

*STATE-OF-THE-ART IN HOW STUDENTS' HEALTH
AND THE EDUCATIONAL PROCESS ARE
AFFECTED BY E-LEARNING DURING THE COVID-
19 PANDEMIC IN FAYOUM GOVERNORATE,
EGYPT*

By

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ABSTRACT

Background & objectives: *Studies on E-learning effects on students' health, including gender differences, are rare, particularly for young children during the Covid-19 pandemic. This study sought to determine how students' health and the educational process affected by E-learning during the COVID-19 pandemic.*

Patients and Methods: *An analytical cross-sectional survey was carried out during November 2022. Some primary, preparatory, and secondary school children aged between 6 and 18 years old were included. Online survey (a Google form) was created in Arabic and posted on social media (Facebook and Whats App). There were four sections totaling 24 items on the online survey.*

Results: *Passive effect existed on secondary school students' behavior and mood, as well as an increase in sleep and appetite disorders in contrast to primary school students' levels of self-confidence which were passively changed, and a significant decline in infection rates was observed. The majority of parents thought that traditional learning was necessary in addition to E-learning in the educational process because it reduced the likelihood of infection.*

Conclusion: *The COVID-19 pandemic dangers may have been avoided with the use of E-learning education, but it also has additional negative effects on appetite, sleep, mood, and behavior. Additionally, it has lower success rates particularly in developing nations.*

Keywords: *Children; Covid-19; E-Learning; Health; Pandemic.*

INTRODUCTION

The internet has expanded our world's access to information, communication, and entertainment (Lyytinen et al., 2016). Children today can access websites with rich material at a young age using next-generation personal devices connected to quick mobile networks. No restrictions apply to the internet (Reid et al., 2016).

The World Health Organization (WHO) proclaimed COVID-19 a pandemic on March 11, 2020, and a worldwide public health emergency with an international impact on January 30, 2020 (Jebril, 2020). The Egyptian government closed all educational institutions nationwide on March, 2020, in response to the COVID-19 pandemic (Medhat and El Kassas, 2020). According to directives issued by the Egyptian government, the ministry of education instructed schools to begin implementing distance learning (DL) strategies, delay the current exams, and routinely assist their students online until the COVID-19 pandemic situation passes (Tang et al., 2022).

Globally, the COVID-19 pandemic had a negative effect on students and educational institutions (Abebe et al., 2017). Schools were forced to close due to the pandemic all throughout the

world, allowing students to follow socially distant learning methods. This abrupt great transition is accompanied by a number of difficulties. This wasn't the first time that conventional teaching methods have been suspended. Both the H1N1 Flu outbreak and the SARS corona virus (SARS-CoV) had a severe impact on the educational process in 2009 in numerous nations with traditional education program (Adnan and Anwar, 2020).

Students' performance has been impacted by the switch from traditional learning to "E-learning," as well as the psychological discomfort brought on by the concomitant experience of lockdown (Alavudeen et al., 2021).

Students may be more vulnerable to physical inactivity and psychological disorder during the E-learning time as a result of schools being closed. Therefore, it is urgent and crucial to emphasize the relevance of this population's physical and mental health. Sitting too long or living a sedentary lifestyle increases the chance of developing non-communicable illnesses like diabetes or obesity. These conditions may frequently coexist with mental health issues or even cause them (Stien et al., 2019).

During the online study time, students would be less likely to exercise and more likely to suffer from life stress and psychological problems (Chu and Li, 2022). When examining how COVID's impact on student health and education has been investigated, growing Middle Eastern nations have received little consideration.

AIM OF THE STUDY

The current study will bridge a gap in the body of knowledge on how using E-learning affects students' health. Current study aimed to examine and determine the impact of E-learning on the educational process and students' health during the COVID-19 pandemic.

Ethical consideration:

1. Before the participants in the study were enrolled, their parents or caregivers provided written consent.
2. The ethical committee of the Fayoum University Faculty of Medicine accepted this study (R300). Study procedures were conducted out in conformity with the Helsinki Declaration's ethical principles.
3. The caregiver for the patient is free to leave the study at any time.

4. Results of the study were kept private.
5. Neither funding nor a conflict of interest was disclosed by the authors for this study.
6. No funding was provided for the research or publications.

Sample size calculation:

According to Epi Info 2000, the sample size of 500 students was determined with an accuracy of 2% and a 95% confidence interval. To overcome the non-responses and data missing, the sample was 10% larger. Sample type was a convenient sample. (CDC Epi info V7.0.8.3).

