

The Effects of the COVID-19 on the Motor Skills and Psychological State of Female Students

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The study aimed to examine the motor skills and psychological state of female students attending pedagogical faculties in Serbia after COVID-19. The study included 108 students, and relied on the theoretical method analysis and survey technique. The results showed that most respondents managed the disease well, which in their opinion affected their motor skills and/or mental health either very little or not at all. In addition, most of the respondents consider their motor skills to have returned to the level they were at prior to their contracting the disease after 4–5 weeks. However, 9% of the respondents think that they have not recovered their muscle strength and endurance one year later. In addition, 21% of the respondents believe they do not have the same level of energy, and that they become fatigued more quickly and more often. The possibility of greater effects on mental health is indicated by the responses of 15% of the respondents who found the period of time they were ill to be very stressful, and that it was followed by problems with concentration and motivation for a long time. In addition to the aforementioned effects, the respondents cite feeling completely helpless, feeling fear of once again contracting the disease, and feeling a decreased desire to socialize after contracting the disease. The results for the specific sample of female students indicate the need for continued work with psychological counsellors, so that the female students may receive psychological support in difficult situations.

Keywords: COVID-19, motor skills, psychological state

Introduction

The COVID-19 virus causes a disease whose symptoms include fever, coughing, breathing problems, cardiovascular problems, and can even result in

death (Witoto 2020). The disease itself is a complex disorder which can damage the lungs, the cardiovascular system, cause muscle weakness and lead to other disorders. Immobilization due to the disease and physical inactivity due to long-term isolation can also affect the motor status of those who have been infected (Woods et al. 2020). Long-term inactivity can cause loss of aerobic endurance (VO_{2max}) of up to 7%, a decrease in musculoskeletal and cognitive abilities, an increase in peripheral insulin resistance, and changes in the lipolysis of fat tissue and the function of mitochondria (Hamilton 2018; Bowden Davies et al. 2019). The lack of muscle contractions is the main cause of muscle atrophy, along with a loss of muscle mass of up to 4% in 14 days among younger individuals (Bowden Davies et al. 2019). Long-term inactivity not only reduces the size of the muscle fibres, but also affects the quality and function of the muscles (Arc-Chagnaud et al. 2020).

In addition to the aforementioned effects, pandemic diseases can also have significant psychological effects. An important factor in their emergence is the isolation people go through, a decrease in social activity, and separation from one's family (Brooks et al. 2020). The period of isolation causes a decrease in social and physical contact, which might lead to mood swings, a decrease in the motivation to study, and cause mental health issues such as anxiety, stress, and depression (Brooks et al. 2020; Wong et al. 2005), anhedonia, a lack of energy, and insomnia (World Health Organization 2017).

The World Health Organization (World Health Organization 2004, 12) defines mental health as a state of well-being and effective functioning in which an individual realizes their own abilities, is resilient to the stresses of life, and is able to make a positive contribution to their community. Research has shown that women are a more vulnerable group since the symptoms of depression are twice as high among women than among men (Salk, Hyde, and Abramson 2017). It is believed that this is the effect of the structure of a society dominated by men, but that the causes can be genetic, ecological, hormonal, and neurobiological in nature (Jalnapurkar, Allen, and Pigott 2018). Post-traumatic stress which emerges after physical and mental trauma causes an intense sense of fear and helplessness (Lee et al. 2018). Fear and helplessness during a pandemic which abounds in various unfavourable situations, combined with the aforementioned predispositions, could cause more mental health problems among women, including a high level of depression, anxiety, and symptoms of stress (Hawryluck et al. 2004; Lee et al. 2018). A study in which an online survey was used on three different occasions to interview almost 25,000 student athletes of both genders and all races during the COVID-19 pandemic indicated that there had been a de-

Table 1 The Results of a Study on the Impact of the COVID-19 Pandemic on the Psychological State of Young Women

