Analysis of preventive behaviours related to covid-19 among colombian people[1]

Análisis de los comportamientos preventivos relacionados con el covid-19 entre los colombianos

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Artículos

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Abstract

This study aims to analyse the role of preventive behaviour in response to the perception of risk in controlling the COVID-19 pandemic. Method: A multiple correspondence analysis was conducted using data collected from the *PSY-Covid 2019* survey, which included a sample of 914 Colombian residents aged between 16 and 79 years *(*M = *32.3*, *SD = 12.4*; *women = 76.4%)*, all with a university education *(96.6%)*, from urban areas *(92.5*%), and from a middle-income background *(63.8%)*. Results: The data were grouped into seven variables: vulnerability to coronavirus, mental health, subjective social norm, barriers to/facilitators of preventive behaviours, self-efficacy, expectation of results, and intention of post-confinement preventive behaviours. The findings indicate that the variables contributing most to the first dimension, which explains preventive behaviour, are expectation of results, intention of post-confinement preventive behaviours, and self-efficacy. Regarding the

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subjective social norm variable, although it contributes most to the second dimension, it is not associated with the previously mentioned variables. It is recommended that studies be conducted in populations with varying educational levels and cultural characteristics.

Keywords: COVID-19, mental health, public health, risk behaviour, psychological impact.

Resumen

Este estudio tiene como objetivo analizar el papel de la conducta preventiva de las personas ante la percepción de riesgo en el control de la pandemia COVID-19. Método: Se realizó un análisis de correspondencias múltiples a partir de los datos recolectados en la encuesta PSY-Covid 2019, utilizando una muestra conformada por 914 residentes colombianos, con edades entre 16 y 79 años ($\bar{x}$ = 32,3, DE =12,4, mujeres = 76,4%), con nivel de formación universitario (96,6 %), procedente de zonas urbanas (92,5 %) y nivel de ingresos medio (63,8 %). Resultados: Los datos se agruparon en siete variables: vulnerabilidad al coronavirus, salud mental, norma social subjetiva, barreras/facilitadores de conductas preventivas, autoeficacia, expectativa de resultados e intención de conductas preventivas post-confinamiento. Los hallazgos muestran que las variables que más contribuyen a la primera dimensión y que permiten explicar la conducta preventiva son: expectativa de resultados, intención de conductas preventivas post-confinamiento y autoeficacia. En cuanto a la variable norma social subjetiva, si bien es la que más aporta a la segunda dimensión, no se asocia con las variables mencionadas anteriormente. Se recomienda que los estudios se realicen en poblaciones con diferentes niveles educativos y características culturales.

Palabras clave: COVID-19, salud mental, salud pública, conductas de riesgo, impacto psicológico.

Introduction

According to the Pan-American Health Organization (2020), the COVID-19 pandemic poses a serious threat to the physical and mental health of individuals, as well as to the well-being of societies as a whole, which have been significantly affected by the crisis caused by this disease. An interesting fact is that, despite not being a fulminant disease, it propagated very quickly worldwide due to various factors related to the non-adoption of preventive behaviours, such as a low perception of risk that can be attributed to false optimism (Urzúa et al., 2020).

Cabanillas-Rojas (2020) states that, except for vaccines and antiviral treatments, the primary methods for managing the spread of epidemics are based on behaviour changes. For this reason, protective behaviours play an important role in reducing transmission and involve voluntary personal choices, emotions, and various types of perceptions. Additionally, it has been found that similar endemic situations have necessitated physical distancing (Baum et al., 2009; Greer, 2013; Uscher-Pines et al., 2020) and social isolation as protective measures (Rashid et al., 2015) when there was insufficient evidence regarding behaviour and its relationship with prevention, adherence to treatment, confrontation, and the advancement of multiple diseases, for which greater relevance is given to the so-called health models.

For their part, Vera-Villarroel et al. (2015) claim that diverse psychological models, such as those of health beliefs, the transtheoretical model, locus of control, self-efficacy, and reasoned action, attempt to explain how health behaviours are acquired and maintained. Additionally, it has been concluded that the mechanisms by which behaviours are acquired, maintained, and

eliminated are primarily related to learning; therefore, the behaviours involved in the processes of health and disease respond to these mechanisms. Thus, transitioning from a condition of absence of illness to being ill, as well as the success or failure of treatment, will be determined by the beliefs, emotions, and behaviours of the individual in preserving their health or putting it at risk (Urzúa et al., 2020).

