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Original article

EFFECTS OF THE CORONAVIRUS PANDEMIC ON THE ATTITUDES OF MIDDLE SCHOOL STUDENTS TOWARDS EXERCISE

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Abstract

Objective. Given the extended state of alertness and online education, this study aims to highlight the need for movement of children aged 11-14 years during the pandemic, their preferences for sports and how much they are aware of the role of exercise in maintaining their health status. These attitudes were correlated with parents' attitudes towards the physical activity of their children.

Methods. The current study is based on questionnaires applied to 137 middle school students and 118 parents regarding online education.

Results. The results indicate that students want to participate face-to-face in the physical activities offered by the educational system, are aware of the need for exercise and express their preferences for certain sports. In relation to these results, parents' opinions reflect how they support their children's physical activity and influence their lifestyles.

Conclusions. Emotional problems are felt by most middle school students and their parents, who consider it necessary to resume physical activity and the educational programme in face-to-face format.

Key Words: pandemic, physical activity, health, education, SARS-CoV-2 virus.

Introduction

The novel coronavirus first appeared in Wuhan (China) in 2019 and has triggered a pandemic during which millions of people were infected and some of them died. This pandemic has unprecedentedly affected several sectors and areas. Education, health, economy and tourism have undergone dramatic changes due to the global lockdown. The effects of these measures have been felt at social and individual levels, with significant consequences for people's well-being.

Excessive use of technology, including both work time spent online and free time spent on social media, has reinforced the sedentary habits of people of different ages. Moreover, the pandemic has increased the population's interest in news and articles that have often caused stress and confusion, decreasing people's confidence in themselves and those around them.

Fear is a factor that contributes to lower immunity, thus increasing the risk of infection with the novel coronavirus (Skahill, 2021).

Given the existence of a virus that causes major respiratory problems, the immune system is a very important factor that can protect us from serious symptoms or death. Its level of contamination largely depends on the lifestyle-diet, mental and emotional status and physical activity. Specialists have concluded that moderate-intensity exercise performed three times a week strengthens the immune system. This aspect seems to have been forgotten during the novel coronavirus pandemic, since this information was not among the government's recommendations.

An experiment by Listkova (2020) suggests the importance of practising daily exercise for 20-30 minutes to combat the mortality rate. Thus, 82% of those who participate in moderate physical activity survive the SARS-CoV-2 infection, unlike sedentary people whose chances of survival are 43%. However, intense training performed for about 2.5 hours a day can do more harm than good in the absence of proper recovery after exercise. Only 30% of those infected survive a severe form of coronavirus because intense workouts decrease the level of immunoglobulins, which are important antibodies of the immunity system.

Studying the development of cases on all continents, Cunha et al. (2020) have established the effectiveness of isolation, this measure considerably slowing down the spread of the virus, but not that of physical distancing during periods of freedom, which caused an increase in the number of infections. But how long can these methods continue to be applied one year after the emergence of the pandemic, given that the economic, educational, medical, sports and other systems experience a downward development trend? The patience of

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adults, but especially children, begins to become difficult to control, emotional and mental problems being noticed in many cases. According to a study conducted in Australia (Newby et al., 2020), depression and anxiety caused by loneliness and limitation of outdoor activities are felt by 78% of respondents. Very young people and the elderly are at a higher risk of impaired mental health, restrictions on their freedom of movement forcing them to perform most activities in the online environment and give up social activities (Shevlin et al., 2020).

The living environment and daily activities influence the physical and intellectual development of a child. Limiting physical activity among children causes negative effects that cannot be remedied over time, such as decreased concentration and memory or loss of motivation to perform school tasks (Shader, 2020). By closing schools and forcing children to stay in the house as long as possible, by discouraging meetings with other children and without the possibility of doing sport because playgrounds were closed and sports events were cancelled, their opportunities to be active, even individually (swimming, athletics, golf, skiing, etc.), were limited (Lollgen et al., 2020). If before they had been encouraged to move a lot, now they are no longer allowed to spend their free time in the playgrounds. This restriction has an impact on the behaviour of a child, who may not return to a normal social and sporting life, especially at the ages of growth and development. Although children have the possibility to play in the house, outdoor activities decisively contribute to their mental, physical and social development. (Nathan et al., 2021)

