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Reasons for the use of masks in open areas after the Peruvian government announced that it will no longer be mandatory in the context of COVID-19 in 2022

Razones para el uso de mascarillas en lugares abiertos luego del anuncio de no obligatoriedad por el gobierno peruano en el contexto de la COVID-19 en 2022

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ABSTRACT

Introduction: In Peru, a high proportion of fully immunized people against COVID-19 has been achieved, which has mitigated the severity of the disease. Thus, under the recommendation of experts, the Peruvian government issued Supreme Decree 118-2022-PCM, which indicated that the use of masks is optional in open and ventilated enclosed spaces as of October 1, 2022. **Objective:** The aim of the present study was to find out the reasons why people continued to wear masks even though it was not mandatory in outdoor environments. **Methods:** A total of 335 people participated, with an average age of 26.11 years (73.1% women). A data collection form was prepared where sociodemographic and health information was requested; in addition, the question "Why do you continue to wear mask despite it being optional in open and closed ventilated spaces?" was included. The data obtained from the last open question of the instrument was analyzed by means of a discursive textual analysis (DTA) and an exploratory analysis through IRAMUTEQ. **Results:** Results indicate that people continue to wear masks, despite the lifting of the restrictions, to avoid contagion of COVID-19 and other respiratory diseases. In addition, the prevention of possible infection and transmission of the virus also focused on the family and vulnerable people. **Discussion:** It is concluded that the practice of wearing masks may be influenced by individual perceptions of risk and interpretations of responsibility and solidarity towards others.

Keywords: COVID-19; mask; reasons; risk.

RESUMEN

Introducción: En el Perú, se logró una alta proporción de personas completamente inmunizados contra COVID-19 que ha mitigado la severidad de la enfermedad. Es así que, bajo la recomendación de expertos el gobierno peruano emitió el Decreto Supremo 118-2022-PCM, donde se indicó que el uso de la mascarilla es opcional en espacios abiertos y espacios cerrados ventilados a partir del 1 de octubre del 2022. **Objetivo:** El presente estudio fue conocer las razones por las cuales las personas continuaron usando mascarilla a pesar de que no era obligatorio en ambientes exteriores. **Metodología:** Participaron un total de 335 personas con un promedio de edad de 26.11 años (73.1% mujeres). Se elaboró una ficha de recolección de datos donde se solicitó información sociodemográfica y de salud; además, se incluyó la pregunta "¿por qué sigue utilizando la mascarilla a pesar de que es opcional en espacios abiertos y cerrados ventilados?" Los datos obtenidos de la última pregunta abierta del instrumento se analizaron mediante un análisis textual discursivo (ATD) y un análisis exploratorio a través de IRAMUTEQ. **Resultados:** Los resultados indicaron que, las personas seguían utilizando mascarillas, a pesar de estar levantadas las restricciones, para evitar contagios de la COVID-19 y de otras enfermedades respiratorias. Además, esta prevención de una posible infección y transmisión del virus es enfocada también a la propia familia y personas vulnerables. **Discusión:** Se concluye que, la práctica de usar mascarillas puede estar influenciada por las percepciones individuales del riesgo y las interpretaciones de responsabilidad y solidaridad frente a los demás.

Palabras clave: COVID-19; mascarilla; razones; riesgo.

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INTRODUCTION

Since the first months of the beginning of the COVID-19 pandemic, the World Health Organization (WHO) provided a set of recommendations to control and reduce the spread of the SARS-CoV-2 virus (1). Thus, following these recommendations, countries around the world restricted movement and social interactions in groups, and recommended social distancing, constant hand washing and the use of face masks (2). Regarding face masks, it has been indicated that their use reduces the amount of virus inhaled by the individual, which would decrease the transmission of SARS-CoV-2 and the resulting COVID-19 load (3,4). Simulation studies indicated that the presence of low percentages of people wearing masks would result in widespread COVID-19 infection in the absence of other strategies to mitigate disease (5). In Peru, a simulation study indicated that the implementation of preventive measures such as the use of masks, together with the use of alcohol and social distancing, generated a slower evolution of the pandemic (6). The same previous study concluded that the probability of becoming infected with COVID-19 reached 90% when an infected person and another susceptible person were not wearing a mask; the probability drops to 0.5% when both people wore a mask and a face shield, the use of only a mask makes the probability of contagion reach 1.5%; and finally, when the infected person wears a mask and another susceptible person does not, the probability reaches 5%.

