The Egyptian Journal of Hospital Medicine (October 2022) Vol. 89, Page 4332- 4339

Commitment to COVID-19 Protective Measures in Schools and among School Children, Egypt

Reda Abdel Latif Ibrahem, Aziza Saad Elbadry*, Shaimaa Yaihya Abdel Raouf
Public Health and Community Medicine Department, Faculty of Medicine,
Menoufia University, Menoufia Governorate, Egypt
***Corresponding author:** Aziza Saad Elbadry, **Mobile:** (+20) 01003784772, **E-mail:** azza_saad1984@yahoo.com

ABSTRACT

Background: School closure was taken as one of the international measures to combat the COVID-19 pandemic. After the recession of the first wave of COVID-19, reopening of schools was decided to gain the educational and psychological support proposed by schools, on condition that they apply strict hygienic measures in schools and by students to prevent the spread of infection. **Objective:** This study aimed to estimate the degree to which school students committed to hygienic measures related to COVID-19 prevention as well as estimate schools' commitment to public health measures related to COVID-19 as reported by students.

Patients and methods: A cross-sectional study was conducted in December 2020 on Egyptian school students. A stratified random sampling technique was used to select 20 basic education schools from the ten districts in Menoufia governorate, Egypt. A sample of 786 students were included and subjected to a self-administered questionnaire containing socio-demographic characteristics, students' commitment to hygienic measures related to COVID-19, and the commitment of the schools to preventive measures of COVID-19.

Results: The studied students were 52.3% males with an average age ranging from 6 to 15 years. About 55.1% were from rural residences and 92% of them were with adequately educated mothers. Hand washing practice was mostly done after returning home from outside (95.2%). More than 95% of them wore masks at school entry but only 39.2% continued wearing them throughout the day. Students' commitment was significantly related to older age students, females, urban residence, and mother's education. **Conclusion:** Commitment of students to hygienic measures against COVID-19 improved mainly with increasing age, female sex, urban areas, and with higher education of mothers. Also, it was significantly correlated with the school's commitment score, so continuing health education and training of parents and students, especially those who are young, will improve students' commitment.

Keywords: COVID-19 infection, Preventive measures, School children.

INTRODUCTION

The outbreak of coronavirus disease (COVID-19) has been declared a Public Health Emergency of International Concern (PHEIC) and the virus has now spread through many countries and territories. On March 12, 2020, the WHO declared it as a pandemic, requiring urgent joint international efforts to control it. Public awareness of infectious viruses remains the most important factor in limiting disease spread [(1)].

Compared to adults, young children appear to be less susceptible to infection, with age often leading to an increase in susceptibility [(2)]. All children are vulnerable to and capable of spreading SARS-CoV-2. Compared to cases in older children and adults, SARS-CoV-2 infections in younger children seem to result in subsequent transmission less frequently. According to surveillance statistics, children between the ages of one and eighteen had considerably lower rates of hospitalization, serious illness requiring in-patient treatment, and mortality than any other age group. Research is urgently needed to identify the precise impact of COVID-19 and its long-term effects on the pediatric population [(3)].

It's important for parents and caregivers to understand that children can be infected with SARS-CoV-2 and can transmit it to others. That is why it is important to use precautions and prevent infection in children as well as adults [(4)].

To stop the spread of the SARS-CoV-2 virus, nations all over the world are implementing extensive public health and social measures (PHSM), which may include closing schools. The impact of school opening on community transmission depends on adherence to preventative measures put in place by the government, since most nations are only gradually loosening restrictions on activities and social gatherings, including the reopening of schools. The spread of the illness must be stopped at all costs [(5)].

Shutting down educational facilities should only be considered when there are no other alternatives. In contrast, school closures have clear negative impacts on child health, education and development, family income, and the overall economy. National and local governments should consider prioritizing continuity of education by investing in comprehensive, multi-layered measures to prevent the introduction and further spread of SARS-CoV-2 in educational settings while also limiting transmission in the wider community [(6)]. Basic principles in schools are to keep students, teachers, and staff safe at school and help stop the spread of COVID-19 [(7)].

