

The Assessment of the Knowledge, Attitudes, and Practices towards COVID-19 Minimum Public Health Standards among Selected Fully Immunized Individuals in the National Capital Region

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ABSTRACT

As of March 2022, 65 out of 84 million vaccine-eligible Filipinos are currently fully vaccinated (Department of Health, 2022). However, despite being fully vaccinated, everyone is still expected to comply with the Minimum Public Health Standards (MPHS), given the risk of transmitting the virus. The present study aimed to determine the level of Knowledge, Attitudes, and Practices (KAP) towards COVID-19 MPHS among fully immunized individuals in the National Capital Region (NCR). Moreover, the correlation between selected socio-demographic profiles and KAP was investigated. A descriptive correlational study was conducted among 204 fully immunized individuals with selected vaccine categories and varying demographic profiles. The data obtained were categorized based on Bloom's Cut-off point distribution (60%) and were analyzed using Pearson Correlation and Linear Regression. Upon analysis, the participants have demonstrated Fair Knowledge, Positive Attitudes, and Good Practices. The Pearson correlation model identified a significant positive correlation between KAP scores. The magnitude of the correlation between Knowledge to Attitudes and Practices was weakly positive, while the correlation between Attitudes to Practices was moderately positive. Furthermore, the linear regression analysis has shown a significant relationship between vaccine category and highest educational attainment with Knowledge and Practices, occupation with Practices, and none for Attitudes. Despite the moderate to high overall KAP, concerns of non-adherence to identified preventive measures were demonstrated, which are crucial in continuous transmission control. Therefore, to bridge the gap identified between KAP, implementation of health education and reinforcement of preventive measures must be emphasized to mitigate the transmission of COVID-19.

KEYWORDS: COVID-19, immunization, preventive measures, knowledge, attitudes, practices, public health

1 INTRODUCTION

Out of 84 million vaccine-eligible citizens, 65 million are already fully immunized in the Philippines as of March 2022 (Department of Health, 2022). As more individuals get vaccinated, there is a rising concern about the possible change in their compliance to the Minimum Public Health Standard (MPHS) towards COVID-19, contributing to the increased risk of virus transmission. The MPHS serves as the primary and most effective preventive measure against disease transmission, including handwashing, proper coughing or sneezing etiquette, wearing a face mask, physical distancing, and isolation (Department of Health, 2020). Hence, adherence to these after vaccination is still essential in managing the pandemic. A previous study in Israel showed evidence suggesting vaccine rollouts may decrease individuals' adherence to preventive behaviors (Rahamim-Cohen et al., 2021). Additionally, there is only limited local literature concerning the knowledge, attitudes, and practices (KAP) towards MPHS. With this, the study aimed to determine the level of KAP toward COVID-19 MPHS among selected fully immunized individuals. Moreover, researchers investigated the correlation between selected sociodemographic profiles and obtained KAP scores.

2 METHODOLOGY

2.1 Study Design and Sampling Method

This study utilized a quantitative descriptive correlational research design and a snowball sampling method to gather selected participants through crowdsourcing and referrals. Researchers prepared an informed consent and a questionnaire composed of Close-Ended (Yes/No) and 4-point Likert scale questions to collect the needed information properly. The questionnaire consisted of inquiry sections adapted from six related journals, modified to gauge the study's objectives, and subjected to Cronbach's Alpha for validation.

2.2 Participants

The present study constituted 204 participants who qualified based on the established inclusion criteria: individuals aged 18-59 years old; those belonging to eligible groups A1 (frontline health workers), A3 (persons with comorbidities), A4 (essential economics personnel), or A5 (indigent population); complete primary vaccination series two weeks before the study; and resident of the National Capital Region.

2.3 Data Collection and Method of Analysis

The research team conducted their data collection by online crowdsourcing through various social media platforms like Facebook, Instagram, and Twitter, with a caption and a publication material containing the link to the survey and the contact information of the principal investigator. The online tool: Google Forms™ was used to conveniently obtain and monitor the questionnaire responses from the target participants. The data obtained were categorized based on Bloom's Cut-off point distribution of < 60%, 60-79%, and ≥ 80% was subjected to statistical analysis using Pearson Correlation and Linear Regression to test the study's hypothesis.

