


Coronavirus disease 2019 (COVID-19) preparedness in a Thai International School: Emotional health and infection control practices*

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To the Editor—The advent of the coronavirus disease 2019 (COVID-19) pandemic has greatly impacted the learning environment in schools. Many primary schools worldwide have switched to online learning, and most private schools have opened with numerous infection prevention measures.¹ Uncertainty in the natural history of COVID-19 includes the infectivity of asymptomatic and presymptomatic children in school as well as the frequency of within school transmission of COVID-19.^{2,3} Thus uncertainty has resulted in strict infection prevention measures taken at schools to ensure the safest environment for both students and teachers. Previous studies have shown that COVID-19 has an impact on anxiety and fear levels of healthcare personnel and patients.^{4,5} Nevertheless, the impacts of COVID-19 on emotional well-being on students and teachers in schools has not been well studied.⁶ In this study, we evaluated the emotional health of students and teachers as well as infection prevention practices at an international school during the COVID-19 outbreak in Thailand.

We performed an online survey of students and teachers attending Ruamrudee International School, Bangkok, Thailand, from February 1, 2021, to April 30, 2021, to evaluate their emotional health, infection prevention practices regarding COVID-19, and the school's preparedness plan. The online survey was distributed to students and teachers (grades 6–12) for participation. Data collected included student and teacher demographics; school infection prevention measures; confidence levels in the school's infection prevention measures, and changes in infection prevention behaviors in both school and community settings, knowledge of COVID-19 transmission, and emotional health inclusive of anxiety, worry, and stress. Respondents rated their confidence level on knowledge and school preparedness plan on a Likert scale from 1 to 5 (1, no confidence to 5, very confident) also changes in their infection prevention behaviors on a Likert scale from 1 to 5 (1, never use to 5, always use). Infection prevention behavior changes (eg, hand hygiene, wearing a mask, and physical distancing) were defined as a rating of 4 (almost always) or 5 (always). We used the Generalized Anxiety Disorder 7-item (GAD-7) scale to categorize anxiety following the original scale: 0–4, minimal anxiety; 5–9,

mild anxiety; 10–14, moderate anxiety; and >14, severe anxiety.⁴ Self-rated worry about acquiring COVID-19 and its negative impacts were rated on a Likert scale of 1 to 10 (1, not worried to 10, extremely worried). Analyses were performed using SPSS version 15 software (IBM, Armonk, NY). Categorical data were compared using a 2-tailed χ^2 or Fisher exact test, as appropriate. Adjusted odds ratios (aORs) and 95% confidence intervals (CIs) were computed; a significant statistical difference was defined as $P < .05$.

Overall, 274 participants consented to study participation; 218 (79.6%) were students, 56 (20.4%) were teachers, and 192 participants (70.1%) were in high school. The infection prevention policies include temperature checks, hand hygiene, wearing masks, and physical distancing (≥ 1 m). The overall confidence toward school measures to prevent COVID-19 transmission was 72.6% for temperature checks, 73.0% for wearing masks and hand hygiene, and 50.7% physical distancing (Table 1). Furthermore, 64 participants (23.4%) were worried about acquiring COVID-19 and potentially spreading it to their friends and families; 101 participants (36.9%) felt stress about it, and 207 participants (75.5%) felt at least minimal anxiety about it. Notably, 228 participants (83.2%) reported wearing a mask in the community; 154 participants (56.2%) reported physical distancing in the community; and 133 participants (48.5%) reported washing their hands more frequently in both school and community settings. There were no statistically significant differences in practices between students and teachers.

By multivariate analysis, receiving accurate information from academic sources was associated with changing behavior in hand washing (aOR, 1.44; 95% CI, 1.15–1.8), wearing a mask (aOR, 1.37; 95% CI, 1.05–1.8), and physical distancing (aOR, 1.9; 95% CI, 1.3–3.29) in the community. Similarly, receiving education on infection prevention measures at school led to changing behaviors regarding hand hygiene (aOR, 1.26; 95% CI, 1.1–4.9), wearing a mask (aOR, 1.3; 95% CI, 1.2–2.2), and physical distancing (aOR, 2.3; 95% CI, 1.3–4.1) in the community, while having regular workshop discussions on COVID-19 prevention in school was associated with improved hand washing (aOR, 1.2; 95% CI, 1.1–3.6) and wearing a mask (aOR, 2.1; 95% CI, 1.9–4.7) in the community. Notably, participants who did not report anxiety were less likely to wear a mask (aOR, 0.46; 95% CI, 0.27–0.77) and to practice physical distancing (aOR, 0.72; 95% CI, 0.75–0.95) in the community.

