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Unveiling the Invisible Impact: Exploring Musculoskeletal Symptoms in Healthcare Students Post COVID-19 Infection. A Cross-Sectional Study in Jordan

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Abstract

Background and Aims: Recent studies found a lot of COVID-19 patients reporting persistent musculoskeletal symptoms after recovering from the acute infection. This study assessed musculoskeletal symptoms in young individuals in Jordan three months after mild to moderate COVID-19 infection, examining the impact of gender and other factors due to a lack of regional research on post-acute COVID-19 complications.

Materials and Methods: We conducted a cross-sectional study from November 2022 to December 2022, using an online questionnaire on Google Forms distributed to university healthcare students via social media. The questionnaire assessed demographics, COVID-19 symptoms including musculoskeletal symptoms, and their association with patient characteristics and disease course.

Results: 261 students, comprising 177 (67.8%) females and 84 (32.2%) males with a mean age of 21.41, participated in our research. 21.4% of our participants complained of at least one musculoskeletal symptom after the acute phase of COVID-19 infection, among which fatigue was the most common (71.6%) followed by headache (60.9%) and muscle pain (52.5%). Female gender was found to be significantly associated with a higher risk of developing musculoskeletal symptoms after the acute phase of COVID-19 infection.

Conclusion: The current study found that many young people who recovered from COVID-19 continue to experience musculoskeletal complaints, which could impact their daily activities and contribute to the burden of the disease. There is a higher prevalence of back pain and joint pain complaints in females, which requires further investigation. Cohort studies may help to better understand the relationship between COVID-19 and ongoing musculoskeletal problems.

Keywords: COVID-19, Long-COVID, Musculoskeletal symptoms, Post-acute COVID-19 syndrome, Young patients.

INTRODUCTION

COVID-19 is an emerging pandemic as declared by the World Health Organization on March 12, 2020 [1]. To date, 1.75 million cases have been diagnosed with COVID-19 in Jordan, with 772 million cases globally [2].

In addition to respiratory manifestations, COVID-19 also affects the nervous, and musculoskeletal system and leads to vascular inflammation resulting in a wide range of symptoms ranging from simple cough to avascular necrosis [3]. COVID-19 commonly causes musculoskeletal symptoms like myalgias, arthralgias, and fatigue. Inflammatory conditions like myositis can lead to weakness, tenderness, and mobility difficulties [4]. Other complications can include osteoporosis and avascular necrosis [5]. These musculoskeletal symptoms may occur in both mild and severe cases and can persist even after the virus has been cleared from the body.

Musculoskeletal symptoms affect work, daily activities, and mobility, especially in physically demanding jobs and livelihoods like healthcare workers and athletes. Tasks such as climbing stairs or getting in and out of the car become challenging. Mental health can be impacted as well leading to depression and reduced quality of life [3].

Limited research in Jordan and the Middle East on COVID-19 complications after a few months of the acute infection prompted this study. Our goal was to assess musculoskeletal symptoms in a younger population, 3 months post-acute infection, mainly with mild to moderate symptoms. Also, the study aimed to examine the impact of gender and other factors on the development of these symptoms.

MATERIALS AND METHODS

Study design

This was a cross-sectional study targeting undergraduate healthcare students at a government-supported university in Amman the capital of Jordan. An online Google Form questionnaire was distributed via social media platforms (Facebook, Instagram, Twitter). Informed consent was obtained before completing the questionnaire.

Sample

535 healthcare students (Medicine, Dentistry, Pharmacy, Nursing, and Rehabilitation Science) completed the questionnaire in 2 months (November 2022 and December 2022). The sample size was estimated using an online calculator (Calculator.net) for a population of nearly 10,000 students (2^{nd} to 6^{th} year) with a 50% population proportion, 5% margin of error, and 95% confidence interval.

Inclusion criteria

(a) Healthcare students (Medicine, Dentistry, Pharmacy, Nursing, and Rehabilitation Science) from 2^{nd} to 6^{th} year.

