

# Knowledge, Attitudes, and Behaviors of Students at Islamic Boarding School X toward COVID-19 Incidence in 2022

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## Abstract

The spread of COVID-19 can occur in various settings but most notably in gathering places. Health protocols to avoid the spread of COVID-19 may be influenced by the knowledge and attitude of individuals. This study examined the relationship between knowledge, attitudes, and behaviors of students at the Islamic Boarding School X in Serang City, Banten Province, Indonesia, with the COVID-19 incidence. A quantitative approach with a cross-sectional study design was used. The study population consisted of 994 students, from which (via the Slovin's formula) a minimum sample size of 285 students was obtained. Data collection was carried out using an online validated questionnaire. The data collected related to age, sex, education level, knowledge level, attitude, behavior, and the COVID-19 incidence as experienced by the respondents. The results showed that most students had low-level knowledge (71.9%), negative attitudes (51.3%), and poor behaviors (53.2%) regarding the COVID-19. Most of the students were infected by the COVID-19 (88%). Statistically, knowledge, attitude, and behavior had no significant relationship with the COVID-19 incidence ( $p$ -value>0.05). This study concludes that knowledge, attitude, and behavior are not related to the COVID-19 incidence.

**Keywords:** attitude, behavior, COVID-19, Islamic students, knowledge

## Introduction

Coronavirus disease 2019 (COVID-19) is a respiratory disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus, which spreads from person to person through droplets released, e.g., coughs, sneezes, or talks.<sup>1</sup> Patients infected with COVID-19 have various symptoms; still, most patients experience mild to moderate symptoms and recover without hospitalization. Common symptoms experienced are fever, cough, fatigue, and anosmia (e.g., loss of the sense of taste and smell). On average, patient experiences symptoms five to six days after infection, but symptoms can present as late as 14 days after infection.<sup>2</sup>

The confirmed cases have significantly impacted community activities, including teaching and learning activities. On March 24, 2020, the Ministry of Education and Culture of the Republic of Indonesia issued the Circular Letter No. 4 of 2020 on Implementation of Education Policy amidst COVID-19 Outbreak, which mainly discussed implementing school from home (SFH) to avoid the spread of COVID-19 in school environments.<sup>3</sup> Then, on December 23, 2021, the Minister of Education,

Culture, Research, and Technology; the Minister of Religious Affairs; the Minister of Health; and the Minister of Home Affairs of the Republic of Indonesia issued Joint Ministerial Decree No. 05/KB/2021, 1347 of 2021 HK.01.08/MENKES/6678/2021, and 443-5847 of 2021, respectively, concerning Learning Activities Guidelines amidst COVID-19 Pandemic, providing policy updates for areas affected by the Enforcement of Community Activity Restrictions (ECAR)/*Pemberlakuan Pembatasan Kegiatan Masyarakat* (PPKM). The areas under the ECAR levels 1-3 had to conduct limited face-to-face learning activities in school.<sup>4</sup> For areas under the ECAR levels 1 and 2, 50% of students could attend face-to-face learning and SFH for the rest. While, areas under the ECAR levels 3 and 4, the learning process runs 100% online.<sup>5</sup> Face-to-face learning was limited across various educational units, such as kindergarten, elementary school, junior and senior high school, higher education, individual course and training institutions (*pesantren*/Islamic boarding schools, religious education institutions, and boarding education units).<sup>6</sup>

To support face-to-face learning activities during the

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COVID-19 pandemic, teachers, educators, and students (both at boarding and non-boarding schools) were required to comply with the health protocols enforced by the Indonesian Government to prevent new clusters of COVID-19. At non-boarding schools, students could only gather when attending class, and at boarding schools, students gathered both at school and in their dormitories. Those conditions at boarding schools affected the rate of COVID-19 transmission because the students gathered for long periods of activities.<sup>7</sup> Also, many boarding schools had limited facilities, which meant several students had to use the toilet and bathroom at once. This caused concerns on the emergence of new clusters of COVID-19 at boarding schools.<sup>8</sup>

