Perceived Effectiveness, Current Knowledge, Essential and Dispensable Features: Determinants of Medical-Grade and Cloth Face Mask Preference by Users Against COVID-19 Transmission

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Abstract

Background: The spread of COVID-19 brought an increasing demand for precautionary products such as face masks. This had led to the availability of a variety of face masks for the public. Objective: The study aimed to determine whether the perceived effectiveness, current knowledge, as well as the face mask's essential and dispensable features distinguish between users who prefer to use either medical-grade face masks or cloth face masks against COVID-19 transmission. Study Design: The study was both quantitative and descriptive in nature as it gathered quantifiable information through a survey questionnaire for statistical analysis of a population sample. A total of 225 respondents from three cities in the National Capital Region with the highest COVID-19 cases participated in the study. Data gathered were subjected to binary logistic regression analysis. Results: The study revealed that the determinants namely, current knowledge, face mask's essential features and dispensable features can distinguish between users who prefer to use either a medical-grade face mask or cloth mask. Perceived effectiveness does not distinguish the face mask preference between users. Conclusions: Individuals who prioritized face masks' essential features preferred medical-grade face masks, whereas individuals who favored face mask's dispensable features preferred cloth face masks. Recommendations: It is recommended that interventions that aim to raise awareness on the proper use of face masks be done.

Keywords: medical-grade face mask, cloth face mask, COVID-19, preference

1. Introduction

On December 31, 2019, the Wuhan Municipal Health Commission in China reported several cases of pneumonia of unknown origin in Wuhan City, in the Hubei province. On January 12, China had finally shared the genetic sequence of COVID-19 to the World Health Organization (WHO). As of 26 August 2020, SARS-CoV-2, and the disease it causes, COVID-19, have been responsible for millions of infections and hundreds of thousands of deaths globally in (2020). Information on coronavirus and COVID-19 is constantly being updated as a result.

While airborne transmission of the virus is still under investigation, there are circumstances where the virus behaves like an airborne disease (Pietrangelo, 2020). This may be applicable in clinical situations where patients are receiving intensive medical care. In most situations, the virus, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), is transmitted through respiratory droplets. Respiratory droplets are produced through exhalation of aqueous matter derived from the respiratory tract. A condensed population can easily be infected by the virus if proper intervention is not observed. Various health agencies and advocates put emphasis on precautionary measures to minimize the spread of the virus.

Face masks provide a dual purpose in cases of infection. They work as a preventive barrier against liquid contaminants that could enter the mucosa in orifices, specifically the oral and nasal cavity of the person wearing it. In the case wherein the individual is infected, it traps the virus within its material. Face masks exist in different forms depending on functionality and use. Medical-grade face mask is a disposable form of personal protective equipment that provides protection against large droplets such as splashes and sprays. This is synonymous to surgical face masks. According to the U.S. Food and Drug Administration (FDA) standards, it falls under Class I medical devices. A right balance between the presence of adequate filtration against microbes and comfort through breathable material are the main criteria considered. In order to 4 achieve this, the majority of the developers use either celluloid or polypropylene plastic fabrics. The Centers for Disease and Control Prevention (CDC, 2020) recommends the use of face masks in public settings wherein social distancing is difficult to maintain. The increase in demand for face masks has led to scarcity of medical-grade face masks which forced individuals to resort to alternative face masks such as cloth face coverings. Cloth face mask is a reusable form of face mask suitable for everyday use. CDC has provided guidelines regarding suitable materials that could provide enough protection against

respiratory droplets. Cloth face masks must have at least two layers of breathable fabric and must completely cover the mouth and nose. Tightly woven cotton fabric is the recommended material for alternative face masks.

The spread of COVID-19 brought an increasing awareness of the importance of taking preventive measures, resulting in high demand for precautionary products such as face masks. This had led to the availability of a variety of face masks for the public. It is in this line that the researchers were motivated to pursue a study to understand the perceived effectiveness, current knowledge, face mask's essential features and dispensable features as determinants of medical-grade and cloth face masks preference by users against COVID-19 transmission. The study determined whether the perceived effectiveness, current knowledge, as well as the face mask's essential and dispensable features distinguish between users who prefer to use either medical-grade face masks or cloth face masks against COVID-19 transmission.

2. Method

2.1. Research Design

The study is both quantitative and descriptive in nature as it aimed to gather quantifiable information through a survey questionnaire for statistical analysis of a population sample. As the research design is descriptive in nature, the research provided systematic information about a certain phenomenon. Data necessary for the research were gathered from respondents through the use of a survey containing questions regarding perceived effectiveness, current knowledge, face mask's essential features and dispensable features of the face masks they prefer against the transmission of COVID-19. Data gathered were subjected to a statistical dependence technique called binary logistic regression analysis, which was used to determine whether differences in several independent variables exist between two categories of the dependent variable (Hair et al., 2010).