(b) Diagnosed with COVID-19 at least 3 months before the study (confirmed by PCR test).

Exclusion criteria

(a) Participants who were not infected with COVID-19 or whose infection was not confirmed by a PCR test (231 participants).

(b) Participants whose infection was less than 3 months before the study (9 participants).

(c) Participants who had any previous medical illness (34 participants).

(d) Participants who had undergone any surgical procedure (0 participants).

Ethical approval

The Institutional Review Board (IRB) approved the study (approval number: 10/2022/28261) in November 2022. Participation in the study was voluntary, with guarantees of anonymity and confidentiality. No personal information was collected. The

data collected was used for statistical purposes by the research team only.

Questionnaire

The questionnaire had short-answer and multiple-choice questions. Items included informed consent, sociodemographic details (age, gender, smoking status, height, weight, etc.) (Table 1), COVID-19-related information (Table 2), symptoms during infection including fever, cough, loss of appetite, abdominal pain, etc. (Table 3), and symptoms after infection including fatigue, headache, joint pain, muscle pain, etc. (Table 4).

Statistical analysis

Data were collected from Google Forms, transferred to Excel, and then analyzed in the Statistical Package for Social Sciences (SPSS) version 29. Descriptive analysis was used to show percentages, frequencies, means, and standard deviations. The categorical Chi-square test determined significance. Associations are reported as odds ratio (OR) with confidence interval (CI). All statistical tests were conducted with a 95% confidence interval and a 5% error margin. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Demographics

In our study, a total of 535 individuals completed the questionnaire. After applying the specified inclusion criteria, 261 participants qualified for inclusion in our analysis. Among these, 177 were female, representing 67.8% of the cohort, while 84 were male, making up the remaining 32.2%. The average age of the participants was 21.41 ± 2.04 years. Notably, the majority of the participants were medical students, constituting 71.6% of the sample.

When considering physical characteristics, the average height was 1.68 ± 0.09 meters, while the average weight was 67.38 ± 15.46 kilograms. These measurements resulted in a mean Body Mass Index (BMI) of 23.8 ± 4.0. Only 36 participants, accounting for 13.8% of the total sample, reported being smokers. (As depicted in Table 1).

Table 1. Demographics

Items		Frequency
Age		21.41 ± 2.04
Gender	Male	84 (32.2%)
	Female	177 (67.8%)
Faculty	Medicine	187 (71.6%)
	Dentistry	20 (7.7%)
	Nursing	15 (5.7%)
	Pharmacy	24 (9.2%)
	Rehabilitation sciences	15 (5.7%)
Current year of study	2nd	56 (21.5%)
	3rd	19 (7.3%)
	4th	82 (31.4%)
	5th	83 (31.8%)
	6th	21 (8.0%)
Are you a smoker	Yes	36 (13.8%)
	No	225 (86.2%)
Height (in meters)		1.68 ± 0.09
Weight (in kilograms)		67.38 ± 15.46
BMI (Mean ± SD)		23.8 ± 4.0
BMI interpretation	Non-Obese	239 (91.6%)
	Obese	22 (8.4%)

COVID-19 Patient Profile

All 261 participants, who were eligible for our analysis, had contracted COVID-19 a minimum of three months before our data collection. Among these participants, the year 2021 had the highest infection rate, with 118 individuals (45.2%) experiencing infection, followed by 2022, in which 84 participants (32.2%) were infected, and 2020, with 59 individuals (22.6%) reporting infections. Within our sample, the vast majority, a substantial 98.1%, had received a COVID-19 vaccine, with Pfizer-BioNTech being the most prevalent choice, administered to 62.5% of the participants. Furthermore, 199 participants, equating to 76.2% of the total sample, received two vaccine doses. (As outlined in Table 2).