According to Maslow's Pyramid, every individual needs to feel personal safety and security, which includes financial security, a stable job, protection, etc. Also, for good performance in everyday life, any person needs to have social relationships, belong to a group, carry out collective activities and feel supported by others. The pandemic has destabilised the entire population, and these needs that cannot be met have caused emotional imbalance and decreased self-esteem and self-confidence, leading to feelings of loneliness, discrimination and marginalisation. These states have also been exacerbated by social distancing, which is unbearable for children because they are in a period when they try to understand the needs of others so as to develop their civic sense in society and discover their abilities through play and group interaction (De Machêdo Rocha et al., 2021).

The fields of sport, art and culture are among the most affected by the pandemic. The closure of schools, gyms, cinemas, theatres, parks and playgrounds, which have been replaced by home activities and online lessons, has a negative impact on children's education.

The main environment where children develop and meet their age-specific needs is school. According to data provided by UNESCO, the closure of educational settings in over 160 countries has affected more than 87% of students worldwide in behavioural, emotional and mental terms (Xiao et al., 2020). Children from rural areas have not felt the restrictions as severely as those living in urban areas because they have more opportunities to exercise, and their conditions to perform digital activities are less developed. Children spending a lot of time in their apartments have built a virtual world to occupy their time, which slows down their harmonious physical and cognitive development. (Aguilar-Farias et al., 2020)

In a research conducted by Ma et al. (2021), 1 in 14 middle school children develops symptoms of depression. According to a study supported by UNESCO (Hung & Wati, 2020), 1.28 billion children from all over the world (approximately 73.8%) feel the need to see their classmates and friends again, talk to them physically and participate together in lessons, they miss the simple morning routine before going to school and the emotions before the classes for which they have not prepared their homework. In addition to the social isolation and panic caused by the pandemic, children from disadvantaged backgrounds have been deprived of the right to education due to the impossibility of participating in online classes as a result of their poor financial situation that does not allow them to purchase the appropriate technology for online lessons.

The need to adapt is imperative, and online education is a new way of communication, a challenge for children, parents and teachers, which will probably continue to exist after the end of the pandemic (Coman et al., 2020).

According to Sawchuk (2020), this change does not respond to the physical, emotional and psychological needs of children, and the fact that they cannot give spontaneous answers inhibits them, which is why students avoid expressing their views so as not to disturb, to confuse the lesson or because they feel it is useless to answer. Lack of physical presence does not motivate them to do their best to understand the lessons, to do their homework, to get involved in curricular activities and very often they lose concentration and have memory problems, even performing other activities in the house during classes. Limited space and monotony induce boredom and decrease the interest in what is being taught. Ethical and moral values diminish due to low social contact and the level of individualism increases because there is no more physical and psychological interaction, extracurricular activities are restricted, and home education puts emphasis on social distancing and selfishness: children are no longer allowed to borrow things, to offer a

handshake or a hug and must avoid any collective, team activities. At an early age, this lifestyle can become a habit, a normal thing for them in the future, the effects of the pandemic being irreversible.

What the authorities overlook when introducing restrictions is the fact that sedentary lifestyles have recorded an alarming increase, especially among children aged 9-13 years. They have access to technology without needing parental help, which is why they also use digital tools outside of school hours. Boys spend a lot of time playing various games, while girls are more concerned with social media. This is due to their lack of occupation and the obligation to spend too much time at home, which leads to a sedentary lifestyle and weight gain. According to an online study (Dunton et al., 2020), children aged 9-13 years would like to play a sport and participate in sports competitions, and even the younger ones feel the need to move in their free time by walking (biking or roller-skating) in the park.

Physical education should be a priority for adults and children, given that daily exercise, outdoor and recreational activities make an enormous contribution to developing immunity. There is an urgent need for personalised and supervised physical education programmes that mainly include outdoor group activities (Bentlage et al., 2020). Lack of activity outside the home, repeated urges for preventive measures, the possibility of infection, economic instability and fear, all of them cause psychological stress manifested by changing moods, high levels of anxiety, frustration, loneliness, anger and insufficient rest.