2.4 Limitations of the Study

This study only involved 204 participants who qualified based on the inclusion criteria and had consented to their participation voluntarily. This study did not cover the participants' potential eligibility for at least one vaccine-priority group. Researchers only assessed the data based on one's applied category as declared in the questionnaire and seen on their vaccination card. Additionally, researchers did not include those belonging to the A2 (Senior Citizen group) as data was challenging to obtain through the studies' electronic survey. Furthermore, there was a significantly low vaccination rate among the elderly population (WHO, 2021). With this, researchers anticipated a probable insufficient representative data of the said group.

2.5 Ethical Considerations

Throughout the study, the researchers upheld the Data Privacy Act of 2012 (RA 10173) to ensure that all participants' private, personal, or sensitive information was held confidential and protected. The researchers have removed all possible conditions that may harm the participants while engaging in this research. An informed consent, complying with the existing ethical standards and requirements approved by the Ethics Board of Committee, was provided to the interested participant before answering the research questionnaire. Eligible participants were given a choice of either consenting to participate or to decline. The data gathered was used for the sole purpose and fulfillment of this research. The data was stored in a restricted Google Drive that the investigators could only view but not download. All data were only available to the researchers, research staff, and the ethics committee board. Outside parties had no access unless the law required the disclosure of such information. The researchers ensured the removal of identity-specific information (i.e., name, email address, and vaccination card picture) before they relayed vital data to the statistician for data analysis. This guaranteed anonymity, emphasizing the participants' right to privacy and confidentiality.

Furthermore, this study was presented to various research platforms and may also be published in journals. Consequently, the study results, including the analysis of the data, and generalized data, will be available to the public, not including any of the participants' personal information.

3 RESULTS

Table 1 Socio-Demographic Profile of Participants

Socio-Demographic Variables		Frequency (%)
Gender	Male Female	51 (25.0%) 153 (75.0%)
Vaccination Category	A1 - Healthcare Worker A3 - Persons with Comorbidities A4 - Uniformed Personnel & Essential Workers A5 - Indigent Population	32 (15.7%) 64 (31.4%) 52 (25.5%) 56 (27.5%)
Highest Educational Attainment	Elementary level High school level Tertiary level College graduate	1 (0.5%) 28 (13.7%) 128 (62.7%) 47 (23.0%)
Occupation	Employed Not employed/Student	45 (22.1%) 159 (77.9%)

The sociodemographic profile of the 204 fully immunized participants living in NCR is shown in Table 1. The majority of the participants (75%) were female, 128 of 204 were in university education (62.7%), and 159 of 204 were unemployed (77.9%). Since the percentages in the vaccine category are nearly identical, there is no apparent evidence of variability.

Table 2 Knowledge, Attitudes and Practices Level of the Participants on COVID-19 MPHS

	Bloom's Category	Scores (%)	Frequency (%)	Mean	SD
Knowledge	Poor Fair Good	≤17 (<60%) 18-23 (60%-79%) 24-30 (≥80%)	56 (27.55%) 114 (55.9%) 36 (16.7%)	19.23	3.98
Attitudes	Negative Uncertain Positive	≤7.7 (<60%) 7.8-10.3 (60%-79%) 10.4-13 (≥80%)	17 (8.3%) 40 (19.6%) 147 (72.1%)	10.88	1.80
Practices	Poor Fair Good	≤15.9 (<60%) 16.0-21.3 (60%-79%) 21.4-27 (≥80%)	23 (11.3%) 62 (30.4%) 119 (58.3%)	20.998	3.62