Among the most studied models are the Health Belief Model (Rosenstock, 2005), the Reasoned Action Model (Fishbein y Ajzen, 1975), and the Theory of Planned Behaviour (Ajzen, 1991), which highlight the importance of aspects related to attitudes, beliefs, perceived control, and social norms in predicting healthy behaviour. While these models cover important factors, encompassing the complexity of preventive behaviours during the current pandemic may extend beyond these frameworks. Factors such as trust in authorities (Bish y Michie, 2010; Chuang et al., 2015), personality characteristics (Carvalho et al., 2020; Zettler et al., 2020), and sociodemographic variables (de Zwart et al., 2010) also provide empirical evidence to help understand preventive behaviours in this and other pandemics.

Likewise, reference to the importance of the line of investigation linked to the perception of risk has been made, indicating its influence on health behaviours (Brewer et al., 2007). This suggests that a greater perception of risk correlates with a higher probability of mask use and avoidance of crowded places (Lau et al., 2004). Specifically, regarding the risk of COVID-19 infection, the following has been found: a greater propensity to wash hands, practise social distancing (Wise et al., 2020), and adopt preventive behaviours (Dryhurst et al., 2020). Nevertheless, it is important to clarify that this perception of risk has been considered insufficient to promote protective behaviours; it is necessary for individuals to evaluate these behaviours as effective against the virus (response efficacy) and to consider themselves capable of carrying them out effectively (self-efficacy).

As far as preventive behaviours are concerned, Grembowski et al. (1993) found that individuals with perceived high self-efficacy have a greater probability of initiating preventive care, seeking early treatments, and being more optimistic about the efficacy of these procedures. In contrast, Zwart et al. (2010) demonstrated that low self-efficacy may lead to a decrease in motivation to engage in health behaviours. Particularly in relation to the propagation of COVID-19, Bogg and Milad (2020) indicate that those who have greater self-efficacy in overcoming obstacles related to adhering to specific behaviour guidelines are more likely to report compliance with governmental directives aimed at its reduction. In this same vein, the barriers and facilitators to adherence to preventive behaviours have been discussed, along with the emphasis on the importance of controlling variables related to ambiguous, unclear, or limited information, as well as the time demands that certain behaviours entail (Houghton et al., 2020).

Another factor to consider is the invulnerability bias, which occurs when people inadequately predict that their results will be more favourable than those of others. This bias contributes to their perception that becoming infected with the COVID-19 virus is improbable. Consequently, being less concerned about the infection increases the chances of contracting it, a bias that may arise from errors in estimating personal or others' outcomes (Shepperd et al., 2015). In this same vein, Skinner (1996) suggests that, although the perception of control has been regarded as a good predictor of physical and mental well-being, it does not necessarily produce

solely positive effects. Furthermore, it can be associated with an increase in stress levels, depression, and even denial (Shapiro et al., 1996).

In this way, the role of behaviour in understanding and controlling recent pandemics is demonstrated. It is proposed that, to engage in any protective behaviour, each individual must comprehend what actions need to be taken, under what precise circumstances, how to execute these actions, and the importance of such behaviours. Additionally, this implies the creation of scenarios for social support through norms and social rules in which protective behaviours are positively valued and become habitual (West et al., 2020). These aspects are considered high priority for the design of any intervention aimed at changing conduct.

Previous findings have reported a direct relationship between social norms, the use of masks (Tang y Wong, 2004), and vaccination behaviours (Oraby et al., 2014). Specifically, regarding COVID-19, the relationship between social norms and the fulfilment of protective behaviours has become evident. In line with this, Goldberg et al. (2020) found that the social norms perceived among family and friends are associated with preventive behaviours and, consequently, an increased probability of engaging in such behaviours. Considering the importance of learning in the acquisition and development of preventive behaviours, it is essential to recognise the high probability of infection and, therefore, the necessity of being aware of isolation measures and the treatment of associated symptoms. It is vital to acknowledge that success will be largely determined by beliefs (cognition), emotions (predispositions to action), and behaviours related to risk and health protection.

Cabrera et al. (2001) propose that beliefs related to health and disease are strongly rooted in the cultural environment and are described as antecedents of behaviour towards health care. They become relevant based on the value that each person places on their health, influenced by social labels and stereotypes about diseases (Ehrenzweig, 2007).