2.2 Subjects and Study Site

The user's perceived effectiveness, current knowledge, essential features and dispensable features of either medical-grade face masks or cloth face masks were obtained from the survey conducted amongst eligible individuals. The bases of eligibility were those who were able to meet the criteria which were as follows: individuals belonging in the age group of 21 to 59 years; 36 individuals who are residing in selected cities in Metro Manila, specifically Manila City, Quezon City and Caloocan City; and individuals who are not a part of the medical and health allied field which include medical professionals and medical students. In the event that an individual did not meet any of the criteria, he/she was excluded from the study. Users who prefer to use both medical-grade and cloth face masks were not considered as eligible respondents.

The study site was conducted in the top three cities with the highest COVID-19 cases in National Capital Region namely, Manila City, Quezon City and Caloocan City, as of February 10, 2021 (DOH, 2021). Upon data collection, a total of 225 respondents participated, with 75 cloth face mask users and 150 medical-grade face mask users. The total number of respondents who participated was deemed sufficient for binary logistic regression with several continuous independent variables at 80% power since according to Hair et al (2010), a minimum of 10 cases per independent variable for each group is sufficient.

2.3 Data Instrumentation

The researchers utilized a survey questionnaire as their research instrument. Pilot testing of the survey questionnaire was done through the use of Google forms and was distributed to 20 viable participants. The results of the pilot test underwent content validity and were analyzed for reliability testing using Cronbach's alpha. The survey included questions that were aligned with the research objectives. The survey questionnaire was designed to gather data regarding the user's perceived effectiveness of the face masks they prefer, the current knowledge of the users regarding medical-grade face masks and cloth face masks, and the factors the users consider when choosing their preferred type of face mask, subcategorized to face mask's dispensable and essential features. The final set of items used to assess the current knowledge of the cloth face masks users consisted of 23 items with item reliability of 0.86, based on results generated from the software Bond&Fox Steps. In addition, the final set of items used to assess the current knowledge of the 39 medical-grade masks users consisted of 24 items with item reliability of 0.94, also based on output from Bond&Fox Steps.

The set of items used to assess the users' perceived effectiveness of their preferred face masks consisted of 5 items with a scale reliability of 0.884 while the set of items used to determine the features considered by the respondents in choosing the face masks, they use consisted of 8 items with a scale reliability of 0.742. Both reliabilities were measured using Cronbach's alpha. To determine the uni-dimensionality of the 8-item scale used to determine the features considered by the

users in choosing their preferred face mask, factor analysis was done using the principal component method with varimax orthogonal rotation. Factor loadings greater than 0.35 were considered acceptable for this study due to the sample size of 225 (Hair et al, 2010). Results of the tests to determine the adequacy of factor analysis showed that a substantial number of bivariate correlations were greater than 0.30 and that the data is fit for factor analysis. First, Bartlett's test of Sphericity was 607.193, which is highly significant ($p < 0.001$) in rejecting the null hypothesis that the correlation matrix is an identity. Secondly, KiserMeyer-Olkin (KMO) Measure of Sampling Adequacy was 0.736, which indicates appropriateness (Hair et al., 2010). Using the principal component method, 2 factors with eigenvalues greater than 1 were extracted from the 8 items. Together, these 2 factors explained 60.74% of the total variance.

2.4 Data Gathering and Ethical Considerations

Dissemination of the survey questionnaire was online-based, utilizing Google Forms as the administrative platform for the survey questionnaire. A link was made from the online questionnaire created. The researchers were in charge of initiating the distribution of the link by sending it to the email addresses of the prospective respondents. In addition, the study employed non-probability sampling, specifically, snowball sampling. Based on the disseminated survey questionnaire through the prospective respondents' emails, a total of 89 respondents participated initially. These respondents were then asked to disseminate the survey to their friends and families who fit the criteria of the study. The link to the survey questionnaire was also disseminated via Facebook Messenger, Facebook and Instagram for additional respondents who wished to participate in the study. Moreover, the researchers asked the assistance of the research participants to recruit other potential participants by sending them the link to the survey questionnaire. The submissions of each participant were directed and compiled by the Google Spreadsheet. The data that were gathered from the survey were subjected to statistical analysis. In addition, the data obtained from the respondents in the spreadsheet were filtered by the researchers, excluding those which did not meet the criteria. The filtered data were processed using the SPSS software for encoding and statistical analysis.

One of the priorities of the study was to abide and adhere to the ethical principles and practices in conducting a research study. It was given high importance that all data and information collected from the participants were used solely for the purpose of the research. The results from the survey were for the benefit of the study and were not used for any unethical purposes. The study was submitted to the University of Santo Tomas - Faculty of Pharmacy Research Ethics Committee. Following the submission, the study underwent a first review from two committee members and was sent back to the researchers for minor revisions. Accordingly, the researchers revised the paper based on the suggestions made by the reviewers that were deemed fit for the study. After completion, the study was submitted to the committee for a second review. The committee granted the researchers approval for the implementation of the study after the second review. All surveys that were disseminated included an informed consent which encapsulated the nature and the purpose of the study. The informed consent was provided in the survey before the selected participants can answer the given questions. This served as an agreement between the participants and the researchers provided that: it gave the participants the right to choose whether they would voluntarily join or withdraw from the conduct of the study and; it provided the researchers the authority to use their answers for research purposes. The study handled all personal information with utmost confidentiality under the terms agreed upon.