Islamic and non-religious boarding schools are academic units potentially exacerbating the transmission of COVID-19. The students of these schools have been observed to apply the required health protocols poorly.<sup>9</sup> Further, only 32% of all the Islamic boarding schools, members of the *Rabithah Ma'ahid Islamiyah Nahdlatul Ulama* (RMI NU), implemented the required health protocols.<sup>9</sup> Also, students are in close contact when they use the same sanitation facilities or borrow each other's clothes, worship equipment, toiletries, and towels. Further, there tends to be a lack of distance between students at these schools.<sup>8</sup>

Community knowledge and attitudes influence the application of health protocols. Respondents who are more mature and did attain higher education have a good level of knowledge, a positive attitude, and better motivation.<sup>10</sup> Similarly, those with higher levels of education tend to adhere more to health protocols. A previous study showed that a person's level of knowledge relates to their compliance with the health protocol to use masks within the community to prevent the spread of COVID-19.<sup>11</sup> Another study indicated that behaviors supporting the COVID-19 prevention occur more among *santri* (a student at Islamic Boarding School) with higher education levels, good knowledge and perceptions of COVID-19 and support from *Ustaz/Ustazah* (teacher/leader in Islamic boarding school), caregivers, and friends.<sup>12</sup> A good level of knowledge, support from colleagues, and the existence of binding regulations related to COVID-19 prevention influence the behavior of officers of the National Population and Family Planning Agency/*Badan Kependudukan dan Keluarga Berencana Nasional* (BKKBN).<sup>13</sup>

Since returning to face-to-face learning (February 2022), 28, 21, 46, and 40 students at the Islamic Boarding School in Blora and Magelang Districts and Depok and Yogyakarta Cities, Indonesia, respectively, were confirmed positive for COVID-19.<sup>14-17</sup> As for the regular boarding schools, confirmed cases a university in Banda Aceh City and a school in Muaro Jambi District,

Indonesia amounted to 60 and 2016 students, respectively.<sup>18,19</sup> Another boarding school that maintains face-to-face learning activities is Islamic Boarding School X in Serang City, Banten Province, Indonesia. The school continued its in-person learning activities according to the Instruction of the Minister of Home Affairs Number 5 of 2022 regarding the Implementation of Level 3, Level 2, and Level 1 COVID-19 Restrictions on Public Activities in Java and Bali Areas.<sup>20</sup>

The Islamic Boarding School X is located in Cinangka Subdistrict, Serang District, Banten Province, Indonesia. It has a total area of 30 hectares with school buildings, dormitories, and other infrastructure. In 2017, the student consisted of 994 males and females. The Islamic Boarding School X has 17 dormitories, with nine male and eight female dormitories; each room consists of five to six students. During face-to-face learning activities in 2022, 695 students were confirmed positive for COVID-19 from January to March 2022.<sup>21</sup> The high risk of COVID-19 transmission at boarding schools, the study on the low application of health protocols in Islamic boarding schools, and the confirmation of COVID-19 cases in Islamic boarding schools all emphasize the need for a study that explains the relationships between knowledge, attitude, and behavior and COVID-19 incidence. This study aimed to address this need by analyzing student's knowledge of COVID-19 and examining this against the COVID-19 incidence among students at Islamic Boarding School X.

## Method

This study was conducted using a quantitative approach and a cross-sectional design in Islamic Boarding School X Serang District, Banten Province, Indonesia, from April to May 2022. From the total population of 994 junior and senior high school students at Islamic Boarding School X, a minimum sample of 285 students remained after applying the Slovin's Formula. However, at the time of data collection, the number of students filling out the questionnaire was more than the minimum sample size, which was 334. Then when the data was cleaned, 24 students' answers were incomplete, so that they were removed. Therefore, the samples consisted of 310 students. The following inclusion criteria were used to confirm the sample: (1) a student of Islamic Boarding School X, (2) participating in face-to-face learning activities, (3) not tested positive for COVID-19, and (4) willing to complete the questionnaire. The exclusion criteria were: (1) non-students of Islamic Boarding School X, (2) tested positive for COVID-19, and (3) not willing to complete the questionnaire.

