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Assessment of Knowledge, Attitude, and Practice Regarding Proper Face Mask Utilization Among Clinic Attendees for COVID-19 Prevention

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Abstract

The COVID-19 pandemic underscored the critical role of facemasks in mitigating viral transmission, yet gaps in knowledge, attitudes, and practices (KAP) regarding their proper use persist, particularly in community healthcare settings. This Applied Practice Experience (APE) project, conducted at SOS Medical Center in North Plainfield, New Jersey, from February to June 2022, aimed to assess and enhance facemask utilization among clinic attendees through targeted education. A quasi-experimental design was employed, to identify best practices, development of a 19-item KAP questionnaire and teaching aid, and pre- and post-intervention surveys with 32 participants (65.6% female; mean age 35.8 years; 69% with bachelor's degree or higher). Participants received individualized education on facemask use, with follow-up assessments after two weeks. Data were analyzed using Wilcoxon signed-rank tests to compare paired pre- and post-scores. Results showed statistically significant improvements: knowledge scores increased from 6.5 to 7.5 ($p<0.0001$), attitude from 3.4 to 4.1 ($p=0.0011$), practice from 3.1 to 4.9 ($p<0.0001$), and overall from 13.0 to 16.5 ($p<0.0001$). Notable gains included 41% increases in correct handling and storage practices. The intervention effectively bridged KAP gaps, supporting recommendations for integrating mask education into clinical consultations, public health campaigns, and policy frameworks to promote widespread adoption. This study highlights the value of simple, scalable education in enhancing respiratory infection control, with implications for future pandemics and occupational health standards.

Keywords: Face mask utilization; COVID-19 prevention; Public health education; Respiratory infection control; Mask education intervention; Wilcoxon signed-rank test

1. Introduction

The covid-19 pandemic put the world on her toes in search of a quick remedy to forestall viral spread. Until recently, it was thought that the virus could only be transmitted by droplets that are coughed or sneezed out or by contaminated fomites, with differences according to the initial load and surface characteristics [1]. However, other studies seemed to indicate the opposite, i.e., that the virus is present in exhaled air produced by talking and breathing [2]. Moreover, a potential role for aerosols in virus diffusion was evident in a complex laboratory study. Aerosols containing a viral load quite like that observed in human respiratory samples were created to generate an aerosolized environment. SARS-CoV-2 was detected ≤3 h after the start of the study [3]. Although these findings were not considered fully convincing by some authors [1], they deserve attention and further studies are required to establish whether and when airborne transmission of SARS-CoV-2 truly occurs and how it can be reduced.

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It is well known that surgical masks can prevent the inhalation of large droplets and sprays but have limited ability to filter submicron-sized airborne particles [4]. As SARS-CoV-2 is also embedded in aerosols <5 μm in diameter, it cannot be determined whether they are always effective. However, mask wearing by patients with pulmonary tuberculosis (an airborne infectious disease) has been shown to reduce infectivity to guinea pigs by 56% [5]. The surgical mask has also been shown to intercept other human coronaviruses during coughing [6]. A meta-analysis of randomized controlled trials has also shown that surgical masks and N95 respirators were similarly effective in preventing influenza-like illness and laboratory-confirmed influenza among healthcare workers [7]. Similar results were obtained in a case-control study comparing the protective effect of surgical masks and N95 respirators against SARS among healthcare workers in five Hong Kong hospitals [8].

Controlling a respiratory infection at source using a face mask is a well-established strategy. For example, symptomatic patients with cough or sneezing are generally advised to put on a face mask, and this applies equally to patients with pulmonary tuberculosis (airborne transmission) and influenza (predominantly droplet-transmitted). With the large number of asymptomatic patients unaware of their own infection [9], the comparable viral load in their upper respiratory tract [10], droplet and aerosol dispersion even during talking and breathing [2], and prolonged viral viability outside our body [3], the universal use of face masks is strongly advocated for as a means of source control in public places during the COVID-19 pandemic. Extreme forms of social distancing are not sustainable, and complete lockdown of cities or even whole countries is devastating to the economy. Universal masking in public complements social distancing and hand hygiene in containing or slowing down the otherwise exponential growth of the pandemic. Universal masking protects against cross-transmission through unavoidable person-to-person contact during the lockdown and reduces the risk for resurgence during relaxation of social distancing measures.