2.5 Data Analysis

The demographic data that were gathered from the participants of the study included age, gender, educational attainment, and preferred type of mask. These data were presented through percentages. In addition, means, standard deviations, frequencies and percentages were computed for variables such as perceived effectiveness of preferred face masks, current knowledge of cloth and medical-grade face mask users, as well as face mask dispensable and essential features.

To determine whether perceived effectiveness, current knowledge, as well as face mask's essential and dispensable features, distinguish between users who prefer to use either medical-grade face masks or cloth face masks against COVID-19 transmission, binary logistic regression analysis was used. This statistical dependence technique may be used to determine whether differences in several independent variables exist between two categories of the dependent variable (Hair et al., 2010). The level of significance that was used for the hypothesis testing was 0.05.

Logistic regression represents the two groups of interest as a binary variable with values 0 and 1. In this study, cloth face masks users were assigned the value of 0 while the medical-grade face masks users were assigned the value of 1. In this situation, the coefficients that were observed in the results would reflect the impact of the independent variables on the likelihood that the user prefers a medical-grade masks. In order to include the independent variables in the binary logistic regression model, the means of the individual responses to the different items were computed. That is, perceived effectiveness is equal to the mean of individual responses to the 5 items; face mask essential features is equal to the mean of individual

responses to quality, preventive capacity, availability, nature of occupation and sense of security and safety while face mask's dispensable features is equal to the mean of individual responses to reusability, aesthetics and comfort.

3. Results and Discussion

3.1 Profile of respondents

A total of 225 residents of 3 selected cities in Metro Manila, Philippines, voluntarily participated in this study. From these participants, 61.30% (n = 138) were female and 38.70% (n = 87) were male. The average age was 34.56 years with a standard deviation of 12.80 years; the youngest was 21 while the oldest was 59 years of age. In terms of city of residence, 47.1% (n = 106) are from Quezon City, 28% (n = 63) from Manila City while the rest are from Caloocan City (24.89%, n = 56).

3.2 Profile of respondents in terms of use and preferred type of masks

As shown in Table 1, more than 80.00% (n = 185) of the respondents started using face masks during the pandemic. In terms of choice, 66.67% (n = 150) prefer to use medical-grade masks while 33.00% (n = 75) favor cloth face masks. In a research from Sangkham (2020), the Philippines has an 80% face mask acceptance rate, with a total daily face mask usage of 48,967,769. Only 17.80% (n = 40) of respondents used face masks prior to the COVID-19 pandemic. Based on the results of the study, it was observed that more than half of the respondents prefer to use a medical-grade face mask. Similar findings were suggested from a cross-sectional survey conducted in a university in Vietnam, which stated that the most common mask type used there was the surgical face mask, followed by the non-antibacterial cloth face mask (Duong et al., 2021). On the other hand, based on the reports of CNN Philippines (2020), the most common mask in use by the general public is a homemade cloth mask. The difference in the data may be attributed to the scale that the study encompassed.

Table 1. Use and preferred type of face masks

Variable	Frequency	Percent
Use of face masks		
Prior to COVID-19 pandemic	41	18.06
During COVID-19 pandemic	186	81.94
Preferred type of face masks		
Cloth face masks	75	33.04
Medical-grade masks	152	66.96

3.3 Perceived effectiveness of preferred face masks against COVID-19 transmission

It can be noted from Table 2 that all of the mean responses are at least 3.5, which indicates that the users strongly agree to the different statements regarding the effectiveness of their preferred face masks against the transmission of COVID-19. Cloth face-masks users strongly believe that it protects the possible entry points for the virus (M = 3.72, SD = 0.421), that the material and thickness of the mask play a role in preventing the transmission of the virus (M = 3.72, SD = 0.452) and wearing it slows down the spread of the virus (M = 3.68, SD = 0.619). Medical-grade masks users also strongly believe that it protects the possible entry points for the virus (M = 3.72, SD = 0.646), wearing it slows down the spread of the virus (M = 3.69, SD = 0.601) and that wearing it will protect others from acquiring infections from them (M = 3.64, SD = 0.571). Results of this study are in accordance with the results of the study conducted by Kwan et al. (2021), who reported that the perceived efficacy of practicing preventive measures and severity of disease were positively associated with face mask use. Additionally, there is strong evidence that individuals' beliefs over the efficacy of masks is highly correlated with their likelihood of adhering to mask requirements, according to Knoteck et al. (2020). Overall, it can be inferred that regardless of mask preference, the users believe that using a face mask will help prevent infection to self and to other people.

