

Does the Covid-19 lockdown affect pain and anxiety in high school seniors and high school graduates preparing for the university exam?

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Abstract

This study aimed to investigate whether the Covid-19 lockdown affect pain, exam anxiety and general anxiety in students preparing for university exam. A total of 364 students were divided into groups as high school seniors (HS, $n = 241$) and high school graduates (HG, $n = 123$). Visual Analog Scale (VAS) for neck and low-back pain, Beck Anxiety Inventory for general anxiety, Exam Anxiety Scale (EAS) for exam anxiety were used. Both groups showed high level of exam anxiety and generalized anxiety ($p < .05$). After Covid-19, neck and low-back pain rates, and VAS pain scores of both groups increased ($p < .05$). Neck pain before Covid-19 and neck and low-back pain after Covid-19 were higher in female students than males ($p < .05$). The Covid-19 lockdown negatively affected the neck and low-back pain level, exam anxiety and general anxiety of both HS and high school graduate students. We suggest that community healthcare services should regard physiotherapy and rehabilitation interventions to treat students with neck and low-back pain via exercise strategies. Psychological and emotional support also could be provided to reduce students' general anxiety and exam anxiety. Future studies should establish the consider menstrual cycle status in female students, and the computer-using time of students.

KEYWORDS

anxiety, Covid-19, low-back pain, neck pain, school

1 | INTRODUCTION

The new type of coronavirus 2019 (Covid-19) disease spread rapidly to the world, starting in China and other countries, and caused a global pandemic. The Covid-19 pandemic is not only increasing the risk of death from a viral infection but also putting psychological pressure on people in all countries. Due to Covid-19, strict isolation measures are taken and the delays in starting schools and universities across the country may affect the mental and physical health of students (Cao et al., 2020). Neck and low-back pains are a condition that includes various risk factors such as physiological, psychosocial, and sociodemographic and has been experienced and reported by young populations. A recent study reported that the frequency of low-back pain and neck pain in adolescents ranged from 19.5% to 56% (Scarabottolo et al., 2017). In a study conducted with high school students, it was observed that 30%–70% of the students experienced low-back pain, which was associated with disability and the pain negatively affected their daily living activities (Casas et al., 2016).

Social isolation to prevent the contagiousness of the Covid-19 pandemic is a required action to reduce the spread of infection by restricting access to family, friends, and other social activities, but this could cause loneliness, anxiety, and depression in individuals (Majumdar et al., 2020). Anxiety is a natural state that can be experienced by every human being, making the individual feel fear or loss of self-confidence, and is considered a normal reaction to situations very stressful in one's life. It is presumed that the Covid-19 pandemic is one of the situations that cause high anxiety recently and it affects the health of society not only physically but also psychologically (Nadeak et al., 2020). Exam anxiety is a severe obstacle that prevents students from fully revealing their cognitive potential, negatively affects exam motivation, and adversely affects their life and career selection decisions. The Higher Education Institutions Exam (YKS), which is held every year in our country, is a source of stress for hundreds of thousands of students (Softa et al., 2015). YKS is a three-session of exam that includes session 1 (basic proficiency test), session 2 (field proficiency test), and session 3 (foreign language test). The number of questions students must respond to can range from 200 to 280 questions depending on the field they choose, and the questions must be answered and marked on the response paper in nearly 1–1.5 minutes of time per question (Kültür & Özcan, 2022). Exam anxiety is one of the factors that can affect the success of students in the YKS exam (Softa et al., 2015). A previous study that reported experiencing exam anxiety at the level of 30% among students preparing for the YKS exam is an indicator of how critical that situation is for students (Şahin et al., 2006). It is important to determine whether the Covid-19 lockdown affect the students preparing for the university exam in our country. Therefore, in our study, we aimed to determine whether the Covid-19 lockdown affect the neck and low-back pain levels, exam anxiety and general anxiety of students preparing for the YKS exam for the first time and for the second time.

2 | METHOD

This study was carried out between February 2020 and June 2020 with the senior high school and high school graduate students living in the city center. Muş Alparslan University Scientific Research and Publication Ethics Committee approved this study (49378/7/59). The data collection followed the norms of the Declaration of Helsinki.