In Egypt, after the interruption of the scholastic year 2019/2020 after WHO declaration that COVID-19 is a worldwide pandemic, the Egyptian ministries of health and education settled precautions to limit the spread of infection, including decreased number of school days, decreased classroom crowding, and ensuring social distancing; mask wearing; hand hygiene; and availability of soap, alcohol, and other hand sanitizers; as well as, recording of cases that

Received: 03/05/2022
Accepted: 04/07/2022

appear in schools to decide class and school closure, as under the ministry's regulations, if more than one confirmed coronavirus case is detected in any class within two weeks, this class will be closed for 28 days. If more than one class is closed in one school within two weeks, this school will be closed for 28 days [8].

We assumed that evaluation and supervision of the degree of adherence to public health measures against COVID-19 spread by schools and among students would help to target the efforts to keep the school environment healthy.

This study aimed to estimate the practice related to the commitment of school students to hygienic measures related to COVID-19 prevention as well as estimate the measures taken by schools to prevent COVID-19 transmission as reported by students.

PATIENTS AND METHODS

A cross-sectional analytical study was conducted during the period from December 1st to December 7th, 2020, on a sample of primary and preparatory schools in Menoufia governorate, Egypt. A stratified random sample was used to select the studied schools from the ten districts in the Menoufia governorate. Two schools were selected from each district; one of them was rural and the other was urban, so, the total number of studied schools was 20 schools (10 schools from rural areas and 10 from urban areas). Students who attended the school regularly were eligible for participation in this study.

The studied students or their guardians (for young children who can't read yet) were subjected to a self-administered questionnaire; 850 questionnaires were distributed, and the students who approved and completed the questionnaire were 786 students, with a response rate of 92.5%.

The questionnaire was constructed by the researchers depending on the guidelines of the ministries of health and education, also depending on guidelines and checklists streamed by WHO, CDC, and UNICEF for the reopening of schools. The questionnaire was initially written in English and translated into Arabic by experts in Public Health [8-11].

The validity of the questionnaire, including content validity and construct validity, was performed by a panel of two epidemiologists and one infection control specialist. A pilot study was done on 50 students who were not included in the main study participants. It was done to determine the clarity of the questions and to assess internal consistency and test retest reliability, and then modifications were made accordingly. The questionnaire was further validated by a pilot survey of 30 students to evaluate the time needed to complete the questionnaire and to assure that all the questions were phrased clearly. Moreover, Cronbach's alpha of the final questionnaire was assessed as 0.81[12].

The questionnaire had 3 sections, including:

- Socio-demographic data like age, sex, residence, mother and father's education.
- Practices related to commitment of students to COVID-19 hygienic measures: it consisted of 10 questions, two of them had multiple correct answers with total score "5 points" for each, the remaining 8 questions were scored as 2 points for best answer, 1 point for "to some limit answer" and 0 point for worst answer; Forming a total score range for this section (0 – 26).
- School measures to combat COVID-19 spread it consisted of 9 questions. They were scored as 2 points for the best answer, 1 point for "to some limit answer" and 0 points for a bad answer; Forming a total score range for this section (0–18).

Ethics approval and consent to participate:

An approval was obtained from the Research Ethics Committee at Menoufia Faculty of Medicine, Egypt to conduct this study. Also, an approval from the Menoufia Directorate of Education was taken to allow collection of data from schools; a written consent was taken from students' guardians to allow their children's participation in this study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical analysis

SPSS (Statistical Package for Social Science) version 23 was used to collect, tabulate, and analyses the data on an IBM compatible computer (SPSS Inc., Chicago, IL, USA). The qualitative data was described as frequency and percentage. The Chi square test (X^2) was used to compare the qualitative data, while the Mann-Whitney U test was used to assess the relationship of scores with personal factors. Multivariate linear regression analysis was used to detect independent factors that affect the students' commitment scores. Spearman correlation was used to correlate the measured scores. A P-value of ≤ 0.05 was considered statistically significant.

RESULTS

This study was conducted on 786 school students in Menoufia governorate. They had a mean age 11.93 (SD 2.17) and ranged from 6–15 years. 52.3% of them were male, 80.5% were rural, and 94% of the students were in governmental schools. About 8% of mothers had basic education, 50.3% had secondary education, and 41.7% of them had high education. Only 35.9% of mothers were working, and about 95% of students' fathers were of secondary or high education (Table 1).

Table (1): Descriptive statistics of socio-demographic criteria of the studied students.