A positive consequence of the lockdown is the closeness between children and parents, who have been forced to spend time together and make sacrifices to take care of them at home. A study conducted in Brazil (Garcia de Avila et al., 2020) suggests that anxiety is an important enemy for children during this period, especially for those who do not benefit from the presence of parents at home, who are isolated in a space where too many people live or whose parents have low living and education standards. Therefore, actions organised by the authorities are required to improve mental health and develop educational levels among people from disadvantaged backgrounds.

Based on the findings of previous studies, the current research aims to highlight the physical, mental and emotional effects of the novel coronavirus pandemic on students in grades 5-8 from their own and their parents' perspectives. On the other hand, the purpose of the parent survey is to identify their problems during the pandemic in terms of children's growth and development and to compare children's responses with the reality perceived by parents in this period. We aim to emphasise the extent to which children and parents are aware of the changes and negative effects of the pandemic on their lifestyles in the last year.

We aim to verify the hypothesis according to which the lockdown has significantly and unfavourably changed the children's habit of exercising in their free time.

Similarly, the restrictions imposed during the pandemic have changed parents' attitudes towards the physical activity of their children.

Methods

The survey participants were 137 students (in grades 5-8) from the "Dimitrie Cantemir" Middle School no. 38 in Constanța (Romania) and 118 parents. Students and parents agreed to participate in this study, signing a formal consent.

- *Questionnaire survey* – students were invited to complete a 12-item questionnaire, while parents completed a 9-item questionnaire. The questions asked, which represent the research variables, are shown in Table 1 (students) and Table 2 (parents):

Table 1. Variables of the questionnaire for students

Variables	Response options
1) Grade	• 5th • 6th • 7th • 8th
2) Gender	• Male • Female
3) In your opinion, to what extent has online education been effective for acquiring the knowledge provided by the school curriculum?	• 1 - very low level • 2 - low level • 3 - medium level • 4 - good level • 5 - very good level
4) On a scale of 1 to 5, to what extent do you feel that the restrictions imposed against the spread of the virus have affected you emotionally and mentally, giving you negative moods and thoughts?	• 1 - very low level • 2 - low level • 3 - medium level • 4 - good level

	• 5 - very good level
5) Do you often feel nervous, agitated, sad, bored or tired?	• True • False
6) What are the negative effects of the novel coronavirus on you? (Multiple-choice question)	• Weight gain • Depression • Loss of contact with friends • Difficulty to understand online lessons • Panic and fear of infection • Limitation of sports activity • Not negatively affected
7) Mention, if any, the positive effects and the lessons you could learn from this epidemic	
8) Do you think that physical activity performed at home is sufficient to maintain an optimal state of health?	• Yes • No
9) What physical activity would you have liked to do during the pandemic?	• Walking (biking, roller-skating, etc.) in the park • Swimming • Sports games (football, tennis, handball, basketball, volleyball, etc.) • Dance and other expression sports (gymnastics, ballet, skating, etc.) • Contact sports (boxing, judo, etc.) • I do not like sports activities
10) What have you missed the most in the last year?	• Interaction with classmates and friends • Sports training and competitions • Face-to-face school • Freedom of movement • I have not missed anything
11) How did you spend your free time outside of online school hours?	• Video games • Social media • TV • Listening to music • Individual physical activities • Reading
12) How do you prefer school activities to take place in the future?	• Physically (face-to-face) • Online

Table 2. Variables of the questionnaire for parents

Variables	Response options
1) Your child is in grade:	• 5th • 6th • 7th • 8th
2) Rate on a scale of 1 to 5 how good communication is with your son/daughter	• 1 - very low level • 2 - low level • 3 - medium level • 4 - good level • 5 - very good level
3) How much time do you spend with your son/daughter?	• Less than 3 hours a day • 3-5 hours a day • More than 5 hours a day • Only on weekends
4) Rate on a scale of 1 to 5 the behavioural changes of your child in the last year	• 1 - very low level • 2 - low level • 3 - medium level