2. Literature review

Face masks have been used over the years as a protective barrier against respiratory diseases in general including the Coronavirus [11]. In fact a systematic review and meta-analysis undertaken to investigate the efficiency of face masks in preventing respiratory virus transmission revealed that proper mask use by healthcare and non-healthcare workers can lower the risk of respiratory virus infection by 80% [12] similar to a 70% lower risk of testing positive for SARS-CoV-2 infection recorded for persons who wore masks during a COVID-19 outbreak on the USS Theodore Roosevelt [13]. Assessing what people know about facemask use, their disposition towards facemask use, and whether and how they wear facemask is crucial to detect gaps and vulnerabilities and provide the necessary rapid response through public health education to avoid the spread of the infection.

Similarly, in the study by Nguyen, there were strong economic and statistical evidence that mandating masks in public significantly lowers the incidence of developing COVID-19 symptoms at the individual level [14]. In fact, in states where people are required to wear masks in public, the number of COVID-19 symptoms declines by 0.43 percentage points. Also, because of the mandate, the tendency of exhibiting any symptoms within the last seven days decreases by 10.52 percentage points. Individuals are 0.29 percentage points less likely to develop all 11 symptoms if the Public Mask Mandate is effective in the residential state. Regarding individual symptoms, individuals residing in states where the Public Mask Mandate is in place are 4.83, 1.96, 3.10, and 7.70 percentage points less likely to suffer from fever/chills, cough, shortness of breath, and fatigue, respectively. The Public Mask Mandate also reduces the incidences of muscle/body aches, headache, loss of appetite, nausea/vomiting, and diarrhea by 7.12, 4.30, 6.13, 4.73, and 2.84 percentage points respectively.

In a cross-sectional study by Larebo et al. conducted among 764 students at Wachemo University in Southern Ethiopia, the overall knowledge about the use of face masks was found to be low(29.2%). This is in contrast to a 2020 study by trivedi et al. where nearly 70% of participants expressed knowledge about the importance of wearing facemask [15-16]. In a related study by Ahmad et al. it was shown that people who know benefits of using facemask shows statistically significant association in using facemask [17].

Narrowing down to health care setting, a study in Addis Ababa showed that the overall knowledge, attitude, and practice of the healthcare providers towards proper face mask utilization were 33.5%, 45.3% and 33.3% respectively, and the proper utilization of face mask associated with knowledge about facemask use and educational status [18]. When compared to a related study in another health care setting in Ethiopia, the level of overall correct use of facemask was 10.1% [19]. Furthermore, the study by MacIntyre et al. examined the evidence around the efficacy of masks and respirators for healthcare workers, sick patients and the general from a total of 19 randomizedcontrolled trials were included in this study - 8 in community settings, 6 in healthcare settings and 5 as source control [12]. In the community, masks appeared to be effective with and without hand hygiene, and both together are more protective. Randomised controlled trials in health care workers showed that respirators, if worn continually during a shift, were effective but

not if worn intermittently. It is interesting to note that medical masks were not effective, and cloth masks even less effective. When used by sick patients randomised controlled trials suggested protection of well contacts.

By virtue of the role healthcare workers play in the administration of care hospitals and clinics happen to be a major convergence point where the traffic allows for a close interaction between sick and non-sick individuals. Moreso the proximity between healthcare workers and patients brings the health sector under radar to check if all stakeholders are using facemasks properly. Besides the healthcare environment is expected to model and promote proper use of facemasks among the people in the community. This was part of the motivation for this current study. Beyond the type and texture of facemask being used, studies have shown that proper use of facemasks in terms of techniques, when to use, duration of use, motivation for use etc. can modify the efficiency of control the use of facemasks provides. The essence of this study is to assess if people are using masks the right way and to provide the necessary education to boost impact of facemask use.