However, the use of facemasks during the outbreak differed according to the time of the pandemic and the location (7). For example, the use of facemasks became ubiquitous in different Asian countries at the beginning of the pandemic (8); whereas, in the United States some authorities discouraged the purchase of facemasks for use by healthy persons and other states of the country left the use of facemasks to individual choice (9). Moreover, a study conducted in 38 countries indicated that the use of facemasks varied over time. Thus, a group of countries showed a higher and constant use of masks (more than 75 %) from April to October 2020 (this was the case of some Latin American countries such as Chile, Argentina and Colombia, etc.); other countries showed a relatively low use in April, but it increased and remained at high levels in Brazil, Portugal, Canada, etc.; whereas, a consistently low use (less than 25 %) was observed in European countries such as Denmark, Sweden and Norway (10). Another study, using a photoepidemiology method, indicated that the rate of facemask usage in closed environments, such as international airports, during the first months of the

pandemic was highest in Asia, followed by South America and very low in the USA (11). Thus, the use of face masks has been one of the most controversial and debated public health preventive behavior during the pandemic (12).

One of the main topics in debate is oriented towards mask usage after acquiring an adequate level of vaccination coverage against COVID-19. A recent study indicated that the mask use must be maintained even if optimal vaccination coverage was achieved and even if herd immunity levels were exceeded, because virus transmission does not stop when high levels of coverage are achieved; furthermore, the use of masks would prevent additional cases of COVID-19 (2). In Peru, a high proportion of fully immunized people against COVID-19 (84.76%) (13) has mitigated the severity of the disease. Thus, under the recommendation of experts, the Peruvian government issued Supreme Decree 118-2022-PCM, which indicated that the use of masks is optional in open spaces and ventilated enclosed spaces as of October 1, 2022. This decision was based on the decrease in cases, hospitalizations, and death in the weeks prior to the publication of the decree. Although many people stopped wearing masks as stipulated in the regulation, a group of people continued to wear them in open and in closed ventilated spaces.

The reasons for wearing or not a mask are diverse and can be personal, social, cultural, psychological and even economic. It has been suggested that not wearing of masks is related to physical discomfort, annoyance, interference in daily interactions and some beliefs (14, 15). Likewise, the presence of anti-mask and anti-vaccine attitudes, political ideologies and perceptions of their ineffectiveness are related to refusal to wear masks (16). On the other hand, greater trust in science and perceived greater efficacy of the mask to reduce contagion (15) and fear (17) are factors that favor mask-wearing behavior. From the fear-impulse theory (18), fear can generate changes, which decrease if the fear is excessive, since behaviors will focus on fear and not on facing the risk. On the other hand, the same situation or information does not have the same effect on all people, because some comply with the recommendations, others do not; while another group complies with the measures in a given place and time, but not in another.

From the health belief model (19), it is suggested that beliefs about disease threats and the effectiveness of measures can predict health behaviors. The latter is important, because if the reason for wearing masks was compliance with imposed norms, when the obligation disappeared, people would stop wearing

them. However, along with the norms, beliefs and habits have appeared, which would cause behavioral change to persist, even in the absence of external laws. As mentioned, this has been observed recently in Peru, where it was still common to find people walking in open places wearing masks, even though it was not mandatory to do so in outdoor environments. In view of this situation, the objective of the present study was to find out the reasons why people continued to wear masks despite the fact that it was not mandatory in outdoor environments. This would allow governments and public health institutions to have scientific information to make rational recommendations on the use of masks despite not being mandatory, after achieving an adequate level of vaccination coverage against COVID-19.

METHODS

Participants: A total of 335 people with an average age of 26.11 years (SD= 10.02), selected by non-probabilistic sampling, participated in the study.

Inclusion criteria were: 1) to be residents of Peru; 2) to be over 18 years of age; and 3) to give informed consent. Most participants were women (73.1%). In addition, most participants reported being single (83.3%) and having completed or incomplete university studies (67.2%). 98.5% indicated having been vaccinated against COVID-19 and 77.6% were vaccinated with their booster doses. 62.4% live with vulnerable people and 91.0% do not suffer from chronic diseases. Regarding the work environment, 29.9% indicated having a permanent job and 36.4% a temporary job. Regarding the use of masks, the majority (65.4%) continue to wear masks in open and closed places with ventilation, even though this was no longer obligatory at the time of the study. Finally, more than 50% of the participants (58.4%) indicated that they will stop wearing masks when the pandemic is totally eradicated. [Table 1](#) reports in more detail the sociodemographic and health characteristics of the sample.