5) Rate on a scale of 1 to 5 the extent to which your child's communication ability has been affected	• 4 - good level • 5 - very good level • 1 - very low level • 2 - low level • 3 - medium level • 4 - good level • 5 - very good level
6) Do you think that the limitation of physical activities imposed by the measures against the novel coronavirus is a factor that has affected the mental and intellectual development of your child (pessimistic thinking, poor school success, lack of interest in lessons, etc.)?	• 1 - very low level • 2 - low level • 3 - medium level • 4 - good level • 5 - very good level
7) Are there any negative emotional effects of the pandemic that worry you about your child's development (agitation, nervousness, anxiety, depression, loss of attention and concentration, fear, etc.)?	• 1 - very low level • 2 - low level • 3 - medium level • 4 - good level • 5 - very good level
8) Rate the effectiveness of online education for the intellectual and emotional development of your son/daughter	• 1 - very low level • 2 - low level • 3 - medium level • 4 - good level • 5 - very good level
9) How do you think it would be better to carry out school activities in the near future?	• Physically (face-to-face) • Online

- *Statistical method* – represented by statistical indicators that established the significant differences between participants' responses to multiple- or single-choice questions. A correlation was made between the results of the questionnaire for parents and those obtained from the survey conducted among children, and the common questions were analysed. To see whether there were differences between the two groups (children and parents), which represented two independent samples, the bilateral (unpaired) *t* test was applied.

Cohen's *d*, which is designed to compare two groups, in our case, children and parents, was also applied. The differences between them are expressed in standard deviation units, this indicator highlighting how many standard deviations are between the two groups. The conventional effect sizes proposed by Cohen are 0.2 (small effect), 0.5 (moderate effect) and 0.8 (large effect) and represent a way of quantifying the size of the difference between groups. If Cohen's *d* is greater than 1, the difference between the two categories is larger than a standard deviation.

Pearson's statistical correlation indicators were used to explore the relationship between the variables and the analysed population (children and parents). The higher the *Chi-square* and *Phi* values, the higher the intensity of the linear relationship between the two variables.

Results

The results obtained from applying the questionnaire to students were analysed by grade and gender (Table 3).

Table 3. Processing of data from the questionnaire for students

	Scale	Grade				Gender	
		5th	6th	7th	8th	Female	Male
In your opinion, to what extent has online education been effective for acquiring the knowledge provided by the school curriculum?	**1**	4 (28.6%)	4 (28.6%)	1 (7.1%)	5 (35.7%)	8 (57.1%)	6 (42.9%)
	2	7 (29.2%)	1 (4.2%)	8 (33.3%)	8 (33.3%)	11 (45.8%)	12 (50.0%)
	3	12 (21.8%)	2 (3.6%)	22 (40.0%)	19 (34.5%)	32 (58.2%)	23 (41.8%)
	4	6 (19.4%)	5 (16.1%)	12 (38.7%)	8 (25.8%)	10 (32.3%)	21 (67.7%)
	5	3 (21.4%)	2 (14.3%)	7 (50.0%)	2 (14.3%)	5 (35.7%)	9 (64.3%)