Data was collected using a Google Forms questionnaire distributed by the Islamic Boarding School X of Serang Public Relations and student council via social

media (Instagram) to the junior and senior high school homeroom teachers, then to the students. The questionnaire contained questions regarding the independent variables of age, sex, education level, knowledge level, attitude, and behavior related to the COVID-19. The questions also pertained to the dependent variable, the COVID-19 incidence experienced by the students.

Validity and reliability tests were carried out to confirm that the questions listed in the questionnaire provided to the respondents were valid and reliable. The questionnaire had a reliability score of 0.927, meaning it was reliable enough to use for data collection. While, for the results of the validity test on the questionnaire, the questions tested were valid questions because they had a Corrected Item-Total Correlation of greater than 0.3610, or the results of R count were greater than R table.

The data collected was processed using a data processing application and analyzed univariately to determine the frequency distribution of each independent variable, dependent variable, and bivariate. The Chi-square test was used to determine the relationship between each independent variable and the dependent variable. Each independent variable was categorized as high or low for the level of knowledge, positive or negative for attitude, and good or bad for behavior. The independent and dependent variables were determined to have a relationship if the Chi-square test results obtained a p-value of <0.05, resulting in the rejection of the study hypothesis. The data from the analysis (descriptions of the respondents; the COVID-19 incidence; the knowledge level, attitudes, and behaviors of the respondents; and the relationship between knowledge, attitude, and behavior with the COVID-19 incidence among the students) were presented in tabular form.

**Results**

The results of this study describe the respondents; COVID-19 incidence among the respondents; their knowledge, attitudes, and behaviors; and the relationship between knowledge, attitude, and behavior with the COVID-19 incidence among the students. The respondents in this study were all students attending the Islamic Junior High School and Senior High School at Islamic Boarding School X. Most respondents (69.4%) were 14 years old or younger, female (56.8%), and junior high school students (72.3%). Of the 310 respondents who filled out the questionnaire, 273 had a history of COVID-19, with 230 confirmed positives (Table 1).

*Knowledge Level*

The respondents' knowledge was measured using eight questions related to the COVID-19. Most respondents answered the eight questions correctly; moreover, the first question on the COVID-19 causing respiratory

disease got the most correct answer (98.4%). However, the last question on booster vaccination got the least correct answer (56.1%) of all eight questions (Table 2).

*Attitude*

Respondents' attitudes were measured using 12 questions. More than half the respondents strongly agreed with the statements on using masks properly, washing hands with soap and clean water, and washing hands with hand sanitizer. The statement receiving the most "strongly agree" responses were those related to isolation if confirmed positive for the COVID-19 (81.9%). The statement receiving the most "strongly disagree" responses were those about washing hands and using hand sanitizer to prevent infection with the COVID-19 (4.2%) (Table 3).

*Behavior*

As shown in Table 4, the statements with the most positive answers were those related to notifying *Ustaz* and *Ustazah* if the student felt symptoms of COVID-19. A total of 224 students responded favorably to these

**Table 1. Respondent's Characteristics (n = 310)**

Variable	Category	n	%
Age	14 years old	215	69.4
	>14 years old	95	30.6
Sex	Male	134	43.2
	Female	176	56.8
Education level	Junior high school	224	72.3
	Senior high school	86	27.7
Confirmed records of COVID-19	Once	273	88.1
	Never	37	11.9
COVID-19 confirmed locations*	Outside	230	74.2
	Inside	9	2.9
	Inside and outside	34	11
	Never	37	11.9

Note: \*Inside/outside the boarding school

**Table 2. Respondent's Knowledge Levels (n = 310)**

Question	Correct Answer	
	n	%
COVID-19 causes respiratory disease*	305	98.4
What are the symptoms of COVID-19?		
Fatigue	251	81.0
Headache	259	83.5
Pain in the body	223	71.9
What can be done to prevent infection with COVID-19?		
Wash hands with soap and hygienic running water for 40-60 seconds	285	91.9
Do students know the difference between primary vaccination and booster vaccination?	217	70.0
If you know, then what is meant by primary vaccination?	214	69.0
If you know, then what is a booster vaccination?***	174	56.1