To determine which psychological factors are likely related to the adoption of preventive behaviours during this pandemic, it is necessary to examine the behaviour of more general factors associated with health behaviours, as well as to recognise the importance of analysing protective variables such as resilience as a protective factor against manifestations of anxiety, depression, and stress (Rand et al., 2020; Palomera-Chávez et al., 2021; Morales et al., 2023). This study aims to understand the adoption of preventive behaviours during the pandemic by analysing the possible relationships between variables such as self-efficacy (SE), expectation of results (EoR), intention of post-confinement preventive behaviours (IppB), subjective social norm, vulnerability to coronavirus, barriers to/facilitators of preventive behaviours, and mental health, based on the demographic data of the population under study and their relationship with the empirical evidence. It is expected that these findings will serve as input for strategic proposals that contribute to strengthening preventive measures and enhancing the perception of control through personal commitment for the benefit of both the individual and the community.

Method

Participants

The sample comprised 914 Colombian individuals aged between 16 and 79 years *(*M = *32.3, SD = 12.4),* predominantly female *(76.4%),* primarily between 16 and 35 years of age *(65.5%),* with a university education level *(96.6%),* middle-income *(63.8%),* and residing in urban areas *(92.5%).*

Measures of evaluation

PSY-Covid Survey-2019 - Colombia. This survey was conducted by the *Universidad Autónoma de Barcelona* (UAB) in collaboration with ASCOFAPSI. The psychological effects of the pandemic on the Colombian population were evaluated through the analysis of 115 variables that measure dimensions associated with mental health and public health. Previously published scales were employed to assess aspects such as anxiety, depression, and personality, while a number of questions were created based on the World Health Organization protocols for the control and prevention of COVID-19. Additionally, a subclassification of the variables to be studied was conducted, considering that there is no information available to verify the validity of the collected data; a procedure that is elaborated upon in the data analysis section.

The aforementioned subclassification was conducted as follows: a) Self-efficacy: the degree to which individuals felt they could carry out various preventive behaviours to avoid infection with COVID-19; b) Expectation of results: attitudes in favour of different preventive behaviours associated with hygiene and social distancing; c) Intention of post-confinement prevention behaviours: the degree of adherence to each preventive behaviour once confinement is over; d) Subjective social norm: the perceived degree to which the participants' immediate environment adopted and valued the different preventive behaviours; e) Vulnerability to coronavirus: the perceived probability of the severity of a COVID-19 infection for the individual and their immediate surroundings; f) Barriers to/facilitators of preventive behaviours: the perceived level of access to various resources associated with the prevention of COVID-19; g) Mental health: symptoms of depression, anxiety, loneliness, and somatisation, measured using the Patient Health Questionnaire (PHQ-2, Löwe et al., 2010), the Generalised Anxiety Disorder (GAD-2, Löwe et al., 2010), the UCLA Loneliness Scale (UCLS, Hays y DiMatteo, 1987), and the Symptom Checklist-90 (Zijlema et al., 2013).

Procedure

This study was derived from research conducted in different countries, which involved the organisation of various groupings followed by the recruitment of participants through a link shared via mass emails directed to universities. The information was compiled between 21 May and 11 June 2020. Once the information was compiled, the next step was to analyse the data obtained, specifically from Colombian individuals residing in the country, in accordance with the sociodemographic data of the participants. Subsequently, the study variables were analysed to identify possible relationships between each of the groups. Those that did not prove to be statistically significant were discarded; finally, the degree of correspondence between them was reviewed.

Data analysis

Taking into account the characteristics of the population under study, a sociodemographic analysis was conducted to identify the greater prevalence. Subsequently, the reliability of the data

from the survey was verified. The database used for this study included 92 items grouped into 18 constructs and 10 individual items, which encompassed variables from different psychological models on health, such as self-efficacy, expectation of results, subjective social norm, intention of post-confinement preventive behaviours, and vulnerability to coronavirus, as well as variables related to mental health, particularly anxiety, depression, and personality.

From the collected data, the aim was to confirm the factors proposed as a predetermined combination of elements through an analysis of internal consistency. This approach was taken because there are no other criteria for verifying the validity of the remaining data. It was decided to discard the analysis of those groupings that do not meet the minimum thresholds of internal consistency ($r > .60$ for groupings with two items and $\alpha > .60$ for groupings of more than two items).