Table 2. Perceived effectiveness of masks against COVID-19 transmission

Questions	1		2		Total	
	M	Sd	M	Sd	M	Sd
I believe that I should use a face mask because it protects the possible entry points (i.e. nose and mouth) for the virus.	3.77	.421	3.71	.657	3.73	.590
I believe that wearing a face mask slows down the spread of the virus.	3.68	.619	3.70	.598	3.69	.604
I believe that wearing face masks will protect me from being infected with COVID-19.	3.61	.590	3.55	.629	3.57	.616
I believe that wearing face masks will protect others from acquiring infections from me.	3.65	.557	3.64	.569	3.65	.564
I believe the material and thickness of the face mask play a role in preventing the transmission of COVID-19	3.72	.452	3.53	.640	3.59	.590

*1 – Cloth face masks, 2 – medical-grade masks
**2.50 – 3.49 Agree; 3.5-4.00 Strongly Agree

3.4 Current knowledge regarding preferred face masks

It can be observed from Table 3 that only 76.00% (n = 57) of cloth face masks users were aware that the chin must be covered when the mask is worn. This value may indicate that individuals overlook that the chin is important in securing the face mask to effectively cover both the nose and mouth. As recommended by CDC (2020), face masks must be placed over the mouth and nose and secured under the chin. It must be adjusted by fitting it comfortably against the sides of the face while making sure breathing is not impeded. Based on the results of this study, only 78.67% (n = 59) were aware that it should be made with more than 1 layer of fabric. This may be due to the lack of accessible information to the general public on what should be the standard met for cloth masks in light of the COVID-19 pandemic. Several studies suggest that face masks made from two or more layers of material are more effective in blocking respiratory particles (Godoy, 2020). In addition, according to WHO (2020), "A minimum of three layers is required for non-medical masks, depending on the fabric used." Only 74.67% (n = 56) were aware that medical practitioners should not wear this type during work hours. This percentage may be because the respondents of the study constituted non-medical workers and students. According to the CDC (2021), cloth face masks are only used by medical practitioners as a last resort if respirators or medical-grade face masks are not available. This may be due to the greater risk of infection faced by the medical practitioners while performing their duties during the pandemic. Cloth masks with less efficacy than medical-grade face masks are not recommended for their use. As medical-grade face masks have been utilized for clinical use prior to the pandemic as PPE against potential infections, this is the standard practice in the healthcare setting. With respect to proper care or washing, only 34.67% (n = 26) were aware that the soiled cloth mask may be included with the regular laundry, only 49.33% (n = 37) were aware that they can be laundered with other clothes, and only 65.33% (n = 49) were aware that although it can be laundered with other clothes, it may not be placed together with other soiled clothes for a prolonged period of time. It can be inferred that these relatively low values stem from the fear of possibly passing the virus onto fomites such as clothing, therefore increasing the likelihood of contracting infection. Cloth face masks may be washed by either a washing machine with regular detergent or through handwashing with bleach solution (Bell, 2020). Soiled, dirtied or wet reusable masks can be stored in a plastic bag until the individual will be able to wash it. Washing the reusable mask can be done by including the mask alongside your regular laundry and then utilizing regular laundry detergent (CDC, 2020).

Table 3. Current knowledge of cloth face masks users

Questions		Correctly answered	Percentage
What parts of the face should be covered by the face mask used?	Nose (√)	75	100.00
	Mouth (√)	73	97.33
	Eyes (X)	73	97.33
	Ears (X)	73	97.33
	Chin (√)	57	**76.00**
During the COVID-19 pandemic, what bodily secretions does a face mask protect you from?	respiratory droplets (√)	64	85.33
	tears (X)	68	90.67
	sweat (X)	67	89.33
	blood (X)	68	90.67
	saliva (√)	70	93.33
The proper way of removing a face mask is holding the loops around the ears and sliding them off.		71	94.67
What is/are the proper way/s of washing the face mask you prefer?	Wash you mask with tap water and laundry detergent/soap. (√)	68	90.67
	Include your face mask with your regular laundry. (√)	26	**34.67**
	I cannot wash my face mask. (X)	73	97.33
Cloth masks should be made of a single layer of fabric. (False)		59	**78.67**
If the cloth mask gets wet or soiled while worn, it doesn't need to be replaced and can still be used. (False)		66	88.00
Medical practitioners may also use cloth masks during work hours. (False)		56	**74.67**
The performance of cloth face masks varies greatly with the shape, fit, and type of fabric, as well as the fabric fineness and the number of layers. (true)		73	97.33
Cloth face masks can be laundered with other clothes. (True)		37	**49.33**
How many times can you use a cloth face masks before washing it? (Once)		60	80.00
A wet cloth face mask will work as well as a dry cloth face mask. (False)		71	94.70
For a prolonged time, used cloth face masks can be placed together with other used cloths until they can be washed. (False)		49	**65.33**
If cannot be washed immediately, used cloth face masks should be placed in a sealable bag to prevent contamination. (True)		66	88.00