Notes: \*Question with the most correct answers, \*\*Question with the least correct answers

**Table 3. Respondent's Attitudes**

Statement	SD	D	N	A	SA
	n (%)	n (%)	n (%)	n (%)	n (%)
Using a mask correctly, you will not be infected with COVID-19	9 (2.9)	27 (8.7)	86 (27.7)	77 (24.8)	111 (35.8)
Wash your hands with soap and clean running water; you will not be infected with COVID-19	8 (2.6)	34 (11.0)	78 (25.2)	79 (25.5)	111 (35.8)
Wash your hands with an alcohol-based hand sanitizer, and you will not be infected with COVID-19**	15 (4.2)	29 (9.4)	95 (30.6)	80 (25.8)	93 (30.0)
Maintaining a distance of 1 meter can reduce the risk of being infected with COVID-19	5 (1.0)	10 (3.2)	46 (14.8)	83 (26.8)	168 (54.2)
Using personal cutlery and not borrowing from friends can reduce the risk of being infected with COVID-19	5 (1.6)	4 (1.3)	24 (7.7)	71 (22.9)	206 (66.5)
Adhere to health protocols, and you will not be infected with COVID-19	5 (1.6)	10 (3.2)	53 (17.1)	73 (23.5)	169 (54.5)
I believe that the COVID-19 vaccination reduces my risk of contracting COVID-19	5 (1.6)	9 (2.9)	59 (19.0)	70 (22.6)	167 (53.9)
I believe that if I become infected with COVID-19 after receiving two doses of the vaccine, then my symptoms will be lighter than before receiving two doses of the vaccine	4 (1.3)	10 (3.2)	61 (19.7)	79 (25.5)	156 (50.3)
I agree that everyone who can get vaccinated should get a COVID-19 vaccination	5 (1.0)	7 (2.3)	38 (12.3)	63 (20.3)	199 (64.2)
The COVID-19 vaccination will create herd immunity	5 (1.0)	5 (1.6)	54 (17.4)	71 (22.9)	177 (57.1)
I agree to isolate if confirmed positive for COVID-19*	1 (0.3)	2 (0.6)	19 (6.1)	34 (11.0)	254 (81.9)
I agree that isolation will reduce the risk of spreading COVID-19	2 (0.6)	1 (0.3)	25 (8.1)	36 (11.6)	246 (79.4)

Notes: SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree  
 \*Statements with the most strongly agreed answers, \*\*Statements with the most strongly disagreed answers

**Table 4. Respondent's Behavior**

Statement	N	R	S	O	A
	n (%)	n (%)	n (%)	n (%)	n (%)
I tell <i>Ustaz/Ustazah</i> if I get symptoms similar to COVID-19*	5 (1.6)	3 (1.0)	24 (7.7)	54 (17.4)	224 (72.3)
I tell <i>Ustaz/Ustazah</i> if my friends get symptoms similar to COVID-19	6 (1.9)	3 (1.0)	25 (8.1)	55 (17.7)	221 (71.3)
I wear the mask properly	2 (0.6)	6 (1.9)	37 (11.9)	70 (22.6)	195 (62.9)
I disinfect the mask before throwing it away**	52 (16.8)	39 (12.6)	77 (24.8)	42 (13.5)	100 (32.3)
I cut the mask before throwing it away	17 (5.5)	13 (4.2)	33 (10.6)	51 (16.5)	196 (63.2)
I wash my hands with soap and hygienic running water	3 (1.0)	5 (1.6)	22 (7.1)	67 (21.6)	213 (68.7)
I wash my hands with soap and hygienic running water for 40–60 seconds	10 (3.2)	21 (6.8)	60 (19.4)	83 (26.8)	136 (43.9)
I wash my hands using hand sanitizer	6 (1.9)	19 (6.1)	61 (19.7)	76 (24.5)	148 (47.7)
I wash my hands with hand sanitizer for 20–30 seconds	15 (4.8)	40 (12.9)	65 (21.0)	73 (23.5)	117 (37.7)
I apply cough and sneeze etiquette even though it is not confirmed COVID-19	4 (1.3)	4 (1.3)	35 (11.3)	67 (21.6)	200 (64.5)
I use personal cutlery and do not borrow my friend's cutlery	2 (0.6)	6 (1.9)	45 (14.5)	65 (21.0)	192 (61.9)
I keep a safe distance of 1 meter from other people when outside the boarding school	8 (2.6)	21 (6.8)	56 (18.1)	78 (25.2)	147 (47.4)
I change clothes after coming home from activities outside the dorm	10 (3.2)	12 (3.9)	59 (19.0)	72 (23.2)	157 (50.6)
I take a shower after coming home from activities outside the dorm	8 (2.6)	12 (3.9)	68 (21.9)	82 (26.5)	140 (45.2)
I still apply the health protocols even though I have received the COVID-19 vaccination	4 (1.3)	5 (1.6)	44 (14.2)	90 (29.0)	167 (53.9)
I still apply the health protocols while in the boarding school	5 (1.6)	12 (3.9)	60 (19.4)	76 (24.5)	157 (50.6)
I continue to apply health protocols while outside the boarding school	3 (1.0)	7 (2.3)	41 (13.2)	64 (20.6)	195 (62.9)
I disinfect the room when a roommate is confirmed COVID-19	11 (3.5)	8 (2.6)	39 (12.6)	58 (18.7)	194 (62.6)
I notify <i>Ustaz/Ustazah</i> if I come in close contact with a friend who is tested positive for COVID-19	3 (1.0)	6 (1.9)	36 (11.6)	48 (15.5)	217 (70.0)