Variable	The studied students

	(N = 786)	
Age Mean ± SD Range	11.93 ± 2.17 6 – 15	
	N	**%**
Age(years) 6-10 11-15	 208 578	 26.5 73.5
Sex Male Female	 411 375	 52.3 47.7
Residence Rural Urban	 433 353	 55.1 44.9
Type of school Governmental Private	 629 157	 80.1 19.9
Mother education Basic Secondary High	 63 395 328	 8.0 50.3 41.7
Mother work Working Not working	 282 504	 35.9 64.1
Father education Basic Secondary High	 41 394 351	 5.2 50.1 44.7

N = number

About half (46.8%) of the participants documented that there was no temperature measurement at school entry; 34.1% mentioned that they didn't wear masks or face shields or only sometimes wore them; only 25.4% of students said that they had separate break time for each grade; and 42.9% of them documented that teachers and school workers always wear face masks when in contact with students.

At least 72.8% of students and 88% documented the stoppage of all activities that require group sharing; the availability of soaps in bathrooms and hand sanitizers in class rooms was documented by 37.7% of students; 95% of students mentioned that they receive health education cessions about COVID-19 at least sometimes; and 98% mentioned that the school authorities informed them at least once that in case of illness, they shouldn't go to school.

The total school commitment score was 9.54±3.72 and ranged from 1–15 (Table 2).

Table (2): Commitment of the studied schools to guidelines related to COVID 19 prevention.

Guidelines related to COVID-19 Prevention	**The studied students N = 786**	
	N	**%**
Measure temperature before school entry No Sometimes Yes	368 142 276	46.8 18.1 35.1
Mask and face shield essential for school entry No Sometimes Yes	180 88 518	22.9 11.2 65.9
Each class have separate time for break: No Sometimes Yes	534 52 200	67.9 6.6 25.4
Teacher and workers wear mask No Sometimes Yes	124 325 337	15.8 41.3 42.9
Good space between students in classroom and in line No To some limit Yes	48 166 572	6.1 21.1 72.8
Availability of hand sanitizer in toilet and classroom No Sometimes Yes	345 145 296	43.9 18.4 37.7
Presence of clean trash pin No Sometimes Yes	11 83 692	1.4 10.6 88.0
Presence of health education COVID-19 No Sometimes Yes	39 187 560	5.0 23.8 71.2
Orders of not going to school in case of illness No Sometimes Yes	16 681 89	2.0 86.6 11.3
Total score Median (IQR)	11 (9 – 13)	

IQR = interquartile range

In table 3, hand washing practice was after toilet, return to home, sneezing and coughing, before eating, after touching anything outside with maximum percentage after returning from outside (95.2%). About 83.7% of the studied students always wear a mask or face shield when going to school, but only 39.2% kept wearing the mask throughout the school day. About 95% of the studied students took alcohol or sterilizing tissue to school, while 28.1% didn't use them at all, and 26.3% of the students sometimes use them. Practices that were used in families to reduce disease transmission mainly were hand washing (87.7%), home daily natural ventilation (58.1%), and reminding family members to wear masks (55.5%).

Table (3): Commitment of the studied students to COVID 19 hygienic preventive measures

COVID 19 Hygienic Preventive Measures	The studied students (N = 786)	
	No.	%
Washing hand after		
Toilet	742	94.4
Return home from outside	748	95.2
Sneezing and coughing	544	69.2
Before eating	554	70.5
After touching anything outside	568	72.3
Frequent hand washing		
No	70	8.9
To some limit	172	21.9
Yes	544	69.2
Wearing mask or face shield on going to school		
No	28	3.6
Sometimes	100	12.7
Yes	658	83.7
Remove mask or face shield in school		
No	308	39.2
Sometimes	152	19.3
Yes	326	41.5
Taking alcohol based sanitizers on going to school		
No	56	7.1
Sometimes	386	49.1
Yes	344	43.8
Using alcohol based sanitizers before eating or after toilet		
No	221	28.1
Sometimes	207	26.3
Yes	358	45.5
Respiratory etiquette		
No	21	2.6
Sometimes	143	18.2
Yes	640	81.4
Disposal of tissue into the trash after its use		
No	83	10.6
Sometimes	166	21.1
Yes	537	68.3
Remember to not touch your face , eyes or mouth		
No	165	21.0
Sometimes	121	15.4
Yes	500	63.6
Sharing your special equipment's with your friends		
No	624	79.4
Sometimes	106	13.5
Yes	56	7.1
Doing to reduce transmission of this disease:		
Sharing information about this disease	223	28.4
Remember my family to wear mask	436	55.5
Encourage my family don’t go out and avoid gathering	198	25.2
Frequent home ventilation	457	58.1
Frequent hand washing	689	87.7
Don’t do anything	38	4.8
Total score		
Median (IQR)	18 (16 – 19)	