2.1 | Sample

The universe of the study was composed of students studying in the city center and preparing for the university entrance exam. According to National Statistical Institution data, it has been determined that there are 19.116 people in the 15–19 age group and 25.403 people in the 20–24 age group in the city center in 2020. It has been determined that the number of candidates taking the university entrance exam in 2020 is 6532. The universe was

determined as 6532 people. The number of samples (n) was calculated by accepting the margin of error (t) = 5.0%, the incidence of the event to be examined (p) = 0.5, the frequency of absence of the event to be examined (q) = 0.5 and the sampling error (d) = 0.05. The sample was determined as 363 people.

2.2 | Instrumentation

Age, height, gender, and other demographic information of all participants were obtained. Visual Analogue Scale (VAS) was used to evaluate neck and low-back pain levels. VAS pain severity is graded on a 10 cm scale as 0 for no pain and 10 for the worst pain imaginable. Pain intensity was categorized as <3 mild pain, 3–6 moderate pain, and >6 severe pain (Arslan et al., 2016). Neck and low-back pain levels were marked by the students on the VAS.

Beck Anxiety Inventory (BAI) was used to evaluate general anxiety. BAI is a 21-item scale that evaluates anxiety. Each question in BAI is summed as “never” = 0 points, “mild” = 1 point, “moderate” = 2 points, and “severe” = 3 points. The lowest score an individual can get is zero, and the highest score is 63. The Turkish adaptation of the scale was conducted previously (Ulusoy et al., 1998).

Exam Anxiety Scale (EAS) was used to evaluate exam anxiety. EAS includes seven basic areas in the scale, including how others see him/herself, how he/she sees himself/herself, worries about the future, worry about not being adequately prepared, bodily-mental reactions and general exam anxiety. Each correct answer is calculated as 1-point, and each incorrect answer is calculated as zero points in the EAS. High scores in subcategories indicate high anxiety levels and lower scores indicate low anxiety levels (Baltaş, 2002).

2.3 | Procedure

The study information and online survey were created through Google Forms. Inclusion criteria were identified as; being studying in the 12th grade in a high school institution affiliated with the Ministry of National Education, being a high school graduate, being between the ages of 17–20 years, being prepared for the university exam for the second time, speaking the local language, and not having any mental problems which may prevent participation in the study. Students who have graduated in the last 2 years have been excluded from the study. Also, students who filled in the online study forms incompletely were excluded from the study. Students who would volunteer and their parents were reached by communicating work information and online survey links to school and study center managers via WhatsApp. A total of 364 students were included in the study. Students were divided into two groups as high school seniors (HS, $n = 241$) and high school graduates (HG, $n = 123$). The first evaluations including the neck and low-back pain levels had been evaluated 1 month before the Covid-19 pandemic emerged in our country within the scope of master course lesson for the purpose of scientific research method education. Two months after the Covid-19 pandemic emerged, the neck and low-back pain levels, exam anxiety and general anxiety of the same students were evaluated. In addition, in-group male/female comparisons of the VAS neck and low-back pain, exam anxiety, and general anxiety were performed in the HS and HG groups.

2.4 | Data analysis

Data were analyzed with SPSS 25.0 (IBM SPSS Statistics 25 software [IBM Corp.]) package program. Continuous variables were given as mean \pm standard deviation and categorical variables as numbers and percentages. When the parametric test assumptions are met, in the comparison of independent group differences significance test of the difference between two means; when parametric test assumptions were not met, Mann–Whitney U test was used to compare independent group differences. The paired samples t -test was used for data that met parametric test

assumptions and the Wilcoxon signed rank test for nonparametric test assumptions in dependent-group comparisons. The differences between categorical variables were analyzed by χ^2 analysis and the McNemar test. Two-way mixed design repeated-measures analysis of variance test was used to assess the differences in the students' neck and low-back pain levels. Statistical significance level was determined as $p < .05$.

