Research Paper

Investigating Psychic and Body Complications Caused by Inactivity Among Students of University During the COVID-19 Pandemic

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ABSTRACT

Objective: The level of mobility and general health has decreased among students in virtual classes during the COVID-19 pandemic. The present study aims to investigate the mental and physical complications caused by inactivity among the students of Farhangian University during virtual classes.

Methods: This was survey research with a cross-sectional design. The statistical population included all male and female students studying at Farhangian University of Mazandaran Province, Iran. According to the determination of the sample size based on the Morgan table, 475 students, consisting of 214 females and 261 males, were randomly selected as the statistical sample of the study. The research instruments include the international physical activity questionnaire, Saehan Caliper (SH5020), the Coopersmith self-esteem scale (1967), the Beck depression questionnaire, and the Nordic skeletal and muscular disorders questionnaire. To analyze the data, we used the independent sample t test to compare the two groups. All analyses were conducted using the SPSS software, version 24.

Results: The research findings showed that the average weekly activity level among women was 634±281 MET/min, and the average weekly activity level among men was 472 ±231 MET/min. In terms of fat percentage by gender, men's average fat percentage was 21.47%±4.74%, and women's average fat percentage was 31.55%±4.37%. Meanwhile, the self-esteem scores of male and female students were obtained at 29.72 and 29.43, respectively. The difference between the two was considered significant as $P<0.05$. In addition to these findings, the correlation between self-esteem and activity level was +0.41. On the other hand, 25(67%) female students and 12(32%) male students suffered from high depression.

Conclusion: Concerning students' skeletal-muscular disorders, findings proved that both genders suffered from physical complications during virtual classes. This study suggests increasing the level of physical activity to reduce body fat mass, increase mental health, and reduce skeletal disorders, which can be properly accomplished through university planning and prioritizing the health of male and female students.

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Highlights

• The self-confidence level of male students was higher than that of female students during COVID-19.2.

• The fat percentage of female students was higher than that of male students during COVID-19.3.

• Regarding the amount of skeletal-muscular disorders of the students, the findings showed that the highest frequency of pain, discomfort and numbness in the upper limbs of all students was more than the lower limbs

Plain Language Summary

Determining the prevalence and pattern of mental disorders and musculoskeletal pain is the first step in the prevention, diagnosis, and treatment of such disorders, even though a targeted and reliable study in this field has not been conducted during the COVID-19 pandemic when students had to use the virtual space for classrooms instead of physically attending the class. Therefore, through this research results, appropriate solutions and detailed plans can be devised to alleviate the mental and physical complications of students.

1. Introduction

Industrial development, the upsetting situation of the COVID-19 pandemic, virtual classes, and life mechanization have majorly affected individuals' lifestyles and have brought sedentary lifestyles to societies (Nayak et al., 2022). This inactivity in students, as the active class of future society, can cause structural and strategic problems for any country (Yang et al., 2022). Therefore, inactivity should be considered a serious problem for the future of a country (Montero-Simó et al, 2022). The role of comprehensive education is to provide education for all humanistic dimensions, which includes the intellectual aspect of the individual along with all psychological and physical aspects (Yuan et al., 2022). This type of comprehensive and inclusive education is beneficial for educational environments, such as universities and colleges (Demchenko et al., 2021). Today, to better adapt to the surrounding environment, individuals in society require a balance of physical readiness and body composition (Mazza et al., 2020), and if they do not have favorable conditions in terms of physical condition and body composition, they usually become aloof, pessimistic, and isolated. In other words, these individuals will not have proper mental balance (Izquierdo, 2005). Obesity is a chronic condition that occurs as a result of intervention in individuals' genetics or their environment, which is affected by society, culture, psychological, metabolic, biochemical, and genetic conditions (Kim et al., 2021). Findings have demonstrated that male students living in urban areas are more likely to be obese (39.4%) compared to male students who live in the suburbs (35.5%). Likewise, 20.6% of urban female students were exposed to obesity compared to suburban females (19.1%). The increasing prevalence of obesity and overweight among children and adults in the United States of America is a warning for doctors and public health officials (Halpern et al., 2021). In different countries, obesity is probably caused by a decrease in physical activity and an inappropriate lifestyle. High levels of health and hygienic indices and physical capabilities reflect the health and potentialities of a society (Wang et al., 2021). It has been well proven that the level of physical activity begins to decrease during adulthood and with age which is associated with weight gain. The evidence that proves the relationship between physical activity in childhood and adolescence and inactivity in individuals in the form of longitudinal studies is rare or does not exist at all. A longitudinal study of 5700 men and women found a link between childhood activity and obesity in adulthood. Those individuals who do not engage in sports activities and then become overweight may be genetically predisposed to this factor because both physical activity and body size are affected by genetic factors (Chaput et al., 2020). In the last few years, inactivity has become widespread in a way that since the 1990s, it has been proposed as one of the main factors of death because of cardiovascular diseases (Ralapanawa & Sivakanesan, 2021). Those individuals who have done intense physical activity enjoy better health conditions compared to individuals with moderate and light activities (Rosenberger et al., 2019). Studies on the level of inactivity and public health have shown that the increase in inactivity is associated with an increase in obesity, as well as a decrease in physical activity with a decrease in general health (McCoy & Morgan, 2020). Research related