TABLE 1: SOCIODEMOGRAPHIC AND HEALTH CHARACTERISTICS OF THE PARTICIPANTS (N=335).

Variables	n	%
Sex		
Feminine	245	73,1%
Masculine	89	26,6%
I prefer not to tell	1	0,3%
Marital Status		
Single	279	83,3%
Married	29	8,7%
Divorced	5	1,5%
Cohabitant	18	5,4%
Widow	4	1,2%
Education		
Complete High School	55	16,4%
Incomplete High School	10	3,0%
Complete Technical Studies	33	9,9%
Incomplete Technical Studies	12	3,6%
Complete Higher Education	82	27,5%
Incomplete Higher Education	133	39,7%
Has been vaccinated against COVID-19?		
Yes	330	98,5%
No	5	1,5%
Reinforcement dose		
Yes	260	77,6%
No	75	22,4%
Work		
Stable work	100	29,9%
Temporal work	122	36,4%
Unemployed	93	27,8%
Retired	20	6,0%
Lives with vulnerable people?		
Yes	209	62,4%
No	126	37,6%
Has a chronic disease?		
Yes	30	9,0%
No	305	91,0%
Type of living area		
Urban	289	86,3%

Rural	46	13,7%
Keeps using a mask		
Yes	219	65,4%
No	116	34,6%
Estimated mask usage time		
A few more days	6	2,7%
A few more weeks	18	8,2%
1 to 2 more months	29	13,2%
2 to 4 more months	20	9,1%
I Will stop wearing a mask when the pandemic is completely eradicated	128	58,4%
I Will never stop wearing a mask	18	8,2%

Instruments

A data collection form was prepared with two sections. In the first section, sociodemographic and health information on the participants was requested, such as age, sex, marital status, educational level, vaccination against COVID-19, booster vaccine dose, work, living with vulnerable people, diagnosis of chronic disease, type of area where they live, use of mask and estimated time of mask use. A second section included the following question: "Why do you continue to wear the mask even though it is optional in open and closed ventilated spaces?" and a space of four lines to write a response. Participants were invited to write their answer on these lines and were told that it would not be a problem if they did not complete all the lines.

Procedures and ethics

The study protocol was evaluated and approved by the Institutional Committee for the Protection of Human Subjects in Research (CIPSHI) of the University of Puerto Rico (No. 2223-006). Data was collected during October 3 and 10, 2022, through an online survey built in Google Forms that was distributed via social networks (Instagram, Twitter and Facebook) and email. In the online survey, the objective of the study, anonymity warrant, confidentiality, and consent were first presented. Participants were required to read and accept the informed consent before continuing to the other questions. There was no time limit for answering the survey; however, it lasted an average of 5 minutes.

Data Analysis

Data obtained from the last open-ended question of the instrument was analyzed using a Discursive Textual Analysis (DTA) and an exploratory analysis through IRAMUTEQ (Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires)

version 0.7 Alpha2 (20). This program speeds up the retrieval of text and word segments, identifying their association and enabling the grouping of statistically significant words based on their co-occurrence in the whole corpus (21). The analysis was conducted by the following steps. First, raw data was reviewed, corrected, and organized into a monothematic corpus of analysis. Each response was separated by a command line and related to four variables that were considered relevant for further classification: Sex, vaccination status, chronic disease and if the respondent lives with a vulnerable person (e.g. **** *sexo_F *Vac_SI *Vul_SI *Cron_No Es necesario protegerme a mí y a mi familia de un potencial contagio de esta u otra infección viral respiratoria.). This process was carried out by using LibreOffice Calc and LibreOffice Writer. The file was saved as a text document using UTF-8 standard encoding (Unicode Transformation Format 8 bit codeunits). The total number of text segments included in the analysis was 217. Next, a basic lexicography was applied to lemmatize the whole corpus and establish the word frequency. Then, a Similarity Analysis was carried out to find the relations between text segments throughout the whole corpus, since the Descending Hierarchical Classification (DHC) pilot trial resulted only in a retention of 61.75%, which is less than the 75% recommended by Camargo y Justo (22). So, the similarity analysis helped to further establish the connections between words based on their proximity and frequency in the corpus, helping researchers to articulate meaning based on visually presented connections. When carrying out the similarity analysis using the variables, no relevant differences were found between groups. So, a general similarity analysis was used to articulate the main motives that participants refer to have in relation to mask usage.