Once the groupings were analysed, the relationships of the remaining variables with the three variables of interest were explored: self-efficacy levels, expectations of results, and intentions regarding post-confinement preventive behaviours. To that end, the scores of these three constructs were divided into levels: high, medium, and low; these levels were used as criteria, and the differences between the high and low levels and the levels of the other variables were verified. In order to process the data from the COVID-19 survey, a multiple correspondence analysis (MCA) was used as an exploratory technique, with the objective of compressing a large amount of data into a reduced number of dimensions (Husson et al., 2017).

Ethical Considerations

It is reported that the data processing of the PSY-Covid-2019-Colombia Survey complied with the stipulations of Law 1090 of 2006 and the ethical regulations of the Universidad Nacional de Colombia. In particular, it is clarified that the research respected the confidentiality of the information analysed.

Results

Mean Difference Analysis

Concerning the analysis of the grouped variables, out of the eighteen proposals, seven were initially maintained, as they demonstrated a minimally acceptable internal consistency, allowing them to be regarded as reliable indicators. The results of internal consistency are shown in Table 1, along with the number of items in the groupings considered.

Considering that one of the aims of the investigation was to explore variables associated with levels of self-efficacy, expectations of results, and intentions regarding post-confinement preventive behaviours, and once the reliability of the indicators had been analysed, the participants were divided according to these three behaviours in accordance with the following levels: high, medium, and low, based on the percentile of the standardised responses for each individual. Furthermore, the high and low groups were compared to demonstrate their differences.

Table 1 presents the test results of the mean difference test, including the level of significance and the effect size. It is emphasised that when analysing the magnitude of the difference between the groups with higher and lower levels in the three variables of interest (self-efficacy, expectation of results, and intention of post-confinement preventive behaviours), the effect size is large *(absolute value of* Cohen's *d between 0.88 and 1.28*). In contrast, for the other

variables (vulnerability to coronavirus, mental health, subjective social norm, and barriers to/facilitators of preventive behaviours), the effect size was, at most, moderate *(absolute value of* Cohen's *d between 0.05 and 0.57).*

Table 1

Internal consistency tests, number of items and means difference tests between the superior and inferior groups

			Significance (Cohen's d)		
Variables	α*	# Items	SE	EoR	IppB
Vulnerability to coronavirus	0.91	2	0.43 (-0.06)	0.46 (0.05)	0.16 (0.11)
Mental health	0.86	10	0.22 (0.15)	0.32 (0.07)	0.84 (-0.01)
Subjective social norm	0.80	7	0.00 (-0.46)	0.00 (-0.45)	0.00 (-0.44)
Barriers to/facilitators of preventive behaviours	0.78	5	0.00 (0.36)	0.00 (0.53)	0.00 (0.57)
Self-efficacy (SE)	0.72	7		0.00 (-0.88)	0.00 (-1.13)
Expectation of results (EoR)	0.83	7	0.00 (-1.08)		0.00 (-1.28)
Intention of post-confinement preventive behaviours (IppB)	0.83	7	0.00 (-1.2)	0.00 (-1.09)	

Note: In the three cases, the difference is between the smaller level group deducted from the one of a greater level, in the variable criteria.

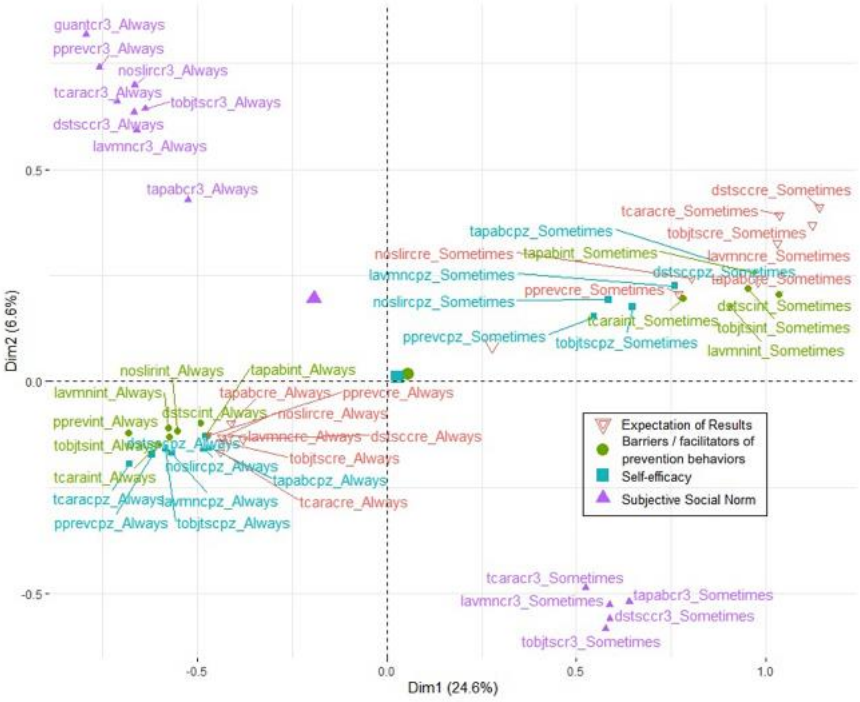
* Since vulnerability to coronavirus consists of two items, the internal consistency test was carried out with Pearson correlation.