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to the level of mobility in a different stratum of society has progressed such that the effect of the education level on food intake, obesity, and other health risk factors (mobility level) has changed over time (Su et al., 2022). Additionally, regular physical activity leads to an increase in physical readiness, and a significant relationship exists between high physical readiness and high self-esteem (Reddy et al., 2021). Some researchers have shown that yoga practice and physical exercises strongly influence individuals' personalities, coping skills, and cognitive performance (Farhang et al., 2022; Pascoe et al., 2021; Sinha & Kumari, 2022). Compared to other groups, Yoga practitioners had higher "Sattva Guna" (balance feature) and preferentially, employed brain regions associated with self-regulation and inhibitory control. Also, other researchers have stated that physical activity is essential for children's current and future health, though most of them do not do 60 min of moderate to intense daily physical activity (Ito et al, 2021; Tandon et al., 2021).

Programs related to physical activity are among the most common ways to increase self-esteem (Mazereel et al., 2021). In addition, compared to complex and heavy activities, simple activities, such as aerobic sports, have the greatest effect on self-esteem (Ryan, 2008). It has been proved that low self-esteem is related to depression, low mental health, and less progress in education (Sánchez-SanSegundo et al., 2022). Self-esteem is related to dissatisfaction with body image in obese individuals who follow weight loss diets (Chang & Kim, 2022). It has been well proven that a decrease in individuals' self-esteem is related to a decrease in their general health level (Hajek & König, 2019). The relationship between self-esteem and obesity has not been well-proven yet (Fields et al., 2021). Although challenges related to self-esteem have significant results on an individual's health, because of incomplete results, it is difficult to argue that low self-esteem is a consequence rather than a cause (Bleidorn & Schwaba, 2018). The decrease in muscle volume and general excessive thinness caused by lack of movement endangers the health of the body's skeleton (Jestratijevic et al., 2022). As a result of excessive muscle wasting, the trunk cannot perform its functions in maintaining the body and preserving its natural alignment, thereby resulting in bad standing, bad sitting situations, and overall wrong movement habits (Wijngaarde et al., 2020). This makes the spine and chest unable to grow normally and remain in a normal state. In addition to the ugliness and deformity of the body, the unnatural curvature of these organs causes the blood flow and breathing to be performed improperly and unnaturally (Hast & Garrison, 2000).

The most important consequences of a lack of movement are illness and reduction of muscle volume and strength (Bonnet et al., 2019). The above items are related to each other and a direct relationship exists between the two factors of muscle cross-section and the amount of power that a muscle can generate. On the other hand, maintaining the skeletal balance of the body is the responsibility of the muscles, especially the amount of strength and power of each muscle. Those individuals who do not have enough physical preparation (readiness), get tired sooner during physical activities. Muscle fatigue in the body will naturally reduce the physical ability and the power level that the muscle can represent during working situations (Blocquiaux et al., 2020). In other words, working with tired muscles is the same as working with weak muscles, and the adverse effects that occur as a result of muscle weakness in a person are also similar to those of working in extreme fatigue conditions. Fatigue and posture may have a cause-and-effect relationship. In this way, the presence of fatigue caused by other factors, such as physical activities in the body, can be influential in disrupting the balance of an appropriate posture. On the other hand, the lack of a proper body posture is a reason for causing more fatigue; the more the body size is out of proportion and balance, the more energy is required to keep it straight because the muscles related to the way the body is positioned to maintain its balance have less mechanical merit. On the other hand, these muscles should be involved in activities that will cause body fatigue (Gaudiino & Di Stefano, 2021). If the child's daily activity is less than normal, the weight of other parts of their body will gradually decrease and the weight and volume of the subcutaneous fat tissue will increase, eventually leading to the child's obesity. Because subcutaneous fat does not equally accumulate in all parts, and in some parts, such as around the abdomen, hips, and the middle part of the body is more than the organs (arms and legs), the child's body position becomes abnormal (Lemaitre et al., 2021).