Table 2. Participants' General Information Regarding COVID-19

Item		Frequency
When did you get infected?	2020	59 (22.6%)
	2021	118 (45.2%)
	2022	84 (32.2%)
Have you received any COVID-19 vaccine?	Yes	256 (98.1%)
	No	5 (1.9%)
Which COVID-19 vaccine have you received?	Pfizer-BioNTech	163 (62.5%)
	AstraZeneca	16 (6.1%)
	Johnson & Johnson	0 (0.0%)
	Moderna	1 (0.4%)
	Sinopharm	74 (28.4%)
	Sputnik V	2 (0.8%)
	None	5 (1.9%)
How many doses of the vaccine have you received?	1 Dose	5 (1.9%)
	2 Doses	199 (76.2%)
	3 Doses	52 (19.9%)
	None	5 (1.9%)

Symptoms During COVI-19 Infection

Among virus-infected participants, 36.8% had a moderate fever, 36.0% experienced moderate coughing, and 28.7% reported a moderate loss of appetite. Sore throat and muscle pain were moderately present in 30.3% and 25.3% of participants, respectively. However, symptoms like abdominal pain, nausea, diarrhea, shortness of breath, loss of smell, and loss of taste were less commonly reported among the infected individuals. (As outlined in Table 3.)

Table 3. The Severity of Symptoms During COVID-19 Infection

Item	None	Mild	Moderate	Severe	Very Severe
Fever	40 (15.3%)	67 (25.7%)	96 (36.8%)	49 (18.8%)	9 (3.4%)
Cough	34 (13.0%)	71 (27.2%)	94 (36.0%)	47 (18.0%)	15 (5.8%)
Lost my appetite	72 (27.6%)	60 (23.0%)	75 (28.7%)	46 (17.6%)	8 (3.1%)
Abdominal pain	153 (58.6%)	53 (20.3%)	40 (15.3%)	12 (4.6%)	3 (1.1%)
Nausea (Sickness)	108 (41.4%)	66 (25.3%)	46 (17.6%)	32 (12.3%)	9 (3.4%)
Diarrhea	163 (62.5%)	53 (20.3%)	29 (11.1%)	11 (4.2%)	5 (1.9%)
Sore throat	45 (17.2%)	59 (22.6%)	79 (30.3%)	54 (20.7%)	24 (9.2%)
Shortness of breath	93 (35.6%)	68 (26.1%)	54 (20.7%)	29 (11.1%)	17 (6.5%)
Loss of taste	101 (38.6%)	38 (14.6%)	46 (17.6%)	50 (19.2%)	26 (10.0%)
Loss of smell	91 (34.8%)	34 (13.0%)	51 (19.5%)	52 (19.9%)	33 (12.6%)
Joint pain	68 (26.0%)	57 (21.8%)	57 (21.8%)	43 (16.5%)	36 (13.8%)
Muscle pain	56 (21.4%)	61 (23.4%)	66 (25.3%)	48 (18.4%)	30 (11.5%)

Symptoms After COVID-19 Infection

After recovering from COVID-19, many participants remained symptom-free. Those with post-infection symptoms reported fatigue (71.6%) and headache (60.9%). Joint pain, muscle pain, neck pain, back pain, low back pain, hip pain, and leg pain were noted by various proportions (ranging from 26.8% to 52.5%). (As shown in Table 4.)

