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Original article

Knowledge about COVID-19 Pandemic and Learning Practices Satisfaction among University Students in Beni-Suef and October 6 Universities

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Article Info	Abstract
Article history:	Background: The COVID-19 pandemic has had a huge
Accepted 24 September 2024	impact on Egypt's educational system, shifting from
Corresponding Author:	traditional lectures to online platforms. Universities have
Mennat-Allah Ashraf	begun to offer online courses through many platforms, but
Elmessery	many lack proper training or standardized learning
mennaashraf_21@hotmail.com	systems. Objective: To assess the knowledge of medical
	and non-medical university students about COVID-19 and
Keywords	their satisfaction with learning practices during the
COVID-19	pandemic lockdown. Subjects and Methods: A cross-
medical and non-medical	sectional study was conducted from November 2022 to
students	July 2023. Data were collected from 770 participants using
e-learning	a structured online questionnaire aimed to assessing
hybrid system	university students' knowledge about COVID-19 and e-
attitude	learning practices. Results: It was found that 89.5% of
and preventive measures.	students had a good level of knowledge about COVID-19.
	91.3% of the participants got their information from social
	media. More than 98% of students have a positive attitude

and are practicing preventive measures against COVID-19. Most students preferred hybrid learning 66% ,52.9% perform better in online exams than traditional. The main difficulties reported in online learning were lack of internet signal 80.8%, noisy environment 73.1% and distraction due to mixed methods 69%, while positive aspects were reducing infection 86.9% and managing time 80.8% engagement in new activities 70.5%. Conclusions and Recommendations: Most students had a good level of knowledge, a positive attitude, and a good knowledge of COVID-19. The medical students had an additional understanding of COVID-19. Most students prefer hybrid systems of learning and have expressed certain difficulties. Future research should focus on investigating the capability of graduates from a hybrid model compared to a traditional model for future planning to ensure the resilience of the educational system.

1. Introduction:

Coronavirus disease 2019 (COVID-19) is an emerging respiratory disease caused by a single-strand, positive-sense ribonucleic acid (RNA) virus, severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) virus (1).

Individuals have clinical symptoms of fever, cough, and shortness of breath with an incubation period of 14 days following exposures to the virus (2).

A systematic review on COVID-19 patients showed that individuals with hypertension, diabetes, cardiovascular and respiratory system diseases were the most vulnerable groups (4). The current pandemic of COVID-19 is propagated from human-to-human transmission by small droplets from the nose or mouth which are spread when a person with COVID-19 coughs or exhales (5)

The virus, transmitted through air, is characterized by fever, cough, fatigue, lung infection, breathing difficulties, headache, runny nose, diarrhea, sore throat, or nasal congestion. (6).

People at high risk for COVID-19 infection include elderly, children, pregnant women, smokers, immune-compliant individuals, and those with chronic diseases. Beliefs about COVID-19 come from stereotypes, government information, social media, personal experiences, and medical sources. (7).

The successful implementation of e-Learning systems depends on how the program is performed by students and instructors (8). Though online teaching is one of the promising alternatives to the physical classroom, students show а negative perception of online learning behavior which might be a significant consequence that is responsible for psychological distress. (9) Technological crack-ups in e-Learning often result in lack of software and hardware support, causing psychological distress among college students due to negative perceptions. (11).

Lower-income students face limited access to online classes due to digital inequalities and lack of modern technology, while excessive internet costs also pose an obstacle. (10).

2. Patients and Methods:

2.1. Study Type and Sampling

This study was a cross-sectional analytical study was conducted to collect data from students at Beni-Suef and October 6 universities, targeting both medical and nonmedical students. Participants were recruited through announcements on official university websites and social media platforms. All students were encouraged to share the survey link to enhance distribution. The sample size was calculated using Epi-info stat-calc, determining a minimum of 384 students per university at a 95% confidence level and a 5% margin of error.

2.2. Data Collection Methods

Data was collected using a self-administered, structured online questionnaire, which was pilot tested before the main study. The questionnaire consisted of three sections:

Sociodemographic Information: Age, gender, education level, course, and year.

Knowledge of COVID-19: Awareness of transmission modes and preventive measures based on WHO guidelines.

Perception of Online Learning: Insights into students' experiences with online education.

2.3. Data Analysis:

Sociodemographic Features: The study collected data on participants' sociodemographic characteristics such as age, sex, education level, course, and year.

Knowledge Assessment:

Structure: Composed of two parts, with the first containing 37 questions on COVID-19 knowledge.

Scoring: Correct answers scored 1 point, while incorrect or unknown responses scored 0. Total scores ranged from 0 to 37 and were converted to a percentage.

Knowledge Levels:

High: 31-37 points (80%-100%)

Moderate: 19-30 points (50%-80%)

Low: 0-18 points (0%-50%)

Information Sources: Included a question on primary sources of COVID-19 information.

Attitude Assessment:

Structure: Consisted of 6 statements measured using Likert scales.

Scoring: Positive attitudes scored from 1 to 5, while negative attitudes had reversed scoring. Total scores ranged from 0 to 24.