Item	Percentage
I felt overwhelmed with problems because of everything I had to endure	51
I have trouble sleeping	28
I feel mentally exhausted	39
I feel very lonely	21
I feel that things are hopeless	16
I feel the loss	13
I'm sad	22
I feel very anxious	29
I feel an irresistible rage	8
I feel so depressed that it is difficult to function	9

Notes Adapted from National Collegiate Athletic Association (2020).

crease in the level of their physical activity, an increase in their difficulty sleeping, sadness, sorrow, and depressive feelings (National Collegiate Athletic Association 2020). The study noted that students reported a lower level of difficulties with loneliness, anger, and sorrow in the later stages of the study than at the very beginning of the pandemic. Higher values of mental exhaustion, anxiety, hopelessness and feelings of depression have been observed, especially in women.

The aim of our study was to analyse the impact of the pandemic caused by the COVID-19 virus and the effects of the coronavirus disease on the motor skills and psychological state of the female students attending pedagogical faculties in Serbia.

Methods

The method of theoretical analysis and the survey technique was used. The study included 108 female students attending pedagogical faculties in Užice and Jagodina, who had been diagnosed with the coronavirus disease. The age of the female students ranged from 19 to 25. Students were interviewed during the experimental period (in class and/or online), and the questions were related to subjective feelings of the consequences of the disease. Their responses were compiled during their regular classes both in the classic and online form, from February to March 2022.

Students were required to assess their own recovery after illness, in terms of the number of weeks it took to return to their original physical fitness. The questionnaire is also intended to describe their condition during the illness:

whether they had a fever, how high their temperature was, whether and how much they lost or gained weight, how long the illness lasted, etc. From the aspect of motor abilities, it was necessary to distinguish what the decrease in ability is reflected in: is it a loss of strength, speed, endurance, feeling tired, etc. And from the aspect of the psychological state, it was important to determine how and in what sense the shown reported motor weakness affects the psychological state of an individual, primarily women. The questionnaire considered loss of self-confidence, decreased concentration, sociological aspects and consequences of isolation during illness, etc. After the survey of female students, the obtained data were processed by statistical methods and a critical review and analysis of the obtained results was performed.

Results and Discussion

Of the 108 surveyed female students, 52% of them believe they had a mild case of the coronavirus disease, while 18.5% of female students described their disease as moderate. None of the participants had a severe case which required hospitalization. 8.5% of them did not have a fever while they were positive for COVID-19. 63% of students did report a fever of up to 38 Celsius and 18.5% reported a fever of 39 Celsius. The duration of each case was from 2 to 30 days. The respondents had a fever from 1 to 16 days. Pneumonia was reported by 15% of respondents. Cardiovascular issues were not reported by any of the participants, while problems with blood pressure were reported by 7%. During their illness, none of the participants reported gaining any weight, but 70% reported losing 3.6 kg on average.

When it comes to the impact of the disease on their motor skills (table 2), we can see that many respondents reported losing a lot of their strength or losing it completely: 50% reported losing a lot or all of their endurance (50%), while most of them felt considerably or completely fatigued (52%). Most of the female respondents (68%) claim to have completely recovered from the coronavirus within 4 weeks after being declared healthy. For several of them (9%) the consequences of the disease were such that they never fully recovered, not even one year later. One third (32%) of the respondents claim that they feel no greater fatigue after the disease, and that they have just as much energy as before. Slightly greater fatigue was reported by 36% of the respondents, while 31% reported getting considerably more fatigued or getting tired a lot or much faster, and not possessing the same amount of energy as before.

Our hypothesis that the coronavirus disease and physical inactivity during isolation would cause a significant decrease in motor skills was confirmed.