According to the reports of the Centers for Disease Control and Prevention in 2018, a total of 29% of school students did not pay attention to physical education classes (Brustio et al., 2018). Meanwhile, another study stated that students with daily physical activity demonstrate higher academic performance (Páez-Maldonado et al., 2020). Physical activity is a behavior that has many proven health benefits, along with being one of the most effective ways to prevent chronic diseases, such as coronary heart disease and diabetes (Speelman et al., 2011).

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This study aims to determine the frequency and complications (mental and physical) caused by inactivity in students of Farhangian University during virtual classes. The main objective is to measure the level of physical activity and the effects of inactivity on mental and physical factors among students studying at Farhangian University of Mazandaran Province, Iran.

2. Materials and Methods

This was a survey study with a cross-sectional design. The statistical population includes all male and female students studying at Farhangian University of Mazandaran Province, Iran. The students were selected randomly and clustered in a way that initially the campuses of Mazandaran Province were divided based on the city and their population, and then students of the cities were randomly selected. The number of samples was selected based on the population; therefore, more samples were allocated to campuses with larger populations. In the following, based on the statistics received from Farhangian University of Mazandaran Province, Iran, according to the sample size based on the Morgan table, a total of 475 students consisting of 214 females and 261 males were randomly selected as the statistical sample of the research.

Research instruments

Amount of physical activity

After obtaining the informed consent letter, the amount of physical activity was calculated using the international physical activity questionnaire (IPAQ) (Craig et al., 2003). In this questionnaire, the physical activities performed by the subjects during the last week were asked, and activities performed for more than 10 min were recorded. These activities included job activities, moving manner, doing household chores, and leisure activities. This questionnaire asks about the amount of intense and moderate physical activity and walking during the last week. According to the scoring protocol of the IPAQ questionnaire, the amount of physical activity of a person can be extracted and reported in two ways as follows:

The total amount of physical activity of the individual during the last week in terms of met-min/week

MET (Tan et al., 2021) is a unit used to estimate energy consumption as a result of physical activity. The value of one MET is approximately equal to the amount of energy consumed by a person at rest. All physical activities can be classified as multiples of the amount of energy consumption in a resting state. In this questionnaire, 3.3 METs are considered for walking, 4 METs for moderate physical activity, and 8 METs for intense physical activity. To calculate the total amount of physical activity in a week, the amount of walking (MET×min×day) should be added together with the amount of moderate physical activity (MET×min×day) and the amount of intense physical activity (MET×min×day) in the last week.

Classification of individuals' physical activity in three levels: Low, medium, and high

High physical activity means an individual has intense physical activity at least 3 days a week and a total of at least 1500 MET-min, or they do any combination of intense, moderate, walking activities for 7 or more days, with a total of at least 3000 MET-min per week. Moderate physical activity means an individual has at least 20 min of intense physical activity 3 days a week or more, or 5 days or more per week, the individual has at least 30 min of intense or moderate activity or walking. Low physical activity means an individual does not report any activity or the reported physical activities do not meet the criteria of high or moderate physical activity (Fogelholm et al., 2006). In the present study, after conducting preliminary studies on the necessity of researching 2 categories of low and moderate activity intensity, the high physical activity category of the intended samples was disregarded; therefore, the category of high activity level was excluded from the study, and the current study was based on the level of activity and the percentage of body fat, as well as the level of self-esteem of two classes with a low and moderate level of physical activity.

To determine the validity of the questionnaire, we used the content validity method. The reliability was measured by the test-retest method, and the correlation coefficient was obtained at 0.62 for the awareness and attitude section and 0.74 for the performance section (Moghaddam et al., 2012).