3 | RESULTS

The mean age was 17.77 ± 0.62 in the HS group, and 19.24 ± 0.65 in the HG group ($p = .001$). There was no difference between the groups in height, weight, and body mass index ($p > .05$) (Table 1). When the students' regular medication use was questioned, 83% of the students in the HS group and 84.3% of the students in the HG group were not using medications regularly. Only 3.7% of the students in the HS group and only 5% of the students in the HG group were using regular psychological drugs. 24.5% of the students in the HS group and 12.2% in the HG group reported that they transmitted to distance education for compulsory and necessary education. 42.4% of the students in the HS group and 45.6% of the students in the HG group reported that they struggle to study lessons under inefficient working conditions at home due to the Covid-19 lockdown. In addition, 10% of students in the HS group and 11.46% of the students in the HG group reported that they had concentration problems in studying lessons due to the Covid-19 lockdown.

When the neck and low-back pain rates before and after the Covid-19 pandemic of the groups were compared using the McNemar test, the HG group was significantly higher in the neck ($p = .0001$) and low-back pain ($p = .0001$) rates. To the Chi-square test results, the HS group showed an increase after Covid-19 in the neck ($p = .0001$) and low-back pain ($p = .001$) rates compared to before Covid-19. Likewise, the HG group demonstrated an increase after Covid-19 in the neck ($p = .0001$) and low-back pain ($p = .002$) rates compared to before Covid-19.

Table 2 shows the pain level changes before and after the Covid-19 lockdown between groups. According to the two-way mixed design repeated-measures analysis of variance test, when the change in time is examined among the groups (Group * Time (interaction)), there was no difference between groups in VAS-neck pain ($p = .074$, $\eta^2 = 0.009$) and VAS-low-back pain levels ($p = .898$, $\eta^2 = 0.002$) (Table 2).

TABLE 1 Demographic data of students in HS and HG groups.

	HS (n = 241)		HG (n = 123)		P
	Mean \pm SD	Median (Min–Max)	Mean \pm SD	Median (Min–Max)	
Age (years)	17.77 \pm 0.62	18 (17–19)	19.24 \pm 0.65	19 (18–20)	0.001* (z = -13.96)
Height (cm)	1.72 \pm 0.10	1.73 (1.50–1.94)	1.71 \pm 0.09	1.70 (1.54–1.93)	0.240 (z = -1.176)
Weight (kg)	66.23 \pm 12.66	66 (43–96)	66.58 \pm 13.66	65 (42–114)	0.835 (z = -0.209)
Body mass index (kg/m ²)	22.00 \pm 2.28	22.13 (17.30–29.34)	22.43 \pm 3.02	22.48 (15.62–33.14)	0.158 (z = -1.413)
	n	%	n	%	
Gender					
Female	122	50.6	72	58.5	
Male	119	49.4	51	41.5	

Abbreviations: Max, maximum; Min, minimum; P, independent group differences; SD, standard deviation; z, Mann–Whitney U Test.

*Statistical difference between groups.

TABLE 2 Before and after Covid-19 of VAS-neck and low-back pain values between groups and score changes (eta report).

	HS (n = 241)		HG (n = 123)		Between-group difference in change scores		Time (main effect) p	Group*Time (Interaction) F/p Value	η^2
	Mean	SD	Mean	SD	Mean	SD			
VAS- Neck pain	Before the Covid-19	1.09	1.64	2.21	2.45	-0.97	.074	3.215/.074	0.009
	After the Covid-19	2.19	2.71	4.28	3.13				
VAS- Low-back pain	Before the Covid-19	1.07	1.68	2.27	2.29	-0.78	.898	0.017/.898	0.002
	After the Covid-19	2.32	2.95	4.29	3.18				

Note: Two-way mixed design repeated-measures analysis of variance.

Abbreviations: η^2 , Effect size, SD, standard deviation; VAS, visual analogue scale.

TABLE 3 Comparison of the exam anxiety and general anxiety scores of the groups.