3. Materials and methods

3.1. Objective #1

I met this objective by conducting an extensive literature review. Please see literature review and references sections of this report. PubMed and google scholar were carefully searched and peer-reviewed journal articles on the use of facemask were thoroughly perused for both what is known and what is not known about the use of facemasks. Accredited official websites like those of World Health Organization (WHO), Center for Disease Control (CDC) and The United States Environmental Protection Agency (USEPA) were explored for current available literature and resources on facemask use were collated with necessary permissions obtained.

The information on facemask use were gathered and the available facts suggested knowledge gaps and deficiencies, were used for comparison with results of the study in question, and for prediction of future patterns. Also, the literature search led to the identification of several best practices in the use of facemasks. Most of which were captured in the face mask use teaching aid. All approvals and permissions to access site resources are the responsibility of the site and site supervisor. IRB submission is not required.

3.2. Objective #2

I met this objective through review of approved articles about facemask use including publications published by WHO, CDC and USEPA. Several standardized questionnaires and templates were studied, inferences were adapted and used to create a pre-test questionnaire and a post-test questionnaire assessing knowledge, attitudes, and practice of clinic attendees regarding use of facemasks with a minimum of 10 questions and develop a teaching aid as well for this study.

The questionnaires and teaching aids were approved by both the site supervisor, course advisor and Applied Practice Experience (APE) panel. The questionnaire is made up of four sections: biodata, knowledge, attitude, and practice. The biodata section had seven items: name, age, sex, marital status, number of children, occupation, and level of education. The knowledge, attitude and practice sections had eight, five and six closed questions respectively with multiple choice answers. The questionnaire was intended to investigate the knowledge, attitude, and practice base of participants, identify gaps, assess the impact of subsequent face mask education, and work out how to improve on the proper use of facemask by community members overall. The questionnaire items were constrained to one page to encourage participation in the survey. The same questionnaire was used for both pre- and post-test.

3.3. Objective #3

I met this objective by first conducting a pre-test survey. The target population was set in SOS Medical Services and included all clinic attendees from patients to staffs to visitors. Consent was obtained from all participants before administering questionnaires. The pre-test questionnaires were administered by trained personnel during normal work/ shift hours. For patients who were going to see a doctor, questionnaire administration was incorporated into the usual clerking process. For others like staffs, clinic attendees and other visitors, the questionnaire was administered to them at their spare time.

The pretested individuals were first taught the basics of face mask use using the face mask use teaching aid I designed and then were handed the teaching aid to go home with and further study them. A follow up visit was scheduled for each participant to return in two weeks in agreement with the management of the clinic. At the follow up visit, the post-test questionnaire was administered to each participant by trained personnel. There were thirty-two participants in all.

3.4. Objective #4

I met this objective by first collating all completed questionnaires. The completed questionnaires were scaled and scored for each participant. The initial data generated was entered into a data entry software for further analysis. The input data from the questionnaire-based interviews were analyzed and interpreted using basic statistical measurements. Pre- and post-intervention scores were aggregated for each area and in total. Each question answered correctly was given a score of "1". Therefore, for each participant, scores could range from 0-8 in the knowledge area, from 0-5 in the attitude area, from 0-6 in the practice area, and from 0-19 for the overall total score. The scores were paired (pre- and post-) for each participant as appropriate for a paired analysis. Paired data come in pairs (or more) of measurements from the same unit or person. Therefore, paired data are not independent. With the smaller sample size (n=32), the assumption of normally distributed data is tenuous, therefore dependent (paired) t-tests were not conducted. Instead, non-parametric tests are performed to detect sore differences. The non-parametric alternative to a paired t-test is the Wilcoxon signed rank test.