From Table 4, it was observed that 74.70% (n = 112) of medical-grade face mask users were aware that the eyes must not be covered when the mask is worn. It is possible that some respondents considered face shields when answering the question. Although face shields protect the eyes by blocking respiratory droplets from reaching them, they are not considered in the scope of the study. Only 42.00% (n = 63) knew that it cannot provide complete protection from germs and other contaminants. It can be inferred that individuals lack awareness that although medical-grade face masks may block large droplets efficiently, they do not offer complete protection against all germs and contaminants. According to the FDA (2020), while medical-grade face masks are efficient in blocking large-particle and respiratory droplets, they do not have the capacity to block and filter minute particles in the air. Because of this, medical-grade face masks do not offer complete protection against germs and other contaminants. Regarding the material used for medical-grade face masks, 76.00% (n = 114) were aware that it is made of non-woven materials such as polypropylene, polyethylene or cellulose. Only 61.30% (n = 92) knew that it must have at least 3 plies to provide protection against transmission while only 38.70% (n = 58) realized that it must have at least 95% droplet filtration efficiency. The researchers believed these values are relatively low due to the lack of mask specifications being placed in the packaging of medical-grade face masks. Instead, they are found on the manufacturer's site and can be seen under the WHO guidelines. According to a study conducted by Chua et al. (2020), 3-ply medical-grade face masks are the face masks frequently used during the COVID-19 pandemic. In addition, WHO (2020) states that, a medical-grade face mask must have at least a 95% droplet filtration system, breathability and consist of multiple layers of manufactured, non-woven materials such as polypropylene, polyethylene or cellulose. Moreover, only 56.70% (n=85) were aware that the layer responsible for the filtering property of the medical-grade face masks is the middle layer and only 67.30%

(n = 101) knew that the outermost layer is waterproof and aids in repelling fluids and muco-salivary droplets. The low percentage of individuals who arrived with the correct answer may be due to the lack of knowledge regarding face masks, specifically individuals who are not part of the health allied field before the start of the pandemic. According to Chua et al. (2020), medical-grade face masks have three different layers that each have a specific purpose. The outermost layer must be waterproof, thus repelling infectious fluids. The middle layer of the medical-grade face mask is responsible for the filtering property of the face mask. Made up of Polypropylene SMS nonwoven fabric, the middle layer prohibits pathogens of a specific size from penetrating in both directions.

Table 4. Current knowledge of medical-grade masks users

Questions		Correctly answered	Percentage
What parts of the face should be covered by the face mask used?	Nose (√)	147	96.71
	Mouth (√)	149	98.03
	Eyes (X)	114	**75.00**
	Ears (X)	146	96.05
	Chin (√)	149	98.03
During the COVID-19 pandemic, what bodily secretions does a face mask protect you from?	respiratory droplets (√)	141	92.76
	tears (X)	138	90.79
	sweat (X)	130	85.53
	blood (X)	139	91.45
	saliva (√)	138	90.79
The proper way of removing a face mask is: holding the loops around the ears and sliding them off. (√)		146	96.05
What is/are the proper way/s of washing the face mask you prefer?	Can't wash it. (√)	124	81.58
	Wash with tap water and soap.	121	79.61
	Include with regular laundry.	150	98.68
Medical grade masks can be used more than once. (False)		132	86.84
Medical grade masks provide complete protection from germs and other contaminants. (False)		64	**42.11**
If the mask you are using gets damaged or soiled, it is okay to still use it. (False)		152	100.00
A medical grade mask is made of non-woven materials such as polypropylene, polyethylene or cellulose. (True)		116	**76.32**
At least how many ply/s does your face mask have to provide protection against the viral transmission? (3 plies)		94	**61.84**
What is the minimum droplet filtration efficiency of a medical-grade mask? (95%)		58	**38.16**
Medical-grade masks must block droplets and particles while at the same time must also be breathable by allowing air to pass. (True)		143	94.08
What layer is responsible for the filtering property of the medical grade face mask? (Middle)		87	**57.24**
What layer of the medical-grade mask is waterproof and aids in repelling fluids and muco-salivary droplets? (outermost)		103	**67.76**
What side of the face mask should be facing out? (colored side)		143	94.08

Table 5 provides the summary of the ratings obtained by the two groups of face masks users in the knowledge test. In the 23-item knowledge test, cloth face masks users got an average of 84.81% with a standard deviation of 8.07%. On the other hand, medical-grade masks users obtained an average of 82.94% with a standard deviation of 9.14% in the 24-item knowledge test.