Multiple Correspondence Analysis

Taking into consideration that this study was conducted with categorical variables, the use of multiple correspondence analysis (MCA) was chosen to reduce a large amount of data to a few dimensions that represent the relationship between the rows and columns of the contingency table (Figure 1).

Figure 1

Multiple correspondence analysis between variables and dimensions



The descriptive analysis of the frequency distribution of the categories showed that the majority of the responses (over *90%)* were divided into the categories “Sometimes” and “Always," whereas for the MCA, the categories “Not very often” and “Never” merged with the category “Sometimes."

The first factorial plane accounts for 31% of the variance in the data, with the variables that contribute most to the first dimension being the *expectation of results*, *intention of post-confinement preventive behaviours*, and *self-efficacy*. Consequently, it is possible to indicate that there is a strong association between the responses to the aforementioned variables.

With respect to the subjective social norm variable, although it contributes the most to the second dimension, it is not associated with the previously mentioned variables. Therefore, it is possible to affirm that the set of projected variables has a quality of representation (measured in cosine squared) greater than 0.3 in the factorial plane. Thus, they are established as the most informative aspects of the study.

Discussion

Health Psychology has sought to understand the processes of behavioural change through various theoretical models that consider both individual and psychosocial perspectives, facilitating changes in attitudes, behaviours, and habits (Alvarez, 2010). In this context, the present study analysed the association among seven variables out of the eighteen included in the database provided by the *Universidad Autónoma de Barcelona* and ASCOFAPSI.

Taking into account that the data used in the present study were collected at the beginning of the COVID-19 outbreak, when many aspects related to its prevention and management were still unknown, various variables were included to explain the adoption or non-adoption of protective measures. Likewise, comparisons were made with studies such as those by Attema et al. (2021), who refer to the need to obtain and analyse individual beliefs over time in a pandemic context, in which the spread of COVID-19 is highly attributable to individual risk behaviours.

For his part, Barry (2009) attributes significant value to effective communication, supported by expertise regarding strict health guidelines from health authorities concerning risks, treatments, and prevention as the best tool to enforce health behaviour. Faced with the restrictive measures proposed by various governments, the need to identify the reasons that lead to the adoption of prevention or risk behaviours against contagion arises, taking into account that the initial measures were largely supported by the need to prepare for the imminent health crisis and its social and economic impact.

At this point, it becomes relevant to analyse the possible associations between individual and psychosocial variables that may be related to protective behaviours. For the present study, this association was identified among the variables of self-efficacy, expectation of results, and intention regarding post-confinement preventive behaviours. This relationship may be linked to the perception of having the tools to adequately face a situation and a greater expectation regarding the results; that is, the intention to engage in protective behaviours (Grembowski et al., 1993; de Zwart et al., 2010; Bogg y Milad, 2020; Houghton et al., 2020) and the absence of restrictive measures.

In this regard, Ning et al. (2021) reported that the behavioural responses of the Chinese public to COVID-19 are similar to those of previous outbreaks of infectious diseases and that, for the most part, the protective measures are associated with a high degree of knowledge, perception of severity, presence of negative emotions, and confidence in the official government media, which is undoubtedly directly related to the perception of self-efficacy. Given these findings, it is important to analyse the approaches of Buitrago et al. (2020) and Uribe et al. (2020), who refer to the fact that most empirical studies on risk perception focus on thoughts (cognitions) about health risks. These authors point out that there have been few studies on the perception of the risk of pandemics, despite the importance of subjective perception in understanding the psychological impact and behaviour of citizens.