As seen in Table 2, the mean Knowledge score among all participants was $19.23/30 \pm 3.98$ denoting “Fair Knowledge” according to Bloom’s cut-off point. Almost all agreed that COVID-19 is a serious disease (99.5%); correctly answered droplets (99%) and contact with infected surfaces (98.5%) as the mode of transmission; and correctly identified elderly (97.5%) and adults with chronic diseases (99%) as the most at-risk group to COVID-19 infection. In addition, the majority could correctly answer questions related to COVID-19 symptoms. In terms of the MPHS, a high percentage of participants correctly identified the

following as effective preventive measures: wearing medical masks (99.5%), avoiding crowded places (100%), isolating infected individuals (99%), hand-sanitizing/washing (98.5%), reducing transmission with isolation and treatment (99%), and proper social distancing of more than one meter apart (93.1%). On the contrary, crucial Knowledge gaps were evident such as more than half agreed that COVID-19 virus transmission is possible through eating wild animals (54.9%), there is an effective cure (56.4%), and that antibiotics is an effective treatment (48.5%).

Moreover, the participants have a “Positive Attitude” with a mean score of $10.88/13 \pm 1.80$ (Table 2). The majority of the participants (>80%) answered *Always* in all questions under the categories of personal hygiene, wearing of face mask, and social distancing. Meanwhile under the category of isolation and contract tracing, the majority answered *Always* only towards the following: willing to practice social distancing for as long as it takes to keep themselves and others safe; staying at home when they are not feeling well; and willing to self-isolate and work from home for 7-14 days if necessary. On the other hand, only less than half of the participants (<50%) answered Always when asked if they agree that COVID-19 will be successfully controlled (73; 35.8%) and if they will contact a health worker whenever they have symptoms such as fever, cough, and sore throat (86; 42.2%).

The overall mean practice score among the 204 participants was 20.998 ± 3.62 , which is under the classification of "Good Practices" in Bloom's cut-off points (Table 2). Specifically, the majority of the participants (>80%) have shown good practice towards the following: performing handwashing before and after handling food (165; 80.9%); covering one's mouth when sneezing or coughing (183; 89.7%); performing handwashing after coming from outside (180; 88.2%); performing handwashing using soap and water (173; 84.8%); throwing used tissues into the bin (181; 88.7%); turning away from people when coughing or sneezing (191; 93.6%); wearing of face mask in crowded places (202; 99%); wearing of face mask in uncrowded places (169; 82.8%); avoiding contact with an infected individual (191; 93.6%); staying at home when feeling flu-like symptoms (179; 87.7%); monitoring of temperature when not feeling well (168; 82.4%); and carrying of hand sanitizer and alcohol (182; 89.2%).

Table 3 Correlation between Knowledge, attitude, and Practices towards COVID-19 MPHS

	Correlation Coefficient Value (r)		
	Knowledge Score	Attitude Score	Practices Score
Knowledge Score	1	.235**	.185**
Attitude Score	.235**	1	.609**
Practices Score	.185**	.609**	1

Note. **. Correlation is significant at values <0.01 (2-tailed).

The table above includes the determined correlation values between the KAP towards COVID-19 MPHS. The findings demonstrate a significant positive correlation ($p < 0.001$) between the KAP scores of the respective samples. Despite the weak magnitude of the correlation between Knowledge scores to attitude ($r = 0.235$) and practices ($r = 0.185$), the correlation of attitude to practices scores is moderately positive.

Particular contrasting sentiments displayed the weak positive correlation between knowledge and attitudes among participants' answers. For example, all participants agreed with the statement that avoiding crowded places is effective in the prevention of the spread of this disease (100%). However, not all (89.7%) believed that social distancing measures are always necessary and will significantly reduce the transmission of this disease. Furthermore, almost all (99.5%) stated that wearing face masks is effective against the contraction of COVID-19. Nevertheless, not all (88.7%) believe that wearing face masks is essential and that they do not only follow this practice because the government mandates it. Another finding regarding a weakly positive correlation between knowledge and practices is that despite having a high knowledge score on droplet transmission (99%), only 59.3% of the participants stated that they perform handwashing prior to touching their eyes and noses.

