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Understanding Compliance with COVID-19 Health Protocols: Insights from Barangay Residents in Northern Mindanao, Philippines

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Abstract

Background: The COVID-19 pandemic drastically altered daily life, prompting stringent health protocols globally. **Objective**: This study investigated the perception and compliance with COVID-19 health protocols among barangay residents in Northern Mindanao, Philippines. Grounded in understanding socio-demographic influences, knowledge, perception, and information sources, the research aimed to discern factors shaping compliance with COVID-19 protocols, informing targeted interventions to enhance public health outcomes. **Method:** This quantitative study employed a descriptive survey research design.. Using a sample size of 372 respondents determined by the Cochran formula, data on compliance levels were collected through validated survey questionnaires. Statistical analyses, including the t-test and f-test, were conducted to compare compliance levels across variables such as age, gender, education, and perception of COVID-19 health protocols. **Results:** Most respondents were 25 to 29, with more females participating. Compliance with COVID-19 health protocols varied significantly by age, gender, educational attainment, sources of information, knowledge, and perception. **Conclusion:** The findings highlighted the diverse factors influencing compliance with COVID-19 health protocols among residents of a specific barangay in Northern Mindanao. Tailored interventions are imperative to enhance adherence to these measures, offering valuable insights for public health authorities and educational institutions striving to promote community health. **Recommendation:** This study underscores the importance of targeted interventions and tailored educational efforts to bolster adherence to public health measures, providing crucial guidance for improving community health outcomes

Keywords: COVID-19, compliance, perception, public health

INTRODUCTION

Coronavirus disease (COVID-19) caused by the SARS-CoV-2 virus shifted many lives, with all activities pivoting indoors. COVID-19 health protocols were drastically implemented due to this disease's communicable nature, which carried detrimental health effects for the majority. Notably, COVID-19 tripled the mortality risk, regardless of the individual's underlying disease conditions (1). However, over the past two years, the world has gradually adapted to the new normal, achieving herd immunity and significantly decreasing COVID-19 cases. Mandatory lockdowns and strict online classes, once critical in preventing SARS-CoV-2 transmission, are now things of the past.

Nevertheless, no official statements from the World Health Organization (WHO) declare an end to this pandemic or confirm the complete eradication of the virus. New virus strains from the same family may occur if people become less compliant with basic health protocols such as handwashing, wearing a facemask, vaccination, and social distancing. These COVID-19 health protocols still needed to be mandated to be entirely removed and may have changed the COVID-19 case trend if the majority continued to resist following them.

The effectiveness of the primary health protocols also depended on the population's compliance with the precautions, which could have been affected by various outlets, such as local news, expressing concerns about the number of cases and vaccinated people in the area (2). According to the Coronavirus Disease Situation Report of the World Health Organization in the Philippines (3), there were 8,004 active cases from November 14 to November 20, with a 10.2% Test Positivity Rate.

This statistic indicated that COVID-19 cases may not have been that evident in society due to possible herd immunity, but it did not immediately presume that the COVID-19 virus was not dangerous. There were chances that people would slowly stop complying with the health protocols mitigating the spread of the virus because of the low rate of COVID-19 cases. A study showed that most adolescents and young adults had a low compliance rate with the minimum health protocols (4). More so, adolescents were believed to have a higher non-compliance rate with health protocols such as cleaning/disinfecting mobile phones and following social distancing.

In society, it was observed that the local people were non-compliant with the essential health protocols to mitigate the transmission of the COVID-19 virus, considering the situation and factors involved at present. For this reason, this research study aimed to explore the perception of COVID-19 health protocols among the residents of a particular barangay in Northern Mindanao and how it affected their compliance with COVID-19 health protocols.

The researchers observed that as people aged, they became more compliant. Progressing age meant people became more affixed by responsibilities, leading to more exposure to risks, increasing their vulnerability, and pushing them to comply with health protocols. Evidently, according to a study by Bavel et al. (5), in line with Daoust (6), an increase in self-reported compliance with COVID-19 health protocols in the late middle-aged was depicted compared to younger adults.

