# Factors associated with the use of masks against COVID-19 among Piauí primary care users

## Fatores associados ao uso de máscaras contra COVID-19 entre usuários da atenção básica do Piauí

## Factores asociados al uso de mascarillas frente al COVID-19 en usuarios de atención primaria de Piauí

**RESUMO**

Objetivo: Identificar fatores relacionados ao uso de máscaras durante a pandemia de COVID-19. Método: Estudo quantitativo transversal incluindo 303 usuários entrevistados entre fevereiro e julho de 2021. Foram analisados: informações sociodemográficas, taxa de uso, universo informacional, percepção de susceptibilidade e severidade da doença e percepção do benefício da máscara. Realizou-se estatística descritiva e análise de regressão. Resultados: Usar máscara foi a informação mais recebida (95,7%); a medida mais implementada, (93,7%); e o método mais importante (53,3%) segundo os usuários. A televisão foi o principal veículo informativo, porém o agente de saúde foi a fonte mais segura. A maioria classificou a doença como severa e mostrou-se indecisa sobre o potencial protetivo da máscara. Maior nível de renda e escolaridade foram preditores de maior confiança na medida. Conclusão: Os usuários adotaram máscaras em larga escala,porém o senso de proteção foi baixo. Tais achados poderão subsidiar estratégias de comunicação em pandemias futuras.

**DESCRITORES:** COVID-19; Ações preventivas contra doenças; Equipamentos de proteção individual; Modelo de crenças de saúde (Health BeliefModel).

**ABSTRACT**

Objective: To identify factors related to the use of masks during the COVID-19 pandemic. Method: Cross-sectional quantitative study including 303 users interviewed between February and July 2021. Sociodemographic information, usage rate, information universe, perception of susceptibility and severity of the disease and perception of the benefit of the mask were analyzed. Descriptive statistics and regression analysis were performed. Results: Wearing a mask was the most received information (95.7%); the most implemented measure (93.7%); and the most important method (53.3%) according to users. Television was the main information vehicle, but the health agent was the safest source. Most classified the disease as severe and were indecisive about the protective potential of the mask. Higher level of income and education were predictors of greater confidence in the measure. Conclusion: Users adopted masks on a large scale, but the sense of protection was low. Such findings may support communication strategies in future pandemics.

**DESCRIPTORS:** COVID-19; Preventive actions against diseases; Equipments for individual safety; Health Belief Model.

**RESUMEN**

Objetivo: Identificar factores relacionados con el uso de mascarillas durante la pandemia de COVID-19. Método: Estudio cuantitativo transversal que incluyó a 303 usuarios entrevistados entre febrero y julio de 2021. Se analizaron: información sociodemográfica, tasa de uso, universo de información, percepción de susceptibilidad y gravedad de la enfermedad y percepción del beneficio de la mascarilla. Se realizaron estadísticas descriptivas y análisis de regresión. Resultados: El uso de mascarilla fue la información más recibida (95,7%); la medida más implementada (93,7%); y el método más importante (53,3%) según los usuarios. La televisión fue el principal vehículo de información, pero el agente de salud fue la fuente más segura. La mayoría clasificó la enfermedad como grave y se mostró indeciso sobre el potencial protector de la máscara. Mayor nivel de ingreso y educación fueron predictores de mayor confianza en la medida. Conclusión: Los usuarios adoptaron mascarillas en gran escala, pero la sensación de protección fue baja. Dichos hallazgos pueden respaldar las estrategias de comunicación en futuras pandemias.

**DESCRIPTORES:** COVID-19; Acciones preventivas contra enfermedades; Equipos para la seguridad individual; Modelo de creencias sobre la salud.