The Wilcoxon signed rank sum test is used to test the statistical significance of all paired differences in this study. For all hypothesis tests in this study, the null hypothesis is that the mean difference in measurements is zero, and the alternative hypothesis is that the mean difference in measurements is not zero. Statistical significance level is set at alpha=0.05. Due to the small sample size, caution should be used when generalizing the results to larger populations. Sequel to this, some recommendations for future implementation of proper use of facemasks were made and are as follows. it is time the governments and public health agencies made rational recommendations on appropriate face mask use to complement their recommendations on other preventive measures, such as hand hygiene. With the current fight against COVID-19, we suggest clinicians incorporate mask education in clinic visits and consultation.

Providing free masks, informing people about the importance of covering both the mouth and nose, calling to attention of people in the moment when they are unmasked in public and role-modelling by community leaders can promote widespread mask usage and bridge the knowledge - practice gap on appropriate use of facemasks. In parallel, urgent research on the duration of protection of various types of common and modern face masks, the measures to be taken to prolong the lifespan of disposable masks, and the invention on reusable masks should be encouraged. These recommendations have been captured as well in the public health implications segment.

4. Results

Table 1 Demographics of study sample

	Frequency (n)	**Percent (%)**
Education		
High school degree	10	31.3%
Bachelors's degree	16	50.0%
Masters's degree	6	18.8%
Gender		
Female	21	65.6%
Male	11	34.4%
	Mean	SD
Age	35.8	16.92

Table 2 Masking questionnaire item summary statistics

Correct response frequencies						
Area	**Item**	**Description**	**Pre (n)**	**Post (n)**	**Change (n)**	**Change (%)**
Knowledge	Q1	What type of mask do you often wear?	32	32	0	0%
	Q2	Facemask helps reduce risk of transmitting COVID 19?	31	32	1	3%
	Q3	What other ways can we reduce COVID 19 transmission?	21	27	6	19%
	Q4	Surgical face masks are re-usable	20	31	11	34%
	Q5	The use of a mask alone is not sufficient to provide an adequate level of protection against COVID-19	22	27	5	16%
	Q6	Surgical masks can be shared.	30	31	1	3%
	Q7	Surgical masks provide complete protection from germs and contaminants.	27	32	5	16%
	Q8	COVID-19 can be transmitted by people who don't have symptoms	26	29	3	9%
Attitude	Q9	Do you think that face masks offer some protection from COVID 19?	29	32	3	9%
	Q10	Do you always keep your mask on?	16	21	5	16%
	Q11	Do you encourage others to wear a mask?	21	26	5	16%
	Q12	Does the use of facemask make any difference for you?	20	26	6	19%
	Q13	Can you afford one surgical mask per day?	23	25	2	6%
Practice	Q14	Do you always ensure your facemask cover the nose, mouth and chin and are secured with ties or ear loops, fitting snugly but comfortably, without gaps?	27	32	5	16%
	Q15	Where do you keep your facemask on?	10	23	13	41%
	Q16	Do you always wash or sanitize your hands before putting on or after removing your facemask?	9	21	12	38%
	Q17	Do you touch your facemask when wearing it?	11	23	12	38%
	Q18	Do you handle your facemask only by the ear loops or ties when taking them off?	16	29	13	41%
	Q19	Do you touch your eyes, nose, mouth, or face when taking off your facemask?	25	29	4	13%

Table 2 below shows a list of the questionnaire items, their description, and pre- and post- group summary statistics. In the area of masking practice, there were a number of items that improved, implying an increase in safe masking practices will ensue. Questions 15 (Where do you keep your facemask on?) and 18 (Do you handle your facemask only by the ear loops or ties when taking them off?) both experienced 41% increase in correct answers. Questions 16 (Do you always wash or sanitize your hands before putting on or after removing your facemask?) and 17 (Do you touch your facemask when wearing it?) both experienced 38% increases in correct responses. In the masking knowledge area, Question 4 ("Surgical facemasks are re-usable") experienced a 34% increase in correct responses.