Notes: N = Never, R = Rarely, S = Sometimes, O = Often, A = Always  
 \*The statement with the most "always" answers, \*\*Statements with the most "never" answers

questions. The statements with the most negative answers were those related to disinfecting masks after use (16.8%).

*Relationship of Knowledge, Attitude, and Behavior and COVID-19 Incidence*

The relationships between the respondents' know-

ledge, attitudes, and behaviors with the COVID-19 incidence among the students are described in Table 5. After grouping the knowledge variables, it was determined that respondents had a low-level knowledge related to the COVID-19, with 223 respondents answering seven or fewer questions correctly. The analysis of the frequency distribution for the attitude of the respondents reveals

Table 5. Relationship of Level of Knowledge, Attitude, and Behavior with COVID-19 Incidence

Variable	Category	COVID-19 Incidence			p-value	OR	95% CI
		Once (n = 275)	Never (n = 37)	Total (n = 310)			
		n (%)	n (%)	n (%)			
Knowledge level	Low	196 (87.9)	27 (12.1)	223 (100.0)	1.000	0.943	0.436–2.040
	High	77 (88.5)	10 (11.5)	87 (100.0)			
Attitude	Negative	139 (87.4)	20 (12.6)	159 (100.0)	0.855	0.882	0.443–1.756
	Positive	134 (88.7)	17 (11.3)	151 (100.0)			
Behavior	Bad	145 (187.9)	20 (12.1)	165 (100.0)	1.000	0.963	0.484–1.918
	Good	128 (88.5)	17 (11.7)	145 (100.0)			

Notes: OR = Odds Ratio, CI = Confidence Interval

that most respondents had a negative attitude to the COVID-19; 159 respondents exhibited a negative attitude. Most respondents (165 respondents) exhibited bad behavior toward the COVID-19.

### Discussion

Most students in this study got infected with the COVID-19 (88.1%) while attending Islamic boarding schools (74.2%). These cases are not surprising as the COVID-19 transmission is influenced by the time at which students spend together in groups.<sup>7</sup> Students attending Islamic boarding schools gather in classes, dormitories, mosques, and other shared areas. Based on Table 2, the questions with the most correct answers are those related to the COVID-19 causing respiratory tract disease. The COVID-19 is a respiratory disease caused by SARS-CoV-2.<sup>22</sup> Many students did not answer questions on COVID-19 booster vaccination correctly; only 174 students (56.1%) answered correctly. The COVID-19 booster vaccine is injected to people older than 18 years.<sup>23</sup> Many respondents in this study were students aged under 18 years, which may have contributed to their inadequate knowledge of the COVID-19 booster vaccinations.