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**Ademir Aragão Moura**
Neurologist at the University Hospital of the Federal University of Piauí (HU-UFPI). Preceptor of the multiprofessional residency in Clinical Neurology at HU-UFPI. Master's student in Family Health at the PROFSAUDE-UFPI program.
ORCID: 0000-0001-8886-6447

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**João Maria Correa Filho**
Médico Psiquiatra. Doutor em ciências. Professor adjunto do curso de Medicina da Universidade Federal do Delta do Parnaíba– PI. Professor do curso de Mestrado em saúde da família – PROFSAUDE – UFPI.
ORCID: 0000-0001-9688-0177

## INTRODUÇÃO

The pandemic caused by the new coronavirus is considered the most serious threat to global public health since the first pandemic of the H1N1 influenza virus, in 1918. Initially, in the absence of a vaccine for the new coronavirus that would lead to the containment of the disease, several countries adopted non-pharmacological intervention measures in order to mitigate the transmission of the virus, reducing the levels of contact in the population, highlighting: hand hygiene, social distancing and wearing a mask. [1]

As the pandemic progressed, the expanded use of masks in public environments began to be discussed as an additional protective measure, based on the experience accumulated by other countries in previous epidemics. The debate was strengthened due to the role of asymptomatic and oligosymptomatic individuals in the spread of the disease, given the evidence that COVID-19 had a long incubation period and the understanding that there was a high viral load in the early stages of the disease. On June 5, 2020, the WHO released guidelines for the use and manufacture of fabric masks as protection against COVID-19, and then began to recommend their use in places where there is widespread transmission of the disease. [2]

Such a recommendation needs to find support in the population to become a really effective measure in the fight against the virus. It is known that people's adherence to preventive measures depends, among other factors, on the consistency of information provided by public authorities, on the population's trust in public and health authorities, and on the population's knowledge about the disease. Understanding the determinants by which people can show relative resistance to protective measures against the spread of the virus is, therefore, of great importance so that public policies can have the desired effectiveness, avoiding or reducing non-adherence to the proposed social controls. [3]

Among the models that seek to explain the factors associated with changing health habits is the "Health Belief Model". This is a psychological model of health behavior change developed by Rosenstock in 1966 to predict behavioral response to treatment received by chronically and acutely ill patients. It consists of 4 main components: perception of susceptibility, perception of severity, perception of barriers and perception of benefits of adopting a new health behavior. [4]

Applying the model to viral diseases of respiratory transmission, the perception of susceptibility is related to the perception of being prone to contracting the disease. It is believed to be the main motivating force for adherence to the use of masks: the greater the sensation of susceptibility, the greater the adherence to the measure. Perceived benefits refer to how effectively masks are believed to be effective in preventing the spread of disease. A positive correlation has been observed between perceived benefits and the likelihood of an individual wearing masks. The perception of severity is linked to the fear of serious illness and death or even fear of damage to the economy or collective well-being. [4]

Faced with scientific disagreements about the effectiveness of using a mask to contain the COVID-19 pandemic, the guiding question of this study is: how does this translate into the imagination of the user of primary care, with regard to the credibility given to its use, the perception of efficacy and the effective use of this protection measure? The following are also objectives of this study: to identify individual sociodemographic factors related to the use of masks and the credibility attributed to this measure; evaluate the informational universe of users regarding access to information on the use of masks.

## METHOD

This study is part of a national multicenter study entitled "Prevention and control of COVID-19: Multicenter study on the perception and practices in daily life of medical-scientific guidelines by the population of territories covered by Primary Health Care", conducted by FIOCRUZ and the professional master's programs in family health - PROFSAUDE- in several cities in Brazil in 2021.

The design of this arm of the research was quantitative, observational and cross-sectional. Questionnaires answered in the state of Piauí, in person, in the following cities were analyzed: Teresina, Batalha, Floriano, Canto do Buriti and Pimenteiras. The cities chosen were the work fields of the PROFSAUDE master's students in Piauí who participated in the research, covering capital and cities in the interior of the state. The instrument was applied during the period from February to July 2021.

The sample was for convenience through the inclusion of families of registered users who had attended the UBS in the 90 days preceding the survey. Users who had not attended the UBS in the last 90 days and the indigenous population were excluded. 70 individuals were selected per health unit. Of the 350 questionnaires answered in the state of Piauí, questionnaires with incomplete completion were discarded, totaling 303 questionnaires for analysis. The instrument was calibrated with 10 interviews, which were discarded from the analysis.

The ethical recommendations of Resolution 466, of October 10, 2012 were


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followed, with authorizations being requested from the interviewees through a Free and Informed Consent Form, after approval of the project by the Research Ethics Committee by Plataforma Brasil under number 4.444.329 and CAAE: 37269320.4.2016.5214.