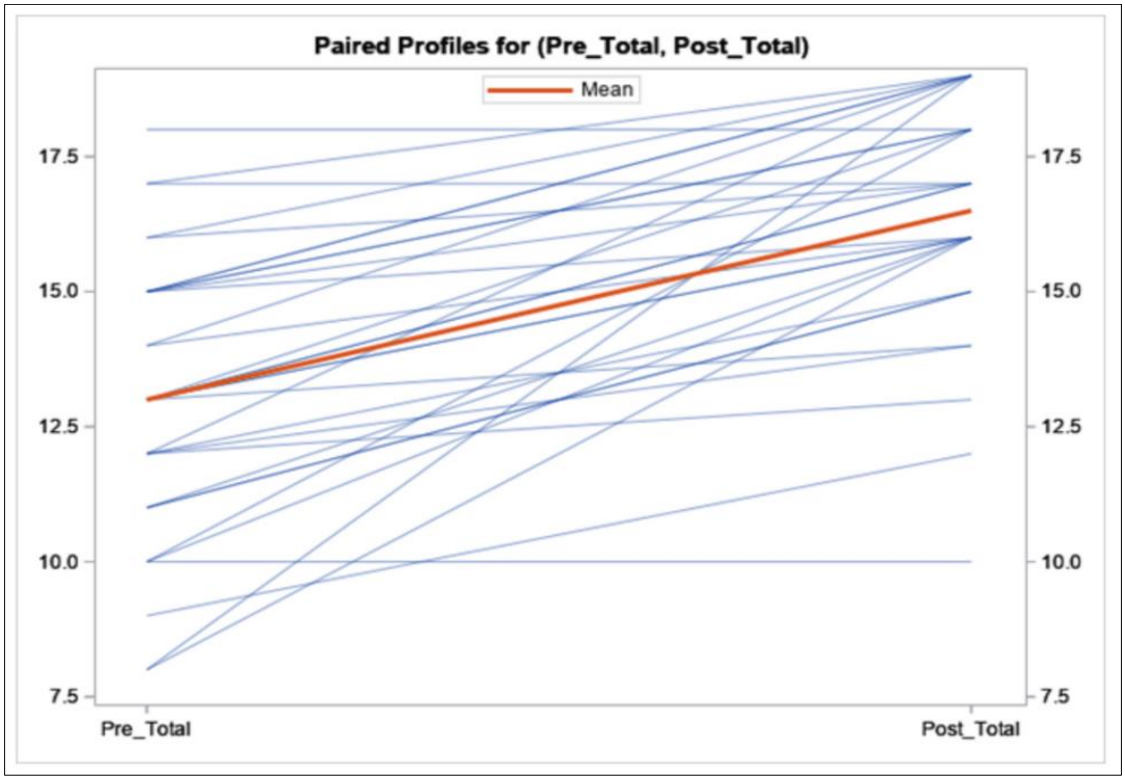

Figure 1 Paired overall test scores for study participants before and after mask education

Table 3 Questionnaire results summary- mean scores and significance tests

Wilcoxen Signed - Rank								
	Pre- score		**Post- score**		**Change**		**Test**	
Test Area (score range)	Mean	SD	Mean	SD	Mean	SD	S	Pr >= |S|
Knowledge (0-8)	6.5	1.27	7.5	0.72	1.0	1.41	107.0	<.0001
Attitude (0-5)	3.4	1.46	4.1	1.16	0.7	1.04	48.0	0.0011
Practice (0-6)	3.1	1.29	4.9	1.12	1.8	1.25	217.5	<.0001
Total (0-19)	13.0	2.60	16.5	2.21	3.5	2.51	217.5	<.0001

As Table 3 shows, at the alpha=0.05 level, all questionnaire areas experienced a statistically significant increase in mean scores. Knowledge area means scores increased from 6.5 to 7.5. The Wilcoxen signed-rank test results (S=107, p<0.0001) confirm that the data support that the mask education program was effective in increasing masking knowledge. Regarding Attitude scores, the mean Attitude scores increased from 3.4 to 4.1, and the Wilcoxon signed rank test (S=48, p=0.0011) confirmed that the increase in mean scores was statistically significant. The mask education program was effective in improving masking attitudes among study participants.