Table 4. The Severity of Symptoms After COVID-19 Infection

Item	None	Mild	Moderate	Severe	Very Severe
Fatigue (Tiredness)	74 (28.4%)	70 (26.8%)	63 (24.1%)	44 (16.9%)	10 (3.8%)
Headache	102 (39.1%)	65 (24.9%)	55 (21.1%)	32 (12.3%)	7 (2.7%)
Joint Pain	128 (49.0%)	51 (19.5%)	54 (20.7%)	21 (8.0%)	7 (2.8%)
Muscle Pain	124 (47.5%)	53 (20.3%)	53 (20.3%)	25 (9.6%)	6 (2.3%)
Neck Pain	163 (62.5%)	48 (18.4%)	31 (11.9%)	17 (6.5%)	2 (0.8%)
Back Pain	152 (58.2%)	51 (19.5%)	36 (13.8%)	16 (6.1%)	6 (2.3%)
Low Back Pain	156 (59.8%)	55 (21.1%)	32 (12.3%)	15 (5.7%)	3 (1.1%)
Hip Pain	191 (73.2%)	35 (13.4%)	22 (8.4%)	10 (3.8%)	3 (1.1%)
Leg Pain	178 (68.2%)	34 (13.0%)	27 (10.3%)	14 (5.4%)	8 (3.1%)
Bedridden due to Fatigue (Tiredness) After COVID-19 infection	166 (63.6%)	36 (13.8%)	40 (15.3%)	16 (6.1%)	3 (1.1%)
Bedridden due to Pain After COVID-19 infection	192 (73.6%)	37 (14.2%)	19 (7.3%)	10 (3.8%)	3 (1.1%)

A subset of participants (16.0%) experienced these symptoms for over three months, with 30.5% reporting widespread muscle pain and 21.4% experiencing widespread joint pain. Notably, a significant association between gender and joint pain was revealed by Pearson's chi-square test ($\chi^2 = 14.77$, *P-value = .039*).

Association between the presence of Symptoms and gender After COVID-19 infection

In the aftermath of the acute phase of infection, female respondents displayed a reduced likelihood of not reporting persistent joint pain (Odds Ratio [OR] = 0.576; *P-value = .039*; 95% Confidence Interval [CI]: 0.341 -0.974) and back pain (OR = 0.469; *P-value = .007*; 95% CI: 0.270 - 0.816) when compared to their male counterparts. (As shown in Table 5.)

DISCUSSION

Many studies have demonstrated that musculoskeletal symptoms can persist after the acute phase of infection, persisting for weeks and months, giving rise to a condition known as Long-COVID or Post-COVID-19 Syndrome [6, 7]. It is also remarkable that current studies mainly focus on musculoskeletal symptoms in severe cases of infection or in patients that require hospitalization without significant attention to milder cases of infection. Our current study aimed to investigate the prevalence of post-COVID musculoskeletal symptoms in a population of young adults, who are healthy and not known to have any musculoskeletal symptoms before, who had mild to moderate symptoms, and determine any associated factors.

Table 5. Association between the Presence of Symptoms and Gender After COVID-19 Infection

Symptoms		Gender		OR	95% Confidence interval for OR		*P-value*
		Female	Male		Lower Bound	Upper Bound	
Fatigue (Tiredness)	None	49 (18.8%)	25 (9.6%)	0.903	0.510	1.601	*.728*
	Present	128 (49.0%)	59 (22.6%)				
Headache	None	64 (24.5%)	38 (14.6%)	0.686	0.404	1.162	*.160*
	Present	113 (43.3%)	46 (17.6%)				
Joint pain	None	79 (30.3%)	49 (18.8%)	0.576	0.341	0.974	*.039*
	Present	98 (37.5%)	35 (13.4%)				
Muscle Pain	None	83 (31.8%)	41 (15.7%)	0.926	0.551	1.557	*.772*
	Present	94 (36.0%)	43 (16.5%)				
Neck pain	None	107 (41.0%)	56 (21.5%)	0.764	0.443	1.318	*.333*
	Present	70 (26.8%)	28 (10.7%)				
Back pain	None	93 (35.6%)	59 (22.6%)	0.469	0.270	0.816	*.007*
	Present	84 (32.2%)	25 (9.6%)				
Low Back pain	None	99 (37.9%)	57 (21.8%)	0.601	0.348	1.038	*.066*
	Present	78 (29.9%)	27 (10.3%)				
Hip pain	None	125 (47.9%)	66 (25.3%)	0.656	0.355	1.211	*.176*
	Present	52 (19.9%)	18 (6.9%)				
Leg Pain	None	118 (45.2%)	60 (23.0%)	0.800	0.454	1.411	*.440*
	Present	59 (22.6%)	24 (9.2%)				
Bedridden due to Fatigue (Tiredness) After COVID-19 infection	None	114 (43.7%)	52 (19.9%)	1.114	0.651	1.906	*.695*
	Present	63 (24.1%)	32 (12.3%)				
Bedridden due to Pain After COVID-19 infection	None	131 (50.2%)	61 (23.4%)	1.074	0.598	1.928	*.812*
	Present	46 (17.6%)	23 (8.8%)				