A study on Islamic Boarding School in Lebak District, Banten Province, Indonesia, assessing students' knowledge levels reported that most students maintained a good level of relevant knowledge. However, some areas required improvement, most notably the statement that "not all infected people will show symptoms but can transmit the COVID-19 virus."<sup>24</sup> This study was conducted in the same province but with a different type of *pesantren*. The focus of the measured knowledge variables was also different; this study was related to transmission and vaccines, including boosters, while the previous study,<sup>24</sup> did not focus on the COVID-19 vaccines since it was conducted at early pandemic.

The data analysis in this study indicated that the knowledge was not related to the COVID-19 incidence

because the p-value was 1.000 or >0.05. The knowledge variable might be unrelated to the COVID-19 incidence due to the homogeneous level of student's knowledge. While attending boarding school, students only receive information from *Ustaz* and *Ustazah*; the knowledge level might vary if they can access information from another source. Another study showed that sources of information such as social media, telecommunication tools, television, and radio have a significant relationship with health workers' knowledge level.<sup>25</sup> The variables in this study are further unrelated because the questions designed to assess student's knowledge did not sufficiently describe their actual knowledge.

Table 3 demonstrates that the statements with the most "strongly agree" answers are those related to self-isolation if tested positive for COVID-19, with 254 (81.9%) respondents strongly agreeing. This attitude was in line with Circular Letter No. HK.02.01/MENKES/202/2020 concerning the Self-Isolation Protocol in Handling COVID-19 mandates that people tested positive must be isolated.<sup>26</sup> The self-isolation reduces the risk of transmission.<sup>27</sup> The previous study of Islamic boarding school did not investigate self-isolation for those tested positive for COVID-19 cases, even though the students tended to have a positive attitude to COVID-19.<sup>24</sup>

A total of 13 students (4.2%) stated "strongly disagree" to the statement on washing hands with hand sanitizer to avoid the COVID-19 infection; thus, it became the statement with the most "strongly disagree" responses in the questionnaire. The students did not seem to be aware that washing hands with hand sanitizer can reduce the number of germs and bacteria on the hands.<sup>28</sup> The data analysis showed that attitudes were not related to the COVID-19 incidence because a p-value of 0.855 or >0.05 was obtained. These variables may not relate to the COVID-19 incidence because the students' attitudes were homogeneous. They learn to deal with things at boarding schools; hence, the attitudes that arise tend to be the same. The students may also have experienced dif-

ficulty in understanding the statements given, meaning that the statements did not sufficiently describe the actual attitudes of the students.

Table 4 illustrates the statements with the most positive answers related to telling the *Ustaz/Ustazah* if the student get the COVID-19 symptoms. A total of 224 (72.3%) students stated that they will always tell *Ustaz/Ustazah* if they get COVID-19 symptoms. *Ustaz/Ustazah* is a substitute for parents while the students are at boarding school. If students reported symptoms similar to the COVID-19, they would undergo an antigen rapid or Reverse Transcription Polymerase Chain Reaction (RT-PCR) test to confirm the COVID-19 infection.<sup>1</sup> If the test result turned out to be positive, the student would receive treatment according to the symptoms experienced and be asked to conduct contact tracing to reduce the virus transmission.<sup>29</sup>

A previous study stated that 30% of Islamic boarding school students did not wear masks.<sup>24</sup> While, in this study, the most "never" answers were related to mask disinfection. A total of 52 (16.8%) students reported never disinfecting their masks after use. This may be because the students had never received information about mask disinfection. As such, student adherence to health protocols would likely increase if the students were given routine education. Mask disinfection is advised so that used masks do not become a medium for virus transmission.<sup>30</sup> The disinfection of masks can be done at home or in a dormitory by soaking used masks in a disinfectant, chlorine, or bleach before disposal.<sup>31</sup>

This study's data analysis showed that behavior was not related to the COVID-19 incidence with a p-value of 1.000 or >0.05. These results align with previous studies stating that behavior is irrelevant to COVID-19 incidence.<sup>32,33</sup> The absence of a relationship between behavioral variables and the COVID-19 incidence in this study may have been influenced by the homogeneous behavior of students. This can happen because students see and imitate behaviors from the same environment or the same *Ustaz* and *Ustazah*. In addition, the answers given to the existing statements may not have sufficiently described the actual student's behavior, resulting in the analysis showing no relationship between the variables.