	Total	32 (23.2%)	14 (10.1%)	50 (6.2%)	42 (30.4%)	66 (47.8%)	71 (51.4%)
To what extent do you feel that the restrictions imposed against the spread of the virus have affected you emotionally and mentally, giving you negative moods and thoughts?	**1**	6 (22.2%)	3 (11.1%)	9 (22.3%)	9 (33.3%)	10 (37.0%)	17 (63.0%)
	2	3 (13.6%)	2 (9.1%)	8 (36.4%)	9 (40.9%)	8 (36.4%)	13 (59.1%)
	3	7 (21.9%)	4 (12.5%)	14 (43.8%)	7 (21.9%)	15 (46.9%)	17 (53.1%)
	4	9 (27.3%)	2 (6.1%)	11 (33.3%)	11 (33.3%)	21 (63.6%)	12 (36.4%)
	5	7 (29.9%)	3 (12.5%)	8 (33.3%)	6 (25.0%)	12 (50.0%)	12 (50.0%)
	Total	32 (23.2%)	14 (10.1%)	50 (36.2%)	42 (30.4%)	66 (47.8%)	71 (51.4%)
Do you often feel nervous, agitated, sad, bored or tired?	**True**	26 (25.7%)	10 (9.9%)	32 (31.7%)	33 (32.7%)	59 (58.4%)	41 (40.6%)
	True, False	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100%)	1 (100.0%)	0 (0.0%)
	False	6 (16.7%)	4 (11.1%)	18 (50.0%)	8 (22.2%)	6 (16.7%)	30 (83.3%)
	Total	32 (23.2%)	14 (10.1%)	50 (36.2%)	42 (30.4%)	66 (47.8%)	71 (51.4%)
What are the negative effects of the novel coronavirus on you? (Multiple-choice question)	**Weight gain**	4 (21.1%)	0 (0.0%)	7 (36.8%)	8 (42.1%)	10 (52.6%)	9 (47.4%)
	Difficulty to understand online lessons	11 (34.4%)	4 (12.5%)	10 (31.3%)	7 (21.9%)	17 (53.1%)	14 (43.8%)
	Limitation of sports activity	5 (29.4%)	2 (11.8%)	5 (29.4%)	5 (29.4%)	3 (17.6%)	14 (43.8)
	Not negatively affected	1 (5.0%)	3 (15.0%)	8 (40.0%)	8 (40.0)	7 (35.0%)	13 (65.0%)
	Panic and fear of infection	2 (33.3%)	0 (0.0%)	2 (33.3%)	2 (33.3%)	5 (83.3%)	1 (16.7%)
	Loss of contact with friends	3 (12.0%)	5 (20.0%)	9 (36.0%)	8 (32.0%)	11 (44.0%)	14 (56.0%)
	Depression	6 (31.6%)	0 (0.0%)	9 (47.4%)	4 (21.1%)	13 (68.4%)	6 (31.6%)
	Total	32 (23.2%)	14 (10.1%)	50 (36.2%)	42 (30.4%)	66 (47.8%)	71 (51.4%)
Do you think that physical activity performed at home is sufficient to maintain an optimal state of health?	**Yes**	5 (14.7%)	2 (5.9%)	16 (47.1%)	11 (32.4%)	11 (32.4%)	22 (64.7%)
	Yes, No	0 (0.0%)	0 (0.0%)	2 (66.7%)	1 (33.3%)	1 (33.3%)	2 (66.7%)
	No	27 (26.7%)	12 (11.9%)	32 (31.7%)	30 (29.7%)	54 (53.5%)	47 (46.5%)
	Total	32 (23.2%)	14 (10.1%)	50 (36.2%)	42 (30.4%)	66 (47.8%)	71 (51.4%)
How do you prefer school activities to take place in the future?	**Physically**	26 (31.3%)	8 (9.6%)	22 (26.5%)	27 (32.5%)	37 (44.6%)	45 (54.2%)
	Physically, Online	6 (12.8%)	4 (8.5%)	27 (57.4%)	10 (21.3%)	22 (46.8%)	25 (53.2%)
	Online	0 (0.0%)	2 (25.0%)	1 (12.5%)	5 (62.5%)	7 (87.5%)	1 (12.5%)

	Total	32 (23.2%)	14 (10.1%)	50 (36.2%)	42 (30.4%)	66 (47.8%)	71 (51.4%)

Analysing the responses, it has been found that online education is rated moderately by students, level 3 being indicated by both girls and boys.

In emotional terms, girls seem to be more affected, most of them mentioning level 4 of the scale, while boys consider lower levels to be predominant. This is confirmed by the responses to the next question (*Do you often feel nervous, agitated, sad, bored or tired?*), which reveal that over 73% of children (59 girls from a total of 66 versus 41 boys out of 71) feel more nervous, agitated or sad. This difference is encouraged by 13 boys who think that they are not affected in any way by the crisis, this opinion being supported by only 7 girls.

However, most students feel affected by the pandemic, the main weaknesses being their difficulty to understand online lessons and loss of contact with friends.

Although not many of them believe that weight gain during this period is a threat, more than half in each category, no matter the grade, think that physical activity performed at home is not sufficient to maintain an optimal state of health, only 33 of the total of 137 students being satisfied from this point of view.

Regardless of personal reasons, students want to return to school and continue classes in physical format. Only 8 children out of the total respondents prefer the online format.

Concerning the open-ended question about the positive effects of the pandemic, most students believe that there are no favourable aspects, but they could learn a few lessons that they intend to apply in the future.

Among the significant responses, we mention that they feel more self-confident because they have understood how important it is for them to express their opinions and be heard, even if others do not agree with them, other students say that they have had enough time to think about their own desires and future goals, to analyse the behaviours of others and be more selective with the people around them, to appreciate important things and people before missing them. Family, personal health and that of loved ones have also become a priority for many students, who are aware of the dangers around them and that they need to be responsible and protect their loved ones, even if they are children.

