	3.890*
	Mild Pain	4.278**
	Moderate Pain	3.876*
	Severe Pain	0.543*
13	Remove Something from your back pocket	

	No pain	3.901*
	Mild Pain	4.332**
	Moderate Pain	3.986*
	Severe Pain	0.321*

NOTE: *Indicates significant

The above table represents the statistical outcomes of stress level scores and SPADI & its prevalent factors of the subjects. In order to examine the effectiveness of stress level by associating the SPADI and its prevalent factors, the Kendell correlation test was worked out. Among these variables accounted for association or relationship, it has been evidenced that there is a significant relationship between the stress level and shoulder pain and its associated factors. There is a high significant 'r' value of mild and moderate shoulder pain among students' is due to the perceived stress level in the above mentioned table. It has also been found that the SPADI scores are statistically significant with stress scores at 5% level i.e, P>0.05. It indicates that any changes in stress level will affect the shoulder pain automatically among college students. Therefore, their online sessions will also get influenced due to their shoulder pain in a given study.

Furthermore, it is evidenced that these SPADI and its associated factors were influenced by stress level among college students during their online sessions. To conclude that, any changes in stress level will also influenced more in the carrying objects, hand movements, pushing and washing activities of college students during their online sessions in a given study.

Results

In the present study, the mean, standard deviation, median and the mean percentage was calculated on the stress level scores regarding neck and shoulder pain among college students. The mean score for the stress level was 12.56 with a mean % of 44.12 whereas a median and standard deviation was 12 and 9.75 respectively.

In this study the statistical outcomes of stress level scores and NDI & its prevalent factors of the subjects. In order to examine the effectiveness of stress level by associating the NDI and its prevalent factors, the chi square Pearson test was worked out. Among these variables accounted for association, the variables such as pain Intensity [**C**=11.67, df=4], lifting [**C**=10.21, df=4], concentration [**C**=10.12, df=4], work [**C**=11.49, df=4], , sleeping [**C**=10.03, df=4], recreation [**C**=10.97, df=4] were found to be statistically highly significant with stress scores at 5% level i.e, P>0.05. It indicates that any changes in stress level will affect the neck pain automatically among college students. Therefore, their online sessions will also get influenced due to neck pain in a given study.

On other hand, the factors like personal Care [**C**=9.87, df=4], reading [**C**=9.50, df=4], headache [**C**=9.53, df=3], drifting [**C**=9.75, df=4] were found to be statistically significant with stress scores at 5% level i.e, P>0.05. It is evidenced that these factors were influenced by stress level regarding their neck pain among college students during their online sessions.

To conclude that, any changes in stress level will also influenced more in the pain Intensity, lifting, concentration, work, sleeping and recreation activities as compared to other factors among college students during their online sessions in a given study.

We examined if the neck pain faced by college students were related to the demographic variables. High neck pain among students were found under the age group of below 20 and above 22, more females were faced more neck pain as compared to males and college students were having large weight under the group of below 45 and above 55. It has been found that there is significant relationship between NDI and demographic variables namely age, gender and weight in a given study.

We examined if the shoulder shoulder pain faced by college students were related to the

demographic variables. High shoulder pain among students were found under the age group of 20-22, more females faced more shoulder pain as compared to males and college students were having high weight under the group of below 45 and 45- 55. It has been found that there is significant relationship between SPADI and demographic variables namely age, gender and weight in a given study.

Furthermore, it is evidenced that these SPADI and its associated factors were influenced by stress level among college students during their online sessions. To conclude that, any changes in stress level will also influenced more in the carrying objects, hand movements, pushing and washing activities of college students during their online sessions in a given study.

Discussion

The purpose of the study was to investigate impact of covid-19 pandemic and lockdown on the level of neck pain and shoulder pain among college students as many researchers have found use of computer for long working hours in faulty posture may lead to neck and shoulder pain in college student. During COVID-19 pandemic, the need of online classes has increased all over the world for all the age groups of children and college student. In the present study we tried to to find out prevalence and reasons for neck and shoulder pain in college students who are taking online classes to maintain their study and health (Shan *et al.*, 2014).

In our present study we first investigated the effect of stress level on neck pain during their online sessions. According to our results given in Table 1 it can be concluded that 49% had low stress level,, about 31% had moderate stress level and about 20% had high stress regarding neck and shoulder pain among college students. This result has been shown in many researches (Changwon Son *et al.*, 2020). Furthermore, it has been investigated in Table 2 that the mean, standard deviation, median and the mean percentage of the stress level regarding neck and shoulder pain among college students. The mean score for the stress level was 12.56 with a mean % of 44.12 whereas a median and standard deviation was 12 and 9.75 respectively. It can be concluded that higher the mean scores means higher the stress level among the students.