PATIENTS AND METHODS

Study design:

In Fayoum city, this analytical cross-sectional survey was carried out during November 2022 on school children.

Inclusion Criteria:

- Students aged between 6 and 18 years old.
- Both males and females students in some primary, preparatory, and secondary school children who can use computers and experience E-learning during Covid-19 pandemic in Fayoum Governorate.
- Students of general education.

Exclusion Criteria:

- Students aged below 6 and above 18 years old.
- Students of technical education.
- School children who can't use computers and experience E-learning during Covid-19 pandemic.

Questionnaire:

Students were exposed to online questionnaire form which included four sections totaling 24 items. With clear directions on how to complete it, the online survey (a Google form) was created in Arabic and posted on social media (Facebook and Whats App).

The questions were created to cover the aforementioned theme areas. The questions' phrasing and structure were carefully considered since it is essential to convey the meaning and intent of a question to the responder through the choice of words and phrases in a question so that all respondents understand it in the same way. After the survey questions were created, careful consideration was given to their placement in the questionnaire.

In the first section, age, sex, and academic grade were among

the three items of demographic factors included to be answered by the respondents.

In the second section, Four items about the effectiveness of computer use, capability of online communication, accessibility to the internet, and troubles with internet connections were covered .In the first two items, respondents to this survey were asked to rate them on a Likert scale, with 3 signifying agreement and 1 signifying disagreement. In the third item about accessibility to the internet, respondents asked to answer by "Yes", "No" or "to some extent". In the fourth item about troubles with internet connections, respondents asked to choose whether they don't have enough experience to deal with internet due to lack of digital knowledge or due to greater expense of E-learning or finally due to interruption of internet connections due to technical issues.

In the third section evaluated how E-learning affected the educational process. It included 10 items, such as the impact of E-learning on academic achievement, teamwork encouragement, and time management support for students, time and effort savings, and facilitating college discussion. Along with whether it attracted to

students, if it might be included into all curricula, whether it is superior to traditional education and to what extent traditional education is still required. The last question concerned the length of the online learning session after which students lost focus. Respondents to this survey were asked to rate the first nine questions on a Likert scale, with 3 signifying agreement and 1 signifying disagreement. The tenth question offered many options for scoring ranging from 15, 30, 60, or more than 60 minutes.

In the fourth section, six categories were evaluated by seven questions (items) to determine how E-learning had an impact on students' health in terms of the following areas: infection rate, attention span, self-confidence, degree of behavioral

and mood disturbance, appetite disorders, and sleep disorders. In this section respondents asked to answer by "Yes", or "No".

Statistical Analysis:

Version 22 of the Statistical Program for Social Science (SPSS) was used to analyze the data. The mean and standard deviation were used to express quantitative data (SD). Frequency and percentage were used to express qualitative data. The subsequent tests were conducted: In order to evaluate proportions between two qualitative factors and probability, the Chi-square (X²) test of significance was applied (P-value). P-values of 0.05 were used to determine significance in statistics. (BM SPSS statistics V22).

RESULTS

In our study, 520 students were involved, for the first section of analysis, 225 (43.3%) female and 295 (56.7%) male existed. Students' ages varied from 6 to 18 years old, with a mean age of 11.2 ± 2.2 years.

Table (1): Comparisons of the E- learning medical consequences between various academic grades during the Covid-19 Pandemic

Effect of E-learning	Primary (N=390)		Preparatory (N=105)		Secondary (N=25)		P-value
	No.	%	No.	%	No.	%	
Mood and behavior							
Negative	225	57.7%	70	66.7%	10	40%	0.03*
Positive	165	42.3%	35	33.3%	15	60%	
Self-confidence :							
Negative	275	70.5%	75	71.4%	25	100%	0.006*
Positive	115	29.5%	30	28.6%	0	0%	
Attention							
Negative	205	52.6%	50	47.6%	10	40%	0.4
Positive	185	47.4%	55	52.4%	15	60%	
Academic achievement							
No effect	145	37.2%	40	38.1%	5	20%	0.2
Worsen	95	24.4%	20	19%	5	20%	
Improve	150	38.5%	45	42.9%	15	60%	
Lower incidence of infection							
Negative	140	35.9%	55	52.4%	15	60%	0.001*
Positive	250	64.1%	50	47.6%	10	40%	
Sleep disorders (insomnia, nightmares, few sleep hours)							
Negative	225	57.7%	65	61.9%	10	40%	0.1
Positive	165	42.3%	40	38.1%	15	60%	
No effect	55	33.3%	5	12.5%	0	0%	<0.001*
Decreased	20	12.1%	0	0%	0	0%	
Increased	90	54.5%	35	87.5%	15	100%	
Appetite							
No effect	250	64.1%	80	76.2%	15	60%	0.004*
Decreased	65	16.7%	10	9.5%	0	0%	
Increased	75	19.2%	15	14.3%	10	40%	