Descriptive statistics were calculated: mean, standard deviation for quantitative variables; and absolute and relative frequencies for qualitative variables. In the inferential analysis, to evaluate the predictors of the dependent variable reliability in the use of a mask, the Poisson Regression model was used, with the robust estimator of the covariance matrix. Values were expressed as robust Prevalence Ratio (PR), confidence intervals. (CI 95%) and the significance of the Wald Chi-square test. Data were analyzed using IBM StatisticalPackage for the Social Sciences version 20.0. The significance level adopted was $p \leq 0.05$.

## RESULTS

There was a predominance of: females, 260 (85.8%), aged between 18 and 40 years, 174 (57.4%), mean age of 38.7 years, self-reported ethnicity as brown, 169 (55.8%), individuals with a partner, 177 (58.4%), with a high school level, 109 (36%), 1 to 3 inhabitants sharing the household with the user, 170 (56.1%) and monthly household income of up to 1 minimum wage, 183 (60.4%).

As for the informational universe of users regarding COVID -19, the use of a mask when leaving home was the most received information, 289 (95.7%). The most used means of communication as an information source was television, 216 (71.5%), however, among the cited sources of information, the most reliable according to users is found in health professionals in the territory, 164 (54.3%). Social media accounted for the lowest reliability rates: Instagram, 12 (4%), Whatsapp, 8 (2.6%), Facebook 7 (2.3%) – TABLE 1.

Among the prevention and control measures, the use of a mask was the most effectively implemented measure among users, 283 (93.7%), being listed as the most important by 161 users (53.3%), followed by total social isolation, 89 (29.5%) and frequent hand washing, 82 (27.2%) - GRAPH 01.

It was observed that most users were undecided about the possibility of being contaminated - most reporting a reasonably high possibility of contamination, 112 (36.9%). Similarly, most users were undecided as to the protective capacity conferred by preventive measures - most

TABLE 01. Informational universe and reliability attributed to information about coronavirus received by primary care users during the covid-19 pandemic, Piauí-BR, 2022.

| Variables | n | % |
|---|---|---|
| **What information did you receive regarding the CORONAVIRUS?*** | | |
| Wearing a mask when leaving home | 289 | 95,7 |
| Use of alcohol gel | 284 | 94,0 |
| Frequent hand washing | 269 | 89,1 |
| Total social isolation | 192 | 63,6 |
| Partial isolation | 172 | 57,0 |
| Others | 12 | 4,0 |
| **How do you get information about the CORONAVIRUS?*** | | |
| TV | 216 | 71,5 |
| Newspapers on TV and/or on the internet | 196 | 64,9 |
| Health professionals in the territory | 161 | 53,3 |
| WhatsApp | 106 | 35,1 |
| Friends/neighbors/relatives/community | 93 | 30,8 |
| Instagram | 91 | 30,1 |
| Facebook | 86 | 28,5 |
| Radio | 53 | 17,5 |
| Rulers | 49 | 16,2 |
| Religion | 40 | 13,2 |
| **Which of these cited sources do you trust the most?*** | | |
| Health professionals in the territory | 164 | 54,3 |
| Newspapers on TV and/or on the internet | 130 | 43,0 |
| TV | 115 | 38,1 |
| Rulers | 24 | 7,9 |
| Friends/neighbors/relatives/community | 22 | 7,3 |
| Religion | 20 | 6,6 |
| Radio | 17 | 5,6 |
| Instagram | 12 | 4,0 |
| WhatsApp | 8 | 2,6 |
| Facebook | 7 | 2,3 |

*multiple variable (the sum of the percentage exceeds 100%)
Source: author's data

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reporting being reasonably confident with the measures, 134 (44.2%) - GRAPHS 02 and 03. On the other hand, there was a majority consensus among users (298) that the disease caused by Sars-cov2 is serious or very serious, representing 98% of respondents.

Regression analysis was performed to look for an association between demographic variables and confidence in the use of masks. Individuals who responded that they were "very confident" or "confident" regarding the protection afforded by preventive measures were classified as confident according to the Likert scale, while those who answered that they were "reasonably confident", "little" or "not at all confident" were classified as "not confident".

With regard to the independent variables related to confidence in the use of a mask, a 1.29 greater chance among people with a higher education level to trust their use compared to people with no schooling ($p<0.001$) and 1.13 higher among those earning up to 3 or more minimum wages compared to those earning less than 1 minimum wage ($p<0.001$) – TABLE 02.