Table 5. Summary of ratings of scores in current knowledge

Groups	Mean	Std. Deviation
Cloth face masks users (n = 75)	84.81	8.07
medical-grade masks users (n = 152)	82.69	8.79

3.5 Factors considered when choosing the face masks used

Respondent-users were asked to assess some factors they considered in choosing their preferred masks. Exploratory factor analysis results yielded that these variables may be grouped into 2 factors, which were named by the researchers as face mask's dispensable features and essential features. As presented in Table 6, the face mask's dispensable features are reusability, aesthetics and comfort provided while the face mask's essential features are preventive capacity, quality, availability, provides a sense of security and safety and nature of occupation. The top 5 features considered by the users in choosing their preferred masks were preventive capacity and sense of security and safety (M = 3.42), quality (M = 3.39), availability (M = 3.33) and comfort provided (M = 3.20).

Amongst the high ranked features, four out of the five components belong in the face mask's essential features considered in choosing a face mask. Preventive capacity, sense of security and safety and quality are features dependent on each other's performance. The primary function of the face mask is its capacity to prevent contact or exposure to viral particles. Its effectiveness is dependent on the quality or material used. This includes the tightness of the weave and the presence of at least two layers (CDC, 2020). Aside from the material, the shape is also considered, specifically the pleats or folds which creates a snug fit in the face so as to prevent the air flowing leaking out of the gaps when expanding (Liao et al., 2020). Given its capability of preventing viral particles from passing through the entry points of the body, it provides a sense of security and safety to the individual wearing the face mask. In the early part of the pandemic, medical-grade face masks became scarce for the general public and have been only prioritized amongst health care workers (Worby et al., 2020). Availability is considered as the problem of the scarcity of medical-grade masks during the start of the pandemic has been addressed by the increased supplies. Comfort is considered a face mask's dispensable feature as it does not directly affect the function of the face mask but contributes to the duration at which the face mask is worn. This can be related to the breathability of the face mask and its ability not to sustain heat and moisture in the covered part of the face (Lee et al., 2020).

Table 6. Dispensable and essential factors in choosing face masks

Factors	Mean	Std. Deviation	Rank
Dispensable features			
Reusability	2.41	1.006	
Aesthetics	2.54	.946	
Comfort it provides	3.04	.769	5
Essential features			
Preventive capacity	3.32	.779	3.5
Quality	3.46	.633	1
Availability	3.32	.629	3.5
Gives me a sense of security and safety	3.43	.637	2
Nature of my occupation	2.31	1.223	

3.6 Differences in perceived *effectiveness, current knowledge, face mask's dispensable and essential features between users* of cloth face masks and medical grade masks

There are 4 independent variables included in the binary logistic regression analysis: knowledge, perceived effectiveness, face mask's dispensable features and essential features. For the variables perceived effectiveness, dispensable

features, and essential features, the means of the level of agreement or responses of each participant to the different statements used to quantify were computed. For "knowledge", the scores obtained by the respondents in the knowledge test were divided by the total number of items and multiplied by 100.

When performing any regression analysis with more than one independent variable, independent variables must not be highly correlated, that is, with correlations greater than 0.90 (Hair et al., 2010). It was observed from Table 7 that there are no pairs of independent variables having correlations greater than 0.6.

Table 7. Correlations between independent variables

	Effectiveness	Dispensable	Essential	Knowledge
Effectiveness	1	.226	.512	.134
Dispensable		1	.331	-0.050
Essential			1	.144
Knowledge				1

Table 8 presents the binary logistic regression model which is statistically significant based on two measures of overall model fit. First, the chi square of the Omnibus tests of model coefficients is statistically significant. Second, there is good data fit to the model, as indicated by the non-significant Hosmer and Lemeshow test. Moreover, the Nagelkerke R square is 0.683, which is greater than 0.50. This indicates that the binary logistic regression model with 4 independent variables accounts for at least one-half of the variation between the two groups of face masks users. Additionally, in terms of the classification accuracy of the model in a final measure of practical significance, the hit ratio is 88.40% as compared to the baseline model of 67.00%. The hit ratio represents the percentage of correctly classified cases. Hence, the resulting model demonstrates acceptable levels of both statistical and practical significance.