In gender differences, a higher probability of women was observed to be more concerned about spreading the virus than men. As women populations became much more prone to infections, particularly those pregnant females that affect not just them but also their babies, they may have been more motivated to find ways to prevent acquiring a disease that can be quickly spread. Notably, studies showed that females were more compliant than males since they were much more motivated to comply with preventive measures. Festila and Otterbing (7) displayed that women scored higher than males on agreeableness and conscientiousness and were more willing to comply with the preventative health practices examined.

Numerous studies found that educational attainment played a significant role in influencing compliance with COVID-19 protocols. Higher levels of education were associated with greater adherence to preventive measures. For instance, Davies et al. (8) demonstrated that individuals with higher educational levels were more likely to comply with guidelines such as mask-wearing, social distancing, and hand hygiene. Similarly, Harper et al. (9) found that students with higher levels of education exhibited higher levels of

adherence to COVID-19 preventive measures. Bauer et al. (10) explored the relationship on a global scale and revealed that countries with higher average educational levels demonstrated higher compliance with COVID-19 guidelines. These findings suggested that education fostered a better understanding of the risks and importance of following protocols, enhanced health knowledge and critical thinking, and promoted a sense of civic responsibility.

A significant portion of the population relies on just one news outlet for staying informed about current events. However, diversifying sources of information could mitigate bias, enhance understanding of differing perspectives, and lead to more accurate personal judgments on various issues. During health crises, such as the COVID-19 pandemic, people typically seek information from trusted sources, highlighting the intensified importance of these sources. Traditional media, like television and newspapers, have played a crucial role in disseminating evidence-based information to the public during such times (11).

Knowledge encompasses awareness of facts and practical skills, shaping individuals' personalities and improving their interactions with others, thereby enhancing decision-making abilities. Researchers stress that a deeper understanding of COVID-19 health protocols may lead to more effective collective responses to the threat posed by the disease. Clements (12) asserts that knowledge about crises such as the COVID-19 pandemic is a critical determinant of people's responses, suggesting that residents' awareness in a specific barangay in Northern Mindanao could significantly impact their adherence to COVID-19 health protocols.

Perception is how a person understands a specific topic or event, significantly influencing emotions and actions. Moreover, it helps one in decision-making and dealing with daily life challenges. Henceforth, perception may also be a factor that affects the beliefs of the people of a particular barangay in Northern Mindanao in complying with the COVID-19 health protocols. Positive perception and good knowledge of COVID-19 infection protection showed higher odds of vaccination compliance (13).

The public's understanding of and opinions of COVID-19 could impact compliance with the COVID-19 healthcare protocols. Evidence suggests that raising public awareness of pandemics is crucial. A deeper understanding of current public perceptions and practices may be achieved by measuring public awareness and knowledge of the coronavirus. Moreover, this helps discover factors that motivate people to adopt healthy and responsive behavior. Notably, there are multiple reasons why compliance with COVID-19 health protocols may vary, as perceptions of the benefits of these COVID-19 health protocols affect the public's level of compliance (14). This scenario implies that if people were aware of the benefits of certain restrictions, they were more inclined to adhere to them.

This study investigated the factors influencing compliance with COVID-19 health protocols among community members in a barangay in Northern Mindanao. The research aimed to determine whether there was a significant difference in compliance levels among respondents when grouped according to age, sex, educational attainment, knowledge of COVID-19 health protocols, sources of information on COVID-19 health protocols, and perception of COVID-19 health protocols.

This study investigated the factors influencing compliance with COVID-19 health protocols among community members in a barangay in Northern Mindanao. Northern Mindanao is characterized by a diverse population, with a mix of urban and rural communities, varying levels of access to healthcare, and differences in educational attainment and socioeconomic status. The region is known for its strong sense of community and resilience, yet faces challenges such as limited healthcare infrastructure in remote areas and varying levels of public health awareness. The research aimed to determine whether there was a significant difference in compliance levels among respondents when grouped according to age, sex, educational attainment, knowledge of COVID-19 health protocols, sources of information on COVID-19 health protocols, and perception of COVID-19 health protocols. Understanding these differences is crucial for developing targeted public health interventions that cater to the unique needs of the region’s population.

METHODS

Design

This study employed a quantitative approach utilizing a descriptive survey research design. Quantitative methodology involved systematically investigating a phenomenon through the collection of statistical, mathematical, and numerical data via a survey questionnaire. The descriptive research design aimed to characterize the distribution of variables without considering potential associations between them or making other assumptions (15). Researchers did not manipulate or control any variables; instead, they identified, observed, and measured them. The study aimed to determine whether variables such as age, gender, educational attainment, sources of information, knowledge, and perception of COVID-19 health protocols directly influenced compliance levels among residents of a specific barangay in Northern Mindanao.