This study has several limitations. The study design was a self-reported online survey. It was conducted at a single center, and sample size was small. Despite these limitations, participants were overwhelmed with emotions, especially anxiety toward COVID-19. However, most of the participants remained confident

*This is an updated version of the original article. For details please see the notice at <https://doi.org/10.1017/ice.2021.278>.

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Cite this article: Narupaves N, et al. (2022). Coronavirus disease 2019 (COVID-19) preparedness in a Thai International School: Emotional health and infection control practices¹*. *Infection Control & Hospital Epidemiology*, 43: 1307–1309, <https://doi.org/10.1017/ice.2021.236>

Table 1. Student and Teacher Characteristics, Emotions, and Infection Control Practices

Variable	No. (%) (N = 274)
Age, median y (range)	16 (11–64)
Sex, female	137 (50)
Occupation	
Student	218 (79.6)
Teacher	56 (20.4)
Section	
Middle school	82 (29.9)
High school	192 (70.1)
Confidence toward	
School's policy for hand hygiene	200 (73)
School's policy for physical distancing	139 (50.7)
School's policy for mask requirement	200 (73)
School's policy for temperature check before campus entry	199 (72.6)
Emotions toward COVID-19	
Worried to return back to school due to COVID-19	42.0 (15.3)
Worried that COVID-19 will impact learning and teaching negatively	80 (29.2)
Worried of acquiring COVID-19 from school	29 (10.6)
Worried of acquiring COVID-19 and spread it to others	64 (23.4)
Feeling stressed due to COVID-19	101 (36.9)
GAD-7 score	
Minimal anxiety	75 (27.4)
Mild anxiety	78 (28.5)
Moderate anxiety	30 (10.9)
Severe anxiety	24 (8.8)
Sources of COVID-19 News	
Knowledge from school	176 (64.2)
Social media ^a news	78 (28.5)
Official ^b news source	168 (61.3)
Improvement in infection control practices	
Washing hands more frequently	133 (48.5)
Wearing a mask in public	228 (83.2)
Physical distancing in school	91 (33.2)
Physical distancing in community	154 (56.2)
Suggestion to reduce stress due to COVID-19	
School to provide adequate masks	146 (53.3)
Workshops to provide continuous knowledge for COVID-19 prevention	66 (24.1)

Note. GAD-7, Generalized Anxiety Disorder 7-item.

^aSeveral social media platforms including Line, Facebook, Instagram.

^bOfficial news sources, which includes academic sources from the medical community, news sources from news agency, and news sources from the government.

in the school's policies to prevent COVID-19. Notably, several infection prevention measures continued to be practiced at suboptimal levels at both school and community settings, whereas changes in several infection prevention behaviors were practiced in the community. Having continuous education particularly focusing on hand washing and physical distancing in school remains critical to improving adherence to both school and community infection prevention measures.

Accurate and reliable academic information as well as receiving education on infection prevention measures at school led to changes in 3 new normal behaviors (ie, hand hygiene, wearing mask, and physical distancing). This change likely was due to the increasing awareness by students and teachers towards COVID-19 prevention. Additional studies to evaluate strategies to improve infection prevention practices at schools are needed.

Acknowledgments.

Financial support. A received funding from Thammasat University Hospital for COVID-19 research.

Conflicts of interest. All authors report no conflicts of interest relevant to this article.