Musculoskeletal manifestations in viral illnesses, including chronic fatigue, have been attributed to the inflammatory immune response through various cytokines, particularly IL-6 and TNF-alpha [8]. The levels of these cytokines in both plasma and respiratory secretions have been directly correlated with the magnitude of severity in COVID-19-positive patients, particularly in patients with common comorbidities that may be further contributing to their increased inflammatory state [9, 10].

In this study, the majority of participants didn't report any symptoms after the acute phase of infection, however in those who did: fatigue (n=187, 71.6%), headache (n=159, 60.9%), muscle pain (n=137, 52.5%) and joint pain (n=133, 51.0%) were the most common symptoms to be reported regardless of their severity. These results align with existing research in the literature, which has also demonstrated the presence of these symptoms following the acute phase of COVID-19 infection, as reported in various studies [1, 3, 11 - 19].

While the majority of participants in our study didn't express any symptoms during or after the acute phase of the illness, it is important not to overlook those who did experience musculoskeletal symptoms

typically associated with COVID-19 infection or those that persisted after the acute infection. These symptoms can lead to a decline in physical activity, hinder daily living activities and work performance, and add to long-term depression, as these individuals are unable to lead pain-free lives.

In multiple studies, fatigue was the most prevalent symptom after the acute stage of infection. Carfi et al. found in their study that in patients who had recovered from COVID-19 after previous hospitalization, 87.4% reported persistence of at least 1 symptom, particularly fatigue, and dyspnea [13]. In a cross-sectional study by Azadvari et al. on Iranian patients, fatigue, headache, and muscle pain were found to be the most common symptoms after the acute stage of infection which was consistent with our study [11]. Also, Janbazi et al. followed 157 Iranian patients after discharge from hospital after post-COVID-19 infection, and found that 43 patients (27.4%) complained of chronic fatigue and muscle weakness 6 months after discharge, among them 40 patients (25.5%) were suspected to have chronic fatigue syndrome [3]. The participants' average age in these studies was 56.3 which is relatively high. This finding may suggest that chronic fatigue and muscle weakness, which the participants reported, could be related not only to COVID-19 but also to the aging process and its associated physiological changes. In contrast, our study focused solely on COVID-19 manifestations and excluded other causes of musculoskeletal pain. The mean age of our participants was 21.41, and all were healthy individuals.

This study holds a significant advantage over previous research as it focuses exclusively on young patients without comorbidities, enabling an investigation of the true impact of musculoskeletal symptoms following COVID-19 infection without the confounding influence of pre-existing health conditions. Through the careful selection of this healthy population, we were able to examine the prevalence and consequences of musculoskeletal symptoms solely attributed to the virus. This approach provides a clearer understanding of the direct effects and outcomes within a relatively healthy group, offering valuable insights that can guide targeted interventions, preventive measures, and personalized healthcare strategies tailored specifically for young patients with no comorbidities.

It is still not completely clear why chronic fatigue persists in some COVID-19 patients. However, most literature suggests that the long-term COVID-19 symptoms are associated with the coronavirus' ability to trigger a massive inflammatory response leading to the release of numerous cytokines that are suggested to cause all these symptoms [8]. Thus, it is important to study the cytokine response in patients who recover from COVID-19 to determine whether these pathophysiological changes are responsible for the persistence of symptoms in patients after the acute stage of infection.