RESULTS

Exploratory Statistical Analysis

After the lemmatization, the analysis of the 217 text

segments resulted in a total of 108 active forms (adjectives, names, and verbs). The following table shows the first 33, with a frequency of ≥ 10 which show semantic relevance related to the monothematic corpus (Table 2).

TABLE 2: ACTIVE FORMS.

Form	Frequency	POS
Persona/person	42	Nom
Aún/yet	36	Adv
Máscara/mask	36	Nom
Seguir/continue	36	Ver
Ya/already	28	Adv
Covid	25	Nom
Usar/use	25	Ver
Contagiar/infect	23	Ver
Seguridad/security	20	Nom
Contagio/contagion	18	Nom
Sentir/feel	18	Ver
Prevenir/prevent	17	Ver
Virus	17	Nom
Vulnerable/vulnerable	17	Nom
Contagiarme/get infected	16	Ver
Cuidar/ take care	16	Ver
Enfermedad /sickness	16	Nom
Más /more	16	Adv
Precaución /precaution	16	Nom
Miedo /fear	14	Nom
Pandemia/ pandemic	14	Nom
Preferir /prefer	14	Ver
Prevención /prevention	14	Nom
Familia/ family	13	Nom
Temor /fear	13	Nom
Volver /come back	13	Ver
Costumbre /costum	12	Nom
Proteger /protect	12	Ver
Evitar /avoid	11	Ver
Mis /my	11	Nr
Querer /want	11	Ver
Salud /health	11	Nom
Lugar /place	10	Nom

Similarity Analysis

A similarity analysis was conducted with the whole list of active forms. Communities and Halo options were selected to represent the most related words. Figure 1 shows the similarity tree that organizes the active forms in three main branches which represent the reasons and motives for the continuation on the use of masks. The size of the words illustrates their frequency, while the thickness of the lines represents the strength of the relation based on proximity, as it is shown in Figure 1.

As a general finding, the center of the tree aggregates terms such as 'seguir'(continue), 'cuidándome' (take care of myself), 'contagios' (infections), which show the intention of continuing to wear a mask, even if the restrictions are lifted, to avoid contagion, not only of COVID-19, but of other respiratory diseases such as

tuberculosis and the Flu: "Debido a que es un gran recurso para evitar contagios no solo del Covid- 19, sino también de la gripe, por ejemplo" (Because it is a great resource to avoid contagion not only of COVID-19, but also the flu, for example).

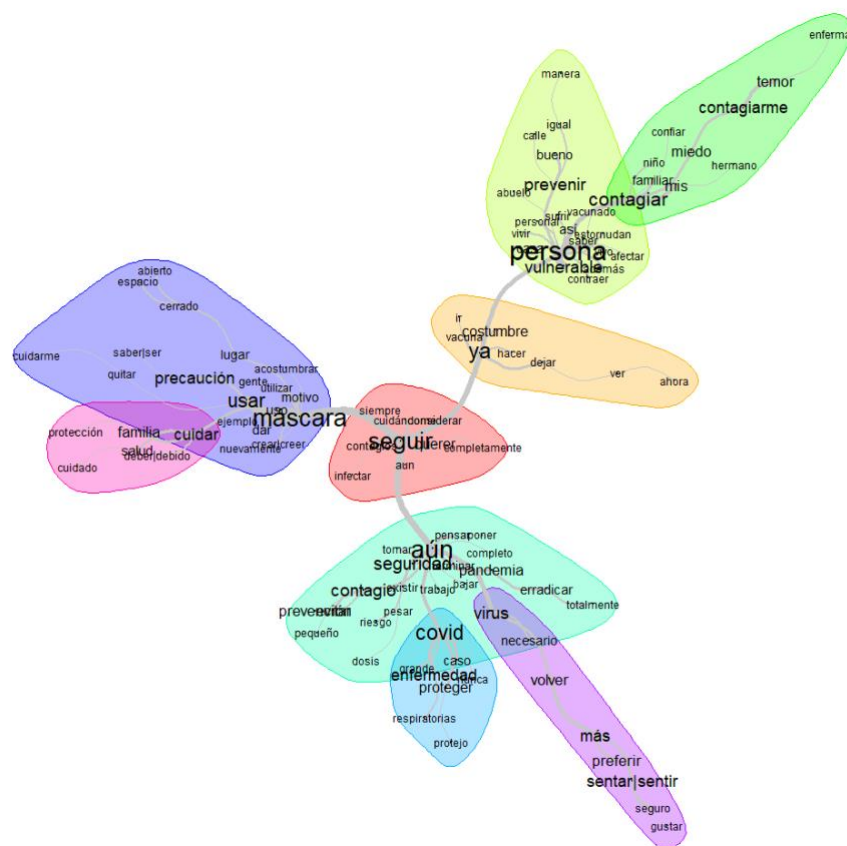
The two communities to the right of figure 1 relate terms such as 'máscara' (mask), 'precaución' (precaution) and 'cuidar' (take care). In a general sense, these communities specify the need to wear a mask as a precautionary measure in open and closed spaces. Also, it describes the need to take care of one's own family, preventing the infection of loved ones: "Porque prefiero seguir guardando cierta precaución y además porque aún no me hago costumbre a no usarla, debo volverme a adaptar más al hecho de ya no llevarla" (Because I still prefer to be cautious and also because I am not yet used to not wearing it, I have to get used to