Attitude Levels:

High: 20-24 points (80%-100%)

Moderate: 13-19 points (50%-80%)

Low: 0-12 points (0%-50%)

Practice Assessment:

Structure: Comprised 12 items, with responses as "always," "sometimes," or "no," and "yes" or "no" for some questions.

Scoring: Scoring varied based on response type, with total scores ranging from 0 to 36.

Practice Levels:

High: 30-36 points (80%-100%) Moderate: 19-29 points (50%-80%)

Low: 0-18 points (0%-50%)

Student Experience: Included questions about students' perceptions and experiences regarding online learning.

Statistical Analysis: Data were analyzed using SPSS 28.0, involving steps such as editing, coding, and statistical summarization, including:

- Use of Chi-square (χ²) tests for categorical variables.
- Mann-Whitney and Kruskal-Wallis tests for non-normally distributed quantitative data.
- Z tests for two sample proportions.
- Spearman correlation coefficients for variable associations.
- Statistical significance was set at p ≤ 0.05, with higher significance at p ≤ 0.01.

2.4. Ethical Considerations

The study was approved by the FMREC at Beni-Suef University with approval No. (FMBSUREC/10042022/Elme ssery) and the October 6 University Ethical Committee. Prior to data collection, official permissions were obtained from the dean of the faculty of Medicine Beni-Suef University. Before the study, written informed consent was obtained from all participants, after explaining the objectives of the work. Confidentiality was maintained throughout, participants were informed and that demographic questions were for identifying characteristics rather than individual identities. Participation was voluntary, and students were allowed to provide feedback or decline participation.

3. Results:

3.1. Demographic Characteristics of the Studied Participants:

The study involved 770 participants, with a median age of 20 years; 53.1% were female. The majority (73%) were from Upper Egypt and frontier governorates, while 67.1% were enrolled in medical faculties. Regarding parental education, 70.5% of participants' parents were university graduates, and 35.2% worked in clerical positions.

3.2. Knowledge About COVID-19:

Medical students demonstrated significantly better knowledge compared to non-medical students across various areas: modes of transmission (p < 0.05), high-risk groups (p < 0.05), symptoms and signs (p < 0.05), and preventive measures (p < 0.05). The median total knowledge score was 29.0 (range: 26.0-32.0) for medical students versus 28.0 (range: 24.0-31.0) for non-medical students, **Table (1)** with a highly significant difference (P <0.001). Social media was the primary source of information for both groups (91.3%) Table (2)

Table (1): Measures of participants' knowledge about COVID-19 disease.

Group knowledge	Medical students (No.=517)	Non-medical students (No.=253)	Total (No=770)	Mann- Whitney Test p value	
Median (IQR)	29.0 (26.0-32.0)	28.0 (24.0-31.0)	29.0 (25.0-32.0)		
Range	9.0-37.0	9.0-26.0	9.0-37.0	<0.001*	

*P value ≤0.05 is considered statistically significant

Group Knowledge items	Medical students (n=517)		Noi stu	n-medical dents n=253)	Total study sample (n=770)	
	No	%	No	%	No	%
TV	315	60.9	170	67.2	485	63.0
Social media	472	91.3	231	91.3	703	91.3
Newspapers	170	32.9	92	36.4	262	34.0
Friends	347	67.1	175	69.2	522	67.8
Relatives in the medical field	459	88.8	213	84.2	672	87.3
Relatives not in the medical field	159	30.8	85	33.6	244	31.7
University	361	69.8	165	65.2	526	68.3

 Table (2): Primary source of information about the COVID-19 disease among the study

participants.

3.3. <u>Attitudes and Practices Toward</u> <u>COVID-19:</u>

While 79% of students reported changes in daily activities due to protective measures, no significant difference was found between medical and non-medical students in their attitudes toward COVID-19(p = 0.960). Vaccination uptake was high, with 95.8%

having received the COVID-19 vaccine. Moreover, 89.9% consistently practiced handwashing after using the toilet (**Table 3**). A significant difference in practice scores was observed between the two groups (P = 0.003), although overall practice measures showed no significant difference (p = 0.060) **Table (4)**.

COVID-19 Attitude items		Total (No=770)	%	
	Agree	608	79.0	
Changes of daily activities	Neutral	140	18.1	
	Disagree	22	2.9	
Worry about being infected when going to university	Agree	437	56.8	
	Neutral	216	28.1	
	Disagree	117	15.1	
	Agree	523	67.9	
Fear of meeting people who have flu symptoms	Neutral	165	21.4	
	Disagree	82	10.7	
	Agree	566	73.5	

 Table (3): Attitude toward COVID-19 disease among the study participants

Disease can be prevented by quarantine	Neutral	149	19.4
measures	Disagree	55	7.1
Spread can be reduced through health education and raising awareness	Agree	652	84.7
	Neutral	70	9.1
	Disagree	48	6.2
	Agree	258	33.5
Combating Measures in Egypt is effective	Neutral	253	32.9
	Disagree	259	33.6