According to our results given in Table 3 found that the the variables such as pain Intensity [C=11.67, df=4], lifting [C=10.21, df=4], concentration [C=10.12, df=4], work [C=11.49, df=4], , sleeping [C=10.03, df=4], recreation [C=10.97, df=4] were found to be statistically highly significant with stress scores at 5% level i.e, P>0.05. It indicates that any changes in stress level will affect the neck pain automatically among college students. Therefore, their online sessions will also get influenced due to neck pain in a given study. On other hand, the factors like personal Care [C=9.87, df=4], reading [C=9.50, df=4], headache [C=9.53, df=3], drifting [C=9.75, df=4] were found to be statistically significant with stress scores at 5% level i.e, P>0.05. It is evidenced that these factors were influenced by stress level regarding their neck pain among college students during their online sessions. It is evidenced that any changes in stress level will also influenced more in the pain Intensity, lifting, concentration, work, sleeping and recreation activities as compared to other factors among college students during their online sessions in a given study.

According to one systematic review conducted by Amira Daher *et al.,* (2021) reported that transition from on-campus studies to online learning had negative effects on students. It significantly increased study-related stress and the development of NP. Identifying risk factors at an early stage may prevent NP from becoming chronic and affecting students' future careers, thereby improving students' quality of life**.** Manali Shah1 *et al* (2021), has also supported our study which concluded that the In this study those who had pain were asked to fill NDI Questionnaire and found that 41.9%, 24.8% and 3.1% participants had mild, moderate and severe functional limitation due to neck pain and 67.4%, 31.8% and 0.8% participants had mild, moderate and severe functional limitation due to low back pain**.**

According to our results given in Table 4 it can be concluded that high stress level among college students were found under the age group of below 20

and 20-22, more males were faced high perceived stress level as compared to females and college students were having high stress level under the weight group of above 55. It has been found that there is significant relationship between stress level and demographic variables namely age, gender and weight in a given study.

According to our results given in Table 5 it can be concluded that high neck pain among students were found under the age group of below 20 and above 22, more females were faced more neck pain as compared to males and college students were having large weight under the group of below 45 and above 55. It has been found that there is significant relationship between NDI and demographic variables namely age, gender and weight in a given study. Fadi Al-Hadidi *et al*., (2017) supported our study and found that there was a significant positive correlation between the duration of mobile phone use, the duration, severity of neck pain and age, gender or headedness. Furthermore, the increased severity of neck pain places a huge burden on the healthcare system**.**

Qais B.Yaseen *et al.*, (2020) is also support our study and found that using desktop/laptop or tablets among students was associated with increased neck and pain and the longer the duration use the more severe the pain. In addition, the pain could affect the normal activity of the students in certain aspects like sleeping, bending over and walking for long distances. Most of the students usually sit on the chair with supine slopping forward during desktop/laptop or tablets. This pain can be severe in some students that it affects their ability to perform some of their normal life activities. The results indicated that there is significant positive relationship between server neck pain and demographic variables namely age gender and weight.

According to our results given in Table 5 it can be concluded that high shoulder pain among students were found under the age group of 20-22, more females faced more shoulder pain as compared to males and college students were having high weight under the group of below 45 and 45- 55. It has been found that there is significant relationship between SPADI and demographic variables namely age, gender and weight in a given study. Elham Gheysvandi *et al.*, (2021) support our study that reported that elementary school students reported a high prevalence of shoulder and neck pain. This study found that improper sitting positions, as well as physical factors were associated with pain**.**

According to our results given in Table 5 it can be concluded that it has been evidenced that there is a significant relationship between the stress level and shoulder pain and its associated factors. There is a high significant 'r' value of mild and moderate shoulder pain among students' is due to the perceived stress level in the above mentioned table. It has also been found that the SPADI scores are statistically significant with stress scores at 5% level i.e, P>0.05. It indicates that any changes in stress level will affect the shoulder pain automatically among college students. Therefore, their online sessions will also get influenced due to their shoulder pain in a given study. Furthermore, it is evidenced that these SPADI and its associated factors were influenced by stress level among college students during their online sessions. It is also depicted that any changes in stress level will also influenced more in the carrying objects, hand movements, pushing and washing activities of college students during their online sessions in a given study.

Kim, M. S. *et al.*, (2020) is also support our study and concluded that individuals with mild neck pain adopt a posture of greater neck flexion than individuals without mild neck pain when using a smartphone. Our findings suggest that young adults with mild neck pain must be aware of their posture and modify their non-neutral cervical alignment when using a smartphone. To reduce the risk of developing severe neck pain, clinicians should instruct smartphone users to maintain a correct neck posture**.** Zhi Shan *et al*., (2020) concluded that there is a high prevalence of Neck and shoulder pain that were closely related to multiple factors. Appropriate interventions should be implemented to reduce the occurrences of neck and shoulder pain.

Conclusion

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