IQR = interquartile range

There was a statistically significant relationship between increasing students' commitment scores and increasing students' age, female sex, urban residence, and mothers with secondary and high education, but the relation was not significant with mother's work, father's education, and type of school.

On performing multivariate linear regression analysis, older age, female sex, and high maternal education were the independent predictors for high students' commitment scores (Table 4).

Table (4): Univariate analysis and multivariate regression analysis for factors affecting student commitment to protective measures of COVID-19

Variable	Student commitment score		P value	Multivariate analysis			
	Mean ± SD	Range		SE	Standardized β	P value	95% CI
Age							
6 – 10	16.62 ± 2.97	7 – 23	0.047	0.07	0.34	0.04	0.02 - 0.95
11 – 15	17.12 ± 2.70	5 – 24					
Sex							
Male	16.49 ± 2.73	7 – 24	0.001	0.13	0.44	<0.001	0.35 - 1.16
Female	17.53 ± 2.74	5 - 24					
Residence							
Rural	17.14 ± 2.67	5 – 24	0.03	0.15	0.27	0.36	0.12 - 1.11
Urban	16.34 ± 3.15	7 – 23					
Mother education	16.62 ± 2.13	5 – 23	0.001	0.03	0.87	0.02	0.12 - 1.25
Basic	17.84 ± 3.15	7 – 24					
Intermediate	17.95 ± 1.66	13 – 24					
High							
Mother work							
Working	17.06 ± 3.01	5 – 24	0.56				
Not working	16.94 ± 2.65	7 – 24					
Father education:	16.68 ± 2.08	5 – 23	0.57				
Basic	17 ± 2.39	9 – 23					
Intermediate	17.13 ± 3.23	11 – 24					
High							
Type of school							
Governmental	16.93 ± 2.75	3 – 23	0.12				
Private	17.91 ± 3.16	7 – 22					

SE = standard error, 95%CI = 95% confidence interval

A significant positive correlation was found between the school's commitment score and the students' commitment score (Figure 1).