Fat percentage

The participants' fat percentage was measured with a Saehan (SH5020) fat meter (caliper) made in England at 3 points of the body (men: Chest, thighs, and abdomen; women: Triceps, upper arms, and thighs) (Onsori & Galedari, 2015). To increase the reliability of the subcutaneous fat measurement process, each body part was measured 3 times with a specific time interval and all measurements were performed on the right side of the body (Soltani et al., 2018). To determine the fat percentage of the subjects, the measured values were put into Jackson Pollock's fat measurement formula and the fat

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percentage was calculated. The standing height of the participants was measured using the height meter model 216 (SECA). For this purpose, the subjects stood in a manner that the rear part of their shoulders touched the height-measuring device. They kept their hands next to their body and close to their feet. The weight of each person was measured using a SECA model scale.

Coopersmith self-esteem questionnaire-short form

The Coppersmith self-esteem scale (1967) (Morrison et al., 1973) is a 58-item self-report, pencil-paper questionnaire, and 8 items are lie-detectors while the other 50 items are divided into 4 subscales, namely general self-esteem, social self-esteem, family self-esteem, and educational self-esteem. The purpose of this questionnaire is to evaluate students' self-esteem. This test has different forms. The original test was primarily designed for 8–15-year-old subjects (form A, or school form); however, a later revision was designed for subjects over 16 years of age (form C, or adult form). Some items were rewritten to adapt the original form for adults' use (form C; for instance, children were replaced with individuals, and schools with work). In addition, a short form of the test (form B, Coopersmith, 1987) exists which includes 25 items and is extracted from the 50-item scale. Coopersmith designed this form as an alternative for limited times. The reliability coefficient of this test is reported at 0.77. The Coopersmith self-esteem scale is standardized in Iran (Narimani & Mousazadeh, 2010).

Depression scale

The Beck depression questionnaire was first developed by Beck et al. in 1961 (Jackson-Koku, 2016). In 1996, Beck et al. made a major revision to cover a wider range of symptoms and provided more consistency with the diagnostic criteria for depressive disorders in DSM-IV. The Beck depression questionnaire is a type of self-assessment test and can be completed in 5 to 10 min. The test consists of a total of 21 items related to different symptoms, in which the participants must answer on a 4-point scale from 0 to 3. These articles cover various areas, such as sadness, pessimism, feelings of incapability and failure, guilt, sleep disturbances, loss of appetite, self-loathing, and so on. Accordingly, 2 items are devoted to emotion, 11 items to cognition, 2 items to overt behaviors, 5 items to physical signs, and 1 item to interpersonal semiotics. Thus, this scale determines different degrees of depression from mild to very severe, and its scores range from a minimum of 0 to a maximum of 63. The Cronbach α coefficient of this questionnaire was reported at 0.84 (Farshchi et al., 2018).

Musculoskeletal disorders

To examine skeletal-muscular ailments by the doctor, the Nordic questionnaire was employed. This tool is a standardized questionnaire for examining disorders and diseases caused by working and daily affairs (López-Aragón et al., 2017). The reliability of this scale has been reported at 0.73 using the Cronbach α method (Namnik et al., 2016).

Data analysis

To analyze the data, the independent sample t-test statistical method was applied to compare the two groups. All analyses were carried out using the SPSS software, version 24.

3. Results

According to the research findings (Table 1) and the ratio of male and female students at Farhangian University of Mazandaran Province, Iran, 59% of the participants were male and 41% were female. The findings of this study showed that 348(73%) students had low physical activity and 127(27%) had sufficient physical activity.

Table 1. Demographic characteristics of participants

Attributes	Mean±SD		
	Male Students	Female Students	Total
Age (y)	20.47±4.32	20.67±3.94	22.27±3.64
Height (cm)	172.19±4.25	163.57±4.64	169±3.98
Weight (kg)	70.14±8.25	59.91±8.32	66.86±7.61
Body mass index (kg/m²)	21.64±1.26	22.13±1.38	21.76±1.44

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Table 2. Comparison of body fat percentage of male and female students based on their activity level

Gender	Activity	Fat Percentage		t
		Mean±SD	No.	
Male	Active	20.19±4.62	71	2.14
	Inactive	21.54±4.43	190	
	Total	21.47±4.74	261	
Female	Active	30.15±4.43	52	2.52
	Inactive	31.64±4.18	162	
	Total	31.55±4.37	214	

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Also, among 348(73%) sedentary students, 138(40%) were women while 210 (60%) were men. On the other hand, among 127(27%) students with sufficient mobility, 109(85%) were men and 18(15%) were women.