When independently analysing the groups of variables included in this study regarding the self-efficacy associated with health behaviours, it can be affirmed, in line with Grembowski et al. (1993), that as long as the subject considers that they have the resources to face the demands of the environment, the probability of initiating preventive care will be greater, leading to a pursuit of early treatments and a more optimistic outlook on their efficacy, as well as a greater capacity to confront the obstacles that may arise when adopting healthy behaviours (Lin et al., 2016). However, it is important to consider what was stated by Ballester et al. (2009), who argue that despite a high perception of self-efficacy, a greater intention and execution of the behaviour may be expressed. In many cases, the presence of external barriers or limitations can also influence the intention to perform such behaviours and, therefore, affect the expectations of the outcome. This

last aspect could partly explain the absence of internal consistency between self-efficacy and the variables of barriers and facilitators.

As for the variable expectation of results, and following Bandura (1995), it can be indicated that it derives from self-efficacy; therefore, the relationship between these two variables could be explained. In this regard, Fanghella et al. (2020) report that people prepared for the environmental consequences of COVID-19 have more pessimistic expectations about the future compared to those who are prepared for the economic benefits. Similarly, Ritchie et al. (2021) show that during the pandemic, there has been a significant drop in people's expectations. In the case of the present research, most of the participants (two-thirds of the sample) believe that they will not be able to carry out the previously defined objective, which is supported by the degree of uncertainty created by the increase in infections and resulting deaths.

Specifically regarding academic performance, Alemany-Arrebola et al. (2020) found that expectations of academic results decrease due to the stress produced by confinement, the pandemic, and the illness or death of a family member or acquaintance. For their part, Alzahrani and Panwar (2021) discovered that pre-pandemic experiences and social influences negatively impacted students' expectations of outcomes. Additionally, Aucejo et al. (2020) found that university students' expectations of future economic income have also been affected.

Regarding the variable post-confinement preventive behaviours, a positive relationship has been found between risk perception and health protection behaviours over time, as a result of an increase in reported healthy behaviours compared to pre-pandemic studies (Schneider et al., 2021). This could indicate that an added value, particularly amid the uncertainty generated by the current pandemic situation, was government decision-making based on the experiences of other countries, which were evaluated, in principle, as positive. Additionally, there was a perception of having one's own resources to face adversities, and scenarios of social support were created in response to protective behaviours (West et al., 2020), even in the absence of information regarding the prediction of pandemic behaviour.

When analysing the subjective social norm variable, it is identified as the most influential in the second plane of the dimension of the MCA; however, it is not associated with the variables of self-efficacy, expectation of results, and intention regarding post-confinement preventive behaviours. This aspect can be related to elements of its own definition, as it is likely to become a protective factor at certain times (Tang y Wong, 2004; Oraby et al., 2014; Goldberg et al., 2020) and not necessarily at others, due to the possible contradictions regarding certain behaviours and the uncertainty arising from its clinical and social management.

Taking into account that the data were collected at the beginning of the confinement period, it is proposed that new post-confinement research be conducted to identify the presence or absence of behaviours acquired during this period. These behaviours are to be expected, as they have become health habits, even in the absence of government regulations, and can be analysed in light of data on the prevalence of morbidity and mortality, economic problems, and associated comorbidities.

Finally, within the limitations of this study, it is noteworthy that the data were collected from a population predominantly consisting of women *(76%)*, aged between 16 and 25 years (42%) and 26 and 35 years *(23%)*, with a university education level *(96%)*, a middle income *(63.8%)*, and residing in urban areas *(92%)*. These aspects underscore the need to conduct studies in other populations where different types of behaviours may be present, as educational level contributes to better protective behaviour or a higher perceived vulnerability to becoming ill (Girma et al., 2020; World Health Organization, 2020). Additionally, it is essential to consider the cultural environment, as it plays a crucial role in shaping beliefs related to health and disease (Cabrera et al., 2001; Ehrenzweig, 2007). Finally, as stated by Rodríguez et al. (2022), it is important to continue exploring variables such as age and its relationship with risk perception as predictors of prevention behaviours.

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