Students' primary and preparatory educational grades were 390 (75%) and 105 (20.2%), respectively, while 25

(4.8%) were in secondary grades. For academic grade, E-learning showed a passive effect on secondary school students'

behavior and mood, as well as an increase in sleep and appetite disorders (p-value 0.01, 0.001, and 0.004 respectively). However, more primary school students' levels of self-confidence were passively changed, and they showed a significant decline in infection rates (p-value 0.006, and 0.001 respectively) as shown in **Table (1)**.

For the second section, for the first two items, 50 (9.6%) pupils use computers ineffectively, compared to 105 (20.2%) who use them to some extent and 365 (70.2%) who use them effectively. Electronic communicators that are good

represent 440 (84.6%), those that are poor are 15 (2.9%), and 65 (12.5%) are in the middle. Regarding internet accessibility, "Yes" respondents make up 420 (80.8%), "No" respondents were 35 (6.7%), and "To some extent" respondents were 65 (12.5%). For the 4th item 445 students (85.6%) reported having difficult accessing the internet for E-learning due to a lack of digital knowledge, where 70 students (13.5%) complained about the greater expense of E-learning and 5 students (1%) had trouble with interruption of internet connections due to technical issues.

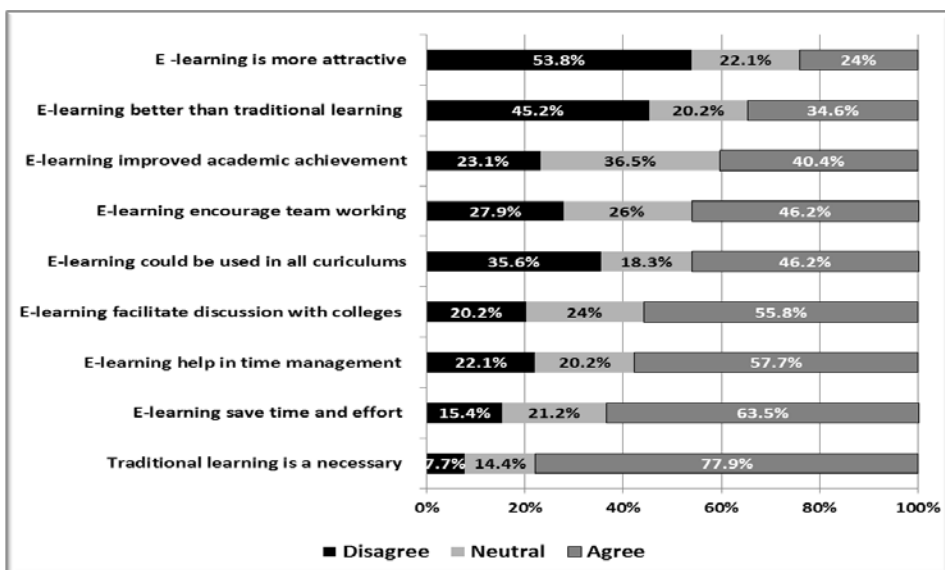


Figure (1): Impact of E-learning on education process during Covid-19 pandemic.

For the third section, 210 (40.4%) of the participants said they found it difficult to concentrate during E-learning sessions that lasted longer than 60 minutes, while 135 (26%) said they did so after around 60 minutes. Only 115 students (22.1% of the total) and 60 students (11.5% of the total) reported losing attention after 30 and 15 minutes, respectively. Traditional learning was deemed necessary by parents (77.9%) in addition to E-learning in the educational process because it

saved time and effort(63.5%), helped students manage their time (57.7%), and allowed for communication with colleges (55.8%). 46.2% of respondents thought that E-learning could be used in all curricula, and it promotes teamwork. E-learning, in their opinion (40.4%), increased students' academic achievement. Only 34.6% of respondents said they preferred online learning to traditional methods, and 24% said students find E-learning attractive as shown in **Figure (1)**.