Sample, sample size and sampling technique

The research was conducted in a barangay in Northern Mindanao, Cagayan de Oro City, which, according to the 2022 census, had a population of 15,341. This barangay was designated as a geographically isolated and disadvantaged area (GIDA) by DOH-Administrative Order No. 2020-0023.

The Cochran formula was used to determine the sample size, which allows for the calculation of the optimal sample size based on required precision, confidence level, and anticipated fraction of the attribute present in the population. This formula is commonly employed when sampling from a large population. With a population size (N) of 10,758, representing residents aged 20 to 64 years old in the specific barangay in Northern Mindanao according to the 2022 census data provided by the barangay, a 95% confidence level or a 0.05 margin of error (e), and a variability of 0.5, the approximate sample size was determined to be 372 respondents (n). Participants were individuals willing to take part in the research and who met the sampling criteria specified for this study.

The researchers utilized the stratified sampling technique to identify clusters of individuals who participated in the research study. This method was considered the most suitable technique for the study, ensuring that each available age group from the data received importance by providing an adequate number of samples for good representation. In applying stratified sampling for this study, the sample size was first subdivided into strata, with each cluster having its corresponding number of samples. In this study, the strata used were the respondents' age groups.

The eligibility criteria for the study specifically included respondents from a specific barangay in Northern Mindanao aged 20 to 64 years old, as these two factors fell within the scope of the study. Furthermore, the study excluded respondents diagnosed with mental disorders or those with hindered mental capability in terms of understanding or remembering information or decision-making skills, as this could lead to inadequate answers, potentially rendering the findings inaccurate and unreliable.

Data collection process

In preparation for data gathering, access to the latest census of the specific barangay in Northern Mindanao was acquired, containing data reflecting the population of each age group in the census. The researchers specifically focused on the number of male and female individuals aged 20-64. Before distributing the survey questionnaires, the researchers subjected their instruments to scrutiny and feedback from experienced clinical instructors at Xavier University College of Nursing. This expert review ensured that the questions were clear, relevant, and effectively designed to measure the intended variables. The feedback received was incorporated into the final version of the questionnaire, enhancing its validity and reliability for the study.

The instrument of data collection

In this study, a structured survey questionnaire was developed to assess the compliance with COVID-19 health protocols among residents of a specific barangay in Northern Mindanao. The questionnaire was grounded in the guidelines from the Inter-Agency Task Force on Emerging Infectious Diseases (IATF-EID) and was designed after an extensive literature review on public health compliance. It covered several dimensions,

including demographic information, knowledge of COVID-19 protocols, perception of health risks, adherence to health protocols, and sources of information. The instrument consisted of 25 items distributed across these dimensions. To ensure validity and reliability, the questionnaire was reviewed by a panel of experts, including clinical instructors from Xavier University College of Nursing, and was pilot-tested on a small sample to refine clarity and structure. Reliability was confirmed using Cronbach's alpha values, indicating acceptable internal consistency. The final questionnaire was then administered to the study population.

Data analysis

The study employed both the t-test and f-test. The t-test assisted the researchers in identifying the overall comparison of data from two groups, often used in testing hypotheses to determine whether a process or treatment significantly affects the population of interest or if the two groups are different. The f-test was then utilized to examine the means and variances between the variables, determining the significant difference between the given responses of the population.

Ethical consideration

The researchers adhered to essential ethical standards for the study concerning the rights and participation of the respondents. The paper underwent review by a panel and was checked for ethical considerations within the Department of Nursing. Subsequently, ethics clearance approval was obtained from the Xavier University Review Ethics Board (XU REC Package No. NSG-2023001282). Furthermore, two validators were consulted for validity testing, and reliability testing was carried out on the questionnaire through pilot testing. Finally, informed consent was provided and signed before the researchers allowed the respondents to answer the survey questionnaire.