Table (4): Practice score about COVID-19 disease among stud	y partic	ipants
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Group	Medical students (No.=517)		Non- medical students (No.=253)		Total (No.=770)		χ^2 p value
*Practice score	No.	%	No.	%	No.	%	
Low practice score	43	8.3	41	16.2	84	10.9	
Moderate practice score	304	58.8	127	50.2	431	56.0	0.003*
High practice score	170	32.9	85	33.6	255	33.1	

* Practice score: Low (0.0-18.0), Moderate (19.0-29.0), High (30.0-36.0)

**P* value ≤0.05 is considered statistically significant

<u>3.4. Gender Differences in Knowledge and Attitudes:</u>

Female participants had a higher median knowledge score (28.0; range: 24.0-31.0) compared to males (26.0; range: 22.0-30.0), with a significant difference (P = 0.002). Strong correlations were found among knowledge, attitudes, and practice scores (p < 0.05).

<u>3.5.</u> <u>E-Learning Experience:</u>

Most participants (66%) prefer hybrid system as a way of learning, **Figure (1).** Regarding the e-learning methods (84.2%) preferred live broadcasts for lectures, with 63.8% attending online classes less than three days a week. While 84.5% had basic computer skills, only 49.5% found e-learning useful. The primary obstacles to e-learning included a noisy environment (73.1%) and poor internet quality (80.8%). Conversely, 67.8% reported positive aspects, including self-care and personal growth, and 86.8% noted that e-learning helped reduce the spread of COVID-19.





<u>3.6. Evaluations and Challenges in E-</u> Learning:

There was a significant difference in receiving direct evaluations for research assignments between medical and nonmedical students (p = 0.020). Medical students were more likely to report confusion from using multiple platforms and issues with internet availability as obstacles to e-learning compared to non-medical students (p < 0.05). However, no significant differences were noted in the perceived positive aspects of e-learning.

4. Discussion:

The study revealed that medical students possess a significantly higher level of knowledge regarding COVID-19 compared to non-medical students. (p <0.05). This aligns with findings from an Egyptian survey (12) and international studies conducted in China (13), which similarly reported superior knowledge among medical students. Conversely, a study in Bangladesh highlighted inadequate knowledge among both the general population and healthcare workers while another Egyptian study (14),identified in understanding gaps prevention and control measures (15). The disparities may stem from varying educational curricula and the novelty of the COVID-19 pandemic.

Regarding sources of information, social media emerged as the primary channel for 91.3% of participants, followed by personal communication with relatives in the medical field, university friends, television, and newspapers .These results are consistent with findings from two Egyptian studies and one Saudi study, which also noted social media as a key platform for information dissemination (14)(16) In contrast, an Iranian study indicated that official guidelines from the WHO and CDC were the main sources of

knowledge, rather than social media (17) The present study indicated a moderate (62.7%) and high (36.3%) attitude score among students, with no statistically significant differences between groups. These findings align with regional studies in Iraq (18) which reported a positive attitude towards governmental regulations and media advocacy. Students prioritized safety measures such as avoiding crowds, wearing masks, and home isolation for confirmed cases (19). However, studies from Uttarakhand (20) noted that female students exhibited more positive attitudes than their male counterparts.

In terms of practical application, a moderate (56.0%) and high (33.1%) practice score was observed among students, with a statistically significant difference between medical and non-medical students (P=0.003). Additionally, a significant gender difference was noted, with females demonstrating better practices related to COVID-19 (P=0.002). This is consistent with findings from an Egyptian study that reported a high practice score among females (12). Another study indicated that early-year medical students were more focused on protective measures, while final-year students were concerned about underreported COVID-19 cases (15). High practice levels were also reported in Uttarakhand, where 98.6% of medical students adhered to social distancing and hygiene protocols (20).

The transition to e-learning during the pandemic was also examined. The study found that 66% of students preferred blended learning methods, with 84.2% participating in live broadcasts. These results are consistent with a meta-analysis indicating that blended learning enhances knowledge retention (21). However, some students expressed negative attitudes towards online learning due to technological challenges and limited resources (22). A study indicated that 62.9% found online learning manageable, with 76.9% appreciating the availability of classes during office hours (23).

Challenges faced during e-learning included distractions (69.0%), expensive internet (67.5%), and a lack of social interaction (66.5%). A study in Indonesia corroborated these findings, noting that technological barriers and network instability hindered online education (24).

Despite these difficulties, the positive aspects of e-learning were noted, including a significant reduction in infection rates (86.9%) and enhanced personal growth (67.8%). Similar sentiments were expressed in Saudi studies, highlighting benefits such as improved communication and flexibility (25). Overall, while the pandemic posed significant challenges to education, it also presented opportunities for innovation in learning methods.

5. Conclusion and Recommendation : The study revealed that 89.5% of university students have sufficient knowledge about COVID-19 prevention, with 99% having an optimistic attitude and 89% engaging in competent practices. Students primarily rely on official health administration websites for information. They have a moderate attitude towards e-learning and hybrid learning systems, but face challenges like poor internet connectivity and distractions.

The study recommended enhancing public health awareness and educational practices by

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raising students' awareness of preventive measures and high-risk groups. It also suggests fostering collaboration between administrations, improving software and internet connectivity

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