Table 2 Descriptive Statistics Describing the Level of Loss of Motor Skills among the Female Students during the Coronavirus

Motor ability	Category	<i>f</i>	<i>f</i> (%)
I lost strength	Not at all	16	15
	A little	20	19
	Enough	48	44
	Absolutely	16	15
I lost speed	Not at all	15	14
	A little	68	63
	Enough	23	21
	Absolutely	4	3
I lost endurance	Not at all	15	14
	A little	39	36
	Enough	47	44
	Absolutely	7	6
I felt weak	Not at all	4	3
	A little	48	44
	Enough	36	33
	Absolutely	20	19
I returned in the form i had before the covid, after (answers are in weeks):	1	20	18
	2	23	21
	3	12	11
	4	19	18
	5	7	6
	6	3	2
	7	7	6
	8	7	6
	More	10	9

Based on the responses provided by the female students, we could conclude that more than one half of the respondents reported losing crucial motor skills while they were ill, including strength (58%) and endurance (50%). Irrespective of the fact that a great many of those surveyed (88%) only had a symptomatic or mild case of the coronavirus disease, 52% reported feeling quite exhausted. On the one hand, the fact that most of the respondents made a full recovery after 4 weeks is encouraging, while on the other it is worrisome that 9% of them reported that they have not made a full recovery one year later.

Based on the responses provided to the 12 posed questions (table 3), it

Table 3 Descriptive Statistics Regarding the Opinions of the Female Students on the Consequences of the Coronavirus Disease on Their Mental Health

After the illness, I felt that ...	Category	<i>f</i>	<i>f</i> (%)
I lost confidence	Not at all	17	16
	A little	89	82
	Enough	4	3
	Absolutely	0	0
I lost concentration	Not at all	32	30
	A little	44	41
	Enough	24	22
	Absolutely	8	7
I was scared for the future of my career	Not at all	70	65
	A little	34	31
	Enough	0	0
	Absolutely	4	3
Isolation during the pandemic had a hard time for me	Not at all	32	30
	A little	44	41
	Enough	28	26
	Absolutely	4	3
I sleep less than before	Not at all	68	63
	A little	24	22
	Enough	8	7
	Absolutely	8	7
I'm sleeping more than before	Not at all	71	66
	A little	19	18
	Enough	15	14
	Absolutely	3	3
I often feel more fatigue (lack of energy) than before	Not at all	35	32
	A little	39	36
	Enough	23	21
	Absolutely	11	10

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could be concluded that the coronavirus disease and the pandemic had the least effect on the self-confidence of female students, and their fear for their career (3%). A greater number of concerned respondents was expected at this time, considering that they did not regularly attend classes, about not being able to meet the requirements regarding their tutorials and exams. Their self-confidence, as well as their self-efficacy, represent the conviction that an individual has the necessary skills to fulfil their tasks, and that failure

Table 3 *Continued from the previous page*

After the illness, I felt that ...	Category	<i>f</i>	<i>f</i> (%)
This entire situation with COVID is very stressful for me	Not at all	15	14
	A little	59	55
	Enough	31	29
	Absolutely	3	3
I'm not in the mood to socialize like i used to	Not at all	59	55
	A little	31	29
	Enough	11	10
	Absolutely	7	6
I feel more tension than before	Not at all	51	47
	A little	51	47
	Enough	3	3
	Absolutely	3	3
I am afraid of being infected again	Not at all	40	37
	A little	48	44
	Enough	16	15
	Absolutely	4	3
I feel fear and helplessness about this disease	Not at all	52	48
	A little	48	44
	Enough	8	7
	Absolutely	4	3
After the illness it is difficult for me to motivate for study, more than before	Not at all	52	48
	A little	36	33
	Enough	8	7
	Absolutely	4	3

or a reduction in their skills could lead to a decrease in self-efficacy. This could lead to an increase in mental stress by causing negative self-evaluation and negative thoughts (Nouwen et al. 2009).