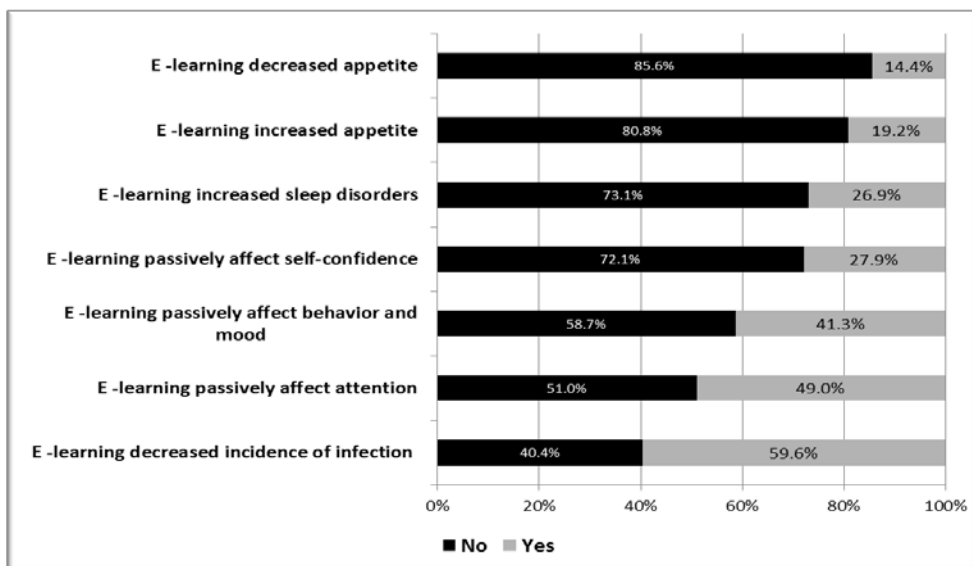


Figure (2): Impact of E-learning on students' health status during Covid-19 pandemic

For the fourth section, results illustrated that, 59.6% of parents said that E-learning reduced the likelihood of infection. However, E-learning increased students' appetite (19.2%) and sleep

disorders (26.6%). E-learning passively affected students' attention in 49% of students, behavior and mood in 41.3%, and self-confidence in 27.9% of students as shown in **Figure (2)**.

Table (2): Comparisons of the E- learning medical consequences between various genders during the Covid-19 Pandemic

Effect of E-learning	Male (N=226)		Female (N=294)		P-value
	No.	%	No.	%	
Mood and behavior					
Negative	145	64.2%	160	54.4%	0.01*
Positive	81	35.8%	134	45.6%	
Self-confidence					
Negative	181	80.1%	194	66%	<0.001*
Positive	45	19.9%	100	34%	
Attention					
Negative	125	55.3%	140	47.6%	0.09
Positive	101	44.7%	154	52.4%	
Academic achievement					
No effect	80	35.4%	110	37.4%	0.01*
Worsen	66	29.2%	54	18.4%	
Improve	80	35.4%	130	44.2%	
Lower incidence of infection					
Negative	56	24.8%	154	52.4%	<0.001*
Positive	170	75.2%	140	47.6%	
Sleep disorders (insomnia, nightmares, few sleep hours)					
Negative	140	61.9%	160	54.4%	0.09
Positive	86	38.1%	134	45.6%	
No effect	10	11.6%	50	37.3%	<0.001*
Decreased	20	23.3%	0	0%	
Increased	56	65.1%	84	62.7%	
Appetite					
No effect	130	57.5%	215	73.1%	0.001*
Decreased	40	17.7%	35	11.9%	
Increased	56	24.8%	44	15%	

For gender difference, although E-learning increased female students' academic achievement, it considerably decreased their self-confidence and had a passive impact on their behavior and mood (p-value 0.001, and 0.01 respectively). However, in addition to an

increase in appetite, males were more likely to have an increase in sleep disorders in children who already had them (p-value 0.001). Additionally, it was believed that E-learning contributed to a decline in infection rates (p-value <0.001), as shown in **Table (2)**.

DISCUSSION

Today's technology allows everyone to learn at any time, wherever in the world, and breaks down geographical borders (**Thabet and Kalyankar, 2014**). The primary goals of E-learning are to make education more widely available, reduce costs, and save time. These three goals together help students do better academically (**Mather and Cummings, 2015**).

The current study found that E-learning showed a passive effect on secondary school students' behavior and mood, as well as an increase in sleep and appetite disorders in contrast to primary school students' levels of self-confidence which were passively changed, and a significant decline in infection rates was observed.

Similarly, **Sulla et al., 2022** found that, students' academic performance and quality of life may have been affected by the Covid-19 pandemic.