The results from the Wald test provided in Table 8 indicate statistical significance for the regression coefficients of face mask's essential features ($p < 0.01$), face mask's dispensable features ($p < 0.01$) and knowledge ($p < 0.01$) but not for perceived effectiveness ($p > 0.05$). For the interpretation of the logistic coefficients, the variable essential features is considered first. It was noted that the logistic coefficient is B = 3.968, which is positive and statistically significant at the 0.01 level. This result implies that higher levels of consideration given to essential features increases the likelihood that a user prefers medical-grade face masks. Medical-grade face masks are attributed to essential features since this type of face mask has been tested and offers a higher capacity to prevent droplet transmission and infections. Medical-grade face masks have to be subjected to ASTM standards and specifications and are categorized into 3 levels of performance (Rengasamy et al., 2009). Moreover, medical-grade face masks are FDA approved, thus contributing to its quality and preventive capacity. For the variable dispensable features, it was observed that the logistic coefficient is B = -5.040, which is negative and statistically significant at the 0.01 level. This result implies that higher levels of consideration given to dispensable features increases the likelihood that a user prefers cloth face masks. Dispensable features increase the likelihood of preferring cloth masks since medical-grade masks are known to be a single-use mask only. Cloth masks, on the other hand, can be washed and reused. They also come in different sets of design adding to their aesthetic appeal. With less restrictions with regards to the type of material used in cloth face masks compared to medical-grade face masks, they can easily be adjusted to fit the comfort of the individual. Another variable which is statistically significant at the 0.01 level is knowledge. It is observed that the logistic coefficient is B = -0.077. This result implies that higher ratings obtained in the knowledge test increases the likelihood that the said user prefers cloth face masks. This may be due to the questions on knowledge on medical-grade face masks being more technical compared to cloth face masks. Since medical-grade face masks must be properly regulated, specific guidelines and standards are employed to ensure that they meet consumer use and do not compromise safety. It is possible that users of medical-grade face masks may not have an in-depth knowledge on the technicalities and specificities of their preferred type of mask. Finally, the coefficient associated with the variable perceived effectiveness of the chosen face masks, B = -0.245 is not statistically significant since $p > 0.05$. This implies that perceived effectiveness cannot be used to distinguish between the two groups of interest. It can be inferred that regardless of mask preference, the users believe that using a face mask will help prevent infection to self and to other people. It can be deduced that the individuals prioritize their protection against COVID-19 transmission. This finding may also be due to mandated guidelines merely stating to use face masks without informing on the level of effectiveness that each type of face mask offers when used in public as protection against COVID-19.

Table 8. Results of logistic regression analysis of preferred face masks as outcome of perceived effectiveness, knowledge, dispensable and essential features

Variables	B	Wald*	Odds ratio	95% confidence interval for Odds ratios	
				Lower	Upper
Essential features	4.016	27.192**	55.483	12.26	251.03
Dispensable features	-5.065	50.339**	.006	.002	.026
Perceived effectiveness	-.237	.215	.789	.290	2.149
Knowledge	-.078	8.341**	.925	.877	.975
Constant	9.853	14.152**			

Omnibus tests of model coefficients: $\chi^2(4) = 153.36, p < .01$;
Hosmer and Lemeshow test: $\chi^2(8) = 9.592, p > .05$
Nagelkerke R square = .683, Hit ratio = 88.5%
*Wald df = 1
**significant at p < 0.01

3.7 Current knowledge based on item type

It was observed that the knowledge rating of medical-grade mask users was lower compared to cloth mask users. This may possibly be due to the difference in difficulty. The WHO Technical Specifications of personal protective equipment for COVID-19: Interim Guidance (2020), a document which includes a detailed and specific list of guidelines and standards, states that all PPE such as medical-grade face masks must meet regulatory approvals and certifications for consumer use. Such guidelines for medical face masks include filtration, pressure drop, synthetic blood penetration, fluid resistance and microbial cleanliness In order to investigate this, common and mask-specific questions were separated and evaluated further. Table 9 presents the ratings of knowledge scores when grouped based on common items and mask-specific items. Here, it was observed that medical-grade mask users got slightly higher ratings on common knowledge items compared to cloth face mask users, M = 90.95 and M = 88.19, respectively. On the other hand, cloth-face mask users rated 79.68 on mask-specific items compared to 71.20 mean ratings of medical-grade mask users.

Table 9. Ratings of scores in current knowledge based on the item type

Item type	Cloth Face Mask users		Medical-grade mask users	
	Mean	SD	Mean	SD
Common items	88.19	8.748	90.95	9.387
Mask-specific items	79.68	10.875	71.20	14.610

To determine if current knowledge, grouped into common and specific items, can distinguish between the two groups of interest, another binary logistic regression is presented. The correlation matrix in Table 10 indicates that no two independent variables are highly correlated, which assures the absence of multicollinearity.

Table 10. Correlations between independent variables

	Effectiveness	Dispensable	Essential	Common items	Specific items
Effectiveness	1	.226**	.512**	.044	.062
Dispensable		1	.331**	-0.176**	.212**
Essential			1	.120	.038
Common items				1	-.187**
Specific items					1

The binary logistic regression, shown in Table 11, is statistically significant based on two measures of overall model fit. The chi square of the Omnibus tests of model coefficients is statistically significant and there is good data fit to the model, as indicated by the non-significant Hosmer and Lemeshow test. The Nagelkerke R square is 0.678, which indicates that the binary logistic regression model with 5 independent variables accounts for at least one-half of the variation between the two groups of face masks users. The hit ratio or percentage of correctly classified cases is 83.90% as compared to the baseline

model (without predictors) of 66.70%. Hence, the resulting model demonstrates acceptable levels of both statistical and practical significance.