	HS (n = 241)		HG (n = 123)		P
	Mean ± SD	Median (Min–Max)	Mean ± SD	Median (Min–Max)	
Exam anxiety scale					
How others see him/herself	4.16 ± 1.50	4 (0–8)	3.74 ± 1.72	4 (1–7)	0.021* (z = -2.301)
How he/she sees himself/herself	3.60 ± 1.57	4 (0–7)	3.75 ± 1.50	4 (1–6)	0.419 (z = -0.807)
Worries about the future	3.61 ± 1.37	4 (0–6)	3.65 ± 1.13	4 (0–6)	0.695 (z = -0.392)
Worry about not being adequately prepared	3.44 ± 1.41	3 (0–6)	3.47 ± 1.25	3 (0–7)	0.921 (z = -0.099)
Bodily reactions	3.55 ± 1.55	4 (0–7)	3.49 ± 1.91	3 (1–10)	0.752 (z = -0.316)
Mental reactions	5.73 ± 1.86	6 (2–10)	5.97 ± 2.16	6 (0–6)	0.195 (z = -1.295)
General exam anxiety	3.41 ± 1.34	3 (0–6)	3.85 ± 1.39	4 (0–7)	0.004* (z = -2.911)
Beck anxiety index	11.85 ± 9.18	9 (0–47)	16.35 ± 11.29	14 (0–59)	0.0001* (z = -4.003)

Abbreviations: Max, Maximum; Min, Minimum; P, Independent group differences; SD, standard deviation; z, Mann–Whitney U Test.

*Statistical difference between groups.

A statistical difference was found in the EAS-how others see him/herself subcategory in favor of the HG group ($p = .021$) whereas a statistical difference was found in favor of the HS group in the EAS-general exam anxiety subcategory ($p = .004$). There was no difference between groups in the EAS-how he/she sees himself/herself, worries about the future, worry about not being adequately prepared, bodily reactions and mental reactions sub-categories ($p > .05$). There was a difference in favor of HS group in BAI score ($p = .0001$) (Table 3).

In HS and HG groups, VAS neck and VAS low-back pain levels were significantly higher in both male and female students after Covid-19 ($p < .05$). VAS neck and low-back pain levels in the HS group were significantly higher in female students than in males before Covid-19 ($p < .05$). However, after Covid-19, female and male students had no difference in VAS neck and low-back pain ($p > .05$). VAS neck pain in the HG group was significantly higher in female students than in males before and after Covid-19 ($p < .05$). However, only VAS low-back pain in female students was significantly higher than in males after Covid-19 ($p > .05$) (Table 4).

How he/she sees himself/herself subscale of EAS in the HS group was significantly higher in female students than in males after Covid-19 ($p < .05$). Worry about not being adequately prepared and general exam anxiety subscales of EAS, and BAI score in the HG group were significantly higher in female students than in males after Covid-19 ($p < .05$) (Table 4).

4 | DISCUSSION

The goal of this study was to investigate the effect of the Covid-19 lockdown on pain, exam anxiety, and general anxiety in students preparing for the university exam. We found that the Covid-19 lockdown negatively affected the neck and low-back pain of both HSs and high school graduate students preparing for the university exam. High school graduate students had higher levels of exam anxiety, general anxiety, and increased neck and low-back pain than HS students. Just over one-third of the HS group (42.4%) and nearly half of the HG group (45.6%) reported

studying under inefficient conditions in the home because of the Covid-19 lockdown. The neck and low-back pain levels and general anxiety of female students were higher than male students in both groups.

Pain, which has physical, psychological, and social aspects, is a potential risk for the development of musculoskeletal problems for students (Salameh et al., 2022). During the Covid-19 lockdown period, prior studies have noted that technological device use, social isolation, and distance education caused discomfort in the shoulder and back region of students (Gałczyk et al., 2021; Roggio et al., 2021; Salameh et al., 2022). The results of previous studies indicated that students' prevalence of pain was raised in the cervical and lumbar regions during the Covid-19 lockdown (Gałczyk et al., 2021; Leirós-Rodríguez et al., 2020; Salameh et al., 2022). Previous reports demonstrated that the frequency of neck pain was between 43.5% to 65% in students (Roggio et al., 2021; Salameh et al., 2022). We found that the prevalence and the level of neck and low-back pain were raised in both groups during the Covid-19 lockdown. The level of neck and low-back pain in students who preparing for the YKS exam during the Covid-19 lockdown was low and moderate level in HS and HG respectively, with no difference between groups. Considering the multifactorial dimension of pain, the level of neck and low-back pain in HG and senior high school students increased alike during the Covid-19 lockdown. This result may be derived from studying lessons under inefficient conditions for both students. Since there was a clinically significant increase (Lauche et al., 2013; Suzuki et al., 2020) in the level of neck and low-back pain in both groups, the exposure from the Covid-19 lockdown which seems clinically risky for students should not be ignored.