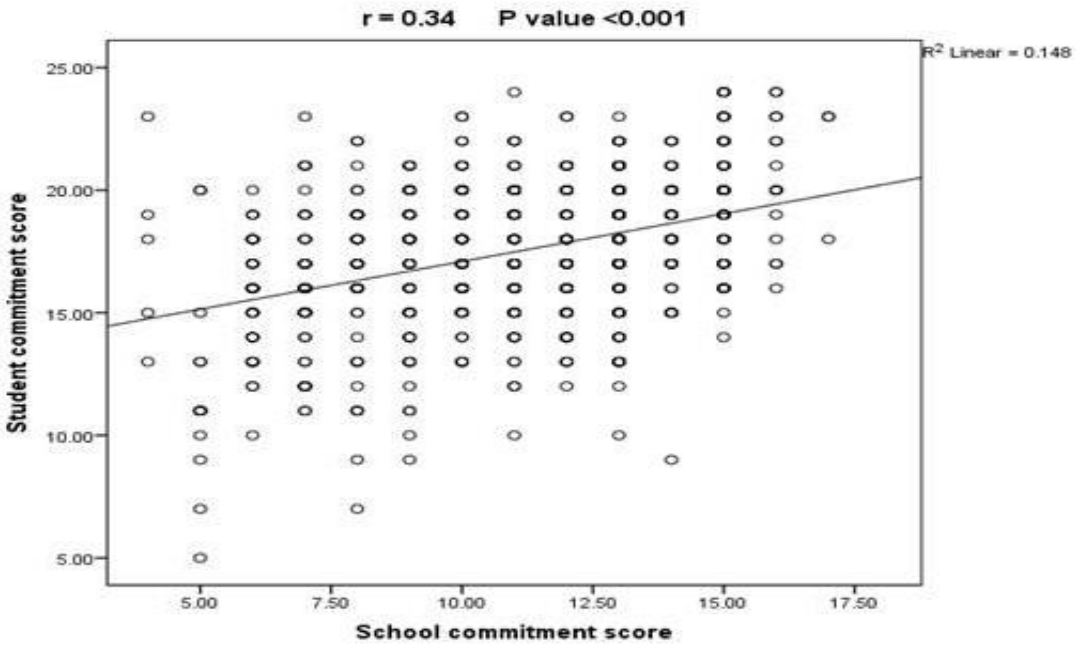

Figure (1): The school's commitment score and the students' commitment score.

DISCUSSION

Returning to school had taken on new meaning and a new set of worries for parents and other caregivers during COVID-19. Schools must now balance the educational, social, and emotional needs of their students along with the health and safety of students and staff during the evolving COVID-19 pandemic **(13).**

Assessing schools' commitment to public health measures should be taken during this pandemic as well as students' commitment to COVID-19 protective measures, which may help in supervising and educating the public to ensure safe school reopening during a pandemic.

To the best of our knowledge, there are no published reports about the commitment of Egyptian schools to public health measures recommended by local authorities. Measures taken by the school were quantified to know the points of power and determine the lag points needing support and improvement.

Following recommendations by public health authorities, temperature checks are being incorporated into public facilities, including schools, to reduce the spread of COVID-19. Hand-held non-contact infrared (IR) forehead thermometers were used because they are rapid, non-invasive, and hygienic. It is inaccurate method for temperature measurement compared with traditional thermometer but it was considered as a primary screening measure at entry point in public facilities including schools, it was mentioned that 46.8% of students documented the absence of temperature check at school entry, this is very low commitment but some reports indicated that its benefit is restricted as primary screening tool only and must accompany the other protective measures like hand washing and social distancing **(14).**

In the current work, 22.9% of students documented that they could enter school without wearing masks and 15.8% of them mentioned that school workers didn't wear masks. WHO instructs that mask should be worn in public settings and when around people who don't live in their household, in addition to staying at least 6 feet apart. A mask is not a substitute for social distancing **(15).**

Social distancing was ensured in schools through the reduction of attendance days to allow optimum distancing in classrooms and also the prevention of all scholastic activities that require gathering in groups, and in some schools (25.4%) taking separate break time for each grade to facilitate gathering control. Social distancing is the most important measure for COVID-19 spread control that significantly decreased the transmission of infection if any **(16, 17).**

The current work that included 786 school students from urban and rural areas in Menoufia governorate, Egypt, revealed that 91.1% of students had increased hand washing practice than usual. This was performed mostly on returning home (95.2%) and using the toilet (94.4%), while hand washing after coughing or sneezing, before eating, and on touching any surface had relatively lower percentages (69.2%, 70.5%, and 72.3%). **Xue *et al.* (18)** found that 96% of primary school students washed their hands in certain situations; 96% after the toilet, while 85.6% of them washed their hands after coughing or sneezing; 95.1% after getting home; 96.4% before meals; and 96.5% after touching objects outside the home. Also, **Shehata *et al.* (19)** explored that

93.9% of school students washed their hands after returning from outside and 86.3% washed them after eating. The relatively lower rate of hand washing after coughing or sneezing, before eating, and on touching any surface in the current work may be due to the fact that it measures hand washing practice in schools while **Xue *et al.*** [18] and **Shehata *et al.*** [19] performed their study on school students during the period of school closure after the beginning of the pandemic, as the children at home had better access to hand washing than in school and they replace it with the use of alcohol-based hand cleaners. **Subedi *et al.*** [20] found a relatively lower percentage, as 79.21% of students adopted hand-washing measures as a preventive strategy; the difference in these values reflected variation between different localities in the perspective of awareness and willingness of the community about COVID-19 prevention.

In response to Egyptian ministries of health and education that gave instructions that all students should wear face masks or face shields and take their own hand cleaner, students under this study mentioned that 96.4% of them wore masks at school entry and 93% of them took hand cleaner, while a considerable percentage of them documented that they sometimes forget them, which necessitates hard implementation of the instructions by school authority, **Shehata *et al.*** [19] explored that 67.8% of students wore face masks outside home, this may be attributed to that Shehata study was performed during school closure in July 2020, this reflected more commitment with face mace mask in our study, which may be due to fear from crowding in schools or due to school compulsion to wear mask.