The results from the Wald test provided in Table 11 indicate statistical significance for the regression coefficients of face mask's essential features ($p < 0.01$), face mask's dispensable features ($p < 0.01$) and knowledge on mask-specific items ($p < 0.01$). It is observed that the logistic coefficient for specific items is B = -0.053, which is negative. This result implies that higher ratings obtained in the masks-specific knowledge items increases the likelihood that the said user prefers cloth face masks. The variable common items between cloth mask and medical-grade mask users is not a significant determinant for mask preference. This may be because the questions share a general concept, making them applicable to both types. The variable specific items is a significant determinant for mask preference.

Table 11. Results of logistic regression analysis of preferred face masks as outcome of perceived effectiveness, knowledge (common and specific), face mask's dispensable and essential features

Variables	B	Wald*	95% confidence interval for Odds ratios	
			Lower	Upper
Essential features	-.457	.858	-1.420	.505
Dispensable features	-4.800	45.560**	-6.194	-3.406
Perceived effectiveness	3.880	24.752**	2.352	5.409
Common items	-0.17	.451	-.066	0.32
Specific items	-.053	8.203**		
Constant	9.340	14.152**		

Omnibus tests of model coefficients: $\chi^2(5) = 146.52, p < .01$;
Hosmer and Lemeshow test: $\chi^2(8) = 4.288, p > .05$
Nagelkerke R square = .673, Hit ratio = 83.9%
*Wald df = 1
**significant at p < 0.01

4. Conclusion

In terms of the perceived effectiveness of the users' preferred face mask against COVID-19 transmission, it can be concluded that cloth face masks and medical-grade masks users both strongly believe that their preferred face mask can protect the users from the virus' possible entry points and slow down the spread of the virus. Cloth face masks users strongly believe that the material and thickness of their preferred mask play a role against virus transmission, whereas medical-grade masks users strongly believe that their preferred mask protects others from acquiring infections from them. Therefore, it can be inferred that regardless of mask preference, users strongly believe that face masks, in general, can protect not only them but also the surrounding individuals.

Questions regarding the specifics of their preferred face masks such as layer and materials, proper care and washing of cloth face masks, as well as how to properly wear a face mask have lower percentages of respondents who answered correctly. It can be concluded that there are individuals who lack awareness in terms of the specifics of their preferred face mask, care, and washing for cloth face masks and the proper use of face masks.

In terms of choosing users' preferred type of face masks, the top 5 factors were determined among the 8 factors asked in the survey. Preventive capacity as well as sense of security and safety topped the rank, meaning these were the main factors that users look for in choosing masks. Next of their priority is the quality of the type of mask. The material used, sturdiness when worn, and how the mask performs against the viral transmission were important to the preference of users. These three factors were under essential features which work hand-in-hand with each other's performance, hence their consecutive rankings. In addition, these were observed to be leaning towards medical-grade masks preference. Another factor was also a face mask essential feature — availability of masks — which ranked 4th for the users. Lastly, the 5th rank is the comfort it provides. For users' preference, the fit of the mask, how breathable, and comfortable they are while wearing a particular type

of mask were important since they can be wearing the mask for a long duration. Dispensable features were attributed towards cloth face mask preference.

It can be concluded that the determinants, current knowledge, face mask's essential features and dispensable features distinguish users' preference between medical-grade mask or cloth mask. Those that favor essential features lean towards preferring medical-grade face masks while those that favor dispensable features lean towards preferring cloth face masks. Higher ratings in knowledge increases the likelihood of preferring cloth face masks over medical-grade masks. However, when separated into common and mask-specific items, the variable common items is not a significant determinant in face mask preference. Higher ratings for specific items also increase likelihood of cloth mask preference. The variable perceived effectiveness of the chosen face masks does not distinguish users' face mask preference.

5. Recommendation

For the future researchers, it is highly recommended that the range of participants is increased as this study primarily focused on those who resided within the Manila City, Quezon City, and Caloocan City. It is also highly recommended that the sample size for the study is to be increased to acquire a more accurate representation of the total population with less varied results. In performing a pilot test, a pre-test and post-test survey questionnaire for obtaining responses may be recommended. The survey questionnaire would benefit from the help of a validator in terms of verifying the contents of the questionnaire and the Filipino translation. In addition, it is recommended that the scope can be widened to include face masks or face protections of varying types. This can include face shields and N95 respirator face masks. For the government, specifically, IATF-EID and DOH, it is recommended that they create interventions and programs such as webinars, seminars, and dissemination of posters if technological capacity would be an issue, that will aim to raise awareness on the proper use of face masks. It is recommended the public be given more accessible information about the use, technicalities, proper care, and know-hows about their preferred type of face mask. For the community, it is recommended that they follow government guidelines, IATF-EID protocols regarding the proper use and care of the face mask they prefer to get the benefit of protection against COVID-19.

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