Some 29% of the respondents reported having a lot of problems concentrating, or that they have a significantly impaired ability to concentrate. That they have significant problems finding motivation to study was reported by 10% of the respondents. Trouble sleeping after the coronavirus disease was reported by 31% of the respondents, of which 14% reported sleeping less than before, while 17% reported sleeping more than before the disease. More than one half of the respondents (56%) did not lose their desire to socialize, 29% of the respondents felt a small change, while 16% of the participants feel that they are significantly less in the mood to socialize than before. Con-

siderable or overwhelming tension was felt by only 6% of the respondents, but when they were supposed to answer the question of just how the overall COVID-19 situation was stressful for them, only 14% responded that it was not at all, 55% responded that they were affected a little, while 32% of the respondents felt that the pandemic touched them considerably or completely. Isolation during the entire pandemic was difficult for 29% of the respondents. This could be explained by the long period of time the respondents spent in their homes when they tested positive for the coronavirus, and during isolation, which resulted in a decrease in communication with other individuals from which they could have received social support. A great fear of once again contracting the disease was reported by 18% of the respondents, while 10% of them felt helpless regarding this disease. What this indicates is that the consequences of the pandemic and the disease itself caused feelings related to the fear of once again finding oneself in such situations in the future among a significant number of young girls.

Based on our findings, this is the first study which deals with the impact of the COVID-19 pandemic and the coronavirus disease on the motor skills and mental health of young girls in the territory of the Balkans. When the data from this study are compared to those of the aforementioned study (National Collegiate Athletic Association 2020) (table 1), a significant number (8–30%) of surveyed respondents who might be suffering serious mental health consequences can be noted in both studies. This study confirmed the hypothesis that young people managed the disease and the pandemic relatively well, as 4/5 of the respondents stated that the COVID-19 virus had a very small impact on their mental health. The study also indicated that there was a smaller number of female students (1/5) for whom this situation, due to the coronavirus disease, changes in their living conditions, worry for their health, their career, and future, led to symptoms of post-traumatic stress. Similar problems were confirmed in other studies as well (Hawryluck et al. 2004; Lee et al. 2018). The situation is not benign since studies (Hallgren et al. 2017) indicate that if such a situation involving isolation, reduced communication with other people and the resulting decrease in social support were to last longer, it could lead to symptoms of depression and anxiety. Irrespective of the fact that this targeted study was carried out on a specific sample of female students, what we consider a shortcoming is the relatively small number of the female participants.

Conclusion

The study, carried out on a specific sample, showed that the coronavirus disease did not significantly impact the motor skills and mental health of most

of the female students. However, a certain number of female students gave responses that indicate problems with mental health, which points to the need of continued work with psychological counselling services in an academic setting, so that the female students could receive psychological support in difficult situations.

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Gibalne sposobnosti in psihološko stanje študentk po bolezni covid-19

Cilj študije je bil analizirati vpliv pandemije, ki jo povzroča virus covid-19, in posledice bolezni na motorične gibalne sposobnosti ter psihološko stanje študentk na pedagoških fakultetah v Srbiji. Študija je vključevala 108 študentk in se je opirala na analizo teoretične metode in tehniko anketiranja. Rezultati so pokazali, da je večina anketirank dobro obvladovala bolezen, ki je po njihovem mnenju zelo malo ali pa sploh ni vplivala na njihove motorične gibalne sposobnosti in/ali duševno zdravje. Poleg tega večina anketirank meni, da so se njihove gibalne sposobnosti po 4–5 tednih vrnila na raven, na kateri so bile pred nastopom bolezni. Vendar pa 9 % anketirank meni, da si po enem letu niso povrnila mišične moči in vzdržljivosti. Poleg tega 21 % anketirank meni, da nimajo enake energije in da se po okužbi s koronavirusom hitreje in pogosteje utrudijo. Na možnost večjih učinkov na duševno zdravje nakazujejo odgovori 15 % anketirank, ki opažajo, da je bilo obdobje, ko so bile bolne, zelo stresno in da so mu dolgo časa sledile težave s koncentracijo ter z motivacijo. Poleg naštetega anketiranke navajajo občutek popolne nemoči, občutek strahu pred ponovnim obolenjem in zmanjšano željo po druženju po obolenju. Navedeni rezultati za določen vzorec študentk kažejo na potrebo po organizaciji nadaljnjega dela s psihološkimi svetovalci v akademskem okolju, da bi študentke dobile psihološko podporo v težkih situacijah.

Ključne besede: covid-19, gibalne sposobnosti, psihološko stanje