For the open-ended question (*Mention, if any, the positive effects and the lessons you could learn from this epidemic)*, many students mentioned that "spending time with family or friends are aspects that they will appreciate much more in the future". However, there are also children who believe that "this is an appropriate time to slow down the pollution of the planet and to know ourselves better in order to be prepared to understand those around us". They also recalled that "stress and fear induced by the media caused emotional problems, which led to a decrease in school performance and interest in online classes". Many students seem to be aware of this danger but want "to be heard and their needs taken into account". The opportunity to have spent more time with parents can be an advantage for many children from organised families and "receive the necessary attention and love". Those who already have problems in the family environment feel greater pressure because "they are forced to stay home longer than they want", sinking even deeper into negative thoughts and moods. According to the responses to this question, the only positive aspects for many of the survey participants are that "they have learned to protect themselves more, realise the importance of civic sense and mutual respect and prioritise personal hygiene".

Almost half of the middle school students who responded to the questionnaire mostly missed walking in the park (49.3%) and playing social, sports games (36.2%). Only 7 children are not attracted to sports activities, while 34 want to resume training and sports competitions. Interaction with classmates and friends and freedom of movement were the main aspects that students missed, in a proportion and 63.8% and 50%, respectively.

Most respondents spent their time in online activities playing video games (83 children) and listening to music (71 children) or on social media (67 children). The most recommended activities provided in the response options were selected by a smaller number of participants, only 33.3% reading or performing individual physical activities.

From the perspective of parents, according to the questionnaire responses, the mental and emotional situation of their children is affected but is not worrying.

There are many correspondences between the responses of parents and children, especially those related to the teaching process. From a total of 118 people, 100 think that students should return to school in physical format, most of them rating the effectiveness of online activities with the lowest score.

Table 4. Processing of data from the questionnaire for parents

Scale	**Grade**

		5th	6th	7th	8th
Rate on a scale of 1 to 5 how good communication is with your son/ daughter	**1**	0 (0.0%)	0 (0.0%)	1 (100%)	0 (0.0%)
	2	-	-	-	-
	3	3 (30.0%)	2 (20.0%)	4 (40.0%)	1 (10.0%)
	4	12 (35.3%)	7 (20.6%)	10 (29.4%)	5 (14.7%)
	5	28 (38.4%	11 (15.1%)	19 (26.0%)	15 (20.5%)
	Total	43 (36.4%)	20 (16.9%)	34 (28.8%)	21 (17.8%)
How much time do you spend with your son/ daughter?	**3-5 hours a day**	15 (51.7%)	3 (10.3%)	5 (17.2%)	6 (20.7%)
	3-5 hours a day, More than 5 hours a day	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)
	Only on weekends	1 (50.0%)	0 (0.0%)	1 (50.0%)	0 (0.0%)
	More than 5 hours a day	24 (33.8%)	14 (19.7%)	20 (28.2%)	13 (18.3%)
	Less than 3 hours a day	3 (21.4%)	2 (14.3%)	7 (50.0%)	2 (14.3%)
	Less than 3 hours a day, Only on weekends	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)
	Total	42 (36.4%)	20 (16.9%)	34 (28.8%)	21 (17.8%)
Rate on a scale of 1 to 5 the behavioural changes of your child in the last year	**1**	3 (33.3%)	1 (11.1%)	3 (33.3%)	2 (22.2%)
	2	3 (25.0%)	4 (33.3%)	3 (25.0%)	2 (16.7%)
	3	18 (43.9%)	5 (12.2%)	10 (24.4%)	8 (19.5%)
	4	13 (34.2%)	8 (21.1%)	10 (26.3%)	7 (18.4%)
	5	6 (33.3%)	2 (11.1%)	8 (44.4%)	2 (11.1%)
	Total	43 (36.4%)	20 (16.9%)	34 (28.8%)	21 (17.8%)
Rate on a scale of 1 to 5 the extent to which your child's communication ability has been affected	**1**	6 (33.3%)	4 (22.2%)	6 (33.3%)	2 (11.1%)
	2	6 (50.0%)	1 (8.3%)	3 (25.0%)	2 (16.7%)
	3	15 (35.7%)	8 (19.0%)	12 (28.6%)	7 (16.7%)
	4	10 (38.5%)	3 (11.5%)	7 (26.9%)	6 (23.1%)
	5	6 (30.0%)	4 (20.0%)	6 (30.0%)	4 (20.0%)
	Total	43 (36.4%)	20 (16.9%)	34 (28.8%)	21 (17.8%)
Do you think that the limitation of physical activities imposed by the measures against the novel coronavirus is a factor that has affected the mental and intellectual development of your child (pessimistic thinking, poor school success, lack of interest in lessons, etc.)?	**1**	5 (29.4%)	3 (17.6%)	5 (29.4%)	4 (23.5%)
	2	5 (38.5%)	3 (23.1%)	2 (15.4%)	3 (23.1%)
	3	11 (36.7%)	5 (16.7%)	8 (26.7%)	6 (20.0%)
	4	12 (36.4%)	5 (15.2%)	11 (33.3%)	5 (15.2%)
	5	10 (40.0%)	4 (16.0%)	8 (32.0%)	3 (12.0%)
	Total	43 (36.4%)	20 (16.9%)	34 (28.8%)	21 (17.8%)
Are there any negative emotional effects of the pandemic that worry	**1**	7 (33.3%)	5 (23.8%)	7 (33.3%)	2 (9.5%)
	2	5 (33.3%)	3 (20.0%)	2 (13.3%)	5 (33.3%)
	3	14 (43.8%)	4 (12.5%)	9 (28.1%)	5 (15.6%)