References

1. Lobo JL, Del Ser J, Bifet A, Kasabov N. Spiking neural networks and online learning: an overview and perspectives. *Neural Networks* 2020;121:88–100.
2. Li, G, Li W, He X, Cao Y. Asymptomatic and presymptomatic infectors: hidden sources of coronavirus disease 2019 (COVID-19). *Clin Infect Dis* 2020;71:2018.
3. Zimmerman KO, Akinboyo IC, Brookhart MA, *et al.* Incidence and secondary transmission of SARS-CoV-2 infections in schools. *Pediatrics* 2021. doi: [10.1542/peds.2020-048090](https://doi.org/10.1542/peds.2020-048090).
4. Apisarnthanarak A, Apisarnthanarak P, Siripraparat C, Saengaram P, Leeprechanon N, Weber DJ. Impact of anxiety and fear for COVID-19 toward infection control practices among Thai healthcare workers. *Infect Control Hosp Epidemiol* 2020;41:1093–1094.
5. Apisarnthanarak A, Siripraparat C, Apisarnthanarak P, *et al.* Patients' anxiety, fear, and panic related to coronavirus disease 2019 (COVID-19) and confidence in hospital infection control policy in outpatient departments: a survey from four Thai hospitals. *Infect Control Hosp Epidemiol* 2020. doi: [10.1017/ice.2020.1240](https://doi.org/10.1017/ice.2020.1240).
6. Cullen W, Gulati G, Kelly BD. Mental health in the COVID-19 pandemic. *QJM* 2020;113:311–312.

Coronavirus disease 2019 (COVID-19) transmission events in school staff in a Brazilian prospective cohort

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To the Editor—Since the emergence of the severe acute respiratory coronavirus virus 2 (SARS-CoV-2) and global pandemic declaration, the recommendation to embrace nonpharmaceutical public health measures has been established, including nonessential business and school closures. Despite some uncertainty, studies have temporally associated school closure with decreased coronavirus disease 2019 (COVID-19) incidence and mortality.^{1,2} However, recent research has revealed lower attack rates for children, and they might be less susceptible to SARS-CoV-2 infection.^{3,4} The balance between the risks of SARS-CoV-2 infection to children and the adverse events of isolation and social distance to their educational and socioemotional skill development is still a matter of debate.⁵ Transmission between staff is more common than transmission between students and staff or among students.⁶

Methods

We studied a cohort of school staff from 3 institutions in Rio Grande do Sul, Brazil's southernmost state, from October 1, 2020, to December 31, 2020. In-person learning was closed from March to September 2020. In total, ~768 students attended onsite classes during the study period. The 3 schools followed a hybrid model in which students attended classes on alternate days. According to the state law, each classroom could support 50% of students, with 1.5 m between students.

The schools' preparedness included the availability of alcohol-based hand rub, disinfectants for environment cleaning, and staff education. Classrooms were organized to maintain a distance of at

least 1.5 m between students. Toys or shared materials were accessed for cleaning, and unnecessary materials were taken out of classrooms. Natural ventilation with doors and windows open was simulated at all times. The cafeteria and dining halls were closed. Students and staff had to wear masks while in school, except those aged <6 years.⁷ Face shields were also recommended for staff, especially educators. Students from kindergarten through grade 12 were separated into "packs" to facilitate case tracking. Packs with infected students or staff were evaluated for a distance-learning mode. Daily symptom screening was performed to monitor staff members and students. Those who presented any symptoms were not allowed to enter the school and were evaluated and monitored by an infectious disease physician. An infection control specialist was available for school leaders by phone 5 days a week. We present a descriptive analysis of this cohort. Statistical comparisons were made using the Fisher exact test.

Results

We received 3,229 answers to daily queries from 315 staff members working onsite during the study period; among them, 55 professionals (17.5%) reported being symptomatic. The most common initial symptoms were sore throat (56.4%); fatigue (41.8%); nausea, vomiting, or diarrhea (38.2%); headache (36.4%); muscle or body aches (34.5%); cough (30.9%); fever (21.8%); shortness of breath (16.4%); and loss of taste or smell (12.7%) (Table 1). Among symptomatic professionals, 7 tested positive for SARS-CoV-2 (12.7%), 38 tested negative (69.1%), and 10 were not tested (18.2%). The presence of fever ($P = .05$), fatigue ($P < .01$), and >5 symptoms at initial presentation ($P < .01$) were associated with a SARS-CoV-2–positive RT-PCR test.

During the study period, 1 classroom of 6-year-old students had to be closed because of a cluster of 3 students who tested positive. All students from this class remained on distance learning for 14 days, and no other cases were reported thereafter.

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Cite this article: dos Santos RP, *et al.* (2022). Coronavirus disease 2019 (COVID-19) transmission events in school staff in a Brazilian prospective cohort. *Infection Control & Hospital Epidemiology*, 43: 1309–1310, <https://doi.org/10.1017/ice.2021.255>