Also, the research findings from examination regarding the pervasiveness of obesity in students showed that the average fat percentage of the subjects was 25.19%±7.44%, while in terms of gender, the average fat percentage of men was obtained at 21.47±4.74% and the average fat percentage of women was reported at 31.55±4.37%. This difference between men and women is considered significant with $P<0.05$. Also, the average level of physical activity of all students was 578±284 Met/min. The present study showed that the average weekly activity level among women was 634 Met/min with a standard deviation of ±281 while the average weekly activity level among men was 472 Met/min with a standard deviation of ±231. In addition to these findings, the correlation between fat mass percentage and activity level was -0.78 (Table 2).

Also, regarding students' level of self-esteem, our findings confirmed that 356(74%) of all male and female students had high self-esteem, and 119(26%) of them had low self-esteem. Among this 74%, the share of female students was 164(46%) and the share of male participants was 192 (54%). On the other hand, among those who had low self-esteem, female students accounted for 52(42%) and male participants accounted for 69 (58%). However, no significant difference was found between the level of activity and self-esteem. Information regarding students' level of activity and their self-esteem is provided in Table 3.

Accordingly, the total self-esteem of the participants was 28.6±5.7. The average score of the students with high self-esteem was 30 and the average score of the students with low self-esteem was 21. Also, the self-es-

Table 3. Comparison of self-esteem of male and female students based on their activity level

Gender	Activity	Self-esteem		t
		Mean±SD	No.	
Male	Active	30.82±5.47	192	1.78
	Inactive	29.45±5.16	69	
	Total	29.72±4.37	261	
Female	Active	29.46±6.46	164	1.27
	Inactive	28.48±6.37	50	
	Total	29.43±6.52	214	

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Table 4. Comparison of the level of depression of male and female students based on their activity level

Gender	Activity	Depression		t
		Mean±SD	No.	
Male	Active	20.64±6.31	192	2.48
	Inactive	27.39±6.29	69	
	Total	25.71±6.43	261	
Female	Active	20.52±5.67	164	2.04
	Inactive	29.61±6.44	50	
	Total	25.65±6.30	214	

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teem scores of male and female students were obtained at 29.72 and 29.43, respectively. The difference between the two was considered significant as P<0.05. In addition, the findings suggested that the correlation between self-esteem and activity level was +0.41.

Also, regarding the level of depression among students, the findings demonstrated that 438(82%) of all male and female students had low depression and 37(18%) of them had high depression. Among this 82%, the share of female students was 203(45%) participants and the share of male individuals was 236(55%). On the other hand, female students accounted for 25(67%) and male subjects accounted for 12(32%) of high depression. However, no significant difference was found between the level of activity and depression. Table 4 provides information about the level of activity and self-esteem of students.

According to Table 5, regarding musculoskeletal disorders of the students, the findings indicate that the highest frequency of pain, discomfort, and numbness in the last 12 months in active male students were related to wrists and hands (n=17), in the last 7 days related to back (n=16), and the most skeletal pain that made them stop physical activity in the last 12 months was a pain in the knees (n=21). In addition, in sedentary male students, the highest frequency of pain, discomfort, and numbness in the last 12 months was related to the back (n=42), during the last 7 days related to the thigh (n=64), and the most skeletal pain made them stop physical activity in the last 12 months was due to back pain (n=74).

In contrast, in female students, the highest frequency of pain, discomfort, and numbness in the past 12 months in active female students were related to the neck (n=15), in the last 7 days related to the wrists and hands (n=22), and the most skeletal pain that in the last 12 months made them quit physical activity was related to shoulder pain (n=31). Also, in sedentary female students, the highest prevalence of pain, discomfort, and numbness in the last 12 months was related to the back (n=72), during the last 7 days related to the shoulders (n=103), and the most skeletal pain in the last 12 months that caused them to quit physical activity was related to back pain (n=108).

4. Discussion

The present study aimed to investigate the mental and physical complications caused by inactivity among the students of Farhangian University during virtual classes as a result of the COVID-19 pandemic. Determining the prevalence and pattern of mental disorders and musculoskeletal pain is the first step in the prevention, diagnosis, and treatment of such disorders, even though a targeted and reliable study in this field has not been conducted during the COVID-19 pandemic when students had to use the virtual space for classrooms instead of physically attending the class. Therefore, through this research results, appropriate solutions and detailed plans can be devised to alleviate the mental and physical complications of students.