Following this, the data also presented a moderately positive correlation between the participants' attitudes and practices. The majority presented a positive attitude concerning social distancing, having answered *Always* in all three (3) questions about this (183:89.7%; 164: 80.4%; 170; 80.3%). However, one of the Practices chosen weakly supports this finding since only 51% of the participants stated that they maintain a distance of at least two (2) meters between other people when in public.

Table 4 Knowledge, Attitudes, and Practices According to Socio-demographic Variables

Variable	Knowledge <i>b</i> 95% CI [LL, UL]	Attitude <i>b</i> 95% CI [LL, UL]	Practices <i>b</i> 95% CI [LL, UL]
Sex			
Male	-.117	-	-
Female	.117	-.277 [-.869, .314]	.012 [-1.147, 1.172]
Vaccination Category			
A1	1.543 (.060, 3.026)*	.520 [-.277, 1.317]	1.581 [.018, 3.143]
A3	.022	.049 [-.616, 714]	1.230 [-.073, 2.534]
A4	-.070	.189 [-.546, 924]	1.894 [.454, 3.335]*
A5	.044	-	-
Highest Educational Attainment			
Elementary level	.032	-1.559 [-5.179, 2.060]	3.082 [-4.014, 10.179]
High school level	.041	-.411 [-1.162, .341]	-.041 [-1.515, 1.433]
Tertiary level	1.252 [.136, 2.368]*	-	-
College graduate	-.060	-.317 [-1.292, .659]	2.030 [.117, 4.1123.942]*
Occupation			
Employed	-.063	-	-
Not employed/student	.063	.308 [-.664, 1.281]	2.796 [.889, 4.703]

Note. * indicates p < 0.05. *b* = unstandardized regression weights. *UL* and *LL* = Upper and lower limits of a confidence interval, respectively.

As shown in Table 4, the results show no sufficient evidence that ($p>0.05$) the level of KAP differed according to gender. Hence, there is no correlation between the gender of the participants and their KAP level towards COVID-19 MPHS. With regards to vaccination category, there is a significant difference in the Knowledge score among individuals under A1 or the healthcare workers ($p = 0.047$), indicating that the perceived Knowledge scores of A1 are higher by 1.543 (95% CI: 0.06 to 3.03). Meanwhile, the vaccination category is not correlated with the attitude towards COVID-19 MPHS. Moving onto the levels of practices, participants under A1 ($p = 0.047$) and A4 category or essential workers ($p = 0.010$) had a perceived practice score higher by 1.581(95% CI: 0.018 to 3.143) and 1.894 (95% CI: 0.454 to 3.335) respectively compared to those who fall under A5 or indigent population. Based on the study, it was observed that individuals under the tertiary level had a significant difference in the Knowledge score ($p=0.028$) which is higher by 1.252 (95% CI: 0.14 to 2.37) compared to other educational levels. However, the results showed no significant difference in the attitude scores ($p>0.05$) according to educational attainment. In addition to this, the perceived

practice scores exhibit a significant difference ($p=0.038$) in college graduate individuals, which is higher by 2.030 (95% CI: 0.117 to 3.942) than tertiary levels. This study showed no significant difference in the Knowledge and attitude scores ($p>0.05$) according to occupation. Therefore, there is no correlation between the occupation and the Knowledge and attitude scores towards COVID-19 MPHS. On the contrary, unemployed individuals had a practice score ($p=0.004$) higher by 2.796 (95 CI: 0.889 to 4.703) than those employed.

4 DISCUSSION

4.1 Knowledge, Attitudes and Practices toward COVID-19 and the MPHS

The present study assessed the correlation of the level of KAP of selected fully immunized individuals in the NCR. Results showed that the general population demonstrated a fair level of knowledge, a positive attitude, and good practices towards COVID-19 MPHS. These findings were consistent with numerous international studies (Bazaid et al., 2021; Sulistyawati et al., 2021; Twinamasiko et al., 2021; Masoud et al., 2021; Majam et al., 2021, and Hatabu et al., 2020). The local study of Lau et al. (2020), on the other hand, reported contrasting findings where its Filipino participants showed low knowledge on certain effective preventive measures (i.e., avoiding crowded places and social distancing) and low overall attitude towards COVID-19. Moreover, the same study published contradictory results with regard to the participants' practices on preventive measures as only 28% of its participants adhered to the practice of wearing face masks. This difference may be attributed to the time when the research was conducted. The study of Lau et al. (2020) was done in the early months of the pandemic, while the present study was conducted in the following year. Considering the positive increase in the current study's results, this highlights the continuous improvement of the Filipinos' knowledge, attitudes and practices over time.