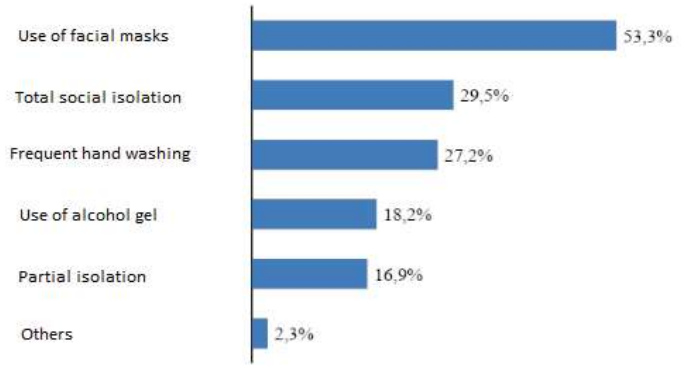
## DISCUSSION

The COVID-19 pandemic is the second pandemic of the 21st century after the H1N1 pandemic in 2009. Much of the literature on the use of mass preventive measures in pandemics including mask wearing comes from Asian countries. [5] This study sought to evaluate the factors associated with the use of a mask against COVID-19 in a population in a northeastern Brazilian state, including users' perceptions of its effectiveness.

As for the sociodemographic profile, it is considered that it reflects the profile of primary care users in Piauí and was made up of users, mostly female, with no higher education level, with a monthly income of up to 1 minimum wage. The number of users sought to include individuals from the interior of the state and the capital, from urban and rural areas, allowing information on both groups to be obtained.

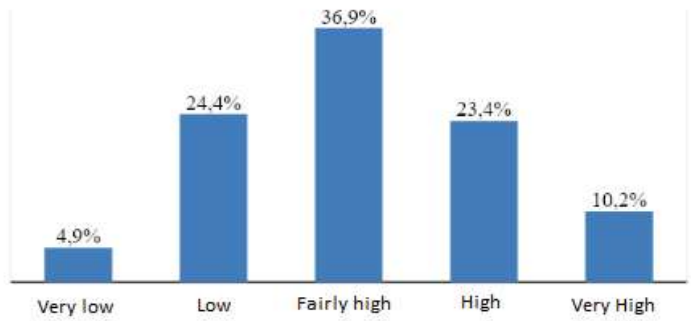
With regard to the informational uni-

GRAPH 01- Actions considered the most important for the prevention of coronavirus contamination among primary care users during the covid-19 pandemic, piauí-br, 2022.



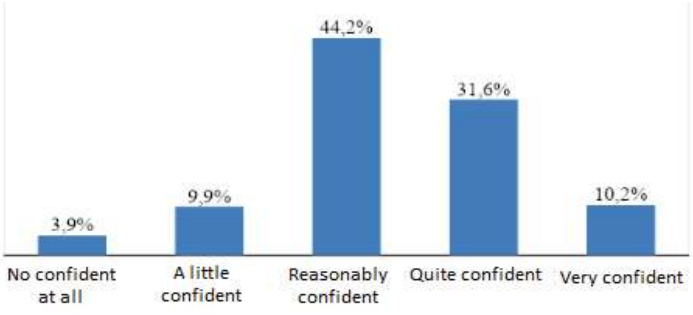

Source: author's data

Graph 02. Possibility of contamination by the coronavirus among primary care users during the COVID-19 pandemic, Piauí-br, 2022.




Source: author's data

Graph 03. Level of confidence in the prevention measures adopted by primary care users during the COVID-19 pandemic, Piauí-BR, 2022.




Source: author's data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verse, it was observed that the means of communication that most affected users was TV, but the most reliable source was the community health agent (CHA). Social media came in last place for reliability.