The results of this study suggest that the prevalence of inactivity among students is high, and about 73% of all individuals did not participate in any of the intense and moderate activities, while in other countries, such as Saudi Arabia, the prevalence of physical inactivity comprises more than 43% of society (Al-Hazzaa, 2007). In the United States, the prevalence of overweight is 36% and obesity is 21% (Davis & Gergen, 1994; Gordon-Larsen, 2001). This amount is reported at 18% (Ramos de Marins, 2001) in Ireland and 33% (McCarthy et al, 2002) in Brazil. Also, the present findings showed that female students had less physical activity (73%) compared to male students (51%).

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Table 5. Comparing the degree of musculoskeletal disorders of male and female students based on their activity level

Gender	Activity	Type of Disorder	Neck	Shoulders	Number of People With Skeletal and Muscular Disorders						Feet
					Elbow	Wrists and hands	Back	Waist	Leg	Knees	
Male students	Active	Pain, discomfort, and numbness during the past 12 months	2	5	2	17	15	11	2	8	9
		Pain, discomfort, and numbness during the past 7 days	5	14	15	14	16	14	10	2	3
		Absence of daily activities during the past 12 months	5	14	11	11	9	5	17	21	14
	Inactive	Pain, discomfort, and numbness during the past 12 months	24	17	25	32	16	42	17	24	34
		Pain, discomfort, and numbness during the past 7 days	21	30	12	51	41	38	64	51	63
		Absence of daily activities during the past 12 months	52	42	47	32	74	42	24	31	20
Female students	Active	Pain, discomfort, and numbness during the past 12 months	15	10	12	6	8	10	14	12	9
		Pain, discomfort, and numbness during the past 7 days	3	14	15	22	12	17	11	13	10
		Absence of daily activities during the past 12 months	21	31	12	18	20	14	17	18	22
	Inactive	Pain, discomfort, and numbness during the past 12 months	61	25	47	29	72	62	71	53	37
		Pain, discomfort, and numbness during the past 7 days	37	103	62	89	16	42	37	89	62
		Absence of daily activities during the past 12 months	81	62	37	54	64	108	82	39	49

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Male students demonstrated more physical activity at all levels compared to female participants. Regarding the number of female students to male students, the current research results indicated that the activity level of female students was much lower than male students, which could be because of the COVID-19 period, social restrictions, and more closure of sports clubs for girls. On the other hand, the lack of physical activity facilities for both male and female students had a significant impact on their lack of exercise.

Furthermore, researchers have stated that highly- educated individuals have a low level of activity, while other researchers (Lewis, 2005) have shown that the amount of physical activity decreases in those with low education. Moreover, based on a study (Hajian-Tilaki & Heidari, 2007), no significant relationship was found between physical activities and education levels, which is consistent with the study of other researchers (Trockel, Barnes, & Egget, 2000; Wilsgaard et al., 2005). Meanwhile, the average level of physical activity in this study showed a significant difference between the level of physical activity of men and women, i.e. men who participated in this study had a higher level of physical activity compared to women. Moreover, during the last 3 decades, a significant increase in obesity among children and adults has been observed (Carter et al., 2011). This issue has spread to the point that with the increase in individuals' education level, their body fat percentage increases as well (Marmot, 2003). Simultaneously, other researchers have reported results contrary to this finding (Morrill et al., 1991). In the present study, educated subjects did not have a very high amount of fat mass. The prevalence of obesity in Venezuela is 74% for men and 56% for women (Campos et al., 2003), which is consistent with the results of this study regarding the difference between women's and men's levels of physical

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activity. However, this rate in Palestine is 48% for men and 65% for women (Campos et al., 2003), which shows contradictory results to our findings. According to all the findings, the present study showed that the difference in fat mass between sedentary and sufficiently active participants was significant. This means that sedentary subjects had a higher fat mass. Another research has shown that the low participation of individuals in educational programs is related to a decrease in their self-esteem, demonstrating a positive correlation (Suss et al., 1996).