Despite the overall increased KAP levels, researchers still detected several knowledge gaps and concerning behaviors towards the COVID-19 MPHS. For instance, more than half of the participants still have misconceptions about its transmission (i.e., animal contact) and treatment (i.e., existing cure and antibiotic use). The former is supported by the study of Azlan et al. (2020), which found that only 35.7% of its participants knew that eating or touching animals could not result in infection. Meanwhile, a study in Malaysia reported similar results regarding antibiotic use, where the general public believed that antibiotics are effective viral treatments and should be prescribed when experiencing flu-like symptoms (Chang et al., 2021). Notably, this gap may be attributed to the lack of information dissemination on such matters, exacerbated by widespread misinformation and overreliance on social media to gain information (Tuppal et al., 2021).

In terms of attitudes, the studies of Puspitasari et al. (2020) in Ethiopia and Fetansa et al. (2021) in China presented contrasting results where the majority of their participants agreed that COVID-19 might be controlled. A reason for this may be associated with the differences in the citizens' confidence in their government in terms of controlling the COVID-19 crisis. The studies conducted in Ethiopia and China show that their participants are confident that their governments will be able to control the crisis (Fetansa et al., 2021; Puspitasari et al., 2020). On the other hand, a study in the Philippines stated that their participants disagreed that the government is doing enough to control the spread of COVID-19 and believed that the Department of Health (DOH) is not effective in addressing COVID-19 problems (Bautisa et al., 2020). Aside from this, only 86 (42.2%) of the participants responded that they always contact a health worker whenever they have symptoms such as fever, cough, and sore throat.

This is similar to the findings of Konjengbam et al. (2021), wherein only 41.6% of their participants agreed to contact a health worker in a similar situation. These findings may signify that there is still a need for better reinforcement of the MPHS as well as a need to improve government plans and policies in controlling the COVID-19 crisis.

Lastly, significant gaps in the participants' Practices in terms of hand hygiene, social distancing, and health-seeking practices have been observed. These are supported by Masoud et al. (2021), wherein a gap between the wearing of face masks in general (52%) compared to the wearing of masks in a crowded place (82%) has been ascertained. Moreover, the identification of gaps in the present study may present a lapse leading to contradictory results, as seen in the study by Urbán et al. (2021), as only 36.8% of the participants showed full adherence to the practices corresponding to COVID-19 preventive measures. The current study found these relevant for implementing programs regarding public awareness of COVID-19 MPHS.

4.2 Correlation Between Knowledge, Attitude and Practices towards COVID-19 MPHS

In order to further evaluate and understand the significance of the participants' knowledge, attitudes, and practices, it is vital to present the correlation between these three (3) parameters. The magnitude of correlation for the values generated between knowledge scores to attitude ($r= 0.235$) and practices ($r=0.185$) is deemed weakly positive. The discovered weakly positive correlation between knowledge, attitudes, and practices is similar to the studies by Masoud et al. (2021), Wright et al. (2021), Tupal et al. (2021), and Sari et al. (2020).

Masoud et al. (2021) presented this similar pattern between knowledge to attitudes and practices and attitudes to practices. A stronger correlation between attitudes and practices is indicative of the furtherance of objectives since the sole promotion of auxiliary knowledge would be insufficient (Masoud et al., 2021). Meanwhile, Wright et al. (2021) emphasized that predictions from health models and empirical evidence from previous epidemics and the COVID-19 pandemic suggested that less concerned individuals about contracting the virus tend to show reduced compliance despite the possession of high knowledge. A weak positive correlation of knowledge to attitudes may signify knowledge as a vital component that shapes attitudes; however, several other factors can appreciably affect this. Moreover, this may be due to decreased motivation for vaccinated individuals to yield due to lowered health risk perception and complacency (Wright et al., 2021). In addition to this, Tupal et al. (2021) exemplified this similar pattern between knowledge and practices and attitude and practices. Finally, Sari et al. (2020) exemplified this through a weak correlation between knowledge and attitudes.