RESULTS

Table 1 presents a detailed summary of the respondents' characteristics by age, highlighting the distribution and compliance with COVID-19 health protocols among different age groups in a specific barangay in Northern Mindanao, Cagayan de Oro City. The age intervals, ranging from 20 to 64 years, were selected to represent distinct life stages, each potentially influencing attitudes and behaviors toward health protocols. The most significant age group was 25 to 29 years old, representing 14.5% of the respondents, followed by those aged 40 to 44 years old (13.7%), 20 to 24 years old (12.6%), and 30 to 34 years old (12.1%). More than half of the participants were aged 39 years old and below. The table also examines the respondents' compliance levels with COVID-19 health protocols across these age intervals, revealing that the highest compliance was observed among those aged 40 to 44, with a mean score of 3.71. This was followed closely by the 30 to 34 age group, with a mean of 3.68, and the 25 to 29 age group, with a mean of 3.66. Notably, the respondents aged 35 to 39 years old demonstrated the lowest compliance, with a mean score of 3.16. Calculating the mean for each age group allows for a clear comparison of compliance levels, offering valuable insights into which age groups are more likely to adhere to health protocols. The use of the F-test (ANOVA) further substantiates these findings, as the resulting p-value was <0.01, indicating a highly significant difference in compliance levels across different age groups. Therefore, the hypothesis that age significantly affects compliance with COVID-19 health protocols was confirmed.

Table 1. Frequency, Distribution, and ANOVA Results of Respondent's Level of Compliance to COVID-19 Health Protocols When Grouped According to Age, Sex, Educational Attainment and Source of Information

Variable		Frequency	Percentage (%)	Mean	p-value
Age	20-24	47	12.6	3.41	<0.01**
	25-29	54	14.5	3.66	
	30-34	45	12.1	3.68	
	35-39	42	11.3	3.16	

	40-44	51	13.7	3.71	
	45-49	36	9.7	3.33	
	50-54	33	8.9	3.52	
	55-59	34	9.1	3.56	
	60-64	30	8.1	3.45	
Sex	Male	159	42.7	3.42	<0.01**
	Female	213	57.3	3.58	
Educational Attainment	No Grade Completed	1	0.3	3.30	<0.01**
	Elementary Undergraduate	13	3.5	3.24	
	Elementary Graduate	16	4.3	3.41	
	High School Undergraduate	55	14.8	3.44	
	High School Graduate	105	28.2	3.37	
	College Undergraduate	112	30.1	3.56	
	College Graduate or Higher	70	18.8	3.77	
Source of Information	Peers	8	2.2	2.99	<0.01**
	Internet	11	3.0	3.36	
	TV	21	5.6	3.48	
	Public Announcements	11	3.0	3.19	
	Radio	6	1.6	3.30	
	Others	1	0.3	3.20	
	Multiple Sources	314	84.4	3.51	

Note. ns = Not Significant * = Significant ** = Highly Significant

Table 1 also revealed that concerning gender, more than half, or 57.3%, of the respondents were female, while the remaining 42.7% were male residents of specific barangay in Northern Mindanao. The table also presented the respondents' compliance level with COVID-19 health protocols when grouped according to their sex. Comparing the mean averages, females had a higher mean value of 3.58, indicating that the female respondents were more compliant with health protocols against COVID-19 than the male respondents. The p-value of the t-test was 0.002. Thus, there was a highly significant difference between the sex of the respondents and their level of compliance with COVID-19 health protocols.

Table 1 also illustrates the frequency and percentage distributions of the respondents regarding their educational attainment. There, 30.1% of the respondents had studied in college but did not graduate. This group was followed by 28.2% of the participants who were high school graduates but did not study in college, 18.8% who were college graduates or had pursued postgraduate studies, and 14.8% who were high school undergraduates. There was only one respondent who reported no educational attainment.

The level of compliance of the respondents to COVID-19 health protocols, when grouped according to educational attainment, was summarized in the table. The most compliant with COVID-19 health protocols were college graduates or those with higher education, with a mean average of 3.77.

They were followed by the respondents who had reached college but had not graduated yet, with a mean value of 3.56. The respondents who did not graduate from the elementary level were the least compliant with the recommended protocols against the virus, with a mean average of 3.24. Using the F-test or ANOVA, the p-value was <0.01, indicating a significant difference between the respondents' educational attainment and compliance with COVID-19 health protocols.