Accordingly, by reducing study hours, students' self-esteem decreases. This is in line with the results of the present study because the students of Farhangian University had high self-esteem. Therefore, it can be concluded that an individual's level of self-esteem probably increases with the increase in their education level. Moreover, no significant relationship was observed between the level of activity and high/low self-esteem which means that both low-activity and sufficiently active groups showed high self-esteem scores. In this regard, other research findings found a significant relationship between self-esteem and obesity (French et al., 1995), which is consistent with the findings of our study. In contrast to these results, another study proved that obese women had lower self-esteem (Pesa, Syre, & Jones, 2000). This could be because by the increase in weight, the amount of mobility reduces and the individual will have fewer social connections and less participation in daily activities, thereby possibly reducing their self-esteem. According to the present study, given the high educational level among the participants and their status at high social and cultural levels, low mobility could not impact their self-esteem. Based on the results (Scherrer & Preckel, 2019), self-esteem does not change significantly with changes in the amount of fat mass because no statistically significant difference exists between sedentary and physically active students in their body fat mass. However, in the opposite claim (Anderson et al., 2006; Davis & Gergen, 1994; Guinn, Semper, Jorgensen, & Skaggs, 1997; Wang et al., 2009), researchers have shown an inverse relationship between individuals' body weight and self-esteem; that is, with a decrease in body weight, the amount of self-esteem increases, and with an increase in body weight, self-esteem decreases. On the other hand, other scientists (Childress et al., 1993) claimed that the level of self-esteem among overweight children was significantly lower than their normal counterparts, which is not consistent with the findings of this study as a significant difference was not observed between the amount of fat mass as well as the activity level with the level of self-esteem. The reason for this difference could be attributed to the age differences between children and adults.

Concerning the level of depression of Farhangian University students, the findings showed that the level of depression of female students during the COVID-19 pandemic and virtual classes was higher compared to male subjects, but this was relatively small and it can be expected that with the increase of psychological and counseling interventions, the case would be reduced. On the other hand, no significant difference was found between the level of activity and depression.

Also, regarding the degree of the musculoskeletal disorders of the students, findings suggested that among active male students, the highest frequency of pain, discomfort, and numbness in the last 12 months were related to the wrists and hands (n=17), in the last 7 days related to back (n=16), and the most skeletal pain that caused them to stop their physical activity in the last 12 months was the pain in their knees (n=21). Also, in sedentary male students, the highest prevalence of pain, discomfort, and numbness in the last 12 months was related to the back (n=42) and in the last 7 days, it was related to the thigh (n=64); meanwhile, the most skeletal pain in the last 12 months which made them quit physical activity was related to back pain (n=74). On the other hand, in female students, the highest prevalence of pain, discomfort, and numbness in the past 12 months was related to the neck (n=15) and during the last 7 days, it was related to wrists and hands (n=22); additionally, the most skeletal pain that caused them to leave physical activity in the last 12 months was related to shoulder pain (n=31). Also, in sedentary female students, the highest frequency of pain, discomfort, and numbness in the last 12 months was related to the back (n=72), and in the last 7 days, it was related to the shoulders (n=103); also, the most skeletal pain in the last 12 months which made them quit physical activity was related to back pain (n=108).

The findings of this study are similar to the global statistics of the COVID-19 pandemic and its impact on individuals' physical and mental factors. The complications caused by the COVID-19 pandemic, as a result of the presence of the students in person, can have negative effects on students. Therefore, it can be concluded that even students and their level of understanding of the benefits of physical activity cannot prevent their mental and physical problems. It is expected that students who use modern scientific resources and are relatively aware of the dangers of obesity and inactivity are not exposed to such injuries; however, in practice, during virtual classes, students of Farhangian University were not sufficiently active. As a result, physical and mental complications were observed among this population. Also, the results related to the degree of psychological factors (self-esteem and depression) showed that in terms of

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mental health, both female and male students were not in satisfactory condition due to a lack of training and other related factors. Hence, during the COVID-19 pandemic, given the health restrictions and government policies regarding quarantines and the pandemic, and on the other hand, virtual classes and using communication devices for attending class, students did not have enough time for exercise. Students did not enjoy physical activity because physical activity was not a priority for students of Farhangian University during the COVID-19 pandemic.

This study suggests increasing the level of physical activity to reduce body fat mass, enhance mental health, and reduce skeletal disorders, which can be properly accomplished through organized university planning and prioritizing the health of male and female students.

Ethical Considerations

Compliance with ethical guidelines

All methods were carried out following relevant guidelines and regulations, also all experimental protocols were approved by the Ethics Committee of the non-interventional, non-pharmaceutical clinical research of Farhangian University on April eleventh, 2022. The study procedures were explained to the participants and informed consent was obtained from all subjects and their parents before starting the study.

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Authors' contributions

Conceptualization, data curation, investigation, methodology, resources, supervision, validation, visualization, and writing (reviewing and editing): The both authors; Project administration, resources and validation: Morteza Homayounnia Firouzjah.

Conflict of interest

The authors declare no conflict of interest.

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