This study exhibited the correlation of attitude to practices as moderately positive. This finding is further substantiated by Masoud et al. (2021), in which the researchers discussed that their results presented a stronger correlation between attitudes and practices. The researchers from the same study further emphasized their recommendations to enhance individuals' knowledge, attitudes, and practices toward COVID-19. In order to develop individuals' practices, adequate knowledge and positive attitudes must be targeted by future interventions since the sole promotion of auxiliary knowledge would be insufficient in itself (Masoud et al., 2021). This claim was further supported by Salman et al. (2020), wherein it was recommended that health regulators utilize various electronic communication approaches

to increase Knowledge of COVID-19 further and eventually develop preventive practices for various individuals.

4.3 Socio-demographic Factors correlated with Knowledge, Attitude and Practices

Gauging people's Knowledge, Attitudes, and Practices is crucial in providing baseline information which eventually aid in the determination of gaps within Knowledge, beliefs, and actions. These measures aid in shedding light on the factors which contribute to such understanding and behavioral patterns. In the research locale, the assessment of the KAP level on compliance to minimum public health standards and determination of the factors influencing the KAP scores have a pertinent role concerning the cases of infections and deaths in COVID-19. Furthermore, this identifies gaps necessary for the implementation of COVID-19 MPHS.

Shrestha et al. (2021) and Limbu et al. (2020) revealed that healthcare workers have higher knowledge levels than non-healthcare workers as the former are expected to be more educated considering the increased COVID-19 risk exposure within their workplace. Their responsibility of being equipped with the correct health information will ensure their protection and, most especially, their patients. Moreover, Bautista et al. (2020) revealed that healthcare and non-healthcare personnel tend to comply more with the appropriate preventive practices against COVID-19. Consequently, the collective adherence to proper practices will serve as a primary intervention in effectively decreasing the COVID-19 transmission and disease burden in communities.

A high percentage of knowledge is seen in higher levels of education due to increased access of students on various social media platforms, considering the current online educational setup (Erfani et al., 2020). Hence, this gives them greater awareness regarding transmission, symptoms, and risk groups. On the other hand, Hatabu et al. (2020) highlighted that perceived higher practice scores of college graduates could be attributed to their advanced understanding, encouraging beneficial behaviors such as avoiding contact with others and washing hands.

Bajaj et al. (2021) and Chai et al. (2022) reported that the decreased practices of employed individuals are probably due to their extensive daily exposure outside and confinement to crowded workplaces compared to non-workers. Therefore, their inconsistency in complying with the protocols may result in low practice scores. Furthermore, non-workers have more access to health information about COVID-19 published online since they have more time browsing their social media accounts than employed people.

5 CONCLUSION

Overall, the general population demonstrated fair knowledge, positive attitudes, and good practices towards COVID-19 MPHS. A weakly positive correlation was exhibited between knowledge score to attitudes and practices, while moderately positive between attitudes score to practices. Moreover, there was a significant relationship between vaccine category and highest educational attainment with knowledge and practices, occupation with practices, while none for attitudes. The present study provided a benchmark of the KAP of selected fully immunized individuals towards COVID-19 MPHS in NCR. Furthermore, this emphasizes the importance of continuing health education and reinforcement of

implementing strategies to enhance knowledge, maintain a positive attitude, and highlight good practices towards COVID-19 to mitigate the transmission of the disease.

For future studies, researchers recommend an increase in participant size, change in setting, or involvement of different age groups. While the current study holds an equal distribution of participants per city within NCR, it is notable that women and the unemployed sector were over-represented in the sample. With this, researchers also recommend a more systematic and probability-based sampling method to attain a greater diversity among the participants and more generalizable and representative results.

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