you about your child's development (agitation, nervousness, anxiety, depression, loss of attention and concentration, fear, etc.)?	**4**	11 (40.7%)	4 (14.8%)	8 (29.6%)	4 (14.8%)
	5	6 (26.1%)	4 (17.4%)	8 (34.8%)	5 (21.7%)
	Total	43 (36.4%)	20 (16.9%)	34 (28.8%)	21 (17.8%)
Rate the effectiveness of online education for the intellectual and emotional development of your son/ daughter	**1**	9 (27.3%)	8 (24.2%)	12 (36.4%)	4 (12.1%)
	2	10 (38.5%)	3 (11.5%)	8 (30.8%)	5 (19.2%)
	3	12 (44.4%)	3 (11.1%)	8 (29.6%)	4 (14.8%)
	4	7 (41.2%)	1 (5.9%)	5 (29.4%)	4 (23.5%)
	5	5 (33.3%)	5 (33.3%)	1 (6.7%)	4 (26.7%)
	Total	43 (36.4%)	20 (16.9%)	34 (28.8%)	21 (17.8%)
How do you think it would be better to carry out school activities in the near future?	**Physically**	37 (37.0%)	15 (15.0%)	32 (32.0%)	16 (16.0%)
	Physically, Online	0 (0.0%)	0 (0.0%)	2 (100.0%)	0 (0.0%)
	Online	6 (37.5%)	5 (31.3%)	0 (0.0%)	5 (31.3%)
	Total	43 (36.4%)	20 (16.9%)	34 (28.8%)	21 (17.8%)

Although over 60% of parents believe that they have very good communication with their children and spend more than 5 hours a day with them, they admit that their children have undergone behavioural changes in the last year, especially the 5th grade students. Moreover, the 5th grade is an important threshold due to the transition from elementary school, where students had contact with only one teacher, to middle school, where each subject is taught by a different teacher.

For this reason, their ability to interact and communicate has deteriorated, most parents moderately rating the response to the questionnaire item regarding this issue. Among students, the 5th graders are the most affected (35.7%). As regards physical activity, parents (just as children) think that movement is necessary for harmonious development at this age, and lack of exercise can be a factor that might affect children's mental state and intellectual ability, which is why they indicate level 4 (Good level) for this item. It is noticed that the concern about the emotional state of children is at a maximum level for 23 parents.

Comparative analysis of the results obtained from parents and children

To see whether there were differences between the two groups (children and parents), which represented two independent samples, the bilateral (unpaired) *t* test was applied. With this test, we could check whether the average score for children's category was significantly different from parents' category, according to the following variables: The extent to which online education has been effective for students to acquire the knowledge provided by the school curriculum (scale 1-5)

1. The extent to which the restrictions imposed against the spread of the virus have affected students both emotionally and mentally, giving them negative moods and thoughts (scale 1-5)
2. How they want school activities to take place in the future (1 = physically; 2 = online; 3 = physically and online.