Table 1 provided a summary of the sources of information regarding COVID-19 health protocols for the respondents. The majority, or 84.4% of the respondents, had multiple sources of information, including their peers, the internet, TV, public announcements, and radio. The table also displayed the respondents' compliance level with COVID-19 health protocols when grouped according to their sources of information on these protocols.

The most compliant were those respondents with multiple sources of information, with a mean average of 3.51. The highest mean was obtained by the respondents who had TV as their primary source of information on health protocols, with a value of 3.48. The least compliant with the protocols were the respondents whose peers were their primary source of information, with a mean average of 2.99. Using F-test or ANOVA analysis, the p-value was 0.010, indicating a highly significant difference between the respondents' sources of information and their compliance with COVID-19 health protocols.

The frequency and percentage distributions of the respondents' knowledge of COVID-19 health protocols are presented in Table 2 below. Almost all, or 99.2% of the respondents, demonstrated good knowledge of the recommended COVID-19 health protocols. The table also disclosed the respondents' compliance level with COVID-19 health protocols when grouped according to their knowledge.

The respondents with excellent knowledge, who scored 10 points, were the most compliant, with a mean average of 3.54. Meanwhile, those with excellent knowledge but scored 9 points had a mean average of 3.13, and those with good knowledge had a mean average of 3.13 in compliance. The F-test or ANOVA resulted in a p-value of <0.01. Hence, there was a highly significant difference between the respondents' knowledge and compliance with COVID-19 health protocols. Specifically, the higher the knowledge, the more compliant the respondents were with COVID-19 health protocols.

Table 2. Frequency, Distribution, and ANOVA Results of Respondent's Level of Compliance to COVID-19 Health Protocols When Grouped According to Knowledge

Categories	Frequency	Percentage (%)	Mean	p-value
Very Good (9-10 pts)	369	99.2	3.34	<0.01**
Good (6-8 pts)	3	0.8	2.93	
Total	372	100		

Note. ns = Not Significant * = Significant ** = Highly Significant

Table 3 presents the respondents' perception of COVID-19 health protocols. Almost all, or 97.3% of the survey participants, had an excellent perception. The table also outlined the respondents' compliance level with COVID-19 health protocols when grouped according to their perception of them. The respondents with an excellent perception who scored 10 points were the most compliant, with a mean average of 3.55. Meanwhile, those with an excellent perception but scored 9 points had

a mean average of 2.74 in terms of compliance, and those with a good perception, scoring 8 points and 7 points, had mean averages of 2.60 and 2.37, respectively. The fair perception is statistically negligible since only

one respondent fell into this category. The F-test or ANOVA also yielded a p-value of <0.01. Hence, there was a highly significant difference between the perception of the respondents and their level of compliance with COVID-19 health protocols.

Table 3. Frequency, Distribution, and ANOVA Results of Respondent's Level of Compliance to COVID-19 Health Protocols When Grouped According to Perception

Perception of COVID-19 Health Protocols	Frequency	Percentage (%)	Mean	p-value
Very Good (9-10 pts)	362	97.3	3.15	<0.01**
Good (6-8 pts)	9	2.4	2.49	
Fair (3-5 pts)	1	0.3	2.80	
Total	372	100		

Note. ns = Not Significant * = Significant ** = Highly Significant

DISCUSSION

A study by Bavel et al. (5), in alignment with Daoust (6), asserted that late middle-aged adults exhibited higher self-reported compliance with COVID-19 health protocols than younger individuals. To comprehensively gather information regarding compliance with COVID-19 health protocols, each age group was segmented for sampling purposes. This segmentation provided an opportunity to explore whether older people demonstrated greater compliance than their younger counterparts.

According to Lin et al. (15), there were also notable differences between men and women globally, with males being more prone to mortality from COVID-19 than females. Additionally, studies such as the one by Galasso et al. (16) indicated that women tend to exhibit better compliance with COVID-19 public health policies than men. Examining the respondents of the specific barangay in Northern Mindanao, where the majority were women rather than men, became a significant factor in demonstrating whether women were more compliant than men.

The research conducted by Festila & Otterbing (17) demonstrated that women, characterized by their agreeableness, were more likely to be compliant than men, particularly pregnant women, who tend to be more cautious. Wang et al. (18) suggested that women may exhibit increased responsibility and more significant concern about the illness, especially its potential impact on family members. Conversely, Courtenay (19) found that men were less likely to adopt preventive measures, including medication and self-care. These findings align with the results obtained by the researchers regarding compliance between men and women in a specific barangay in Northern Mindanao, indicating that female respondents were more compliant than men.