In our study, we found headache (n=159, 60.9%) to be the second most prevalent symptom after the acute phase of infection. Headache was also described as one of the common persistent symptoms after the acute phase of infection in multiple articles [17 – 19].

One of these studies suggests that T-cell dysfunction may be the cause of headaches in Long COVID syndrome, which is similar to autoimmune diseases. This dysfunction may occur because the SARS-CoV-2 virus causes antigen-presenting cells to present antigens to auto-reactive T-cells through bystander activation. Surprisingly, COVID-19 patients

have demonstrated a 15-20% incidence of thyroid dysfunction, which is closely linked to T-cell-mediated autoimmunity.

Therefore, thyroid dysfunction may be a factor in the development of autoimmune symptoms in long COVID. Additionally, B-cells may also play a role in the autoimmune response seen in long COVID [19].

Muscle pain and joint pain are typically present in the early course of the disease and are common symptoms to persist after the acute stage of infection. The coronavirus' ability to induce systemic elevations of cytokines and signaling molecules has also been implicated in the musculoskeletal manifestations that present in long-term COVID-19. However, some recent studies suggest that the mechanism behind COVID-19 myalgia may vary from the cytokine storm seen in typical viral infections. With the elevation of lactate dehydrogenase and the absence of creatine kinase, one study suggests that COVID-19 myalgias may be enhanced through a novel mechanism related to muscle ischemia rather than cell death [1].

We found that muscle pain (n=137, 52.5%) and joint pain (n=133, 51.0%) were common persistent symptoms in our population. Karaarslan et al. reported that 40.6% of patients had myalgia at 3 months, and 15.1% of patients had myalgia at 6 months after hospitalization while 39.2% of patients had joint pain at 3 months and 18.6% had joint pain at 6 months, respectively [15]. Another study by Tuzun et al. reported that myalgia and arthralgia were quite common in COVID-19 cases, and they found that patients who had severe myalgia regardless of disease activity and muscle involvement seemed to be related to hypoxia leading to ischemic myalgia and physical fatigue [1]. Proper management and treatment of musculoskeletal symptoms with non-steroidal anti-inflammatory drugs (NSAIDs) and rehabilitation programs with physical therapy may help patients regain physical function and improve their overall quality of life.

Furthermore, we found that females were almost twice as likely to develop musculoskeletal symptoms such as joint pain and back pain within 3 months after the end of their infection.

In our study, we show that female respondents were less likely to not develop persistent joint pain (Odds Ratio [OR] = 0.576; *P-value = .039*; 95% Confidence Interval [CI]: 0.341 -0.974) as well as being less likely to not complain of persistent back pain (OR = 0.469; *P-value = .007*; 95% CI: 0.270 - 0.816) in comparison to male respondents within 3 months after the end of their infection. This is consistent with other studies that show an association between the female sex and the higher likelihood of developing musculoskeletal symptoms after the end of the acute stage of infection [3, 14, 15, 20 - 22].

It has been established in earlier studies that females usually mount stronger immune responses to viral infections and are also prone to many autoimmune and inflammatory pathologies, [23] and thus it has been suggested in the literature, that Long-COVID tends to follow the same pattern as those autoimmune and inflammatory pathologies and that it is possible that the increased prevalence in females may be due to a different immune system response during and after COVID-19.

Limitations

This study was subject to multiple limitations that are worth mentioning. First, since this was a cross-sectional study, we were unable to evaluate causal relationships. Second, this study relied on survey

respondents' self-report and might have been subject to incomplete recall or recall bias. Third, a larger sample size is required to determine a strong association between persistent musculoskeletal symptoms and COVID-19. Finally, around 67.8% of the participants were female, so it is also worth considering the biological differences between males and females in pain perception when interpreting the results of this study as females have a lower threshold of pain perception [24].