Surprisingly, despite very good commitment to face mask and hand cleaning at school entry but a significant percentage of children took off their masks during the school day (41.5%) and didn't use hand cleaner (28.1%), these findings indicated that children in that age need more intimate supervision and more frequent health education about the importance of protective measures. similar results were noted by **Singh *et al.*** [21] who found that 98.7% used frequent hand washing or alcohol-based cleanser to protect against COVID-19 while relatively lower value was found by **Subedi *et al.*** [20], 77.23%reported using face mask, as previously mentioned, this difference may be explained by variation of socio-demographic criteria, cultural background, and economics in different communities.

Practicing respiratory etiquette was observed "always" in 81.4% of students and "sometimes" in 18.2% of them. **Singh *et al.*** [21] found that 97.4% of the participants performed respiratory etiquette when coughing or sneezing, while **Subedi *et al.*** [20] documented use of this practice in 81.19% of students and disposal of tissue into the trash after its use in 70.3%. These levels are good, but continuous education of students to increase awareness about respiratory etiquette and hygienic disposal of tissues to protect others is needed.

"Not touching face, eyes or mouth" is one of the preventive measures against infections especially COVID-19, our study revealed 21% of the students couldn't prevent themselves from touching their faces and 15.4% of them sometimes did that. According to **Kwok *et al.*** [22] who observed that among his participant students, they touched their faces 23 times per hour on average. So, children don't just need orders to not do that but much more they need practice tips to comply with such practice. Many sites published easy tips can comply with "don't touch face practice" [23].

Students who share their tools like food, water bottles or pens with their colleagues were 7.1%, but 13.5% of them sometimes did that. This needs health education to increase awareness about susceptibility of infection by such practice. This is documented as the SARS-CoV-2 virus transmitted through droplet infection, but it was confirmed that it could survive on surfaces and cause infection [24].

The results of the current work revealed a higher students' commitment score among older aged students, females than males, those from urban residences, and among students with highly educated mothers. This is in line with **Alves *et al.*** [25], who showed that females were engaged in more preventive behaviors than males. The same results were also found by **Peng *et al.*** [26]; also, **Yuan *et al.*** [27] found that the practice of COVID-19 preventive measures was less in males, those living in country areas, and younger aged students, and it improved also with better education.

CONCLUSION

Commitment of students to hygienic measures mainly increased in older students, among females, those with urban residences, and in those with adequately educated mothers. Students' commitment to hygienic measures was also significantly correlated with school commitment. Continuous health education and training of parents and students, especially those who are younger, will improve students' commitment. Also, schools need more supply by soap, hand sanitizers, and supervision of school workers.

Conflict of interest: The authors declare no conflict of interest.

Sources of funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contribution: Authors contributed equally in the study.

REFERENCES

1. **WHO (2020):** COVID-19 Public Health Emergency of International Concern (PHEIC) Global research and innovation forum. Available at: https://www.who.int/publications/m/item/covid-19-

public-health-emergency-of-international-concern-(pheic)-global-research-and-innovation-forum