Table 5. Bilateral (unpaired) t test

Variable	*Children*			*Parents*			*t*	*p*	***Cohen's d***
	N	Mean	Standard Deviation	N	Mean	Standard Deviation			
Effectiveness of online education for acquiring	138	3.05	1.103	118	2.62	1.365	2.755	0.000	0.351

the knowledge provided by the school curriculum									
Effect of restrictions on emotional and cognitive components	138	3.04	1.374	118	3.37	1.100	2.176	0.006	0.268
How they want school activities to take place in the future	138	1.46	0.606	118	1.17	0.420	4.455	0.000	**0.543**

Independent *t* tests highlight significant results for all investigated variables, especially regarding the way in which school activities will take place in the future, where Cohen's *d* has a mean value of 0.543, which indicates that the average score for children's group is higher by 0.543 (54.3%) standard deviations than the average score obtained by parents' group. There are also small differences for the other two analysed questions about the effectiveness of online education and the negative effects induced by the restrictions imposed during this period, where Cohen's *d* has the values 0.351 standard deviation units and 0.268, respectively.

Table 6 shows the *Chi-square* and *Phi* values, which, the higher they are, the higher the intensity of the linear relationship between the two variables.

Table 6. Pearson's indicators

Variable	Children	Parents	*N*	***Chi-square***	*p*	*Effect size (**Phi** coefficient)*
Effectiveness of online education for acquiring the knowledge provided by the school curriculum	53.9%	46.1%	256	**19.999**	0.000	0.280
Effect of restrictions on emotional and cognitive components	53.9%	46.1%	256	12.775	0.012	0.223
How they want school activities to take place in the future	53.9%	46.1%	256	18.987	0.000	0.272

Calculations show that there are significant differences between the two categories, especially regarding the effectiveness of online education (χ^2 (3) = 19.999), where the option of most parents is for level 1, while children mainly mention levels 3 and 4.

Significant differences are also noticed for the other two analysed questions, with (χ^2 (3) = 12.775) and (χ^2 (3) = 18.987), respectively. In terms of negative effects on mental and emotional states, the two surveyed categories believe that students have been affected to a large extent by the restrictions imposed against the spread of the virus, the differences being smaller than for the other variables. Both children and parents support the development of classes in physical format, but there is a significantly higher number of students than adults who have opted for exclusively online classes, namely 47 and 16, respectively.

Discussions

The novel coronavirus pandemic has caused more than a health crisis and economic issues. The results of this study are surprising as there are significant differences between genders but less significant differences between grades. This demonstrates that the effects of the pandemic are being felt among children of all ages, that their needs are the same and they are facing the same problems as a consequence of recent global changes. However, the ways of manifestation are different in females and males, girls being more sensitive during this period.

Conclusion

Emotional problems are felt by most middle school students and their parents, who consider it necessary to resume physical activity and the educational programme in face-to-face format.

The inefficiency of online education is confirmed not only by students but also by parents, who have noticed changes in their children's behaviour, a decrease in their communication ability and the stagnation of their intellectual development due to lack of physical activity and demotivation for the digitised educational programme.

The need for socialisation and freedom that most students feel prevents them from noticing the positive effects of this period, except that they appreciate more the time spent with their families and loved ones.

This health crisis that has affected the entire population is negatively felt in mental and emotional terms by both children and their parents, but there are significative differences in the way of perceiving the effects experienced by children. The correlations between the two questionnaires reveal that parents are more aware of the danger behind online

schooling, which they consider inefficient for the education and development of their children.

Among the research limitations, we mention the relatively small number of study participants, who come from a single educational unit. Also, the research tool was not validated before applying it to the sample included in the current study.

However, we highlight the contribution of this study to the opening of new research directions that are mainly reflected in the possibility of extending it to other educational units and other age categories. An in-depth analysis of the consequences of the pandemic on the educational process in general and the practice of physical exercise in particular is required with a view to design effective remedial activities that can mitigate its negative effects on the growth and development of children in grades 5-8.

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