Among Jordanian students **Al-Salman et al., 2022** concluded that the long-term use of digital tools, a lack of in-person connection, and a high workload of tasks in educational process have caused anxiety, changed sleeping patterns, distraction, and a stressful environment that may have contributed to depression.

Canadian study concluded that since it goes against the assumption that teenagers would sleep more if they had the opportunity, the lack of change in sleep duration during the COVID-19 pandemic was a bit of a surprise (**Simon Fraser University, 2021**).

Indeed, the majority of pupils in the current study use computers effectively with good electronic communicators but unfortunately the majority had trouble accessing the internet for E-learning due to technical difficulties and a lack of digital knowledge in addition to difficulty to concentrate during E-learning sessions. A minority complained the greater expense of E-learning, and trouble focusing throughout the E-learning sessions due to interruption of internet connections.

In agreement of **Rajabalee and Santally, 2021** findings, even now, some academic institutions have trouble utilizing online education, which is insufficient to raise students' test scores.

In contrast, due to the rapid advancement of internet technology, E-learning has increasingly taken the place of traditional classroom instruction in many educational institutions. (**Rajabalee and Santally, 2021**). According to **El Mhouthi et al., 2018** E-learning has a competitive

advantage and is adopted by many schools, which has an impact on students' academic progress.

Our study concluded that the majority of parents thought that E-learning were deemed necessary in addition to traditional learning in the educational process because it saved time and effort, helped students manage their time, and allowed for communication with colleges. Furthermore, 46.2% believed that E-learning could be incorporated into all curricula.

In another study by **Pham et al., 2019** they showed that E-learning is markedly impacted by these factors like decrease workload, time saving and technology. They concluded that by using advanced technology they can develop their E-learning process in developed form which is easy to understand by everyone.

The lectures and direct interactions that students have with their peers and professors in person have been missed. Only 18.9% of students claimed to be interested in E-learning entirely in the long run, with students declaring that it could not replace traditional learning experiences (**Sulla et al., 2022**).

In contrast, due to the limited resources of educational institutions, a previous study in Pakistan conducted by **Mahmood,**

2021 who concluded that traditional classroom learning was more effective as compared to online learning or distance education especially in underdeveloped countries, where a great percentage of students had difficulty to access the internet due to technical and financial issues.

For gender difference, the present study showed that E-learning increased female students' academic achievement, it considerably decreased their self-confidence and had a passive impact on their behavior and mood. In contrast, males were more likely to have an increase in sleep disorders and appetite and decrease in incidence of infection.

Longer periods of time spent on laptops and phones for education have a negative impact on students' mental and physical health (**Manisha and Pooja, 2021, Komal, 2020**).

School closings had an impact on students' mental health when physical activity declines noticeably throughout the online learning session for both male and female students (**Chu and Li, 2022**).

Unlike other studies which didn't focus on how does E-Learning affect health, our study concluded that E-learning reduced

the likelihood of infection but increased students' appetite and sleep disorders and it passively affected students' attention, behavior, mood and self-confidence as shown in **Figure (2)**.

Consequently, E-learning was an ideal option during Covid-19 pandemic to reduce the incidence of infection but nowadays; combined traditional and E-learning is optimal.

LIMITATIONS

There is a paucity of data regarding medical effects of E-learning on children especially during Covid-19 pandemic. Data are self-reported from children's mothers and difficulty with recall should be in mind. Small sample size is one of the limitations of this research study. Future researches should increase the sample size. As the results are only based on students' opinions, the inclusion of faculty opinions in future studies help in understating the issues faced by instructors regarding online education.

CONCLUSIONS

E-learning is a great alternative for safeguarding the health of professors and students during the COVID-19 pandemic, but it is not as successful as traditional learning. E-learning cannot reach its target objectives in

underdeveloped countries where a great majority of students are unable to access the internet due to technical as well as financial issues. As a result of spending more time online for longer periods for school, students' infection rate, mood, behavior, self-confidence, appetite, sleep and academic achievement have been impacted.

RECOMMENDATIONS

All countries must deal with digital literacy through training to their institutions so better learning outcomes can be reached. Create preventative measures aimed at increasing physical activity. It is advised to closely monitor the long-term change in mental health given the link between inactivity and mental disease.

Authors Contributions:

H.H.S.: Create the idea, conceived the study, design; and shared in drafting, editing and revision of the manuscript.

A.Y.E.: conceived the study, design, statistical analysis; and shared in drafting, editing and revision of the manuscript.

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