Despite the changes imposed by the pandemic, compromising the transit between the different territories covered by the family health teams and even making face-to-face meetings between team members and users difficult, this study pointed out the health agent as the greatest source of credibility for the information received. This is possibly due to the capillarity that the ACS has in the territories, recognizing the demands and peculiarities of the area under its responsibility, with bond building, which in turn generates credibility. [6]

On the other hand, the social media ecosystem, where relevant information is arranged side by side with others whose accuracy is not relevant, may be related to the low search for veracity of the information in these vehicles and, therefore, to the low credibility of the information coming from them. [7]

Political polarization has greatly contributed to the emergence and perpetuation of false news – fake news. Studies place Brazil among the five countries in the world with the highest circulation of rumors, conspiracy theories and stigma, alongside the USA, China, Spain and Indonesia. [13] Political polarization entails attitudinal and affective polarization among people. Individuals tend to take extreme and opposite attitudes at the same time, so negative feelings and distrust are more easily disseminated in relation to the practitioner of the opposite action. This can cause segments of the population to reach different conclusions about the same threat and take different actions, generally shared in private groups, where only the thoughts of that group echo without openness to contradictions. [11]

Even though it is a new habit, it was observed that the use of the mask found strong support among primary care users in Piauí. State data regarding mask use are also similar to those surveyed in Paraíba,

TABLE 02. Confidence in the use of masks against coronavirus according to the sociodemographic profile of primary care users during the COVID-19 pandemic, Piauí-BR, 2022.

| Variables | Confidence in mask wearing | | PR (CI95%) | p-value |
|---|---|---|---|---|
| | Yes n (%) | No n (%) | | |
| City | | | | |
| Batalha | 56 (75,7) | 18 (24,3) | 1,00 (0,92 - 1,09) | 0,254 |
| Canto do Buriti | 52 (75,4) | 17 (24,6) | 1 | |
| Floriano | 58 (86,6) | 9 (13,4) | 1,06 (0,99 - 1,14) | |
| Pimenteiras | 19 (90,5) | 2 (9,5) | 1,09 (0,99 - 1,87) | |
| Teresina | 55 (76,4) | 17 (23,6) | 1,01 (0,93 - 1,09) | |
| Gender | | | | |
| Female | 210 (80,8) | 50 (19,2) | 1,07 (0,98 - 1,16) | 0,149 |
| Male | 30 (69,8) | 13 (30,2) | 1 | |
| Age | | | | |
| 18 to 40 years | 144 (82,8) | 30 (17,2) | 1,11 (0,99 - 1,25) | 0,134 |
| 41 to 60 years | 80 (76,9) | 24 (23,1) | 1,08 (0,95 - 1,22) | |
| More than 60 years | 16 (64,0) | 9 (36,0) | 1 | |
| Self-reported Color/race/ethnicity | | | | |
| White | 42 (73,7) | 15 (26,3) | 1 | 0,137 |
| Black | 57 (74,0) | 20 (26,0) | 1,00 (0,92 - 1,09) | |
| Brown | 141 (83,4) | 28 (16,6) | 1,06 (0,98 - 1,14) | |
| Marital status | | | | |
| With partner | 138 (78,0) | 39 (22,0) | 1 | 0,523 |
| Without partner | 102 (81,0) | 24 (19,0) | 1,02 (0,97 - 1,07) | |
| Educational level | | | | |
| Illiterate | 8 (50,0) | 8 (50,0) | 1 | <0,001 |
| Elementary school | 72 (71,3) | 29 (28,7) | 1,14 (0,96 - 1,35) | |
| High School | 88 (80,7) | 21 (19,3) | 1,21 (1,02 - 1,43) | |
| Higher education | 72 (93,5) | 5 (6,5) | 1,29 (1,09 - 1,52) | |
| How many people do they live with? | | | | |
| 0 | 4 (66,7) | 2 (33,3) | 1 | 0,257 |
| 1 to 3 | 130 (76,5) | 40 (23,5) | 1,06 (0,84 - 1,33) | |
| More than 3 | 106 (83,5) | 21 (16,5) | 1,10 (0,87 - 1,38) | |
| Household monthly income | | | | |
| Up to 1 MI | 134 (73,2) | 49 (26,8) | 1 | <0,001 |
| Up to 2 MI | 59 (83,1) | 12 (16,9) | 1,06 (0,99 - 1,12) | |
| Up to 3 MI | 24 (96,0) | 1 (4,0) | 1,13 (1,07 - 1,19) | |
| More than 3 MI | 23 (95,8) | 1 (4,2) | 1,13 (1,07 - 1,20) | |

MI = Monthly income; PR = Prevalence Ratio; CI95% = 95% Confidence Interval; p-value = Wald's Chi-square.
Source: author's data

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another state in the northeast region of Brazil, where it was found that most respondents (61.1%) reported always wearing masks in public environments. [5]