4.1. Study Data

A simple data summary is as follows: Sample size: 32, Sex: 12 males and 20 females, Age range: 9-66 years, Level of education: 4th grade to master's degree, Pre-test: 100% passed knowledge, 72% passed attitude and 28% passed practice, and Post-test: 100% passed knowledge, 84% passed attitude and 91% passed practice. A quasi-experimental design was used by comparing pre- and post-intervention questionnaire outcomes in three areas related to masking: 1) masking knowledge, 2) attitudes regarding masking, and 3) masking practices. Thirty-two (n=32) participants consented to take part in the study. Table 1 below shows a summary of the demographic characteristics of study

participants. In terms of education, approximately 69% of study participants attained a bachelor's degree or higher. The mean age of study participants was 35.8 years (SD=16.92).

4.2. Statistical Analysis

Pre- and post-intervention scores were aggregated for each area and in total. Each question answered correctly was given a score of "1". Therefore, for each participant, scores could range from 0-8 in the knowledge area, from 0-5 in the attitude area, from 0-6 in the practice area, and from 0-19 for the overall total score. The scores were paired (pre- and post-) for each participant as appropriate for a paired analysis. Paired data come in pairs (or more) of measurements from the same unit or person. Therefore, paired data are not independent. With the smaller sample size (n=32), the assumption of normally distributed data is tenuous, therefore dependent (paired) t-tests were not conducted. Instead, non-parametric tests are performed to detect sore differences. The non-parametric alternative to a paired t-test is the Wilcoxon signed rank test.

The Wilcoxon signed rank sum test is used to test the statistical significance of all paired differences in this study. For all hypothesis tests in this study, the null hypothesis is that the mean difference in measurements is zero, and the alternative hypothesis is that the mean difference in measurements is not zero. Statistical significance level is set at alpha=0.05. Due to the small sample size, caution should be used when generalizing the results to larger populations.

Figure 1 shows the paired overall pre-scores and post-scores for the questionnaire. The paired scores reveal that almost all study participants increased their total scores following the mask education program. The red line represents the mean score, which increased from 13 before the mask education to 16.5 after the mask education was conducted. Table 3 shows, for each test area and in total, the mean pre- and post-scores and standard deviations, the mean change in score, standard deviation of the score change, and the results of the Wilcoxen signed-rank sum test. Practice area mean scores increased from 3.1 to 4.9. The Wilcoxen signed-rank test results ($S=217.5$, $p<0.0001$) confirm that the difference in Practice pre- and post- mean scores was statistically significant. The mask program was effective in improving masking practice among study participants. Finally, overall mean scores increased from 13 to 16.5. The Wilcoxen signed-rank test results ($S=217.5$, $p<0.0001$) confirm that the increase in mean overall scores was statistically significant.

Summary

The non-parametric Wilcoxon signed-rank sum test was performed for pre- and post-intervention mask knowledge as measured by a pre- and post- questionnaire. The hypothesis tests revealed the following results. There is evidence that the mask education program increased masking knowledge, improved attitudes around masking, and improved masking practices among study participants. Overall, the mask education program was effective in improving all three areas of mask-effectiveness among study participants.

5. Discussion

5.1. Discussion of competencies

FC 2 Select quantitative and qualitative data collections methods appropriate for a given public health context

Because of the intermittent spikes in COVID-19 infections, it became crucial to investigate the appropriate use of facemask. The clinic site had a good turn in of individuals representing the local community who are either coming in to get tested for COVID-19 or seeking advice regarding COVID-19. After detailed research into scholarly recommendations on appropriate data collection methods, carefully studying the target population and evaluating the prevailing circumstances, the use of an interview based structured questionnaire was decided as the most appropriate method in this case.