the fact of not wearing it anymore).

The following three communities, orange, yellow and green represent, first, in close relation to the previous group of communities, the use of the mask is shown to be a custom integrated into the habits of the

participants. Nevertheless, yellow and green communities reveal a strong connection between the terms 'persona' (person), 'vulnerable' (vulnerable), 'prevenir' (prevent), 'contagiar' (infect), 'contagiarme' (get infected), 'miedo' (fear) and 'temor' (dread).

FIGURE 1: SIMILARITY ANALYSIS TREE



These terms illustrate a motive related to the prevention of both infecting vulnerable people (being children, older adults or family members) and being infected. Both possible situations generate emotions such as fear and dread towards infection with COVID-19: "Siento temor que en cualquier momento pueda contagiarme y contagiar a los míos" (I feel fear that in any moment I could get infected and infect my loved ones).

The next related communities, highlighted by light blue, light green and purple in the bottom of the tree, relate terms such as 'aún'(yet), 'seguridad' (security), 'contagio' (infection), 'covid', 'virus', 'enfermedad'. As a general finding, the center of the tree aggregates terms such as 'seguir'(continue), 'cuidándose' (take care of myself), 'contagios' (infections), which show the intention of continuing to wear a mask, even if the restrictions are lifted, to avoid contagion, not only of COVID-19, but of other respiratory diseases such as

(disease), 'prevención' (prevention). These further develops the general reason to wear a mask, specifying the psychological need of security in relation to the prevalence of the pandemic, which has not yet been completely eradicated. In this context, participants recognize the need to further prevent a possible infection and transmission of the virus: "porque considero que la enfermedad aún no está erradicada del todo, por precaución, mi salud y la de los demás prefiero seguir usando mascarilla" (Because I consider that the disease is not yet completely eradicated, for precaution, my health and the health of others I prefer to continue wearing a mask).

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The following three communities, orange, yellow and green represent, first, in close relation to the previous group of communities, the use of the mask is shown to be a custom integrated into the habits of the participants. Nevertheless, yellow and green communities reveal a strong connection between the terms 'persona' (person), 'vulnerable' (vulnerable), 'prevenir' (prevent), 'contagiar' (infect), 'contagiarme' (get infected), 'miedo' (fear) and 'temor' (dread). These terms illustrate a motive related to the prevention of both infecting vulnerable people (being children, older

adults or family members) and being infected. Both possible situations generate emotions such as fear and dread towards infection with COVID-19: "Siento temor que en cualquier momento pueda contagiarme y contagiar a los míos" (I feel fear that in any moment I could get infected and infect my loved ones).

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of care and respect towards others (28). Similarly, this could imply the presence of a collectivist variable, characterized by the perception of an interdependent self that cares about the needs of the group (29) as a predictor of mask use. It has previously been suggested that more collectivistic societies tend to wear facemasks more as a preventive measure to cope with the pandemic than members of more individualistic societies (30). As the presence of the collectivist variable was not assessed in this study, this remains a working hypothesis for future studies.