CONCLUSION

This study found that among young individuals who recovered from COVID-19, a substantial prevalence of ongoing musculoskeletal complaints was present. These musculoskeletal complaints could impair people's ability to function and be productive, adding to the COVID-19 burden. Our study has also established a link between the female sex and the increased prevalence of joint pain and back pain complaints after the acute phase of infection, which warrants further investigations to establish a cause for such an association. Cohort studies may also be useful for further assessing the relationship between COVID-19 and persisting musculoskeletal problems.

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Conflict of Interest Statement

The first author and all co-authors declare that there are no conflicts of interest.

Author Contributions Statement

Odai G. Bani Monia contributed to conceptualization, data curation, methodology, investigation, formal analysis, and original drafting review and editing of the work. Fadi Al-Hadidi contributed to conceptualization, supervision and original drafting review and editing of the work. Mohammad A. Abu Zalam, Bashar H. AlAmour, Ahmad R. Mohammad, Jehad F. AlSamhori, Leen W. AlTarifi, Jood S. AlHunaifat contributed to data curation, methodology, investigation, software, writing original draft. Jehad F. AlSamhori contributed to formal analysis and methodology. All authors gave final approval and agreed to be accountable for all aspects of work ensuring integrity and accuracy.

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كشف التأثير غير المرئي: استكشاف أعراض الجهاز العضلي الهيكلي لدى طلاب الرعاية الصحية بعد الإصابة بفيروس كورونا (كوفيد-19). دراسة مقطعية في الأردن

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الملخص

الخلفية والأهداف: وجدت الدراسات الحديثة أن العديد من مرضى كوفيد-19 يبلغون عن أعراض عضلية هيكلية مستمرة بعد التعافي من العدوى الحادة. قامت الدراسة بتقييم الأعراض العضلية الهيكلية في الأفراد الشباب في الأردن بعد ثلاثة أشهر من الإصابة بعدوى كوفيد-19 الخفيفة إلى المتوسطة، مع فحص تأثير الجنس وعوامل أخرى نظرًا لنقص الأبحاث الإقليمية حول مضاعفات ما بعد الحادة لكوفيد-19.

منهجية الدراسة: أجرينا دراسة مقطعية من نوفمبر 2022 إلى ديسمبر 2022، باستخدام استبيان عبر الإنترنت على نماذج جوجل تم توزيعه على طلاب الرعاية الصحية الجامعيين عبر وسائل التواصل الاجتماعي. قيم الاستبيان السمات الديموغرافية، أعراض كوفيد-19 بما في ذلك الأعراض العضلية الهيكلية، وعلاقتها بخصائص المرضى ومسار المرض.

النتائج: شارك في بحثنا 261 طالبًا، بما في ذلك 177 (67.8%) من الإناث و84 (32.2%) من الذكور بمتوسط عمر 21.41. اشتكى 21.4% من المشاركين لدينا من وجود عرض عضلي هيكلي واحد على الأقل بعد المرحلة الحادة من عدوى كوفيد-19، حيث كان التعب الأكثر شيوعًا (71.6%) يليه الصداع (60.9%) وألم العضلات (52.5%). وجد أن الجنس الأنثوي مرتبط بشكل كبير بخطر أعلى لتطوير الأعراض العضلية الهيكلية بعد المرحلة الحادة من عدوى كوفيد-19.

الاستنتاج: وجدت الدراسة أن العديد من الشباب الذين تعافوا من كوفيد-19 يستمرون في تجربة شكاوى عضلية هيكلية، والتي يمكن أن تؤثر على أنشطتهم اليومية وتساهم في عبء المرض. هناك انتشار أعلى لشكاوى ألم الظهر وألم المفاصل بين الإناث، مما يتطلب مزيدًا من التحقيق. قد تساعد الدراسات الطولية على فهم أفضل للعلاقة بين كوفيد-19 والمشاكل العضلية الهيكلية المستمرة.

الكلمات الدالة: كوفيد-19، متلازمة كوفيد الطويلة، الأعراض العضلية الهيكلية، متلازمة ما بعد الحادة لكوفيد-19، المرضى الشباب.