According to Khafaie et al. (20), higher educational attainment was associated with increased health literacy, encompassing the ability to access, understand, and effectively use health information. This situation enabled individuals to grasp the significance of adhering to COVID-19 guidelines and make informed choices regarding their health. Furthermore, education equipped individuals with knowledge about the virus, transmission dynamics, and the efficacy of preventive measures, enabling them to make informed decisions. Education enhanced critical thinking skills, allowing individuals to evaluate information critically, differentiate between reliable sources and misinformation, and make evidence-based decisions. This development helped individuals navigate the influx of information during the pandemic and discern accurate guidance (21).

Salisbury (22) emphasized that many individuals opt to receive their news from a single source, but employing multiple sources

of information could reduce bias, enhance understanding of differing viewpoints, and enable more informed personal decisions on various topics. Traditional media, such as television and newspapers, have been instrumental in conveying evidence-based information to the public (10). Additionally, people often rely on their family members, friends, and colleagues for COVID-19 information (18), utilizing various platforms like social media and the Internet to express their views and attitudes towards public health policies related to the pandemic (23). Rincón et al. (24) found that individuals' primary sources of information significantly influenced their understanding and subsequent health behaviors.

According to Wong et al. (25), health literacy was the primary component for engaging in disease prevention practices that demonstrated a person's capacity to access, comprehend, and use health-related data to make decisions in areas associated with health.

This finding suggested that knowledge was a social cognitive ability that enabled people to be well-informed of the dangers, resources, and health advice related to diseases and, ideally, to act in ways that promote public health. The study results regarding knowledge of COVID-19 Health Protocols are consistent with previous studies, such as the study by Xu et al. (26). Their research demonstrated the connections between COVID-19 infection, four NPIs (handwashing, good coughing technique, social distance, and mask use), public risk perception, knowledge, attitude, and other social demographic characteristics. 99.9% (n=8146) recognized why and how to wear a mask, 97.2% knew the right approach to practice social distancing, and 97.8% knew the right way to cough. 96.8% of respondents said they put their knowledge into practice. Additionally, their research revealed that 22% of respondents attended parties for Chinese New Year (January 24–25, 2020), a significant Chinese event. If the public had had access to real-time information and been equipped with relevant knowledge about the threat and gravity of the situation, such gatherings might have been prevented.

The study by Alkhaldi et al. (27), which focused on investigating the general population's perception of the COVID-19 virus, showed that 74% of the participants felt anxious about the entire COVID-19 outbreak and its progression. During the COVID-19 outbreak, when health risks were still heightened and COVID-19 health protocols were strictly implemented, there was an increased awareness of the need to prevent virus transmission. The results of this study showed that 97.3% of the respondents had an excellent perception of COVID-19 health protocols. With data gathered post-COVID-19 outbreak, improving outcomes were observed as these protocols continued to be enforced, which is reflected in the decreasing number of COVID-19 cases reported by the World Health Organization. However, the study's limitations include potential biases in self-reported perceptions and the challenge of generalizing findings to different geographical regions or demographic groups. Additionally, the data collected was retrospective, and therefore, it might not fully capture changes in attitudes or compliance levels that occurred over time or in response to new variants of the virus.

CONCLUSION

In conclusion, the study revealed significant variations in the compliance levels with COVID-19 health protocols among residents of a specific barangay in Northern Mindanao, Cagayan de Oro City, when stratified across age, gender, educational attainment, knowledge of COVID-19 health protocols, sources of information on COVID-19 health protocols, and perceptions of these protocols. Notably, age and gender emerged as influential factors, with respondents aged 40 to 44 exhibiting the highest compliance and females generally displaying greater compliance than males. Education also played a pivotal role, as individuals with higher educational attainment demonstrated increased compliance. Moreover, a positive correlation between knowledge levels and compliance was observed. Access to diverse information sources and a positive perception of health protocols further contributed to higher compliance rates. The study underscores the necessity for targeted interventions and communication strategies tailored to different demographics to enhance compliance with COVID-19 health protocols. These insights are valuable for public health authorities and

educational institutions aiming to promote adherence to health measures within the community.

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