2. **Li X, Xu W, Dozier M *et al.* (2020):** The role of children in transmission of SARS-CoV-2: A rapid review. J Glob Health, 10(1):011101.
3. **European Centre for Disease Prevention and Control (2021):** COVID-19 in children and the role of school settings in transmission - second update. Available at: https://www.ecdc.europa.eu/en/publications-data/children-and-school-settings-covid-19-transmission
4. **CDC (2020):** Keep Children Healthy during the COVID-19 Pandemic. Available at: https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/children.html (last access 23 July, 2022).
5. **WHO (2020):** WHO Director-General's opening remarks at the media briefing on COVID-19. Available at: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-may-2020
6. **Kuhfeld M, Soland J, Tarasawa B *et al.* (2020):** Projecting the Potential Impact of COVID-19 School Closures on Academic Achievement. Educational Researchers, 49(8):549-565.
7. **CDC (2020):** Strategies for Protecting K-12 School Staff from COVID-19. Available at: https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-staff.html
8. **Ministry of Education (MOE), Egypt (2020):** Egypt's Education Ministry sets 30 coronavirus-related health measures ahead of academic year. Egypt's Education Ministry sets 30 coronavirus-related health measures ahead of academic year - Egypt Independent. Available at: https://egyptindependent.com/egypts-education-ministry-sets-30-coronavirus-related-health-measures-ahead-of-academic-year/
9. **WHO (2020):** Key Messages and Actions for COVID-19 Prevention and Control in Schools. Available at: https://www.who.int/docs/default-source/coronaviruse/key-messages-and-actions-for-covid-19-prevention-and-control-in-schools-march-2020
10. **CDC (2020):** Operating schools during COVID-19: CDC's Considerations. Available at: https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/schools.html
11. **UNICEF (2020):** Considerations for school-related public health measures in the context of COVID-19. Available at: https://www.unicef.org/media/82736/file/Considerations-for-school-related-public-health%20measures-in-COVID-19-2020.pdf
12. **Tsang S, Royse C, Terkaw A (2017):** Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. Saudi J Anaesth., 11(1):80-89.
13. **UNICEF (2020):** Cleaning and hygiene tips to help keep the COVID-19 virus out of your home. Available at: https://www.unicef.org/romania/stories/cleaning-and-hygiene-tips-help-keep-covid-19-virus-out-your-home
14. **Gostic K, Mummah A, Kucharski R *et al.* (2020):** Estimated effectiveness of symptom and risk screening to prevent the spread of COVID-19. eLife, 9:e55570.
15. **WHO (2020):** Coronavirus disease (COVID-19) advice for the public: When and how to use masks. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks
16. **Qian M, Jiang J (2020):** COVID-19 and social distancing. Z Gesundh Wiss., 20:1-3.
17. **Alagoz O, Sethi A, Patterson B *et al.* (2020):** Effect of Timing of and Adherence to Social Distancing Measures on COVID-19 Burden in the United States: A Simulation Modeling Approach. Annals of Internal Medicine, 20:1-4.
18. **Xue Q, Xie X, Liu Q *et al.* (2020):** Knowledge, attitudes, and practices towards COVID-19 among primary school students in Hubei Province, China. Children and Youth Services Review, 120:105735.
19. **Shehata M, Adel A, Armaneous A *et al.* (2021):** Egyptian school children awareness and precautions in Covid19 pandemic: a cross sectional survey study. Bull Natl Res Cent., 45(1):39.
20. **Subedi D, Bhandari S, Gaire A *et al.* (2020):** Knowledge, Attitude, and Practices Associated with COVID-19 Among School Students in Bharatpur, Chitwan District of Nepal. International Journal of Medical Students, 8(3):231-237.
21. **Singh J, Sewda A, Shiv D (2020):** Assessing the Knowledge, Attitude and Practices of Students Regarding the COVID-19 Pandemic. Journal of Health Management, 22(2):281-290.
22. **Kwok Y, Gralton J, McLaws M (2015):** Face touching: a frequent habit that has implications for hand hygiene. Am J Infect Control, 43(2):112-114.
23. **Cleveland Clinic (2020):** How to Actually Comply With the Don't-Touch-Your-Face Advice From Health Experts. Available at: https://health.clevelandclinic.org/how-to-actually-comply-with-the-dont-touch-your-face-advice-from-health-experts/
24. **WHO (2020):** Coronavirus disease (COVID-19): How is it transmitted? Available at: https://www.who.int/news-room/q-a-detail/coronavirus-disease-covid-19-how-is-it-transmitted
25. **Alves R, Samorinha C, Precioso J (2020):** Knowledge, attitudes and preventive behaviors toward COVID-19: a study among higher education students in Portugal. Journal of Health Research, 20:1-5.
26. **Peng Y, Pei C, Zheng Y *et al.* (2020):** A cross-sectional survey of knowledge, attitude and practice associated with COVID-19 among undergraduate students in China. BMC Public Health, 20:1292.
27. **Yuan T, Liu H, Li X *et al.* (2020):** Factors Affecting Infection Control Behaviors to Prevent COVID-19: An Online Survey of Nursing Students in Anhui, China in March and April 2020. Med Sci Monit., 26:e925877.