Most studies on Islamic boarding schools are conducted in Indonesia because few countries have established this specific school. For this reason, the references used are primarily from Indonesia. Controlling COVID-19 transmission by implementing health protocols at an Islamic boarding school is difficult, yet it must be done.<sup>24</sup> Similarly, implementing health protocols must also be applied at Islamic boarding and regular schools.

This study was conducted using primary data collected via online questionnaires (Google Forms). The respondents may not have filled in the answers according to

their opinions or actual conditions. While collecting data via online questionnaires, there is a risk of the questions or directions not being well understood by the respondents. This study was limited to describing the population within the study setting; junior and senior high schools at Islamic Boarding School X. The study could not describe the knowledge, attitudes, and behaviors of students attending other boarding schools and other educational institutions.

## Conclusion

Most surveyed students in Islamic Boarding School X get infected with the COVID-19 while attending face-to-face learning activities. Of these, most students possessed a low level of knowledge, a negative attitude, and poor behavior towards the COVID-19. However, after analyzing the data, their knowledge, attitudes, and behaviors do not have relationship to the COVID-19 incidence.

## Recommendation

Institutions must educate students to increase their knowledge related to the COVID-19. Education can be in the forms of giving seminars, placing posters in classroom and on dormitory wall boards, or installing billboards and banners along the streets of the boarding school. Providing education and posting information can be coordinated with local clinics, health centers, and health offices. It is also necessary to supervise and provide examples to students regarding attitudes and behaviors towards the COVID-19. This could include providing examples of and supervising the application of health protocols at school and dormitories, mosques, and other shared spaces.

The Indonesian Ministry of Religious Affairs and Ministry of Health need to revisit the existing face-to-face learning policies in boarding schools. Supervision and periodic training must be put in place at all boarding schools regarding the number of students participating in face-to-face learning. Health protocols to reduce the spread of the COVID-19 in boarding schools must be implemented more strictly. Future study should consult a broader population so that the resulting data is not homogeneous. It would also be beneficial to include socio-demographic, economic, and geographical factors to determine the COVID-19 incidence more accurately.

## Abbreviations

COVID-19: Coronavirus Disease 2019; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2; SFH: School From Home; ECAR: Enforcement of Community Activity Restrictions; PPKM: *Pemberlakuan Pembatasan Kegiatan Masyarakat*; RMI NU: *Rabithah Ma'ahid Islamiyah Nahdlatul Ulama*; BKKBN: *Badan Kependudukan dan Keluarga Berencana Nasional*; RT-PCR: Reverse Transcription Polymerase Chain Reaction.

### Ethics Approval and Consent to Participate

This research obtained an ethical license with the letter Ket-156/UN2.F10.D11/PPM.00.02.2022 from the Research and Community Engagement Ethical Committee, Faculty of Public Health, Universitas Indonesia.

The title, objectives, respondent criteria, the guarantee of data confidentiality, respondent's right to resign from filling out the questionnaire, possible risks, time to fill out the questionnaire, rules around giving gifts or souvenirs, and a list of authors of this study were provided to each respondent before filling out the questionnaire. Afterward, the authors asked questions about the respondent's willingness to complete the questionnaire. The respondent could choose "Willing" and continue to fill out the questionnaire or "Not willing" and not fill out the questionnaire.

### Competing Interest

The author declares that there is no significant competing financial, professional, or personal interest that might have affected the performance or presentation of the work described in this manuscript.

### Availability of Data and Materials

The data available is only data that has been written in the manuscript, because other data are limited by research ethics.

### Authors' Contribution

ARH and DS compiled the questionnaires. ARH collected, processed, and analyzed the data, and wrote the manuscript. DS supervised and gave recommendations on data processing and analysis.

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