The idea was to also capitalize on the routine clinic visit of consented participants. Apart from the fact that the participants would be well guided by a trained personal in filling in their responses for the questionnaire, a robust information base would also be obtained from the whole exercise. The data collection method here involved the use of a pre-test questionnaire, post-test questionnaire, teaching aid and trained personnel to both administer the questionnaires and educate participants on an interpersonal basis. The facemask use questionnaire and facemask use teaching aid have both been attached to this work as products.

FC 3: Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate

Toward meeting this competency, a quasi-experimental design was used by comparing pre- and post-intervention questionnaire outcomes in three areas related to masking: 1) masking knowledge, 2) attitudes regarding masking, and 3) masking practices. Information was organized into data using a data entry excel spreadsheet. The scoring scale was first designed and applied to each questionnaire, sixty-four in all. The responses for each participant were scored with a minimum of 50% considered as pass. The overall knowledge,attitude and practice scores were computed. A professional data analyst was employed to analyze the data.

Furthermore, the scores were paired (pre- and post-) for each participant as appropriate for a paired analysis. Paired data come in pairs (or more) of measurements from the same unit or person. Therefore, paired data are not independent. The Wilcoxon signed rank sum test is a non-parametric test used to test the statistical significance of all paired differences in this study. With the smaller sample size (n=32), the assumption of normally distributed data is tenuous, therefore dependent (paired) t-tests were not conducted. A more detailed run down of the method of analysis and outcomes are captured in the result section of this APE report.

FC 4: Interpret results of data and analysis for public health research, policy, or practice

To satisfy this competency, the results from the tested hypothesis were evaluated and brainstormed along with other health professionals including a nurse, a physician, and a statistician. I had a detailed discussion with the statistician on the best approach to analyze the data generated from this study. The product that demonstrates this competency is the results analysis section of this report which captures the study data, statistical analysis and inferential summary. The details for justification of the method of analysis is well described in the result section of this study. We also sat down to talk about the applications of the results. The sample size: 32, Sex: 12 males and 20 females, Age range: 9-66 years, Level of education: 4th grade to master's degree, Pre-test: 100% passed knowledge, 72% passed attitude and 28% passed practice, and Post-test: 100% passed knowledge, 84% passed attitude and 91% passed practice. The details of this analysis is fully captured in the results section of this report.

There is evidence that the mask education program increased masking knowledge, improved attitudes around masking, and improved masking practices among study participants. Overall, the mask education program was effective in improving all three areas of mask-effectiveness among study participants. The outcome of this study can further inform public health policies to further strengthen the investments on public education on correct mask usage as this would have a massive impact on the reduction of the spread of COVD-19. This health campaign can be organized in small groups using our clinics, schools, and churches as platforms.

FC 19: Communicate audience-appropriate public health content, both in writing and through oral presentation

The first step to addressing this competency is by putting this entire report together inclusive of the aim and objectives of the study, methodology, results, outcomes, applications, and recommendations. This involves including all the revisions made after review of both my site supervisor and the APE panel. Another critical part was the poster presentation I designed using the school template. The poster captures the major highlights of the study in a very straightforward and thought-provoking way and summarized with clarity while efficiently conveying the key message or outcomes or essence of the study. Please see appendix C for the poster presentation.

Also, a power point presentation was delivered orally by me regarding the outcome of this study to staffs and attendees of the clinic on a clinic day. Please see appendix D for the PowerPoint slides. The clinic has usual scheduled seminar days where important public health issues are discussed which I took advantage of to present the outcome of my research with the sole aim of educating the public. Since based on my findings the face mask use teaching aid improved the scores of the participants, I shared the facts contained therein verbally with my audience. There was an interactive session where I responded to questions. A copy of the write up for the study was also submitted to the chief executive officer and medical director of the clinic. I also donated copies of the teaching aid manual to be retained in the clinic for distributing and educating visitors of the clinic. I intend to do more presentations in other surrounding clinics, schools, and churches within the community.