Several reports have shown that the frequency and the level of neck and low-back pain were higher in female students (Al Rawaf et al., 2019; Diepenmaat et al., 2006). Supporting this finding, in a previous report conducted before Covid-19, the frequency of neck pain was 15.7% for boys and 18.9% for girls (Scarabottolo et al., 2017). Likewise, the frequency of low-back pain was 31.6% (Lemos et al., 2013) and 33.5% (Roggio et al., 2021), and 15.7% for boys and 20% for girls (Scarabottolo et al., 2017). In line with the previous literature, our results revealed that the neck and low-back pain levels of female students were higher than males. Considering the complex nature of pain, the intense and strenuous pace, and the continuity of study, the female gender may express more pain as supported in the literature. A possible explanation is that a possible overall reduction of physical activity due to the Covid-19 lockdown and therefore increase the neck and low-back pain levels may have happened, especially in female students. One of the topics emerging from this finding relates specifically to the female students who were influenced negatively by the Covid-19 lockdown more than male students and thus there may be a predictor of a challenging process for them. Therefore, education for female students particularly is needed to give them help to manage their pain, like exercise booklets, pain management guidelines, or prevention methods.

As well as the increasing death rate in the world due to the Covid-19 pandemic, anxiety has been observed in students as well as people of all ages and mostly impacted younger people and females due to Covid-19 (Islam et al., 2020; Wang et al., 2020). In earlier studies conducted before the Covid-19 pandemic, the students had 14.1% of general anxiety (Jin et al., 2014), 11%–24.4% of a high level of anxiety (Jin et al., 2014; Kumar & Akoijam, 2017). A previous meta-analysis performed on 40,348 medical school students reported that 33.8% of the students had experienced anxiety (Quek et al., 2019). In studies conducted during the Covid-19 pandemic, it was reported that 37.02% (Hakami et al., 2021), and 87.7% (Baloran, 2020) of university students experienced anxiety, particularly higher in females (Gao et al., 2020; Sui et al., 2022). Additionally, in a previous study examining the mental health among 2349 university students in 9 countries, during the pandemic, it was found that Türkiye had the highest risk of depression and anxiety (Ochnik et al., 2021). The cut-off value of the BAI score, which we used to assess students' anxiety in our study, was determined as 8 points in a previous study (Oh et al., 2018). According to the previous finding, we found that our HS and HG experience high general anxiety with a score of 11.85 and 16.35 respectively, but higher in high school graduate students. Also, we detected that in HG, the general anxiety of female students was higher than that of male students. Our findings broadly support the work of previous studies and indicate that, from a clinical perspective, the Covid-19 lockdown has negative consequences on students' mental and psychological health. Lack of face-to-face education, uncertainties, fear of getting sick, and dying may have triggered the increase in general anxiety in both groups.