Similarly, the findings can be explained from the theory of planned behavior (TPB) (31), where the perception of the risk of contagion to oneself and others has a positive impact on prevention practices during epidemics. This would have generated a greater awareness of Peruvians about the severity of COVID-19, susceptibility, and mortality of the disease to develop positive beliefs about how masks would help overcome the pandemic (32). In this regard, a relevant variable, and one that is also present in the health belief model (EHBM) (33), is fear. This is clearly observed in the strong relationships found between the terms: person, vulnerable, prevent, infect, infect me, and fear. Fear has been one of the most important emotions during the COVID-19 pandemic, as it is an expected response to threatening situations (34). This fear generates coping responses that seek to manage threats and lead to adopting and maintaining preventive health behaviors (35).

DISCUSSION

The use of masks has been reported to be a protective barrier that reduced the risk of COVID-19 transmission among the population (23). As of October 1, it was no longer mandatory in Peru to wear masks in open spaces. Even so, after this regulation came into effect, people were observed walking in open spaces wearing masks. In view of this situation, the objective of the present study was to find out the reasons why people continued to wear masks even though it was not mandatory in outdoor environments.

A first and central finding indicated that people continued to wear masks, despite the lifting of restrictions, to avoid contagion, not only of COVID-19, but also of other respiratory diseases. In addition, the prevention of possible infection and transmission of the virus is also focused on family and vulnerable people. This agrees with the idea that people would wear masks to obtain a personal benefit by avoiding getting infected with the virus or to benefit others by not transmitting the virus (24). In this sense, although obtaining benefits for oneself is one of the strongest factors for the use of masks, the findings demonstrate that people are social beings who are willing and able to cooperate with others (25, 26). This could promote attitudes and behaviors related to the restriction of daily activities, such as not wearing masks when it is no longer mandatory, to protect risk groups from COVID-19 (27). Thus, the use of a mask would indicate a level

The findings have theoretical and practical implications. The results allow a better understanding of why some people wear masks in public even though it is not mandatory at the time of data collection. In addition, people wearing masks for personal benefit or to benefit others by not transmitting the virus suggests the presence of underlying unobservable cultural phenomena that may contribute to mask use. This could function as an argument for the design of policies related to the use or non-use of masks, which should consider pre-existing social norms and experiences related to their use (10).

Despite the important results, the study has several limitations. First, because the sample was selected through non-random sampling, there is the possibility of selection bias and problems in generalizing the findings, since the participants are not representative of the general population of Peru. The selection bias caused the sample of the current study to be mostly female, single and with university studies in progress or completed. Second, the use of an online survey meant that the response rate was likely to be comparatively lower in lower socioeconomic groups and those living in rural areas that do not have full access to the Internet. Third, the study was of a cross-sectional nature where data were collected in a single time period immediately after the Peruvian government indicated that mask use is optional in open spaces and ventilated enclosed spaces. However, it would be interesting to be able to conduct a longitudinal study where this behavior in Peruvian citizens could be followed up. Fourth, the use of self-report questions could generate the presence of social desirability. However, their use was important since the reasons for mask use are based on personal feelings and had to be further elaborated by participants.

In conclusion, people continued to wear masks, despite the lifting of restrictions, to prevent the spread of COVID-19 and other respiratory diseases. In addition, this prevention of possible infection and transmission of the virus is also focused on the family and vulnerable people. Therefore, it could be indicated that the practice of wearing masks may be influenced by individual perceptions of risk and interpretations of responsibility and solidarity towards others. It should be considered that the non-obligatory use of masks should be part of a safer preventive health approach. Despite the non-obligatory use of masks, public health messages should be addressed to people who decide to continue wearing them, such as the proper wearing of masks, the use of clear, simple, and evidence-based information on protection against the transmission of respiratory diseases and being transparent about the

benefits and precautions regarding mask usage. This will help Peruvians form more realistic expectations about the pros and cons of wearing or not wearing masks. In this way, more informed decisions could be made about preventive health practices. This is even more important because at the time of writing the manuscript (December 6, 2022), Peru was in the fifth wave of the COVID-19 pandemic.

AUTHOR'S CONTRIBUTIONS

TC-R: conceptualized, conducted the research, wrote the initial draft, and wrote and revised the final version. NO-K: designed the methodology and analyzed the data, wrote and reviewed the final version; CC-L, XLI-E, DEY-L and JT: data collection, critical review of the manuscript, managed the research activities, wrote and reviewed the final version. All authors assume responsibility for the article.

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