ENV P7: Understand the formation of environmental policies and describe the process of standard setting in occupational health and safety

Ultimately this study intends to lower COVD-19 rates through effecting positive change in the correct use of facemask among community members. There are recommendations which have arisen from this study which would eventually be presented along with other interesting outcomes from the study to the mayor of the community and other major stakeholders in environmental health. To further strengthen and substantiate the proposition of this study as to convincingly suggest to leaders in government the best next possible action to take to reduce COVID-19 burden through consistent mask education while actively educating the public, the results are currently being written up for publication in both local and international journal.

Some of the recommendations which could advise formation of environmental health policies are as follows. Clinicians should incorporate mask education in clinic visits and consultation. Providing free masks, informing people about the importance of covering both the mouth and nose, calling to attention of people in the moment when they are unmasked in public and role-modelling by community leaders can promote widespread mask usage and bridge the knowledge - practice gap on appropriate use of facemasks.

5.1.1. Public health implications

In the area of masking practice from the study, there were several items that improved, implying an increase in safe masking practices will ensue. Questions 15 (Where do you keep your facemask on?) and 18 (Do you handle your facemask only by the ear loops or ties when taking them off?) both experienced 41% increase in correct answers. Questions 16 (Do you always wash or sanitize your hands before putting on or after removing your facemask?) and 17 (Do you touch your facemask when wearing it?) both experienced 38% increases in correct responses. We suggest that our results like Lukasz et al., 2020 may be of help in construction of public education campaigns on the proper use of face masks.

From the above, it is time for governments and public health agencies to make rational recommendations on appropriate face mask use to complement their recommendations on other preventive measures, such as hand hygiene. With the current fight against COVID-19, we suggest clinicians incorporate mask education in clinic visits and consultation. Providing free masks, informing people about the importance of covering both the mouth and nose, calling to attention of people in the moment when they are unmasked in public and role-modelling by community leaders can promote widespread mask usage and bridge the knowledge - practice gap on appropriate use of facemasks. In parallel, urgent research on the duration of protection of various types of common and modern face masks, the measures to be taken to prolong the lifespan of disposable masks, and the invention on reusable masks should be encouraged.

6. Conclusion

This APE project demonstrates the profound impact of targeted education on improving knowledge, attitudes, and practices surrounding facemask use in a community healthcare setting amid the COVID-19 pandemic. Through a structured intervention involving literature-informed best practices, a validated questionnaire, and personalized teaching aids, significant enhancements were observed across all measured domains among 32 diverse participants. The statistical evidence-marked by substantial score increases and confirmed via Wilcoxon signed-rank tests-underscores the efficacy of this approach in fostering safer behaviors, such as proper handling (41% improvement) and hygiene adherence (38% improvement), which are essential for reducing airborne transmission risks.

These findings extend beyond the clinic, informing public health implications by advocating for rational policy reforms. Governments and agencies should prioritize facemask education alongside hand hygiene and social distancing measures, incorporating it into routine clinical visits to address asymptomatic spread and economic recovery challenges. Recommendations include providing free masks, promoting full facial coverage, enforcing real-time reminders in public spaces, and encouraging role-modeling by leaders to close the knowledge-practice divide. Furthermore, urgent research into mask durability, reusability innovations, and long-term efficacy is warranted to sustain these gains.

Ultimately, this project not only advanced environmental and occupational health competencies-such as data collection, biostatistical analysis, and policy advocacy-but also reinforced the clinic's role as a community hub for preventive health. By empowering individuals with evidence-based tools, it contributes to resilient public health systems, reducing infection burdens and paving the way for equitable, informed responses to future health crises. Future expansions could scale this model to schools, workplaces, and broader populations for even greater societal impact.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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