Exam anxiety is defined as the increase in the level of restlessness and anxiety during an exam that the student takes, and as a result, it causes a decrease in the student's academic performance and causes the student to misrepresent the information (Ewell et al., 2022). As the Covid-19 pandemic affects college students, students who will enter the exam also may be negatively affected due to exam anxiety (Aguilera-Hermida, 2020; Fruehwirth et al., 2021). It is known that the anxiety experienced before the university entrance exam may prevent students from displaying their own skills. Furthermore, exam anxiety may form negativities in goals and even may end students' education life (Erözkan, 2004). Considering a large number of students taking the YKS exam, it is known that the preparation process for the university exam is challenging in terms of reaching the student's goal (Yıldırım, 2007). In a previous study conducted with 1.021 students during the Covid-19 lockdown, it was reported that the anxiety level of students preparing for the university exam is quite high compared to students studying at university (Fernández-Castillo, 2021). However, in contrast to earlier findings, a previous study stated that university students have higher exam anxiety than high school students (Doğan, 2020). During the Covid-19 lockdown, we found that students preparing for the university exam had higher exam anxiety in both groups, but higher in the high school graduate than HS. This result can be seen as a meaningful sign that the Covid-19 lockdown is having a negative impact on students' exam anxiety. Concentration problems represented in 10%–11% of both groups are likely possible to affect exam anxiety and may be regarded as an indicator of high exam anxiety. Also, we found that the exam anxiety of female students in HG was higher than that of male students. Not being able to settle into a licensing program in the first year, pressure from relatives and family, and pessimistic thoughts may have paved the way for high exam anxiety in high school graduate students.

One of the reasons why students of our study have high exam anxiety may be that they do not know enough about coping with stress and reducing anxiety. It has been reported in studies that original interventions designed by guidance services to reduce high exam anxiety can protect students from the negative consequences of stress that develop over time (Hashmat et al., 2008; Yıldırım, 2007). Educators who undertake the task of preparing students for university exams should implement programs or methods that will increase students' self-efficacy levels to protect them from exam anxiety (Onyeizugbo, 2010). For this purpose, students' social support systems can be strengthened by offering psycho-educational programs to teachers and parents of students in all types of high schools (Yıldırım, 2007). Additionally, psychological counseling services of guidance services in schools and study centers could be expanded. Guidance services could try to provide training on coping with exam anxiety that develops in the face of stress by creating an opportunity to meet with students.

The strengths of our study are the high number of participants in both groups. Also, the results that are new to the literature on how the Covid-19 lockdown affects students preparing for the university exam, are descriptive and may require taking a strategy. The fact that we did not evaluate the physical activity levels, mood, and computer use time of both groups and the fact that we did not evaluate the menstrual cycle of female students in our study is a limitation of our study. Also, we did not make regular long-term follow-ups after the Covid-19 lockdown which could be seen as another limitation.

5 | CONCLUSION

We aimed to determine whether the Covid-19 lockdown affect the neck and low-back pain levels, exam anxiety and general anxiety of both HS and high school graduate students preparing for the YKS exam for the first time and for the second time. Our results indicated that the Covid-19 lockdown negatively affected the neck and low-back pain, exam anxiety and general anxiety of both HS and high school graduate students. The results also demonstrated that exam anxiety and general anxiety were high in both groups. Exam anxiety, general anxiety, and neck and low back pain rates of high school graduate students were more influenced by the Covid-19 lockdown. The neck and low-back pain levels and general anxiety of female students were higher than male students in both groups.

6 | IMPLICATIONS

In line with our results obtained at the beginning of the Covid-19 lockdown, we consider that methods of coping with neck and low-back pain can be applied to help students prepare for the university entrance exam. Clinically meaningful increases in neck and low-back pain and general anxiety in both groups indicate that the Covid-19 lockdown has negative effects on students, specifically female students. In accordance with this purpose, we recommend that community healthcare services should consider physiotherapy and rehabilitation interventions to treat students with neck and low-back pain, particularly female students via simple exercise strategies. Hence, education is needed to give them help to manage their pain, like exercise booklets, pain management guidelines, or prevention methods from specialized healthcare workers. In addition, psychological and emotional support could be provided to reduce students' general anxiety and exam anxiety. Given that the Covid-19 pandemic will continue for a while, rehabilitation strategies including online communication, motivation, and physical activity support for students preparing for the exam can also be provided to help them overcome the negative impact during the challenging Covid-19 period. It is necessary to increase the number of studies aimed at eliminating the problems experienced by HS and high school graduate students by detecting and revealing the negative effects of a sedentary lifestyle due to the Covid-19 lockdown. Future studies including the evaluation of general anxiety, exam anxiety, and pain conditions of HS and high school graduate students should be designed to consider the menstrual cycle status in female students, and the computer-using time of students.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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