Although there is no consensus on the subject, the universal use of a mask was voluntarily adopted by the community in Asia, like Hong Kong in China, even before the WHO took a position in favor of universal masking. This massive action may be related to cultural aspects and painful experiences in the past, such as the SARS outbreak in 2003. The paradigm shift occurred after the confirmation of contamination by pre-symptomatic and asymptomatic individuals. [8]

The fact that most users considered the disease COVID-19 a serious illness (98.0%) may be one of the factors implicated in the high adoption rates of mask use in Piauí. It is known that the perception of threat is one of the pillars of the health belief model, a model that proposes to explain the motivators for changing habits and behaviors in health. Threat perception refers to personal beliefs about the probability of contracting a certain disease. It includes two subcomponents: perception of vulnerability, which is the extent to which an individual feels vulnerable to a given illness, and perception of severity, which refers to beliefs about how serious the consequences of that illness can be. The model assumes that the stronger the personal beliefs in the severity of an illness and the greater the perceived susceptibility, the more strongly the individual will be motivated to avoid it. [9]

According to Clarka, perception of vulnerability, perception of severity and belief in the government were variables of lesser importance in decision-making in favor of protective measures [9] Sim, et al [4] exploring past pandemics found that the perception of susceptibility was the biggest motivator. It is also necessary to consider that other factors that go beyond the model of health beliefs can explain the movements towards a new action, among them the "action inducers" proposed by Tang, et al. [10]

The family, society, the media and the government play an important role in acting as inducers of behavior change in society to take preventive measures. Among these main inducers is the social norm: what the individual perceives that other people are doing and the approval or disapproval involved in these acts. Behind the norm is a desire to learn from another person, gain group affiliation, or peer approval. Social groups may be able to amplify both beneficial and harmful behaviors, and research further suggests that most health interventions do not come from the direct effect on the person receiving the intervention, but from indirect effects on their social contacts who seek to copy this behavior. [11]

Does the high adoption rate of masks imply that the user is confident in their protective effectiveness? The data from this study showed that no. Most users were undecided about the possibility of being contaminated and about the real protective capacity conferred by the measure. The constant change of information and regulations; the uncertainties of a new disease and disagreements between regulatory bodies may have contributed to undermining user confidence.

Finally, the regression analysis showed an association between income and education with the importance given to masks: higher educational levels and higher income are more related to their use. There was also a trend towards greater reliability in preventive measures among the elderly and male individuals, unlike the literature that points to a predominance of pro-mask behavior among female individuals. [4]

Younger individuals tend to engage less in preventive measures. A study conducted in China pointed out that such individuals reported less preventive behaviors, less intention to do them and were less likely to make changes in behavior. In the pandemic context, this may be related to rumors that older individuals are the only ones to get sick from COVID-19. The fact is that adult individuals and people with comorbidities are at greater risk of acquiring the disease, but anyone can become ill. Fake news and disinformation may have contributed to the dissemination of erroneous news in this regard. [12]

This study has limitations. Barriers related to mask use (economic, aesthetics, respiratory discomfort, etc) as well as the motivators listed by the user of this measure (social norm? Health issues? Presence of comorbidities?) can be explored more deeply in the future by qualitative design.

It is also important to know which individual factors lead to the discontinuation of mask use when normative decrees release individuals from their use on public roads according to local realities.

## CONCLUSION

Mask wearing plays a central role in preventing and controlling the transmission of viral respiratory infectious diseases. Adherence to its use can be modulated by multiple factors, whether demographic, individual or environmental.

Despite disagreements between scientists, government officials and directors of public health agencies in Brazil regarding the use of masks on public roads, primary care users have largely adopted this measure and considered it an important preventive measure against Sars-cov-2. It was observed, however, that the sense of protection given by them was low, negatively modulating the perception of susceptibility to the virus.

Demographic factors (higher income and education level) were predictors of greater confidence in the use of the mask and the health agent was the most credible vehicle of information regarding COVID-19, reiterating its central role in primary health care, even in the face of social distancing measures.

Health campaigns aimed at encouraging users to adopt preventive measures in future pandemics, considering the urgency due in periods of health crisis, will have to take into account the factors related to their use and reliability attributed to them, in order to deliver messages more directed to target audiences, in order to obtain better results.


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